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Errata

Title & Document Type: 5372A Service Manual

Manual Part Number: 05372-90016

Revision Date: April 1990

HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

About this Manual

We've added this manual to the Agilent website in an effort to help you support your product. This manual provides the best information we could find. It may be incomplete or contain dated information, and the scan quality may not be ideal. If we find a better copy in the future, we will add it to the Agilent website.

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MANUAL UPDATING CHANGES **CHANGE DATE:** January 13, 1993

MANUAL UPDATING COVERAGE	MANUAL IDENTIFICATION
This supplement adapts your manual to instruments with Serial Numbers prefixed through 3248 and Firmware revision 2947	**Instrument:** HP 5372A Frequency & Time Interval Analyzer Service Manual **Manual Part Number:** 05372-90016 **Manual Print Date:** APRIL 1990

ABOUT THIS SUPPLEMENT

The information in this supplement is provided to correct manual errors and to adapt the manual to instruments containing changes after the manual print date.

Change and correction information in this supplement is itemized by page numbers corresponding to the original manual pages. The pages in this supplement are organized in numerical order by manual page number.

HOW TO USE THIS SUPPLEMENT

Insert this title page in front of the title page in your manual.

Perform all changes specified for "All Serials", and all changes through the Series Prefix of your instrument or board.

Insert any complete replacement pages provided into your manual in the proper location. The following pages are included in this update packet: 1-5, 1-15, 1-19, 2-63/4-5/4-11, 4-17/4-21, 4-25/4-28, A3

If your manual has been updated according to the last edition of this supplement, you need only perform those changes pertaining to the new series prefix; see List of Effective Pages. New information affecting "All Serials" will be indicated by a "#" in front of the change.

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LIST OF EFFECTIVE PAGES

SERIAL PREFIX, SERIAL # OR DATE CODE	PAGES
All Serials	1-5/1-6, 1-19, 2-63, 4-5/4-9, 4-26, 8-11, A-3
2952A00276 & above	4-10/4-12, 8-9, 8-11
2952A00446 & above	1-15, 1-19, 1-34, 4-26, 11-11 The following Series 2952A instruments also include changes indicated for Series 3045A: 2952A00551, 2952A00561, 2952A00553, 2952A00562, 2952A00555
3041A	3-28/3-30, 4-10/4-12, 4-17/4-21, 8-9, 8-11, 10-21, 10-25, 10-27 The following Series 3041A instruments also include changes indicated for Series 3045A: 3041A00568, 3041A00603, 3041A00576, 3041A00616, 3041A00583, 3041A00618, 3041A00599
3041A00581 & above	4-2
A2 (05372-60002) Date Code 90423	4-5/4-9, 7-23, 7-29
3045A A5 (05372-60005) Date Code 90452 A6 (05372-60006) Date Code 90454	4-17/4-21, 10-21, 10-23
3141A	4-10/4-12, 8-9, 8-11
3301A	4-26/4-28

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGES 4-26/4-28, TABLE 4-2. MISCELLANEOUS HARDWARE AND CHASSIS PARTS:

All Serials	>Change A16 POWER MODULE CABLE from 51083-60108 to 05371-60231. >Change p/n 2950-0035 to 0590-1251 NUT SPECLY 15/32-32-THD .1-IN-THK .562 WD.
2952A00446	>Replace page 4-26 with page 4-26 (Series 2952A00446 and above) supplied in & above these manual changes.
3301A	>Replace pages 4-26/4-28 with Series 3248A Chassis parts list supplied in these manual changes.

PAGE 7-23, FIGURE 7-10. A2 INPUT AMPLIFIER BOARD COMPONENT LOCATOR:

3041A	A2 (05372-60002) Date Code 90423. >Delete R203, below U15. >Delete R219 and R220 on far right side near L1/L201.

PAGE 7-29, FIGURE 7-11. A2 INPUT AMPLIFIER BOARD SCHEMATIC DIAGRAM:

3041A	A2 (05372-60002) Date Code 90423. >Replace Randomizer portion of the schematic diagram with the diagram on the following page.

PAGE 8-9, FIGURE 8-3. A3 TIME BOARD, COMPONENT LOCATOR:

2952A00276	>AC termination consisting of C100, R100 have been added to the circuit side of A3U14 Pin 17.
3041A	>Change R31 to C131. >Delete R32. >Delete TP2.
3141A	>A3C100 and R100 have been moved from the circuit side of the board to the component side between U14 and U15.

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 1-34. FIGURE 1-11. REAR PANEL FEATURES:

2952A00446 >Change "4.0 A" to "4.0 AT" in Fuse information.

PAGES 3-28/3-30. ADJUSTMENT PROCEDURES:

3041A >Delete A3 and A5 ZDT Bias Adjustment procedures, paragraphs 3-25 thru 3-27.
>Delete VCS Bias Adjustment procedures, paragraph 3-28.

PAGE 4-2. REPLACEABLE PARTS:

3041A00581 4.3 SPECIAL PARTS REPLACEMENT CONSIDERATIONS:
>Change A9 HP part number from 05372-60009 to 05371-60009.

PAGES 4-5/4-9, TABLE 4-2. A2 INPUT AMPLIFIER REPLACEABLE PARTS:

All Serials >Change A2H4 from 0380-1731 to 3050-1387 WASHER-SHLDR N0. 2 .09-IN-ID.
>Change A2H7 from 0515-0406 SCREW-MACH M3 X 0.5 8MM-LG PAN-HD POZI.

3041A A2 (05372-60002) DATE CODE 90423
>Replace A2 Replaceable Parts list with Date Code 90423 parts list supplied in these manual changes.

PAGES 4-10/4-12. TABLE 4-2. A3 TIME BOARD REPLACEABLE PARTS:

2952A00276 >Add C100, 0160-4810, CAPACITOR-FXD 330PF +-5% 100V CER COG.
>Add R100, 0699-1542, RESISTOR-FXD 51 +-1% .125 TF TC=0+-50.
>Add TP100, 1251-5177, CONNECTOR-SGL CONT PIN .031-IN-BSC-SZ.
>Add XU14, 1200-0825, SOCKET-IC DIP-20-CONT DIP-SLDR.

3041A >Replace A3 Replaceable Parts List with Date Code 90402 parts list supplied in these manual changes.

3141A >Change A3C100 from 0160-4810 (330pf) to 0160-4031 CAPACITOR-FXD 331PF +-5% 100V CER COG.
>Delete TP100.
>Delete XU14.

PAGES 4-17/4-21. TABLE 4-2. A5 EVENT BOARD REPLACEABLE PARTS:

3041A >Replace A5 Replaceable Parts List with Date Code 90404 parts list supplied in these manual changes.

3045A >Replace A5 Replaceable Parts List with Date Code 90452 parts list supplied in these manual changes.

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HP 5372A PERFORMANCE TEST RECORD (Page 3 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Recommended Instrument	Test		Results Minimum	Actual	Maximum
	CHANNEL A AND B TESTS (Continued)				
3325A	1 KHz 2 Vp-p –1 V Offset	PkAmp Chan A Max. Min.	 –400 mV –2.4 V	 _____ _____	 +400 mV –1.6 V
		PkAmp Chan B Max. Min.	 –400 mV –2.4 V	 _____ _____	 +400 mV –1.6 V
8663A	200 MHz 71 mVrms (200 mVp-p) 0 V Offset	PkAmp Chan A Max. Min.	 +60 mV –140 mV	 _____ _____	 +140 mV –60 mV
		PkAmp Chan B Max. Min.	 +60 mV –140 mV	 _____ _____	 +140 mV –60 mV
8663A	200 MHz 10 dBm (2 Vp-p) 0 V Offset	PkAmp Chan A Max. Min.	 +600 mV –1.4 V	 _____ _____	 +1.4 V –600 mV
		PkAmp Chan B Max. Min.	 +600 mV –1.4 V	 _____ _____	 +1.4 V –600 mV
	Sensitivity/ Minimum Pulse Width (optional)				
8131A	1.0 ns Pulse 100.0 ns Period 45 mVp-p 0 V Offset	±TI Chan A	700 ps	_____	1.3 ns
8131A	1.5 ns Pulse 100.0 ns Period 45 mVp-p 0 V Offset	±TI Chan A	1.2 ns	_____	1.8 ns

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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HP 5372A PERFORMANCE TEST RECORD (Page 4 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Recommended Instrument	Test		Results Minimum	Actual	Maximum
	EXTERNAL ARM TESTS*				
	Frequency Range/ Dynamic Range				
3325A	1 Hz 140 mVp-p 0 V Offset	Gate Time	993.000 000 0 ms	_____	1.007 000 000 0 s
3325A	1 Hz 5 Vp-p 0 V Offset (Square Wave)	Gate Time	993.000 000 0 ms	_____	1.007 000 000 0 s
8663A	100 MHz 50 mVrms (140 mVp-p) 0 V Offset	Gate Time	99.8 ns	_____	100.2 ns
	Signal Operating Range				
3325A	10 MHz 5 Vp-p 2.5 V Offset	Gate Time	199.8 ns	_____	200.2 ns
3325A	10 MHz 5 Vp-p –2.5 V Offset	Gate Time	199.8 ns	_____	200.2 ns
	Trigger Accuracy				
3325A	Variable Offset	Ext Arm		Max. Trigger Level _____ Min. Trigger Level _____	
		Ext Arm Trigger Level Accuracy†	–20 mV	_____	+20 mV
	Sensitivity/Minimum Pulse Width				
8161A	5.0 ns Pulse 200.0 ns Period 140 mVp-p 0 V Offset (Square Wave)	Gate Time	199.8 ns	_____	200.2 ns

* A 50Ω feedthrough termination must be connected to the External Arm input.

† TRIGGER LEVEL ACCURACY = $\left\{\frac{\text{MAX. TRIGGER LEVEL} + \text{MIN. TRIGGER LEVEL}}{2}\right\} 100\text{mV}$

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9045[illegible])		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2	05372-60002	3	1	INPUT AMPLIFIER BOARD (DATE CODE 90423)	28480	05372-60002
A2C1	0180-2207	5	2	CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C2	0160-0576	5	23	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C3	0180-0098	8	2	CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C7	0180-0098	8		CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C8	0160-4371	6	4	CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C9	0160-3879	7	6	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C10	0180-3847	1	4	CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C11	0160-4040	6	2	CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C12	0180-3941	6	2	CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C16	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C18	0160-3728	5	4	CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C19	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C22	0180-3775	4	4	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C23	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C24	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C31	0160-4040	6		CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C32	0180-3941	6		CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C34	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C36	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C37	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C41	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C42	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C44	0160-3875	3	2	CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C45	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C46	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C47	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C48	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A2C49	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C51	0160-3875	3		CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C201	0160-4557	0	7	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C202	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C203	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C204	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C205	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C206	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C207	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C208	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C209	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C210	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C211	0160-4801	7	2	CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V
A2C212	0160-4791	4	2	CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C213	0160-4791	4		CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C214	0160-4801	7		CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90452)		
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R85				NOT ASSIGNED		
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R90				NOT ASSIGNED		
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2C215	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C216	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2CR1	1902-0959	3	2	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR2	1902-0956	0	2	DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR3	1902-0953	7	2	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR4	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR5	1902-0945	7	4	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR6	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR8	1902-0959	3		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR9	1902-0953	7		DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR10	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR13	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR14	1902-0956	0		DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR201	1902-0943	5	2	DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR202	1902-0943	5		DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR205	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2H1	0515-0659	8	16	SCREW-MACHINE ASSEMBLY M2 X 0.4 8MM-LG	00000	ORDER BY DESCRIPTION
A2H2	05371-20201	9	4	HEATSINK	28480	05371-20201
A2H3	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A2H4	0380-1731	2	16	SPACER-PRESS-IN 1.70 MM LG; 2.38 MM ID	46384	YC3-4564
A2H5	3050-0891	7	1	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A2H6	0535-0004	9	1	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
A2H7	0515-0897		1	SCREW-MACH M3 X 0.5 8M-LG PAN-HD POZI	00000	ORDER BY DESCRIPTION
A2J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J2	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2J3	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2K1	0490-1554	0	8	RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K2	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K3	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K4	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K5	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K6	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K7	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K8	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2L1	9140-1170	4	10	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L3	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L4	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L5	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L6	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L7	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L8	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L9	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L201	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2MP1	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	9021
A2MP2	54100-29101	2	4	SPRING-HYBRID	28480	54100-29101
A2MP3	54100-29104	5	4	CLAMP-HYBRID	28480	54100-29104
A2P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A2P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A2P3	1250-2052	8	1	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A2Q1	1853-0314	9	4	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q2	1854-0090	0	4	TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q3	1854-0686	0	5	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q4	1854-0092	2	4	TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q5	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90452)		
A5P11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5P12				NOT ASSIGNED		
A5P13				NOT ASSIGNED		
A5P14				NOT ASSIGNED		
A5R15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5P17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178P-F
A5P18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22				NOT ASSIGNED		
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	10	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38				NOT ASSIGNED		
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2263	2	1	RESISTOR 100 +-1% .125W TF TC=0+-50	28480	0699-2263
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q7	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q9	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q10	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q11	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q12	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q13	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q14	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q15	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q16	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q201	1854-0215	1	2	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q202	1854-0215	1		TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q203	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2R1	2100-3749	6	2	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R2	2100-0545	4	2	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R3	2100-3749	6		RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R4	2100-0545	4		RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R5	0698-3446	3	4	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R6	0698-7196	8	3	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R7	0698-3613	6	4	RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R8	0698-7212	9	8	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R9	0698-7254	9	4	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R10	2100-3750	9	4	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R11	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R12	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R13	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R14	2100-3759	8	2	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R15	2100-3759	8		RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R16	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R17	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R18	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R19	0699-1320	0	4	RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R20	0699-2358	6	2	RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R21	0699-2263	2	2	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R22	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R23	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R24	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R25	0699-2245	0	2	RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R26	0699-1542	8	19	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R27	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R28	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R29	0698-7234	5	2	RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R30	0698-7256	1	3	RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R31	0698-7232	3	2	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R32	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R33	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R34	0698-7262	9	2	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R38	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R39	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R40	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R41	0698-7236	7	6	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R42	0699-1769	1	2	RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R43	0698-7220	9	7	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R44	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R45	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R46	0698-7260	7	12	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R47	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R48	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R49	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9045B)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	9	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R51	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R52	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R53	0699-2358	6		RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R54	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R55	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R56	0698-7234	5		RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R57	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R58	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R59	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R60	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R61	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R62	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R63	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R66	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R67	0699-2245	0		RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R68	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R69	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R70	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R71	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R74	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R75	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R76	0698-7262	9		RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R77	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R78	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R79	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R80	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R81	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R82	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R83	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R84	0698-7257	2	2	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A2R85	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R86	0698-6360	6	2	RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R87	0698-7237	8	3	RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R88	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R89	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R90	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R91	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R92	0699-1768	1		RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R93	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R94	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R95	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R96	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R98	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R99	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R100	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R102	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A2R103	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R104	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R105	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R107	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R108	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R109	0698-7235	6	1	RESISTOR 909 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-909R-F
A2R110	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R111	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R112	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R113	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A2R114	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R115	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R116	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R117	0698-7257	2		RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD (DATE CODE 9045Z)	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R118	0698-6360	6		RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R202	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R203				NOT ASSIGNED		
A2R204	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R205	0698-7240	3	1	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R206	0698-7238	9	1	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R207	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R208	0757-0441	8	2	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R209	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R210	0699-1991	1	1	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A2R211	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R212	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R213	1810-0203	5	1	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A2R214	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A2R215	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R216	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R217	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R218	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R219				NOT ASSIGNED		
A2R220				NOT ASSIGNED		
A2R221	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A2U1	0955-0404	3	2	U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U2	1NB7-8076	3	2	DCOFFSET HYBRID	28480	1NB7-8076
A2U3	1826-0275	4	2	IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U4	1NB7-8109	3	2	SYNC COMP HYBRID	28480	1NB7-8109
A2U5	1820-2000	5	2	IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A2U6	1826-0311	9	2	IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U7	1826-0609	8	2	ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U8	1826-1049	2	2	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U9	1826-0282	3	2	IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U10	1826-0285	6	2	IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U11	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A2U12	1820-3394	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS09N
A2U13	0955-0404	3		U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U14	1NB7-8076	3		DCOFFSET HYBRID	28480	1NB7-8076
A2U15	1NB7-8109	3		SYNC COMP HYBRID	28480	1NB7-8109
A2U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U17	1826-0275	4		IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U18	1826-0311	9		IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U19	1826-0635	0	2	IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U20	1826-1246	1	2	D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U21	1826-0609	8		ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U22	1826-1049	2		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U23	1826-0285	6		IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U24	1826-0282	3		IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U25	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A2U26	1820-2273	4	1	IC-INTERFACE DRVR PERIPHERAL GENERAL	56289	UDN-2981A
A2U27	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U28	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2U29	1826-0635	0		IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U30	1826-1246	1		D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U201	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL 2-INP	04713	MC10H105P
A2U202	1820-2956	0	1	IC GATE ECL/10KH EXCL-OR/NOR TPL 2-INP	04713	MC10H107P
A2U203	1820-3579	5	2	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U204	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U205	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A2U206	1826-0521	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072CP
A2U207	1826-1204	1	1	D/A 8-BIT 20-PLASTIC CMOS	24355	AD7528JN
	0340-0864	6	1	INSULATOR-XSTR THRM-CNDCT	18565	69-11-A536-1671
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				MISCELLANEOUS HARDWARE AND CHASSIS PARTS (SERIAL NUMBER 2952A00446 AND ABOVE)		
A1	05372-60001	8	1	BD AY-TB CONTROL	28480	05372-60001
A2	05372-60002	9	1	BD AY-INPUT AMP	28480	05372-60002
A3	05372-60003	0	1	BD AY-TIME	28480	05372-60003
A4	05372-60004	1	1	BD AY-INTERP	28480	05372-60004
A5	05372-60005	2	1	BD AY-EVENT	28480	05372-60005
A6	05372-60006	3	1	BD AY-CNT SPRT	28480	05372-60006
A7	05372-60007	4	1	BD AY-PROCESSOR	28480	05372-60007
A7U16	05372-80032	3	1	EPROM-80032	28480	05372-80032
A7U17	05372-83033	4	1	EPROM-80033	28480	05372-80003
A7U18	05372-80034	5	1	EPROM-80034	28480	05372-80034
A7U19	05372-83035	6	1	EPROM-80035	28480	05372-80005
A7U52	05372-80036	7	1	EPROM-80036	28480	05372-80036
A7U53	05372-80037	8	1	EPROM-80037	28480	05372-80037
A7U54	05372-80038	9	1	EPROM-80038	28480	05372-80038
A7U55	05372-80039	0	1	EPROM-80039	28480	05372-80039
A8	05372-60008	5	1	BD AY-IO CONTROL	28480	05372-60008
A9	05372-60009	6	1	BD AY-DOUBLE REG	28480	05372-60009
A10	51089-60015	1	1	BD AY TRIPLE REG	28480	51089-60015
A11	05371-60011	3	1	BD AY-FRONT PNL	28480	05371-60011
A12	05372-60012	1	1	BD AY-MOTHER	28480	05372-60012
A13	05372-60013	6	1	BD AY-REAR PANEL	28480	05372-60013
A14	05371-60014	6	1	BD AY-TB MULT	28480	05371-60014
A15	10811-60111	8	1	QUARTZ OSC 10MHZ	28480	10811-60111
A16	05371-60231	9	1	CBL AY-PWR MOD	28480	05371-60231
A17	2090-0209	4	1	CRT ASSY-7" W/PCB	28480	2090-0209
A20	05372-60020	1	1	BD AY-C CHAN 030	28480	05372-60020
A20	05372-60020	1	1	BD AY-C CHAN 090	28480	05372-60020
A22	05372-60022	3	1	BD AY-FAST PORT 020	28480	05372-60022
B1	3160-0521	3	1	FAN-TBAX 100-CFM 12VDC	11045	4312-26
C1	0180-3572	9	1	CAP-FXD 50 V AL-ELCTLT	56289	36DE373G050BF2A
C2	0160-3036	8	4	CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C3	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C4	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C5	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
CR1	1906-0231	2	1	DIODE-CT-RECT 200V 15A	28480	1906-0231
F1	2110-0303	9	1	FUSE (INCH) 2A 250V NTD FE UL (SLOW BLO)	75915	312 002
F1	2110-0014	3	1	FUSE (INCH) 4A 250V TD FE UL	75915	313 004
H1	0380-1523	0	2	STANDOFF-HEX 10.1-MM-LG M3.5 X 0.6-THD	14480	TJL 100.305
H3	0515-0411	0	4	SCREW-MACH M3 X 0.5 22MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H4	0515-0885	2	19	SCREW-MACH M4 X 0.7 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6	77	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H6	0515-0896	5	14	SCREW-MACH M4 X 0.7 10MM-LG	00000	ORDER BY DESCRIPTION
H7	0515-1110	8	6	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H8	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
H9	0515-1232	5	10	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H10	0515-1323	5	20	SCREW-MACH M3 X 0.5 30MM-LG PAN-HD	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3	05372-60003	4	1	TIME BOARD	28480	05372-60003
A3C1	0160-0576	5	52	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C2	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C3	0160-3879	7	3	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C7	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C8	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C12	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C22	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C32	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C33	0160-4521	8	1	CAP-FXD 12pF 200 V	09969	RPE121-105C0G120J200V
A3C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C41	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C42	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C43	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C44	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C45	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C46	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C47	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C48	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C49	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C50	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C51	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C52	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C53	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C58	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C59	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C60	0160-4031	5	4	CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A20	05372-60020	5	1	C-CHANNEL BOARD	28480	05372-60020
A20C1	0160-6100	3	8	CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C2	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C3	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C5	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C7	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C9	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C11	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C12	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C13	0160-7193	6	8	CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C14	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C15	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C16	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C17	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C18	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C19	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C20	0160-5789	2	2	CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C21	0180-3922	3	1	CAP-FXD 15 uF 20 V	00039	NRD156M20R12
A20C22	0180-3755	0	1	CAP-FXD 33 uF 10 V	00039	NRD336M10R12
A20C23	0160-5789	2		CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C24	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20D1	1900-0231	0	3	DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D2	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D3	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D4	1902-1544	4	1	DIODE-ZNR 10 V X% .35W		
A20J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J2	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J3	1252-3345	8	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-3345
A20L1	9140-1117	9	5	COIL 47 uH 5%	06352	NL45323T-470J
A20L2	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L3	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L4	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L5	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L7	9140-1109	9	2	COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L8	9140-1109	9		COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L9	9140-1075	8	4	COIL 1 uH 30%	05826	9140-1075
A20L10	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L11	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L12	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20R1	0699-1318	6	1	RESISTOR 1K +-1% .125W	05524	CRCW1206F
A20R2	0699-2697	6	4	RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R3	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R4	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R5	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20U1	5088-7037	8	1	1.8 GHZ ATTEN	28480	5088-7037
A20U2	1826-1613	6	4	IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U3	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U4	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U5	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U6	1820-6555	3	1	IC DIVR ECL DIV-X-4	28480	QDMP-7004
	0361-0028	8	14	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0515-0894	3	6	SCREW-MACH M2.5 X 0.45 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	05305-00010	6	1	CLAMP-GRNDING	28480	05305-00010
	0535-0008	3	2	NUT-HEX DBL-CHAM M2.5 X 0.45 2MM-THK	00000	ORDER BY DESCRIPTION
	05372-20203	2	1	HEATSINK	28480	05372-20203
	05372-00025	4	*	HYBRID CLAMP	28480	05372-00025

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGES 4-26/4-28, TABLE 4-2. MISCELLANEOUS HARDWARE AND CHASSIS PARTS:

All Serials
>Change A16 POWER MODULE CABLE from 51083-60108 to 05371-60231.

2952A00446 & above
>Replace page 4-26 with page 4-26 (Series 2952A00446 and above) supplied in these manual changes.

PAGE 7-23, FIGURE 7-10. A2 INPUT AMPLIFIER BOARD COMPONENT LOCATOR:

3041A
A2 (05372-60002) Date Code 90423.
>Delete R203, below U15.
>Delete R219 and R220 on far right side near L1/L201.

PAGE 7-29, FIGURE 7-11. A2 INPUT AMPLIFIER BOARD SCHEMATIC DIAGRAM:

3041A
A2 (05372-60002) Date Code 90423.
>Replace Randomizer portion of the schematic diagram with the diagram on the following page.

PAGE 8-9, FIGURE 8-3. A3 TIME BOARD, COMPONENT LOCATOR:

2952A00276
>AC termination consisting of C100, R100 have been added to the circuit side of A3U14 Pin 17.

3041A
>Change R31 to C131.
>Delete R32.
>Delete TP2.

3141A
>A3C100 and R100 have been moved from the circuit side of the board to the component side between U14 and U15.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A20	05372-60020	5	1	C-CHANNEL BOARD	28480	05372-60020
A20C1	0160-6100	3	8	CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C2	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C3	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C5	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C7	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C9	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C11	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C12	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C13	0160-7193	6	8	CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C14	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C15	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C16	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C17	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C18	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C19	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C20	0160-5789	2	2	CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C21	0180-3922	3	1	CAP-FXD 15 uF 20 V	00039	NRD156M20R12
A20C22	0180-3755	0	1	CAP-FXD 33 uF 10 V	00039	NRD336M10R12
A20C23	0160-5789	2		CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C24	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20D1	1900-0231	0	3	DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D2	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D3	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D4	1902-1544	4	1	DIODE-ZNR 10 V X% .35W		
A20J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J2	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J3	1252-3345	8	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-3345
A20L1	9140-1117	9	5	COIL 47 uH 5%	06352	NL45323T-470J
A20L2	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L3	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L4	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L5	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L7	9140-1109	9	2	COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L8	9140-1109	9		COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L9	9140-1075	8	4	COIL 1 uH 30%	05826	9140-1075
A20L10	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L11	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L12	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20R1	0699-1318	6	1	RESISTOR 1K +-1% .125W	05524	CRCW1206F
A20R2	0699-2697	6	4	RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R3	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R4	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R5	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20U1	5088-7037	8	1	1.6 GHZ ATTEN	28480	5088-7037
A20U2	1826-1613	6	4	IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U3	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U4	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U5	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U6	1820-6555	3	1	IC DIVR ECL DIV-X-4	28480	QDMP-7004
	0361-0028	8	14	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0515-0894	3	6	SCREW-MACH M2.5 X 0.45 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	05305-00010	6	1	CLAMP-GRNDING	28480	05305-00010
	0535-0008	3	2	NUT-HEX DBL-CHAM M2.5 X 0.45 2MM-THK	00000	ORDER BY DESCRIPTION
	05372-20203	2	1	HEATSINK	28480	05372-20203
	05372-00025	4	1	HYBRID CLAMP	28480	05372-00025
	05372-64020	3	1	BD AY-PCL 68020	28480	05372-64020

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R85				NOT ASSIGNED		
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R90				NOT ASSIGNED		
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				MISCELLANEOUS HARDWARE AND CHASSIS PARTS (SERIES 3131A and above)		
A1	05372-60001	8	1	BD AY-TB CONTROL	28480	05372-60001
A2	05372-60002	9	1	BD AY-INPUT AMP	28480	05372-60002
A3	05372-60003	0	1	BD AY-TIME	28480	05372-60003
A4	05372-60004	1	1	BD AY-INTERP	28480	05372-60004
A5	05372-60005	2	1	BD AY-EVENT	28480	05372-60005
A6	05372-60006	3	1	BD AY-CNT SPRT	28480	05372-60006
A7	05372-60007	4	1	BD AY-PROCESSOR	28480	05372-60007
A7U16	05372-80032	3	1	EPROM-80032	28480	05372-80032
A7U17	05372-83033	4	1	EPROM-80033	28480	05372-80003
A7U18	05372-80034	5	1	EPROM-80034	28480	05372-80034
A7U19	05372-83035	6	1	EPROM-80035	28480	05372-80005
A7U52	05372-80036	7	1	EPROM-80036	28480	05372-80036
A7U53	05372-80037	8	1	EPROM-80037	28480	05372-80037
A7U54	05372-80038	9	1	EPROM-80038	28480	05372-80038
A7U55	05372-80039	0	1	EPROM-80039	28480	05372-80039
A8	05372-60008	5	1	BD AY-IO CONTROL	28480	05372-60008
A9	05372-60009	6	1	BD AY-DOUBLE REG	28480	05372-60009
A10	51089-60015	1	1	BD AY TRIPLE REG	28480	51089-60015
A11	05371-60011	3	1	BD AY-FRONT PNL	28480	05371-60011
A12	05372-60012	1	1	BD AY-MOTHER	28480	05372-60012
A13	05372-60013	6	1	BD AY-REAR PANEL	28480	05372-60013
A14	05371-60014	6	1	BD AY-TB MULT	28480	05371-60014
A15	10811-60111	8	1	QUARTZ OSC 10MHZ	28480	10811-60111
A16	05371-60231	9	1	CBL AY-PWR MOD	28480	05371-60231
A17	2090-0310	8	1	CRT ASSY - 7" W/PCB	28480	2090-0310
A20	05372-60020	1	1	BD AY-C CHAN 030	28480	05372-60020
A20	05372-60020	1	1	BD AY-C-CHAN 090	28480	05372-60020
A22	05372-60022	3	1	BD AY-FAST PORT 020	28480	05372-60022
B1	3160-0521	3	1	FAN-TBAX 100-CFM 12VDC	11045	4312-26
C1	0180-3572	9	1	CAP-FXD 50 V AL-ELCTLT	56289	36DE373G050BF2A
C2	0160-3036	8	4	CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C3	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C4	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C5	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
CR1	1906-0231	2	1	DIODE-CT-RECT 200V 15A	28480	1906-0231
F1	2110-0303	9	1	FUSE (INCH) 2A 250V NTD FE UL (SLOW BLO)	75915	312 002
F1	2110-0014	3	1	FUSE (INCH) 4A 250V TD FE UL	75915	313 004
H1	0380-1523	0	2	STANDOFF-HEX 10.1-MM-LG M3.5 X 0.6-THD	14480	TJL 100.305
H3	0515-0411	0	4	SCREW-MACH M3 X 0.5 22MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H4	0515-0885	2	20	SCREW-MACH M4 X 0.7 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6	71	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H6	0515-0896	5	6	SCREW-MACH M4 X 0.7 10MM-LG	00000	ORDER BY DESCRIPTION
H7	0515-1110	8	4	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H8	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
H9	0515-1232	5	14	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H10	0515-1323	5	20	SCREW-MACH M3 X 0.5 30MM-LG PAN-HD	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R12				NOT ASSIGNED		
A5R13				NOT ASSIGNED		
A5R14				NOT ASSIGNED		
A5R15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22				NOT ASSIGNED		
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	11	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R38	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R40	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
H11	0515-1331	5	16	SCREW-METRIC SPECIALTY M4 X 0.7 THD; 7MM	00000	ORDER BY DESCRIPTION
H13	0515-1430	5	11	SCREW-MACH M3 X 0.5 8MM-LG 90-DEG-FLH-HD	00000	ORDER BY DESCRIPTION
H15	0515-1824	1	4	SCREW-TPG M4 X 0.7 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H16	0535-0004	9	2	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
H17	0535-0110	8	29	NUT-SPECIALTY LKG 2.41MM-THK 9.53MM-WD	00000	ORDER BY DESCRIPTION
H18	0361-1272	6	4	FASTNER, PLASTIC PUSH	00000	ORDER BY DESCRIPTION
H19	2190-0011	8	2	WASHER-LK INTL T NO. 10 .195-IN-ID	78189	1910-00
H20	2190-0102	8		WASHER-LK INTL T 15/32 IN .472-IN-ID	78189	1922-01
H21	2190-0577	1	2	WASHER-LK HLCL NO. 10 .194-IN-ID	28480	2190-0577
H22	2360-0115	4	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H23	2360-0201	9	2	SCREW-MACH 6-32 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H23	6960-0002	4	3	PLUG-HOLE TR-HD FOR .5-D-HOLE STL	71785	SS-48152-K1110
H24	2680-0129	8	2	SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H25	0590-1251	6	8	NUT-SPCLTY 15/32-32-THD .1-IN-THK .562WD	28480	0590-1251
H26	3050-0589	0	12	WASHER-FL NM NO. 5 .136-IN-ID .375-IN-OD	86928	5610-12-32
H27	5081-7683	6	1	NUT-BNC	28480	5081-7683
H29	05371-20205	3	1	PLUG-OPTION 060	28480	05371-20205
H30	54100-25701	0	1	NUT-POD LOCK	28480	54100-25701
H31				NOT ASSIGNED		
H37	0624-0481	5	2	SCREW-TPG 2-28 .219-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H38	0590-0505	1		NUT KNURLED 030	00000	ORDER BY DESCRIPTION
H38	0590-0505	1	2	NUT KNURLED 090	00000	ORDER BY DESCRIPTION
H40	6960-0010	4	1	PLUG-HOLE TR-HD FOR .625-D-HOLE STL	71785	SS-48172-K1110
MP1	05371-00009	3	1	SHIELD-RF CAVITY	28480	05371-00009
MP2	05372-00029	8	1	CAGE-CARD	28480	05372-00010
MP3	05371-00011	7	1	BRKT-PROBE	28480	05371-00011
MP4	9100-4807	6	1	XFMR-PWR 100/120/220/240V	09535	5181-0138
MP5	05372-00014	1	1	COV-RF CAVITY	28480	05372-00014
MP6	05372-00015	2	1	PANEL-REAR	28480	05372-00015
MP7	05372-00030	1	1	COV-PWR SPLY	28480	05372-00030
MP8	05371-40001	9	1	PANEL-FRONT	28480	05371-40001
MP9	05372-40001	0	1	KEY PAD	28480	05372-40001
MP10	05371-80004	6	1	WINDOW-5371	28480	05371-80004
MP11	05371-80021	7	1	SHIELD DUST CRT	28480	05371-80021
MP12	1400-0611	0	2	CLAMP-FL-CA 1-WD	06383	FCC-A-C8
MP13	1460-1345	5	2	TILT STAND SST	28480	1460-1345
MP14	3160-0562	2	1	FINGER GUARD	10960	08213
MP15	5001-0540	2	2	SIDE-TRIM	28480	5001-0540
MP16	5021-8405	6	1	FRAME-FRONT	28480	5021-8405
MP17	5021-5806	5	1	FRAME-REAR	28480	5021-5806
MP18	5021-5838	3	4	CORNER STRUT	28480	5021-5838
MP19	5041-8801	8	4	FOOT	28480	5041-8801
MP20	5041-8802	9	1	TOP-TRIM	28480	5041-8802
MP21	5041-8821	2	4	STANDOFF-REAR	28480	5041-8821
MP22	5041-8819	8	2	STRP-HDLE CAP TR	28480	5041-8819
MP23	5041-8820	1	2	STRP-HDLE CAP R	28480	5041-8820
MP24	5062-3705	5	2	STRAP HANDLE AY	28480	5062-3705
MP25	5062-3736	2	1	TOP COVER	28480	5062-3736
MP26	5062-3990	0	1	KIT-HANDL7*SYS2+	28480	5062-3990
MP27	01650-47401	7	1	KNOB	28480	01650-47401
MP28	05371-00024	2	1	BOTTOM-COVER	28480	05371-00024
MP29	05371-00025	3	2	SIDE COVER	28480	05371-00025
MP30				NOT ASSIGNED		
MP31	05371-20204	2	1	CAVITY-RF	28480	05371-20204
MP32	54100-45201	7	2	PROBE GUIDE	28480	54100-45201
MP33	54100-64101	6		COVER-POD 060	28480	54100-64101
MP33	54100-64101	6	4	COVER-POD 090	28480	54100-64101
MP34	05371-80025	1	1	INSULATOR	28480	05371-80025
MP35	0340-0596	1	1	INSULATOR-XSTR THRM-CNDCT	55285	7403-09FR-04
MP36	0340-0685	9	1	INSULATOR MYLAR CLEAR	28480	0340-0685
MP37	05371-00022	0	1	SHIELD SAFETY	28480	05371-00022
MP38	05371-00023	1	1	SHIELD-CABLE	28480	05371-00023
MP39	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
MP40	3160-0583	7	4	FASTENING CLIP FOR USE WITH MOUNTING	11045	LZ212
MP41	1250-1562	3	1	ADAPTER-COAX STR F-N M-SMA	16179	CD705488-002
MP42				NOT ASSIGNED		

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5C66	0160 3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
S1	3101-2906	8	1	SWITCH-RKR SUBMIN SPDT 3A 250VAC	78553	B123J1ZQ1E
T1	9100-4807	3	1	TRANSFORMER-POWER 100/120/220/240V	28480	9100-4807
W3	8120-5321	2	1	CABLE ASSEMBLY-COAXIAL 50 OHM; RIBBON	00779	413438-1
W4	05372-60201	4	1	CBL-AY PWR SUP	28480	05372-60201
W5	05371-60202	4	1	CBL AY FRT PANEL	28480	05371-60202
W7	05372-60205	8	1	CBL-AY HPIB	28480	05372-60205
W9	05371-60207	9	1	CBL AY X CHANNEL	28480	05371-60207
W10	05371-60208	0	2	CBL AY REAR INPT060	28480	05371-60208
W11	05371-60208	0		CBL AY REAR INPT090	28480	05371-60208
W12	05372-60215	0		CBL-AY X CHANNEL060	28480	05372-60215
W12	05372-60215	0	2	CBL-AY X CHANNEL090	28480	05372-60215
W13	05372-60216	1	2	CBL-AY-CLK SHORT	28480	05372-60216
W14	05372-60216	1		CBL-AY-CLK SHORT	28480	05372-60216
W15	05372-60217	2	1	CBL-AY-CLK LONG	28480	05372-60217
W16	05371-60220	6	2	CBL ASSY CLOCK	28480	05371-60220
W17	05371-60220	6		CBL ASSY CLOCK	28480	05371-60220
W18	05372-60221	8	1	CBL-AY TB POWER	28480	05372-60221
W19	05371-60222	8	2	CBL AY-POD	28480	05371-60222
W20	05371-60222	8		CBL AY-POD	28480	05371-60222
W21	05371-60223	9	1	CBL AY-XCHAN EXT	28480	05371-60223
W22	8120-1378	1	1	POWER CORD SET 18-AWG 3-COND 90-IN-LG	11383	PS-204-625
W23	54100-67602	8	2	CUSTOMER CONN ASSY	28480	54100-67602
W24	54100-67602	8		CUSTOMER CONN ASSY	28480	54100-67602
W26	05372-60224	1	1	CBL-AY FRNT PNL 030	28480	05372-60224
W27	05372-60229	6		CBL-AY-PWR C-CHL030	28480	05372-60229
W27	05372-60229	6	2	CBL-AY-PWR C-CHL090	28480	05372-60229
W28	05372-60230	9		CBL-AY C CHANNEL030	28480	05372-60230
W28	05372-60230	9	2	CBL-AY C CHANNEL090	28480	05372-60230
W29	05372-60231	0		CBL AY-CCHAN EXT030	28480	05372-60231
W29	05372-60231	0	2	CBL AY-CCHAN EXT090	28480	05372-60231
W30	05372-60232	1	1	CBL-AY RR PNL CH090	28480	05372-60232
W31	05372-60225	2	1	CBL-AY FST PRT 1020	28480	05372-60225
W32	05372-60226	3	1	CBL-AY FST PRT 2020	28480	05372-60226
W33	05372-60227	4	1	CBL-AY FST PRT 3020	28480	05372-60227
	05348-00011	8	1	PAD-FOAM (CRT)	28480	05348-00011
	05372-00027	6	1	SHLD-TRANS	28480	05372-00027
	05372-80001	4	1	LABEL-FRONT 5372A	28480	05372-80001
	05372-80010	5	1	LABEL-FRONT OPT 030	28480	05372-80010
	05372-80053	6	1	LABEL, CRT ADJUSTMENT	28480	05372-80053
	05372-90001	5	1	MNL-OPERATING	28480	05372-90001
	05372-90003	7	1	MNL-PROGRAMMING	28480	05372-90003
	05372-90005	9	1	MNL-OPERATING	28480	05372-90005
	05372-90006	0	1	MNL-PROGRAMMING	28480	05372-90006
	05372-90007	1	1	MNL-GETTING STR	28480	05372-90007
	05372-90010	6	1	MNL-GETTING STR	28480	05372-90010
	05372-90012	8	1	MANUAL-OPT #20 020	28480	05372-90012
	1252-3348	1	3	CONN-RECT D-MICROMIN 40-CKT 40-CONT	28480	1252-3348
	1400-0507	3	1	CABLE TIE .062-2-DIA .095-WD NYL	06383	PLT-2M-M
	1400-1439	2	7	CLAMP-F-LAT CABLE .375 WD NYLON, ADH BACK	02768	8511-46-00-9909
	2190-0102	8	6	WASHER-LK INTL T 15/32 IN .472-IN-ID	78189	1922-01
	5040-6974	0	1	COVER-FRONT	28480	5040-6974
	5062-1234	1	1	LBL KIT OPT W30	28480	5062-1234
	8120-5322	3	3	MULTI-CONTACT ASSY 28-AWG 40-COND	00779	749658-1
	5062-3978	4	1	RACK MOUNT KIT 908	28480	5062-3978
	5062-4072	1	1	RACK MOUNT KIT 913	28480	5062-4072
	54002A	3	1	50 OHM POD	28480	54002A

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD (DATE CODE 90404)	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 7-23, FIGURE 7-10. A2 INPUT AMPLIFIER BOARD COMPONENT LOCATOR:

3041A

A2 (05372-60002) Date Code 90423.
>Delete R203, below U15.
>Delete R219 and R220 on far right side near L1/L201.

PAGE 7-29, FIGURE 7-11. A2 INPUT AMPLIFIER BOARD SCHEMATIC DIAGRAM:

3041A

A2 (05372-60002) Date Code 90423.
>Replace Randomizer portion of the schematic diagram with the diagram on the following page.

PAGE 8-9, FIGURE 8-3. A3 TIME BOARD, COMPONENT LOCATOR:

2952A00276

>AC termination consisting of C100, R100 have been added to the circuit side of A3U14 Pin 17.

3041A

>Change R31 to C131.
>Delete R32.
>Delete TP2.

3141A

>A3C100 and R100 have been moved from the circuit side of the board to the component side between U14 and U15.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 90402)		
A3U6	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U7	1820-3438	5	1	IC MUXR/DATA-SEL TTL ALS 2-TO-1-LINE	01295	SN74ALS257N
A3U8	1820-2701	3	2	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U9	1820-3227	0	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F257N
A3U10	1820-6535	9	1	IC GATE-ARY CMOS	10411	LMA9284
A3U11	1820-2701	3		IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U12	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U13	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U14	1820-4350	2	1	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS241BN
A3U15	1820-3121	3	7	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U16	1820-2848	9	1	IC RCVR ECL/10KH LINE RCVR TPL	04713	MC10H116P
A3U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U18	1820-2654	5	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F157N
A3U19	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U20	1820-3707	1	5	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U21	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U22	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U23	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U24	1820-5821	4	1	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F574N
A3U25	1818-4134	5	5	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U26	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U27	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U28	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U29	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U30	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U31	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U32	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U33	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U34	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U35	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U36	1820-5789	3	4	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U37	1DK5-0002	7	2	IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U38	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U39	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U40	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U41	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U43	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U44	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3XU10	1200-1470	7	1	SOCKET-IC-PGA 145-CONT SQUARE DIP-SLDR	00779	55275-4
A3XU37	1200-1372	8	2	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A3XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 90402)		
A3C61	0160-4031	5		CAP-FXD 330PF 100V	09969	RP3121-105C0G331J100V
A3C62	0160-4031			CAP-FXD 330PF 100V	09969	RP3121-105C0G331J100V
A3C63	0160-4031			CAP-FXD 330PF 100V	09969	RP3121-105C0G331J100V
A3C131	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3DL1	1810-1019	3	1	DELAY LINE ACTIVE DEVICE W/DUAL IN-LINE	92912	0447-0051-85
A3DL2	1810-1326	5	3	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL3	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL4	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL5	1810-1107	0	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3DL6	1810-1107	0		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3J1	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A3J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A3L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A3P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A3P3	1250-2052	8	2	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3P4	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3R1	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	C1433	750-61
A3R2	0699-2263	2	6	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R3	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R4	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R5	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R6	1810-0800	8	1	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A3R7	1810-0341	2	1	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A3R8	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R9	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R10	1810-0280	8	7	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R11	0699-1542	8	6	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R12	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R13	1810-0270	6	4	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R14	0699-2253	0	3	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R15	0699-2252	9	3	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R16	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R17	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R18	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R19	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R20	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R22	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R25	1810-0366	1	2	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R26	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R28	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R29	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R30	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R31				NOT ASSIGNED		
A3R32				NOT ASSIGNED		
A3R33	8159-0005	0	1	RESISTOR ZERO OHMS 22AWG	28480	8159-0005
A3R34	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3U1	1818-4675	9	3	IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U2	1820-2698	7	1	IC DRVR TTL F LINE DRVR OCTL	18324	74F240N
A3U3	1820-2691	0	1	IC FF TTL F D-TYPE POS-EDGE-TRIG	18324	74F74N
A3U4	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U5	1820-3143	9	1	IC FF TTL ALS D-TYPE POS-EDGE-TRIG DUAL	01295	SN74ALS874NT

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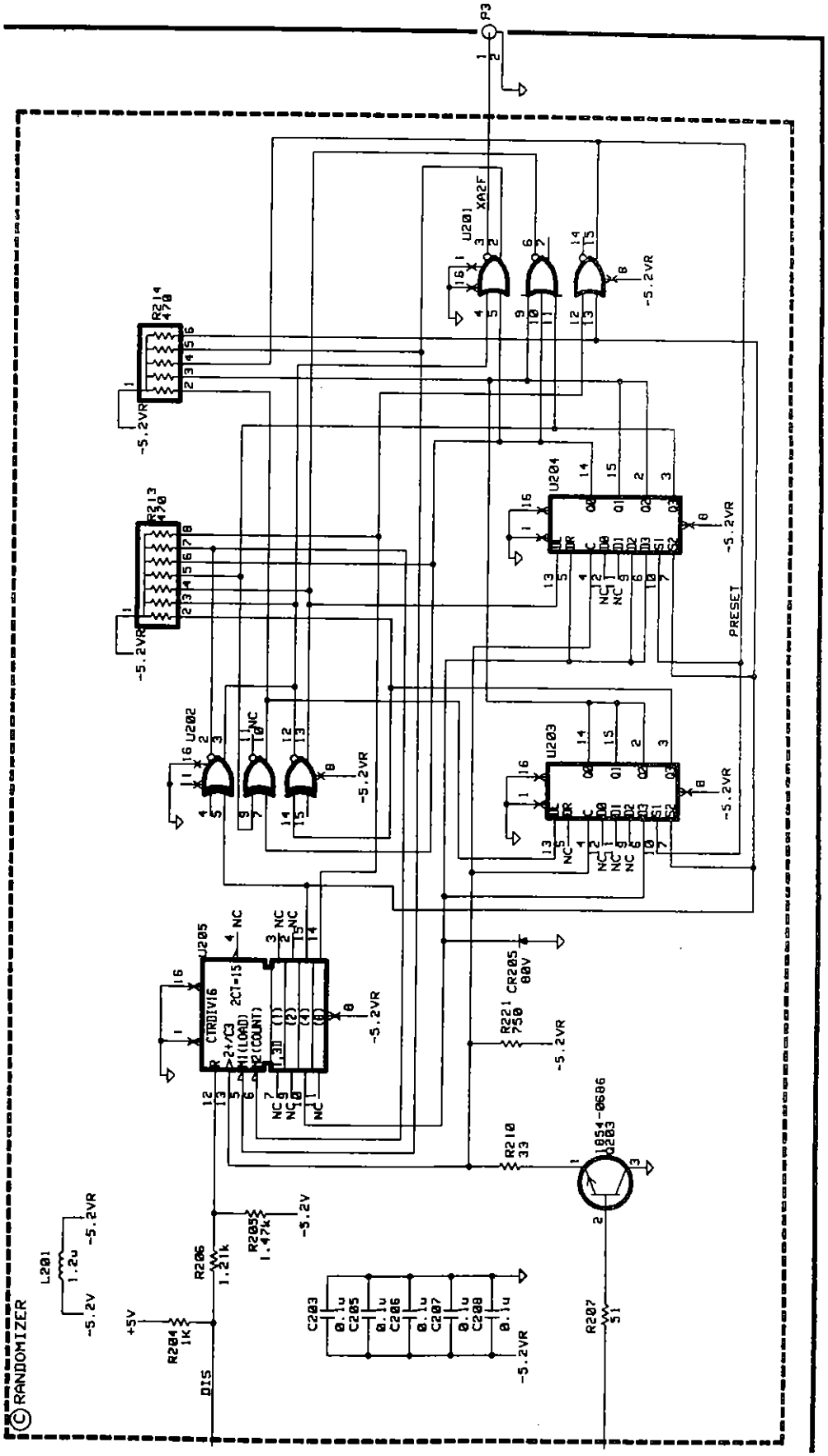

Part of Figure 7-11. A2 Input Amplifier board, Schematic Diagram
A2 DATE CODE 90423 (Sheet 3 of 3)

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3	05372-60003	4	1	TIME BOARD (DATE CODE 90402)	28480	05372-60003
A3C1	0160-0576	5	53	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C2	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C3	0160-3879	7	3	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A3C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C7	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C8	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C12	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C22	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C32	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C33	0160-4521	8	1	CAP-FXD 12pF 200 V	09969	RPE121-105C0G120J200V
A3C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C41	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C42	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C43	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C44	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C45	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C46	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C47	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C48	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C49	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C50	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C51	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C52	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C53	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C58	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C59	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C60	0160-4031	5	4	CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R118	0698-6360	6		RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R202	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R203				NOT ASSIGNED		
A2R204	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R205	0698-7240	3	1	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R206	0698-7238	9	1	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R207	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R208	0757-0441	8	2	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R209	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R210	0699-1991	1	1	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A2R211	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R212	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R213	1810-0203	5	1	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A2R214	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A2R215	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R216	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R217	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R218	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R219				NOT ASSIGNED		
A2R220				NOT ASSIGNED		
A2R221	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A2U1	0955-0404	3	2	U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U2	1NB7-8076	3	2	DCOFFSET HYBRID	28480	1NB7-8076
A2U3	1826-0275	4	2	IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U4	1NB7-8109	3	2	SYNC COMP HYBRID	28480	1NB7-8109
A2U5	1820-2000	5	2	IC FF ECL D-M/S POS-EDGE-TRIG	28480	8196D-0100
A2U6	1826-0311	9	2	IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U7	1826-0609	8	2	ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U8	1826-1049	2	2	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U9	1826-0282	3	2	IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U10	1826-0285	6	2	IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U11	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	8196D-0100
A2U12	1820-3394	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS09N
A2U13	0955-0404	3		U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U14	1NB7-8076	3		DCOFFSET HYBRID	28480	1NB7-8076
A2U15	1NB7-8109	3		SYNC COMP HYBRID	28480	1NB7-8109
A2U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U17	1826-0275	4		IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U18	1826-0311	9		IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U19	1826-0635	0	2	IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U20	1826-1246	1	2	D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U21	1826-0609	8		ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U22	1826-1049	2		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U23	1826-0285	6		IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U24	1826-0282	3		IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U25	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A2U26	1820-2273	4	1	IC-INTERFACE DRVR PERIPHERAL GENERAL	56289	UDN-2981A
A2U27	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U28	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2U29	1826-0635	0		IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U30	1826-1246	1		D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U201	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL 2-INP	04713	MC10H105P
A2U202	1820-2956	0	1	IC GATE ECL/10KH EXCL-OR/NOR TPL 2-INP	04713	MC10H107P
A2U203	1820-3579	5	2	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U204	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U205	1820-4159	9	1	IC CNTR ECL/10KH 8IN SYNCHRO 4-BIT	04713	MC10H016P
A2U206	1826-0521	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072CP
A2U207	1826-1204	1	1	D/A 8-BIT 20-PLASTIC CMOS	24355	AD7528JN
	0340-0864	6	1	INSULATOR-XSTR THRM-CNDCT	18565	69-11-A536-1671
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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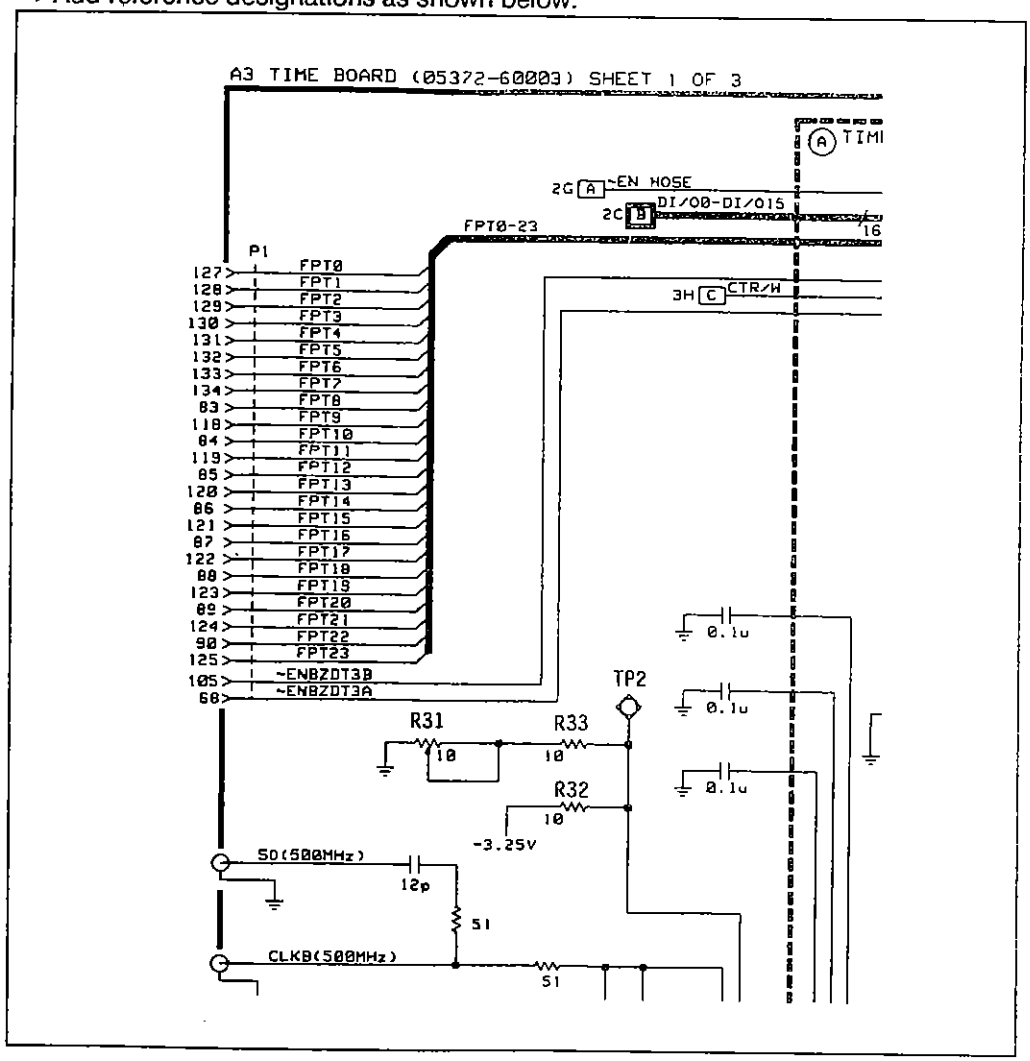
MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 8-11, FIGURE 8-4. A3 TIME BOARD SCHEMATIC DIAGRAM (Sheet 1 of 3):

All Serials

>Add reference designations as shown below:



2952A00276 & above

>Add A3R100 (51 ohms) and A3C100 (330 pf) from A3U14 Pin 17 to ground.

3041A

>Delete A3TP 2.
>Delete A3R32, 10 ohms.
>Change A3R33 value from 10 ohms to 0 ohms.
>Replace A3R31 with A3C131, .1UF.

3141A

>Change A3C100 value from 330pf to 331 pf.
>Delete TP100.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R51	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R52	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R53	0699-2358	6		RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R54	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R55	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R56	0698-7234	5		RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R57	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R58	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R59	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R60	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R61	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R62	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R63	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R66	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R67	0699-2245	0		RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R68	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R69	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R70	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R71	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R74	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R75	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R76	0698-7262	9		RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R77	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R78	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R79	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R80	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R81	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R82	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R83	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R84	0698-7257	2	2	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A2R85	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R86	0698-6360	6	2	RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R87	0698-7237	8	3	RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R88	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R89	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R90	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R91	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R92	0699-1769	1		RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R93	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R94	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R95	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R96	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R98	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R99	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R100	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R102	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L040
A2R103	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R104	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R105	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R107	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R108	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R109	0698-7235	6	1	RESISTOR 909 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-909R-F
A2R110	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R111	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R112	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R113	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A2R114	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R115	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R116	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R117	0698-7257	2		RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q7	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q9	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q10	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q11	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q12	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q13	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q14	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q15	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q16	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q201	1854-0215	1	2	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q202	1854-0215	1		TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q203	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2R1	2100-3749	6	2	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R2	2100-0545	4	2	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R3	2100-3749	6		RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R4	2100-0545	4		RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R5	0698-3446	3	4	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R6	0698-7196	8	3	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R7	0698-3613	6	4	RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R8	0698-7212	9	8	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R9	0698-7254	9	4	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R10	2100-3750	9	4	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R11	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R12	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R13	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R14	2100-3759	8	2	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R15	2100-3759	8		RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R16	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R17	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R18	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R19	0699-1320	0	4	RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R20	0699-2358	6	2	RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R21	0699-2263	2	2	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R22	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R23	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R24	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R25	0699-2245	0	2	RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R26	0699-1542	8	19	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R27	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R28	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R29	0698-7234	5	2	RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R30	0698-7256	1	3	RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R31	0698-7232	3	2	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R32	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R33	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R34	0698-7262	9	2	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R38	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R39	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R40	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R41	0698-7236	7	6	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R42	0699-1769	1	2	RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R43	0698-7220	9	7	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R44	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R45	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R46	0698-7260	7	12	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R47	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R48	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R49	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 10-21, FIGURE 10-9. A5 EVENT BOARD, COMPONENT LOCATOR:

3041A
> Change R22 to C122.
> Delete R85.
> Delete TP4.

3045A
A5 (05372-60005) Date Code 90452
> Delete A5R38, above U72.

PAGE 10-23 FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 1 of 6):

3045A
A5 (05372-60005) Date Code 90452
> Delete A5R38, 82 ohms, to the left of U72.
> Change A5R40 value from 120 ohms to 100 ohms.

PAGE 10-25, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 2 of 6):

3041A
> Delete R14.
> Change A5R15 value from 10 ohms to 0 ohms.
> Replace A5R13 with A5C113, .1uF.
> Delete TP 1.

PAGE 10-27, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 3 of 6):

3041A
> Change A5R84 value from 10 ohms to 0 ohms.
> Delete A5R85.
> Replace A5R22 with A5C122, .1UF.
> Delete TP 4.

PAGE 11-11, FIGURE 11-3. A12 MOTHERBOARD SCHEMATIC DIAGRAM:

2952A00446 & above
A12 SCHEMATIC DIAGRAM NOTES:
> Change fuse HP Part Number from 2110-0055 to 2110-0014; change rating from "NO TIME DELAY" to "TIME DELAY".

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2C215	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7P104M50V
A2C216	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2CR1	1902-0959	3	2	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR2	1902-0956	0	2	DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR3	1902-0953	7	2	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR4	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR5	1902-0945	7	4	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR6	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR8	1902-0959	3		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR9	1902-0953	7		DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR10	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR13	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR14	1902-0956	0		DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR201	1902-0943	5	2	DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR202	1902-0943	5		DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR205	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2H1	0515-0659	8	16	SCREW-MACHINE ASSEMBLY M2 X 0.4 8MM-LG	00000	ORDER BY DESCRIPTION
A2H2	05371-20201	9	4	HEATSINK	28480	05371-20201
A2H3	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A2H4	0380-1731	2	16	SPACER-PRESS-IN 1.70 MM LG; 2.38 MM ID	46384	YC3-4564
A2H5	3050-0891	7	1	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A2H6	0535-0004	9	1	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
A2H7	0515-0406	3	1	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A2J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J2	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2J3	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2K1	0490-1554	0	8	RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K2	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K3	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K4	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K5	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K6	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K7	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K8	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2L1	9140-1170	4	10	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L3	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L4	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L5	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L6	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L7	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L8	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L9	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L201	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2MP1	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
A2MP2	54100-29101	2	4	SPRING-HYBRID	28480	54100-29101
A2MP3	54100-29104	5	4	CLAMP-HYBRID	28480	54100-29104
A2P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A2P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A2P3	1250-2052	8	1	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A2Q1	1853-0314	9	4	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q2	1854-0090	0	4	TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q3	1854-0686	0	5	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q4	1854-0092	2	4	TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q5	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2	05372-60002	3	1	INPUT AMPLIFIER BOARD (DATE CODE 90423)	28480	05372-60002
A2C1	0180-2207	5	2	CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C2	0160-0576	5	23	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C3	0180-0098	8	2	CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C7	0180-0098	8		CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C8	0160-4371	6	4	CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C9	0160-3879	7	6	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C10	0180-3847	1	4	CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C11	0160-4040	6	2	CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C12	0180-3941	6	2	CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C16	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C18	0160-3728	5	4	CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C19	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C22	0180-3775	4	4	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C23	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C24	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C31	0160-4040	6		CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C32	0180-3941	6		CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C34	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C36	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C37	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C41	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C42	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C44	0160-3875	3	2	CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C45	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C46	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C47	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C48	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A2C49	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C51	0160-3875	3		CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C201	0160-4557	0	7	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C202	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C203	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C204	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C205	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C206	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C207	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C208	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C209	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C210	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C211	0160-4801	7	2	CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V
A2C212	0160-4791	4	2	CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C213	0160-4791	4		CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C214	0160-4801	7		CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V

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Table 1-1. HP 5372A Recommended Test Equipment

INSTRUMENT	REQUIRED CHARACTERISTICS	USE	RECOMMENDED MODEL/PART NUMBER
Oscilloscope	275 MHz Bandwidth	A, T	HP 1725A
Oscilloscope	1-GHz Bandwidth Channel vs. Channel Display Trigger Delay	A, T	HP 54100A
Synthesizer/ Function Generator	DC to 10 MHz Freq Range 45 mVp-p to 5 Vp-p Amp Range −2.5V to +2.5V DC Offset Range	P, A	HP 3325A
Synthesized Signal Generator	100 MHz to 2 GHz Freq Range 15 mVrms to 100 mVrms Amp Range	P, A	HP 8663A
Digital Multimeter	100 µV Resolution in True RMS AC	P, A, T	HP 3458A
Universal Frequency Counter	Duty Cycle at 1 kHz Input 0.001 Degree Resolution	A	HP 5335A
Support Service Kit	HP 5372A	A, T	05372-67001
P = PERFORMANCE TESTS A = ADJUSTMENTS T = TROUBLESHOOTING PROCEDURES			

1-13. SAFETY CONSIDERATIONS

The HP 5372A is a Safety Class I instrument provided with a protective earth terminal. This instrument is designed and tested to international safety standards. Safety information pertinent to the operation and servicing of this instrument is included in both this chapter and Chapter 3 (Adjustment Procedures).

Although this instrument has been designed in accordance with international safety standards, this manual contains information, cautions, and warnings that must be followed to ensure safe operation and to maintain the instrument in safe condition. Service instructions and adjustment procedures, which require the removal the top or bottom instrument covers, are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing or make any adjustments with the covers removed unless you are qualified to do so.

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WARNING

THIS IS A SAFETY CLASS I PROVIDED WITH A PROTECTIVE EARTH TERMINAL. AN UNINTERRUPTABLE SAFETY EARTH GROUND MUST BE PROVIDED FROM THE MAINS POWER SOURCE TO THE HP 5372A INPUT WIRING TERMINALS, POWER CORD, OR SUPPLIED POWER CORD SET. WHENEVER IT IS LIKELY THAT THE PROTECTION HAS BEEN IMPAIRED, ANY INTERRUPTION OF THE PROTECTIVE GROUNDING CONDUCTOR INSIDE OR OUTSIDE THE INSTRUMENT OR OPENING THE PROTECTIVE EARTH TERMINAL WILL CAUSE A POTENTIAL SHOCK HAZARD THAT COULD RESULT IN PERSONAL INJURY. INTENTIONAL INTERRUPTION IS PROHIBITED. THE INSTRUMENT MUST BE MADE INOPERATIVE AND BE SECURED AGAINST ANY UNINTENDED OPERATION.

IF THE HP 5372A IS TO BE ENERGIZED VIA AN EXTERNAL AUTOTRANSFORMER FOR VOLTAGE REDUCTION, MAKE SURE THAT THE COMMON TERMINAL IS CONNECTED TO THE EARTH POLE OF THE POWER SOURCE. FAILURE TO GROUND THE INSTRUMENT CAN RESULT IN PERSONAL INJURY. REFER TO THE PARAGRAPH TITLED "Power Cable".

WARNING

THE AC POWER CIRCUITS TO TRANSFORMER T1 AND THE A12 MOTHERBOARD ARE ALWAYS ENERGIZED WHEN THE INSTRUMENT IS CONNECTED TO AC MAINS REGARDLESS OF THE SETTING OF THE FRONT-PANEL POWER SWITCH (STBY-ON). THE +25 VDC (UNREGULATED) ON THE A12 MOTHERBOARD, THE UNREGULATED DC VOLTAGE TO THE A7 PROCESSOR BOARD (BACK-UP RAMS U20 AND U56, REAL-TIME CLOCK U87), AND THE REGULATED DC VOLTAGE TO THE A15 OVEN OSCILLATOR HEATER ARE ALSO ALWAYS ON WHEN THE AC POWER IS CONNECTED TO THE HP 5372A, EVEN WHEN THE FRONT-PANEL STBY-ON SWITCH IS SET TO STBY. CONTACT WITH ANY OF THESE CIRCUITS CAN RESULT IN PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

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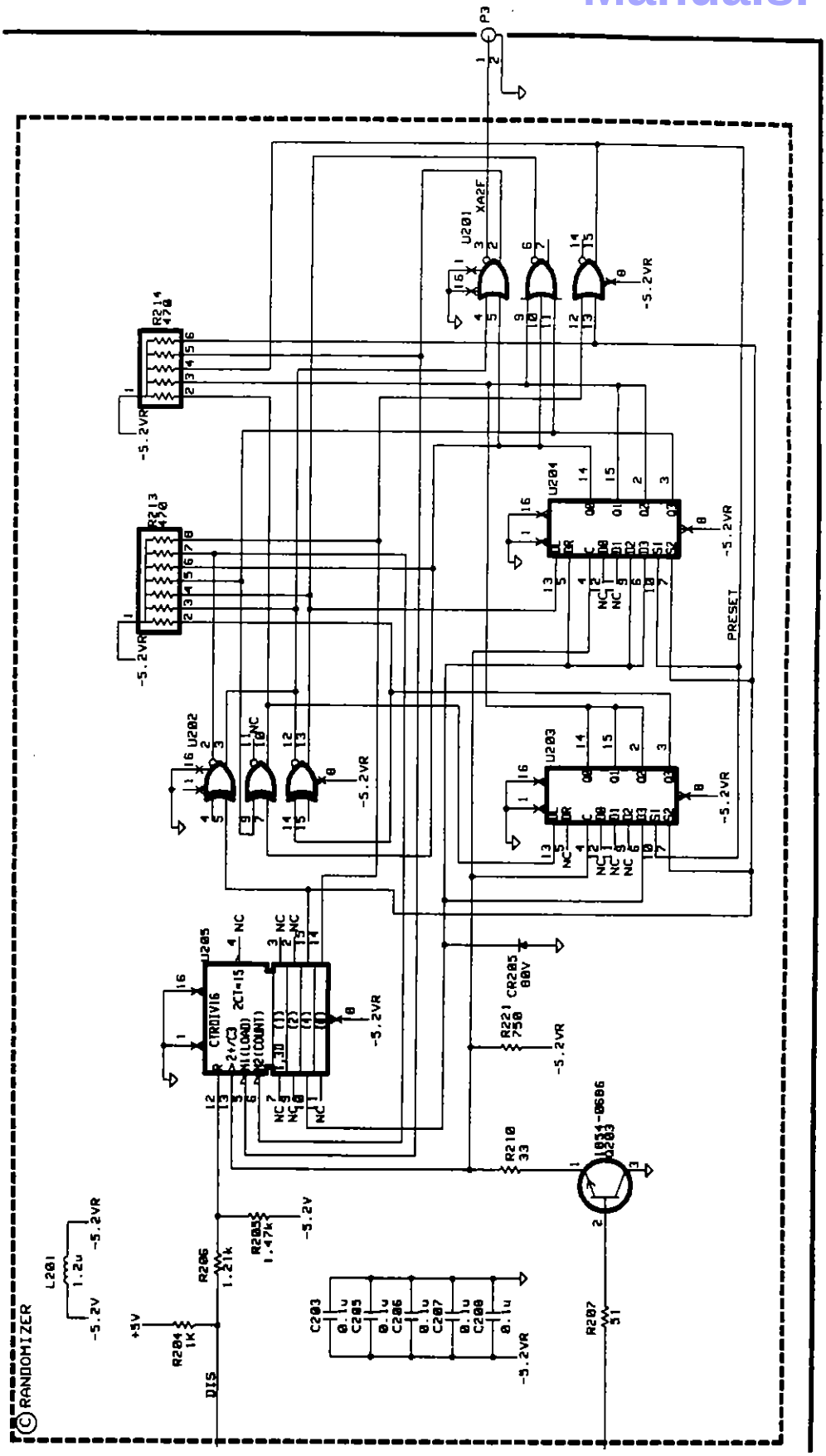

Part of Figure 7-11. A2 Input Amplifier board, Schematic Diagram
A2 DATE CODE 90423 (Sheet 3 of 3)

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Power line connections are selected by the position of the plug-in turret wheel in the A16 module. The correct value fuse, with a 250-volt rating, must be installed before the turret wheel is inserted. The HP 5372A uses a 4 Ampere fuse (HP Part Number 2110-0014) for 100/120-volt operation and a 2 Ampere fuse (HP Part Number 2110-0303) for 220/240-volt operation.

To change the line fuse, disconnect power cord W22 from the A16 module and then follow the instructions in *Figure 1-2*.

In addition, the HP 5372A has two internal, low-voltage fuses; a 10 Ampere fuse, A9F1, that protects the +25V Unregulated input to the A9 Double Regulator Board (HP P/N 2110-0713), and a thermal fuse, A15F1, contained within the A15 Oven Oscillator (HP P/N 2110-0617).

1-30. FRONT-PANEL LED ANNUNCIATORS

Several front-panel LED annunciators provide a visual indication of several of the instrument's status conditions. Two examples of status conditions are the HP-IB configuration and the trigger state.

1-31. HP-IB Status LEDs

RMT - The RMT annunciator LED is ON when HP 5372A is under remote control.

LSN - The LSN annunciator LED is ON when the HP 5372A is addressed to listen.

TLK - The TLK annunciator LED is ON when the HP 5372A is addressed to talk, or when it is being used in the TALK ONLY mode.

SRQ - The SRQ annunciator LED is ON when the HP 5372A sends a service request to the controller in charge of the HP-IB.

1-32. Instrument Control LEDs

GATE - The GATE annunciator LED shows the status of the HP 5372A's counter gate. Before a measurement starts, this LED is OFF, indicating the gate is closed. During a measurement, this LED turns ON, indicating the gate is open. When the gate duration is less than or equal to 100 milliseconds, the GATE LED remains ON for a minimum of approximately 100 milliseconds.

SINGLE - When the SINGLE annunciator LED is ON, the counter makes a single measurement and displays the result.

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1-33. EXTERNAL ARM, CHANNEL A, and CHANNEL B LEDs

All three of these LEDs provide a visual indication of the triggering status of each respective channel. If one of the three LEDs is flashing at a 10-Hz rate, the respective channel is triggering. If one of the LEDs is OFF the input signal to the respective channel is either above or below the trigger level setting.

1-34. STANDBY LED and Power (STBY-ON) Switch

When the STBY-ON switch is in the ON position, power is supplied to the entire instrument. The STBY position removes normal operating power to the instrument, but continues to supply power to both the A15 Oven Oscillator's internal oven to maintain a constant temperature for its crystal, and to two backup RAM ICs (A7U20 and U56) located on the A7 Processor Board. The front-panel STANDBY annunciator LED is ON when the switch is set to STBY. This means that the input to the main chassis-mounted transformer T1, and consequently the unregulated +25 Volts DC to the A15 oscillator oven and the LP voltage to the A7 backup RAMs are always energized whenever AC power is connected, regardless of the STBY-ON switch setting.

Note that the HP 5372A's A7 Processor Board is equipped with an internal battery for continuous memory storage of up to 10 separate front panel settings. The battery is NOT rechargeable.

1-35. Keyboard Memory

Whenever the HP 5372A is set to Standby, the 68020 microprocessor automatically stores the front-panel settings in memory energized by a back-up battery power supply. This avoids having to re-enter math constants, functions or input setups, whenever the instrument is set to Standby, AC power is removed from the instrument, or the A7 Processor Board is physically removed from the instrument.

1-36. HEWLETT-PACKARD INTERFACE BUS (HP-IB)

1-37. HP-IB Connections

The HP 5372A communicates over the HP-IB via the 24-pin connector located on the instrument's rear panel. The connector is compatible with the HP 10833A/B/C/D HP-IB cables. The HP-IB system allows the user to connect up to 15 (including the system controller) HP-IB compatible instruments. The HP-IB cables have identical "piggy-back" connectors at both ends of the cable allowing several cables to be connected to a single source without the need of special adapters or switch boxes.

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE A-3. WARRANTED SPECIFICATIONS (Continued):

All Serials

>Replace Resolution equation with the following:

$$\left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A) + 150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_A \qquad\qquad \text{Sample Interval}_B} \right) \times \text{Ratio}$$

>Replace Accuracy (for Frequency A/B) equation with the following:

$$\pm \text{Resolution} \pm \left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A) + 150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_A \qquad\qquad \text{Sample Interval}_B} \right) \times \text{Ratio}$$

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1-46. Rear Panel Inputs including Channel C (Option 090)

The Rear Panel Input including Channel C (090) is a field installable option. Option 090 includes 50 ohm BNC inputs for Channel A and B, a 1 M ohm input for External Arm, and a 50 ohms Type-N connector for Channel C. Front-panel input pods cannot be used with Option 090 installed. Channel A, B, and C performance for Option 090 is equivalent to front panel performance. External Arm performance for Option 090 is listed in Rear Panel Specifications, Appendix A. To retrofit this option, refer to see the Retrofit Option section of this chapter. This option can only be retrofitted to an HP 5372A.

1-47. Rack Mount Adapter Kit — With Handles Removed (Option 908)

The Rack Mount Adapter kit is a field installable option. Option 908 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5061-9678. The kit consists of two flanges and mounting hardware.

1-48. Rack Mount Flange Kit — With Handles Attached (Option 913)

The Rack Mount Flange Kit is a field installable option. Option 913 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5062-4072. The kit consists of two flanges and mounting hardware. This option supplies two rack flanges and mounting hardware for instruments already equipped with front handles.

1-49. Extended Warranty Support (Option W30)

Option W30 provides two additional years of return-to-HP hardware-service support. Option W30 is available only at the time of instrument purchase. Service contracts are available from Hewlett-Packard for instruments which did not include Option W30 at the time of purchase. For more information, contact your nearest Hewlett-Packard Sales and Support office.

1-50. HP Calibration Service (Option W32)

Option W32 provides three years of return-to-HP calibration service.

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 10-21, FIGURE 10-9. A5 EVENT BOARD, COMPONENT LOCATOR:

3041A
> Change R22 to C122.
> Delete R85.
> Delete TP4.

3045A
A5 (05372-60005) Date Code 90452
> Delete A5R38, above U72.

PAGE 10-23 FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 1 of 6):

3045A
A5 (05372-60005) Date Code 90452
> Delete A5R38, 82 ohms, to the left of U72.
> Change A5R40 value from 120 ohms to 100 ohms.

PAGE 10-25, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 2 of 6):

3041A
> Delete R14.
> Change A5R15 value from 10 ohms to 0 ohms.
> Replace A5R13 with A5C113, .1uF.
> Delete TP 1.

PAGE 10-27, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 3 of 6):

3041A
> Change A5R84 value from 10 ohms to 0 ohms.
> Delete A5R85.
> Replace A5R22 with A5C122, .1UF.
> Delete TP 4.

PAGE 11-11, FIGURE 11-3. A12 MOTHERBOARD SCHEMATIC DIAGRAM:

2952A00446 & above
A12 SCHEMATIC DIAGRAM NOTES:
> Change fuse HP Part Number from 2110-0055 to 2110-0014; change rating from "NO TIME DELAY" to "TIME DELAY".

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1-51. RETROFIT OPTIONS

The following sections contain retrofit installation procedures for Options 030, 060, and 090.

1-52. INSTRUCTIONS FOR INSTALLING OPTION 030 C-CHANNEL RETROFIT KIT, HP P/N 05372-67002

1-53. Introduction

This installation note provides instructions for installing the Option 030 C-Channel Retrofit kit, HP P/N 05372-67002. This procedure applies to all HP 5372A series prefixes.

1-54. Parts Included

The HP 5372A Option 030 Retrofit Kit, HP P/N 05372-67002, contains the following parts:

HP Part Number	Description	Quantity
05372-60020	C-Channel Board	1
05372-60224	Front panel cable (semi-rigid)	1
05372-60229	Power supply ribbon cable	1
05372-60230	C-Channel cable SMA(m)-SMA(m)	1
05372-60231	C-Channel Extension cable SMA(f)-SMA(m)	1
05372-80010	Front panel label	2
0515-0897	Screws	4
0590-0505	Knurled nut	1
1250-1562	Adapter N(f)-SMA(m)	1
1400-0611	Cable clamp	1

1-55. Tools Required

5/16 Open-End Wrench, Pozidriv Screwdriver, Utility Knife

1-56. Option 030 Installation Procedure

CAUTION

The following installation requires that you follow proper static prevention measures to avoid static damage to parts and internal assemblies in the HP 5372A. This procedure should only be performed by someone familiar with these techniques.

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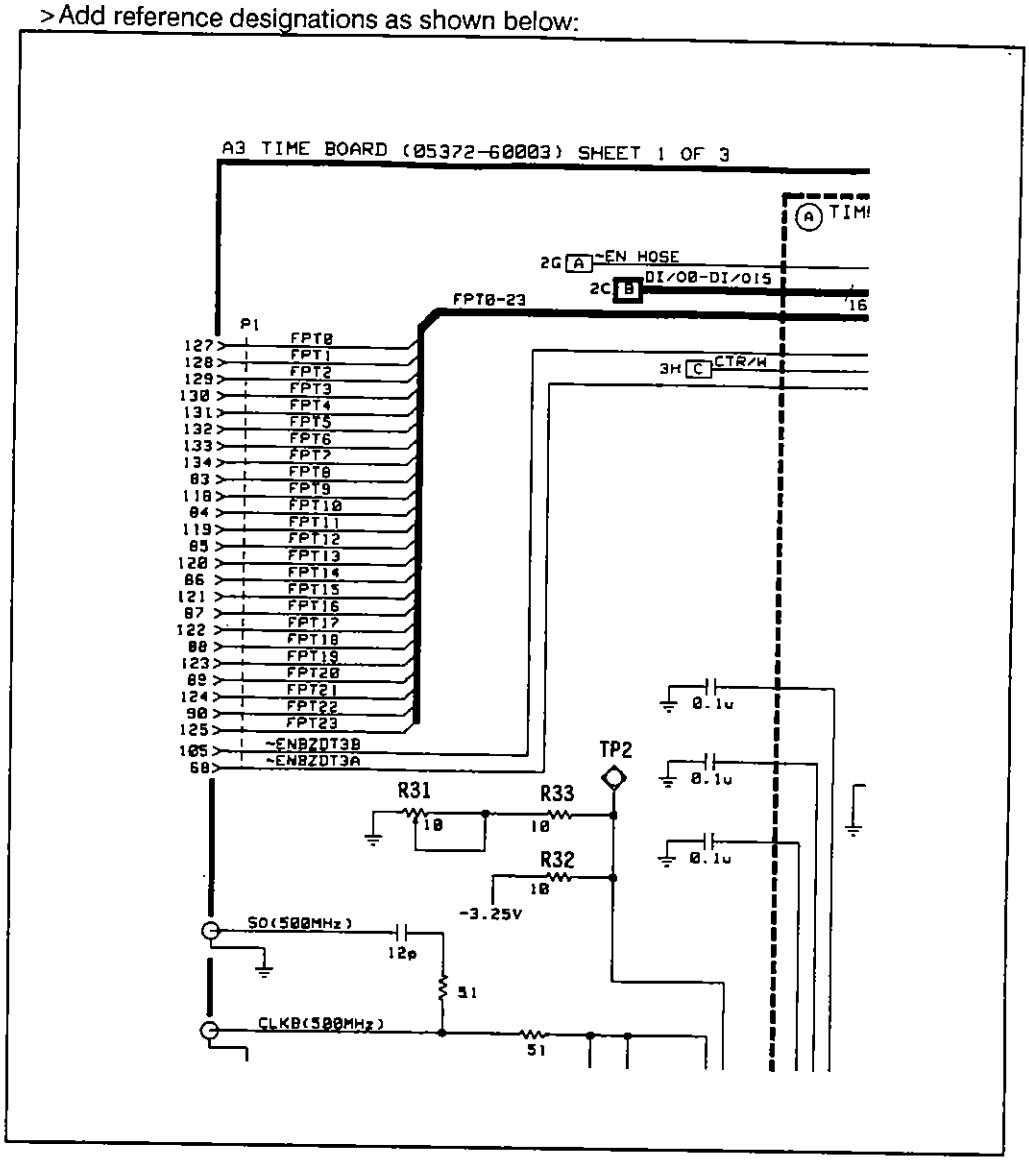
MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 8-11, FIGURE 8-4. A3 TIME BOARD SCHEMATIC DIAGRAM (Sheet 1 of 3):

All Serials

>Add reference designations as shown below:



2952A00276 & above

>Add A3R100 (51 ohms) and A3C100 (330 pf) from A3U14 Pin 17 to ground.

3041A

>Delete A3TP 2.
>Delete A3R32, 10 ohms.
>Change A3R33 value from 10 ohms to 0 ohms.
>Replace A3R31 with A3C131, .1UF.

3141A

>Change A3C100 value from 330pf to 331 pf.
>Delete TP100.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2	05372-60002	3	1	INPUT AMPLIFIER BOARD (DATE CODE 90423)	28480	05372-60002
A2C1	0180-2207	5	2	CAP-FXD 100uF 10 V TA	56289	150D107X9010P2
A2C2	0160-0576	5	23	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C3	0180-0098	8	2	CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C7	0180-0098	8		CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C8	0160-4371	6	4	CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C9	0160-3879	7	6	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C10	0180-3847	1	4	CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C11	0160-4040	6	2	CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C12	0180-3941	6	2	CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C16	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C18	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C19	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C22	0180-3775	4	4	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C23	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C24	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C31	0160-4040	6		CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C32	0180-3941	6		CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C34	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C36	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C37	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C41	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C42	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C44	0160-3875	3	2	CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C45	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C46	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C47	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C48	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A2C49	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C51	0160-3875	3		CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C201	0160-4557	0	7	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C202	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C203	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C204	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C205	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C206	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C207	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C208	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C209	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C210	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C211	0160-4801	7	2	CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V
A2C212	0160-4791	4	2	CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C213	0160-4791	4		CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C214	0160-4801	7		CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGES 4-26/4-28, TABLE 4-2. MISCELLANEOUS HARDWARE AND CHASSIS PARTS:

All Serials
> Change A16 POWER MODULE CABLE from 51083-60108 to 05371-60231.

2952A00446 & above
> Replace page 4-26 with page 4-26 (Series 2952A00446 and above) supplied in these manual changes.

PAGE 7-23, FIGURE 7-10. A2 INPUT AMPLIFIER BOARD COMPONENT LOCATOR:

3041A
A2 (05372-60002) Date Code 90423.
> Delete R203, below U15.
> Delete R219 and R220 on far right side near L1/L201.

PAGE 7-29, FIGURE 7-11. A2 INPUT AMPLIFIER BOARD SCHEMATIC DIAGRAM:

3041A
A2 (05372-60002) Date Code 90423.
> Replace Randomizer portion of the schematic diagram with the diagram on the following page.

PAGE 8-9, FIGURE 8-3. A3 TIME BOARD, COMPONENT LOCATOR:

2952A00276
> AC termination consisting of C100, R100 have been added to the circuit side of A3U14 Pin 17.

3041A
> Change R31 to C131.
> Delete R32.
> Delete TP2.

3141A
> A3C100 and R100 have been moved from the circuit side of the board to the component side between U14 and U15.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2C215	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C216	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2CR1	1902-0959	3	2	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR2	1902-0956	0	2	DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR3	1902-0953	7	2	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR4	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR5	1902-0945	7	4	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR6	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR8	1902-0959	3		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR9	1902-0953	7		DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR10	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR13	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR14	1902-0956	0		DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR201	1902-0943	5	2	DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR202	1902-0943	5		DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR205	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2H1	0515-0659	8	16	SCREW-MACHINE ASSEMBLY M2 X 0.4 8MM-LG	00000	ORDER BY DESCRIPTION
A2H2	05371-20201	9	4	HEATSINK	28480	05371-20201
A2H3	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A2H4	0380-1731	2	16	SPACER-PRESS-IN 1.70 MM LG; 2.38 MM ID	46384	YC3-4564
A2H5	3050-0891	7	1	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A2H6	0535-0004	9	1	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
A2H7	0515-0406	3	1	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A2J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J2	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2J3	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2K1	0490-1554	0	8	RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K2	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K3	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K4	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K5	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K6	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K7	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K8	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2L1	9140-1170	4	10	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L3	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L4	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L5	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L6	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L7	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L8	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L9	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L201	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2MP1	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
A2MP2	54100-29101	2	4	SPRING-HYBRID	28480	54100-29101
A2MP3	54100-29104	5	4	CLAMP-HYBRID	28480	54100-29104
A2P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A2P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A2P3	1250-2052	8	1	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A2Q1	1853-0314	9	4	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q2	1854-0090	0	4	TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q3	1854-0686	0	5	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q4	1854-0092	2	4	TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q5	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 1-15. GENERAL INFORMATION:

2952A00446 & above ALL

>Change fuse part number from 2110-0055 to 2110-0014 in line 3 of the first paragraph.

PAGE 1-34. FIGURE 1-11. REAR PANEL FEATURES:

2952A00446

>Change "4.0 A" to "4.0 AT" in Fuse information.

PAGES 3-28/3-30 ADJUSTMENT PROCEDURES:

3041A

>Delete A3 and A5 ZDT Bias Adjustment procedures, paragraphs 3-25 thru 3-27.
>Delete VCS Bias Adjustment procedures, paragraph 3-28.

PAGE 4-2. REPLACEABLE PARTS:

3041A00581

4.3 SPECIAL PARTS REPLACEMENT CONSIDERATIONS:
>Change A9 HP part number from 05372-60009 to 05371-60009.

PAGES 4-5/4-9, TABLE 4-2. A2 INPUT AMPLIFIER REPLACEABLE PARTS:

3041A

A2 (05372-60002) DATE CODE 90423
>Replace A2 Replaceable Parts list with Date Code 90423 parts list supplied in these manual changes.

PAGES 4-10/4-12. TABLE 4-2. A3 TIME BOARD REPLACEABLE PARTS:

2952A00276

>~~Add C100, 0160-4810, CAPACITOR-FXD 330PF +-5% 100V CER COG.~~
>Add R100, 0699-1542, RESISTOR-FXD 51 +-1% .125 TF TC=0+-50.
>Add TP100, 1251-5177, CONNECTOR-SGL CONT PIN .031-IN-BSC-SZ.
>Add XU14, 1200-0825, SOCKET-IC DIP 20-CONT DIP-SLDR.

3041A

>Replace A3 Replaceable Parts List with Date Code 90402 parts list supplied in these manual changes.

3141A

>Change A3C100 from 0160-4810 (330pf) to 0160-4031 CAPACITOR-FXD 331PF +-5% 100V CER COG.
>Delete TP100.
>Delete XU14.

PAGES 4-17/4-21. TABLE 4-2. A5 EVENT BOARD REPLACEABLE PARTS:

3041A

>Replace A5 Replaceable Parts List with Date Code 90404 parts list supplied in these manual changes.

3045A

>Replace A5 Replaceable Parts List with Date Code 90452 parts list supplied in these manual changes.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q7	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q9	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q10	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q11	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q12	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q13	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q14	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q15	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q16	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q201	1854-0215	1	2	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q202	1854-0215	1		TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q203	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2R1	2100-3749	6	2	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R2	2100-0545	4	2	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R3	2100-3749	6		RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R4	2100-0545	4		RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R5	0698-3446	3	4	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R6	0698-7196	8	3	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R7	0698-3613	6	4	RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R8	0698-7212	9	8	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R9	0698-7254	9	4	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R10	2100-3750	9	4	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R11	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R12	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R13	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R14	2100-3759	8	2	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R15	2100-3759	8		RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R16	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R17	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R18	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R19	0699-1320	0	4	RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R20	0699-2358	6	2	RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R21	0699-2263	2	2	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R22	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R23	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R24	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R25	0699-2245	0	2	RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R26	0699-1542	8	19	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R27	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R28	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R29	0698-7234	5	2	RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R30	0698-7256	1	3	RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R31	0698-7232	3	2	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R32	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R33	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R34	0698-7262	9	2	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R38	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R39	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R40	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R41	0698-7236	7	6	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R42	0699-1769	1	2	RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R43	0698-7220	9	7	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R44	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R45	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R46	0698-7260	7	12	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R47	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R48	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R49	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R51	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R52	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R53	0699-2358	6		RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R54	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R55	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R56	0698-7234	5		RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R57	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R58	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R59	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R60	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R61	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R62	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R63	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R66	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R67	0699-2245	0		RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R68	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R69	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R70	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R71	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R74	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R75	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R76	0698-7262	9		RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R77	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R78	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R79	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R80	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R81	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R82	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R83	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R84	0698-7257	2	2	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A2R85	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R86	0698-6360	6	2	RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R87	0698-7237	8	3	RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R88	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R89	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R90	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R91	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R92	0699-1769	1		RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R93	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R94	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R95	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R96	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R98	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R99	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R100	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R102	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A2R103	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R104	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R105	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R107	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R108	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R109	0698-7235	6	1	RESISTOR 909 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-909R-F
A2R110	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R111	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R112	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R113	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A2R114	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R115	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R116	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R117	0698-7257	2		RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F

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MANUAL UPDATING CHANGES

CHANGE DATE: October 4, 1991

MANUAL UPDATING COVERAGE	MANUAL IDENTIFICATION
This supplement adapts your manual to instruments with Serial Numbers prefixed through 3141 and Firmware revision 2947	**Instrument:** HP 5372A Frequency & Time Interval Analyzer Service Manual **Manual Part Number:** 05372-90016 **Manual Print Date:** APRIL 1990

ABOUT THIS SUPPLEMENT

The information in this supplement is provided to correct manual errors and to adapt the manual to instruments containing changes after the manual print date.

Change and correction information in this supplement is itemized by page numbers corresponding to the original manual pages. The pages in this supplement are organized in numerical order by manual page number.

HOW TO USE THIS SUPPLEMENT

Insert this title page in front of the title page in your manual.

Perform all changes specified for "All Serials", and all changes through the Series Prefix of your instrument or board.

Insert any complete replacement pages provided into your manual in the proper location. The following pages are included in this update packet: 4-5/4-11, 4-17/4-21, 4-25/4-26

If your manual has been updated according to the last edition of this supplement, you need only perform those changes pertaining to the new series prefix; see List of Effective Pages. New information affecting "All Serials" will be indicated by a "#" in front of the change.

HEWLETT PACKARD

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R118	0698-6360	6		RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R202	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R203				NOT ASSIGNED		
A2R204	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R205	0698-7240	3	1	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R206	0698-7238	9	1	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R207	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R208	0757-0441	8	2	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R209	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R210	0699-1991	1	1	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A2R211	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R212	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R213	1810-0203	5	1	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A2R214	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A2R215	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R216	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R217	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R218	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R219				NOT ASSIGNED		
A2R220				NOT ASSIGNED		
A2R221	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A2U1	0955-0404	3	2	U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U2	1NB7-8076	3	2	DCOFFSET HYBRID	28480	1NB7-8076
A2U3	1826-0275	4	2	IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U4	1NB7-8109	3	2	SYNC COMP HYBRID	28480	1NB7-8109
A2U5	1820-2000	5	2	IC FF ECL D-M/S POS-EDGE-TRIG	28480	8196D-0100
A2U6	1826-0311	9	2	IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U7	1826-0609	8	2	ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U8	1826-1049	2	2	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U9	1826-0282	3	2	IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U10	1826-0285	6	2	IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U11	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	8196D-0100
A2U12	1820-3394	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS09N
A2U13	0955-0404	3		U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U14	1NB7-8076	3		DCOFFSET HYBRID	28480	1NB7-8076
A2U15	1NB7-8109	3		SYNC COMP HYBRID	28480	1NB7-8109
A2U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U17	1826-0275	4		IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U18	1826-0311	9		IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U19	1826-0635	0	2	IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U20	1826-1246	1	2	D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U21	1826-0609	8		ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U22	1826-1049	2		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U23	1826-0285	6		IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U24	1826-0282	3		IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U25	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A2U26	1820-2273	4	1	IC-INTERFACE DRVR PERIPHERAL GENERAL	56289	UDN-2981A
A2U27	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U28	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2U29	1826-0635	0		IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U30	1826-1246	1		D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U201	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL 2-INP	04713	MC10H105P
A2U202	1820-2956	0	1	IC GATE ECL/10KH EXCL-OR/NOR TPL 2-INP	04713	MC10H107P
A2U203	1820-3579	5	2	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U204	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U205	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A2U206	1826-0521	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072CP
A2U207	1826-1204	1	1	D/A 8-BIT 20-PLASTIC CMOS	24355	AD7528JN
	0340-0864	6	1	INSULATOR-XSTR THRM-CNDCT	18565	69-11-A536-1671
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3	05372-60003	4	1	TIME BOARD (DATE CODE 90402)	28480	05372-60003
A3C1	0160-0576	5	53	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C2	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C3	0160-3879	7	3	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C7	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C8	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C12	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C22	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C32	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C33	0160-4521	8	1	CAP-FXD 12pF 200 V	09969	RPE121-105C0G120J200V
A3C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C41	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C42	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C43	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C44	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C45	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C46	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C47	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C48	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C49	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C50	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C51	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C52	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C53	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C58	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C59	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C60	0160-4031	5	4	CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V

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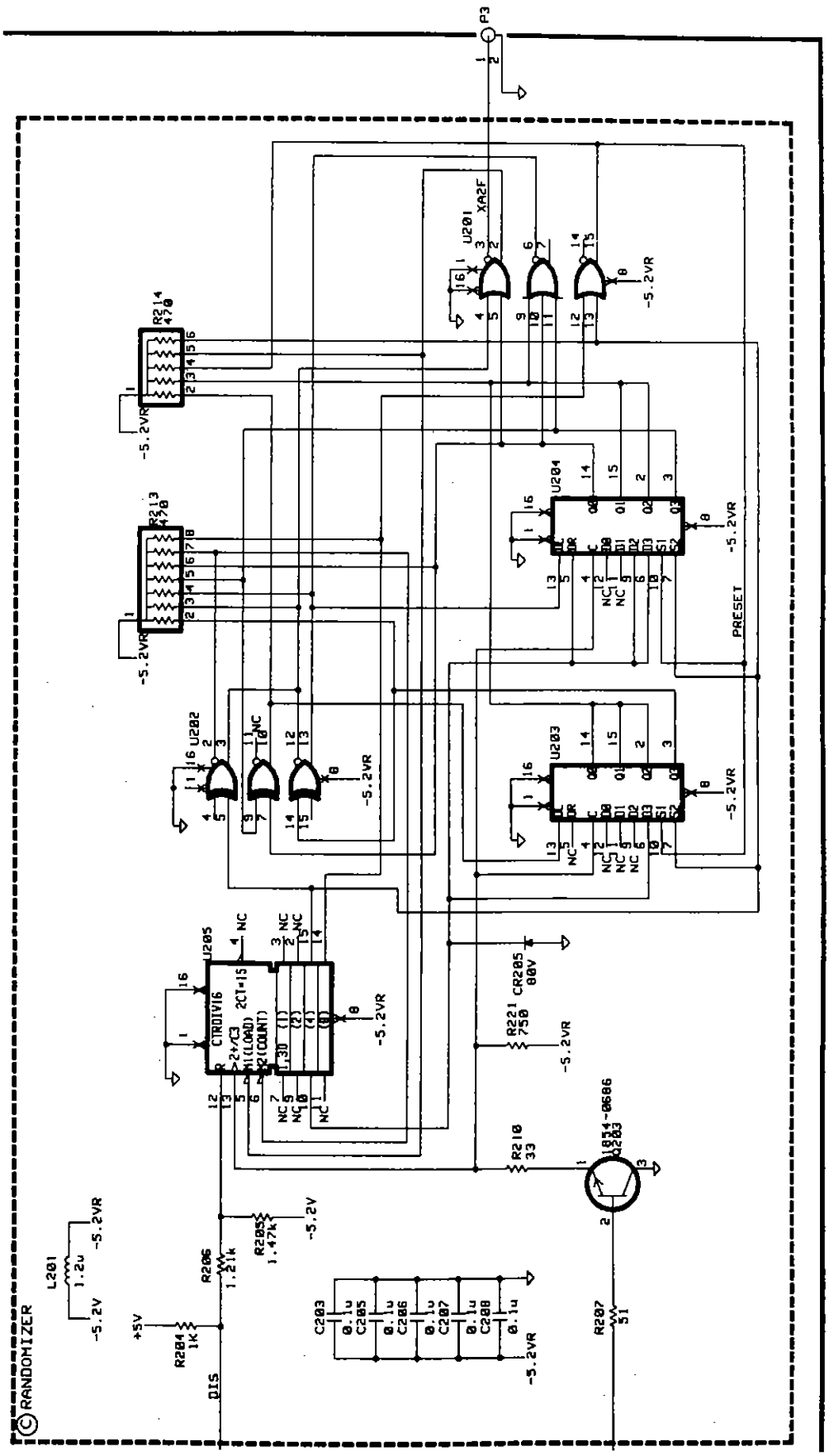

Part of Figure 7-11. A2 Input Amplifier board, Schematic Diagram
A2 DATE CODE 90423 (Sheet 3 of 3)

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 90402)		
A3C61	0160-4031	5		CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C62	0160-4031			CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C63	0160-4031			CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C131	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A3CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3DL1	1810-1019	3	1	DELAY LINE ACTIVE DEVICE W/DUAL IN-LINE	92912	0447-0051-85
A3DL2	1810-1326	5	3	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL3	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL4	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL5	1810-1107	0	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3DL6	1810-1107	0		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3J1	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A3J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A3L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A3P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A3P3	1250-2052	8	2	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3P4	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3R1	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	C1433	750-61
A3R2	0699-2263	2	6	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R3	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R4	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R5	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R6	1810-0800	8	1	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A3R7	1810-0341	2	1	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A3R8	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R9	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R10	1810-0280	8	7	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R11	0699-1542	8	6	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R12	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R13	1810-0270	6	4	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R14	0699-2253	0	3	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R15	0699-2252	9	3	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R16	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R17	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R18	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R19	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R20	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R22	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R25	1810-0366	1	2	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R26	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R28	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R29	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R30	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R31				NOT ASSIGNED		
A3R32				NOT ASSIGNED		
A3R33	8159-0005	0	1	RESISTOR ZERO OHMS 22AWG	28480	8159-0005
A3R34	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3U1	1818-4675	9	3	IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U2	1820-2698	7	1	IC DRVR TTL F LINE DRVR OCTL	18324	74F240N
A3U3	1820-2691	0	1	IC FF TTL F D-TYPE POS-EDGE-TRIG	18324	74F74N
A3U4	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U5	1820-3143	9	1	IC FF TTL ALS D-TYPE POS-EDGE-TRIG DUAL	01295	SN74ALS874NT

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 90402)		
A3U6	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U7	1820-3438	5	1	IC MUXR/DATA-SEL TTL ALS 2-TO-1-LINE	01295	SN74ALS257N
A3U8	1820-2701	3	2	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U9	1820-3227	0	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F257N
A3U10	1820-6535	9	1	IC GATE-ARY CMOS	10411	LMA9284
A3U11	1820-2701	3		IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U12	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U13	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U14	1820-4350	2	1	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS241BN
A3U15	1820-3121	3	7	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U16	1820-2848	9	1	IC RCVR ECL/10KH LINE RCVR TPL	04713	MC10H116P
A3U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U18	1820-2654	5	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F157N
A3U19	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U20	1820-3707	1	5	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U21	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U22	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U23	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U24	1820-5821	4	1	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74FS74N
A3U25	1818-4134	5	5	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U26	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U27	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U28	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U29	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U30	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U31	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U32	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U33	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U34	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U35	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U36	1820-5789	3	4	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U37	1DK5-0002	7	2	IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U38	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U39	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U40	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U41	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U43	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U44	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3XU10	1200-1470	7	1	SOCKET-IC-PGA 145-CONT SQUARE DIP-SLDR	00779	55275-4
A3XU37	1200-1372	8	2	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A3XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				AS EVENT BOARD (DATE CODE 9045L)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	ICS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	ICS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	ICS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	ICS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	ICS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD (DATE CODE 9040)	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	PPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9045Z)		
A5P76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15Y0-82-F
A5P77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15Y0-121-F
A5P78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5P79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15Y0-471-F
A5P80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5P81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15Y0-121-F
A5P82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15Y0-82-F
A5P83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5P84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5P85				NOT ASSIGNED		
A5P86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5P90				NOT ASSIGNED		
A5P91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15Y0-331-F
A5P92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5P93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15Y0-331-F
A5P94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	2	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90452)		
A5P11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5P12				NOT ASSIGNED		
A5P13				NOT ASSIGNED		
A5P14				NOT ASSIGNED		
A5P15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5P16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5P17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5P18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5P19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P22				NOT ASSIGNED		
A5P23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5P29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	10	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5P35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R38				NOT ASSIGNED		
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R40	0699-2263	2	1	RESISTOR 100 +-1% .125W TF TC=0+-50	28480	0699-2263
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE1SYQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R12				NOT ASSIGNED		
A5P13				NOT ASSIGNED		
A5R14				NOT ASSIGNED		
A5R15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5R16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5R17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22				NOT ASSIGNED		
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	11	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9045)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-60
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5P77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5P78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R85				NOT ASSIGNED		
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R90				NOT ASSIGNED		
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD (DATE CODE 9045C)	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				MISCELLANEOUS HARDWARE AND CHASSIS PARTS (SERIAL NUMBER 2952A00446 AND ABOVE)		
A1	05372-60001	8	1	BD AY-TB CONTROL	28480	05372-60001
A2	05372-60002	9	1	BD AY-INPUT AMP	28480	05372-60002
A3	05372-60003	0	1	BD AY-TIME	28480	05372-60003
A4	05372-60004	1	1	BD AY-INTERP	28480	05372-60004
A5	05372-60005	2	1	BD AY-EVENT	28480	05372-60005
A6	05372-60006	3	1	BD AY-CNT SPRT	28480	05372-60006
A7	05372-60007	4	1	BD AY-PROCESSOR	28480	05372-60007
A7U16	05372-80032	3	1	EPROM-80032	28480	05372-80032
A7U17	05372-83033	4	1	EPROM-80033	28480	05372-80003
A7U18	05372-80034	5	1	EPROM-80034	28480	05372-80034
A7U19	05372-83035	6	1	EPROM-80035	28480	05372-80005
A7U52	05372-80036	7	1	EPROM-80036	28480	05372-80036
A7U53	05372-80037	8	1	EPROM-80037	28480	05372-80037
A7U54	05372-80038	9	1	EPROM-80038	28480	05372-80038
A7U55	05372-80039	0	1	EPROM-80039	28480	05372-80039
A8	05372-60008	5	1	BD AY-IO CONTROL	28480	05372-60008
A9	05372-60009	6	1	BD AY-DOUBLE REG	28480	05372-60009
A10	51089-60015	1	1	BD AY TRIPLE REG	28480	51089-60015
A11	05371-60011	3	1	BD AY-FRONT PNL	28480	05371-60011
A12	05372-60012	1	1	BD AY-MOTHER	28480	05372-60012
A13	05372-60013	6	1	BD AY-REAR PANEL	28480	05372-60013
A14	05371-60014	6	1	BD AY-TB MULT	28480	05371-60014
A15	10811-60111	8	1	QUARTZ OSC 10MHZ	28480	10811-60111
A16	05371-60231	9	1	CBL AY-PWR MOD	28480	05371-60231
A17	2090-0209	4	1	CRT ASSY-7" W/PCB	28480	2090-0209
A20	05372-60020	1	1	BD AY-C CHAN 030	28480	05372-60020
A20	05372-60020	1	1	BD AY-C CHAN 090	28480	05372-60020
A22	05372-60022	3	1	BD AY-FAST PORT 020	28480	05372-60022
B1	3160-0521	3	1	FAN-TBAX 100-CFM 12VDC	11045	4312-26
C1	0180-3572	9	1	CAP-FXD 50 V AL-ELCTLT	56289	36DE373G050BF2A
C2	0160-3036	8	4	CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C3	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C4	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C5	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
CR1	1906-0231	2	1	DIODE-CT-RECT 200V 15A	28480	1906-0231
F1	2110-0303	9	1	FUSE (INCH) 2A 250V NTD FE UL (SLOW BLO)	75915	312 002
F1	2110-0014	3	1	FUSE (INCH) 4A 250V TD FE UL	75915	313 004
H1	0380-1523	0	2	STANDOFF-HEX 10.1-MM-LG M3.5 X 0.6-THD	14480	TJL 100.305
H3	0515-0411	0	4	SCREW-MACH M3 X 0.5 22MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H4	0515-0885	2	19	SCREW-MACH M4 X 0.7 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6	77	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H6	0515-0896	5	14	SCREW-MACH M4 X 0.7 10MM-LG	00000	ORDER BY DESCRIPTION
H7	0515-1110	8	6	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H8	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
H9	0515-1232	5	10	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H10	0515-1323	5	20	SCREW-MACH M3 X 0.5 30MM-LG PAN-HD	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A20	05372-60020	5	1	C-CHANNEL BOARD	28480	05372-60020
A20C1	0160-6100	3	8	CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C2	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C3	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C5	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C7	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C9	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C11	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C12	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C13	0160-7193	6	8	CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C14	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C15	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C16	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C17	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C18	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C19	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C20	0160-5789	2	2	CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C21	0180-3922	3	1	CAP-FXD 15 uF 20 V	00039	NRD156M20R12
A20C22	0180-3755	0	1	CAP-FXD 33 uF 10 V	00039	NRD336M10R12
A20C23	0160-5789	2		CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C24	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20D1	1900-0231	0	3	DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D2	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D3	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D4	1902-1544	4	1	DIODE-ZNR 10 V X% .35W		
A20J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J2	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J3	1252-3345	8	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-3345
A20L1	9140-1117	9	5	COIL 47 uH 5%	06352	NL45323T-470J
A20L2	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L3	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L4	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L5	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L7	9140-1109	9	2	COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L8	9140-1109	9		COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L9	9140-1075	8	4	COIL 1 uH 30%	05826	9140-1075
A20L10	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L11	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L12	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20R1	0699-1318	6	1	RESISTOR 1K +-1% .125W	05524	CRCW1206F
A20R2	0699-2697	6	4	RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R3	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R4	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R5	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20U1	5088-7037	8	1	1.6 GHZ ATTEN	28480	5088-7037
A20U2	1826-1613	6	4	IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U3	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U4	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U5	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U6	1820-6555	3	1	IC DIVR ECL DIV-X-4	28480	QDMP-7004
	0361-0028	8	14	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0515-0894	3	6	SCREW-MACH M2.5 X 0.45 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	05305-00010	6	1	CLAMP-GRNDING	28480	05305-00010
	0535-0008	3	2	NUT-HEX DBL-CHAM M2.5 X 0.45 2MM-THK	00000	ORDER BY DESCRIPTION
	05372-20203	2	1	HEATSINK	28480	05372-20203
	05372-00025	4	1	HYBRID CLAMP	28480	05372-00025

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WARRANTED SPECIFICATIONS (Continued)

Frequency or Period Ratio

Range:

Channel A and B: **250 mHz [16 kHz] to 500 MHz (2 ns to 4.0 s [65 µs]).**

Channel C: **100 MHz to 2 GHz (0.5 ns to 10 ns).**

Least Significant Digit Displayed:

$$\pm \frac{200\text{ps}}{\text{Sample Interval}} \times \text{Ratio}$$

Resolution:

$$\pm\left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A)}{\text{Sample Interval}_A} + \frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_B}\right) \times \text{Ratio}$$

Accuracy (for Frequency A/B):

$$\pm \text{Resolution} \pm\left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A)}{\text{Sample Interval}_A} + \frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_B}\right) \times \text{Ratio}$$

Totalize

Resolution:

±1 count of input per measurement sample, for each channel.

For A/B:

$$\pm \frac{\text{Totalize Result A} \pm 1}{\text{Totalize Result B} \mp 1}$$

For B/A:

$$\pm \frac{\text{Totalize Result B} \pm 1}{\text{Totalize Result A} \mp 1}$$

Accuracy:

± Resolution

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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WARRANTED SPECIFICATIONS (Continued)

Time Interval

Range:

Time Interval: **10 ns to 8.0 s [131 μs].**

Continuous Time Interval: **100 ns [75 ns] to 8.0 s [131 μs].**

± Time Interval: **- 4.0 s [- 65 μs] to +4.0 [+ 65 μs], including 0 seconds.**

Least Significant Digit Displayed:

N = number of measurements averaged.

$$\pm \frac{200\ \text{ps}}{\sqrt{N}}$$

Resolution:

$$\pm \frac{150\ \text{ps rms} \pm \text{Start Trigger Error} \pm \text{Stop Trigger Error}}{\sqrt{N}}$$

Accuracy:

± Resolution ± (Time Base Aging x Time Interval) ± Trigger Level Timing Error ± 1 ns Systematic Error.

Time Deviation

Signal Input Range:

2 ns to 8.0 s [131 μs].

Least Significant Digit Displayed:

± 200 ps.

Resolution:

±150 ps rms ± (1.4 x Trigger Error).

Accuracy:

±Resolution± (Time Base Aging x Time Interval) ± 1 ns Systematic Error.

Automatic Carrier Determination

rms Resolution (for Number of Measurements per Block ≥3):

$$\frac{\sqrt{13.5} \times (150\text{ps rms} + 1.4 \times \text{Trigger Error})}{(\text{Number of Blocks})^{1/2} \times (\text{Number of Measurements per Block})^{3/2} \times \text{Sample Interval}} \times \text{Frequency}$$

Accuracy:

± Resolution ± (Time Base Aging x Frequency).

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9040)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R85				NOT ASSIGNED		
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5P90				NOT ASSIGNED		
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3938	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R12				NOT ASSIGNED		
A5R13				NOT ASSIGNED		
A5R14				NOT ASSIGNED		
A5R15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22				NOT ASSIGNED		
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	11	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A20	05372-60020	5	1	C-CHANNEL BOARD	28480	05372-60020
A20C1	0160-6100	3	8	CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C2	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C3	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C5	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C7	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C9	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C11	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C12	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C13	0160-7193	6	8	CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C14	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C15	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C16	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C17	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C18	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C19	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C20	0160-5789	2	2	CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C21	0180-3922	3	1	CAP-FXD 15 uF 20 V	00039	NRD156M20R12
A20C22	0180-3755	0	1	CAP-FXD 33 uF 10 V	00039	NRD336M10R12
A20C23	0160-5789	2		CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C24	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20D1	1900-0231	0	3	DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D2	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D3	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D4	1902-1544	4	1	DIODE-ZNR 10 V X% .35W		
A20J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J2	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J3	1252-3345	8	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-3345
A20L1	9140-1117	9	5	COIL 47 uH 5%	06352	NL45323T-470J
A20L2	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L3	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L4	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L5	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L7	9140-1109	9	2	COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L8	9140-1109	9		COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L9	9140-1075	8	4	COIL 1 uH 30%	05826	9140-1075
A20L10	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L11	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L12	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20R1	0699-1318	6	1	RESISTOR 1K +-1% .125W	05524	CRCW1206F
A20R2	0699-2697	6	4	RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R3	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R4	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R5	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20U1	5088-7037	8	1	1.6 GHZ ATTEN	28480	5088-7037
A20U2	1826-1613	6	4	IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U3	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U4	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U5	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U6	1820-6555	3	1	IC DIVR ECL DIV-X-4	28480	QDMP-7004
	0361-0028	8	14	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0515-0894	3	6	SCREW-MACH M2.5 X 0.45 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	05305-00010	6	1	CLAMP-GRNDING	28480	05305-00010
	0535-0008	3	2	NUT-HEX DBL-CHAM M2.5 X 0.45 2MM-THK	00000	ORDER BY DESCRIPTION
	05372-20203	2	1	HEATSINK	28480	05372-20203
	05372-00025	4	1	HYBRID CLAMP	28480	05372-00025

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9040A)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				MISCELLANEOUS HARDWARE AND CHASSIS PARTS (SERIAL NUMBER 2952A00446 AND ABOVE)		
A1	05372-60001	6	1	BD AY-TB CONTROL	28480	05372-60001
A2	05372-60002	9	1	BD AY-INPUT AMP	28480	05372-60002
A3	05372-60003	0	1	BD AY-TIME	28480	05372-60003
A4	05372-60004	1	1	BD AY-INTEPP	28480	05372-60004
A5	05372-60005	2	1	BD AY-EVENT	28480	05372-60005
A6	05372-60006	3	1	BD AY-CNT SPPT	28480	05372-60006
A7	05372-60007	4	1	BD AY-PROCESSOR	28480	05372-60007
A7U16	05372-80032	3	1	EPROM-80032	28480	05372-80032
A7U17	05372-80033	4	1	EPROM-80033	28480	05372-80003
A7U18	05372-80034	5	1	EPROM-80034	28480	05372-80034
A7U19	05372-80035	6	1	EPROM-80035	28480	05372-80005
A7U52	05372-80036	7	1	EPROM 80036	28480	05372-80036
A7U53	05372-80037	8	1	EPROM-80037	28480	05372-80037
A7U54	05372-80038	9	1	EPROM-80038	28480	05372-80038
A7U55	05372-80039	0	1	EPROM-80039	28480	05372-80039
A8	05372-60008	5	1	BD AY-IO CONTROL	28480	05372-60008
A9	05372-60009	6	1	BD AY-DOUBLE REG	28480	05372-60009
A10	51089-60015	1	1	BD AY TRIPLE REG	28480	51089-60015
A11	05371-60011	3	1	BD AY-FRONT PNL	28480	05371-60011
A12	05372-60012	1	1	BD AY-MOTHER	28480	05372-60012
A13	05372-60013	6	1	BD AY-REAR PANEL	28480	05372-60013
A14	05371-60014	6	1	BD AY-TB MULT	28480	05371-60014
A15	10811-60111	8	1	QUARTZ OSC 10MHZ	28480	10811-60111
A16	05371-60231	9	1	CBL AY-PWR MOD	28480	05371-60231
A17	2090-0209	4	1	CRT ASSY-7" W/PCB	28480	2090-0209
A20	05372-60020	1	1	BD AY-C CHAN 030	28480	05372-60020
A20	05372-60020	1	1	BD AY-C CHAN 090	28480	05372-60020
A22	05372-60022	3	1	BD AY-FAST PORT 020	28480	05372-60022
B1	3160-0521	3	1	FAN-TBAX 100-CFM 12VDC	11045	4312-26
C1	0180-3572	9	1	CAP-FXD 50 V AL-ELCTLT	56289	36DE373G050BF2A
C2	0160-3036	8	4	CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C3	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C4	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C5	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
CR1	1906-0231	2	1	DIODE-CT-RECT 200V 15A	28480	1906-0231
F1	2110-0303	9	1	FUSE (INCH) 2A 250V NTD FE UL (SLOW BLO)	75915	312 002
F1	2110-0014	3	1	FUSE (INCH) 4A 250V TD FE UL	75915	313 004
H1	0380-1523	0	2	STANDOFF-HEX 10.1-MM-LG M3.5 X 0.6-THD	14480	TJL 100.305
H3	0515-0411	0	4	SCREW-MACH M3 X 0.5 22MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H4	0515-0885	2	19	SCREW-MACH M4 X 0.7 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6	77	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H6	0515-0896	5	14	SCREW-MACH M4 X 0 7 10MM-LG	00000	ORDER BY DESCRIPTION
H7	0515-1110	8	6	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H8	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
H9	0515-1232	5	10	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H10	0515-1323	5	20	SCREW-MACH M3 X 0.5 30MM-LG PAN-HD	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60009	6	1	EVENT BOARD (DATE CODE 90404)	28480	05372-60009
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A9 EVENT BOARD (DATE CODE 9045)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	2	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 90402)		
A3U6	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U7	1820-3438	5	1	IC MUXR/DATA-SEL TTL ALS 2-TO-1-LINE	01295	SN74ALS257N
A3U8	1820-2701	3	2	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U9	1820-1227	0	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F257N
A3U10	1820-6535	9	1	IC GATE-ARY CMOS	10411	LMA9284
A3U11	1820-2701	3		IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U12	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U13	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U14	1820-4350	2	1	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS241BN
A3U15	1820-3121	3	7	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U16	1820-2848	9	1	IC RCVR ECL/10KH LINE RCVR TPL	04713	MC10H116P
A3U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U18	1820-2694	5	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F157N
A3U19	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U20	1820-3707	1	5	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U21	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U22	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U23	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U24	1820-5821	4	1	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F574N
A3U25	1818-4134	5	5	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U26	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U27	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U28	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U29	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U30	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U31	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U32	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U33	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U34	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U35	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U36	1820-5789	3	4	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U37	1DK5-0002	7	2	IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U38	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U39	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U40	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U41	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U43	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U44	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3XU10	1200-1470	7	1	SOCKET-IC-PGA 145-CONT SQUARE DIP-SLDR	00779	55275-4
A3XU37	1200-1372	8	2	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A3XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	90120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 9040Z)		
A3C61	0160-4031	5		CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C62	0160-4031			CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C63	0160-4031			CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C131	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3DL1	1810-1019	3	1	DELAY LINE ACTIVE DEVICE W/DUAL IN-LINE	92912	0447-0051-85
A3DL2	1810-1326	5	3	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL3	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL4	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL5	1810-1107	0	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3DL6	1810-1107	0		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3J1	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JP104-2
A3J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JP104-2
A3L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A3P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A3P3	1250-2052	8	2	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3P4	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3R1	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	C1433	750-61
A3R2	0699-2263	2	6	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R3	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R4	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R5	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R6	1810-0800	8	1	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A3R7	1810-0341	2	1	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A3R8	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R9	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R10	1810-0280	8	7	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R11	0699-1542	8	6	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R12	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R13	1810-0270	6	4	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R14	0699-2253	0	3	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R15	0699-2252	9	3	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R16	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R17	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R18	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R19	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R20	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R22	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R25	1810-0366	1	2	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R26	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R28	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R29	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R30	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R31				NOT ASSIGNED		
A3R32				NOT ASSIGNED		
A3R33	8159-0005	0	1	RESISTOR ZERO OHMS 22AWG	28480	8159-0005
A3R34	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3U1	1818-4675	9	3	IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U2	1820-2698	7	1	IC DRVR TTL F LINE DRVR OCTL	18324	74F240N
A3U3	1820-2691	0	1	IC FF TTL F D-TYPE POS-EDGE-TRIG	18324	74F74N
A3U4	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U5	1820-3143	9	1	IC FF TTL ALS D-TYPE POS-EDGE-TRIG DUAL	01295	SN74ALS874NT

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90452)		
A5P11	1810-0293	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5P12				NOT ASSIGNED		
A5P13				NOT ASSIGNED		
A5P14				NOT ASSIGNED		
A5P15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5P16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5P17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178P-F
A5P18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5P19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P22				NOT ASSIGNED		
A5P23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5P27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P28	1810-0293	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	10	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38				NOT ASSIGNED		
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2263	2	1	RESISTOR 100 +-1% .125W TF TC=0+-50	28480	0699-2263
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3	05372-60003	4	1	TIME BOARD (DATE CODE 90402)	28480	05372-60003
A3C1	0160-0576	5	53	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C2	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C3	0160-3879	7	3	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C7	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C8	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C12	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C22	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C32	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C33	0160-4521	8	1	CAP-FXD 12pF 200 V	09969	RPE121-105C0G120J200V
A3C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C41	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C42	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C43	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C44	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C45	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C46	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C47	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C48	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C49	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C50	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C51	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C52	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C53	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C58	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C59	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C60	0160-4031	5	4	CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90452)		
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R85				NOT ASSIGNED		
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R90				NOT ASSIGNED		
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	3	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R118	0698-6360	6		RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R202	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R203				NOT ASSIGNED		
A2R204	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R205	0698-7240	3	1	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R206	0698-7238	9	1	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R207	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R208	0757-0441	8	2	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R209	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R210	0699-1991	1	1	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A2R211	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R212	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R213	1810-0203	5	1	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A2R214	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A2R215	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R216	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R217	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R218	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R219				NOT ASSIGNED		
A2R220				NOT ASSIGNED		
A2R221	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A2U1	0955-0404	3	2	U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U2	1NB7-8076	3	2	DCOFFSET HYBRID	28480	1NB7-8076
A2U3	1826-0275	4	2	IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U4	1NB7-8109	3	2	SYNC COMP HYBRID	28480	1NB7-8109
A2U5	1820-2000	5	2	IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A2U6	1826-0311	9	2	IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U7	1826-0609	8	2	ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U8	1826-1049	2	2	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U9	1826-0282	3	2	IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U10	1826-0285	6	2	IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U11	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A2U12	1820-3394	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS09N
A2U13	0955-0404	3		U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U14	1NB7-8076	3		DCOFFSET HYBRID	28480	1NB7-8076
A2U15	1NB7-8109	3		SYNC COMP HYBRID	28480	1NB7-8109
A2U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U17	1826-0275	4		IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U18	1826-0311	9		IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U19	1826-0635	0	2	IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U20	1826-1246	1	2	D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U21	1826-0609	8		ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U22	1826-1049	2		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U23	1826-0285	6		IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U24	1826-0282	3		IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U25	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A2U26	1820-2273	4	1	IC-INTERFACE DRVR PERIPHERAL GENERAL	56289	UDN-2981A
A2U27	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U28	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2U29	1826-0635	0		IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U30	1826-1246	1		D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U201	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL 2-INP	04713	MC10H105P
A2U202	1820-2956	0	1	IC GATE ECL/10KH EXCL-OR/NOR TPL 2-INP	04713	MC10H107P
A2U203	1820-3579	5	2	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U204	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U205	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A2U206	1826-0521	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072CP
A2U207	1826-1204	1	1	D/A 8-BIT 20-PLASTIC CMOS	24355	AD7528JN
	0340-0864	6	1	INSULATOR-XSTR THRM-CNDCT	18565	69-11-AS36-1671
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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MANUAL UPDATING CHANGES **CHANGE DATE:** November 18, 1991

MANUAL UPDATING COVERAGE	MANUAL IDENTIFICATION
This supplement adapts your manual to instruments with Serial Numbers prefixed through 3141 and Firmware revision 2947	**Instrument:** HP 5372A Frequency & Time Interval Analyzer Service Manual **Manual Part Number:** 05372-90016 **Manual Print Date:** APRIL 1990

ABOUT THIS SUPPLEMENT

The information in this supplement is provided to correct manual errors and to adapt the manual to instruments containing changes after the manual print date.

Change and correction information in this supplement is itemized by page numbers corresponding to the original manual pages. The pages in this supplement are organized in numerical order by manual page number.

HOW TO USE THIS SUPPLEMENT

Insert this title page in front of the title page in your manual.

Perform all changes specified for "All Serials", and all changes through the Series Prefix of your instrument or board.

Insert any complete replacement pages provided into your manual in the proper location. The following pages are included in this update packet: 1-19, 4-5/4-11, 4-17/4-21, 4-25/4-26

If your manual has been updated according to the last edition of this supplement, you need only perform those changes pertaining to the new series prefix; see List of Effective Pages. New information affecting "All Serials" will be indicated by a "#" in front of the change.

HEWLETT PACKARD

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R51	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R52	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R53	0699-2358	6		RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R54	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R55	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R56	0698-7234	5		RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R57	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R58	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R59	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R60	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R61	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R62	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R63	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R66	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R67	0699-2245	0		RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R68	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R69	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R70	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R71	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R74	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R75	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R76	0698-7262	9		RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R77	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R78	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R79	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R80	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R81	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R82	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R83	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R84	0698-7257	2	2	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A2R85	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R86	0698-6360	6	2	RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R87	0698-7237	8	3	RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R88	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R89	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R90	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R91	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R92	0699-1769	1		RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE3S-510-F
A2R93	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R94	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R95	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R96	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R98	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R99	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R100	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R102	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A2R103	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R104	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R105	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R107	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R108	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R109	0698-7235	6	1	RESISTOR 909 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-909R-F
A2R110	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R111	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R112	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R113	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A2R114	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R115	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R116	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R117	0698-7257	2		RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F

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LIST OF EFFECTIVE PAGES

SERIAL PREFIX, SERIAL # OR DATE CODE	PAGES
All Serials	A3, 1-19, 4-26, 8-11
2952A00276 & above	4-10/4-12, 8-9, 8-11
2952A00446 & above	1-15, 1-34, 4-26, 11-11 The following Series 2952A instruments also include changes indicated for Series 3045A: 2952A00551 2952A00561 2952A00553 2952A00562 2952A00555
3041A	3-28/3-30, 4-10/4-12, 4-17/4-21, 8-9, 8-11, 10-21, 10-25, 10-27 The following Series 3041A instruments also include changes indicated for Series 3045A: 3041A00568 3041A00603 3041A00576 3041A00616 3041A00583 3041A00618 3041A00599
3041A00581 & above	4-2
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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q7	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q9	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q10	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q11	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q12	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q13	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q14	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q15	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q16	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q201	1854-0215	1	2	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q202	1854-0215	1		TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q203	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2R1	2100-3749	6	2	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R2	2100-0545	4	2	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R3	2100-3749	6		RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R4	2100-0545	4		RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R5	0698-3446	3	4	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R6	0698-7196	8	3	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R7	0698-3613	6	4	RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R8	0698-7212	9	8	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R9	0698-7254	9	4	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R10	2100-3750	9	4	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R11	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R12	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R13	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R14	2100-3759	8	2	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R15	2100-3759	8		RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R16	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R17	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R18	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R19	0699-1320	0	4	RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R20	0699-2358	6	2	RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R21	0699-2263	2	2	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R22	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R23	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R24	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R25	0699-2245	0	2	RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R26	0699-1542	8	19	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R27	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R28	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R29	0698-7234	5	2	RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R30	0698-7256	1	3	RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R31	0698-7232	3	2	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R32	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R33	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R34	0698-7262	9	2	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R38	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R39	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R40	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R41	0698-7236	7	6	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R42	0699-1769	1	2	RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R43	0698-7220	9	7	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R44	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R45	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R46	0698-7260	7	12	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R47	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R48	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R49	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 1-15. GENERAL INFORMATION:

2952A00446 & above
> Change fuse part number from 2110-0055 to 2110-0014 in line 3 of the first paragraph.

PAGE 1-34. FIGURE 1-11. REAR PANEL FEATURES:

2952A00446
> Change "4.0 A" to "4.0 AT" in Fuse information.

PAGES 3-28/3-30 ADJUSTMENT PROCEDURES:

3041A
> Delete A3 and A5 ZDT Bias Adjustment procedures, paragraphs 3-25 thru 3-27.
> Delete VCS Bias Adjustment procedures, paragraph 3-28.

PAGE 4-2. REPLACEABLE PARTS:

3041A00581
4.3 SPECIAL PARTS REPLACEMENT CONSIDERATIONS:
> Change A9 HP part number from 05372-60009 to 05371-60009.

PAGES 4-5/4-9, TABLE 4-2. A2 INPUT AMPLIFIER REPLACEABLE PARTS:

3041A
A2 (05372-60002) DATE CODE 90423
> Replace A2 Replaceable Parts list with Date Code 90423 parts list supplied in these manual changes.

PAGES 4-10/4-12. TABLE 4-2. A3 TIME BOARD REPLACEABLE PARTS:

2952A00276
> Add C100, 0160-4810, CAPACITOR-FXD 330PF +-5% 100V CER COG.
> Add R100, 0699-1542, RESISTOR-FXD 51 +-1% .125 TF TC=0+-50.
> Add TP100, 1251-5177, CONNECTOR-SGL CONT PIN .031-IN-BSC-SZ.
> Add XU14, 1200-0825, SOCKET-IC DIP 20-CONT DIP-SLDR.

3041A
> Replace A3 Replaceable Parts List with Date Code 90402 parts list supplied in these manual changes.

3141A
> Change A3C100 from 0160-4810 (330pf) to 0160-4031 CAPACITOR-FXD 331PF +-5% 100V CER COG.
> Delete TP100.
> Delete XU14.

PAGES 4-17/4-21. TABLE 4-2. A5 EVENT BOARD REPLACEABLE PARTS:

3041A
> Replace A5 Replaceable Parts List with Date Code 90404 parts list supplied in these manual changes.

3045A
> Replace A5 Replaceable Parts List with Date Code 90452 parts list supplied in these manual changes.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIEP BOAPD (DATE CODE 90423)		
A2C215	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	PPA30X7P104M50V
A2C216	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	PPA30X7P104M50V
A2CP1	1902-0959	3	3	DIODE-ZNP 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CP2	1902-0956	0	2	DIODE-ZNP 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CP3	1902-0953	7	2	DIODE-ZNP 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CP4	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CP5	1902-0945	7	4	DIODE-ZNP 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CP6	1902-0945	7		DIODE-ZNP 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CP7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CP8	1902-0959	3		DIODE-ZNP 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CP9	1902-0953	7		DIODE-ZNP 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CP10	1902-0945	7		DIODE-ZNP 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CP11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CP12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CP13	1902-0945	7		DIODE-ZNP 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CP14	1902-0956	0		DIODE-ZNP 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CP201	1902-0943	5	2	DIODE-ZNP 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CP202	1902-0943	5		DIODE-ZNP 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CP203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CP204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CP205	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2H1	0515-0659	8	16	SCREW-MACHINE ASSEMBLY M2 X 0.4 8MM-LG	00000	ORDER BY DESCRIPTION
A2H2	05371-20201	9	4	HEATSINK	28480	05371-20201
A2H3	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A2H4	0380-1731	2	16	SPACER-PRESS-IN 1.70 MM LG; 2.38 MM ID	46384	YC3-4564
A2H5	3050-0891	7	1	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A2H6	0535-0004	9	1	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDEP BY DESCRIPTION
A2H7	0515-0406	3	1	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A2J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	38JR127-1
A2J2	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2J3	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	38JR127-1
A2J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2K1	0490-1554	0	8	RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K2	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K3	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K4	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K5	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K6	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K7	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K8	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2L1	9140-1170	4	10	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L3	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L4	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L5	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L6	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L7	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L8	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L9	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L201	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2MP1	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
A2MP2	54100-29101	2	4	SPRING-HYBRID	28480	54100-29101
A2MP3	54100-29104	5	4	CLAMP-HYBRID	28480	54100-29104
A2P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A2P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A2P3	1250-2052	8	1	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A2Q1	1853-0314	9	4	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q2	1854-0090	0	4	TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q3	1854-0686	0	5	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q4	1854-0092	2	4	TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q5	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGES 4-26/4-28, TABLE 4-2. MISCELLANEOUS HARDWARE AND CHASSIS PARTS:

All Serials — >Change A16 POWER MODULE CABLE from 51083-60108 to 05371-60231.

2952A00446 & above — >Replace page 4-26 with page 4-26 (Series 2952A00446 and above) supplied in these manual changes.

PAGE 7-23, FIGURE 7-10. A2 INPUT AMPLIFIER BOARD COMPONENT LOCATOR:

3041A — A2 (05372-60002) Date Code 90423.
>Delete R203, below U15.
>Delete R219 and R220 on far right side near L1/L201.

PAGE 7-29, FIGURE 7-11. A2 INPUT AMPLIFIER BOARD SCHEMATIC DIAGRAM:

3041A — A2 (05372-60002) Date Code 90423.
>Replace Randomizer portion of the schematic diagram with the diagram on the following page.

PAGE 8-9, FIGURE 8-3. A3 TIME BOARD, COMPONENT LOCATOR:

2952A00276 — >AC termination consisting of C100, R100 have been added to the circuit side of A3U14 Pin 17.

3041A — >Change R31 to C131.
>Delete R32.
>Delete TP2.

3141A — >A3C100 and R100 have been moved from the circuit side of the board to the component side between U14 and U15.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2	05372-60002	3	1	INPUT AMPLIFIEP BOAPD (DATE CODE 90423)	28480	05372-60002
A2C1	0180-2207	5	2	CAP-FXD 100uF 10 V TA	56289	150D107X9010P2
A2C2	0160-0576	5	23	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C3	0180-0098	8	2	CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C7	0180-0098	8		CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C8	0160-4371	6	4	CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C9	0160-3879	7	6	CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A2C10	0180-3847	1	4	CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C11	0160-4040	6	2	CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C12	0180-3941	6	2	CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	PPE121-105X7P104M50V
A2C16	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C18	0160-3728	5	4	CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C19	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C22	0180-3775	4	4	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C23	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C24	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A2C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A2C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C31	0160-4040	6		CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C32	0180-3941	6		CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C34	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C36	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C37	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C41	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C42	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C44	0160-3875	3	2	CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C45	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C46	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C47	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C48	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A2C49	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C51	0160-3875	3		CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C201	0160-4557	0	7	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C202	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C203	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C204	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C205	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C206	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C207	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C208	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C209	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C210	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C211	0160-4801	7	2	CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V
A2C212	0160-4791	4	2	CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C213	0160-4791	4		CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C214	0160-4801	7		CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V

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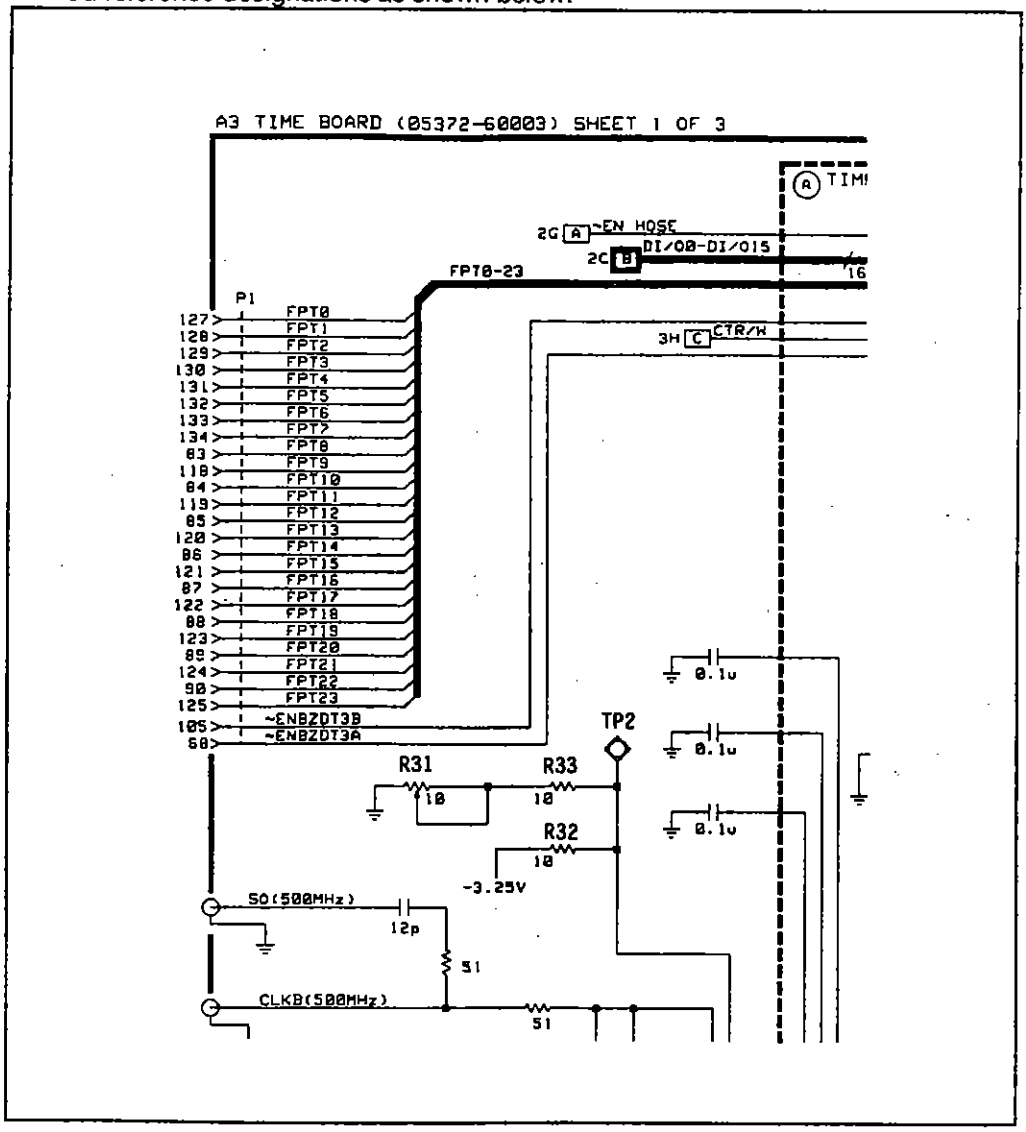
SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 8-11, FIGURE 8-4. A3 TIME BOARD SCHEMATIC DIAGRAM (Sheet 1 of 3):

All Serials

>Add reference designations as shown below:



2952A00276 & above

>Add A3R100 (51 ohms) and A3C100 (330 pf) from A3U14 Pin 17 to ground.

3041A

>Delete A3TP 2.
>Delete A3R32, 10 ohms.
>Change A3R33 value from 10 ohms to 0 ohms.
>Replace A3R31 with A3C131, .1UF.

3141A

>Change A3C100 value from 330pf to 331 pf.
>Delete TP100.

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1-51. RETROFIT OPTIONS

The following sections contain retrofit installation procedures for Options 030, 060, and 090.

1-52. INSTRUCTIONS FOR INSTALLING OPTION 030 C-CHANNEL RETROFIT KIT, HP P/N 05372-67002

1-53. Introduction

This installation note provides instructions for installing the Option 030 C-Channel Retrofit kit, HP P/N 05372-67002. This procedure applies to all HP 5372A series prefixes.

1-54. Parts Included

The HP 5372A Option 030 Retrofit Kit, HP P/N 05372-67002, contains the following parts:

HP Part Number	Description	Quantity
05372-60020	C-Channel Board	1
05372-60224	Front panel cable (semi-rigid)	1
05372-60229	Power supply ribbon cable	1
05372-60230	C-Channel cable SMA(m)-SMA(m)	1
05372-60231	C-Channel Extension cable SMA(f)-SMA(m)	1
05372-80010	Front panel label	2
0515-0897	Screws	4
0590-0505	Knurled nut	1
1250-1562	Adapter N(f)-SMA(m)	1
1400-0611	Cable clamp	1

1-55. Tools Required

5/16 Open-End Wrench, Pozidriv Screwdriver, Utility Knife

1-56. Option 030 Installation Procedure

CAUTION

The following installation requires that you follow proper static prevention measures to avoid static damage to parts and internal assemblies in the HP 5372A. This procedure should only be performed by someone familiar with these techniques.

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 10-21, FIGURE 10-9. A5 EVENT BOARD, COMPONENT LOCATOR:

3041A
>Change R22 to C122.
>Delete R85.
>Delete TP4.

3045A
A5 (05372-60005) Date Code 90452
>Delete A5R38, above U72.

PAGE 10-23 FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 1 of 6):

3045A
A5 (05372-60005) Date Code 90452
>Delete A5R38, 82 ohms, to the left of U72.
>Change A5R40 value from 120 ohms to 100 ohms.

PAGE 10-25, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 2 of 6):

3041A
>Delete R14.
>Change A5R15 value from 10 ohms to 0 ohms.
>Replace A5R13 with A5C113, .1uF.
>Delete TP 1.

PAGE 10-27, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 3 of 6):

3041A
>Change A5R84 value from 10 ohms to 0 ohms.
>Delete A5R85.
>Replace A5R22 with A5C122, .1UF.
>Delete TP 4.

PAGE 11-11, FIGURE 11-3. A12 MOTHERBOARD SCHEMATIC DIAGRAM:

2952A00446 & above
A12 SCHEMATIC DIAGRAM NOTES:
>Change fuse HP Part Number from 2110-0055 to 2110-0014; change rating from "NO TIME DELAY" to "TIME DELAY".

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1-46. Rear Panel Inputs including Channel C (Option 090)

The Rear Panel Input including Channel C (090) is a field installable option. Option 090 includes 50 ohm BNC inputs for Channel A and B, a 1 M ohm input for External Arm, and a 50 ohms Type-N connector for Channel C. Front-panel input pods cannot be used with Option 090 installed. Channel A, B, and C performance for Option 090 is equivalent to front panel performance. External Arm performance for Option 090 is listed in Rear Panel Specifications, Appendix A. To retrofit this option, refer to see the Retrofit Option section of this chapter. This option can only be retrofitted to an HP 5372A.

1-47. Rack Mount Adapter Kit — With Handles Removed (Option 908)

The Rack Mount Adapter kit is a field installable option. Option 908 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5061-9678. The kit consists of two flanges and mounting hardware.

1-48. Rack Mount Flange Kit — With Handles Attached (Option 913)

The Rack Mount Flange Kit is a field installable option. Option 913 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5062-4072. The kit consists of two flanges and mounting hardware. This option supplies two rack flanges and mounting hardware for instruments already equipped with front handles.

1-49. Extended Warranty Support (Option W30)

Option W30 provides two additional years of return-to-HP hardware-service support. Option W30 is available only at the time of instrument purchase. Service contracts are available from Hewlett-Packard for instruments which did not include Option W30 at the time of purchase. For more information, contact your nearest Hewlett-Packard Sales and Support office.

1-50. HP Calibration Service (Option W32)

Option W32 provides three years of return-to-HP calibration service.

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SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE A-3. WARRANTED SPECIFICATIONS (Continued):

All Serials

>Replace Resolution equation with the following:

$$\left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A) + 150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_A \qquad\qquad \text{Sample Interval}_B} \right) \times \text{Ratio}$$

>Replace Accuracy (for Frequency A/B) equation with the following:

$$\pm \text{Resolution} \pm \left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A) + 150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_A \qquad\qquad \text{Sample Interval}_B} \right) \times \text{Ratio}$$

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE A-3. WARRANTED SPECIFICATIONS (Continued):

All Serials

>Replace Resolution equation with the following:

$$\left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A) + 150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_A \qquad\qquad \text{Sample Interval}_B} \right) \times \text{Ratio}$$

>Replace Accuracy (for Frequency A/B) equation with the following:

$$\pm \text{Resolution} \pm \left(\frac{150\text{ps rms} + (1.4 \times \text{Trigger Error}_A) + 150\text{ps rms} + (1.4 \times \text{Trigger Error}_B)}{\text{Sample Interval}_A \qquad\qquad \text{Sample Interval}_B} \right) \times \text{Ratio}$$

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1-46. Rear Panel Inputs including Channel C (Option 090)

The Rear Panel Input including Channel C (090) is a field installable option. Option 090 includes 50 ohm BNC inputs for Channel A and B, a 1 M ohm input for External Arm, and a 50 ohms Type-N connector for Channel C. Front-panel input pods cannot be used with Option 090 installed. Channel A, B, and C performance for Option 090 is equivalent to front panel performance. External Arm performance for Option 090 is listed in Rear Panel Specifications, Appendix A. To retrofit this option, refer to see the Retrofit Option section of this chapter. This option can only be retrofitted to an HP 5372A.

1-47. Rack Mount Adapter Kit — With Handles Removed (Option 908)

The Rack Mount Adapter kit is a field installable option. Option 908 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5061-9678. The kit consists of two flanges and mounting hardware.

1-48. Rack Mount Flange Kit — With Handles Attached (Option 913)

The Rack Mount Flange Kit is a field installable option. Option 913 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5062-4072. The kit consists of two flanges and mounting hardware. This option supplies two rack flanges and mounting hardware for instruments already equipped with front handles.

1-49. Extended Warranty Support (Option W30)

Option W30 provides two additional years of return-to-HP hardware-service support. Option W30 is available only at the time of instrument purchase. Service contracts are available from Hewlett-Packard for instruments which did not include Option W30 at the time of purchase. For more information, contact your nearest Hewlett-Packard Sales and Support office.

1-50. HP Calibration Service (Option W32)

Option W32 provides three years of return-to-HP calibration service.

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 10-21, FIGURE 10-9. A5 EVENT BOARD, COMPONENT LOCATOR:

3041A
>Change R22 to C122.
>Delete R85.
>Delete TP4.

3045A
A5 (05372-60005) Date Code 90452
>Delete A5R38, above U72.

PAGE 10-23 FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 1 of 6):

3045A
A5 (05372-60005) Date Code 90452
>Delete A5R38, 82 ohms, to the left of U72.
>Change A5R40 value from 120 ohms to 100 ohms.

PAGE 10-25, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 2 of 6):

3041A
>Delete R14.
>Change A5R15 value from 10 ohms to 0 ohms.
>Replace A5R13 with A5C113, .1uF.
>Delete TP 1.

PAGE 10-27, FIGURE 10-10. A5 EVENT BOARD SCHEMATIC DIAGRAM (Sheet 3 of 6):

3041A
>Change A5R84 value from 10 ohms to 0 ohms.
>Delete A5R85.
>Replace A5R22 with A5C122, .1UF.
>Delete TP 4.

PAGE 11-11, FIGURE 11-3. A12 MOTHERBOARD SCHEMATIC DIAGRAM:

2952A00446
& above
A12 SCHEMATIC DIAGRAM NOTES:
>Change fuse HP Part Number from 2110-0055 to 2110-0014; change rating from "NO TIME DELAY" to "TIME DELAY".

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1-51. RETROFIT OPTIONS

The following sections contain retrofit installation procedures for Options 030, 060, and 090.

1-52. INSTRUCTIONS FOR INSTALLING OPTION 030 C-CHANNEL RETROFIT KIT, HP P/N 05372-67002

1-53. Introduction

This installation note provides instructions for installing the Option 030 C-Channel Retrofit kit, HP P/N 05372-67002. This procedure applies to all HP 5372A series prefixes.

1-54. Parts Included

The HP 5372A Option 030 Retrofit Kit, HP P/N 05372-67002, contains the following parts:

HP Part Number	Description	Quantity
05372-60020	C-Channel Board	1
05372-60224	Front panel cable (semi-rigid)	1
05372-60229	Power supply ribbon cable	1
05372-60230	C-Channel cable SMA(m)-SMA(m)	1
05372-60231	C-Channel Extension cable SMA(f)-SMA(m)	1
05372-80010	Front panel label	2
0515-0897	Screws	4
0590-0505	Knurled nut	1
1250-1562	Adapter N(f)-SMA(m)	1
1400-0611	Cable clamp	1

1-55. Tools Required

5/16 Open-End Wrench, Pozidriv Screwdriver, Utility Knife

1-56. Option 030 Installation Procedure

CAUTION

The following installation requires that you follow proper static prevention measures to avoid static damage to parts and internal assemblies in the HP 5372A. This procedure should only be performed by someone familiar with these techniques.

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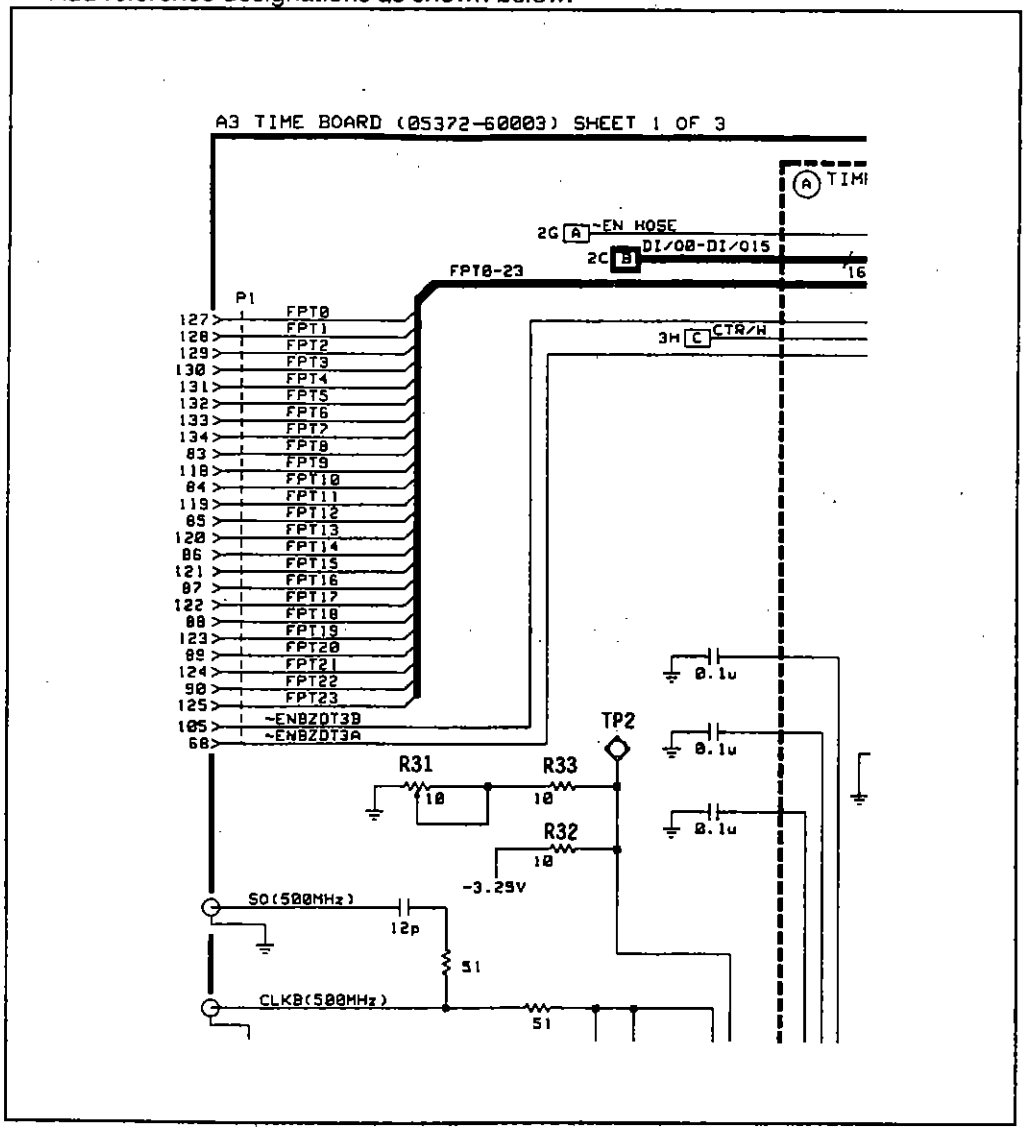
MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 8-11, FIGURE 8-4. A3 TIME BOARD SCHEMATIC DIAGRAM (Sheet 1 of 3):

All Serials

>Add reference designations as shown below:



2952A00276 & above

>Add A3R100 (51 ohms) and A3C100 (330 pf) from A3U14 Pin 17 to ground.

3041A

>Delete A3TP 2.
>Delete A3R32, 10 ohms.
>Change A3R33 value from 10 ohms to 0 ohms.
>Replace A3R31 with A3C131, .1UF.

3141A

>Change A3C100 value from 330pf to 331 pf.
>Delete TP100.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2	05372-60002	3	1	INPUT AMPLIFIER BOARD (DATE CODE 9043J)	28480	05372-60002
A2C1	0180-2207	5	2	CAP-FXD 100uF 10 V TA	56289	150D107X9010P2
A2C2	0160-0576	5	23	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C3	0180-0092	8	2	CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C7	0180-0092	8		CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C8	0160-4371	6	4	CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C9	0160-3879	7	6	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A2C10	0180-3847	1	4	CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C11	0160-4040	6	2	CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C12	0180-3941	6	2	CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C16	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C18	0160-3728	5	4	CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C19	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C22	0180-3775	4	4	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C23	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C24	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A2C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A2C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A2C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C31	0160-4040	6		CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C32	0180-3941	6		CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C34	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C36	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C37	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C41	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C42	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C44	0160-3875	3	2	CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C45	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C46	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C47	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C48	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A2C49	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C51	0160-3875	3		CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C201	0160-4557	0	7	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C202	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C203	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C204	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C205	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C206	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C207	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C208	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C209	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C210	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C211	0160-4801	7	2	CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V
A2C212	0160-4791	4	2	CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C213	0160-4791	4		CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C214	0160-4801	7		CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGES 4-26/4-28, TABLE 4-2. MISCELLANEOUS HARDWARE AND CHASSIS PARTS:

All Serials
> Change A16 POWER MODULE CABLE from 51083-60108 to 05371-60231.

2952A00446 & above
> Replace page 4-26 with page 4-26 (Series 2952A00446 and above) supplied in these manual changes.

PAGE 7-23, FIGURE 7-10. A2 INPUT AMPLIFIER BOARD COMPONENT LOCATOR:

3041A
A2 (05372-60002) Date Code 90423.
> Delete R203, below U15.
> Delete R219 and R220 on far right side near L1/L201.

PAGE 7-29, FIGURE 7-11. A2 INPUT AMPLIFIER BOARD SCHEMATIC DIAGRAM:

3041A
A2 (05372-60002) Date Code 90423.
> Replace Randomizer portion of the schematic diagram with the diagram on the following page.

PAGE 8-9, FIGURE 8-3. A3 TIME BOARD, COMPONENT LOCATOR:

2952A00276
> AC termination consisting of C100, R100 have been added to the circuit side of A3U14 Pin 17.

3041A
> Change R31 to C131.
> Delete R32.
> Delete TP2.

3141A
> A3C100 and R100 have been moved from the circuit side of the board to the component side between U14 and U15.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2C215	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	PPA30X7P104M50V
A2C216	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	PPA30X7P104M50V
A2CR1	1902-0959	3	2	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR2	1902-0956	0	2	DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR3	1902-0953	7	2	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR4	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR5	1902-0945	7	4	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR6	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR8	1902-0959	3		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR9	1902-0953	7		DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR10	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR13	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR14	1902-0956	0		DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR201	1902-0943	5	2	DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR202	1902-0943	5		DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR205	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2H1	0515-0659	8	16	SCREW-MACHINE ASSEMBLY M2 X 0.4 8MM-LG	00000	ORDER BY DESCRIPTION
A2H2	05371-20201	9	4	HEATSINK	28480	05371-20201
A2H3	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A2H4	0380-1731	2	16	SPACER-PRESS-IN 1.70 MM LG; 2.38 MM ID	46384	YC3-4564
A2H5	3050-0891	7	1	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A2H6	0535-0004	9	1	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
A2H7	0515-0406	3	1	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A2J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J2	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2J3	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2K1	0490-1554	0	8	RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K2	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K3	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K4	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K5	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K6	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K7	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K8	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2L1	9140-1170	4	10	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L3	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L4	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L5	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L6	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L7	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L8	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L9	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L201	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2MP1	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	8021
A2MP2	54100-29101	2	4	SPRING-HYBRID	28480	54100-29101
A2MP3	54100-29104	5	4	CLAMP-HYBRID	28480	54100-29104
A2P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A2P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A2P3	1250-2052	8	1	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A2Q1	1853-0314	9	4	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q2	1854-0090	0	4	TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q3	1854-0686	0	5	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q4	1854-0092	2	4	TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q5	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S

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MANUAL CHANGES, MODEL 5372A (05372-90016)

SERIAL PREFIX, SERIAL # OR DATE CODE	CHANGES

PAGE 1-15. GENERAL INFORMATION:

2952A00446 & above

>Change fuse part number from 2110-0055 to 2110-0014 in line 3 of the first paragraph.

PAGE 1-34. FIGURE 1-11. REAR PANEL FEATURES:

2952A00446

>Change "4.0 A" to "4.0 AT" in Fuse information.

PAGES 3-28/3-30 ADJUSTMENT PROCEDURES:

3041A

>Delete A3 and A5 ZDT Bias Adjustment procedures, paragraphs 3-25 thru 3-27.
>Delete VCS Bias Adjustment procedures, paragraph 3-28.

PAGE 4-2. REPLACEABLE PARTS:

3041A00581

4.3 SPECIAL PARTS REPLACEMENT CONSIDERATIONS:
>Change A9 HP part number from 05372-60009 to 05371-60009.

PAGES 4-5/4-9, TABLE 4-2. A2 INPUT AMPLIFIER REPLACEABLE PARTS:

3041A

A2 (05372-60002) DATE CODE 90423
>Replace A2 Replaceable Parts list with Date Code 90423 parts list supplied in these manual changes.

PAGES 4-10/4-12. TABLE 4-2. A3 TIME BOARD REPLACEABLE PARTS:

2952A00276

>Add C100, 0160-4810, CAPACITOR-FXD 330PF +-5% 100V CER COG.
>Add R100, 0699-1542, RESISTOR-FXD 51 +-1% .125 TF TC=0+-50.
>Add TP100, 1251-5177, CONNECTOR-SGL CONT PIN .031-IN-BSC-SZ.
>Add XU14, 1200-0825, SOCKET-IC DIP 20-CONT DIP-SLDR.

3041A

>Replace A3 Replaceable Parts List with Date Code 90402 parts list supplied in these manual changes.

3141A

>Change A3C100 from 0160-4810 (330pf) to 0160-4031 CAPACITOR-FXD 331PF +-5% 100V CER COG.
>Delete TP100.
>Delete XU14.

PAGES 4-17/4-21. TABLE 4-2. A5 EVENT BOARD REPLACEABLE PARTS:

3041A

>Replace A5 Replaceable Parts List with Date Code 90404 parts list supplied in these manual changes.

3045A

>Replace A5 Replaceable Parts List with Date Code 90452 parts list supplied in these manual changes.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q7	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q9	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q10	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q11	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q12	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-S
A2Q13	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q14	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q15	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q16	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q201	1854-0215	1	2	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q202	1854-0215	1		TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q203	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2R1	2100-3749	6	2	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R2	2100-0545	4	2	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R3	2100-3749	6		RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R4	2100-0545	4		RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R5	0698-3446	3	4	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R6	0698-7196	8	3	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R7	0698-3613	6	4	RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R8	0698-7212	9	8	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R9	0698-7254	9	4	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R10	2100-3750	9	4	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R11	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R12	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R13	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R14	2100-3759	8	2	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R15	2100-3759	8		RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R16	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R17	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R18	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R19	0699-1320	0	4	RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R20	0699-2358	6	2	RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R21	0699-2263	2	2	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R22	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R23	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R24	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R25	0699-2245	0	2	RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R26	0699-1542	8	19	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R27	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R28	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R29	0698-7234	5	2	RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R30	0698-7256	1	3	RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R31	0698-7232	3	2	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R32	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R33	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R34	0698-7262	9	2	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R38	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R39	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R40	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R41	0698-7236	7	6	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R42	0699-1769	1	2	RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R43	0698-7220	9	7	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R44	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R45	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R46	0698-7260	7	12	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R47	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R48	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R49	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

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LIST OF EFFECTIVE PAGES

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All Serials..... A3, 1-19, 4-26, 8-11

2952A00276 & above..... 4-10/4-12, 8-9, 8-11

2952A00446 ..... 1-15, 1-34, 4-26, 11-11
& above..... The following Series 2952A instruments also include changes indicated for Series 3045A:

2952A00551 2952A00561
2952A00553 2952A00562
2952A00555

3041A 3-28/3-30, 4-10/4-12, 4-17/4-21, 8-9, 8-11, 10-21, 10-25, 10-27
The following Series 3041A instruments also include changes indicated for Series 3045A:

3041A00568 3041A00603
3041A00576 3041A00616
3041A00583 3041A00618
3041A00599

3041A00581 4-2
& above

A2 (05372-60002)..... 4-5/4-9, 7-23, 7-29
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3045A 4-17/4-21, 10-21, 10-23
A5 (05372-60005)
Date Code 90452
A6 (05372-60006)
Date Code 90454

3141A 4-10/4-12, 8-9, 8-11

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R51	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R52	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R53	0699-2358	6		RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R54	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R55	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R56	0698-7234	5		RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-826R-F
A2R57	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R58	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R59	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R60	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R61	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R62	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R63	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R66	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R67	0699-2245	0		RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R68	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R69	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R70	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R71	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R74	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R75	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R76	0698-7262	9		RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R77	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R78	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R79	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R80	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R81	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R82	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R83	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R84	0698-7257	2	2	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A2R85	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R86	0698-6360	6	2	RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R87	0698-7237	8	3	RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R88	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R89	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R90	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R91	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R92	0699-1769	1		RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R93	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R94	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R95	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R96	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R98	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R99	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R100	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R102	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A2R103	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R104	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R105	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R107	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R108	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R109	0698-7235	6	1	RESISTOR 909 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-909R-F
A2R110	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R111	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R112	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R113	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A2R114	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R115	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R116	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R117	0698-7257	2		RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F

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MANUAL UPDATING CHANGES **CHANGE DATE:** November 18, 1991

MANUAL UPDATING COVERAGE	MANUAL IDENTIFICATION
This supplement adapts your manual to instruments with Serial Numbers prefixed through 3141 and Firmware revision 2947	**Instrument:** HP 5372A Frequency & Time Interval Analyzer Service Manual **Manual Part Number:** 05372-90016 **Manual Print Date:** APRIL 1990

ABOUT THIS SUPPLEMENT

The information in this supplement is provided to correct manual errors and to adapt the manual to instruments containing changes after the manual print date.

Change and correction information in this supplement is itemized by page numbers corresponding to the original manual pages. The pages in this supplement are organized in numerical order by manual page number.

HOW TO USE THIS SUPPLEMENT

Insert this title page in front of the title page in your manual.

Perform all changes specified for "All Serials", and all changes through the Series Prefix of your instrument or board.

Insert any complete replacement pages provided into your manual in the proper location. The following pages are included in this update packet: 1-19, 4-5/4-11, 4-17/4-21, 4-25/4-26

If your manual has been updated according to the last edition of this supplement, you need only perform those changes pertaining to the new series prefix; see List of Effective Pages. New information affecting "All Serials" will be indicated by a "#" in front of the change.

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A2 INPUT AMPLIFIER BOARD (DATE CODE 90423)		
A2R118	0698-6360	6		RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R202	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R203				NOT ASSIGNED		
A2R204	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R205	0698-7240	3	1	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R206	0698-7238	9	1	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R207	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R208	0757-0441	8	2	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R209	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R210	0699-1991	1	1	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A2R211	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R212	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R213	1810-0203	5	1	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A2R214	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A2R215	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R216	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R217	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R218	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R219				NOT ASSIGNED		
A2R220				NOT ASSIGNED		
A2R221	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A2U1	0955-0404	3	2	U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U2	1NB7-8076	3	2	DCOFFSET HYBRID	28480	1NB7-8076
A2U3	1826-0275	4	2	IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U4	1NB7-8109	3	2	SYNC COMP HYBRID	28480	1NB7-8109
A2U5	1820-2000	5	2	IC FF ECL D-M/S POS-EDGE-TRIG	28480	8196D-0100
A2U6	1826-0311	9	2	IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U7	1826-0609	8	2	ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U8	1826-1049	2	2	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U9	1826-0282	3	2	IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U10	1826-0285	6	2	IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U11	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	8196D-0100
A2U12	1820-3394	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS09N
A2U13	0955-0404	3		U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U14	1NB7-8076	3		DCOFFSET HYBRID	28480	1NB7-8076
A2U15	1NB7-8109	3		SYNC COMP HYBRID	28480	1NB7-8109
A2U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U17	1826-0275	4		IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U18	1826-0311	9		IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U19	1826-0635	0	2	IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U20	1826-1246	1	2	D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U21	1826-0609	8		ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U22	1826-1049	2		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U23	1826-0285	6		IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U24	1826-0282	3		IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U25	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A2U26	1820-2273	4	1	IC-INTERFACE DRVR PERIPHERAL GENERAL	56289	UDN-2981A
A2U27	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U28	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2U29	1826-0635	0		IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U30	1826-1246	1		D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U201	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL 2-INP	04713	MC10H105P
A2U202	1820-2956	0	1	IC GATE ECL/10KH EXCL-OR/NOR TPL 2-INP	04713	MC10H107P
A2U203	1820-3579	5	2	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U204	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U205	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A2U206	1826-0521	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072CP
A2U207	1826-1204	1	1	D/A 8-BIT 20-PLASTIC CMOS	24355	AD7528JN
	0340-0864	6	1	INSULATOR-XSTR THRM-CNDCT	18565	69-11-A536-1671
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3	05372-60003	4	1	TIME BOARD (DATE CODE 90402)	28480	05372-60003
A3C1	0160-0576	5	53	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C2	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C3	0160-3879	7	3	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C7	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C8	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C12	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C22	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C32	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C33	0160-4521	8	1	CAP-FXD 12pF 200 V	09969	RPE121-105C0G120J200V
A3C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C41	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C42	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C43	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C44	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C45	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C46	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C47	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C48	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C49	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C50	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C51	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C52	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C53	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C58	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C59	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C60	0160-4031	5	4	CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V

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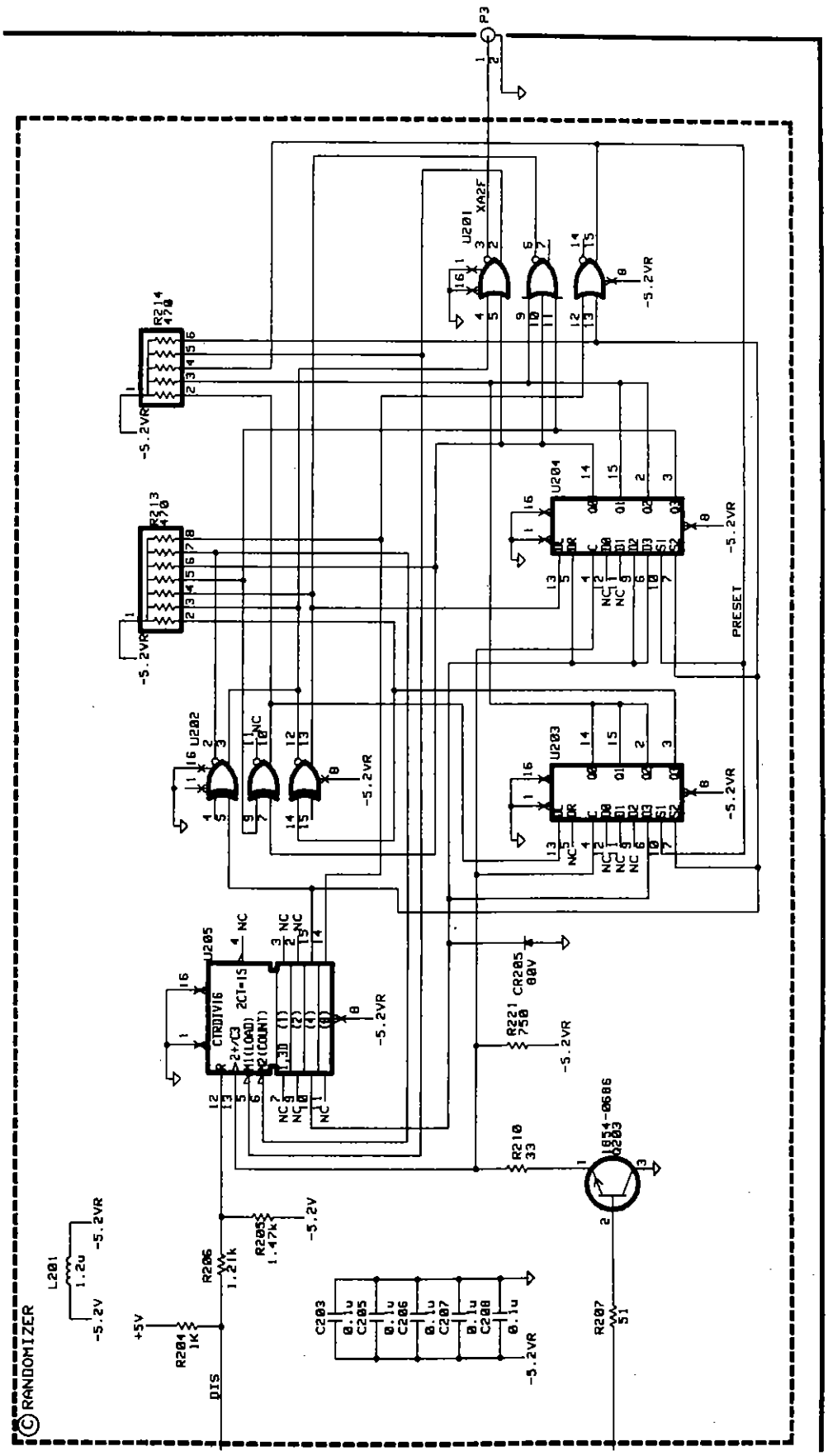

Part of Figure 7-11. A2 Input Amplifier board, Schematic Diagram
A2 DATE CODE 90423 (Sheet 3 of 3)

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 9040Z)		
A3C61	0160-4031	5		CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C62	0160-4031			CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C63	0160-4031			CAP-FXD 330PF 100V	09969	RPE121-105C0G331J100V
A3C131	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3DL1	1810-1019	3	1	DELAY LINE ACTIVE DEVICE W/DUAL IN-LINE	92912	0447-0051-85
A3DL2	1810-1326	5	3	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL3	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL4	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL5	1810-1107	0	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3DL6	1810-1107	0		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3J1	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JP104-2
A3J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JP104-2
A3L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A3P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A3P3	1250-2052	8	2	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3P4	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3R1	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	C1433	750-61
A3R2	0699-2263	2	6	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3P3	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R4	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R5	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R6	1810-0800	8	1	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A3P7	1810-0341	2	1	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A3R8	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3P9	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R10	1810-0280	8	7	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R11	0699-1542	8	6	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3P12	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3P13	1810-0270	6	4	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R14	0699-2253	0	3	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R15	0699-2252	9	3	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R16	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R17	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R18	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R19	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R20	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R22	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R25	1810-0366	1	2	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R26	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R28	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R29	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R30	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R31				NOT ASSIGNED		
A3R32				NOT ASSIGNED		
A3R33	8159-0005	0	1	RESISTOR ZERO OHMS 22AWG	28480	8159-0005
A3R34	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3U1	1818-4675	9	3	IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U2	1820-2698	7	1	IC DRVR TTL F LINE DRVR OCTL	18324	74F240N
A3U3	1820-2691	0	1	IC FF TTL F D-TYPE POS-EDGE-TRIG	18324	74F74N
A3U4	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U5	1820-3143	9	1	IC FF TTL ALS D-TYPE POS-EDGE-TRIG DUAL	01295	SN74ALS874NT

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	S	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	S	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	S	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A3 TIME BOARD (DATE CODE 9040J)		
A3U6	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U7	1820-3438	5	1	IC MUXR/DATA-SEL TTL ALS 2-TO-1-LINE	01295	SN74ALS257N
A3U8	1820-2701	3	2	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U9	1820-3227	0	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F257N
A3U10	1820-6535	9	1	IC GATE-ARY CMOS	10411	LMA9284
A3U11	1820-2701	3		IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U12	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U13	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U14	1820-4350	2	1	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS241BN
A3U15	1820-3121	3	7	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U16	1820-2848	9	1	IC RCVR ECL/10KH LINE RCVR TPL	04713	MC10H116P
A3U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U18	1820-2654	5	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F157N
A3U19	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U20	1820-3707	1	5	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U21	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U22	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U23	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U24	1820-5821	4	1	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F574N
A3U25	1818-4134	5	5	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U26	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U27	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U28	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U29	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U30	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U31	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U32	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U33	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U34	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U35	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U36	1820-5789	3	4	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U37	1DK5-0002	7	2	IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U38	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U39	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U40	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U41	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	1DK5-0002
A3U43	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U44	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3XU10	1200-1470	7	1	SOCKET-IC-PGA 145-CONT SQUARE DIP-SLDR	00779	55275-4
A3XU37	1200-1372	8	2	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A3XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-UD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				AS EVENT BOARD (DATE CODE 9045L)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD (DATE CODE 90404)	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				AS EVENT BOARD (DATE CODE 9045Z)		
A5P76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5P77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5P78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5P79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5P80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5P81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5P82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5P83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5P84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5P85				NOT ASSIGNED		
A5P86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5P88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5P90				NOT ASSIGNED		
A5P91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5P92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5P93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5P94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DY5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 9045Z)		
A5R11	1810-0363	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R12				NOT ASSIGNED		
A5R13				NOT ASSIGNED		
A5R14				NOT ASSIGNED		
A5R15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22				NOT ASSIGNED		
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	10	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38				NOT ASSIGNED		
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2263	2	1	RESISTOR 100 +-1% .125W TF TC=0+-50	28480	0699-2263
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R12				NOT ASSIGNED		
A5R13				NOT ASSIGNED		
A5R14				NOT ASSIGNED		
A5R15	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R16	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22				NOT ASSIGNED		
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	11	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R70				NOT ASSIGNED		
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				AS EVENT 8UAPD (DATE CODE 9045L)		
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	PPE121-105X7P103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C100 - 112				NOT ASSIGNED		
A5C113	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C122	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-653-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	2	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE1SYQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE1SYQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE1SYQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R85				NOT ASSIGNED		
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R90				NOT ASSIGNED		
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE1SYQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE1S 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE1SYQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE1S 33 OHM F
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	1DK5-0002	7	4	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD (DATE CODE 9045Z)	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C6	0160-0576	5	51	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7P104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7P103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				A5 EVENT BOARD (DATE CODE 90404)		
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS5748N
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS5748N
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	1DK5-0002	7		IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	50Z1
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
				MISCELLANEOUS HARDWARE AND CHASSIS PARTS (SERIAL NUMBER 2952A00446 AND ABOVE)		
A1	05372-60001	8	1	BD AY-TB CONTROL	28480	05372-60001
A2	05372-60002	9	1	BD AY-INPUT AMP	28480	05372-60002
A3	05372-60003	0	1	BD AY-TIME	28480	05372-60003
A4	05372-60004	1	1	BD AY-INTERP	28480	05372-60004
A5	05372-60005	2	1	BD AY-EVENT	28480	05372-60005
A6	05372-60006	3	1	BD AY-CNT SPRT	28480	05372-60006
A7	05372-60007	4	1	BD AY-PROCESSOR	28480	05372-60007
A7U16	05372-80032	3	1	EPROM-80032	28480	05372-80032
A7U17	05372-83033	4	1	EPROM-80033	28480	05372-80003
A7U18	05372-80034	5	1	EPROM-80034	28480	05372-80034
A7U19	05372-83035	6	1	EPROM-80035	28480	05372-80005
A7U52	05372-80036	7	1	EPROM-80036	28480	05372-80036
A7U53	05372-80037	8	1	EPROM-80037	28480	05372-80037
A7U54	05372-80038	9	1	EPROM-80038	28480	05372-80038
A7U55	05372-80039	0	1	EPROM-80039	28480	05372-80039
A8	05372-60008	5	1	BD AY-IO CONTROL	28480	05372-60008
A9	05372-60009	6	1	BD AY-DOUBLE REG	28480	05372-60009
A10	51089-60015	1	1	BD AY TRIPLE REG	28480	51089-60015
A11	05371-60011	3	1	BD AY-FRONT PNL	28480	05371-60011
A12	05372-60012	1	1	BD AY-MOTHER	28480	05372-60012
A13	05372-60013	6	1	BD AY-REAR PANEL	28480	05372-60013
A14	05371-60014	6	1	BD AY-TB MULT	28480	05371-60014
A15	10811-60111	8	1	QUARTZ OSC 10MHZ	28480	10811-60111
A16	05371-60231	9	1	CBL AY-PWR MOD	28480	05371-60231
A17	2090-0209	4	1	CRT ASSY-7" W/PCB	28480	2090-0209
A20	05372-60020	1	1	BD AY-C CHAN 030	28480	05372-60020
A20	05372-60020	1	1	BD AY-C CHAN 090	28480	05372-60020
A22	05372-60022	3	1	BD AY-FAST PORT 020	28480	05372-60022
B1	3160-0521	3	1	FAN-TBAX 100-CFM 12VDC	11045	4312-26
C1	0180-3572	9	1	CAP-FXD 50 V AL-ELCTLT	56289	36DE373G050BF2A
C2	0160-3036	8	4	CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C3	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C4	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C5	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
CR1	1906-0231	2	1	DIODE-CT-RECT 200V 15A	28480	1906-0231
F1	2110-0303	9	1	FUSE (INCH) 2A 250V NTD FE UL (SLOW BLO)	75915	312 002
F1	2110-0014	3	1	FUSE (INCH) 4A 250V TD FE UL	75915	313 004
H1	0380-1523	0	2	STANDOFF-HEX 10.1-MM-LG M3.5 X 0.6-THD	14480	TJL 100.305
H3	0515-0411	0	4	SCREW-MACH M3 X 0.5 22MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H4	0515-0885	2	19	SCREW-MACH M4 X 0.7 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6	77	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H6	0515-0896	5	14	SCREW-MACH M4 X 0.7 10MM-LG	00000	ORDER BY DESCRIPTION
H7	0515-1110	8	6	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H8	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
H9	0515-1232	5	10	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H10	0515-1323	5	20	SCREW-MACH M3 X 0.5 30MM-LG PAN-HD	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398M686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A20	05372-60020	5	1	C-CHANNEL BOARD	28480	05372-60020
A20C1	0160-6100	3	8	CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C2	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C3	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C5	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C7	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C9	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C11	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C12	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C13	0160-7193	6	8	CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C14	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C15	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C16	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C17	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C18	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C19	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C20	0160-5789	2	2	CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C21	0180-3922	3	1	CAP-FXD 15 uF 20 V	00039	NRD156M20R12
A20C22	0180-3755	0	1	CAP-FXD 33 uF 10 V	00039	NRD336M10R12
A20C23	0160-5789	2		CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C24	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20D1	1900-0231	0	3	DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D2	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D3	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D4	1902-1544	4	1	DIODE-ZNR 10 V X% .35W		
A20J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J2	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J3	1252-3345	8	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-3345
A20L1	9140-1117	9	5	COIL 47 uH 5%	06352	NL45323T-470J
A20L2	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L3	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L4	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L5	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L7	9140-1109	9	2	COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L8	9140-1109	9		COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L9	9140-1075	8	4	COIL 1 uH 30%	05826	9140-1075
A20L10	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L11	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L12	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20R1	0699-1318	6	1	RESISTOR 1K +-1% .125W	05524	CRCW1206F
A20R2	0699-2697	6	4	RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R3	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R4	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R5	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20U1	5088-7037	8	1	1.6 GHZ ATTEN	28480	5088-7037
A20U2	1826-1613	6	4	IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U3	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U4	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U5	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U6	1820-6555	3	1	IC DIVR ECL DIV-X-4	28480	QDMP-7004
	0361-0028	8	14	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0515-0894	3	6	SCREW-MACH M2.5 X 0.45 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	05305-00010	6	1	CLAMP-GRNDING	28480	05305-00010
	0535-0008	3	2	NUT-HEX DBL-CHAM M2.5 X 0.45 2MM-THK	00000	ORDER BY DESCRIPTION
	05372-20203	2	1	HEATSINK	28480	05372-20203
	05372-00025	4	1	HYBRID CLAMP	28480	05372-00025

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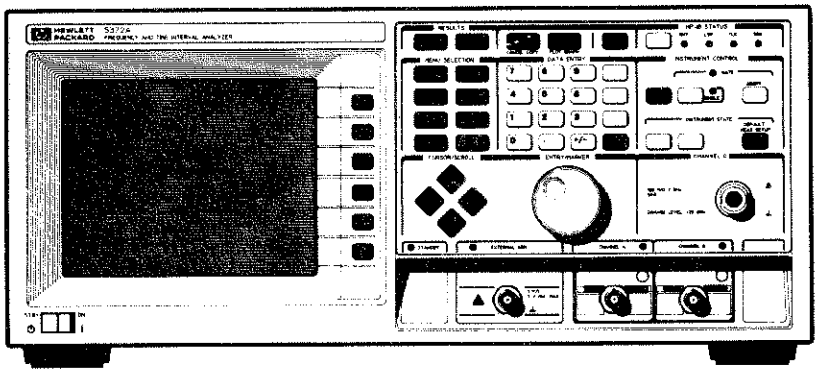
HP 5372A

Frequency and Time Interval Analyzer

SERVICE MANUAL



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SERVICE MANUAL

HP 5372A
Frequency and Time Interval Analyzer

MANUAL APPLICABILITY

This manual applies directly to an HP 5372A having the serial number prefix listed below. If this number does not match your instrument, refer to the "Manual Updating Changes" included with this manual.

For additional important information about serial numbers, see INSTRUMENT AND MANUAL IDENTIFICATION in Chapter 1, General Information.

SERIAL NUMBER
Serial Number Prefix: 2952

Edition 1
E0490

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Printed: APRIL 1990

HEWLETT PACKARD

MANUAL PART NUMBER 05372-90016
Microfiche Part Number 05372-90017

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Safety Considerations

GENERAL

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage and the correct fuse is installed. Refer to instructions in Appendix B of the Operating Manual.

SAFETY EARTH GROUND

An uninterruptible safety earth ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.

Safety Symbols

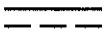
Instruction manual symbol; the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual.

Indicates hazardous voltages.

Indicates earth (ground) terminal.

Indicates terminal is connected to chassis when such connection is not apparent.

Alternating current.



Direct current.

WARNING

THIS DENOTES A HAZARD. IT CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR THE LIKE, WHICH, IF NOT CORRECTLY PERFORMED OR ADHERED TO, COULD RESULT IN PERSONAL INJURY. DO NOT PROCEED BEYOND A *WARNING* SIGN UNTIL THE INDICATED CONDITIONS ARE FULLY UNDERSTOOD AND MET.

CAUTION

This denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a *CAUTION* sign until the indicated conditions are fully understood and met.

Safety Information

WARNING

Any interruption of the protective grounding conductor (inside or outside the instrument) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection.)

Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

If this instrument is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to the earthed pole terminal (neutral) of the power source.

Instructions for adjustments while covers are removed and for servicing are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform such adjustments or servicing unless qualified to do so.

For continued protection against fire, replace the line fuse(s) only with 250V fuse(s) of the same current rating and type (for example, normal blow, time delay). Do not use repaired fuses or short circuited fuseholders.

When measuring power line signals, be extremely careful and always use a step-down isolation transformer whose output voltage is compatible with the input measurement capabilities of this product. This product's front and rear panels are typically at earth ground, so NEVER TRY TO MEASURE AC POWER LINE SIGNALS WITHOUT AN ISOLATION TRANSFORMER.

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GENERAL INFORMATION

1-1. INTRODUCTION

The HP 5372A Service Manual provides information on testing, adjusting, troubleshooting, and repairing the HP 5372A Frequency and Time Interval Analyzer.

1-2. SERVICE MANUAL ORGANIZATION AND CONTENTS

The HP 5372A Service Manual is organized as follows:

CHAPTER 1 — GENERAL INFORMATION - Provides information on the organization and content of the service manual. This chapter contains information on many different topics, including safety considerations and test equipment. Three retrofit installation procedures are also listed.

CHAPTER 2 — PERFORMANCE TESTS - Provides procedures for operation verification, complete performance testing, and HP-IB verification. The verification procedures are used to give a high degree of confidence that the HP 5372A is operating properly. The complete performance test is used to verify that the electrical performance of the HP 5372A is within specifications, listed in Appendix A.

CHAPTER 3 — ADJUSTMENT PROCEDURES - Provides procedures required to maintain the instrument operating characteristics within specifications.

CHAPTER 4 — REPLACEABLE PARTS - Provides ordering information for all replaceable parts and assemblies within the instrument.

CHAPTER 5 — OVERALL TROUBLESHOOTING - Provides information on the HP 5372A service strategy, and using the diagnostic test failure messages to determine the faulty assembly/component. This chapter also provides information on dead-instrument troubleshooting.

CHAPTER 6 — THEORY OF OPERATION - Provides an overall description of the HP 5372A. This chapter also contains block diagrams at several functional levels.

CHAPTER 7 — A2 INPUT AMPLIFIER Provides component-level theory of operation, troubleshooting procedures, block diagram, component locator, and schematic diagrams for the A2 assembly.

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CHAPTER 8 — A3 TIME Provides component-level theory of operation, troubleshooting procedures, block diagram, component locator, and schematic diagrams for the A3 assembly.

CHAPTER 9 — A4 INTERPOLATOR Provides component-level theory of operation, troubleshooting procedures, block diagram, component locator, and schematic diagrams for the A4 assembly.

CHAPTER 10 — A5 EVENT Provides component-level theory of operation, troubleshooting procedures, block diagram, component locator, and schematic diagrams for the A5 assembly.

CHAPTER 11 — A12 MOTHERBOARD Provides component-level theory of operation, troubleshooting procedures, block diagram, component locator, and schematic diagrams for the A12 assembly.

CHAPTER 12 — C-CHANNEL Provides component-level theory of operation, troubleshooting procedures, block diagram, component locator, and schematic diagrams for the A20 assembly.

APPENDIX A — SPECIFICATIONS - Provides all specifications of the HP 5372A. This appendix also lists typical, non-warranted operating characteristics.

APPENDIX B — FUNCTIONS/ARMING - Provides descriptions of the various measurement functions and arming modes.

APPENDIX C — DIAGNOSTICS - Provides detailed information on all built-in diagnostic tests that can be used to verify various functional subsections of the instrument's circuitry.

1-3. INSTRUMENT DESCRIPTION

The HP 5372A Frequency and Time Interval Analyzer is a precision frequency and time interval measuring instrument that uses a new counting technique called "continuous measurement". This new counting technique provides contiguous frequency and time interval measurements with a wide range of arming and triggering features. Time-sampling of frequency and time interval measurements up to 13.3 MHz eliminating measurement "dead time" is attainable. Trigger events are time-stamped and stored for post-processing by a 68020 microprocessor. A special integrated circuit, called a Sequencer, controls the arming of three 32-bit count chains, each operating simultaneously and using two 16-bit Zero-Dead-Time counters (ZDTs). A new interpolation technique resolves measurements to 200 ps LSD. High-speed memory provides built-in statistical analysis capability. A front-panel CRT display allows presentation of measurement data and user-friendly interface.

The HP 5372A has two independent measurement channels, A and B, and an external arming input (an optional high-frequency C-Channel is available). Arming can occur on any of the three standard inputs and can be specified by time, events, signal edge, cycle, or parity.

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In addition to making frequency (and period) and time interval measurements, the HP 5372A can make the following measurements:

- Positive and Negative Pulse Width
- Rise and Fall Time
- Totalize
- Phase
- Peak Amplitude
- Duty Cycle
- Phase Deviation
- Time Deviation
- Simultaneous Dual-channel Frequency

The HP 5372A can analyze measurement data to produce histograms, time variance graphs, event timing graphs, limit tests, Allan Variance, and more. Additional features include (1) HP-IB compatibility with enhanced control language, (2) CRT screen printout capability, (3) diagnostic capability accessible via the front panel, (4) statistics and math capability, (5) save and recall of instrument setups, and (6) graphics capability.

1-4. ACCESSORIES SUPPLIED

The HP 5372A is supplied with two HP 54002A 50 ohm input pods (Channel A and B), and with a power cord (HP P/N 8120-1378).

1-5. ACCESSORIES AVAILABLE

The HP 54002A 50Ω BNC Input Pod is standard and shipped with the HP 5372A. This pod is used where measurements require terminated lines. Pod alternatives to the HP 54002A and additional accessories are listed below.

1-6. HP 54001A 10 KΩ Active Input Probe/Pod

This pod is useful when measuring densely-packed, high-speed logic circuits.

1-7. HP 54003A 1 MΩ Probe Pod

This pod is useful when circuits being measured are sensitive to resistive loading. The 54003A is compatible with oscilloscope probes.

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1-8. HP 5364A 2-18 GHz Microwave Mixer/Detector

The HP 5364A Microwave Mixer/Detector can be used to convert signals in the 2 to 18 GHz range down to the 500 MHz operating range of the HP 5372A.

1-9. HP J06-59992A Time Interval Calibrator

The HP J06-59992A Time Interval Calibrator can improve the accuracy of measurements made with the HP 5372A by providing the means to measure and remove systematic uncertainties (such as differential channel delay, long-term drift or timebase oscillator aging, and trigger level timing error) from measurement data.

1-10. Rack Slide-Mount Kit (HP Part Number 1494-0059)

WARNING

THE HP 5372A WEIGHS 24.5 KG (54 LBS). CARE MUST BE TAKEN WHEN LIFTING THE INSTRUMENT TO AVOID PERSONAL INJURY. USE EQUIPMENT SLIDES WHEN RACK MOUNTING.

Installation of the Rack Slide-Mount Kit reduces the need to lift the HP 5372A when rack mounting the instrument.

1-11. SERVICE EQUIPMENT AVAILABLE

The HP 5372A Support Service Kit, HP Part Number 05372-67001, contains extender boards and special cables necessary for performing troubleshooting and adjustment procedures. The extender boards and cables allow the HP 5372A assemblies to be extended from their A12 Motherboard plug-in connectors for monitoring with appropriate test equipment. The Items provided in the Service Support Kit are listed in *Table 3-2*.

1-12. RECOMMENDED TEST EQUIPMENT

The test equipment listed in *Table 1-1* is recommended for use during performance tests, adjustment procedures, and troubleshooting procedures. Substitute test equipment may be used if it meets or exceeds the required characteristics listed in the table.

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Table 1-1. HP 5372A Recommended Test Equipment

INSTRUMENT	REQUIRED CHARACTERISTICS	USE	RECOMMENDED MODEL/PART NUMBER
Oscilloscope	275 MHz Bandwidth	A, T	HP 1725A
Oscilloscope	1-GHz Bandwidth Channel vs. Channel Display Trigger Delay	A, T	HP 54100A
Synthesizer/ Function Generator	DC to 10 MHz Freq Range 45 mVp-p to 5 Vp-p Amp Range –2.5V to +2.5V DC Offset Range	P, A	HP 3325A
Synthesized Signal Generator	100 MHz to 2 GHz Freq Range 15 mVrms to 100 mVrms Amp Range	P, A	HP 8663A
Digital Multimeter	100 µV Resolution in True RMS AC	P, A, T	HP 3458A
Universal Frequency Counter	Duty Cycle at 1 kHz Input 0.001 Degree Resolution	A	HP 5335A
Support Service Kit	HP 5372A	A, T	05371-67001

P = PERFORMANCE TESTS A = ADJUSTMENTS T = TROUBLESHOOTING PROCEDURES

1-13. SAFETY CONSIDERATIONS

The HP 5372A is a Safety Class I instrument provided with a protective earth terminal. This instrument is designed and tested to international safety standards. Safety information pertinent to the operation and servicing of this instrument is included in both this chapter and Chapter 3 (Adjustment Procedures).

Although this instrument has been designed in accordance with international safety standards, this manual contains information, cautions, and warnings that must be followed to ensure safe operation and to maintain the instrument in safe condition. Service instructions and adjustment procedures, which require the removal the top or bottom instrument covers, are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing or make any adjustments with the covers removed unless you are qualified to do so.

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WARNING

THIS IS A SAFETY CLASS I PROVIDED WITH A PROTECTIVE EARTH TERMINAL. AN UNINTERRUPTABLE SAFETY EARTH GROUND MUST BE PROVIDED FROM THE MAINS POWER SOURCE TO THE HP 5372A INPUT WIRING TERMINALS, POWER CORD, OR SUPPLIED POWER CORD SET. WHENEVER IT IS LIKELY THAT THE PROTECTION HAS BEEN IMPAIRED, ANY INTERRUPTION OF THE PROTECTIVE GROUNDING CONDUCTOR INSIDE OR OUTSIDE THE INSTRUMENT OR OPENING THE PROTECTIVE EARTH TERMINAL WILL CAUSE A POTENTIAL SHOCK HAZARD THAT COULD RESULT IN PERSONAL INJURY. INTENTIONAL INTERRUPTION IS PROHIBITED. THE INSTRUMENT MUST BE MADE INOPERATIVE AND BE SECURED AGAINST ANY UNINTENDED OPERATION.

IF THE HP 5372A IS TO BE ENERGIZED VIA AN EXTERNAL AUTOTRANSFORMER FOR VOLTAGE REDUCTION, MAKE SURE THAT THE COMMON TERMINAL IS CONNECTED TO THE EARTH POLE OF THE POWER SOURCE. FAILURE TO GROUND THE INSTRUMENT CAN RESULT IN PERSONAL INJURY. REFER TO THE PARAGRAPH TITLED "Power Cable".

WARNING

THE AC POWER CIRCUITS TO TRANSFORMER T1 AND THE A12 MOTHERBOARD ARE ALWAYS ENERGIZED WHEN THE INSTRUMENT IS CONNECTED TO AC MAINS REGARDLESS OF THE SETTING OF THE FRONT-PANEL POWER SWITCH (STBY-ON). THE +25 VDC (UNREGULATED) ON THE A12 MOTHERBOARD, THE UNREGULATED DC VOLTAGE TO THE A7 PROCESSOR BOARD (BACK-UP RAMS U20 AND U56, REAL-TIME CLOCK U87), AND THE REGULATED DC VOLTAGE TO THE A15 OVEN OSCILLATOR HEATER ARE ALSO ALWAYS ON WHEN THE AC POWER IS CONNECTED TO THE HP 5372A, EVEN WHEN THE FRONT-PANEL STBY-ON SWITCH IS SET TO STBY. CONTACT WITH ANY OF THESE CIRCUITS CAN RESULT IN PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

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WARNING

WHEN THIS INSTRUMENT IS CONNECTED TO THE POWER MAINS, DANGEROUS VOLTAGES ARE ALWAYS LOCATED INSIDE THE INSTRUMENT, REGARDLESS OF THE POSITION OF THE STBY-ON (POWER) SWITCH.

WARNING

TO PREVENT CATHODE-RAY TUBE (CRT) IMPLOSION, AVOID HANDLING OR JARRING OF THE CRT DISPLAY UNIT. BREAKAGE OF THE CRT CAUSES A HIGH-VELOCITY SCATTERING OF GLASS FRAGMENTS (IMPLOSION). HANDLING THE CRT MUST BE DONE ONLY BY QUALIFIED MAINTENANCE PERSONNEL USING APPROVED SAFETY MASK AND GLOVES.

WARNING

ANY ADJUSTMENT, MAINTENANCE, AND REPAIR OF THE OPENED, ENERGIZED INSTRUMENT SHOULD BE AVOIDED WHEN POSSIBLE. BUT, IF NECESSARY, SUCH TESTING SHOULD BE PERFORMED BY A SKILLED PERSON WHO IS AWARE OF THE HAZARDS INVOLVED. CAPACITORS INSIDE THE INSTRUMENT, SUCH AS C1, MAY STILL BE CHARGED EVEN IF THE INSTRUMENT HAS BEEN DISCONNECTED FROM ITS AC POWER SOURCE.

WARNING

IF, DURING MAINTENANCE, IT BECOMES NECESSARY TO REMOVE THE SAFETY SHIELD INSULATORS (MP37) THAT COVER THE MOTHERBOARD HIGH VOLTAGE AREA OR THE LOW VOLTAGE (BUT POTENTIALLY HIGH CURRENT) BRIDGE DIODE CR1, ENSURE THAT THEY ARE REPLACED WHEN WORK IS COMPLETED.

WARNING

REMOVE ALL JEWELRY (RINGS, BRACELETS, ETC.) WHEN WORKING WITHIN THE HP 5372A. HIGH VOLTAGES ARE PRESENT WITHIN THE POWER SUPPLY SAFETY COVER WHILE A LOW VOLTAGE-HIGH CURRENT HAZARD EXISTS NEAR BRIDGE RECTIFIER CR1.

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WARNING

THE HP 5372A WEIGHS 23.2 KG (51 LBS). CARE MUST BE TAKEN WHEN LIFTING THE INSTRUMENT TO AVOID PERSONAL INJURY. USE EQUIPMENT SLIDES WHEN RACK MOUNTING. (REFER TO "OPTIONS" PARAGRAPHS IN CHAPTER 1 FOR DETAILS.)

CAUTION

BEFORE PLUGGING THE HP 5372A into the Mains (line) voltage, be sure the correct line voltage and fuse have been selected. You must set the voltage selector turret wheel correctly to adapt the HP 5372A to the power source available. Refer to the paragraph titled "Line Voltage and Fuse Selection".

CAUTION

The HP 5372A top and bottom covers are unique to the HP 5372A and therefore must remain with the instrument at all times. Both covers are insulated so replacing either one with the covers from another instrument could result in damage to the HP 5372A.

CAUTION

Make sure that only fuses with the required current and voltage ratings, and of the specified type (normal blow, time delay, etc.), are used for replacement. DO NOT USE shorted circuit fuseholders or repaired fuses.

1-14. Safety Symbols

The safety symbols used on equipment and in manuals are shown in "Safety Considerations" at the front of this manual.

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1-15. After Service Product Safety Checks

The following safety checks must be performed after any troubleshooting and repair procedures have been completed to ensure the safe operation of the instrument.

WARNING

RESISTANCE CHECKS DESCRIBED BELOW REQUIRE THAT THE POWER CORD BE CONNECTED TO THE THE HP 5372A AND THAT AC POWER BE DISCONNECTED. BE SURE THAT THE POWER CORD IS NOT CONNECTED TO POWER BEFORE PERFORMING ANY SAFETY CHECKS.

A. VISUAL INSPECTION. Visually inspect the interior of the instrument for any signs of abnormal internally generated heat, such as discolored printed circuit boards or components, damaged insulation, or evidence of arcing. Determine and remedy the cause of any such condition.

B. GROUND CONTINUITY TEST. Plug the power cord (W22) into the rear-panel power module. (DO NOT CONNECT THE INSTRUMENT TO AC POWER.) Using a suitable ohmmeter, check resistance from the instrument enclosure (chassis) to the ground pin on the power cord plug. The reading must be less than 1 Ohm. Flex the power cord while making this measurement to determine whether intermittent discontinuities exist.

C. Check any indicated front- or rear-panel ground terminals marked, using the above procedure.

D. INSULATION RESISTANCE TEST. Tie the line and neutral pins of the power cord plug together. Measure the resistance from the instrument enclosure (chassis) to the line and neutral pins of the power cord plug. The minimum acceptable resistance is 2 MΩ. Replace any component which results in a failure.

E. A16 POWER MODULE CHECK. Check the line fuse and the power line selector (turret wheel) to verify that the correctly rated fuse is installed and that the instrument is properly set for the AC power source applied.

1-16. ELECTROSTATIC DISCHARGE

Electronic components and assemblies in the HP 5372A can be permanently degraded or damaged by electrostatic discharge. Use the following precautions when servicing the instrument:

A. ENSURE that the static sensitive devices or assemblies are serviced at static safe work stations providing proper grounding for service personnel.

B. ENSURE that static-sensitive devices or assemblies are stored in static shielding bags or containers.

C. DO NOT wear clothing subject to static buildup, such as wool or synthetic materials.

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D. DO NOT handle components or assemblies in carpeted areas.

E. DO NOT remove an assembly or component from its static shielding protection until you are ready to install it.

F. AVOID touching component leads. (Handle by the packaging only.)

1-17. CLEANING PRINTED-CIRCUIT BOARDS

After soldering a component to a printed-circuit (PC) board, HP recommends that you DO NOT remove the flux from the soldered area. It has been found that after a hand soldering operation, the solder flux from RMA-P2 (Rosin, Mildly Active) solder does no harm if left in place on a PC board; the flux residue is inert and non-conductive. However, when the flux is dissolved with a chemical, in an attempt to remove it from the board, it spreads over the board, releasing several activators (chlorides, bromides, etc.). Now, instead of having a harmless flux residue with the water soluble activators trapped inside, you have a potential corrosion problem. If the instrument is stored in a humid environment, over time moisture will be absorbed which can start the corrosion process.

1-18. SCHEMATIC DIAGRAM SYMBOLS AND REFERENCE DESIGNATIONS

Figure 1-1 shows the various common symbols used on the schematic diagrams. At the bottom of *Figure 1-1*, the identification system for reference designators, assemblies, and subassemblies is shown.

1-19. Reference Designators

Reference designators are assigned to indicate the class and the location of printed circuit assemblies (boards), subassemblies (if any), and all of the component parts, as shown in the example in *Figure 1-1*. Assemblies are assigned numbers in sequence — A1, A2, etc. Component parts are numbered in sequence, from left to right, top to bottom, according to the physical location on the assembly.

Subassemblies within an assembly are given a subordinate "A" number. For example, the rectifier subassembly A1 of *Figure 1-1* has a complete designation of A25A1. For individual components, the complete designation is determined by adding the assembly number and subassembly number, if any. For example, CR1 would have a complete reference designator of A25A1CR1.

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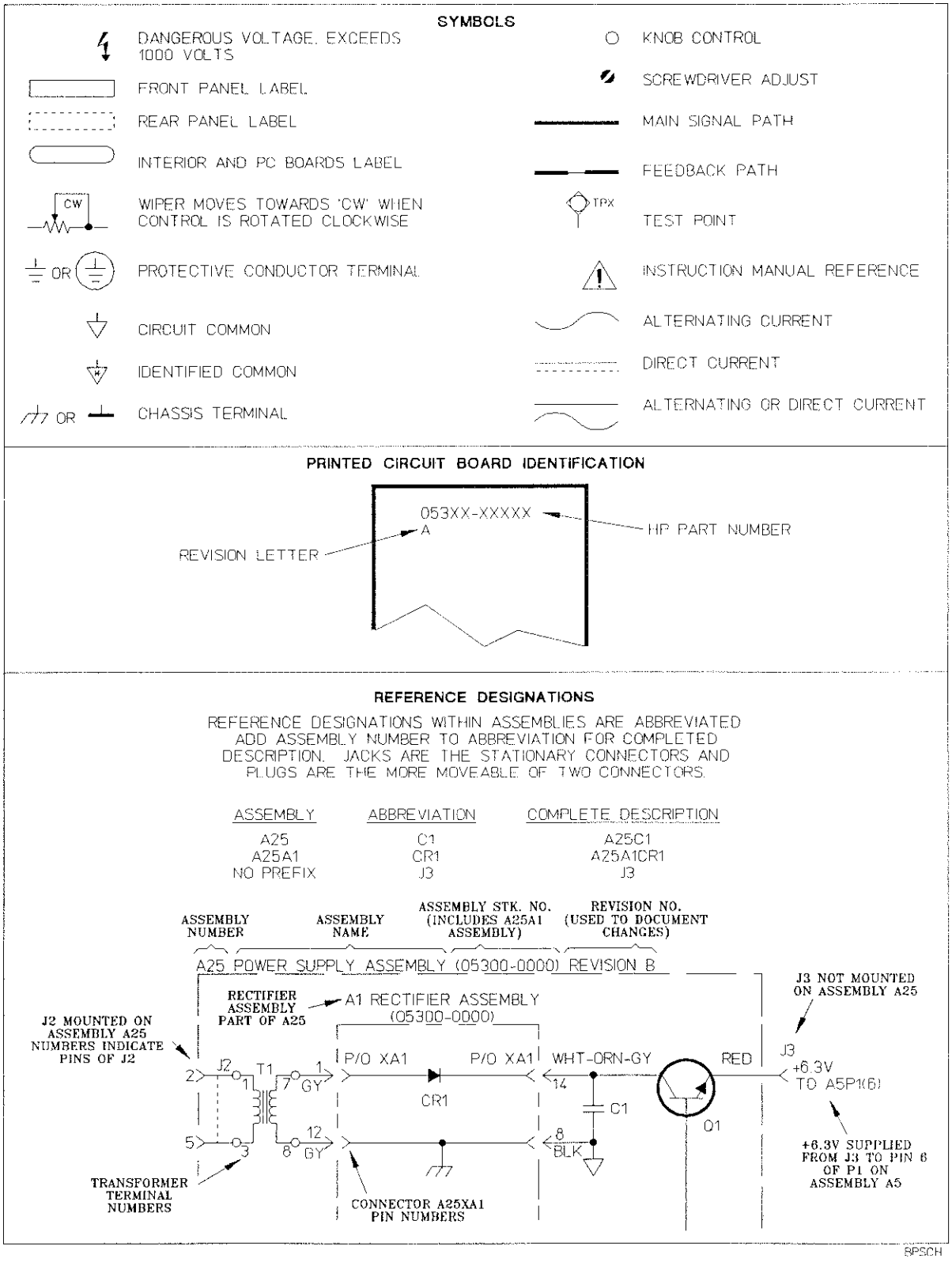

Figure 1-1. Schematic Diagram Notes

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1-20. IDENTIFICATION MARKINGS ON PRINTED-CIRCUIT BOARDS

Printed-circuit boards in the HP 5372A are identified by three types of markings: an assembly part number, a revision letter, and a manufacturing date code.

The assembly part number has 10 digits, as in 05372-60005, and is the primary identification. All assemblies with the same part number are interchangeable. When a production change is made on an assembly that renders it incompatible with previous assemblies, the part number is also changed.

Revision letters, A, B, etc., denote changes in printed circuit layout. For example, if a capacitor type is changed, physically as opposed to electrically, and requires different spacing for its leads, the printed-circuit layout is changed and the revision number is incremented to the next letter.

The manufacturing date code is a 10 digit number which indicates both the actual date the assembly was manufactured, and the order in which it was manufactured that day. The date code is listed as YYWWD-XXXXX, where YY indicates the year, WW indicates the week number of the year, D indicates the day number of the week, and XXXXX indicates that this assembly was the nth assembly produced that day regardless of assembly number.

1-21. IDENTIFICATION AND REPAIR OF MULTI-LAYER CIRCUIT BOARDS

Multi-layer circuit boards with conductors in three or more layers have a rectangular pattern of 4, 6, or 8 windows with single digits visible in the windows when viewed over a light. The square windows appear on both sides of the circuit board. The number of identifiable numbers indicate the number of layers in the circuit board. For, example, a circuit board having four windows with a "1" in one window, a "4" in a second window (on the opposite side of the board), a "2" or "3" visible through the third window, and one window that's blank, the board has three layers.

CAUTION

Multi-layer circuit boards are susceptible to damage from heat or excessive force applied when removing or replacing parts. Static-free vacuum devices that pull the molten solder out of the circuit board's feedthrough holes are required. With the solder effectively removed, parts should be easy to remove with excessive prying or pulling on component leads.

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1-22. LOGIC SYMBOLS

Logic symbols used in this manual conform to the American National Standard publication *EEE Standard Graphic Symbols for Logic Functions, ANSI/IEEE Std. 91-1984.* This standard supercedes MIL-STD-806B. Another useful reference source is *The TTL Data Book,* "Explanation of New Logic Symbols" by F.A. Mann (Texas Instruments Incorporated).

1-23. ROUTINE MAINTENANCE

The only routine maintenance required is the periodic cleaning of the front-panel CRT protective anti-glare filter screen. The filter may be cleaned as follows:

A. WHILE THE FILTER IS INSTALLED IN THE INSTRUMENT.

1. *Method 1.* Wipe the mesh with a lint-free cloth that has been dampened with isopropyl alcohol.

2. *Method 2.* Use compressed air to blow off any dirt particles on the filter.

NOTE

DO NOT USE any type of cloth or tissue paper which may contaminate the filter with particles.

B. WHEN THE FILTER IS REMOVED FROM THE INSTRUMENT. Clean the filter with a lint-free cloth that has been dampened with warm, soapy water. Use a light, rubbing motion to clean the filter mesh. Rinse the filter thoroughly by holding it under warm, running water. Dry the filter using two lint-free cloths, rubbing the mesh from both sides simultaneously.

Refer to the filter removal procedure described in the disassembly instructions in this manual section if filter cleaning or replacement is required.

1-24. OPERATING ENVIRONMENT

1-25. Temperature

The instrument may be operated in temperatures that range between 0° and 40° C.

1-26. Humidity

The HP 5372A may be operated in environments with humidity from 5% to 95% at temperatures that range between 0° and 40° C.

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1-27. Altitude

The HP 5372A may be operated at altitudes up to 4,572 metres (15,000 feet).

1-28. POWER REQUIREMENTS

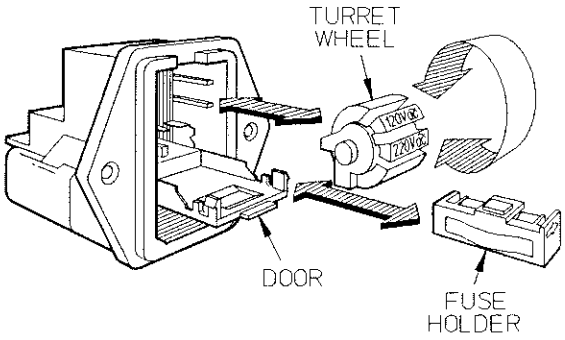
The HP 5372A can operate from power sources of 100-, 120-, 220-, or 240-volt AC, ±10%, at 50, 60, or 400 Hertz. Maximum power consumption is 500 volt-amperes. (See "SAFETY CONSIDERATIONS" for additional information.)

1-29. LINE VOLTAGE AND FUSE SELECTION

CAUTION

BEFORE PLUGGING THE HP 5372A into the Mains (line) voltage, be sure the correct line voltage and fuse have been selected. You must set the voltage selector turret wheel correctly to adapt the HP 5372A to the power source available. Refer to the paragraph titled "Line Voltage and Fuse Selection".

The HP 5372A is equipped with a power module (A16 Power Module Cable Assembly located on the instrument's rear panel) that contains a turret wheel line voltage selector that allows you to select either 100-, 120-, 220-, or 240-volt AC operation as shown in *Figure 1-2*. Before applying power to the HP 5372A, the turret wheel selector must be set to the correct position and the correct fuse must be installed as described in the following paragraph.



SELECTION OF OPERATING VOLTAGE

1. Using a small, flat-head screwdriver, snap open the power module door to access the fuse and turret wheel.
2. REMOVE the turret wheel before turning to desired voltage. DO NOT turn turret wheel while installed in module. Push wheel firmly into module slot.
3. To change or install fuse, pull fuse holder and re-insert fuse in holder, using caution to select correct fuse value. Re-insert fuse and holder.
4. Close the power module door. The selected operating voltage is shown in module window.

Figure 1-2. Line Voltage Selection Using A16 Power Module Turret Wheel

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Power line connections are selected by the position of the plug-in turret wheel in the A16 module. The correct value fuse, with a 250-volt rating, must be installed before the turret wheel is inserted. The HP 5372A uses a 4 Ampere fuse (HP Part Number 2110-0055) for 100/120-volt operation and a 2 Ampere fuse (HP Part Number 2110-0303) for 220/240-volt operation.

To change the line fuse, disconnect power cord W22 from the A16 module and then follow the instructions in *Figure 1-2.*

In addition, the HP 5372A has two internal, low-voltage fuses; a 10 Ampere fuse, A9F1, that protects the +25V Unregulated input to the A9 Double Regulator Board (HP P/N 2110-0713), and a thermal fuse, A15F1, contained within the A15 Oven Oscillator (HP P/N 2110-0617).

1-30. FRONT-PANEL LED ANNUNCIATORS

Several front-panel LED annunciators provide a visual indication of several of the instrument's status conditions. Two examples of status conditions are the HP-IB configuration and the trigger state.

1-31. HP-IB Status LEDs

RMT - The RMT annunciator LED is ON when HP 5372A is under remote control.

LSN - The LSN annunciator LED is ON when the HP 5372A is addressed to listen.

TLK - The TLK annunciator LED is ON when the HP 5372A is addressed to talk, or when it is being used in the TALK ONLY mode.

SRQ - The SRQ annunciator LED is ON when the HP 5372A sends a service request to the controller in charge of the HP-IB.

1-32. Instrument Control LEDs

GATE - The GATE annunciator LED shows the status of the HP 5372A's counter gate. Before a measurement starts, this LED is OFF, indicating the gate is closed. During a measurement, this LED turns ON, indicating the gate is open. When the gate duration is less than or equal to 100 milliseconds, the GATE LED remains ON for a minimum of approximately 100 milliseconds.

SINGLE - When the SINGLE annunciator LED is ON, the counter makes a single measurement and displays the result.

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1-33. EXTERNAL ARM, CHANNEL A, and CHANNEL B LEDs

All three of these LEDs provide a visual indication of the triggering status of each respective channel. If one of the three LEDs is flashing at a 10-Hz rate, the respective channel is triggering. If one of the LEDs is OFF the input signal to the respective channel is either above or below the trigger level setting.

1-34. STANDBY LED and Power (STBY-ON) Switch

When the STBY-ON switch is in the ON position, power is supplied to the entire instrument. The STBY position removes normal operating power to the instrument, but continues to supply power to both the A15 Oven Oscillator's internal oven to maintain a constant temperature for its crystal, and to two backup RAM ICs (A7U20 and U56) located on the A7 Processor Board. The front-panel STANDBY annunciator LED is ON when the switch is set to STBY. This means that the input to the main chassis-mounted transformer T1, and consequently the unregulated +25 Volts DC to the A15 oscillator oven and the LP voltage to the A7 backup RAMs are always energized whenever AC power is connected, regardless of the STBY-ON switch setting.

Note that the HP 5372A's A7 Processor Board is equipped with an internal battery for continuous memory storage of up to 10 separate front panel settings. The battery is NOT rechargeable.

1-35. Keyboard Memory

Whenever the HP 5372A is set to Standby, the 68020 microprocessor automatically stores the front-panel settings in memory energized by a back-up battery power supply. This avoids having to re-enter math constants, functions or input setups, whenever the instrument is set to Standby, AC power is removed from the instrument, or the A7 Processor Board is physically removed from the instrument.

1-36. HEWLETT-PACKARD INTERFACE BUS (HP-IB)

1-37. HP-IB Connections

The HP 5372A communicates over the HP-IB via the 24-pin connector located on the instrument's rear panel. The connector is compatible with the HP 10833A/B/C/D HP-IB cables. The HP-IB system allows the user to connect up to 15 (including the system controller) HP-IB compatible instruments. The HP-IB cables have identical "piggy-back" connectors at both ends of the cable allowing several cables to be connected to a single source without the need of special adapters or switch boxes.

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1-38. HP-IB Address Selection

The HP-IB device address of the HP 5372A is selected from its front panel via the SYSTEM Menu screen. The address applies to both talk and listen functions. The selectable addresses range from 0 to 30. Instructions the selecting the address can be found in Section 12 of the Operating Manual. The default address value is "3" and is retained in the non-volatile CMOS memory (A7U20 and U56) located on the A7 Processor Board.

1-39. HP-IB Descriptions

A description of the Hewlett-Packard Interface Bus (HP-IB) is provided in the HP 5372A Programmer's Manual.

1-40. LOGIC FAMILY VOLTAGE LEVELS

The HP 5372A uses four types of logic devices. They are:

A. Transistor-Transistor-Logic (TTL)

B. Emitter-Coupled Logic (ECL)

C. Emitter-Emitter-Coupled Logic (EECL)

D. Emitter-Function Logic (EFL)

Logic Levels

Logic State	TTL	ECL	EECL	EFL
HIGH	+2.0V to +5.0V	–0.9V	0.0V	+2.1V
LOW	0V to +0.8V	–1.8V	–0.8V	+1.5V

1-41. INSTRUMENT AND MANUAL IDENTIFICATION

The instrument serial number is located on the rear panel of the instrument. The serial number is in the form: XXXXAYYYYY. The first four digits (XXXX) and the letter A comprise the serial number prefix. The last five digits (YYYYY) are the suffix. The prefix (XXXXA) is the same for all identical instruments; it changes only when a change is made to the instrument. The suffix (YYYYY), however, is assigned sequentially and differs from instrument to instrument. The contents of this manual apply to instruments with the serial number prefix(es) listed under SERIAL NUMBER on the title page.

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An instrument manufactured after the printing of this manual may have a serial number prefix that is not listed on the title page. This unlisted serial number prefix indicates the instrument is different than that described in this manual. The manual for this newer instrument is accompanied by "MANUAL UPDATING CHANGES" supplement. This supplement contains information that explains how to adapt the manual to the newer instruments.

In addition to change information, the supplement may contain information for correcting errors in the manual. To keep this manual current and as possible, Hewlett-Packard recommends that you periodically request the latest MANUAL UPDATING CHANGES. The supplement for this manual is identified with the manual print date and part number, both of which appear on the manual title page. Complimentary copies of the supplement are available from Hewlett-Packard. For information concerning a serial number prefix that is not listed on the title page or in the MANUAL UPDATING CHANGES supplement, contact your nearest Hewlett-Packard Sales and Support Office.

1-42. OPTIONS

The following options are available with the HP 5372A.

1-43. FastPort Data Output (Option 020)

The FastPort Data Output option is not a field installable option. This option consists of three 40-pin rear panel connectors, which allows access to unprocessed measurement data. This option must be ordered as part of the HP 5372A when the instrument is first shipped.

1-44. 2 GHz Channel C (Option 030)

The 2 GHz Channel C option is a field installable option. This option extends the frequency range of the HP 5372A to 2 GHz. The option 030 retrofit kit, HP P/N 05372-67002, includes all the parts and instructions for installing the option 030 (see the Retfofit Option section of this chapter). This option can only be retrofitted to an HP 5372A.

1-45. Rear Panel Inputs (Option 060)

The Rear Panel Input option (060) is a field installable option. Option 060 provides 50Ω BNC inputs for Channel A and B, and a 1 MΩ BNC input for EXTERNAL ARM. Front-panel input pods cannot be used with Option 060 is installed. Channel A and B performance for Option 060 is equivalent to front panel performance. External Arm performance for Option 060 is listed the Rear Panel Specifications, located in Appendix A. The Option 060 Retrofit Kit, HP P/N 05371-60230, includes all the parts and instructions for installing the Option 060 (see the Retrofit Option section of this chapter). This option can be retrofitted to an HP 5371A or an HP 5372A.

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1-46. Rear Panel Inputs including Channel C (Option 090)

The Rear Panel Input including Channel C (090) is a field installable option. Option 090 includes 50 ohm BNC inputs for Channel A and B, a 1 M ohm input for External Arm, and a 50 ohms Type-N connector for Channel C. Front-panel input pods cannot be used with Option 090 installed. Channel A, B, and C performance for Option 090 is equivalent to front panel performance. External Arm performance for Option 090 is listed in Rear Panel Specifications, Appendix A. To retrofit this option, refer to see the Retrofit Option section of this chapter. This option can only be retrofitted to an HP 5372A.

1-47. Rack Mount Adapter Kit — With Handles Removed (Option 908)

The Rack Mount Adapter kit is a field installable option. Option 908 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5061-9678. The kit consists of two flanges and mounting hardware.

1-48. Rack Mount Flange Kit — With Handles Attached (Option 913)

The Rack Mount Flange Kit is a field installable option. Option 913 Rack Mounting Kit is available, at additional cost, when ordered at the same time as the instrument. If ordered separately, the Rack Mounting Kit may be ordered using HP Part Number 5061-9772. The kit consists of two flanges and mounting hardware. This option supplies two rack flanges and mounting hardware for instruments already equipped with front handles.

1-49. Extended Warranty Support (Option W30)

Option W30 provides two additional years of return-to-HP hardware-service support. Option W30 is available only at the time of instrument purchase. Service contracts are available from Hewlett-Packard for instruments which did not include Option W30 at the time of purchase. For more information, contact your nearest Hewlett-Packard Sales and Support office.

1-50. HP Calibration Service (Option W32)

Option W32 provides three years of return-to-HP calibration service.

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1-51. RETROFIT OPTIONS

The following sections contain retrofit installation procedures for Options 030, 060, and 090.

1-52. INSTRUCTIONS FOR INSTALLING OPTION 030 C-CHANNEL RETROFIT KIT, HP P/N 05372-67002

1-53. Introduction

This installation note provides instructions for installing the Option 030 C-Channel Retrofit kit, HP P/N 05372-67002. This procedure applies to all HP 5372A series prefixes.

1-54. Parts Included

The HP 5372A Option 030 Retrofit Kit, HP P/N 05372-67002, contains the following parts:

HP Part Number	Description	Quantity
05372-60020	C-Channel Board	1
05372-60224	Front panel cable (semi-rigid)	1
05372-60229	Power supply ribbon cable	1
05372-60230	C-Channel cable SMA(m)-SMA(m)	1
05372-60231	C-Channel Extension cable SMA(f)-SMA(m)	1
05372-80010	Front panel label	2
0515-0897	Screws	4
0590-0505	Knurled nut	1
1250-1562	Adapter N(f)-SMA(m)	1
1400-0611	Cable clamp	1

1-55. Tools Required

5/16 Open-End Wrench, Pozidriv Screwdriver, Utility Knife

1-56. Option 030 Installation Procedure

CAUTION

The following installation requires that you follow proper static prevention measures to avoid static damage to parts and internal assemblies in the HP 5372A. This procedure should only be performed by someone familiar with these techniques.

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NOTE: This procedure takes approximately 30 minutes.

1. Disconnect AC power cable from the HP 5372A rear panel.
2. Remove the instrument top cover and both subcovers, located beneath the top cover, as follows:
   a. Use the Pozidriv to loosen the screw located on the back side of the top cover.
   b. Unscrew and remove the two instrument feet located at the top and back of the instrument. Then slide the top cover off towards the back of the instrument.
   c. Remove both subcovers.
3. Remove the right side cover (as viewed from the front panel) as follows:
   a. Remove the two screws that secure the carrying strap to the instrument.
   b. Remove the carrying strap, and slide the side cover off toward the back of the instrument.
4. Remove ENTRY/MARKER knob located on the front panel by firmly pulling it away from the front panel.
5. Peel off the front panel label by inserting the utility knife blade under the bottom left corner of the label and peeling upward.
6. Replace old front panel label with new label (HP P/N 05372-80010) as follows:
   a. Peel off the label's protective backing.
   b. Carefully align the label with the left edge of the front panel, and press the sticker on the front panel from left to right so that no air bubbles are trapped under the label. (If the label does not align properly the first time, remove it and use the extra label included in the retrofit kit).
7. Replace the ENTRY/MARKER knob on the front panel.
8. Locate the plastic cable clamp, on the right side of the card cage, which houses the two black input pod cables. Remove the cable clamp by pulling it firmly away from the card cage.
9. Install the C-Channel board by screwing it on to the four standoffs on the right outside edge of the card cage. Make sure that the ribbon cable connector faces out toward the side cover, and down toward the mother board. (see *Figure 1-3*).

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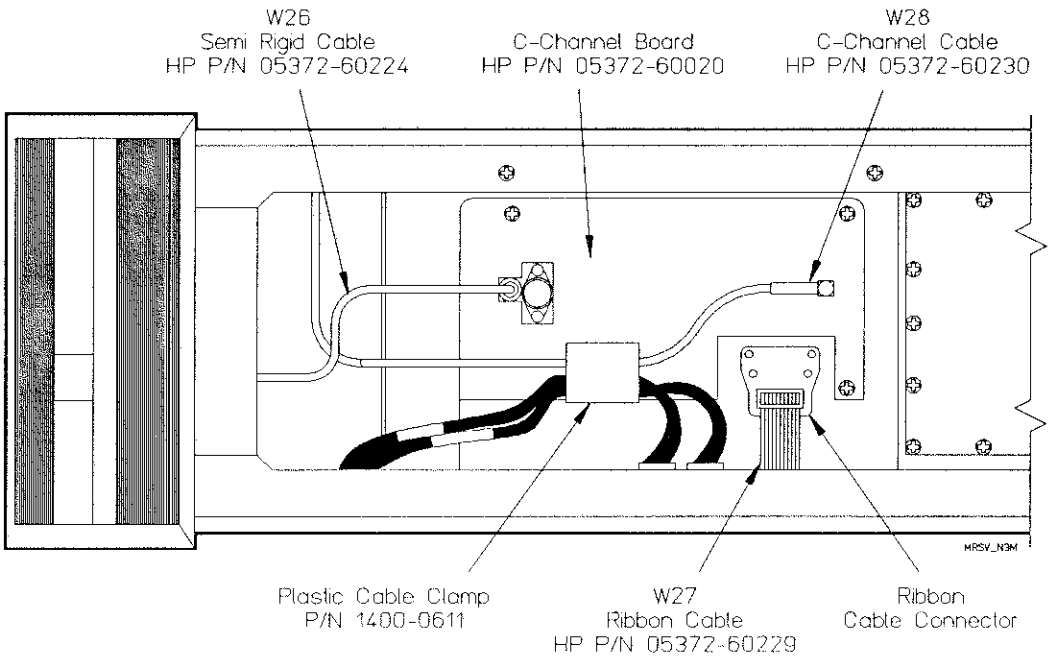

Figure 1-3. Right Side View of Option 030 Installation

10. Attach the ribbon cable (HP P/N 05372-60229) as follows:

    a. Connect one end of the ribbon cable into the connector on the C-Channel board with the red edge of the ribbon cable facing the back of the instrument.

    b. Plug the other end of the ribbon cable into the connector on the mother board. (see *Figure 1-3*).

11. Attach the N-to-SMA adapter (HP P/N 1250-1562) to the front panel as follows:

    a. Place the N-to-SMA adapter through the front panel hole marked C-Channel. The "N" connection should stick out of the front panel about 3/4 inch (see *Figure 1-4*).

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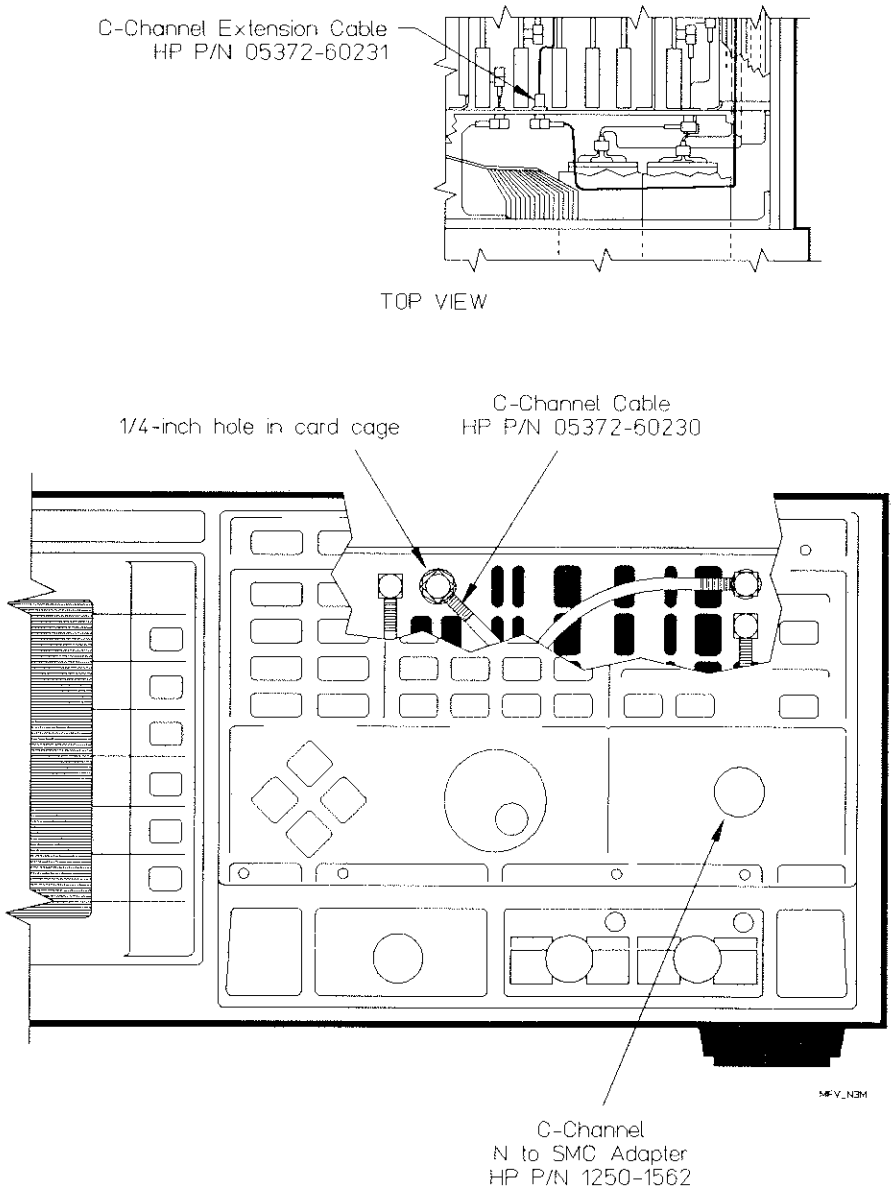

Figure 1-4. Front View of Option 030 Installation

b. Fasten the adapter to the front panel by screwing the knurled nut (HP P/N 0590-0505) onto the adapter until it tightens against the front panel.

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12. Install the semi-rigid cable (HP P/N 05372-60224) as follows:

    a. Partially screw on the semi-rigid cable to the SMA side of the front panel N-to-SMA adapter until the other end lines up with the SMA connector on the C-Channel board which is located closest to the front of the instrument (See *Figure 1-3*).

    b. Screw the other end of the semi-rigid cable to the C-Channel board's SMA connector.

    c. Tighten both ends of the semi-rigid cable with the open-end wrench.

13. Attach the C-Channel extension cable (HP P/N 05372-60231) to the card cage as follows:

    a. Locate the 1/4 inch round hole in the card cage located behind the front panel and directly to the right of where the white External Arm Input cable connects to the card cage (see *Figure 1-4*).

    b. Remove the nut and star washer from the female side of the C-Channel Extension cable. Place the female side of the SMA connector through the 1/4 inch hole from the inside of the card cage so that the connector faces the front of the instrument (the A5 board may have to be lifted for this procedure).

    c. Fasten the SMA connector to the card cage by replacing the star washer and screwing the nut onto the connector until it tightens against the card cage. Make sure that the connector at the opposite end of the cable faces down so that the cable will not be twisted after attaching it to A5J3.

14. Attach the C-Channel extension cable to A5J3 as follows:

    a. Use the two white board extractors on either side of the A5 board to lift the A5 board (HP P/N 05372-60005) up 4 or 5 inches until the J3 connector in the center of the A5 board is visible above the card cage (none of the A5 board cables need to be removed).

    b. Connect the C-Channel Extension cable to the A5J3 connector.

    c. Push the A5 board back into the card cage making sure it makes a good connection with the sockets on the mother board. Make sure none of the coax cables get trapped between the A5 board and the mother board sockets.

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15. Attach the C-Channel cable (HP P/N 05372-60230) as follows:

    a. Connect one end of the C-Channel cable to the female end of the C-Channel Extension cable which should be sticking out of the card cage directly to the right of where the white External Arm Input cable connects to the card cage. (see *Figure 1-4*).

    b. Connect the other end of the C-Channel cable to the C-Channel board's SMA connector that is located closest to back of the instrument. (see *Figure 1-3*).

16. Locate the A12S1 dip switch on the mother board under the back corner of the C-Channel board (see *Figure 1-5*). When a standard instrument is shipped from the factory, the A12S1 switch is set with all eight switches in their left-most position (i.e., toward center line of instrument as viewed from the front panel). After installing the Option 030 C-Channel, the number 5 switch (the 5th switch from the front panel) needs to be switched to its right most position.

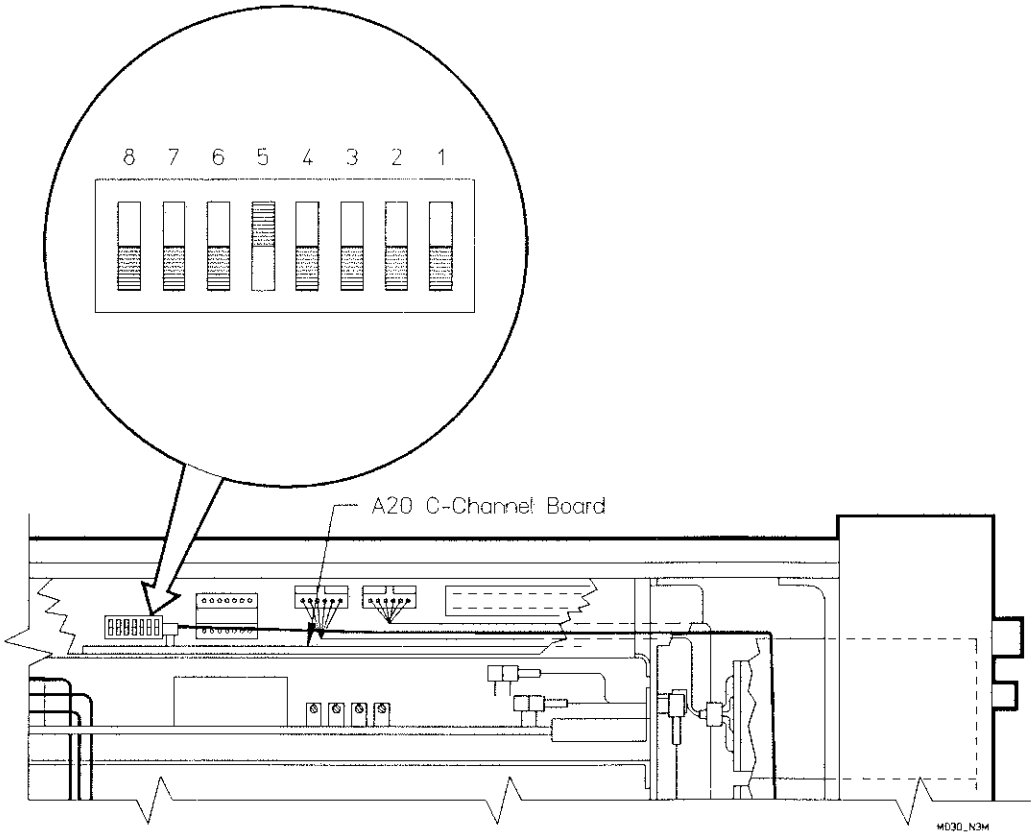

Figure 1-5. Option 030 Switch Setting

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17. Attach the plastic cable clamp (P/N 1400-0611) to the bottom edge of the C-Channel board (see *Figure 1-3*). Slide the C-Channel cable and the two black input pod cables into the cable clamp.

18. Power the 5372A on and press the System hardkey. Verify that the option section indicates that the Channel C option is installed. If not, the S1 switch is not set correctly, repeat step 16.

19. Blacken the Option 030 circle on the rear panel of the 5372A using an indelible marking pen.

Installation of Option 030 is complete. Replace all instrument covers.

1-57. INSTRUCTIONS FOR INSTALLING OPTION 060 AND OPTION 090 REAR PANEL INPUTS RETROFIT KIT, HP P\N 05371-60230

1-58. Introduction

This section provides the installation instructions for retrofitting the following rear panel options to the HP 5372A.

- Option 060 — Rear panel inputs for Channel A, Channel B, and External Arm.
- Option 090 — Rear panel inputs for Channel A, Channel B, External Arm, and Channel C.

The parts and instructions for installing Option 060 are included in the retrofit kit, HP P/N 05371-60230.

The parts and instructions for installing Option 090 are also included in the retrofit kit, HP P/N 05371-60230. However, as explained later in the OPTION 090 Installation Procedures, two additional parts need to be order separately to install Option 090. In performing the installation procedures, first perform the Option 060 Installation Procedures. Then continue with the Additional Installation Procedures for Option 090.

In order to retrofit Option 090, an Option 030 C-Channel input must be installed in the HP 5372A. If the instrument does not contain Option 030, then the C-Channel retrofit kit, HP P/N 05372-67002, should be used to install the Channel C option before installing Option 090.

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1-59. Parts Included

The HP 5372A Option 060 Retrofitting Kit, HP P\N 05371-60230, contains the following parts:

HP Part Number	Description	Quantity
05371-60208	W10 and W11 Channel A and B Rear Input Cables	2
05371-60215	W12 External Arm Rear Input Cable	1
05371-20205	H29 Front Panel External Arm Hole Plug	1
54100-64101	MP33 Blank Front Panel Pod Covers	2
5371-90008	Service Note 5371A-4	1
1400-1231	MP38 Cable Clamp	5
2190-0102	H20 15/32 Inch Lock Washer	3
2950-0035	H25 15/32 Inch Hex Nut	3

1-60. Tools Required

9/16 Inch Nut Driver
2-Point (Large) Pozidrive Screwdriver
6mm Open-End Wrench
5/16 Inch Open-End Wrench
Utility Knife

1-61. Option 060 Installation Procedures

1. Disconnect AC power cable from HP 5372A rear panel.

2. Use Pozidrive to remove instrument top cover. Then remove both subcovers located beneath the top cover.

3. Remove the right side cover of the HP 5372A (as viewed from the front panel). Remove the bottom cover.

4. Remove the three metal plugs located at the rear panel in the places marked Option 060/090 Inputs "Channel A", "Channel B", and "External Arm".

5. Remove both channel A and B input pods installed in the front panel (i.e., HP 54001A, HP 54002A, or HP 54003A). Remove the Pod Power/I.D. cables attached directly behind each input pod. (Easiest access to the Pod Power/I.D. cables is through the bottom and right side of the HP 5371A.)

6. Install the two MP33 Blank Front Panel Pod Covers, HP P\N 54100-64101, to cover the holes created by removing the pods in step 5. (See *Figure 1-6.*)

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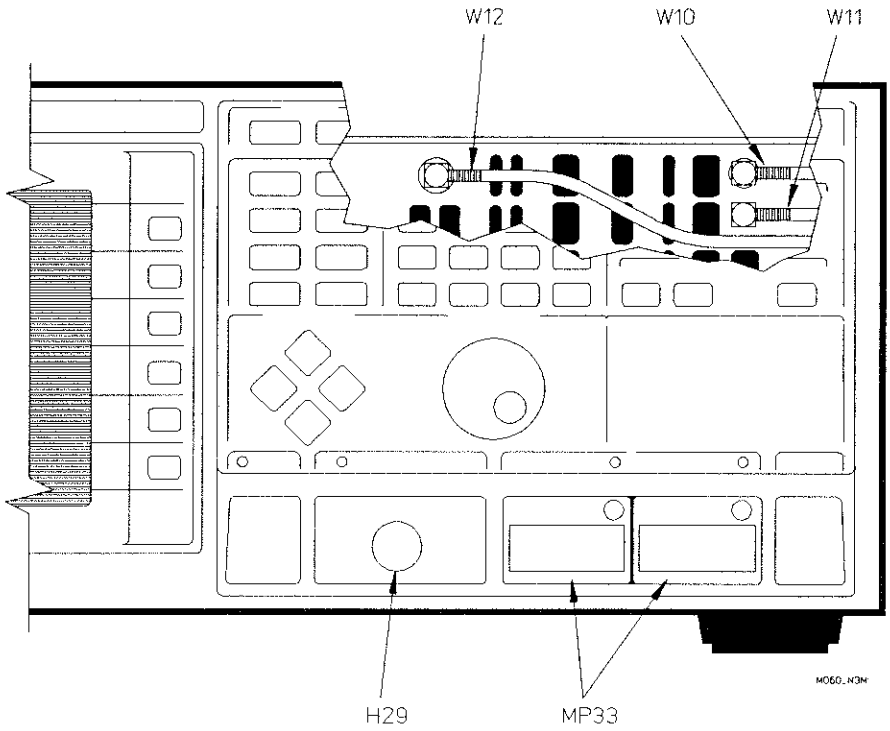

Figure 1-6. Front View of Option 060 Installation

7. Remove the front panel External Arm input BNC cable. Install the H29 Front Panel External Arm Hole Plug, HP P\N 05371-20205, where the External Arm Input BNC cable was removed.

8. Attach the five MP38 cable clamps, HP P\N 1400-1231, to the instrument chassis as follows:

   a. Attach one cable clamp to the upper-right corner of the instrument card cage. (See *Figure 1-7.*)

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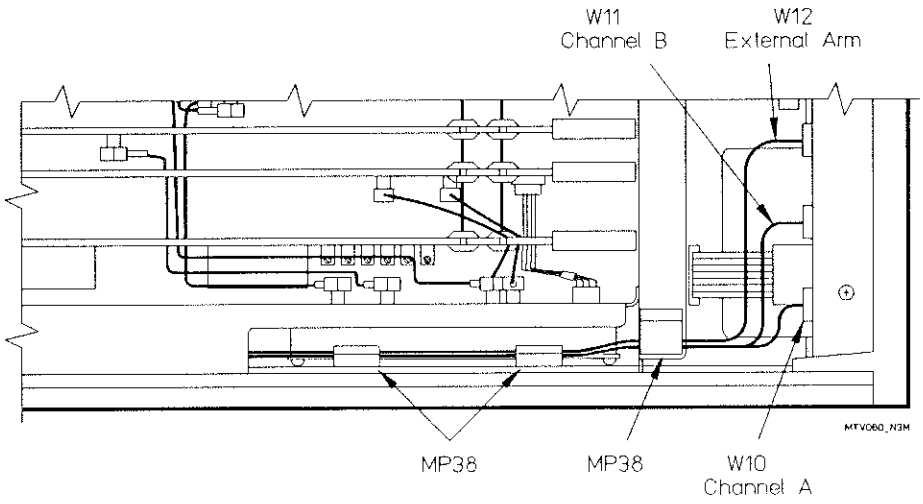

Figure 1-7. Top View of Option 060 Installation

b. Attach two cable clamps to the inner side of the right-corner strut, spacing them approximately two inches apart. (See *Figure 1-7*.)

c. Attach the remaining two cable clamps toward the top side of the card cage spacing them two to three inches apart. (See *Figure 1-8*.)

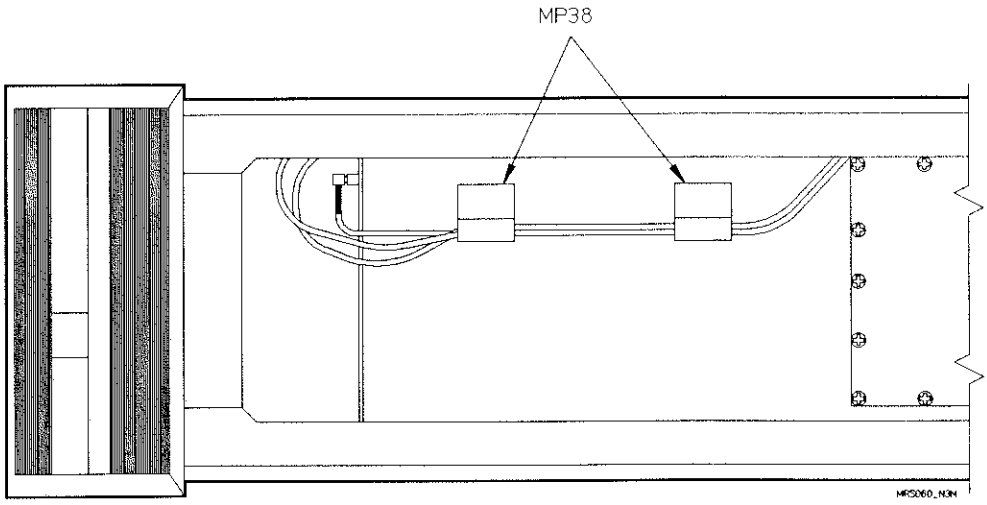

Figure 1-8. Right Side View of Option 060 Installation

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9. Install W12 External Arm Rear Panel Input cable, HP P\N 05371-60215, as follows:

   a. From inside the instrument, insert the BNC end of the External Arm Rear Panel Input Cable through the rear panel EXTERNAL ARM hole.

   b. Secure the cable's BNC end to the rear panel using one H20 Lock Washer, HP P\N 2190-0102, and one H25 Hex Nut, HP P\N 2950-0035. Tighten the Hex Nut using a 9/16 inch Nut Driver.

   c. Route this cable from the rear of the HP 5372A to the front of the instrument. Secure the cable into the five cable clamps installed in step 8.

   d. Connect the SMC connector end of the External Arm Rear Panel Input Cable to W21 External Arm Extension Cable Bulkhead Connector located at the front of the card cage. (See *Figure 1-6.*) Tighten using a 6mm open-end wrench.

10. Install W10 Channel A Rear Panel Input Cable, HP P\N 05371-60208, as follows:

   a. From inside the instrument, insert the BNC end of the Channel A Rear Panel Input Cable through the rear panel CHANNEL A hole.

   b. Secure the cable's BNC end to the rear panel using one H20 Lock Washer, HP P\N 2190-0102, and one H25 Hex Nut, HP P\N 2950-0035. Tighten the Hex Nut using a 9/16 inch Nut Driver.

   c. Route the cable from the rear of the HP 5372A to the front of the instrument. Secure the cable into the five cable clamps installed in step 8.

   d. Connect the SMA connector end of the Channel A Rear Panel Input Cable to W19 Channel A Input Extension Cable Bulkhead Connector located at the front of the card cage. (See *Figure 1-6.*) Tighten using a 5/16 inch open-end wrench.

11. Install W11 CHANNEL B Rear Panel Input Cable, HP P\N 05371-60208, as follows:

   a. From inside the instrument, insert the BNC end of the Channel B Rear Panel Input Cable through the rear panel CHANNEL B hole.

   b. Secure the cable's BNC end to the rear panel using one H20 Lock Washer, HP P\N 2190-0102, and one H25 Hex Nut, HP P\N 2950-0035. Tighten the Hex Nut using a 9/16 inch Nut Driver.

   c. Route the cable from the rear of the HP 5372A to the front of the instrument. Secure the cable into the five cable clamps installed in step 8.

   d. Connect the SMA connector end of the Channel B Rear Panel Input Cable to W20 Channel B Input Extension Cable Bulkhead Connector located at the front of the card cage. (See *Figure 1-6.*) Tighten using 5/16 inch open-end wrench.

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12. When a standard instrument is shipped from the factory, the Option 060 Selection Switch (A12S1) is set with all eight switches in their left-most position (i.e., toward center line of instrument as viewed from the front panel). To modify the switch settings to accomodate installation of Option 060, set switch #2 (second switch from the front panel) to its right-most position. (See *Figure 1-9.*)

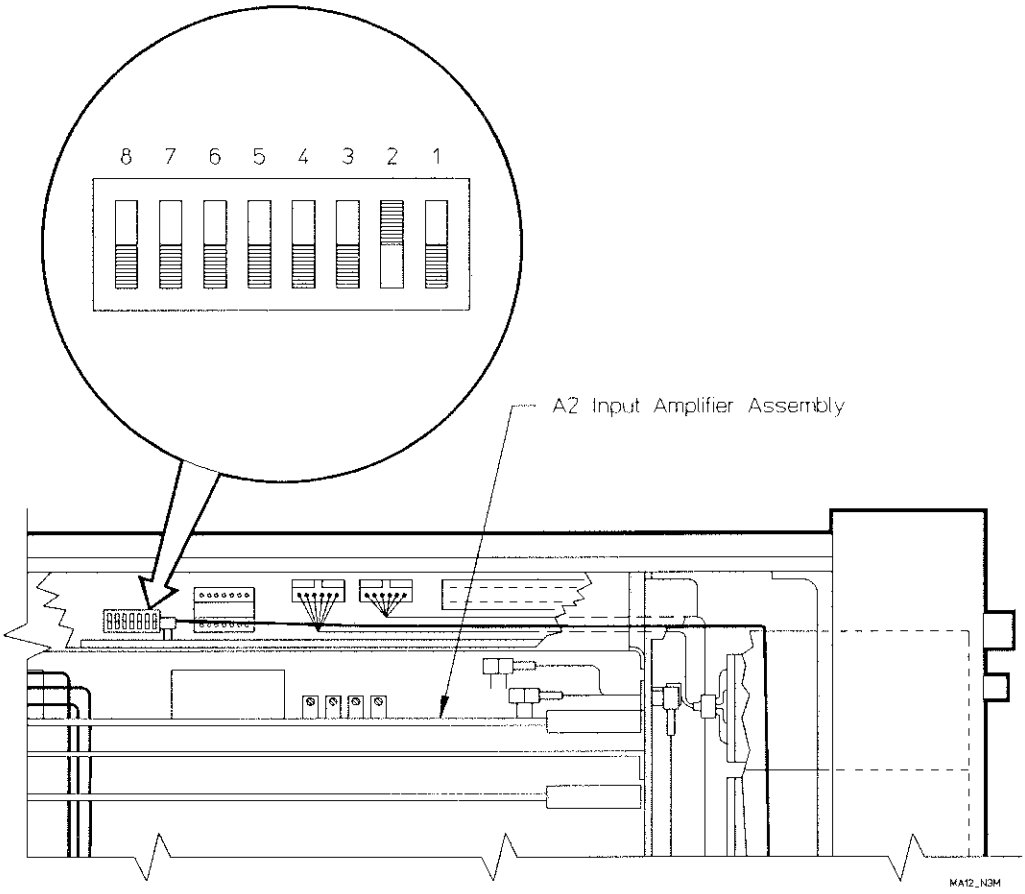

Figure 1-9. Option 060 Switch Setting

Installation of Option 060 Rear Panel Inputs is now complete. Replace all instrument covers.

1-62. Additional Installation Procedures for Option 090

Option 090 is a superset of the Option 060 rear panel inputs. Option 090 is the Option 060 plus a C-Channel with rear panel inputs. To install this option, complete the installation procedures for Option 060, detailed above, then complete the following procedure.

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NOTE

The following additional parts need to be ordered to install Option 090.

1-63. Additional Parts Required

HP Part Number	Description	Quantity
05372-80011	Front panel Label (Opt. 090)	1
05372-60232	Rear Panel Cable (semi-rigid)	1

After completing the Option 060 installation procedures perform the following procedure to make the C-Channel a rear panel input.

1. Remove the rear panel metal plug marked OPTION 060/090 INPUTS, "CHANNEL C".
2. Remove the ENTRY/MARKER knob located on the front panel by firmly pulling it away from the front panel.
3. Remove the front panel C-Channel N-to-SMA connector, and install it in the Rear Panel hole marked "CHANNEL C".
4. Peel off the front panel label by inserting the utility knife blade under the bottom left corner of the label and peeling upward.
5. Replace old front panel label with new label (HP P/N 05372-80011) as follows:
   a. Peel off the label's protective backing.
   b. Carefully align the label with the left edge of the front panel, and press the sticker on the front panel from left to right so that no air bubbles are trapped under the label.
6. Replace the ENTRY/MARKER knob on the front panel.
7. Unscrew and remove the semi-rigid cable that connects the front panel input with the C-Channel Input.
8. Attach one end of the semi-rigid cable (HP P\N 05372-60232) to the C-Channel board's input and the other end of the connector to the rear panel adapter which was installed in step 3.

Installation of Option 090 Rear Panel Inputs is now complete. Replace all instrument covers.

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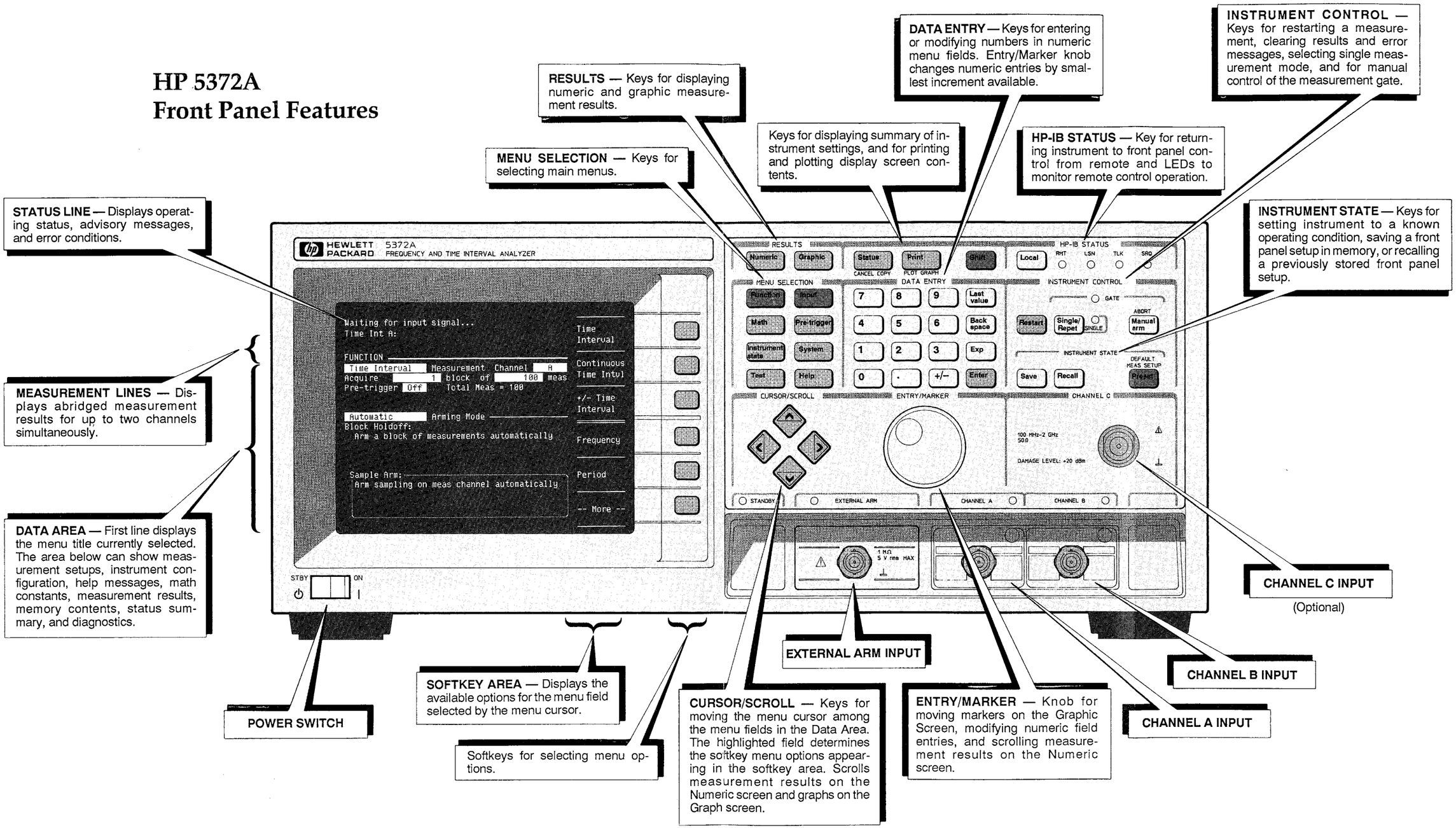
HP 5372A
Front Panel Features



STATUS LINE — Displays operating status, advisory messages, and error conditions.

MEASUREMENT LINES — Displays abridged measurement results for up to two channels simultaneously.

DATA AREA — First line displays the menu title currently selected. The area below can show measurement setups, instrument configuration, help messages, math constants, measurement results, memory contents, status summary, and diagnostics.

RESULTS — Keys for displaying numeric and graphic measurement results.

MENU SELECTION — Keys for selecting main menus.

Keys for displaying summary of instrument settings, and for printing and plotting display screen contents.

DATA ENTRY — Keys for entering or modifying numbers in numeric menu fields. Entry/Marker knob changes numeric entries by smallest increment available.

HP-IB STATUS — Key for returning instrument to front panel control from remote and LEDs to monitor remote control operation.

INSTRUMENT CONTROL — Keys for restarting a measurement, clearing results and error messages, selecting single measurement mode, and for manual control of the measurement gate.

INSTRUMENT STATE — Keys for setting instrument to a known operating condition, saving a front panel setup in memory, or recalling a previously stored front panel setup.

POWER SWITCH

SOFTKEY AREA — Displays the available options for the menu field selected by the menu cursor.

Softkeys for selecting menu options.

CURSOR/SCROLL — Keys for moving the menu cursor among the menu fields in the Data Area. The highlighted field determines the softkey menu options appearing in the softkey area. Scrolls measurement results on the Numeric screen and graphs on the Graph screen.

EXTERNAL ARM INPUT

ENTRY/MARKER — Knob for moving markers on the Graphic Screen, modifying numeric field entries, and scrolling measurement results on the Numeric screen.

CHANNEL A INPUT

CHANNEL B INPUT

CHANNEL C INPUT
(Optional)

Figure 1-10. Front Panel Features

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HP 5372A
Rear Panel Features

FREQUENCY STANDARD

EXTERNAL INPUT — Accepts a 1, 2, 5, or 10 MHz source. When an external source is applied, the HP 5372A automatically switches to using the external source.

OUTPUT — Provides a 10 MHz output frequency for reference purposes. When an external input frequency is present, this 10 MHz output frequency will be derived from the external input.

GATE 1 AND GATE 2 OUTPUTS — Provide negative-going edges that indicate when measurement samples occur.

ARM DELAY 1 AND ARM DELAY 2 OUTPUTS — Provide negative-going edges that indicate when arming conditions are satisfied.

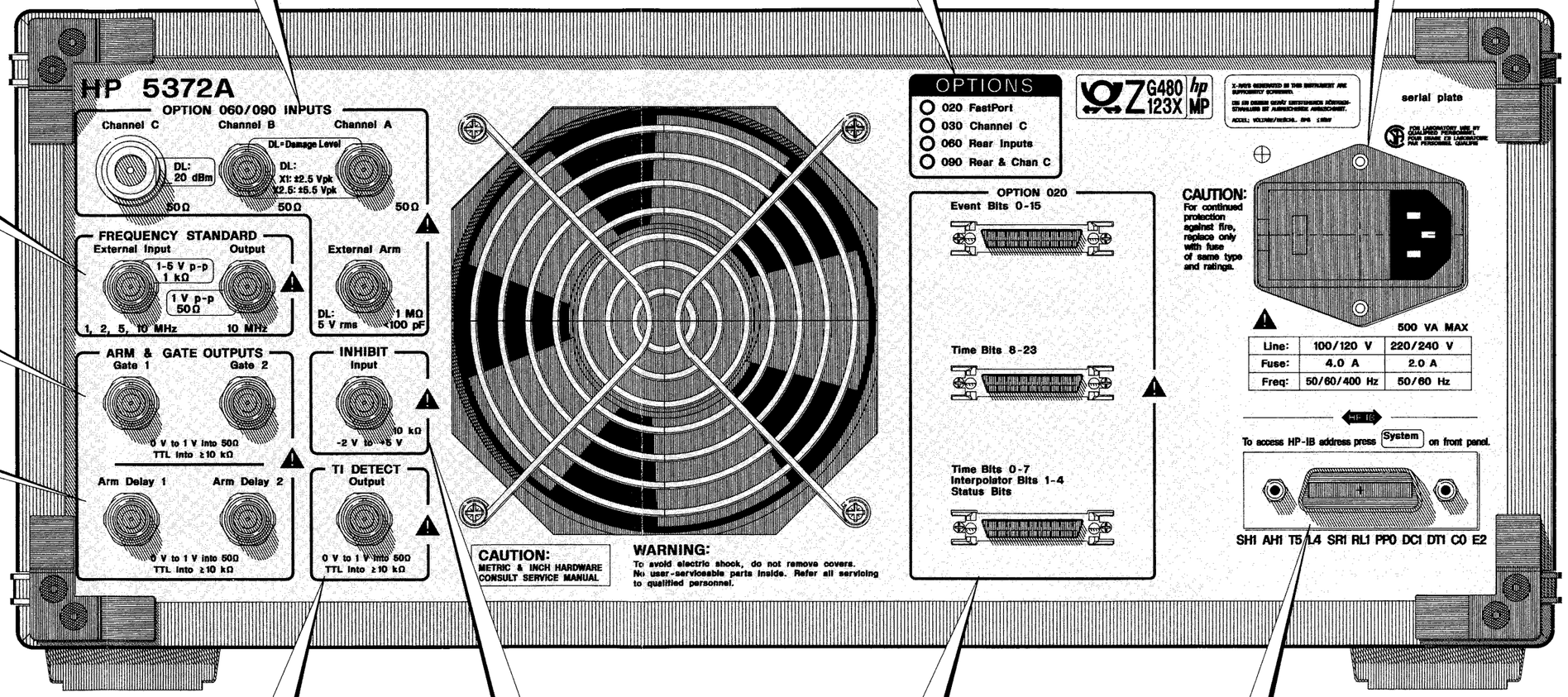
OPTION 060/090 INPUTS

OPTION 060 — 50Ω inputs for Channels A and B, 1 MΩ input for External Arm.

OPTION 090 — Option 060 plus an N-type connector for Channel C.

OPTIONS INFORMATION — The small circle next to the option name will be filled in if the option has been installed at the factory.

AC POWER MODULE



TI DETECT OUTPUT — Signal changes state when a measured time interval satisfies conditions specified on the Pre-trigger menu (see Chapter 10).

INHIBIT INPUT — An external signal can be applied to selectively suppress the acquisition of measurement data (see Chapter 10).

OPTION 020 OUTPUTS — Provides real-time measurement information at the measurement rate of the HP 5372A.

HP-IB CONNECTOR

Figure 1-11. Rear Panel Features

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2

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2

PERFORMANCE TESTS

2-1. INTRODUCTION

This chapter contains procedures for testing the electrical performance of the HP 5372A Frequency and Time Interval Analyzer, using specifications listed in Appendix A, as performance standards. Three types of testing are described: operation verification, complete performance testing, and HP-IB verification.

NOTE

If you are unfamiliar with the operation of the HP 5372A, we recommend you review the HP 5372A Getting Started Guide. This document is a "hands-on" tutorial which will help you become familiar with most of the instrument's features. By making the prescribed measurements and analyzing their results, you will be more comfortable pressing the front-panel keys and better understand the organization of the front panel controls.

2-2. OPERATION VERIFICATION

The Operation Verification is a set of tests which may be performed to give a high degree of confidence that the instrument is operating properly, without performing the complete Performance Tests. An Operation Verification is useful for incoming inspection, routine maintenance, and after instrument repair.

2-3. PERFORMANCE TESTS

The complete Performance Tests verify the specifications listed in *Table* 2-2. All tests can be performed without access to the inside of the instrument.

2-4. HP-IB VERIFICATION

The HP-IB Verification program exercises the instrument via the HP-IB interface. The program is written for a Series 200 or 300 HP 9000 as the controller. If the instrument successfully completes all phases of the verification program, there is a very high probability that the HP-IB interface is working properly. The HP-IB program is available on floppy disks, HP Part

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Number 05372-13502 (5 ¼ inch LIF formatted disk) and HP Part Number 05372-13501 (3 ½ inch LIF formatted disk).

2-5. EQUIPMENT REQUIRED

The equipment required for all test procedures in this chapter is listed in *Table 2-1*. Any equipment that satisfies the required characteristics given in the table may be substituted for the recommended models.

2-6. CALIBRATION CYCLE

The HP 5372A requires periodic verification of correct operation. Depending on use and environmental conditions, the HP 5372A should be checked using the Operation Verification and complete Performance Tests at least once a year.

2-7. TEST RECORD

Results of the Operation Verification, complete Performance Tests, and HP-IB Verification test should be recorded on a copy of the Performance Tests Record, located at the end of this chapter.

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Table 2-1. Equipment Required

INSTRUMENT	REQUIRED CHARACTERISTIC	RECOMMENDED MODEL
Synthesizer/Function Generator	DC to 10 MHz Frequency Range 45 mVp-p to 5 Vp-p Amplitude Range –2.5V to +2.5V DC Offset Range	HP 3325A
Synthesized Signal Generator	10 MHz to 2.0 GHz Frequency Range 12.6 mV rms to 707 mV rms Amplitude Range	HP 8663A
Digital Voltmeter	10 µVResolution	HP 3458A
Pulse Generator	5 ns Pulse Width 280 mV p-p Amplitude 200 ns Period	HP 8161A
Attenuator	DC to 10 MHz Frequency Range 20 dB Attenuation	HP 8495D
Power Meter	100 MHz to 2 GHz	HP 436A
Power Sensor	100 MHz to 2 GHz –25 dBm to +7 dBm	HP 8481A
Power Splitter	100 MHz to 2 GHz	HP 11667A
Adapter	N(m)-to-BNC(f)	HP P/N 1250-0780
Adapter	Banana(m)-to-BNC(f)	HP 1251-2277
Adapter	BNC T-connector	HP 1250-0781
BNC Termination	50 ohm Feedthrough	HP 10100C
Adapters (2)	N(m)-to-SMA(f)	HP 1250-1250
Adapters (2)	N(m)-to-N(m)	HP 1250-0778
Cable	100 MHz to 2 GHz Frequency Range	Gore SN56181
Printer	ThinkJet	HP 2225A
Cable	HP-IB	HP 10833A

2-8. OPERATION VERIFICATION PROCEDURES

2-9. HP 5372A Setup

1. Insert 50 Ω BNC input pods (HP 54002A) into both Channel A and Channel B input pod slots in the front panel.

2. Attach a BNC T-connector to the HP 5372A rear-panel FREQUENCY STANDARD OUTPUT.

3. Connect a 4-foot BNC cable from the T-connector to the HP 5372A Channel A input pod.

4. Connect a 4-foot BNC cable from the T-connector to the HP 5372A Channel B input pod.

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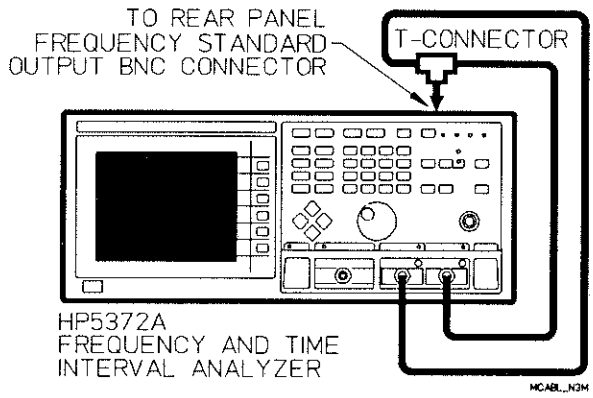

Figure 2-1. HP 5372A Operation Verification Setup

2-10. Power-Up Self Test and Diagnostics

1. Before connecting the power cord and switching on the instrument, be sure that the line voltage selector is properly set, the correct fuse is installed, and all safety precautions have been observed.

2. Connect the HP 5372A power cord to the primary power source, and set the STBY-ON power switch to ON. Verify the Power-up Self Test routine, as follows:

   a. After 3 seconds, the screen displays the words "Performing Self Test ..."

   b. After a few more seconds, and if there are no error or failure messages, the Function screen is displayed.

   c. If the HP 5372A displays an ERROR or FAILURE message, refer to the troubleshooting procedures in chapter 5 of the HP 5372A Service Manual. This chapter contains specific information about diagnostic failures.

3. Press Preset key.

4. Press Single/Repet key. The SINGLE LED should now be illuminated.

5. Press Test key.

6. Press "19" on the DATA ENTRY numeric keypad, and then press the Enter key.

7. Press the **Run** softkey.

8. Press the front-panel keys one at a time and verify the key name corresponds to the Front Panel Test "Key" field.

9. Move the Marker knob in both directions and verify the direction with the Front Panel Test "Key" field.

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10. Press "21" on the DATA ENTRY numeric keypad, and then press the Enter key.
11. Press the **Run** softkey.
12. Verify that the CRT pattern covers the CRT display with a medium green color, and then press Test key.
13. Press "23" on the DATA ENTRY numeric keypad, and then press the Enter key.
14. Press the **Run** softkey.
15. After 30 seconds, verify that there are no Randomizer test failures, then press the **Stop** softkey.

2-11. Instrument Control

PRESET AND SHIFT-PRESET

1. Press Preset key.

> *NOTE*
>
> *Pressing the Preset key at any time resets the HP 5372A parameters (measurement function, channel(s), block and measurement sizes, arming mode, input trigger setting(s), etc.) to a default measurement setup. If the Preset key is pressed by mistake, the last instrument setup can be retrieved by pressing the Recall key and then entering "0" on the DATA ENTRY numeric keypad. The instrument setup at the time Preset is selected is saved in storage register "0".*

2. The Function screen should be displayed.

   Verify the following fields:

   "Measurement" field = Time Interval
   "Channel" field = A
   "Arming Mode" field = Automatic

3. The GATE LED should be blinking rapidly, while both the Channel A and Channel B trigger LEDs are blinking at at a comparatively slower rate. (The TLK LED may be lighted, but will have no effect on the operation verification procedure.)
4. Press Shift and then press Preset key. (From now on this will be referred to as "Shift-Preset".) This presets the instrument to a set of default values and state.

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5. The Default Measurement Setup screen, Numeric screen in Results/Statistics mode, should be displayed.

   Verify the following:

   Mean = 100.0 ns ±200 ps
   Std Dev = 0 s up to 200 ps

SINGLE/REPET AND RESTART

1. Press Single/Repet key.
2. The SINGLE LED will light and the GATE LED will turn off.
3. Press Restart key (The HP 5372A will make one block of measurments each time this key is pressed.)
4. The GATE LED should light up briefly each time Restart key is pressed in the single mode. The values displayed are from the block of measurements initiated by pressing Restart key. There may be little or no change in the values shown because the HP 5372A is measuring its FREQUENCY STANDARD OUTPUT, a very precise source.

MANUAL ARMING

1. Press Preset key.
2. Press the **More** softkey.
3. Press the **Totalize** softkey.
4. Move the cursor to the "Arming Mode" field.
5. Press the top softkey until **Hld/Samp** is highlighted, and then press the **Manual** softkey.
6. Press Manual Arm key, wait about 1 second, and press Manual Arm key again.

NOTE

Press Restart before initializing a new Totalize measurement.

7. The value displayed in the top right of the function screen should be proportional to the amount of time you waited before pressing Manual Arm key the second time in Step 6. For a one second time interval, the result should be 10.000 000 M.

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2-12. Measurement Functions

NOTE

The Time Interval measurement function is tested by the Instrument Control Block procedures (performed earlier in the Operation Verification) and therefore is not tested in the following procedures. In addition, Rise Time, Fall Time, Phase, Duty Cycle, Positive Pulse Width, Negative Pulse Width, and Period measurements are also not tested directly since they are variations of the measurements tested below.

±TIME INTERVAL MEASUREMENT

1. Disconnect the BNC cable end from the Channel B input pod.
2. Press Preset key.
3. Press the **±Time Interval** softkey.
4. Press Input key.
5. Press the **Common** softkey.
6. Press the Single/Repet key. The SINGLE LED should now be illuminated.
7. The result displayed should be 0 s ± 200 ps.
8. Reconnect the BNC cable end to the Channel B input pod.

FREQUENCY MEASUREMENTS

1. Press Function key.
2. Press the **Frequency** softkey.
3. Move the cursor to the "Channel" field.
4. Press the **More** softkey until **A&B** is a menu selection option.
5. Press the **A&B** softkey.
6. The measurements shown at the top of the display should both be between 9.99 MHz and 10.01 MHz.

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PEAK AMPLITUDE MEASUREMENTS

7. Move the cursor to the "Measurement" field.
8. Press the **More** softkey until **Peak Amplitude** is a menu selection option.
9. Press the **Peak Amplitude** softkey.
10. The maximum should be above 350 mV. The minimum should be below –400 mV.
11. Move the cursor to the "Channel" field.
12. Press the **B** softkey.
13. The maximum should be above 350 mV. The minimum should be below –400 mV.

2-13. Arming Modes

NOTE

An arming mode only needs to be tested in one measurement function to ensure correct operation.

FREQUENCY ARMING MODES

1. Press Preset key.
2. Press the **Frequency** softkey.
3. Move the cursor to the "Arming Mode" field.
4. Press the following softkeys and verify that the values displayed at the top of the Function screen are approximately the same as those below:

Edge Holdoff	10.00 MHz
Time Holdoff	10.00 MHz
Event Holdoff	10.00 MHz

5. Press the top softkey until **Sample** is highlighted and continue:

Interval Sampling	10.000 0 MHz
Time Sampling	10.000 000 000 MHz
Cycle Sampling	10.000 MHz
Edge Sampling	10.000 MHz

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6. Press the top softkey until **Hld/Samp** is highlighted and continue:

Edge/Interval	10.000 0 MHz
Edge/Time	10.000 000 000 MHz
Edge/Edge	10.000 MHz

7. Press the **More** softkey and continue:

Edge/Cycle	10.000 MHz
Edge/Event	10.000 MHz
Time/Interval	10.000 0 MHz

8. Press the **More** softkey and continue:

Time/Time	10.000 000 000 MHz
Event/Interval	10.000 0 MHz
Event/Event	10.000 MHz
Externally Gated	10.00 MHz

± TIME INTERVAL ARMING MODES

1. Disconnect the BNC cable end from the Channel B input pod.
2. Press Preset key.
3. Press Input key.
4. Press the **Common** softkey.
5. Press Function key.
6. Press the ± **Time Interval** softkey.
7. Move the cursor to the "Arming Mode" field.
8. Press the top softkey until **Sample** is highlighted.
9. Press the following softkeys and verify that the values displayed at the top of the Function screen are approximately the same as those below:

Parity Sampling	0 s ±200 ps
Repetitive Edge	0 s ±200 ps

10. Press the **More** softkey and continue:

Repetitive Edge-Par	0 s ±200 ps
Random Sampling	0 s ±200 ps

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11. Press the top softkey until **Hld/Samp** is highlighted and continue:

    Edge/Parity 0 s ±200 ps

12. Press the **More** softkey and continue:

    Edge/Random 0 s ±200 ps

13. Reconnect the BNC cable end to the Channel B input pod.

2-14. Input Menu

SEPARATE/COMMON INPUT

1. Press Preset key.
2. The result at the top of the display should be 100.0 ± 0.2 ns.
3. Move the cursor to the Channel field.
4. Press the **A→B** softkey.
5. The result displayed at the top right corner of the screen should be 100 ±2 ns.
6. Disconnect the BNC cable end from the Channel B input pod.
7. Press Input key.
8. Press the **Common** softkey. The value displayed should be 100.0 ±2 ns.
9. Reconnect the BNC cable end to the Channel B input pod.

TRIGGER SLOPE

1. Move the cursor down to the Channel A "Slope" field and press the **Neg** softkey.
2. The result displayed at the top-right corner should now read approximately 50 ns ±4 ns.

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2-15. Measurement Control

PRE-TRIGGER, TI DETECT OUTPUT, AND MEASUREMENT INHIBIT INPUT

1. Press Preset key.
2. Press Single/Repet key. The SINGLE LED should now be illuminated.
3. Move the cursor to the "meas" field.
4. Press "10" on the DATA ENTRY numeric keypad, and then press the Enter key.
5. Move the cursor to the "Pre-trigger" field.
6. Press the **`Pretrigger On`** softkey.
7. Press Pre-trigger key.
8. Press the **`External Arm`** softkey and verify the GATE LED is ON (verfies the pre-trigger condition is being met).
9. Connect a BNC cable from the rear panel TI Detect output to the External Arm input.
10. Press Numeric key. The Numeric screen should display 10 measurements with the pre-trigger event (P event on display) at either measurement 5 or 6, as shown in *Figure* 2-2.
11. Press Pre-trigger key.
12. Press the **`Time Interval`** softkey.

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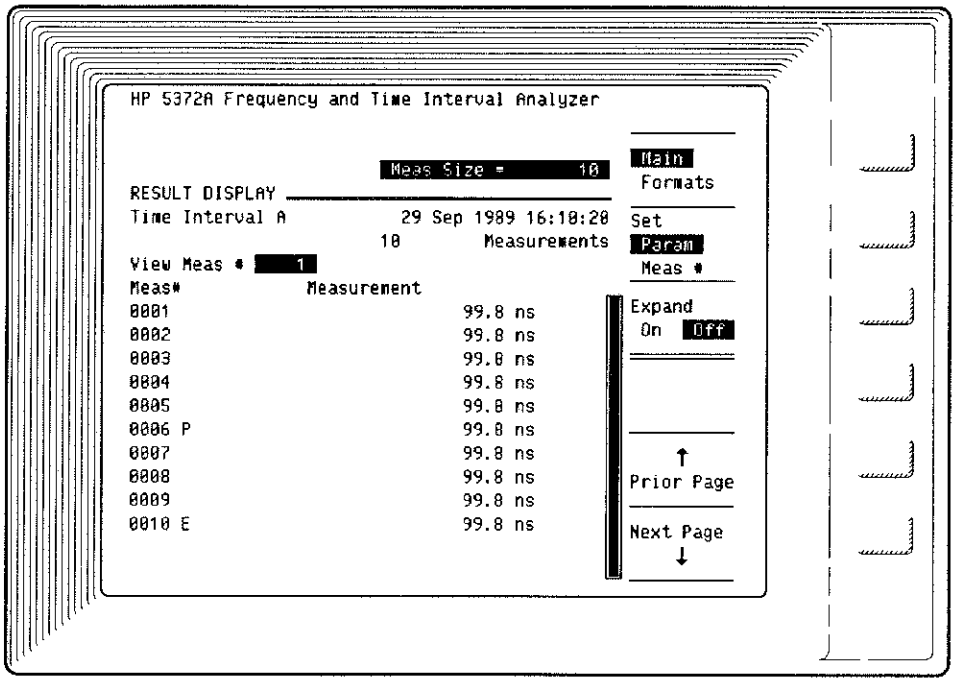
Figure 2-2. Numeric Display of Pre-trigger Measurement Result



13. Move the cursor to the TI Detect interval field (the current value of this field should be 0 s).

14. Press "105" on the DATA ENTRY numeric keypad, and then press the **ns** softkey. The top of the display should read "Waiting for pre-trigger..."

15. Press "95" on the DATA ENTRY numeric keypad, and then press the **ns** softkey. The top of the display should read a measured result of 100 ±0.2 ns.

16. Move the cursor to the "Inhibit" field.

17. Press the **On** softkey. The top of the display should read a measured result of 100 ±0.2 ns.

18. Move the cursor to the "inhibit input is" field.

19. Press the **Inhibit Below threshold** softkey. The top of the display should read "Measurement inhibited".

20. Disconnect the BNC cable from the rear panel TI Detect output and the External Arm input.

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GATE 1 OUTPUT

1. Connect a BNC cable from the rear panel Gate 1 output to the Channel B input pod.
2. Press Preset key.
3. Press the **Frequency** softkey.
4. Move the cursor to the "Channel" field.
5. Press the **More** softkey until **A&B** is a menu selection option.
6. Press the **A&B** softkey.
7. Move the cursor to the "Arming Mode" field.
8. Press the **Interval Sampling** softkey.
9. Press Input key.
10. Move the cursor to the Channel B "Mode" field.
11. Press the **Manual Trig** softkey.
12. Move the cursor to the Channel B "Level" field.
13. Press "500" on the DATA ENTRY numeric keypad, and then press the **mV** softkey.
14. The top of the CRT should display:

    Frequency A: 10.000 0 MHz ± 200 Hz
    Frequency B: 100.000 kHz ± 2 Hz

GATE 2 OUTPUT

1. Disconnect the BNC cable end from the rear panel Gate 1 output and connect it to the rear panel Gate 2 output.
2. Press Function key.
3. Move the cursor to the "Channel" field.
4. Press the **More** softkey.
5. Press the **A** softkey.

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6. Move the cursor to the Sample Arm "interval" field.

7. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key. The Channel B input trigger LED should flash once every second.

ARM DELAY 1 OUTPUT

1. Disconnect the BNC cable end from the rear panel Gate 2 output and connect it to the rear panel Arm Delay 1 output.

2. Move the cursor to the "Arming Mode" field.

3. Press the top softkey until **`Holdoff`** is highlighted.

4. Press the **`Time Holdoff`** softkey.

5. Move the cursor to the Block Holdoff "Delay" field.

6. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key. The Channel B input trigger LED should flash once every second.

ARM DELAY 2 OUTPUT

1. Disconnect the BNC cable end from the rear panel Arm Delay 1 output and connect it to the rear panel Arm Delay 2 output. The Channel B input trigger LED should flash once every second.

2-16. HP-IB and Print

NOTE

Disconnect HP-IB interface cables that may be connected between the HP 5372A and an external controller before proceeding with the "HP-IB and Print" test.

1. Press Preset key.

2. Press Single/Repet key. the SINGLE LED should now be illuminated.

3. Press System key.

4. Press the **`Talk Only`** softkey.

5. Move the cursor to the "Print" field.

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6. Press the **Display** softkey.

7. Connect an HP-IB cable from the HP 5372A rear panel HP-IB Connector to an HP 2225A ThinkJet printer (or other similar HP-IB graphics printer).

8. Locate the row of switches on the rear panel of the printer. Set the switch that will enable the LISTEN ONLY mode for the printer (for the HP 2225A, set switch #2 up).

9. Connect the HP 2225A power cord to the primary power source, and set the power switch to ON.

10. Press HP 5372A Restart key.

11. Press Graphic key.

12. Press Print key. The printer should print a copy of the Graphic screen.

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2-17. PERFORMANCE TEST PROCEDURES

Table 2-2 lists a summary of the complete performance tests and the specifications tested.

Table 2-2. Specifications Tested by Performance Tests

PAGE NO.	TEST DESCRIPTION	SPECIFICATIONS TESTED
2-3	Operation Verification	Overall HP 5372A Operation
2-19	CHANNEL A AND B TESTS	
	Frequency Range	125 mHz to 500 MHz
	Dynamic Range	45 mVp-p to 2 Vp-p
	Signal Operating Range	–2 Vdc to +2 Vdc
	Manual Trigger Accuracy	20 mV ± 1% of setting
	Auto Trigger Tests	
	Frequency Range	1 kHz to 200 MHz
	Dynamic Range	200 mVp-p to 2 Vp-p
	Accuracy	± 20% pk-pk amplitude
	Signal Op. Range	–2 Vdc to +2 Vdc
	Sensitivity	45 mVp-p with min pulse width
	Minimum Pulse Width	1 ns with 45 mVp-p amplitude
		1.5 ns with 45 mVp-p amp (Holdoff Arming)
2-39	EXTERNAL ARM TESTS	
	FRONT PANEL TESTS	
	Frequency Range	DC to 100 MHz
	Dynamic Range	140 mVp-p to 5 Vp-p
	Signal Operating Range	–5 Vdc to +5 Vdc
	Trigger Accuracy	±20 mV or ±10% of setting, whichever is greater
	Sensitivity	140 mVp-p with 5 ns pulse
	Minimum Pulse Width	5 ns with 140 mVp-p amplitude
	REAR PANEL TESTS	
	Frequency Range	DC to 100 MHz
	Dynamic Range	280 mVp-p to 5 Vp-p (DC to 20 MHz)
		280 mVp-p to 2.5 Vp-p (20 MHz to 100 MHz)
	Signal Operating Range	–5 Vdc to +5 Vdc
	Trigger Accuracy	±20 mV or ±10% of setting, whichever is greater
	Sensitivity	280 mVp-p with 5 ns pulse
	Minimum Pulse Width	5 ns with 280 mVp-p amplitude
2-55	CHANNEL C TESTS	
	Frequency Range	100 MHz to 2 GHz
	Dynamic Range:	
	100 MHz to 1.5 GHz	–25 dBm to +7 dBm
	>1.5 GHz to 2.0 GHz	–20 dBm to +7 dBm
	Sensitivity:	
	100 MHz to 1.5 GHz	–25 dBm
	>1.5 GHz to 2.0 GHz	–20 dBm
2-60	HP-IB Operation Verification Program	Overall HP-IB Operation

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2-18. Equipment Preliminary Setup

HP 5372A PRELIMINARY SETUP

1. Disconnect any HP-IB cables from the rear panel.
2. Insert 50Ω input pods (HP 54002A) into both Channel A and Channel B input pod slots in the front panel.
3. Before connecting the power cord and switching on the instrument, be sure the line voltage selector is properly set, the correct fuse is installed, and all safety precautions have been observed.
4. Connect the HP 5372A power cord to the primary power source, and set the STBY-ON power switch to ON. Verify the Power-Up Self Test routine, as follows:
5. After 3 seconds, the screen displays the words "Performing Self Test ..."
6. After a few more seconds, and if there are no error or failure messages, the Function screen is displayed. The CRT will display the message "Waiting for input signal..." if no input signal is present.
7. If the HP 5372A displays an ERROR or FAILURE message, refer to the troubleshooting procedures in chapter 5 of the HP 5372A Service Manual. This chapter contains specific information about diagnostic failures.
8. Press Instrument State key. If the write protection for any register 1 through 9 is ON, use the **`Off`** softkey to turn off the write protection.

TEST EQUIPMENT PRELIMINARY SETUP

1. Disconnect any HP-IB cables from the rear panels.
2. Connect the power cords to the primary power source, and allow at least twenty minutes warmup before using the instruments.
3. Set the power switch from STBY to ON.
4. If the display indicates that there are any errors, refer to the appropriate operating manual.

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2-19. CHANNEL A AND B TESTS

Specifications Tested:

125 mHz to 500 MHz Frequency Range
45 mVp-p to 2 Vp-p Dynamic Range

–2 V to +2 V Signal Operating Range

20 mV ± 1% of setting Manual Trigger Accuracy

AUTO TRIGGER TESTS

1 kHz to 200 MHz Frequency Range
200 mVp-p to 2 Vp-p Dynamic Range
± 20% of pk-pk amplitude Accuracy
–2 V to +2 V Signal Operating Range

45 mVp-p Sensitivity at minimum pulse width
1 ns Minimum Pulse Width at minimum amplitude
1.5 ns Min Pulse Width at minimum amplitude (Holdoff Arming)

Equipment:

HP 3325A Synthesizer/Function Generator
HP 8663A Synthesized Signal Generator

Description: The Channel A and B Tests consists of five separate test procedures, which verify the above specifications. The first test verifies both the frequency range and dynamic range, the second test verifies the signal operating range, the third test verifies the manual trigger accuracy, the fourth test verifies the auto trigger frequency range, dynamic range, accuracy, and signal operating range, and the fifth test (optional) verifies both the sensitivity and minimum pulse width.

2-20. HP 5372A Configuration Setup

NOTE

This procedure sets the HP 5372A Function and Input menus to specific configurations which will be used in the Channel A and B Tests. The configurations are stored in memory using the Save key, and are then recalled from memory during the Performance Tests using the Recall key.

1. Press Preset key.
2. Press the **Frequency** softkey.
3. Move the cursor to the "meas" field.

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4. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key.
5. Move the cursor to the "Arming Mode" field.
6. Press the top softkey until **Sample** is highlighted.
7. Press the **Interval Sampling** softkey.
8. Move the cursor to the Sample Arm "intervals" field.
9. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key.
10. Press Input key.
11. Move the cursor to the Channel A "Mode" field.
12. Press the **Manual Trig** softkey.
13. Move the cursor to the Channel B "Mode" field.
14. Press the **Manual Trig** softkey.
15. Press Single/Repet key. The SINGLE LED should now be illuminated.
16. Press Save key, and then enter "1" on the DATA ENTRY numeric keypad.
17. Press Function key.
18. Move the cursor to the "Channel" field.
19. Press the **More** softkey.
20. Press the **B** softkey.
21. Press Save key, and then enter "2" on the DATA ENTRY numeric keypad.
22. Press the **More** softkey until **A&B** is a menu selection option.
23. Press the **A&B** softkey.
24. Press Input key.
25. Move the cursor to the "Input Channels" field.
26. Press the **Common softkey.**
27. Press Save key, and then enter "3" on the DATA ENTRY numeric keypad.
28. Move the cursor to the Channel A "Level" field.

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29. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key.
30. Move the cursor to the Channel B "Level" field.
31. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key.
32. Press Save key, and then enter "4" on the DATA ENTRY numeric keypad.
33. Press "–1" on the DATA ENTRY numeric keypad, and then press the Enter key.
34. Move the cursor to the Channel A "Level" field.
35. Press "–1" on the DATA ENTRY numeric keypad, and then press the Enter key.
36. Press Save key, and then enter "5" on the DATA ENTRY numeric keypad.
37. Press ".998" on the DATA ENTRY numeric keypad, and then press the Enter key.
38. Move the cursor to the Channel B "Level" field.
39. Press ".998" on the DATA ENTRY numeric keypad, and then press the Enter key.
40. Move the cursor to the "Input Channels" field.
41. Press the **Separate** softkey.
42. Move the cursor to the Channel A "Hysteresis" field.
43. Press the **Max** softkey.
44. Move the cursor to the Channel B "Hysteresis" field.
45. Press the **Max** softkey.
46. Press Function key.
47. Press the **More** softkey.
48. Press the **A** softkey.
49. Press Single/Repet key. The SINGLE LED should now be off.
50. Press Save key, and then enter "6" on the DATA ENTRY numeric keypad.
51. Press the **More** softkey.
52. Press the **B** softkey.
53. Press Save key, and then enter "7" on the DATA ENTRY numeric keypad.

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54. Press Preset key.
55. Press the **More** softkey until **Peak Amplitude** is a menu selection option.
56. Press the **Peak Amplitude** softkey.
57. Press Single/Repet key. The SINGLE LED should now be illuminated.
58. Press Save key, and then enter "8" on the DATA ENTRY numeric keypad.
59. Move the cursor to the "Channel" field.
60. Press the **B** softkey.
61. Press Save key, and then enter "9" on the DATA ENTRY numeric keypad.

NOTE

The Function and Input menus for each configuration are presented on the following pages. All configurations are in the Single mode (SINGLE LED illuminated) except configurations 6 and 7, which are in the Repet mode.

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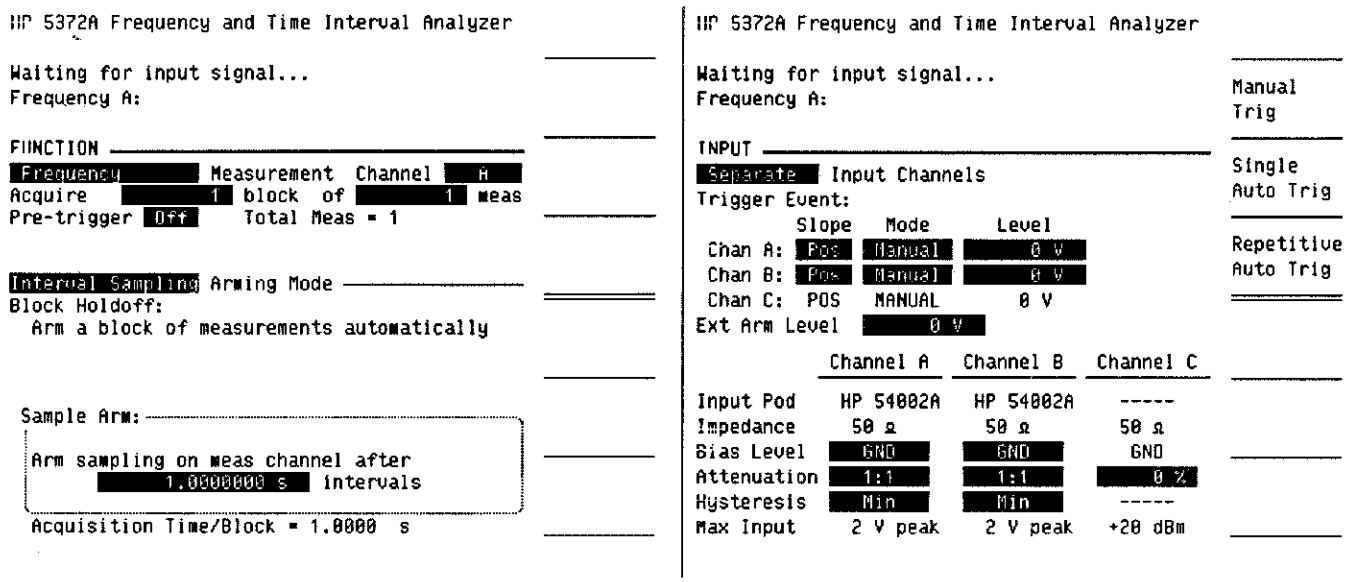

Figure 2-3. Channel A and B Configuration 1

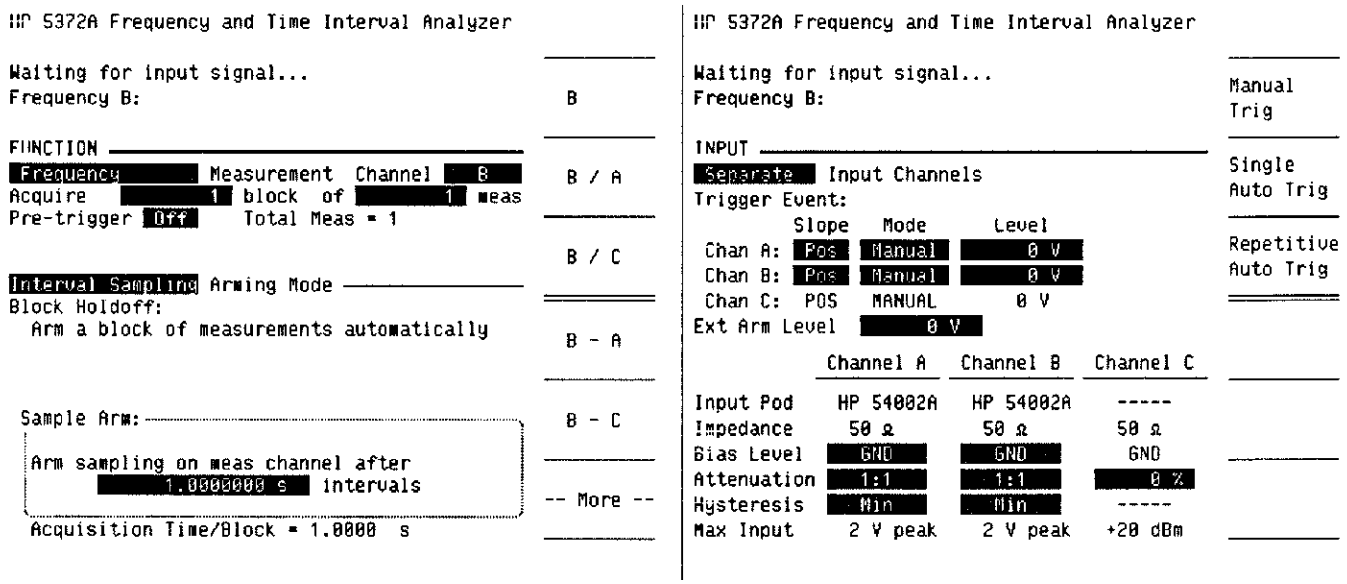

Figure 2-4. Channel A and B Configuration 2

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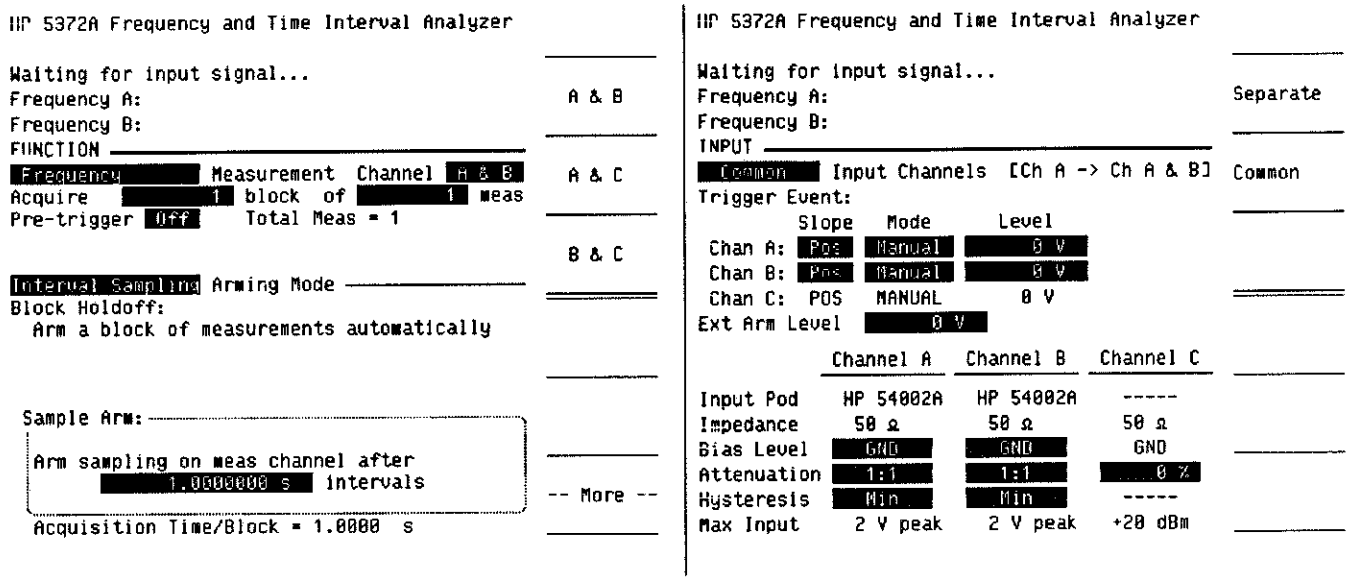

Figure 2-5. Channel A and B Configuration 3

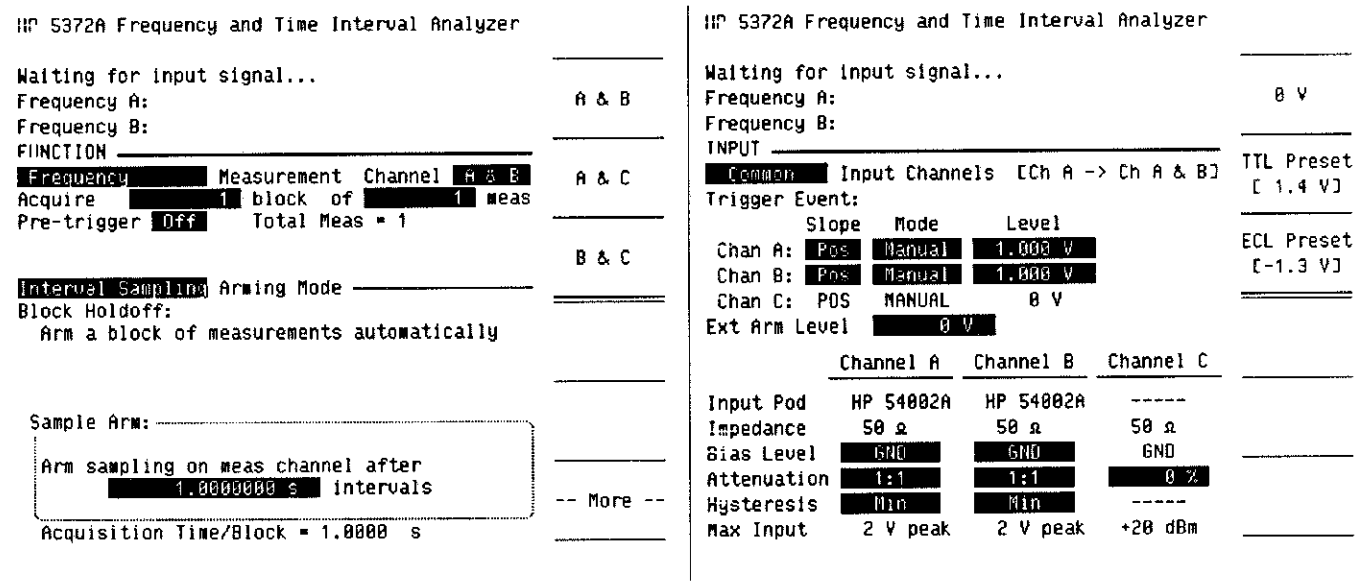

Figure 2-6. Channel A and B Configuration 4

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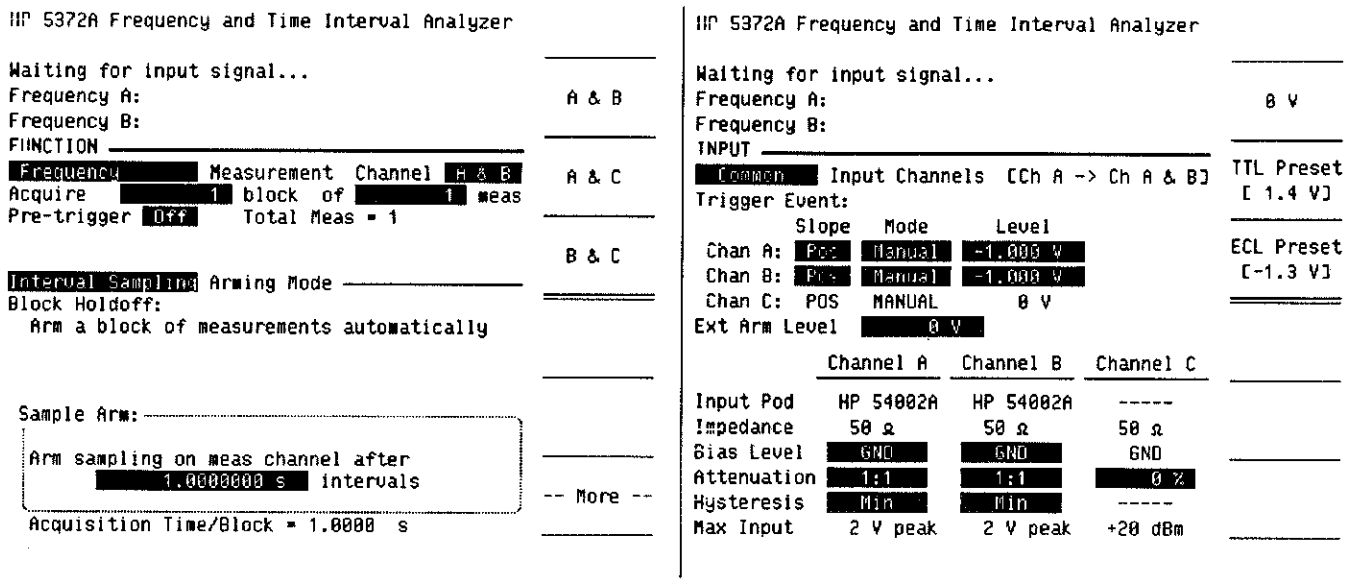

Figure 2-7. Channel A and B Configuration 5

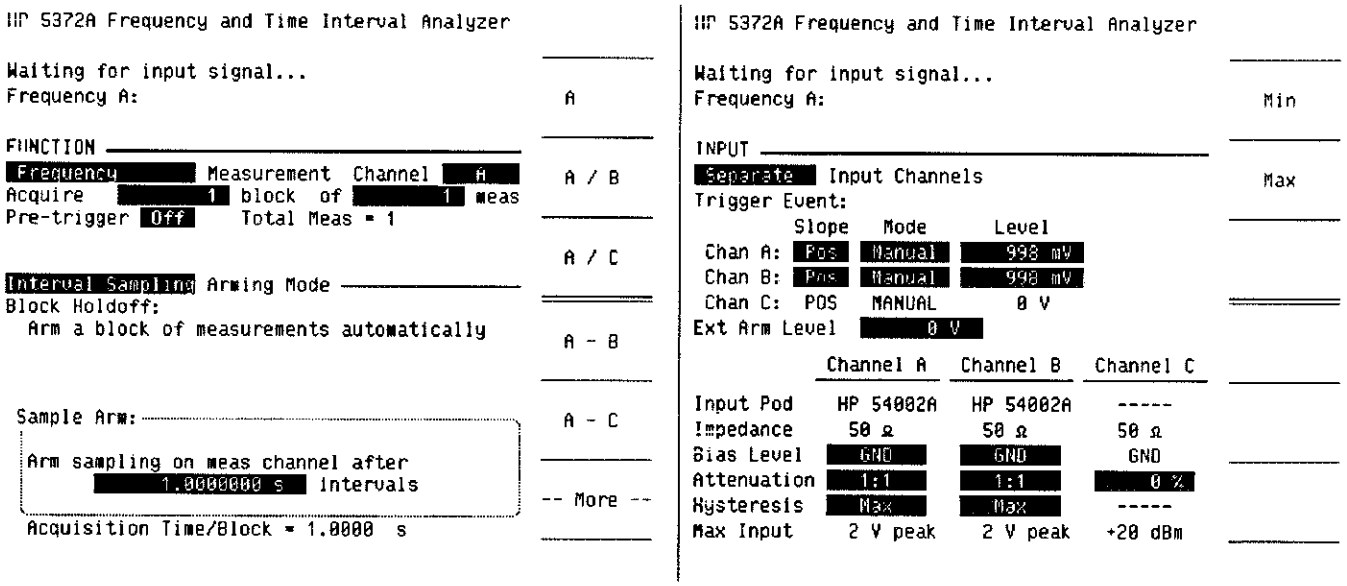

Figure 2-8. Channel A and B Configuration 6 (Repet mode)

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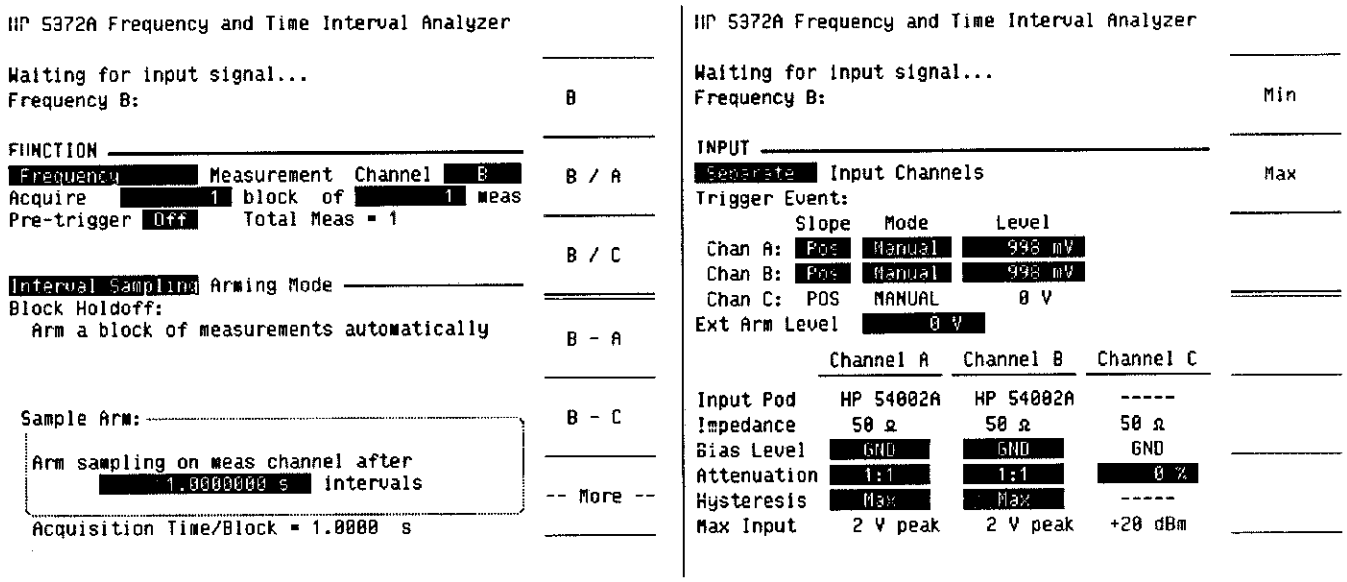

Figure 2-9. Channel A and B Configuration 7 (Repet mode)

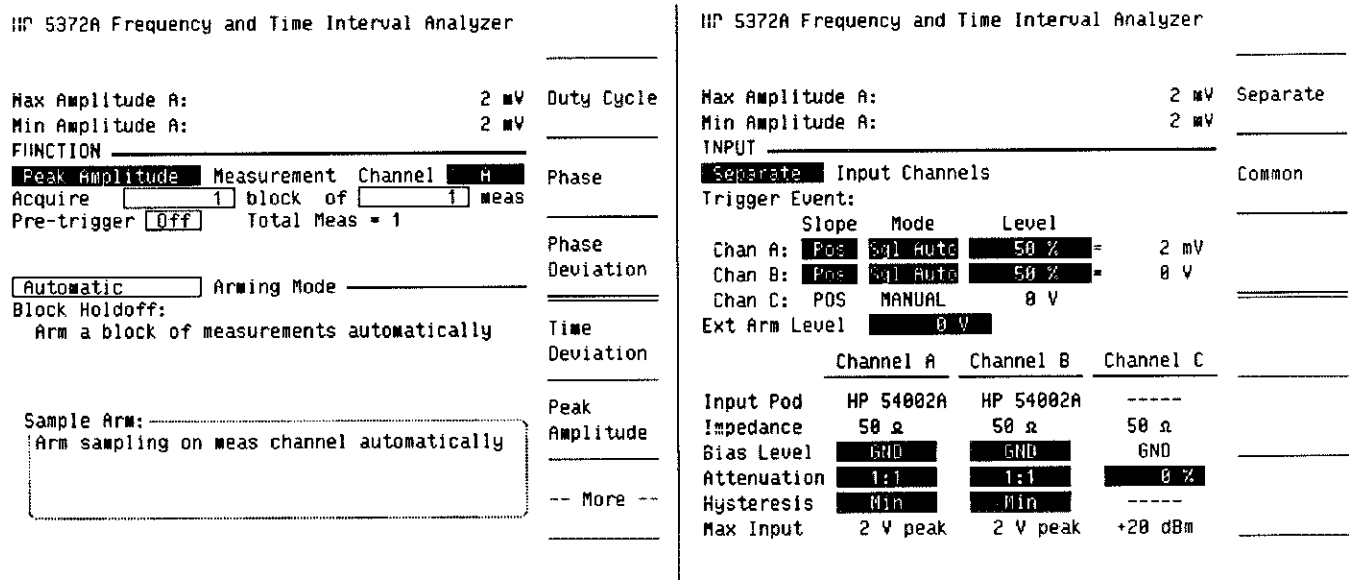

Figure 2-10. Channel A and B Configuration 8

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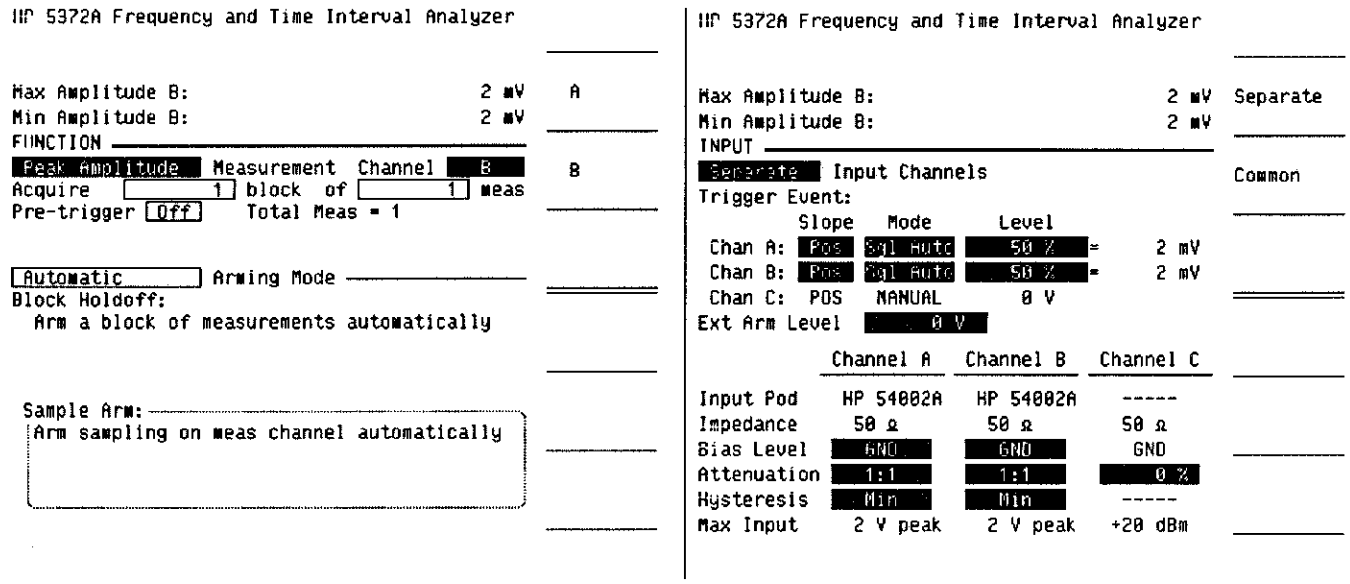

Figure 2-11. Channel A and B Configuration 9

2-21. Channel A and B Frequency and Dynamic Ranges Test

Specifications Tested: 125 mHz to 500 MHz
45 mVp-p to 2 Vp-p

"A" causes double counting @ 2V p-p

HP 3325A SETUP

1. Press the FREQ key, enter ".125", and press Hz key.
2. Press the AMPTD key, enter "45", and press mV key.
3. Press the DC OFFSET key, enter "0", and press mV key.
4. Select the sine wave (20 MHz) function.
5. Connect a BNC cable from the SIGNAL output to the HP 5372A Channel A input pod.
6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT (the HP 3325A front-panel EXT REF LED should be illuminated).

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HP 8663A SETUP

1. Press the FREQUENCY key, enter "500", and press MHz key.
2. Press the AMPLITUDE key, enter "15", and press mV key.
3. Attach a N(m)-to-BNC(f) adapter (HP # 1250-0780) to the RF OUTPUT connector.

FREQUENCY RANGE AND DYNAMIC RANGE TEST PROCEDURE

1. Press Recall key, and then enter "1" on the DATA ENTRY numeric keypad.

NOTE

The HP 5372A requires 8 seconds to perform each .125 Hz test.

2. After 8 seconds, the top of the HP 5372A CRT should display a result for Channel A. Enter this value on the Performance Test Record.
3. Disconnect the BNC cable from the HP 5372A Channel A input pod and connect it to the HP 5372A Channel B input pod.
4. Press Recall key, and then enter "2" on the DATA ENTRY numeric keypad.
5. After 8 seconds, the top of the HP 5372A CRT should display a result for Channel B. Enter this value on the Performance Test Record.
6. Press the HP 3325A AMPTD key, enter "2", and press VOLT key.
7. Press the HP 3325A square wave (10 MHz) function key.
8. Press HP 5372A Restart key.
9. After 8 seconds, the top of the HP 5372A CRT should display a result for Channel B. Enter this value on the Performance Test Record.
10. Disconnect the BNC cable from the HP 5372A Channel B input pod and connect it to the HP 5372A Channel A input pod.
11. Press Recall key, and then enter "1" on the DATA ENTRY numeric keypad.
12. After 8 seconds, the top of the HP 5372A CRT should display a result for Channel A. Enter this value on the Performance Test Record.
13. Disconnect the BNC cable end from the HP 3325A SIGNAL output, and connect it to the HP 8663A RF OUTPUT.

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14. Disconnect the BNC cable end from the HP 3325A rear panel EXT REF IN, and connect it to the HP 8663A rear panel time base input.

15. Press Numeric key.

16. Press Recall key, and then enter "3" on the DATA ENTRY numeric keypad.

17. The HP 5372A CRT should display results for both Channel A and B. Enter these values on the Performance Test Record.

18. Press the HP 8663A AMPLITUDE key, enter "10", and press +dBm key (The +10 dBm amplitude is equivalent to 2 Vp-p).

19. Press HP 5372A Restart key.

20. The HP 5372A CRT should display results for both Channel A and B. Enter these values on the Performance Test Record.

2-22. Channel A and B Signal Operating Range Test

Specification Tested: –2 Vdc to +2 Vdc

HP 3325A SETUP

1. Press the FREQ key, enter "10", and press MHz key.

2. Press the AMPTD key, enter "2", and press VOLT key.

3. Press the DC OFFSET key, enter "1", and press VOLT key.

4. Select the sine wave (20 MHz) function key.

5. Connect a BNC cable from the SIGNAL output to the HP 5372A Channel A input pod.

6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

SIGNAL OPERATING RANGE TEST PROCEDURE

1. Press Recall key, and then enter "4" on the DATA ENTRY numeric keypad.

2. The HP 5372A CRT should display results for both Channel A and B. Enter these values on the Performance Test Record.

3. Press the HP 3325A DC OFFSET key, enter "–1", and press VOLT key.

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4. Press Recall key, and then enter "5" on the DATA ENTRY numeric keypad.

5. The HP 5372A CRT should display results for both Channel A and B. Enter these values on the Performance Test Record.

2-23. Channel A and B Manual Trigger Accuracy Test

Specification Tested: 20 mV ± 1% of setting

HP 3458A SETUP

1. Connect a Banana-to-BNC adapter to the 2 wire input.

HP 3325A SETUP

1. Press the FREQ key, enter "10", and press kHz key.

2. Press the AMPTD key, enter "1.0", and press VOLT key.

3. Connect a BNC T-Connector to the SIGNAL ouput.

4. Connect a BNC cable from one end of the BNC T-Connector to the HP 5372A Channel A input pod.

5. Connect a BNC cable from one end of the BNC T-Connector to the HP 3458A Multimeter.

6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

MANUAL TRIGGER ACCURACY TEST PROCEDURE

1. Press Recall key, and then enter "6" on the DATA ENTRY numeric keypad.

2. Press the HP 3325A DC OFFSET key, enter "998", and press mV key.

3. Press HP 5372A Math key.

4. Press the **Set Ch A Reference** softkey.

5. Move the cursor to the Channel A "Limits" field.

6. Press the **On** softkey.

7. Move the cursor to the Channel A "Low Limit" field.

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8. Press "–100" on the DATA ENTRY numeric keypad, and then press the Enter key.

9. Move the cursor to the Channel A "High Limit" field.

10. Press "100" on the DATA ENTRY numeric keypad, and then press the Enter key.

11. Press the HP 3325A DC OFFSET key, enter "1.45", and then press VOLT key.

12. Press Numeric key.

13. Using the HP 3325A MODIFY keys, increase the DC OFFSET to the maximum level that allows all measurements to "Pass" the Limit test (The "Limit" test displays either "Pass", "High", or "Low", depending on whether the measurement was within the limits, greater than the high limit, or below the low limit, respectively). Begin the test by incrementing in 10 mV steps until the "High" or "Low" limit is displayed. Then, decrease the DC OFFSET 10 mV, and finally increase in 1 mV steps to the maximum level that allows all measurements to "Pass". Record the DC OFFSET value, from the HP 3458A display, on the Performance Test Record.

14. Press the HP 3325A DC OFFSET key, enter "550", and press mV key.

15. Using the HP 3325A MODIFY keys, decrease the DC OFFSET to the minimum level that allows all measurements to "Pass" the Limit test. Begin the test by decrementing in 10 mV steps until the "High" or "Low" limit is displayed. Then, increase the DC OFFSET 10 mV, and finally decrease in 1 mV steps to the minimum level that allows all measurements to "Pass". Record the DC OFFSET value, from the HP 3458A display, on the Performance Test Record.

16. Calculate the average of the two recorded DC OFFSET values, and then subtract 998 mV (HP 5372A trigger level) from the average. Record this result on the Performance Test Record.

17. Disconnect the BNC cable end from the HP 5372A Channel A input pod and connect it to the HP 5372A Channel B input pod.

18. Press Recall key, and then enter "7" on the DATA ENTRY numeric keypad.

19. Repeat the above procedure for Channel B (Begin at Step 2).

2-24. Channel A and B Auto Trigger Tests

Specifications Tested:
1 kHz to 200 MHz Frequency Range
200 mVp-p to 2 Vp-p Dynamic Range
± 20% of pk-pk amplitude Accuracy
–2 V to +2 V Signal Operating Range

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NOTE

The Peak Amplitude function specifications are tested in the Auto Trigger tests.

HP 3325A SETUP

1. Press the FREQ key, enter "1", and press kHz key.
2. Press the DC OFFSET key, enter "0", and press mV key.
3. Press the AMPTD key, enter "200", and press mV key.
4. Connect a BNC cable from the SIGNAL output to the HP 5372A Channel A input pod.
5. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

HP 8663A SETUP

1. Press the FREQUENCY key, enter "200", and press MHz key.
2. Press the AMPLITUDE key, enter "71", and press mV key.

AUTO TRIGGER TEST PROCEDURE

1. Press Recall key, and then enter "8" on the DATA ENTRY numeric keypad.
2. The HP 5372A CRT should display maximum and minimum results for Channel A. Enter these values on the Performance Test Record.
3. Disconnect the BNC cable from the HP 5372A Channel A input pod and connect it to the HP 5372A Channel B input pod.
4. Press Recall key, and then enter "9" on the DATA ENTRY numeric keypad.
5. The HP 5372A CRT should display maximum and minimum results for Channel B. Enter these values on the Performance Test Record.
6. Press the HP 3325A AMPTD key, enter "2", and press VOLT key.
7. Press the HP 3325A DC OFFSET key, enter "1", and press VOLT key.
8. Press HP 5372A Restart key.
9. The HP 5372A CRT should display results for Channel B. Enter these values on the Performance Test Record.

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10. Press the HP 3325A DC OFFSET key, enter "–1", and press VOLT key.
11. Press HP 5372A Restart key.
12. The HP 5372A CRT should display results for Channel B. Enter these values on the Performance Test Record.
13. Disconnect the BNC cable from the HP 5372A Channel B input pod and connect it to the HP 5372A Channel A input pod.
14. Press Recall key, and then enter "8" on the DATA ENTRY numeric keypad.
15. The HP 5372A CRT should display results for Channel A. Enter these values on the Performance Test Record.
16. Press the HP 3325A DC OFFSET key, enter "1", and press VOLT key.
17. Press HP 5372A Restart key.
18. The HP 5372A CRT should display results for Channel A. Enter these values on the Performance Test Record.
19. Disconnect the BNC cable end from the HP 3325A SIGNAL output, and connect it to the HP 8663A RF OUTPUT.
20. Disconnect the BNC cable end from the HP 3325A rear panel EXT REF IN, and connect it to the HP 8663A rear panel time base input.
21. Press HP 5372A Restart key.
22. The HP 5372A CRT should display results for Channel A. Enter these value on the Performance Test Record.
23. Disconnect the BNC cable from the HP 5372A Channel A input pod and connect it to the HP 5372A Channel B input pod.
24. Press Recall key, and then enter "9" on the DATA ENTRY numeric keypad.
25. The HP 5372A CRT should display results for Channel B. Enter these values on the Performance Test Record.
26. Press the HP 8663A AMPLITUDE key, enter "10", and press +dBm key (The +10 dBm amplitude is equivalent to 2 Vp-p).
27. Press HP 5372A Restart key.
28. The HP 5372A CRT should display results for Channel B. Enter these values on the Performance Test Record.

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29. Disconnect the BNC cable from the HP 5372A Channel B input pod and connect it to the HP 5372A Channel A input pod.

30. Press Recall key, and then enter "8" on the DATA ENTRY numeric keypad.

31. The HP 5372A CRT should display results for Channel A. Enter these values on the Performance Test Record.

2-25. Channel A and B Sensitivity and Minimum Pulse Width Test (optional)

NOTE

The Sensitivity and Minimum Pulse Width Test is an optional performance test. This test requires a 1 ns pulse generator, which is not required equipment.

Specifications Tested:

45 mV p-p at minimum pulse width
1 ns at minimum amplitude
1.5 ns at minimum amp. (Holdoff Arm.)

HP 8131A SETUP

1. Press the AUTO/TRIG/GATE key, until the **AUTO** LED is ON.

2. Press the Channel 1 DOUB/DELAY key until both the **DELAY** LED and key LED are ON.

3. Use the vernier keys to input "0 ps".

4. Press the Channel 1 DCYC/WIDTH key until both the **DCYC** LED and key LED are ON.

5. Use the vernier keys to input "1%".

6. Press the Channel 1 DCYC/WIDTH key until both the **WIDTH** LED and key LED are ON.

7. Use the vernier keys to input "1.00 ns".

8. Press the Channel 1 AMPL/HIGH key until both the **AMPL** LED and key LED are ON.

9. Use the vernier keys to input ".45 V".

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10. Press the Channel 1 OFFS/LOW key until both the **OFFS** LED and key LED are ON.
11. Use the vernier keys to input "0 V".
12. Press the COUNT/PERIOD key until both the **PERIOD** LED and key LED are ON.
13. Use the vernier keys to input "100 ns".
14. Enable the Channel A output by ensuring the DISABLE, LIMIT, and COMP LEDs are off.
15. Connect an SMA cable from the Channel 1 OUTPUT to the HP 8495D Attenuator (set at 0 dB attenuation).
16. Connect an SMA(m)-to-BNC(f) adapter to the HP 8495D output.
17. Connect a BNC cable from the HP 8495D to the HP 5372A Channel A input pod.
18. Connect an SMA(m)-to-BNC(f) adapter to the HP 8131A EXT INPUT.
19. Connect a BNC cable from the HP 8131A EXT INPUT to the HP 5372A FREQUENCY STANDARD OUTPUT.
20. Press the AUTO/TRIG/GATE key until the TRIG LED is ON.
21. Press the Positive Slope EXT INPUT key until the key LED is ON.

HP 5372A SETUP

1. Press Preset key.
2. Press the **±Time Interval** softkey.
3. Press Input key.
4. Press the **Common** softkey.
5. Move the cursor to the Channel A "Mode" field.
6. Press the **Manual Trig** softkey.
7. Move the cursor to the Channel B "Mode" field.
8. Press the **Manual Trig** softkey.
9. Press Single/Rept key. The SINGLE LED should now be illuminated.
10. Press Math key.

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11. Press the **On** softkey (enables Channel A statistics).
12. Press Restart key.
13. Press the **Set Ch A Reference** softkey.
14. Press Input key.
15. Move the cursor to the Channel B "Slope" field.
16. Press the **Neg** softkey.

SENSITIVITY AND MINIMUM PULSE WIDTH TEST PROCEDURE

1. Set the HP 8495D to 20 dB attenuation.
2. Press HP 5372A Restart key.
3. The top of the HP 5372A CRT should display a ±Time Interval A→B result. Enter the absolute value of this result on the Performance Test Record.
4. Press the HP 8131A Channel 1 DCYC/WIDTH key until both the **WIDTH** LED and key LED are ON.
5. Use the vernier keys to input "1.50 ns".
6. Press Function key.
7. Move the cursor to the "Arming Mode" field.
8. Press the **Edge Holdoff** softkey.
9. Move the cursor to the Block Holdoff "edge" field.
10. Press the **Neg** softkey.
11. The top of the HP 5372A CRT should display a ±Time Interval A→B result. Enter the absolute value of this result on the Performance Test Record.

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2-26. EXTERNAL ARM INPUT TESTS

2-27. HP 5372A Configuration Setup

NOTE

This procedure sets the HP 5372A Function and Input menus to specific configurations which will be used in the External Arm Input Tests. The configurations are stored in memory using the Save key, and are then recalled from memory during the Performance Tests using the Recall key.

1. Press Preset key.
2. Press the **Frequency** softkey.
3. Move the cursor to the "meas" field.
4. Press "2" on the DATA ENTRY numeric keypad, and then press the Enter key.
5. Move the cursor to the "Arming Mode" field.
6. Press the top softkey until **Hld/Samp** is highlighted.
7. Press the **Edge/Edge** softkey.
8. Move the cursor to the Block Holdoff "Channel" field.
9. Press the **Ext Arm** softkey.
10. Move the cursor to the Sample Arm "Channel" field.
11. Press the **Ext Arm** softkey.
12. Press Numeric key.
13. Press the **Expand** softkey until **On** is highlighted.
14. Press Single/Repet key. The SINGLE LED should now be illuminated.
15. Press Save key, and then enter "1" on the DATA ENTRY numeric keypad.
16. Press Input key.
17. Move the cursor to the Ext Arm "Level" field.
18. Press "2.5" on the DATA ENTRY numeric keypad, and then press the Enter key.

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19. Press Save key, and then enter "2" on the DATA ENTRY numeric keypad.
20. Press "–2.5" on the DATA ENTRY numeric keypad, and then press the Enter key.
21. Press Save key, and then enter "3" on the DATA ENTRY numeric keypad.
22. Press "100" on the DATA ENTRY numeric keypad, and then press the **mV** softkey.
23. Press Function key.
24. Move the cursor to the "Arming Mode" field.
25. Press the top softkey until **Holdoff** is highlighted.
26. Press the **Edge Holdoff** softkey.
27. Press Save key, and then enter "4" on the DATA ENTRY numeric keypad.
28. Move the cursor to the Block Holdoff "edge" field.
29. Press the **Neg** softkey.
30. Press Save key, and then enter "5" on the DATA ENTRY numeric keypad.

NOTE

The Function and Input menus for each configuration are presented on the following pages. All configurations are in the single mode (SINGLE LED illuminated).

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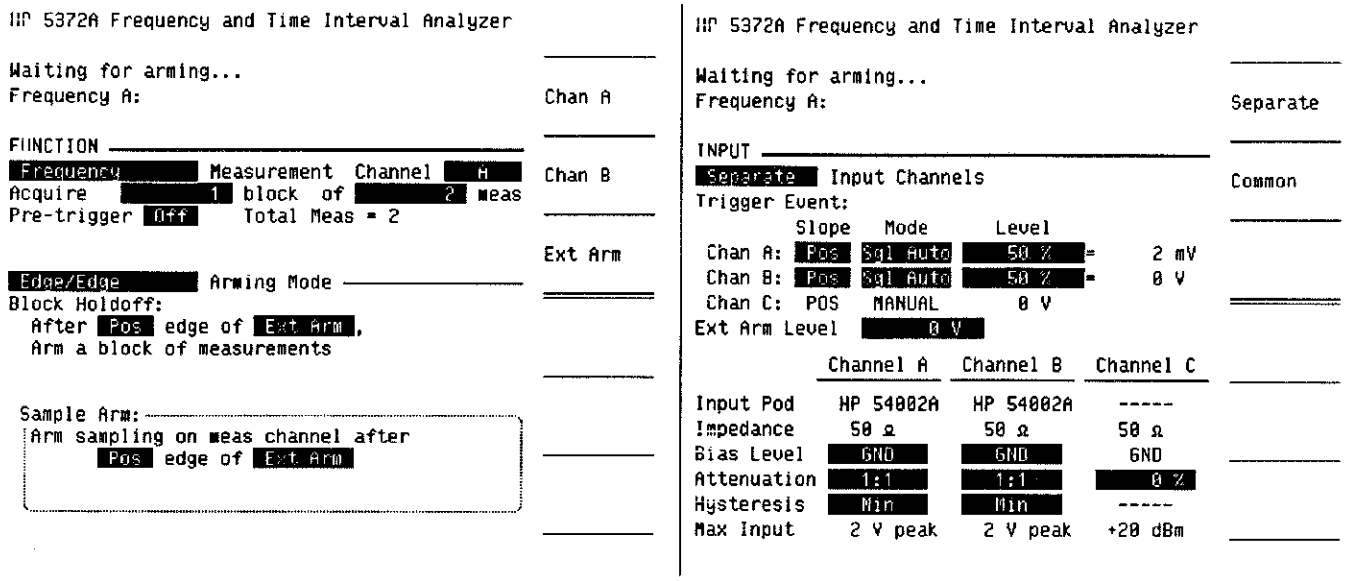

Figure 2-12. External Arm Input Configuration 1

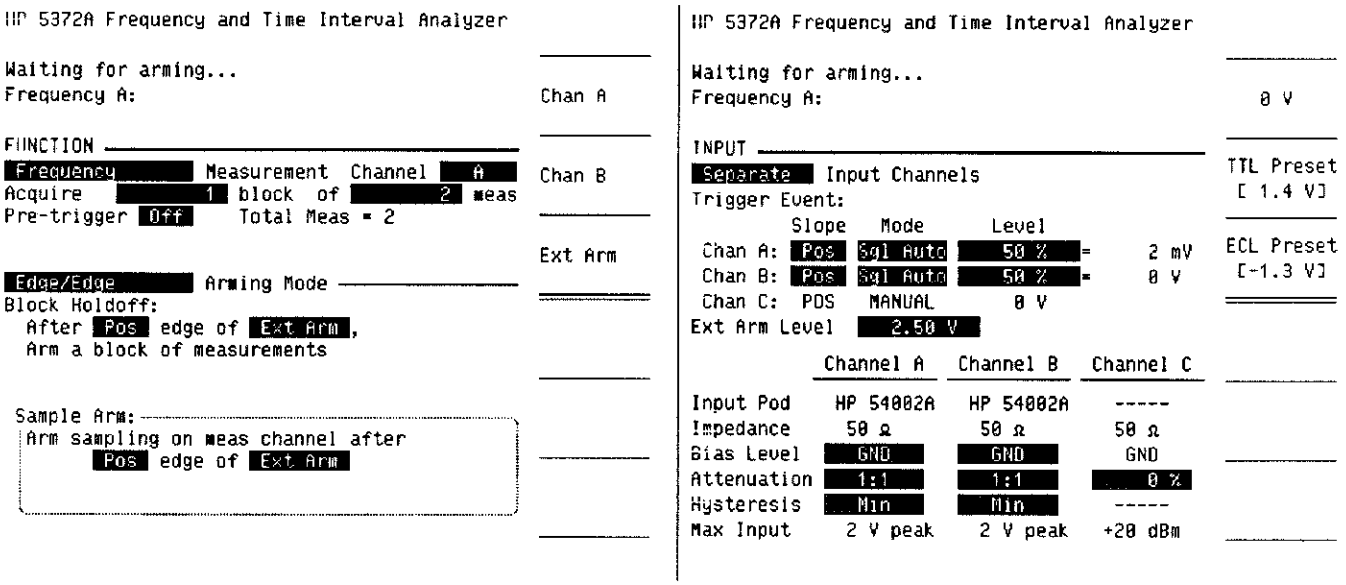

Figure 2-13. External Arm Input Configuration 2

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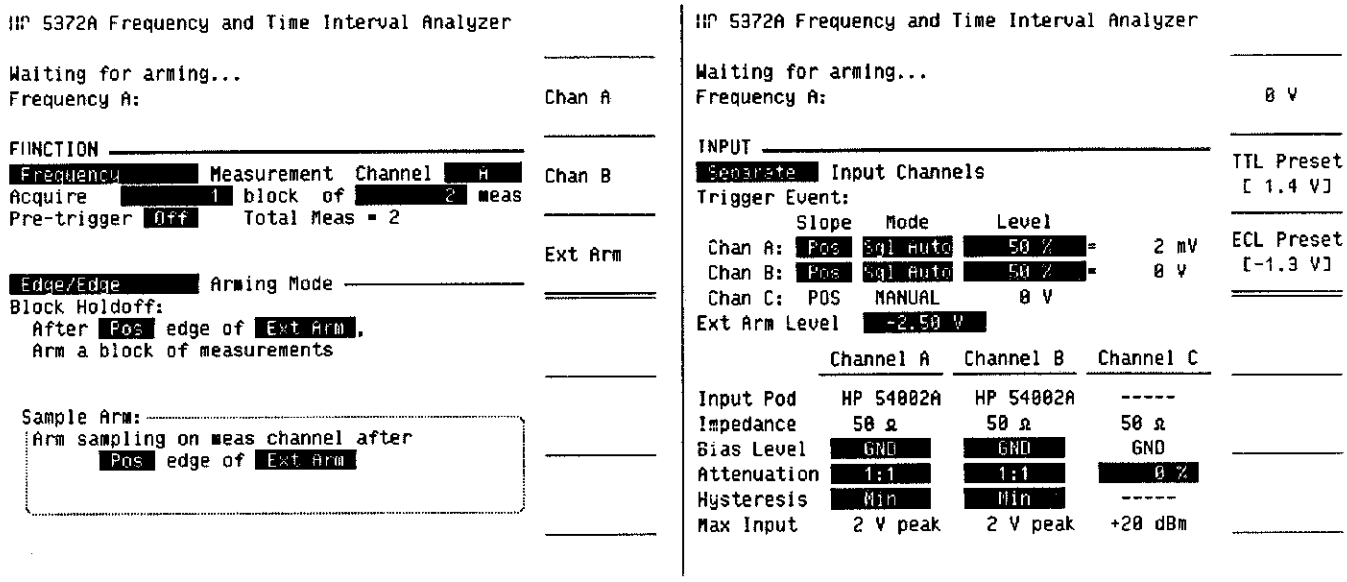

Figure 2-14. External Arm Input Configuration 3

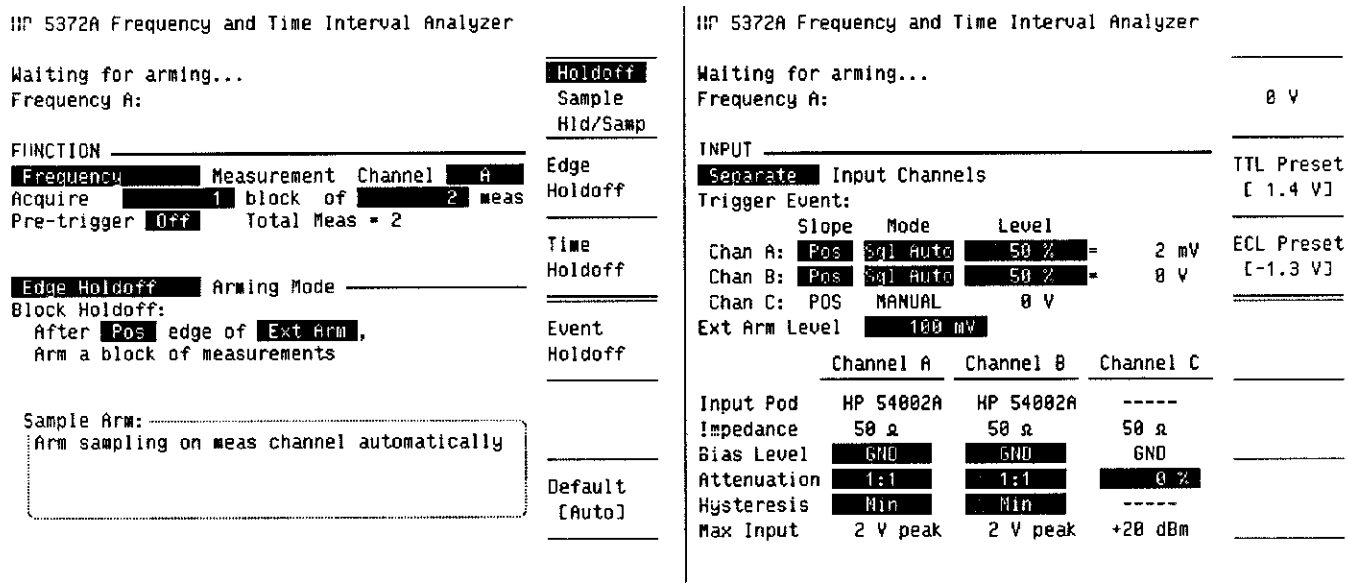

Figure 2-15. External Arm Input Configuration 4

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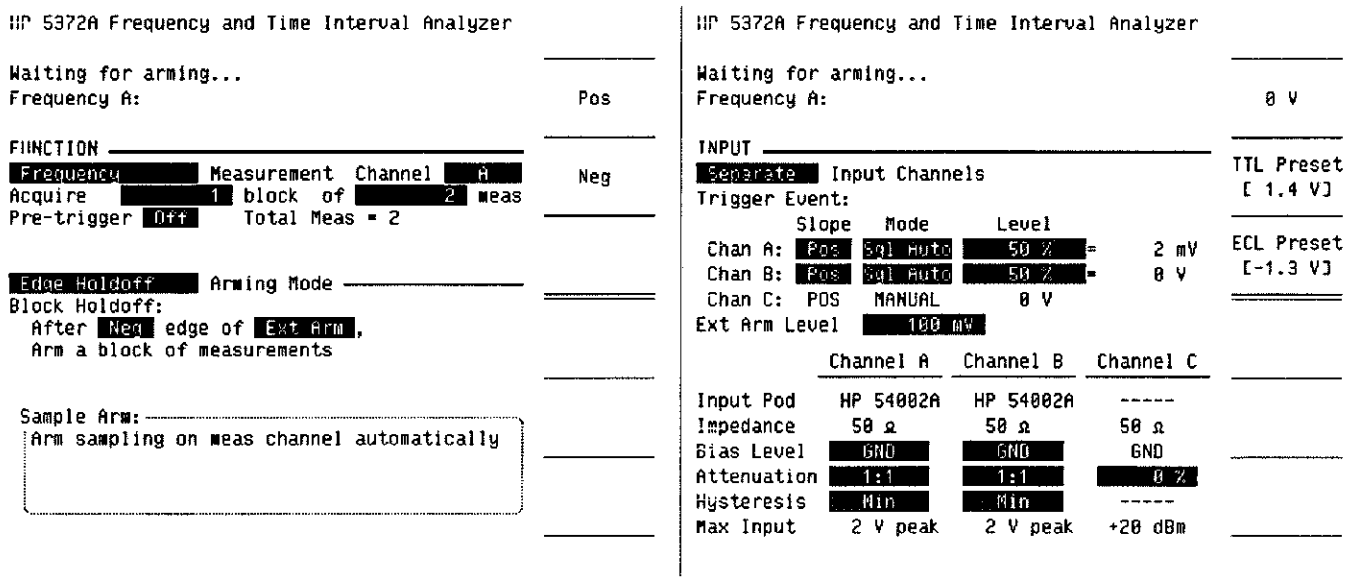

Figure 2-16. External Arm Input Configuration 5

NOTE

The rear panel External Arm Input specifications (option 060 and 090) are different than the front panel specifications. The complete front-panel performance tests are listed first, followed by the complete rear-panel performance tests.

2-28. Front Panel External Arm Input Tests

Specifications Tested: DC to 100 MHz Frequency Range
140 mV p-p to 5 Vp-p Dynamic Range

–5 V to +5 V Signal Operating Range

±20m V or ±10% of setting Trigger Accuracy

140 mV p-p Sensitivity at min pulse width
5 ns Minimum Pulse Width at min amplitude

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Equipment: HP 3325B Synthesizer/Function Generator
HP 8663A Synthesized Signal Generator
HP 8161A Pulse Generator

Description: The External Arm Input Tests consists of four separate test procedures, which verify the above specifications. The first test verifies both the frequency range and dyanamic range, the second test verifies the signal operating range, the third test verifies the trigger accuracy, and the fourth test verifies both the sensitivity and minimum pulse width.

2-29. External Arm Input Frequency and Dynamic Ranges Test

Specifications Tested: DC to 100 MHz
140 mVp-p to 5 Vp-p

NOTE

The low frequency range (DC) specification is tested in the trigger accuracy test.

HP 5372A SETUP

1. Connect a 50 ohm feedthrough termination to the External Arm input.
2. Connect a BNC T-connector to the rear-panel FREQUENCY STANDARD OUTPUT.
3. Connect a BNC cable from one end of the T-connector to the Channel A input pod.

HP 3325A SETUP

1. Press the FREQ key, enter "1", and press Hz key.
2. Press the DC OFFSET key, enter "0", and press mV key.
3. Press the AMPTD key, enter "140", and press mV key.
4. Select the sine wave (20 MHz) function.
5. Connect a BNC cable from the SIGNAL output to the HP 5372A External Arm input.
6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT (the HP 3325A front-panel EXT REF LED should be illuminated).

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HP 8663A SETUP

1. Press the FREQUENCY key, enter "100", and press MHz key.
2. Press the AMPLITUDE key, enter "50", and press mV key.
3. Attach a N(m)-to-BNC(f) adapter (HP # 1250-0780) to the RF OUTPUT connector.

FREQUENCY RANGE AND DYNAMIC RANGE TEST PROCEDURE

1. Press Recall key, and then enter "1" on the DATA ENTRY numeric keypad.
2. Press Numeric key.
3. Move the cursor to the "View Meas #" field.
4. Press "3" on the DATA ENTRY numeric keypad, and then press the Enter key.
5. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.
6. Press the HP 3325A AMPTD key, enter "5", and press VOLT key.
7. Press the HP 3325A square wave (10 MHz) function key.
8. Press HP 5372A Restart key.
9. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.
10. Disconnect the BNC cable end from the HP 3325A SIGNAL output, and connect it to the HP 8663A RF OUTPUT.
11. Disconnect the BNC cable end from the HP 3325A rear panel EXT REF IN, and connect it to the HP 8663A rear panel time base input.
12. Press Restart key.
13. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.

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2-30. External Arm Input Signal Operating Range Test

Specification Tested: –5 Vdc to +5 Vdc

HP 3325A SETUP

1. Press the FREQ key, enter "10", and press MHz key.
2. Press the AMPTD key, enter "5", and press VOLT key.
3. Press the DC OFFSET key, enter "2.5", and press VOLT key.
4. Select the sine wave (20 MHz) function.
5. Connect a BNC cable from the SIGNAL output to the HP 5372A External Arm input.
6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

SIGNAL OPERATING RANGE TEST PROCEDURE

1. Press Recall key, and then enter "2" on the DATA ENTRY numeric keypad.
2. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.
3. Press the HP 3325A DC OFFSET key, enter "–2.5", and press VOLT key.
4. Press Recall key, and then enter "3" on the DATA ENTRY numeric keypad.
5. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.

2-31. External Arm Input Trigger Accuracy Test

Specifications Tested: ±20 mV or 10% of setting, whichever is greater.

NOTE

This test also verifies the low frequency range (DC) specification.

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HP 3458A SETUP

1. Connect a Banana-to-BNC adapter to the 2 wire input.

HP 3325A SETUP

1. Press the sine wave (20 MHz) function (enables the DC only mode).
2. Press the DC OFFSET key, enter "80, and press mV key.
3. Connect a BNC T-connector to the SIGNAL output.
4. Connect a BNC cable from one end of the T-connector to the HP 5372A External Arm input.
5. Connect a BNC cable from one end of the T-connector to the HP 3458A Multimeter.
6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

TRIGGER ACCURACY TEST PROCEDURE

1. Press Recall key, and then enter "4" on the DATA ENTRY numeric keypad.
2. Using the HP 3325A MODIFY keys, increase the DC OFFSET in 1 mV increments until the GATE LED goes off. Record the DC OFFSET value, from the HP 3458A dispaly, on the Performance Test Record.
3. Press the HP 3325A DC OFFSET key, enter "120", and press mV key.
4. Press Recall key, and then enter "5" on the DATA ENTRY numeric keypad.
5. Using the HP 3325A MODIFY keys, decrease the DC OFFSET in 1 mV increments until the GATE LED goes off. Record the DC OFFSET value, from the HP 3458A display, on the Performance Test Record.
6. Calculate the average of the two recorded DC OFFSET values, and then subtract 100 mV (HP 5372A Ext Arm trigger level) from the average. Record this result on the Performance Test Record.

2-32 External Arm Input Sensitivity and Minimum Pulse Width Test

Specifications Tested: 140 mVp-p at minimum amplitude
5 ns at mininimum amplitude

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HP 8161A SETUP

1. Press the PERIOD key, enter "200" on the CHANNEL/DATA keys, and then press ns key.
2. Press the DELAY key, press CHANNEL A key, enter "0" on the CHANNEL/DATA keys, and then press ns key.
3. Press the WIDTH key, press CHANNEL A key, enter "5" on the CHANNEL/DATA keys, and then press ns key.
4. Press the LEE key, press CHANNEL A key, enter "1.3" on the CHANNEL/DATA keys, and then press ns key.
5. Press the TRE key, press CHANNEL A key, enter "1.3" on the CHANNEL/DATA keys, and then press ns key.
6. Press the HIL key, press CHANNEL A key, enter ".07" on the CHANNEL/DATA keys, and then press V key.
7. Press the LOL key, press CHANNEL A key, enter "–.07" on the CHANNEL/DATA keys, and then press V key.
8. Enable the Channel A output by ensuring the DISABLE LED is off.
9. Connect a BNC cable from OUTPUT A to the HP 5372A External Arm Input.

SENSITIVITY AND MINIMUM PULSE WIDTH TEST PROCEDURE

1. Press Recall key, and then enter "1" on the DATA ENTRY numeric keypad.
2. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.

2-33. Rear Panel External Arm Input Tests

Specifications Tested:

DC to 100 MHz Frequency Range
280 mV p-p to 5 Vp-p Dynamic Range (DC to 20 MHz)
280 mV p-p to 2.5 Vp-p Dynamic Range (20 MHz to 100 MHz)

–5 V to +5 V Signal Operating Range

±20 mV or 10% of setting Trigger Accuracy

280 mV p-p Sensitivity at min pulse width
5 ns Minimum Pulse Width at min amplitude

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Equipment:
HP 3325B Synthesizer/Function Generator
HP 8663A Synthesized Signal Generator
HP 8161A Pulse Generator

Description: The Rear Panel External Arm Input Tests consists of four separate test procedures, which verify the above specifications. The first test verifies both the frequency range and dyanamic range, the second test verifies the signal operating range, the third verifies the trigger accuracy, and the fourth test verifies both the sensitivity and minimum pulse width.

2-34. Rear Panel External Arm Input Frequency and Dynamic Ranges Test

Specifications Tested:
DC to 100 MHz
280 mVp-p to 5 Vp-p (DC to 20 MHz)
280 mVp-p to 2.5 Vp-p (20 MHz to 100 MHz)

NOTE
The low frequency range (DC) specification is tested in the trigger accuracy test.

HP 5372A SETUP

1. Connect a 50 ohm feedthrough termination to the External Arm input.
2. Connect a T-connector to the rear-panel FREQUENCY STANDARD OUTPUT.
3. Connect a BNC cable from one end of the T-connector to the Channel A input.

HP 3325A SETUP

1. Press the FREQ key, enter "1", and press Hz key.
2. Press the DC OFFSET key, enter "0", and press mV key.
3. Press the AMPTD key, enter "280", and press mV key.
4. Select the sine wave (20 MHz) function.
5. Connect a BNC cable from the SIGNAL output to the HP 5372A External Arm input.
6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT (the HP 3325A front-panel EXT REF LED should be illuminated).

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HP 8663A SETUP

1. Press the FREQUENCY key, enter "100", and press MHz key.
2. Press the AMPLITUDE key, enter "100", and press mV key.
3. Attach a N(m)-to-BNC(f) adapter (HP # 1250-0780) to the RF OUTPUT connector.

FREQUENCY RANGE AND DYNAMIC RANGE TEST PROCEDURE

1. Press Recall key, and then enter "1" on the DATA ENTRY numeric keypad.
2. Press Numeric key.
3. Move the cursor to the "View Meas #" field.
4. Press "2" on the DATA ENTRY numeric keypad, and then press the Enter key.
5. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.
6. Press the HP 3325A AMPTD key, enter "5", and press VOLT key.
7. Press the HP 3325A square wave (10 MHz) function key.
8. Press HP 5372A Restart key.
9. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.
10. Disconnect the BNC cable end from the HP 3325A SIGNAL output, and connect it to the HP 8663A RF OUTPUT.
11. Disconnect the BNC cable end from the HP 3325A rear panel EXT REF IN, and connect it to the HP 8663A rear panel time base input.
12. Press Restart key.
13. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.

2-35. Rear Panel External Arm Input Signal Operating Range Test

Specification Tested: –5 Vdc to +5 Vdc

HP 3325A SETUP

1. Press the FREQ key, enter "10", and press MHz key.

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2. Press the AMPTD key, enter "5", and press VOLT key.
3. Press the DC OFFSET key, enter "2.5", and press VOLT key.
4. Select the sine wave (20 MHz) function.
5. Connect a BNC cable from the SIGNAL output to the HP 5372A External Arm input.
6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

SIGNAL OPERATING RANGE TEST PROCEDURE

1. Press Recall key, and then enter "2" on the DATA ENTRY numeric keypad.
2. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.
3. Press the HP 3325A DC OFFSET key, enter "–2.5", and press VOLT key.
4. Press Recall key, and then enter "3" on the DATA ENTRY numeric keypad.
5. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.

2-36. Rear Panel External Arm Input Trigger Accuracy Test

Specifications Tested: ±20 mV or 10% of setting, whichever is greater.

NOTE

This test also verifies the low frequency range (DC) specification.

HP 3458A SETUP

1. Connect a Banana-to-BNC adapter to the 2 wire input.

HP 3325A SETUP

1. Press the sine wave (20 MHz) function (enables the DC only mode).
2. Press the DC OFFSET key, enter "80", and press mV key.
3. Connect a BNC T-connector to the SIGNAL output.
4. Connect a BNC cable from one end of the T-connector to the HP 5372A External Arm input.

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5. Connect a BNC cable from one end of the T-connector to the HP 3458A Multimeter.

6. Connect a BNC cable from the rear panel EXT REF IN to the HP 5372A rear panel FREQUENCY STANDARD OUTPUT.

TRIGGER ACCURACY TEST PROCEDURE

1. Press Recall key, and then enter "4" on the DATA ENTRY numeric keypad.

2. Using the HP 3325A MODIFY keys, increase the DC OFFSET in 1 mV increments until the GATE LED goes off. Record the DC OFFSET value, from the HP 3458A dispaly, on the Performance Test Record.

3. Press the HP 3325A DC OFFSET key, enter "120", and press mV key.

4. Press Recall key, and then enter "5" on the DATA ENTRY numeric keypad.

5. Using the HP 3325A MODIFY keys, decrease the DC OFFSET in 1 mV increments until the GATE LED goes off. Record the DC OFFSET value, from the HP 3458A display, on the Performance Test Record.

6. Calculate the average of the two recorded DC OFFSET values, and then subtract 100 mV (HP 5372A Ext Arm trigger level) from the average. Record this result on the Performance Test Record.

2-37. Rear Panel External Arm Input Sensitivity and Minimum Pulse Width Test

Specifications Tested: 280 mVp-p at minimum amplitude
5 ns at mininimum amplitude

HP 8161A SETUP

1. Press the PERIOD key, enter "200" on the CHANNEL/DATA keys, and then press ns key.

2. Press the DELAY key, press CHANNEL A key, enter "0" on the CHANNEL/DATA keys, and then press ns key.

3. Press the WIDTH key, press CHANNEL A key, enter "5" on the CHANNEL/DATA keys, and then press ns key.

4. Press the LEE key, press CHANNEL A key, enter "1.3" on the CHANNEL/DATA keys, and then press ns key.

5. Press the TRE key, press CHANNEL A key, enter "1.3" on the CHANNEL/DATA keys, and then press ns key.

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6. Press the HIL key, press CHANNEL A key, enter ".14" on the CHANNEL/DATA keys, and then press V key.

7. Press the LOL key, press CHANNEL A key, enter "–.14" on the CHANNEL/DATA keys, and then press V key.

8. Enable the Channel A output by ensuring the DISABLE LED is off.

9. Connect a BNC cable from OUTPUT A to the HP 5372A External Arm Input.

SENSITIVITY AND MINIMUM PULSE WIDTH TEST PROCEDURE

1. Press Recall key, and then enter "1" on the DATA ENTRY numeric keypad.

2. The HP 5372A CRT should display both a frequency result and a gate time for Channel A. Record the gate time on the Performance Test Record.

2-38. CHANNEL C TESTS

Specifications Tested:
100 MHz to 1.5 GHz Frequency Range
–25 dBm to 7 dBm Dynamic Range
–25 dBm Sensitivity
1.55 GHz to 2.06 Hz Frequency Range
–20 dBm to +7 dBm Dynamic Range
–20 dBm Sensitivity

Equipment:
HP 8663A Synthesized Signal Generator
HP 436A Power Meter
HP 8481A Power Sensor
HP 11667A Power Splitter
2 HP 1250-1250 N(m)-to-SMA(f) Adapters
2 HP 1250-0778 N(m)-to-N(m) Adapters
SMC cable (Gore SN 56181)

Description: The Channel C Tests consists of one test procedure, which verifies the above specifications. This test procedure is for the option 030 or 090 2 GHz C-Channel.

NOTE
Perform the calibration procedures on the HP 436A.

2-39. HP 5372A Configuration Setup

1. Press Preset key.

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2. Press **Frequency** softkey.
3. Move the cursor to the "Channel" field.
4. Press the **More** softkey until **C** is a menu selection option.
5. Press the **C** softkey.
6. Move the cursor to the "meas" field.
7. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key.
8. Move the cursor to the "Arming Mode" field.
9. Press the top softkey until **Sample** is highlighted.
10. Press the **Interval Sampling** softkey.
11. Move the cursor to the Sample Arm "intervals" field.
12. Press "1" on the DATA ENTRY numeric keypad, and then press the Enter key.
13. Press Single/Repet key. The SINGLE LED should now be illuminated.

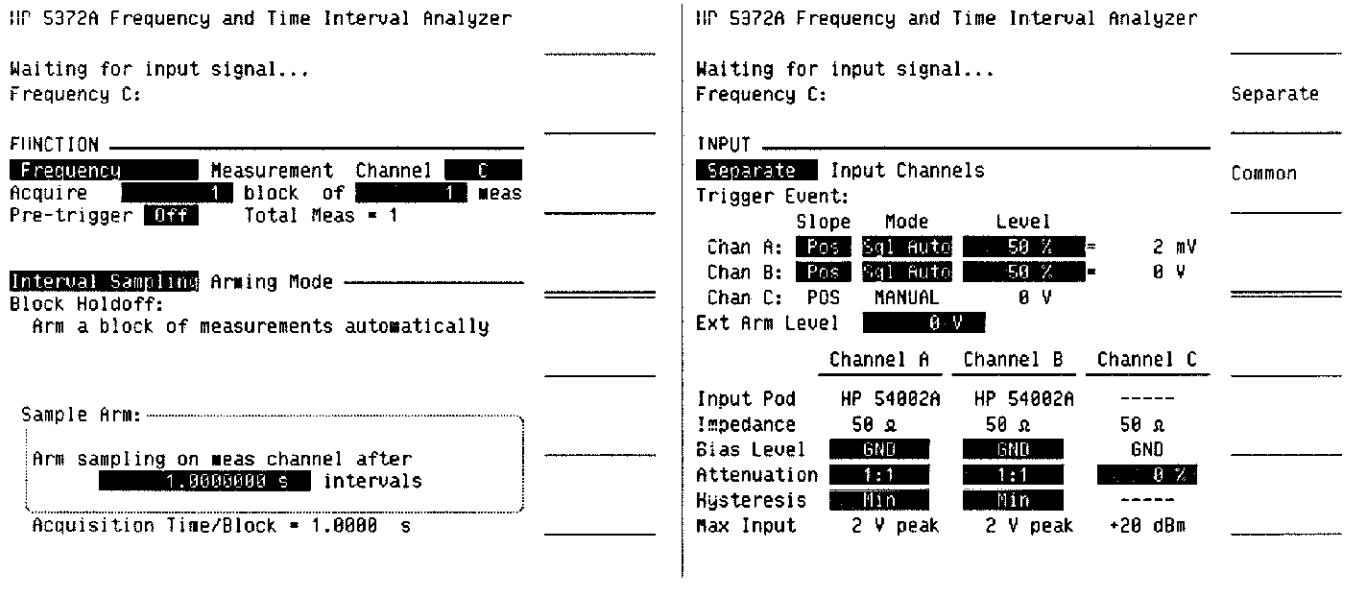

Figure 2-17. Channel C Configuration

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2-40. Frequency Range/ Dynamic Range/ Sensitivity Test

HP 5372A SETUP

1. Set up the HP 5372A as shown in *Figure 2-18.*

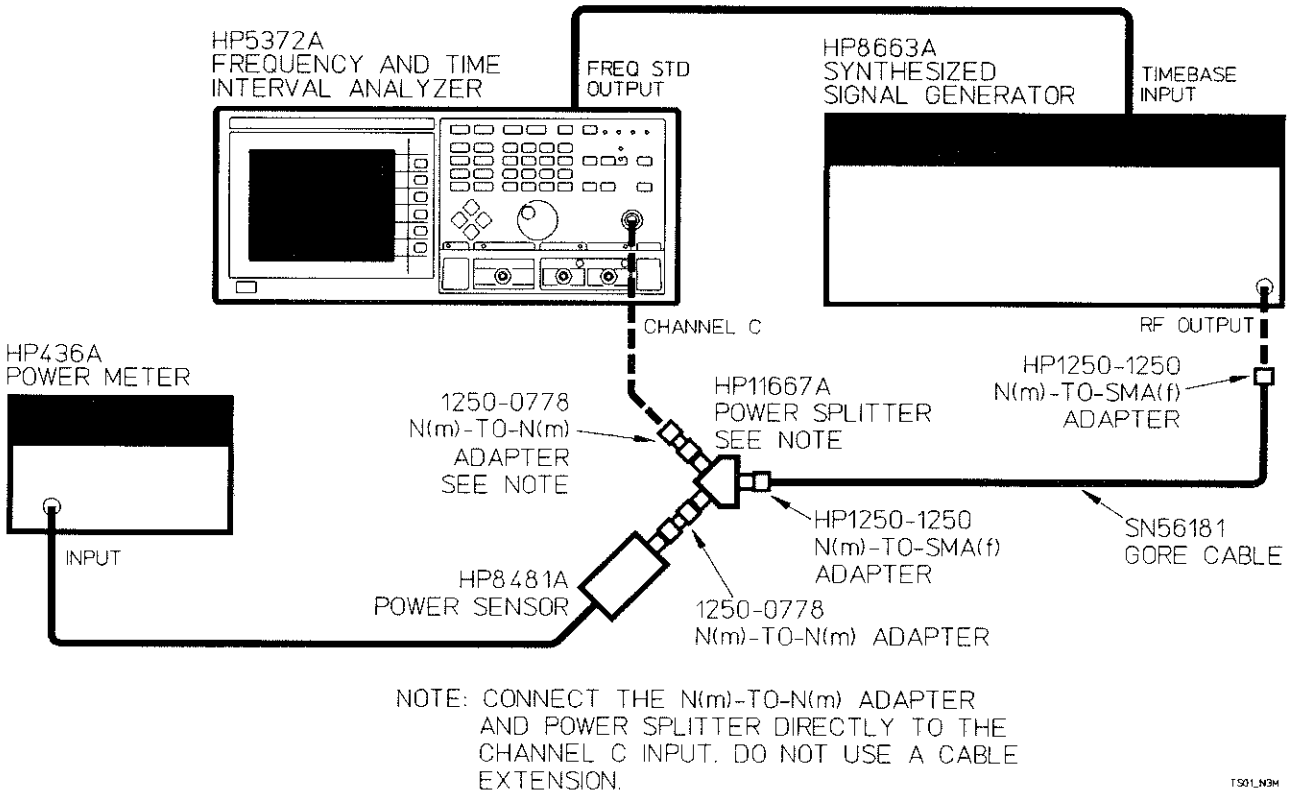

Figure 2-18. Channel C Test Setup

HP 8663A SETUP

1. Press the FREQUENCY key, enter "100", and press MHz key.
2. Press the AMPLITUDE key, enter "25", and press -dBm key.

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FREQUENCY RANGE/DYNAMIC RANGE/SENSITIVITY TEST PROCEDURE

1. Adjust the HP 8663A amplitude until the HP 436A display reads –25 dBm.
2. Press HP 5372A Numeric key.
3. Press HP 5372A Restart key.
4. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.
5. Adjust the HP 8663A amplitude until the HP 436A display reads +7 dBm.
6. Press HP 5372A Restart key.
7. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.
8. Recalibrate the HP 436A Power Meter (typical calibration factor of 99%).
9. Press the HP 8663A FREQUENCY key, enter "1.5", and press GHz key.
10. Adjust the HP 8663A amplitude until the HP 436A display reads –25 dBm.
11. Press HP 5372A Restart key.
12. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.
13. Adjust the HP 8663A amplitude until the HP 436A display reads +7 dBm.
14. Press HP 5372A Restart key.
15. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.
16. Press the HP 8663A FREQUENCY key, enter "1.55", and press GHz key.
17. Adjust the HP 8663A amplitude until the HP 436A display reads –20 dBm.
18. Press HP 5372A Restart key.
19. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.
20. Adjust the HP 8663A amplitude until the HP 436A display reads +7 dBm.
21. Press HP 5372A Restart key.

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22. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.

23. Recalibrate the HP 436A Power Meter (typical calibration factor of 98%).

24. Press the HP 8663A FREQUENCY key, enter "2.0", and press GHz key.

25. Adjust the HP 8663A amplitude until the HP 436A display reads –20 dBm.

26. Press HP 5372A Restart key.

27. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.

28. Adjust the HP 8663A amplitude until the HP 436A display reads +7 dBm.

29. Press HP 5372A Restart key.

30. The HP 5372A CRT should display a result for Channel C. Enter this value on the Performance Test Record.

THE HP 5372A PERFORMANCE TESTS ARE NOW COMPLETE.

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2-41. HP-IB VERIFICATION PROGRAM

The HP-IB Operation Verification Program checks the HP 5372's ability to transmit and receive HP-IB messages. During this verification program, the analyzer's HP-IB data input/output bus, control, and handshake lines are checked. Only the HP 5372A, an HP Series 200 or 300 Computer, and applicable HP-IB interface cable are required for the test setup. The validity of the test results is based on the following assumptions:

- The HP 5372A operates correctly from the front panel. This can be verified by performing the "HP 5372A Operation Verification Tests" found earlier in this chapter.
- The controller being used can properly execute HP-IB commands.

The HP 5372A's device address (primary address) is 03 and may be changed from the front panel through the System menu. The address setting applies to both the Talk/Listen and Talk Only modes. For the HP Series 200 or 300 Computers the HP-IB interface select code is 7.

NOTE

The device address is retained in non-volatile memory. If the address is not recallable due to a battery or memory failure, a default value of 3 will be selected. The user can not alter the default address.

If all of the checks performed by the program listed in *Table* 2-3 are successful, the HP 5372A's HP-IB capability can be considered to be performing properly. This program does not check to see if ALL of the analyzer's program commands are being properly interpreted and executed by the HP 5372A. However, if the front panel operation is confirmed to be working properly and its HP-IB capability operates correctly, then there is high probability that the analyzer will respond properly to all of its program commands.

After successful completion of the HP-IB Operation Verification Test presented in *Table* 2-3, mark **"PASS"** or **"FAIL"** on the "HP 5372A Performance Test Record" located at the end of this chapter.

THE HP 5372A HP-IB OPERATION VERIFICATION IS NOW COMPLETE.

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Table 2-3. HP-IB Operation Verification Program

```
10    !!!!
```

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Table 2-3. HP-IB Operation Verification Program (Continued)

```
510   Analyzer=703
520   OUTPUT Analyzer;"CLE;PRES"
530   OUTPUT Analyzer;"DSP,""HP-IB VERIFICATION     TEST 1"""
540   DISP "HP-IB VERIFICATION  TEST 1  SELF TEST",
550   OUTPUT Analyzer;"DIAG;TEST,1"
560   DISP "        WAIT 20 SECONDS ..."
570   WAIT 20  !  WAIT FOR SELF-TEST TO COMPLETE
580   OUTPUT Analyzer;"TEST?"
590   WAIT .2
600   ENTER Analyzer;Result$
610   IF Result$=" 0 [ ] No new test data" THEN GOTO 580  !Query again,not ready
620   IF Result$<>" 1 [P] Self Test PASSED" THEN  !  Self Test FAILED
630     PRINT "TEST 1 FAILED, TEST ABORTED"
640     PRINT "' 1 [P] Self Test PASSED' SHOULD BE RETURNED"
650     PRINT "RESULT IS:  ";Result$
660     BEEP
670     STOP
680   END IF
690   PRINT "TEST 1 Self-Test Status : PASSED"
700   OUTPUT Analyzer;"STOP;DSP,""TEST 1 PASSED"""
710   BEEP
720   WAIT 1
730   RETURN
740 Test2:  !!!!
```

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Table 2-3. HP-IB Operation Verification Program (Continued)

```
1030  BEEP
1040  WAIT 1
1050  RETURN
1060 Test3: !!!!
```

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Table 2-3. HP-IB Operation Verification Program (Continued)

```
1550  IF Result<>0 AND Result<>32 AND Result<>1024 AND Result<>1056 THEN
1560    PRINT "TEST 3.3 FAILED, TEST ABORTED"
1570    OUTPUT Analyzer;"DSP,""TEST 3.3 FAILED, TEST ABORTED"""
1580    PRINT "H.W. STATUS REG SHOULD RETURN 0,32,1024, OR 1056.  IT IS: ";Resul
t
1590    STOP
1600  END IF
1610  DISP "HP-IB VERIFICATION     TEST 3.4"
1620  OUTPUT Analyzer;"DSP,""HP-IB VERIFICATION     TEST 3.4"""
1630  OUTPUT Analyzer;"*ESR?"
1640  WAIT .2
1650  ENTER Analyzer;Result
1660  IF Result<>128 AND Result<>64 AND Result<>0 THEN
1670    PRINT "TEST 3.4 FAILED, TEST ABORTED"
1680    OUTPUT Analyzer;"DSP,""TEST 3.4 FAILED, TEST ABORTED"""
1690    PRINT "EVENT STATUS REG. SHOULD RETURN 128, 64, OR 0; IT IS: ";Result
1700    STOP
1710  END IF
1720  DISP "HP-IB VERIFICATION     TEST 3.5"
1730  OUTPUT Analyzer;"DSP,""HP-IB VERIFICATION     TEST 3.5"""
1740  OUTPUT Analyzer;"INT;MTV,1;INP;SOUR,A;TRIG,MAN;LEV,2"
1750  WAIT 3
1760  OUTPUT Analyzer;"*HSR?"
1770  WAIT .2
1780  ENTER Analyzer;Result
1790  IF Result<>256 AND Result<>1056 THEN
1800    PRINT "TEST 3.5 FAILED, TEST ABORTED"
1810    OUTPUT Analyzer;"DSP,""TEST 3.5 FAILED, TEST ABORTED"
1820    PRINT "H.W. STATUS REG SHOULD RETURN 256 OR 1056, IT IS: ";Result
1830    STOP
1840  END IF
1850  DISP "HP-IB VERIFICATION     TEST 3.6"
1860  OUTPUT Analyzer;"DSP,""HP-IB VERIFICATION     TEST 3.6"""
1870  OUTPUT Analyzer;"LOC"
1880  OUTPUT Analyzer;"*ESR?"
1890  WAIT .2
1900  ENTER Analyzer;Result
1910  OUTPUT Analyzer;"CLE;PRES"
1920  IF Result<>64 THEN
1930    PRINT "TEST 3.6 FAILED, TEST ABORTED"
1940    OUTPUT Analyzer;"DSP,""TEST 3.6 FAILED, TEST ABORTED"""
1950    PRINT "EVENT STATUS REGISTER SHOULD RETURN 64, IT IS:";Result
1960    STOP
1970  END IF
1980  PRINT "TEST 3 Status Registers : PASSED"
1990  OUTPUT Analyzer;"DSP,""TEST 3 PASSED"""
2000  BEEP
2010  WAIT .2
2020  BEEP
2030  WAIT .2
2040  BEEP
2050  RETURN
```

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Table 2-3. HP-IB Operation Verification Program (Continued)

```
2060 Test4: !!!!
```

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HP 5372A PERFORMANCE TEST RECORD (Page 1 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Repair/Work Order No. _____

Serial Number: _____

Temperature: _____

Test Performed By: _____

Relative Humidity: _____

Date: _____

Post-Calibration Test: ☐

Notes: _____

Pre-Calibration Test: ☐

Recommended Instrument	Test	Results Minimum	Actual	Maximum
	Operation Verification	**Pass** _____	**Fail** _____	
	HP-IB Verification	**Pass** _____	**Fail** _____	
	CHANNEL A AND B TESTS			
	Frequency Range/ Dynamic Range			
3325A	.125 Hz, 45 mVp-p, 0 V Offset — Freq: Chan A	121.000 000 000 mHz	_____	129.000 000 000 mHz
	Chan B	121.000 000 000 mHz	_____	129.000 000 000 mHz
3325A	.125 Hz, 2 Vp-p, 0 V Offset, (Square Wave) — Freq: Chan A	124.930 000 000 mHz	_____	125.070 000 000 mHz
	Chan B	124.930 000 000 mHz	_____	125.070 000 000 mHz
8663A	500 MHz, 15 mVrms (45 mVp-p), 0 V Offset — Freq: Chan A	499.999 999 90 MHz	_____	500.000 000 10 MHz
	Chan B	499.999 999 90 MHz	_____	500.000 000 10 MHz
8663A	500 MHz, 10 dBm (2 Vp-p), 0 V Offset — Freq: Chan A	499.999 999 90 MHz	_____	500.000 000 10 MHz
	Chan B	499.999 999 90 MHz	_____	500.000 000 10 MHz
	Signal Operating Range			
3325A	10 MHz, 2 Vp-p, 1 V Offset — Freq: Chan A	9.999 999 800 MHz	_____	10.000 000 200 MHz
	Chan B	9.999 999 800 MHz	_____	10.000 000 200 MHz
3325A	10 MHz, 2 Vp-p, –1 V Offset — Freq: Chan A	9.999 999 800 MHz	_____	10.000 000 200 MHz
	Chan B	9.999 999 800 MHz	_____	10.000 000 200 MHz

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HP 5372A PERFORMANCE TEST RECORD (Page 2 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Recommended Instrument	Test		Results Minimum	Actual	Maximum
	CHANNEL A AND B TESTS (Continued)				
	Manual Trigger Accuracy				
3325A	10 KHz 1 Vp-p Variable Offset	Chan A		Max. Trigger Level _____ Min. Trigger Level _____	
		Chan A Trigger Level Accuracy*	–29.98 mV	_____	+29.98 mV
		Chan B		Max. Trigger Level _____ Min. Trigger Level _____	
		Chan B Trigger Level Accuracy*	–29.98 mV	_____	+29.98 mV
	Auto Trigger Frequency Range/Dynamic Range/ Accuracy/Signal Operating Range				
3325A	1 KHz 200 mVp-p 0 V Offset	PkAmp Chan A Max. Min.	 +60 mV –140 mV	 _____ _____	 +140 mV –60 mV
		PkAmp Chan B Max. Min.	 +60 mV –140 mV	 _____ _____	 +140 mV –60 mV
3325A	1 KHz 2 Vp-p 1 V Offset	PkAmp Chan A Max. Min.	 +1.6 V –400 mV	 _____ _____	 +2.4 V +400 mV
		PkAmp Chan B Max. Min.	 +1.6 V –400 mV	 _____ _____	 +2.4 V +400 mV

* TRIGGER LEVEL ACCURACY = $\left[\frac{\text{MAX. TRIGGER LEVEL} + \text{MIN. TRIGGER LEVEL}}{2}\right] - 998\text{mV}$

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HP 5372A PERFORMANCE TEST RECORD (Page 3 of 6)

HEWLETT-PACKARD MODEL 5372A FREQUENCY AND TIME INTERVAL ANALYZER					
Recommended Instrument	Test		Results Minimum	Actual	Maximum
	CHANNEL A AND B TESTS (Continued)				
3325A	1 KHz 2 Vp-p –1 V Offset	PkAmp Chan A Max. Min.	 –400 mV –2.4 V	 _____ _____	 +400 mV –1.6 V
		PkAmp Chan B Max. Min.	 –400 mV –2.4 mV	 _____ _____	 +400 mV –1.6 mV
8663A	200 MHz 71 mVrms (200 mVp-p) 0 V Offset	PkAmp Chan A Max. Min.	 +60 mV –140 mV	 _____ _____	 +140 mV –60 mV
		PkAmp Chan B Max. Min.	 +60 mV –140 mV	 _____ _____	 +140 mV –60 mV
8663A	200 MHz 10 dBm (2 Vp-p) 0 V Offset	PkAmp Chan A Max. Min.	 +600 mV –1.4 V	 _____ _____	 +1.4 V –600 mV
		PkAmp Chan B Max. Min.	 +600 mV –1.4 V	 _____ _____	 +1.4 V –600 mV
	Sensitivity/ Minimum Pulse Width (optional)				
8131A	1.0 ns Pulse 100.0 ns Period 45 mVp-p 0 V Offset	±TI Chan A	700 ps	_____	1.3 ns
8131A	1.5 ns Pulse 100.0 ns Period 45 mVp-p 0 V Offset	±TI Chan A	1.2 ns	_____	1.8 ns

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HP 5372A PERFORMANCE TEST RECORD (Page 4 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Recommended Instrument	Test		Results Minimum	Actual	Maximum
	EXTERNAL ARM TESTS*				
	Frequency Range/ Dynamic Range				
3325A	1 Hz 140 mVp-p 0 V Offset	Gate Time	993.000 000 0 ms	_____	1.007 000 000 0 s
3325A	1 Hz 5 Vp-p 0 V Offset (Square Wave)	Gate Time	993.000 000 0 ms	_____	1.007 000 000 0 s
8663A	100 MHz 50 mVrms (140 mVp-p) 0 V Offset	Gate Time	99.8 ns	_____	100.2 ns
	Signal Operating Range				
3325A	10 MHz 5 Vp-p 2.5 V Offset	Gate Time	199.8 ns	_____	200.2 ns
3325A	10 MHz 5 Vp-p –2.5 V Offset	Gate Time	199.8 ns	_____	200.2 ns
	Trigger Accuracy				
3325A	Variable Offset	Ext Arm		Max. Trigger Level _____ Min. Trigger Level _____	
		Ext Arm Trigger Level Accuracy†	–20 mV	_____	+20 mV
	Sensitivity/Minimum Pulse Width				
8161A	5.0 ns Pulse 200.0 ns Period 140 mVp-p 0 V Offset (Square Wave)	Gate Time	199.8 ns	_____	200.2 ns

* A 50Ω feedthrough termination must be connected to the External Arm input.

† TRIGGER LEVEL ACCURACY = $\left\{\frac{\text{MAX. TRIGGER LEVEL} + \text{MIN. TRIGGER LEVEL}}{2}\right\} - 100\text{mV}$

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HP 5372A PERFORMANCE TEST RECORD (Page 5 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Recommended Instrument	Test		Results Minimum	Actual	Maximum
	OPTION 060/090 REAR PANEL EXTERNAL ARM TESTS*				
	Frequency Range/Dynamic Range				
3325A	1 Hz 280 mVp-p 0 V Offset	Gate Time	993.000 000 0 ms	_____	1.007 000 000 0 s
3325A	1 Hz 5 Vp-p 0 V Offset (Square Wave)	Gate Time	993.000 000 0 ms	_____	1.007 000 000 0 s
8663A	100 MHz 100 mVrms (280 mVp-p) 0 V Offset	Gate Time	99.8 ns	_____	100.2 ns
	Signal Operating Range				
3325A	10 MHz 5 Vp-p 2.5 V Offset	Gate Time	199.8 ns	_____	200.2 ns
3325A	10 MHz 5 Vp-p –2.5 V Offset	Gate Time	199.8 ns	_____	200.2 ns
	Trigger Accuracy				
3325A	Variable Offset	Ext Arm		Max. Trigger Level _____ Min. Trigger Level _____	
		Ext Arm Trigger Level Accuracy†	–20 mV	_____	+20 mV
	Sensitivity/ Minimum Pulse Width				
8161A	5.0 ns Pulse 200.0 ns Period 280 mVp-p 0 V Offset (Square Wave)	Gate Time	199.8 ns	_____	200.2 ns

* A 50Ω feedthrough termination must be connected to the External Arm input.

† TRIGGER LEVEL ACCURACY = $\left[\frac{\text{MAX. TRIGGER LEVEL} + \text{MIN. TRIGGER LEVEL}}{2}\right]$ 100mV

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HP 5372A PERFORMANCE TEST RECORD (Page 6 of 6)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Recommended Instrument	Test	Results		
		Minimum	Actual	Maximum
	OPTION 030/090 **CHANNEL C TESTS** **Frequency Range/ Dynamic Range/ Sensitivity**			
8663A	100 MHz –25 dBm Freq: Chan C	99.999 999 96 MHz	_____	100.000 000 04 MHz
	100 MHz +7 dBm Freq: Chan C	99.999 999 98 MHz	_____	100.000 000 02 MHz
	1.5 GHz –25 dBm Freq: Chan C	1.499 999 999 7 GHz	_____	1.500 000 000 3 GHz
	1.5 GHz +7 dBm Freq: Chan C	1.499 999 999 7 GHz	_____	1.500 000 000 3 GHz
	1.55 GHz –20 dBm Freq: Chan C	1.549 999 999 7 GHz	_____	1.550 000 000 3 GHz
	1.55 GHz +7 dBm Freq: Chan C	1.549 999 999 7 GHz	_____	1.550 000 000 3 GHz
	2.0 GHz –20 dBm Freq: Chan C	1.999 999 999 6 GHz	_____	2.000 000 000 4 GHz
	2.0 GHz +7 dBm Freq: Chan C	1.999 999 999 6 GHz	_____	2.000 000 000 4 GHz

3 ADJUSTMENT PROCEDURES

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3

ADJUSTMENT PROCEDURES

3-1. INTRODUCTION

This chapter describes the adjustments required to maintain the HP 5372A within specifications. These adjustments should be performed when required, such as: (1) when the instrument fails any of the performance tests, (2) when a component or part that may affect adjustments has been repaired or replaced, (3) for periodic maintenance of the A15 Oven Oscillator, or (4) for visual improvement of the front-panel CRT display.

Except for the power supply adjustment procedures, which should be performed before any repairs are made to the instrument, the order in which the adjustments are performed is not critical. However, the *A2 Input Amplifier Adjustments* must be performed in the order presented.

3-2. SAFETY CONSIDERATIONS

Although this instrument has been designed in accordance with international safety standards, this section contains information, cautions, and warnings which must be followed to ensure safe operation and to retain the instrument in safe condition. Service adjustments should be performed only by a qualified service person.

WARNING

THE AC POWER CIRCUITS TO TRANSFORMER T1 AND THE A12 MOTHERBOARD ARE ALWAYS ENERGIZED WHEN THE INSTRUMENT IS CONNECTED TO AC MAINS REGARDLESS OF THE SETTING OF THE FRONT-PANEL POWER SWITCH (STBY-ON). THE +25 VDC (UNREGULATED) ON THE A12 MOTHERBOARD, THE UNREGULATED DC VOLTAGE TO THE A7 PROCESSOR BOARD (BACK-UP RAMS U20 AND U56, REAL-TIME CLOCK U78), AND THE REGULATED DC VOLTAGE TO THE A15 OVEN OSCILLATOR HEATER ARE ALSO ALWAYS ON WHEN THE AC POWER IS CONNECTED TO THE HP 5372A, EVEN WHEN THE FRONT-PANEL STBY-ON SWITCH IS SET TO STBY. CONTACT WITH ANY OF THESE CIRCUITS CAN RESULT IN PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

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WARNING

BEFORE APPLYING POWER TO THE HP 5372A, THE INSTRUMENT AND ALL PROTECTIVE EARTH TERMINALS, EXTENSION CORDS, AUTOTRANSFORMERS, AND DEVICES CONNECTED TO THE INSTRUMENT SHOULD BE CONNECTED TO A PROTECTIVE EARTH GROUNDED SOCKET.

ANY INTERRUPTION OF THE PROTECTIVE GROUNDING CONDUCTOR INSIDE OR OUTSIDE THE INSTRUMENT OR OPENING THE PROTECTIVE EARTH TERMINAL WILL CAUSE A POTENTIAL SHOCK HAZARD THAT COULD RESULT IN PERSONAL INJURY. INTENTIONAL INTERRUPTION IS PROHIBITED.

WARNING

TO PREVENT CATHODE-RAY TUBE (CRT) IMPLOSION, AVOID HANDLING OR JARRING OF THE CRT DISPLAY UNIT. BREAKAGE OF THE CRT CAUSES A HIGH-VELOCITY SCATTERING OF GLASS FRAGMENTS (IMPLOSION). HANDLING THE CRT MUST BE DONE ONLY BY QUALIFIED MAINTENANCE PERSONNEL USING APPROVED SAFETY MASK AND GLOVES.

WARNING

ADJUSTMENTS IN THIS SECTION ARE PERFORMED WITH THE POWER ON AND THE SAFETY COVERS OFF. CONTACT WITH SEVERAL POINTS WITHIN THE INSTRUMENT CAN CAUSE SEVERE INJURY. ADJUSTMENTS SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL WHO ARE AWARE OF THE HAZARDS INVOLVED (FOR EXAMPLE, FIRE AND ELECTRICAL SHOCK).

NOTE

All adjustments should be done with a non-conductive alignment tool.

3-3. ADJUSTMENT LOCATIONS

Assembly locations are identified in *Figure 3-28,* found at the end of this chapter. Adjustment locations are identified in *Figures 3-20* through *3-27,* also found at the end of this chapter. Note that all adjustment procedures must be made with the instrument's top cover removed. Adhere to all safety warnings and cautions when performing maintenance with any of the instrument's covers removed.

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3-4. EQUIPMENT REQUIRED

The equipment required to perform the adjustment procedures are listed in *Tables 3-1* and *3-2*, *Adjustment Procedure Equipment Requirements* , and *Adjustment Procedure Accessory Requirements*, respectively. For your convenience, all required test equipment is also listed at the beginning of each individual adjustment procedure. Test equipment other than those specified may be substituted if they meet the specifications used in these adjustments.

Table 3-1. Adjustment Procedure Equipment Requirements

INSTRUMENT	REQUIRED CHARACTERISTICS	RECOMMENDED MODEL/PART NUMBER
Oscilloscope	275 MHz Bandwidth	HP 1725A
Oscilloscope	1-GHz Bandwidth Channel vs. Channel Display Trigger Delay	HP 54100A
Cesium Beam Frequency Standard	± 2 × 10E-12 Long-term Stability	HP 5061B
Synthesizer/ Function Generator	125 mHz to 10 MHz Frequency Range 45 mVp-p to 5 Vp-p Amp. Range –2.5V to +2.5V DC Offset Range	HP 3325A
Generator	1 Hz Resolution at 500 MHz 50 mVrms to 2 Vrms at 500 MHz 10 dBm Amplitude at 500 MHz	
Digital Multimeter	100 µV Resolution in True RMS AC 1 MΩ Input Impedance	HP 3458A
Universal Frequency Counter	Duty Cycle at 1 kHz Input 0.001 Degree Resolution	HP 5335A

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Table 3-2. Adjustment Procedure Accessory Requirements

Items Provided in Support Service Kit (HP Part Number 05372-67001)			
Item	**Qty**	**Description**	**HP Part Number**
A19 RF Extender Board	1	A1 Timebase Control Board A2 Input Amplifier Board A4 Interpolator Board	05372-60016
A20 Time/Event Extender Board	1	A3 Time Board A5 Event Board	05372-60023
A21 Microproc. Extender Board	1	A7 Processor Board	05371-60015
Cable Assembly	3	50Ω CI Phase Cable Assembly	05371-60229
Cable Assembly	1	POD Cable Assembly	05371-60222
Cable Assembly	1	Front-Panel Extension Cable Assembly	05371-60224
Probe Divider	1	10:1 Probe Divider	10020-67703
Adapter	1	N(m) to BNC(f) Adapter	1250-0780
Adapter	1	MC-MC RF Adapter	1250-0827
Adapter	1	3 SMC J Tee Adapter	1250-0837
Adapter	1	SMC(m)-to-SMA(m)	1250-1693

3-5. TOOLS REQUIRED

The following tools are also required to perform the adjustment procedures:

- Non-conductive Alignment Tool (Qty 1)
- 8mm Open-end Wrench (Qty 1)
- 6 mm Open-end Wrench (Qty 1)
- 5 mm Open-end Wrench (Qty 1)
- Soldering Iron (and accessories)
- BNC Tee-connector (Qty 1)
- HP 10503A 50Ω Cable [120 cm (48 in.) in length] terminated at each end with UG-88C/U BNC connectors (Qty 4).

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3-6. ADJUSTMENT PREPARATION

1. Before turning on the HP 5372A, insert two HP 54002 50 Ohm Input Pods into the front panel slots if these pods are not currently installed. (Perform this step only if the HP 5372A is not installed with option 060 or 090 rear-panel inputs).

2. Allow a one hour warm-up period for the HP 5372A and all the other equipment before beginning the adjustments. Turn on all test equipment power switches at this time.

> *NOTE*
> *If performing the A15 Oven Oscillator Adjustment procedure, allow at least a 24-hour warm-up period for the HP 5372A.*

3. Remove the top cover (MP25) and the two inner protective metal (MP5 and MP7) covers from the HP 5372A.

Table 3-3 is a list of adjustments procedures and identifies by reference designator the adjustable components involved.

> *NOTE*
> *Adjustment values may be recorded on the "HP 5372A Adjustment Record" provided at the end of this section.*

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Table 3-3. HP 5372A Adjustments

ASSEMBLY NAME	ADJUSTABLE COMPONENT REFERENCE DESIGNATOR	ADJUSTMENT DESCRIPTION
A9 Double Regulator	A9R14 A9R24	–5.2 Volt Power Supply –3.3 Volt Power Supply
A10 Triple Regulator	A10R4 A10R3	–15 Volt Power Supply +15 Volt Power Supply
A15 Oven Oscillator	A15C1	10 MHz Oscillator Frequency
A4 Interpolator		Interpolator Resolution
	R6, R19, R20, R24, R27, R31, R35, R38, R41, and R46	Interpolator 1 (Start)
	R60, R73, R74, R76, R78, R80, R82, R85, R92, and R97	Interpolator 2 (Stop)
	A4 Delay Jumpers	Interpolator CI Phase
A3 Time	R31	ZDT VCS Adjustment
A5 Event	VCS1 ADJ, VCS2 ADJ	ZDT VCS Adjustment
A2 Input Amplifier	A2R3 A2R1 A2R4 A2R2 A2R10 A2R12 A2R11 A2R13	Channel A Input Bias Loop Channel B Input Bias Loop Channel A DC Offset Channel B DC Offset Channel A Hysteresis Offset Channel A Hysteresis Width Channel B Hysteresis Offset Channel B Hysteresis Width
	A2R10 A2R11 A2R12 A2R13	Channel A DC Offset Refinement Channel B DC Offset Refinement Channel A Hysteresis Refinement Channel B Hysteresis Refinement
	A2R14 A2R15	Channel A DC Offset Control Gain Channel B DC Offset Control Gain
A17 CRT & Driver Board	A17 Pots	CRT Display

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3-7. ADJUSTMENT PROCEDURES

The following sections contain information necessary to perform all adjustments on the HP 5372A Frequency and Time Interval Analyzer. The adjustments should be performed in the order presented.

3-8. A9 DOUBLE AND A10 TRIPLE REGULATOR ADJUSTMENTS

Description: This procedure adjusts the –5.2V, –3.3V, and ±15V supply voltages to values specified in Table 3-3.

Equipment Used: HP 3458A Digital Multimeter

Test Setup: See *Figure 3-1.*

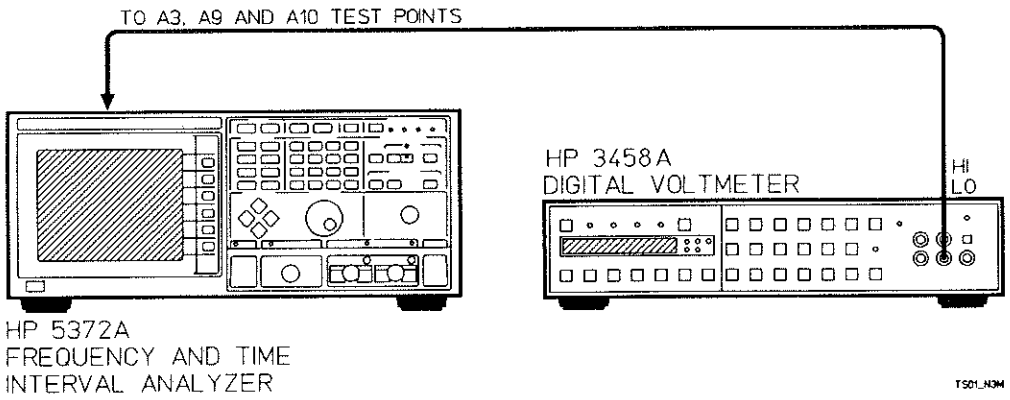

Figure 3-1. A9 and A10 Power Supply Adjustment Setup

3-9. HP 3458A Setup

1. Connect a Banana-to-BNC(f) adapter to the VOLTS (HI) and COM (LO) inputs.
2. Connect a BNC cable to the Banana-to-BNC(f) adapter.
3. Connect a BNC-to-Alligator clip adapter to the open end of the BNC cable.
4. Set the instrument to DC volts.

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3-10. Power Supply Adjustment Procedure

1. Connect the COM (LO) probe to either the A9 Double Regulator or A10 Triple Regulator Board GND test points located at the top edge of either board. See *Figures* 3-22 and 3-23.

2. Connect the HI test probe to the test points specified in *Table* 3-3, located at the top edge of the A9 Double Regulator and the A10 Triple Regulator Board. Adjust the appropriate potentiometers until the voltages are within the ranges specified in *Table* 3-4.

NOTE

The –3.3 V test point is on the A3 Time Board. This test point may be printed as –3.25 V, however, the correct voltage for this test point is –3.30 V.

Table 3-4. Power Supply Adjustment Limits

ASSEMBLY	TEST POINT	POTENTIOMETER	ADJUSTMENT RANGE
A3	–3.3 V	A9R24	–3.31V to –3.29V
A9	–5.2 V	A9R14	–5.21V to –5.19V
A10	–15 V	A10R4	–15.01V to –14.99 V
A10	+15 V	A10R3	+14.99V to +15.01V

3. Attach the test lead to the A10 Triple Regulator +5V test point and verify that the voltage is between +4.8 V dc and +5.2 V dc. If not, replace the A10 with a new assembly.

WARNING

REPLACE POWER SUPPLY COVER AFTER SATISFACTORY COMPLETION OF THE POWER SUPPLY ADJUSTMENTS. WITH THE POWER ON AND THIS COVER REMOVED, DANGEROUSLY HIGH VOLTAGES ARE PRESENT IN THE AREA OF THE CATHODE RAY TUBE (CRT) AND THE CRT DRIVER BOARD. KEEP COVER IN PLACE WHEN AT ALL POSSIBLE. POWER SHOULD BE OFF DURING COVER INSTALLATION.

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3-11. A15 OVEN OSCILLATOR ADJUSTMENT

Description: This procedure describes the adjustment of the internal 10 MHz Oven Oscillator to within specifications.

Equipment Used: HP 1725A Oscilloscope
House Standard Frequency (1,2,5, or 10 MHz)

Test Setup: See *Figure 3-2.*

> ***NOTE***
> *The A15 Oven Oscillator requires a 24 hour warm-up period prior to performing this adjustment.*

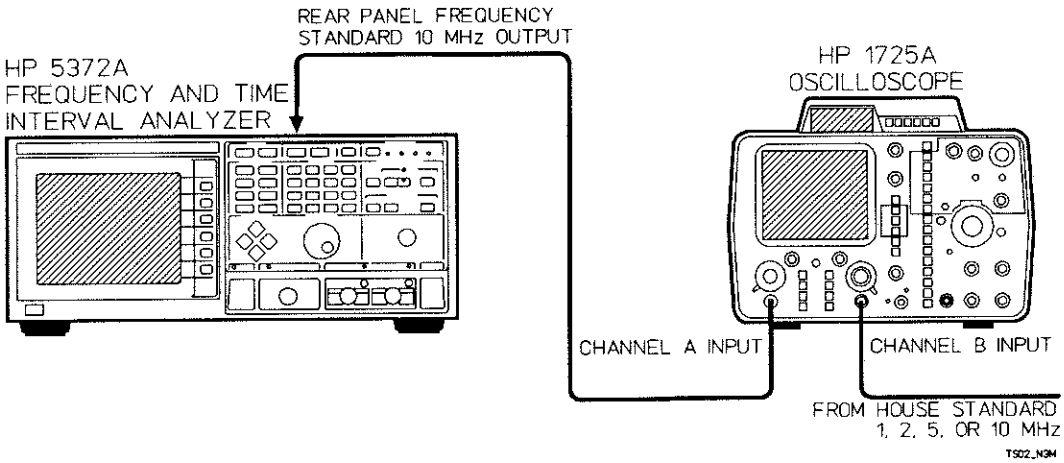

Figure 3-2. A15 Oven Oscillator Adjustment Setup

3-12. HP 1725A Oscilloscope Setup

1. Set Channel A vertical input termination to 50Ω.
2. Set the Channel A vertical sensitivity to 0.5 Volt/division.
3. Set the horizontal sweep to .01 µs/division.
4. Connect a 50Ω BNC cable from Channel A of the oscilloscope to the FREQUENCY STANDARD OUTPUT located at the rear panel of the HP 5372A.
5. Set VERT DISPLAY to A and MAIN TRIGGERING to EXT.
6. Using a 50Ω BNC cable, connect a house standard (1,2,5, or 10 MHz reference frequency) to EXT TRIG of the oscilloscope.

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3-13. A15 Oven Oscillator Adjustment Procedure

7. Remove the 5372A top cover and locate the adjustment, A15C1, located on top of the A15 Oven Oscillator (see *Figure 3-24*).

8. Adjust A15C1 (see *Figure 3-24*) until the horizontal movement of the signal on the oscilloscope display is minimized or stopped. Increase the horizontal resolution of the oscilloscope for greater accuracy.

9. By timing the horizontal movement (in cm/second) of the signal on the oscilloscope display with a stop watch, the approximate offset can be determined based on oscilloscope sweep speed. For example, if the trace moves 5 cm in 10 seconds and the sweep speed is 0.01 µs/div, the A15 Oven Oscillator's output is within 5×10^{-9} of the house standard reference frequency.

$$\text{Offset} = \frac{\text{movement in cm}}{\text{time in seconds for movement}} \times \frac{\text{sweep speed in seconds}}{\text{division}}$$

For example, a sweep speed of 0.1 µs/div and a drift of 1 cm/sec would result in an offset of

$$\text{Offset} = \frac{1 \text{ cm}}{\text{seconds}} \times 0.1 \frac{\mu\text{s}}{\text{div}} - 1 \times 10^{-7}$$

10. Determine the offset using the above formula. The offset must be less than 5×10^{-10}. This means that using a sweep speed of 0.01 us/div and observing the movement for 10 seconds, the drift must be less than 0.5 cm.

3-14. A4 INTERPOLATOR BOARD ADJUSTMENTS

There are two main adjustments for the A4 Interpolator Board: the Resolution Adjustment, and the CI-to-CLKA Phase Adjustment.

3-15. A4 Interpolator Resolution Adjustment

Description: This procedure adjusts the Interpolator 1 (Start) and Interpolator 2 (Stop) resolution. This is accomplished by adjusting the IT1 and IT2 delay of each "flash interpolation" flip-flop to exactly 200 ps.

Equipment Used:

HP 8663A Synthesized Signal Generator
05372-60016 Extender Board
HP Part Number 05371-60229 CI Phase Cable Assembly
HP Part Number 1250-0780 N(m)-to-BNC(f) Adapter

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Test Setup: See *Figure 3-3.*

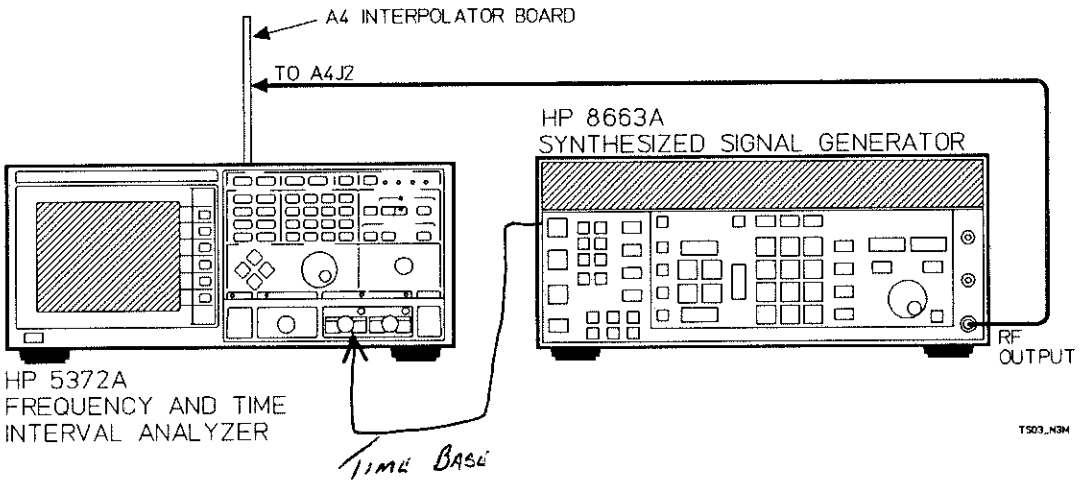

Figure 3-3. Interpolator Resolution Adjustment Setup

3-16. HP 8663A SETUP

1. Press FREQ key, enter "499.983 333", and press MHz key.
2. Press AMPTD key, enter "10", and press +dBm key.
3. Connect the N-to-BNC adapter to the RF OUTPUT connector.
4. Connect the CI phase cable assembly to the N-to-BNC adapter.
5. Connect a BNC cable from the rear panel 10 MHz of the HP 8663A to the Channel A input pod of the HP 5372A.

3-17. HP 5372A SETUP

CAUTION

DO NOT ALLOW THE CASING OF ANY SMC CONNECTORS TO CONTACT PINS OR CONDUCTORS EXPOSED DURING THIS PROCEDURE. THIS CAN LEAD TO A SHORT CIRCUIT CAUSING DAMAGE TO THE HP 5372A.

1. Set the front-panel STBY-ON power switch from ON to STBY, and disconnect the power cord from the primary power source.
2. Unscrew the SMC cable from A4J2 on the A4 Interpolator Board.

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3. Remove the A4 Interpolator Board from its slot in the A12 Motherboard.
4. Insert the 05372-60016 RF Extender Board in the A4 card guide and insert in the A12 Motherboard connector.
5. Insert the A4 Interpolator Board into the Extender Board.
6. Connect the cable from the HP 8663A to A4J2 on the A4 Interpolator Board.
7. Connect the power cord to the primary power source, and turn the front-panel STBY-ON power switch from STBY to ON.
8. Press TEST key.
9. Move the cursor to Test 24, "Calibrate Interps".
10. Press the **Run** `softkey.`
11. The screen should display a staircase pattern as shown in *Figure 3-4*. A potentiometer is specified at each of the nine transition bands. Each potentiometer controls the steps on both sides of the transition band.

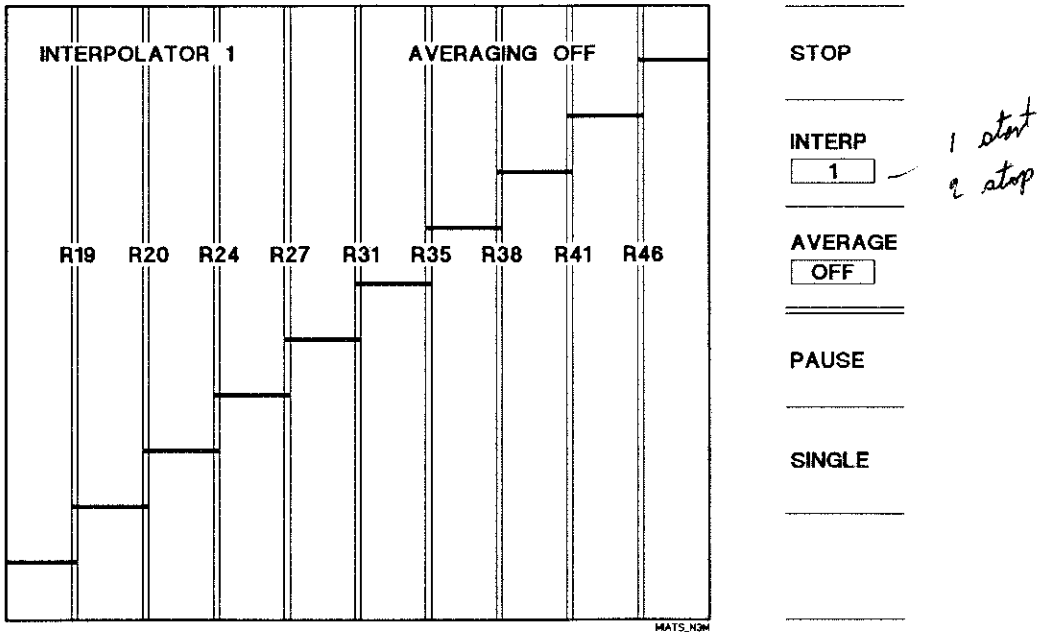

Figure 3-4. Interpolator Adjustment Test Screen (With Averaging Off)

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3-18. INTERPOLATOR 1 (START) ADJUSTMENT PROCEDURE

NOTE

See Figure 3-21 for component locations.

1. A4R6 controls the CI to IT phase for the Interpolator I (Start). Adjust A4R6 to make the first and last steps of the staircase about the same width.

2. Adjust the following Interpolator 1 (Start) potentiometers to make all the steps of the staircase about the same length. The step transition points should fall in the indicated bands shown on the display.

   A4: R19 R20 R24 R27 R31 R35 R38 R41 R46 (and R6 if necessary)

3. Press the **AVERAGE OFF** softkey. (Sets to **AVERAGE ON.**)

4. Refine the adjustments made in Step 2 by adjusting the same potentiometers to move all the steps completely into the inner horizontal band, which is designated by the two solid horizontal lines. The steps may randomly extend outside this inner horizontal band, but should not extend far outside the outer horizontal band, which is designated by the two dotted horizontal lines (see notes below).

NOTE

Each pot controls two steps. Adjust A4R6 to first balance the first and tenth steps at the edges of the screen. Then adjust the pots stated above. Adjust A4R19 to get the left most step into the band, even though this may put the second leftmost step out of the band. Then adjust A4R20 to put the second leftmost step into the band even though this may put the thirdmost step out of the band. Continue this until all the steps are into the band.

NOTE

This adjustment sequence may have to be repeated several times to obtain the correct results.

3-19. INTERPOLATOR 2 (STOP) PROCEDURE

1. Press the **AVERAGE ON** softkey. (Sets to **AVERAGE OFF.**)

2. Press the Interpolator 2 (Stop) (**Interp 1**) softkey. (Sets to **Interp 2.**)

3. A4R60 controls the CI to IT phase for the Interpolator 2 (Stop). Adjust A4R60 to make the first and last steps of the staircase about the same width.

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4. Adjust the following Interpolator 2 (Stop) potentiometers to make all the steps of the staircase about the same length. The step transition points should fall in the indicated bands shown on the display.

   A4: R73 R74 R76 R78 R80 R82 R85 R92 R97 (and R60 if necessary)

5. Press the **AVERAGE OFF** softkey. (Sets to **AVERAGE ON**.)

6. Refine the adjustments made in Step 4 by adjusting the same potentiometers to move all the steps completely into the inner horizontal band, which is designated by the two solid horizontal lines. The steps may randomly extend outside this inner horizontal band, but should not extend far outside the outer horizontal band, which is designated by the two dotted horizontal lines.

   NOTE

   Each pot controls two steps. Adjust A4R60 to first balance the first and tenth steps at the edges of the screen. Then adjust the pots stated above. Adjust A4R73 to get the left most step into the band, even though this may put the second leftmost step out of the band. Then adjust A4R74 to put the second leftmost step into the band even though this may put the thirdmost step out of the band. Continue this until all the steps are into the band.

   NOTE

   This adjustment sequence may have to be repeated several times to obtain the correct results.

7. Press the **STOP** softkey.

8. Set the HP 5372A STBY-ON power switch from ON to STBY, disconnect the power cord from the primary power source.

9. Disconnect the SMC cable from the A4. Remove the A4 assembly from the extender board. Remove the extender board from the A4 slot in the A12 Motherboard. If the Interpolator CI-to-CLKA Phase Adjustment is to be done next, do not remove the Extender Board.

10. Insert the A4 Interpolator Board into its A12 Motherboard slot. Reconnect the SMC Clock cable to the A4J2 connector. It may be necessary to temporarily remove the A1 Time Base Control board to reconnect SMC clock cable to the A4 board.

3-20. Interpolator CI-to-CLKA Phase Adjustment

Description: This adjustment allows the phase relationship between the CI edge (used as the latch signal for the Time Counter) and the edge of the next 500 MHz reference frequency (CLK A) to be set. This

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ensures that when the CI edge arrives at the Time Counter, the next clock edge will increment the counter and the new count value will be latched and then stored in the Time Counter RAM. This eliminates the chance of storing a wrong count value in memory or missing a clock edge.

Equipment Used:

HP 54100-series Digitizing Oscilloscope
3 each BNC(m)-to-SMC(f) 50Ω Cables
(HP Part Number 05371-60229)
Test Probe, 10:1, 500 Ohm with SMC(m) connector
(HP Part Number 10020-67703)
Adapter, SMC(m) to SMC(m) to SMC(m) tee
(HP Part Number 1250-0837)
Adapter, SMC(m) to SMC(m) straight
(HP Part Number 1250-0827)
Soldering Iron (and four 0 Ohm Resistors)
Extender Card (HP Part Number 05372-60016)

3-21. HP 5100A SETUP

CAUTION

DO NOT REPLACE AN INPUT POD WHILE THE 5372A IS ENERGIZED. ALWAYS SET ANALYZER'S FRONT-PANEL STBY-ON POWER SWITCH TO STBY BEFORE REMOVING OR INSERTING A 54001A, 54002A, OR 54003A INPUT POD. DAMAGE TO THE POD CAN RESULT FROM NOT FOLLOWING THIS PROCEDURE.

NOTE

Allow the 54100A at least 20 minutes to warmup before proceeding with this procedure.

1. Install 50Ω input pods (HP 54002A) for both channel 1 and channel 2 inputs of the 54100A.
2. Attach a BNC(m)-to-SMC(f) 50Ω cable (HP Part Number 05372-60229) to the 54100A channel 1 input.
3. Attach a BNC(m)-to-SMC(f) 50Ω cable (HP Part Number 05372-60229) to the 54100A channel 2 input.
4. Attach a BNC(m)-to-SMC(f) 50Ω cable (HP Part Number 05372-60229) to the 5372A rear-panel 10 MHz FREQUENCY STANDARD OUTPUT.
5. Attach the opposite ends of all three cables to the SMC tee adapter. The 10 MHz frequency from the 5372A rear panel connects to the center of the Tee-connector and is sent to both oscilloscope channels. This procedure is used to calibrate out any offsets caused by cable lengths.

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6. Press AUTO-SCALE key.
7. Set Offset, Triggering and Sensitivity as follows:
   a. Set Channel 1 Offset to 0.
   b. Set Channel 1 VOLTS/DIV to 200 mv/div.
   c. Set Channel 2 Offset to 0.
   d. Set Channel 2 VOLTS/DIV to 200 mv/div.
   e. Set Channel 1 Trigger Level to 0.
   f. Set Channel 2 Trigger Level to 0.
8. Press the **More** softkey at the bottom of the CRT display until the **Display** softkey is menu selection option.
9. Press **Display** softkey at bottom of CRT display.
   a. Set Display Mode to "Averaged".
   b. Set NUMBER OF AVERAGES to "16".
   c. Set Split Screen to "Off".
10. Press **More** softkey at bottom of CRT display.
11. Press **Utility** softkey at bottom of CRT display.
12. Press **Cal Menu** softkey at right of CRT display.
13. Press **TRIG DELAY Chan 1** softkey at the right of CRT display.
14. Press **Expand Waveform** softkey at right of CRT display until a resolution of 500 ps/div is obtained.
15. Rotate the 54100A RPG (rotary knob) until rising edge of channel 1 input signal crosses the X-axis at the grid origin. See *Figure* 3-5.

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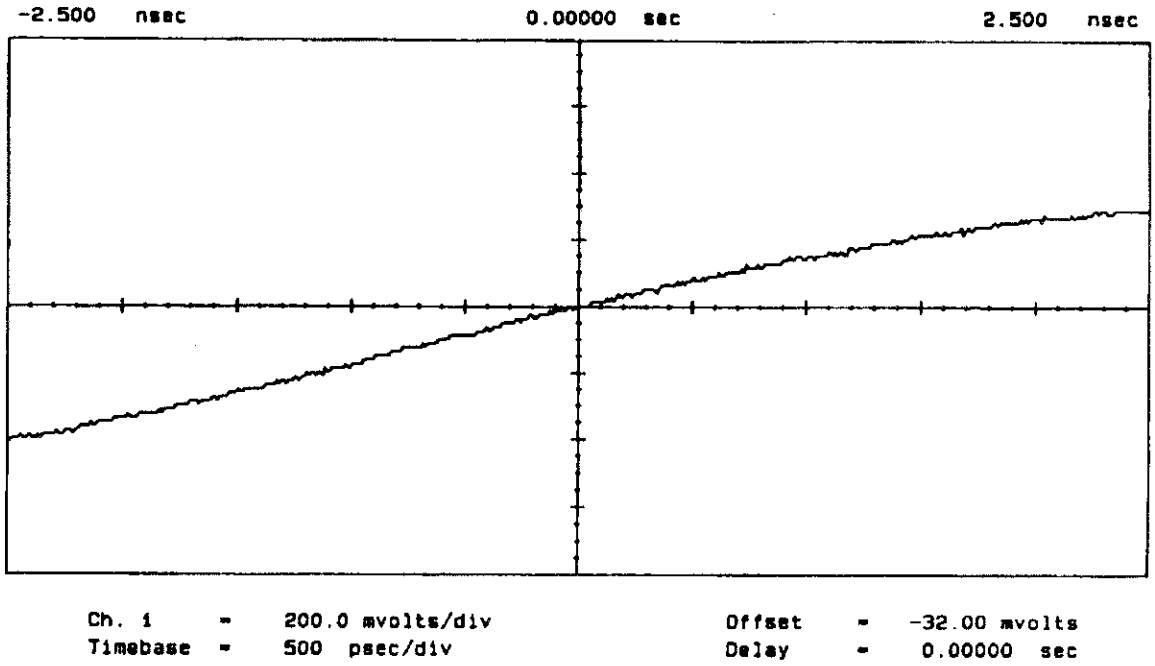

Figure 3-5. Channel 1 Signal Positioning on 54100A CRT Display

16. Press the **TRIG DELAY Chan 1** softkey at right of CRT display. **SKEW Ch to Ch** should replace **TR G~DEL Y~Ch n**~1 softkey display.

17. Press **Expand Waveform** softkey at right of CRT display until a resolution of 500 ps/div is obtained.

18. Rotate the 54100A RPG (rotary knob) to adjust skew. Continue adjusting until the rising edge of channel 2 input signal also crosses the X-axis at the grid origin. *This zeroes the skew that existed between the input channels of the 54100A Oscilloscope.* See *Figure 3-6.*

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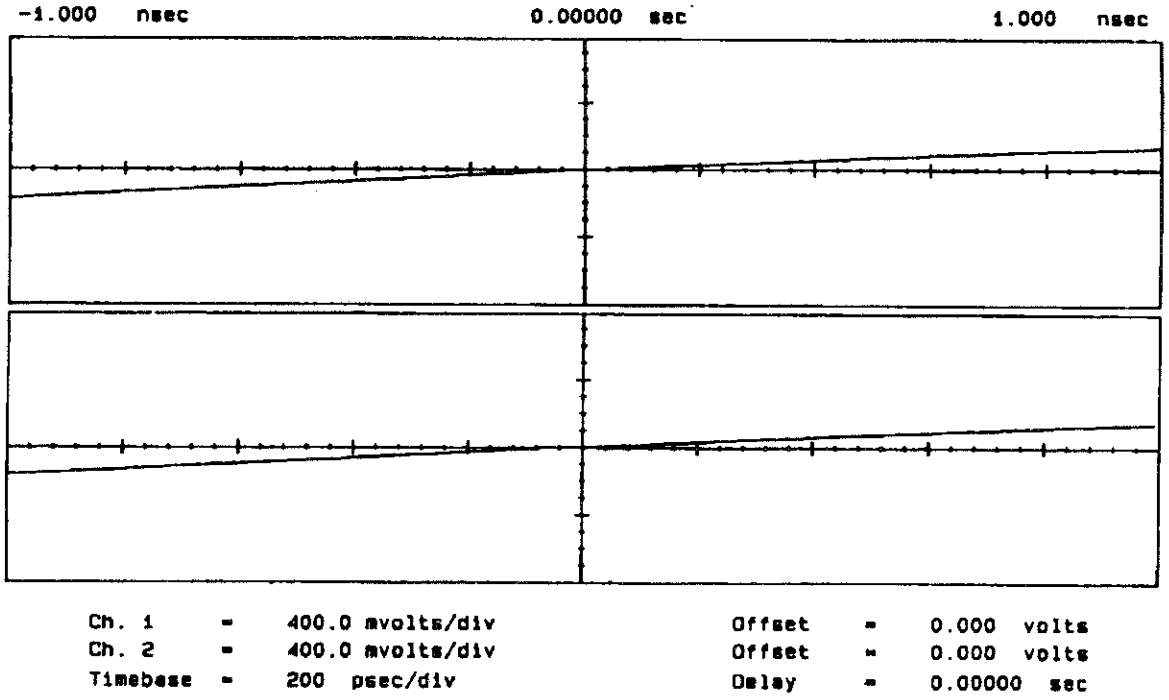

Figure 3-6. Zero Skew Between Channel 1 & 2 Waveform

19. Press the **SKEW Ch to Ch** softkey at right of CRT display.
TRIG DELAY Chan 2 should replace **SKEW Ch to Ch** softkey display.

20. Press **Expand Waveform** softkey at right of CRT display until a resolution of 500 ps/div is obtained.

21. Rotate the 54100A RPG (rotary knob) until the rising edge of channel 2 input signal crosses the x-axis at the grid origin.

22. Press **Exit Cal Menu** softkey at the right of CRT display.

23. Press **More** softkey at bottom of CRT display.

24. Adjust the 54100A Oscilloscope to the following settings:

```
Chan 1 Softkey
  Ch1 Mode: Normal
  Chan 1 Display: On
  VOLTS/DIV: 100 mV/div
  Offset: 0.000 V
Chan 2 Softkey
  Ch2 Mode: Normal
  Chan 2 Display: On
  VOLTS/DIV: 100 mV/div
  Offset: -1.200 V
```

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```
Timebse Softkey
  SEC/DIV: 500 ps/div
  Delay: 0 s
  Delay Ref at: Center
  : Trg'd Sweep

Trigger Softkey
   Trigger Mode: Edge
   Trig Src: Chan 2
   Trig Level: -1.2V
   Slope: Positive
   Holdoff: Time = 70.000 ns
Display Softkey
  Display Mode: # Averaged = 16
  Split Screen: Off
   Graticle: Grid
Probes Softkey
   Chan 1 PROBE ATTEN: 1.000
   Chan 2 PROBE ATTEN: 10.00
```

25. Disconnect all BNC(m)-to-SMC(f) 50Ω cables from the SMC tee adapter.

26. Connect the SMC(m)-to-SMC(m) adapter to the channel 1 input cable.

27. Connect the 10:1 500Ω probe (HP Part Number 10020-67703) to the channel 2 input cable.

28. Disconnect the cable connected to the 5372A rear panel.

3-22. HP 5372A SETUP

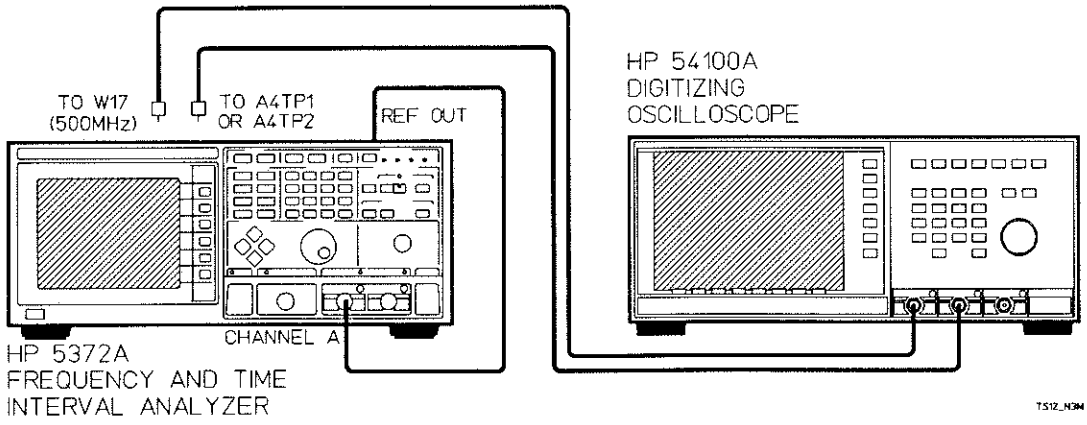

Figure 3-7. A4 Interpolator CI-to-CLKA Phase Adjustment Setup

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CAUTION

DO NOT ALLOW THE CASING OF ANY SMC CONNECTORS TO CONTACT PINS OR CONDUCTORS EXPOSED DURING THIS PROCEDURE. THIS CAN LEAD TO A SHORT CIRCUIT CAUSING DAMAGE TO THE HP 5372A. USE PAPER TO KEEP THESE CONNECTORS ISOLATED.

1. Set the front-panel STBY-ON power switch from ON to STBY, and disconnect the power cord from the primary power source.
2. Remove SMC cable, W16, from A4J2 of the A4 Interpolator Board (This cable routes a 500 MHz reference frequency, CLKA, from the A14 board to the A4 board).
3. Remove the A4 Interpolator Board.
4. Remove SMC cable, W17, from A3J2 of the A3 Time Board (This cable routes a 500 MHz reference frequency, CLK B, from the A14 board to the A3 board). Connect A3J2 to the adapter on the 54100A Oscilloscope channel 1 input cable.
5. Remove extender board cable, W3, from J4 of the 05372-60016 A19 RF Extender Board.
6. Place the A19 RF Extender Board in the A4 slot on the A12 Motherboard.
7. Connect SMC cable, W16, to J4 of the A19 Extender Board.
8. Insert the A4 assembly into the extender board.
9. Connect extender board cable, W3, to A4J2 of the A4 Interpolator Board.
10. Connect the power cord to the primary power source, and turn the STBY-ON power switch from STBY to ON.

NOTE

Disregard any CRT failure messages from the Power-up Self-Test.

11. Connect the 10:1 500Ω probe (HP Part Number 10020-67703) from 54100A channel 2 input cable to A4TP1 (CI1).
12. Press PRESET key.
13. Move the cursor to the "Pre-trigger" field, and then press the **`Pretrigger On softkey.`**
14. Press Pre-trigger key.

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15. Press the **External~Arm** softkey.

> *NOTE*
> *Steps 13 through 15 put the HP 5372A count hardware in a "free-run" mode.*

16. Press INPUT key.

17. Move the cursor to the "Chan A: Mode" field.

18. Press the **Manual Trig** softkey. Set the trigger level to 0 Volts if not set already.

19. Connect a BNC cable from the 5372A rear-panel FREQUENCY STANDARD 10 MHz OUTPUT signal to the 5372A CHANNEL A input pod.

3-23. INTERPOLATOR 1 (START) CI1-to-CLKA PHASE ADJUSTMENT PROCEDURE

1. The 54100A Oscilloscope displays the 500 MHz reference frequency (CLK A) on input channel 1, and the CI1 leading edge on input channel channel 2. The oscilloscope requires a few minutes to display the waveforms, which should eventually be similar to *Figure 3-8*.

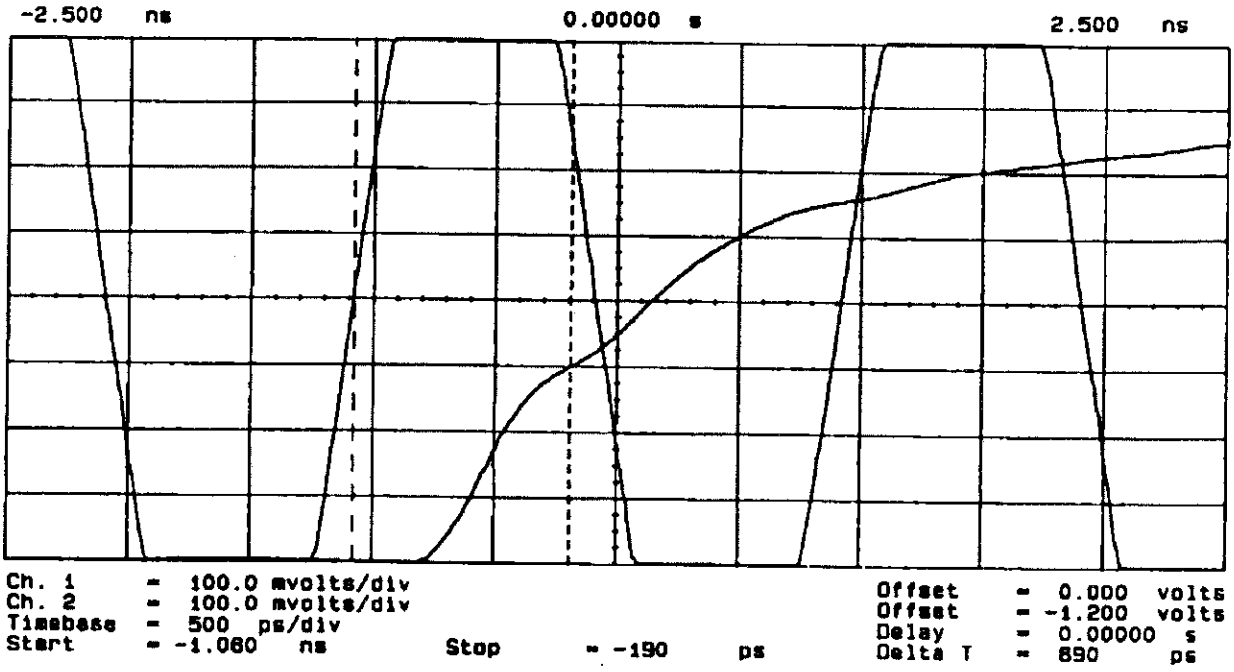

Figure 3-8. Oscilloscope Display of CI1 and CLKA

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NOTE

The 54100A Oscilloscope is used to determine the time between the rising edge of the CI1 signal and the next rising edge of the 500 MHz reference frequency, CLKA. This is accomplished by selecting the **Delta t** *softkey on the oscilloscope.*

2. Press the **More** softkey (at the bottom of the HP 54100A CRT display) until **Delta T** is a menu selection option, and then press the **Delta T** softkey.

3. Set T markers to On.

4. Using the 54100A's rotary knob, set the STOP MARKER on the rising edge of the CI1 signal on channel 2 at –1.3 Volts

5. Using the 54100A's rotary knob, set the START MARKER on the rising edge of the 500 MHz reference frequency (CLK A) on channel 1 at 0 Volts. (The START MARKER must be placed to the left of the STOP MARKER.)

6. Read "Delta t" displayed in the lower right-hand corner of the 54100A CRT display and refer to *Table 3-5* to detemine if the CI1-to-CLKA delay is within limits. If Interpolator 1 (Start) delay is within limits ("Delta t" is between 200 ps and 1400 ps), no change is required. In this case, skip to section 3-23. If the Interpolator 1 (Start) delay is NOT within limits, refer to the "Configuration Required" column of *Table 3-5* and continue.

Table 3-5. Interpolator 1 (START) CI1-to-CLKA Phase Adjustment

Measured Time Delay Between CI1 or CI2 and 500 MHz Reference Clock (CLKA)	Current Configuration	Configuration Required	Description
1400 ps<Measured Time<1800 ps	2 3	1 2	Delay too long.
200 ps<Measured Time<1400 ps	1,2,3	No change necessary.	Delay is correct.
–200 ps<Measured Time<200 ps	1 2	2 3	Delay too short

7. Set the HP 5372A STBY-ON power switch to STBY.

8. Remove the SMC cable and test probe from A4TP1, of the A4 Interpolator Board. Remove the A4 Interpolator Board from the A19 Extender Board.

9. Locate Interpolator 1 (Start) delay jumpers W1-W5 by referring to *Figure 3-9*.

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10. Refer to the actual A4 Interpolator Board and *Figure 3-9* to determine which delay configuration currently exists in the Interpolator 1 (Start) circuit.

11. Desolder and remove the 0Ω resistor(s) (i.e., delay jumpers W1-W5) used for the current delay configuration. Solder the required delay configuration using 0Ω resistors as delay jumpers.

12. Return the A4 Interpolator Board into the extender board already inserted into slot A4 of the A12 Motherboard. Reconnect the SMC cable to the A4 Interpolator Board. Insert the test probe into A4TP1.

13. Set the HP 5372A STBY-ON power switch to ON, and then press Restart key.

14. The 54100A Oscilloscope should again display the CI1 and 500 MHz reference frequency (CLK A) signals as shown in *Figure 3-8*. Return to Step 2. Repeat this process until the measured time delay is within the limits listed in *Table 3-5*.

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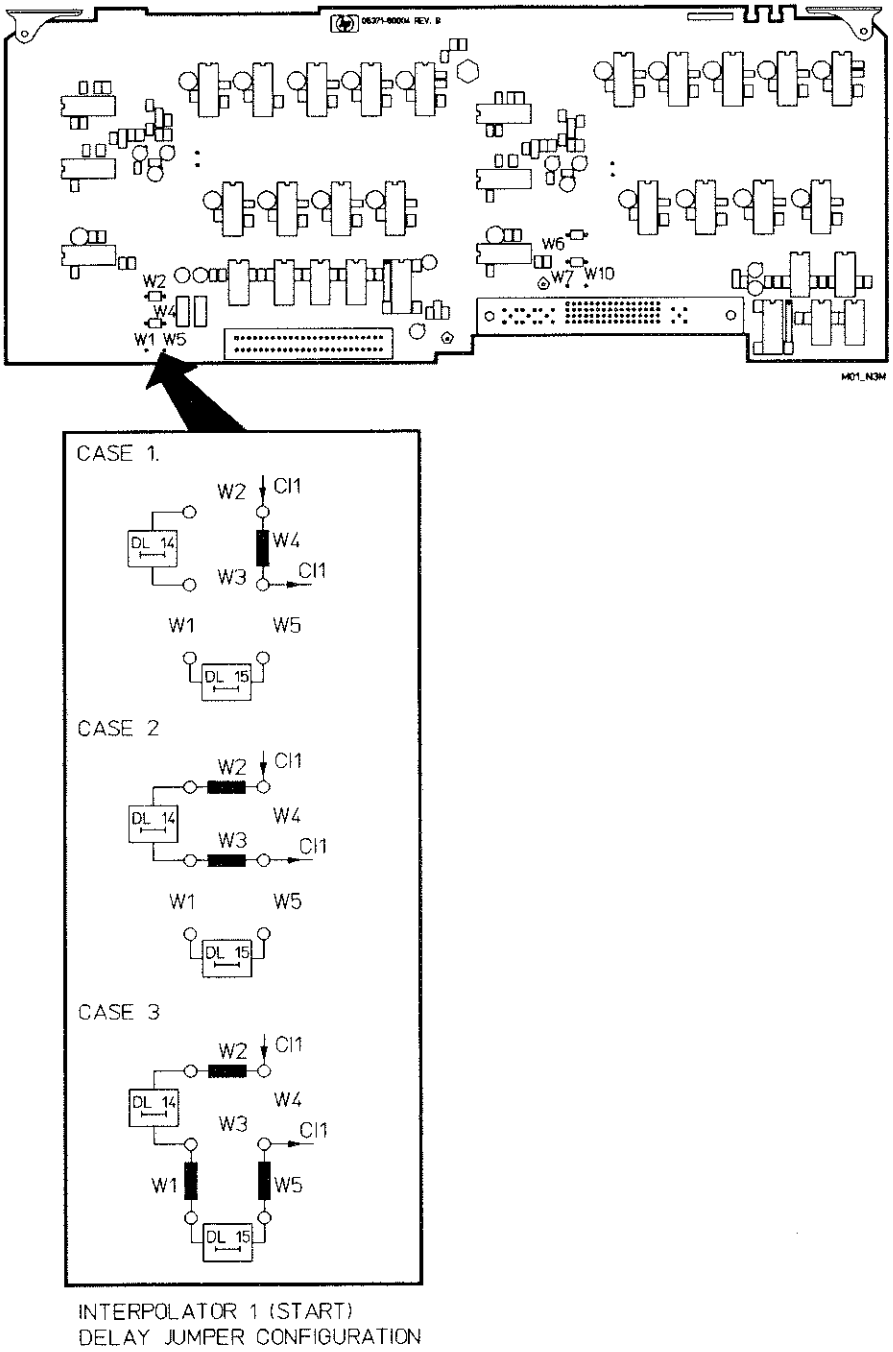

Figure 3-9. Interpolator 1 (Start) Delay Configurations

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3-24. INTERPOLATOR 2 (STOP) CI2-to-CLKA PHASE ADJUSTMENT PROCEDURE

1. Remove the oscilloscope probe from A4TP1 (CI1) and attach it to A4TP2 (CI2) (see *Figure 3-21*).

2. The 54100A Oscilloscope displays the 500 MHz reference frequency (CLKA) on input channel 1, and the CI2 leading edge on input channel 2. The oscilloscope requires a few minutes to display the waveforms, which should eventually be similar to *Figure 3-10*.

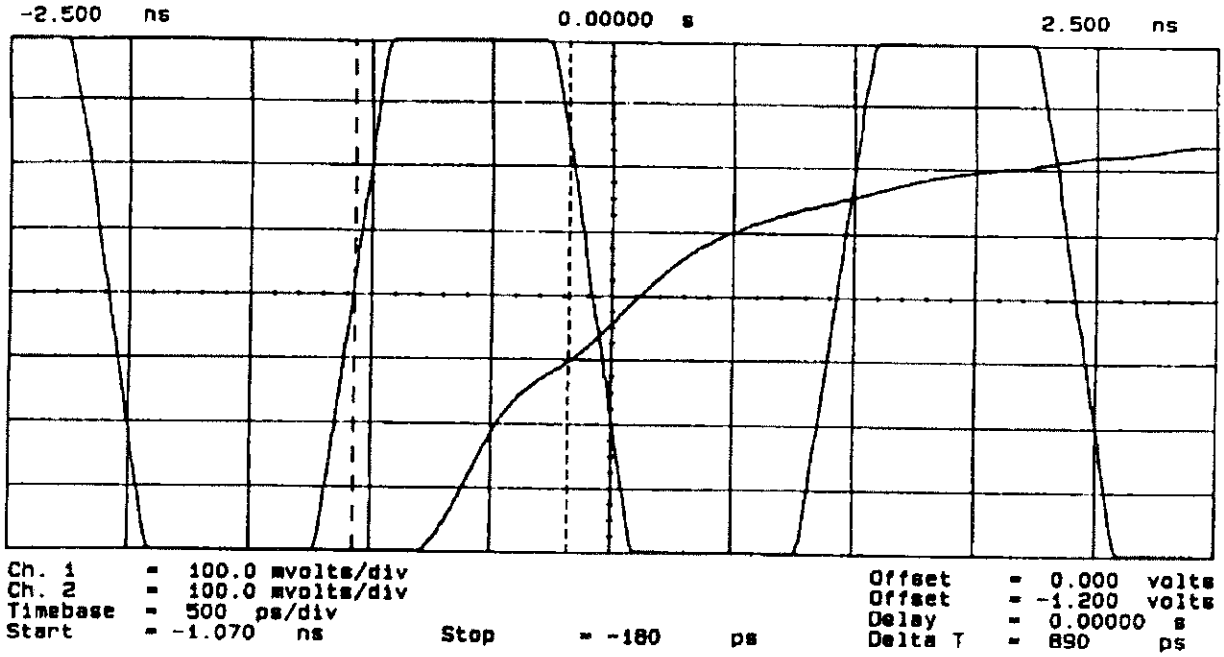

Figure 3-10. Oscilloscope Display of CI2 and CLKA

3. Press **Delta t** softkey at the bottom of 54100A CRT display.

   a. Set Tmarkers to On.

4. Using the 54100's rotary knob, set the STOP MARKER on the rising edge of CI2 signal on channel 2 at –1.3 Volts.

5. Using the 54100A's rotary knob, set the START MARKER on the rising of 500 MHz reference frequency (CLKA) on channel 1 to 0 Volts. (The START MARKER must be place to the left of the STOP MARKER.)

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6. Read "Delta t" displayed in the lower right-hand corner of the 54100A CRT display and refer to *Table 3-5* to determine if the CI2-to-CLKA delay is within limits. If Interpolator 2 (Stop) delay is within limits ("Delta t" is between 200 ps and 1400 ps), no change is required. In this case, skip to Step 15. If the Interpolator 2 (Stop) delay is NOT within specified limits, continue with Step 7.

7. Set the HP 5372A STBY-ON power switch to STBY.

8. Remove the SMC cable and test probe from A4TP2 of the A4 Interpolator Board. Remove the A4 Interpolator Board from the A19 Extender Board.

9. Locate Interpolator 2 (Stop) delay jumpers W6-W10 by referring to *Figure 3-11*.

10. Refer to the actual A4 Interpolator Board and *Figure 3-11* to determine which delay configuration currently exists in the Interpolator 2 (Stop) circuit.

11. Desolder and remove the 0Ω resistor(s) (i.e., delay jumpers W6-W10) used for the current delay configuration. Solder the required delay configuration using 0Ω resistors as delay jumpers.

12. Return the A4 Interpolator Board into the extender board already inserted into slot XA4 of the A12 Motherboard. Reconnect the SMC cable to the A4 Interpolator Board. Insert the test probe into A4TP2.

13. Set the HP5372A STBY-ON power switch to ON, and then press the Restart key.

14. The 54100A Oscilloscope should again display the CI2 and 500 MHz reference frequency (CLKA) signals as shown in *Figure 3-10*. Return to Step 3. Repeat this process until the measured time delay is within the limits listed in *Table 3-5*.

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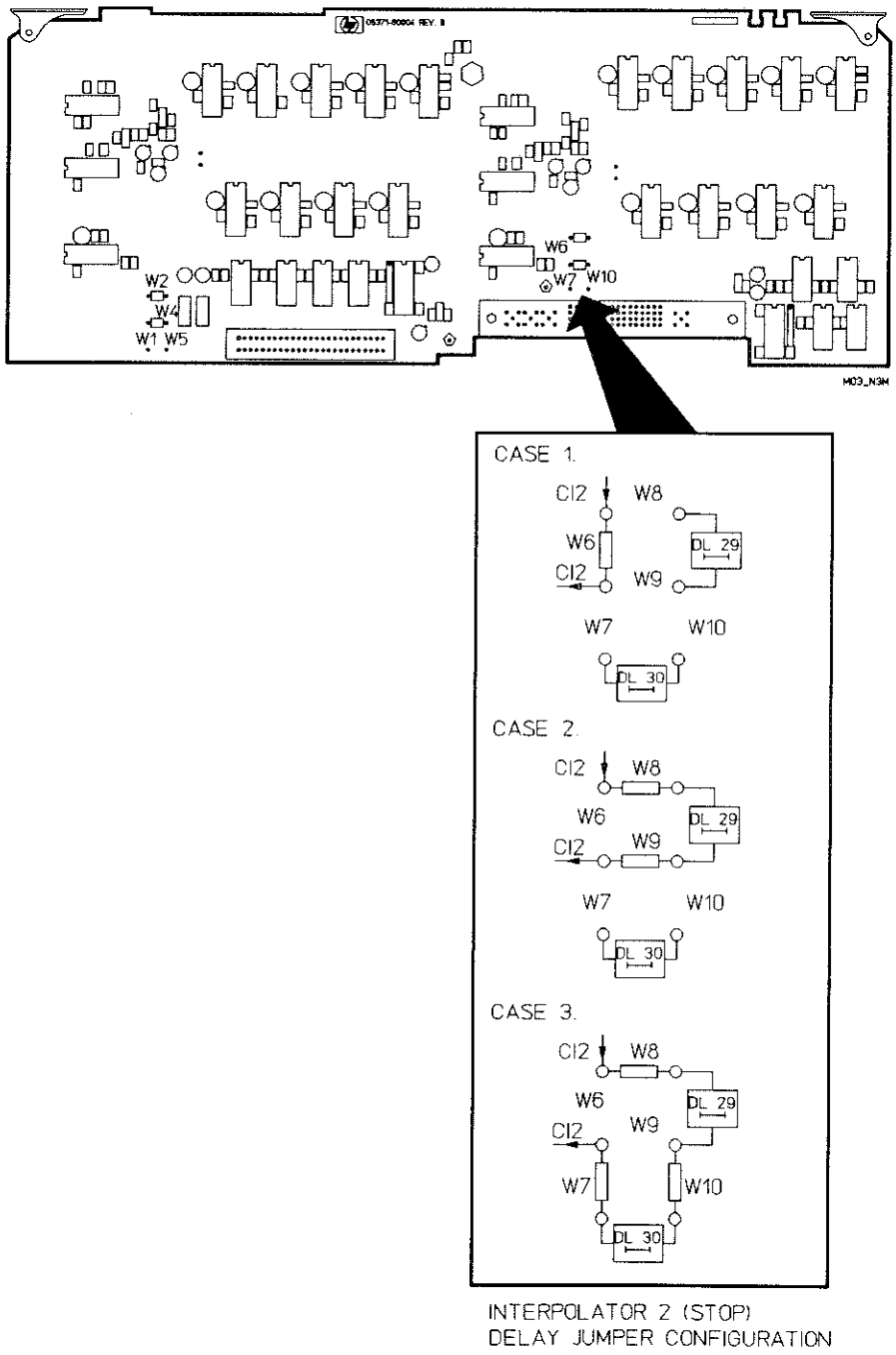

Figure 3-11. Interpolator 2 (Stop) Delay Configurations

15. Set the HP 5372A STBY-ON power switch to STBY, and disconnect the power cord from the primary power source.

16. Remove the extender cable from the A4 Board.

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17. Remove the A4 Board from the A19 Extender Board.

18. Remove SMC cable W16 from the A19 Extender Board. Remove the A19 Extender Board from the A12 Motherboard.

19. Remove the oscilloscope channel 1 cable and adapter from SMC cable W17. Reconnect SMC cable W17 to the A5 Board.

20. Insert the A4 Board into the A12 Motherboard.

21. Reconnect SMC cable W16 to the A4 Board. (The A1 Time Base Control Board may have to be temporarily removed to reconnect the SMC cable).

3-25. A3 AND A5 ZDT BIAS ADJUSTMENTS

Equipment Used: HP 3458A Digital Multimeter

3-26. HP 3458A Setup

1. Connect a Banana to BNC(f) adapter to the VOLTS (HI) and COM (LO) inputs.

2. Connect a BNC cable to the Banana-to-BNC(f) adapter.

3. Connect a BNC-to-Alligator clip adapter to the open end of the BNC cable.

3-27. HP 5372A Setup

1. Set the HP 5372A STBY-ON power switch to STBY, and disconnect the 5372A power cord from the primary power source.

2. Remove the A4 board.

> *NOTE*
> *To read the ZDT label on the A3 board, it will be necessary to partially remove the A3 board.*

3. Remove the two cables from the cable clamps at the top edge (near the rear) of the A3 board.

4. Remove the A3 board as far as it will go.

5. Read and RECORD the ZDT VCS bias voltage on A3U37 (ZDT3A). See *Figure 3-26.*

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6. Insert the A3 board back into the A3 slot in the A12 Motherboard. Insert the two cables back into their locations at the top edge on the A3 board.

> ***NOTE***
> *To read the ZDT labels on the A5 board, it will be necessary to partially remove the A5 board.*

7. Remove the A5 board as far as it will go. (It may be necessary to temporarily remove the A6 Count Support Board.)

8. Read and RECORD the ZDT VCS bias voltages on A5U42 (ZDT1A) and A5U73 (ZDT2A). See *Figure 3-27.*

9. Insert the A5 board back into the A5 slot in the A12 Motherboard.

10. Reconnect the HP 5372A power cord into the primary power outlet and turn the STBY-ON power switch to ON. *IGNORE* the ZDT failure messages on the HP 5372A display.

3-28. VCS Bias Adjustment

Description: Potentiometers A5VCS1 ADJ, A5VCS2 ADJ, and A3R31 are adjusted to set the VCS bias to the value marked on the ZDT label. First, A9R24 (–3.30V ADJUST) is adjusted, then the ZDT VCS biases on the A3 and A5 boards are set. The adjustments allow the ZDTs to operate over the specified temperature range of 0 to 40 degrees celsius.

1. Connect the COM (LO) test probe to the HP 5372A metal chassis.

2. Connect the HI test probe to the –3.25V test point on the A3 board.

3. Adjust A9R24 (-3.30V ADJUST) for a –3.30 ± .001V indication on the DVM.

4. Connect the DVM positive lead to A5VCS1 and adjust the A5 VCS1 ADJ potentiometer to match the VCS voltage marked on the ZDT label on A5U42 (ZDT1A).

5. Connect the DVM positive lead to A5VCS2 and adjust the A5 VCS2 ADJ potentiometer to match the VCS voltage marked on the ZDT label on A5U73 (ZDT2A).

6. Connect the DVM positive lead to A3TP2 and adjust A3R31 to match the VCS voltage marked on the ZDT label on A3U37 (ZDT3A).

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7. Set the HP 5372A STBY-ON power switch to STBY, and disconnect the 5372A power cord from the primary power source.

8. Insert the A4 board back into the A4 slot in the A12 Motherboard, and reconnect the SMC cable to the A4 Interpolator Board (the A1 Time Base Control Board may have to be temporarily removed to reconnect the SMC cable).

9. Reconnect the HP 5372A power cord into the primary power outlet.

3-29. A2 INPUT AMPLIFIER ADJUSTMENTS

NOTE

Diagnostic test 25, Cal. Sensitivity, should be performed both at the beginning and end of the A2 Input Amplifier Adjustments.

3-30. Calibration Sensitivity Adjustment Procedure (Maximum Hysteresis)

1. Press the HP 5372A Test key.

2. Press "25" on the DATA ENTRY keypad, and then press the Enter key.

3. Press the **Run** softkey.

4. Input a 60 mVp-p, 10 KHz sine wave into Channel A.

5. Using the softkeys, perform the adjustment until the display indicates the desired range.

6. When the Channel A sensitivity is adjusted to the correct limits (9000-9900), press the **Channel** softkey to setup the Channel B sensitivity adjustment.

NOTE

Keep the signal applied to the Channel A input for both the Channel A and Channel B calibration sensitivity adjustments.

7. Using the softkeys, perform the adjustment until the display indicates the desired range.

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NOTE

The following three procedures of this section (Input Bias Loop and DC Offset, Hysteresis and DC Offset, and DC Offset Refinement) require that the A2 Input Amplifier be placed on an extender board (HP Part Number 05371-60016). The procedure for placing the A2 assembly on an extender board is described below.

3-31. HP 5372A Setup

1. Set the STBY-ON power switch from ON to STBY, and disconnect the 5372A power cord from the primary power source.
2. Disconnect the four cables from the A2 Input Amplifier Board.
3. Remove the A2 assembly from its A12 Motherboard slot.
4. Insert the RF Extender Board, HP Part Number 05372-60016, into the A2 slot of A12 Motherboard.
5. Insert the A2 assembly into the extender board.
6. Reconnect the cables to the A2 assembly. For Channel A (upper front cable), use extension cable 05371-60222 found in the Support Service Kit.
7. Reconnect the 5372A power cord to the primary power source, and turn the STBY-ON power switch to ON.

NOTE

The following adjustments MUST be performed in the order presented:

1) Calibration Sensitivity Adjustment
2) Input Bias Loop and DC Offset
3) Hysteresis and DC Offset
4) DC Offset Refinement
5) Hysteresis Refinement
6) DC Offset Control Gain
7) Calibration Sensitivity Adjustment

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3-32. Input Bias Loop and DC Offset Adjustment

Description: Both adjustments are directed toward the A2 DC Offset Hybrids, U2 and U14. The input bias loop gain adjustment decreases undesired DC offsets. The DC Offset adjustment minimizes the oscillation of the DC Feedback control signal.

Equipment Used: HP 3458A Digital Multimeter
HP 3325A Synthesizer/Function Generator

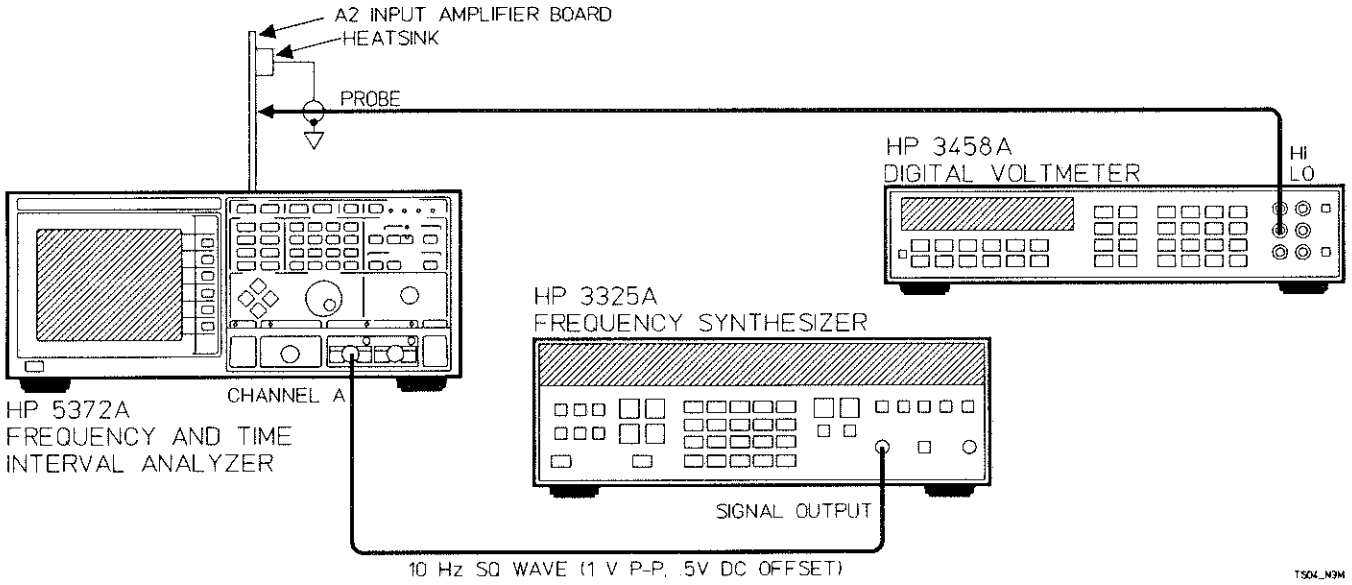

Figure 3-12. Input Bias Loop and DC Offset Adjustment Setup

3-33. HP 3325A SETUP

1. Press the FREQ key, enter "10", and press Hz key.
2. Press the AMPTD key, enter "1", and press VOLT key.
3. Press the DC OFFSET key, enter "0.5", and press VOLT key.
4. Select the square wave (10 MHz) function.

3-34. HP 3458A SETUP

1. Set the power switch to ON, and then press the ADV key.

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3-35. HP 5372A SETUP

2. Press PRESET key.
3. Press the **FREQUENCY** softkey.
4. Press INPUT key.
5. Move the cursor to the "Chan A: Mode" field.
6. Press the **MANUAL TRIG** softkey.
7. Move the cursor to the "Chan B: Mode" field.
8. Press the **MANUAL TRIG** softkey.

3-36. CHANNEL A INPUT BIAS LOOP ADJUSTMENT PROCEDURE

1. Connect a BNC cable between the SIGNAL output of the 3325A and the 5372A CHANNEL A input pod.
2. Connect the DVM HI test probe to either end of A2R50. Connect the DVM COM (LO) test probe to the heat sink of any of the hybrids or to the chassis.
3. Adjust A2R3 until the AC voltage displayed on the HP 3458A is between 1 mV and 15 mV RMS.
4. Disconnect the BNC cable end from the HP 5372A Channel A input pod.

3-37. CHANNEL B INPUT BIAS LOOP ADJUSTMENT PROCEDURE

1. Connect a BNC cable between the SIGNAL output of the 3325A and the 5372A CHANNEL B input pod.
2. Press the HP 5372A FUNCTION key.
3. Move the cursor to the "Channel" field.
4. Press the **More** softkey, and then press the **B** softkey.
5. Connect the DVM HI test probe to either end of A2R101.
6. Adjust A2R1 until the AC voltage displayed on the HP 3458A is between 1 mV and 15 mV RMS.

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3-38. CHANNEL B DC OFFSET ADJUSTMENT PROCEDURE

1. Press the 3325A FREQ key, enter "100", and press Hz key.
2. Connect the test probe point to either end of A2R103.
3. Adjust A2R2 until the AC voltage displayed on the 3458A is less than 1 mV RMS.
4. Detach the BNC cable connected to the 5372A CHANNEL B input pod.

3-39. CHANNEL A DC OFFSET ADJUSTMENT PROCEDURE

1. Connect BNC cable between the SIGNAL output of the 3325A and the 5372A CHANNEL A input pod.
2. Press the **More** softkey until **A** is a menu selection option.
3. Press the **A** softkey.
4. Connect the test probe point to either end of A2R63.
5. Adjust A2R4 until the AC voltage displayed on the HP 3458A is less than 1 mV RMS.

3-40. Hysteresis: Width and DC Offset Adjustment

Description: DC offsets introduced by the comparators A2U4 and A2U15 are undesirable and must be minimized. The comparators' hysteresis window widths are set to 12 mV (0V ± 6 mV).

Equipment used: HP 1725A Oscilloscope
HP 3325A Synthesizer/Function Generator

NOTE

The Hysteresis and DC Offset, DC Offset Refinement, and Hysteresis Refinement adjustment procedures, whose adjustments primarily affect A2 comparators U4 and U15, comprise a two-pass system for adjusting the comparator hysteresis and DC offset. The Hysteresis and DC Offset Adjustment procedure performs a coarse adjustment of the the hysteresis and DC offset. The DC Offset Refinement Adjustment and Hysteresis Refinement Adjustment provide fine hysteresis and DC Offset adjustments.

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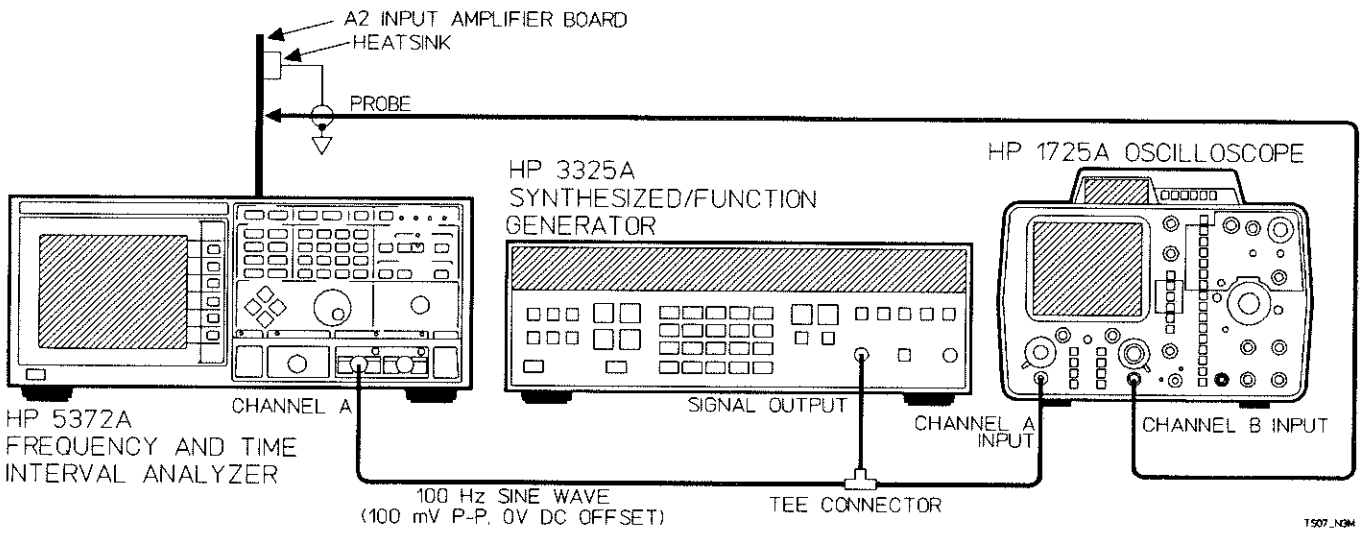

Figure 3-13. Hysteresis and DC Offset Adjustment Setup

3-41. HP 3325A SETUP

1. Press FREQ key, enter "100", and press Hz key.
2. Press DC OFFSET key, enter "0", and press mV key.
3. Press AMPTD key, enter "100", and press mV key.
4. Select the sine wave (20 MHz) function.

3-42. HP 1725A SETUP

1. Set both Channel A and Channel B oscilloscope vertical inputs to 1MΩ termination.
2. Display and center the Channel A horizontal "ground" line.
3. Display and center the Channel B horizontal "ground" line.
4. Set the Channel A vertical input sensitivity to 0.01 VOLTS/DIV.
5. Set the Channel B vertical input sensitivity to 0.05 VOLTS/DIV.
6. Connect a test probe to Channel B. (HP 10017A 10:1 1 MΩ Probe is recommended.)

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3-43. HP 5372A SETUP

1. Press PRESET key.
2. Press the **FREQUENCY** softkey.
3. Press INPUT key.
4. Move the cursor to the "Chan A: Mode" field.
5. Press the **MANUAL~TRIG** softkey.
6. Move the cursor to the "Chan B: Mode" field.
7. Press the **MANUAL~TRIG** softkey.
8. Attach a t-connector to the Channel A input pod.
9. Connect a BNC cable from the t-connector to the Channel A input of the oscilloscope.
10. Connect a BNC cable from the t-connector to the SIGNAL output of the HP 3325A.

3-44. CHANNEL A HYSTERESIS WIDTH AND DC OFFSET ADJUSTMENT PROCEDURE

1. Insert the oscilloscope test probe point in the test hole located at the upper end of A2R24 (chip resistor) as shown in *Figure 3-20.* (This hole is drilled through the pc board and located below resistor A2R10.) Attach the ground clip to the heat sink of the hybrids or to the metal chassis.

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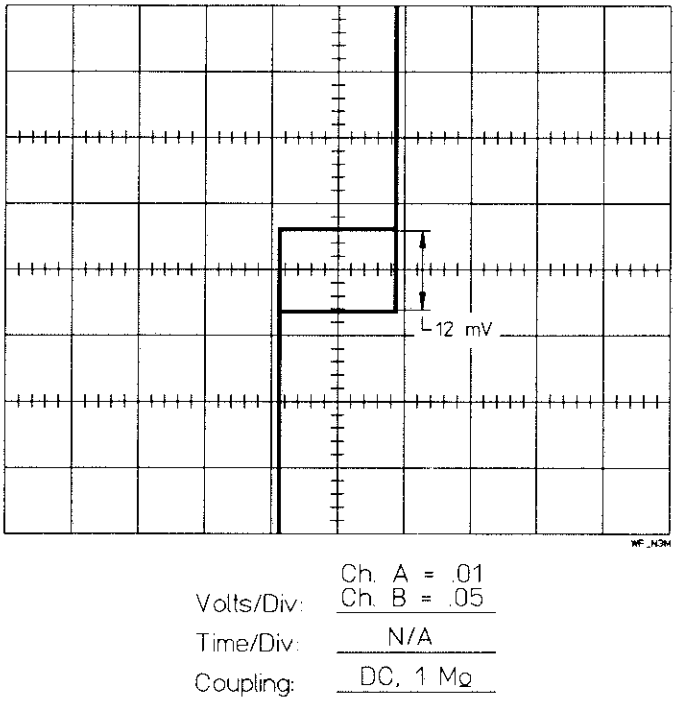

Figure 3-14. Comparator Hysteresis Width

2. Set the HP 1725A VERT DISPLAY to Channel A.

3. Set the HP 1725A INT TRIG to Channel B.

4. Set the oscilloscope HORIZONTAL DISPLAY to X-Y. A hysteresis waveform similar to the *Figure 3-14* should be displayed.

5. Adjust A2R10 to vertically center the hysteresis at the center of the display.

6. Adjust A2R12 to set the hysteresis width to 12 mV (the oscilloscope is set up to display 10 mV/div).

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3-45. CHANNEL B HYSTERESIS WIDTH AND DC OFFSET ADJUSTMENT PROCEDURE

7. Detach the tee-connector from the Channel A input pod.
8. Connect the tee-connector to the HP 5372A Channel B input pod.
9. Press the HP 5372A FUNCTION key.
10. Move the HP 5372A cursor to the "Channel" field. Press the **More** softkey and then press the **B** softkey.
11. Insert the oscilloscope test probe point in the test hole located at the upper end of A2R79 as shown in *Figure 3-20.* (This hole is drilled through the pc board and is located at the upper end of the A2R79 chip resistor.)
12. Adjust A2R11 to vertically center the hysteresis at the center of the display of the oscilloscope.
13. Adjust A2R13 to set the hysteresis width to 12 mV.

3-46. DC Offset Refinement

Description: Minimize the undesired DC offsets introduced by the comparators, A2U4 and A2U15. A sine wave with perfect symmetry and 0 V DC offset should cause the comparator to produce a 50% duty cycle square wave. DC offsets would vary the duty cycle. Adjust the DC offsets until the comparator output has a 50% duty cycle.

Equipment Used: HP 5335A Universal Counter
HP 3325A Synthesizer/Function Generator

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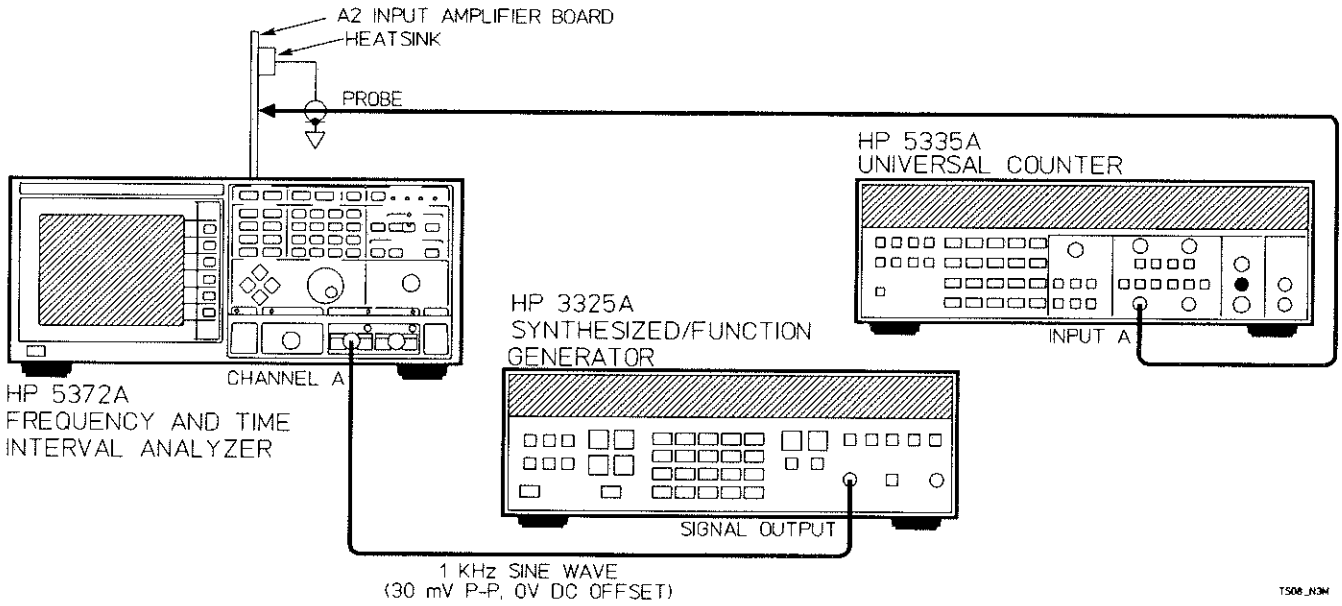

Figure 3-15. DC Offset Refinement Adjustment Setup

3-47. HP 3325A SETUP

1. Press the FREQ key, enter "1", and press kHz key.
2. Press the DC OFFSET key, enter "0", and press mV key.
3. Press the AMPTD key, enter "30", and press mV key.
4. Select the sine wave (20 MHz) function.

3-48. HP 5335A SETUP

1. Press DUTY CY A located in FUNCTION block.
2. Press AUTO TRIG located in INPUT block.
3. Press the Input A FILTER key located in INPUT block.
4. Connect a test probe to the INPUT A connector.

3-49. HP 5372A SETUP

1. Press PRESET key.
2. Press the **FREQUENCY** softkey.

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3. Press INPUT key.
4. Move the cursor to the Chan A: Mode field.
5. Press the **MANUAL TRIG** softkey.
6. Move the cursor to the "Chan B: Mode" field.
7. Press the **MANUAL TRIG** softkey.
8. Connect a BNC cable from the Channel A input pod to the HP 3325A SIGNAL output connector.

3-50. CHANNEL A DC OFFSET REFINEMENT ADJUSTMENT PROCEDURE

1. Insert the test probe point in the test hole located at the upper end of A2R24 as shown in *Figure 3-20.* (This hole is drilled through the pc board and located between resistors A2R10 and A2J2.) Attach the ground clip to the heat sink of the hybrids or to the metal chassis.
2. Adjust A2R10 until the HP 5335A displays a duty cycle between 49% and 51%.
3. Press the **More** softkey, and then press the **B** softkey.

3-51. CHANNEL B DC OFFSET REFINEMENT ADJUSTMENT PROCEDURE

1. Detach the BNC cable from the HP 5372A Channel A input pod and re-attach it to the Channel B input pod.
2. Press the HP 5372A FUNCTION key.
3. Move the cursor to the "Channel" field.
4. Insert the test probe point in the test hole located at the upper end of A2R79 as shown in *Figure 3-20.* (This hole is drilled through the pc board and is located between resistors A2J4 and A2C30.)
5. Press the HP 5335A NORM key located in the CYCLE block.
6. Adjust A2R11 until the HP 5335A displays a duty cycle between 49% and 51%

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3-52. Hysteresis Refinement

Description: Adjust comparator hysteresis width to 12 mV. A 12 mV p-p input signal should just trigger the comparator on each cycle. Adjust the comparator hysteresis window to the width that will just trigger on each cycle of the signal. The HP 5372A should then display a minimum frequency near the frequency of the input signal.

Equipment Used: **HP 3325A Synthesizer/Function Generator**

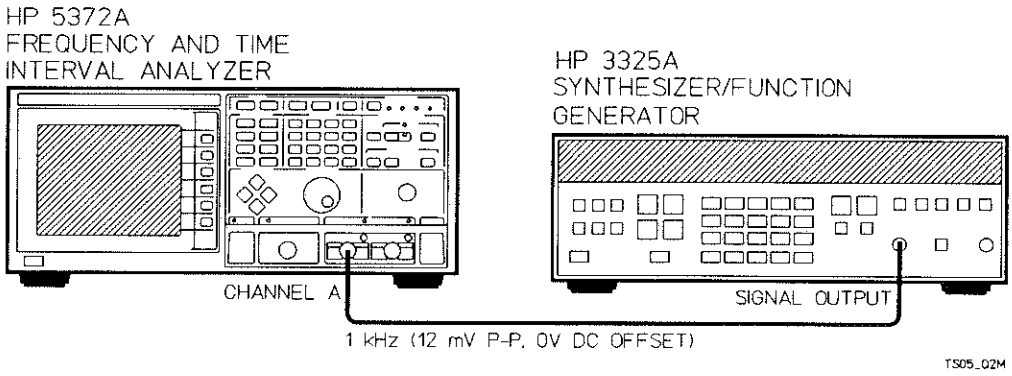

Figure 3-16. Hysteresis Refinement Adjustment Setup

3-53. HP 3325A SETUP

1. Press the FREQ key, enter "1", and press kHz key.
2. Press the DC OFFSET key, enter "0", and press mV key.
3. Press the AMPTD key, enter "12", and press mV key.
4. Select the sine wave (20 MHz) function.

3-54. HP 5372A SETUP

1. Press PRESET key.
2. Press the **FREQUENCY** softkey.
3. Press MATH key.
4. Press the **ON** softkey (enables Channel A statistics).

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5. Move the cursor to the "Chan B Statistics" field.
6. Press the **ON** softkey.
7. Press INPUT key.
8. Move the cursor to the "Chan A: Mode" field.
9. Press the **MANUAL~TRIG** softkey.
10. Move the cursor to the "Chan B: Mode" field.
11. Press the **MANUAL~TRIG** softkey.
12. Press NUMERIC key.
13. Press the top softkey until **Formats** is highlighted.
14. Press the **Result/Statistics** softkey.
15. Connect a BNC cable from the Channel A input pod to the SIGNAL output connector of the HP 3325A.

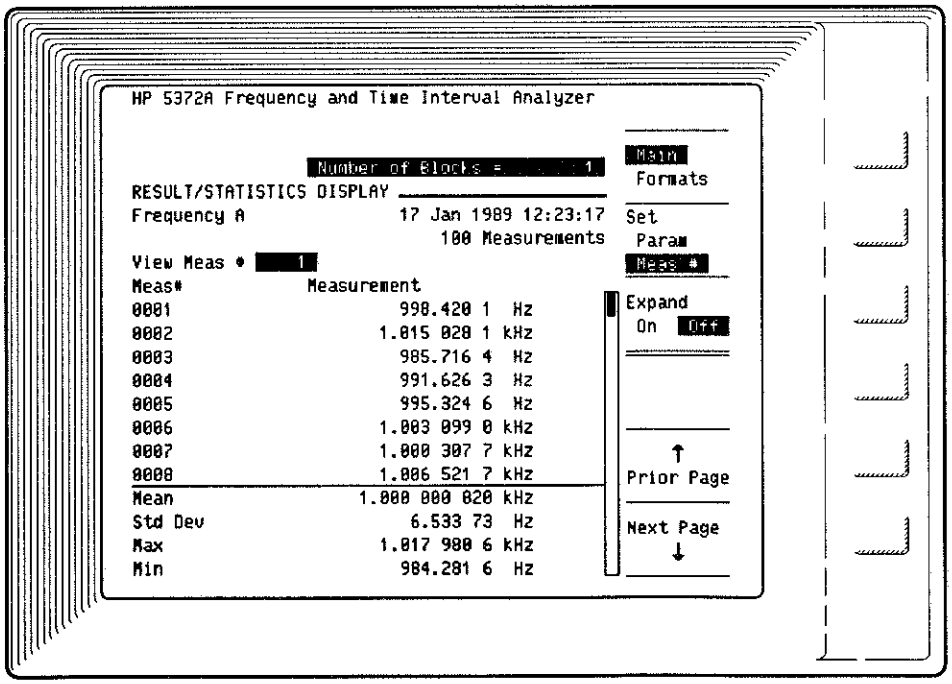

Figure 3-17. Numeric Results Screen

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3-55. CHANNEL A HYSTERESIS REFINEMENT ADJUSTMENT PROCEDURE

1. Adjust A2R12 such that the "Min" frequency indicates values as low as possible yet all greater than 900 Hz. See *Figure 3-17* for an example of the display being referenced.

3-56. CHANNEL B HYSTERESIS REFINEMENT ADJUSTMENT PROCEDURE

1. Detach the BNC cable from Channel A and connect it to Channel B.
2. Press the HP 5372A FUNCTION key.
3. Move the cursor to the "Channel" field.
4. Press the **More** softkey, and then press the **B** softkey.
5. Press NUMERIC key.
6. Adjust A2R13 until the "Min" frequency indicates readings as low as possible yet all still above 900 Hz.

3-57. DC Offset Control Gain

Description: Adjust the gain of an inverting amplifier to compensate the DC offset control voltage for high-frequency roll-off. The gain of the DAC that sends the DC offset control voltage decreases at high frequency. Adjust the gain at low frequency to give DC offsets at the high tolerance level. This results in DC offsets at the high tolerance level at high frequency and DC offsets that are very accurate for all frequencies in between.

Equipment Used: HP 3325A Synthesizer/Function Generator

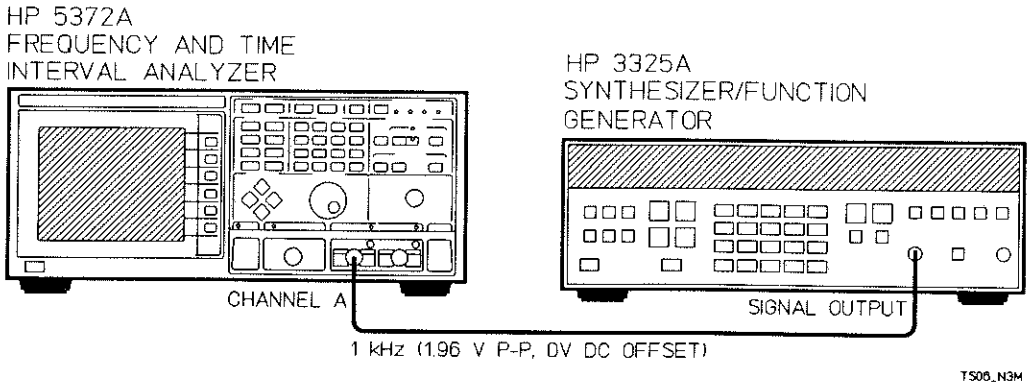

Figure 3-18. DC Offset Gain Adjustment Setup

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3-58. HP 3325A SETUP

1. Press FREQ key, enter "1", and press kHz key.
2. Press DC OFFSET key, enter "0", and press mV key.
3. Press AMPTD key, enter "1.96", and press VOLT key.
4. Select the sine wave (20 MHz) function.

3-59. HP 5372A SETUP

1. Press PRESET key.
2. Press the **More** softkey until **Peak Amplitude** is a menu selection option.
3. Press the **Peak Amplitude** softkey.
4. Connect a BNC cable from the Channel A input pod to the HP 3325A SIGNAL output.

3-60. CHANNEL A DC OFFSET CONTROL GAIN ADJUSTMENT PROCEDURE

1. Adjust A2R14 until the Max Amplitude A: value indicated at the top of the CRT display is between 1.000 and 1.002 Volts.

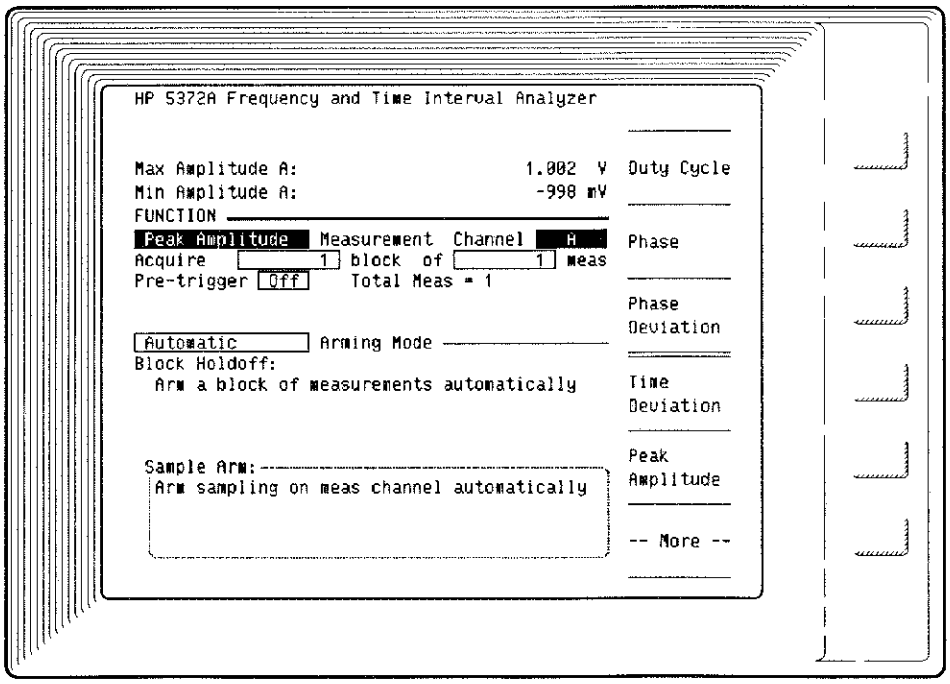

Figure 3-19. Peak Amplitude Screen Results

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2. Detach the BNC cable from the HP 5372A Channel A input pod.

3-61. CHANNEL B DC OFFSET CONTROL GAIN ADJUSTMENT PROCEDURE

1. On the 5372A front panel, press FUNCTION hardkey, move the cursor to the "Channel" field, press the **B** softkey, and press the NUMERIC hardkey.

2. Adjust A2R15 until the Max Amplitude B: value indicated at the top of the CRT display is between 1.000 and 1.002 Volts.

3-62. EXTENDER BOARD REMOVAL

1. Set the HP 5372A power switch from ON to STBY.

2. Detach the cables from the A2 assembly and remove the board from the extender board. Remove the extender board from the A12 Motherboard connector.

3. Insert the A2 assembly into its A12 Motherboard slot, and re-attach the cables to the A2 assembly.

4. Set the HP 5372A power switch from STBY to ON.

NOTE

Proceed to section 3-30 and re-perform the Calibration Sensitivity Adjustment Procedure.

3-63. A17 CRT AND CRT DRIVER BOARD ADJUSTMENTS

Description: This procedure adjusts the CRT display until it is visually satisfactory to the user.

3-64. HP 5372A Setup

1. Set 5372A STBY-ON power switch to ON if not powered up already.

2. Press HP 5372A Test key.

3. Press "20" on the DATA ENTRY numeric keypad, press the Enter key, and then press the **Run** softkey.

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3-65. A17 CRT and CRT Driver Board Adjustment Procedure

The following adjustable components are accessible through the internal Power Supply Cover, MP7. Use the labels provided on MP7 to locate the all adjustable components (see *Figure 3-25*). Adjust the following until the screen display is satisfactory:

- VERTICAL HOLD
- HORIZONTAL HOLD
- HORIZONTAL WIDTH
- VERTICAL SIZE
- CONTRAST
- BRIGHTNESS
- FOCUS

1. Using an alignment tool, rotate VERTICAL HOLD ccw until display just begins to roll. Note position of the pot. Repeat by rotating pot in opposite direction, cw. Adjust this pot between these two limits.

2. Using an alignment tool, rotate HORIZONTAL HOLD until test pattern is centered on CRT.

3. To gain access to the HORIZONTAL WIDTH adjustment component, remove the left side cover of the HP 5372A, as viewed from the front of the instrument. Using a .1" hex alignment tool, rotate HORIZONTAL WIDTH cw to increase width and ccw to decrease width. If display is off center, Step 2.

4. Using an alignment tool, rotate VERTICAL SIZE until test pattern is within CRT grid markings. This adjustment need not be exact.

5. Using an alignment tool, set CONTRAST minimum by rotating in cw direction.

6. Using an aligment tool, set BRIGHTNESS to maximum then adjust until retrace just disappears.

7. Using an alignment tool, adjust CONTRAST until display is visible in ambient light of 5372A operating location.

THE HP 5372A ADJUSTMENTS ARE NOW COMPLETE.

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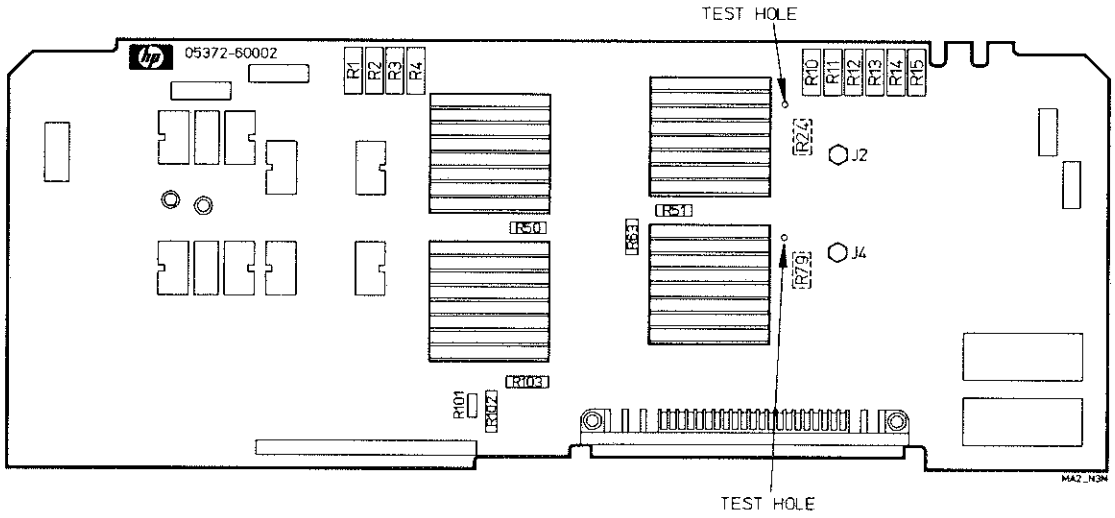

Figure 3-20. A2 Input Amplifier Board Adjustment Locator

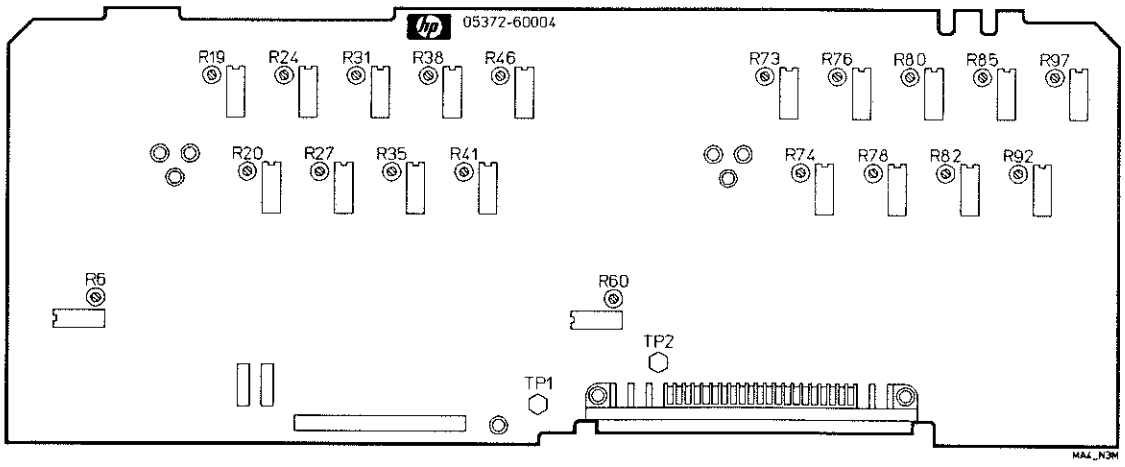

Figure 3-21. A4 Interpolator Board Adjustment Locator

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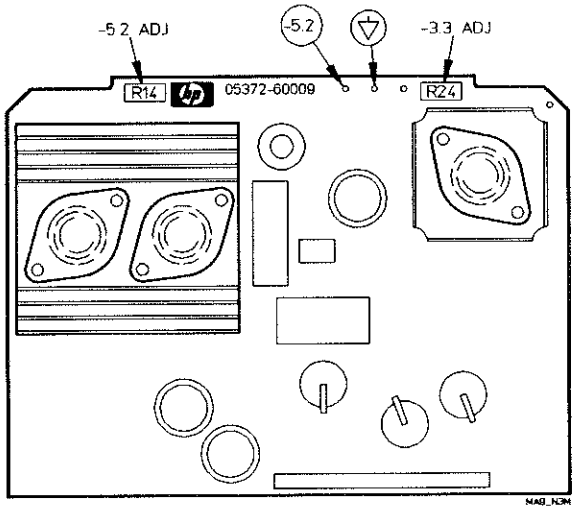

Figure 3-22. A9 Double Regulator Board Adjustment Locator

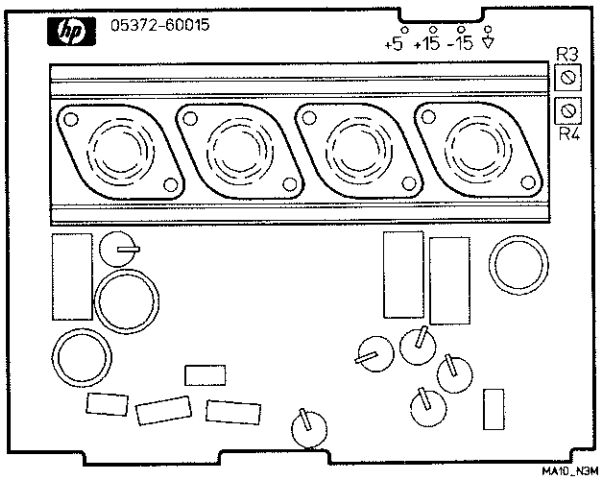

Figure 3-23. A10 Triple Regulator Board Adjustment Locator

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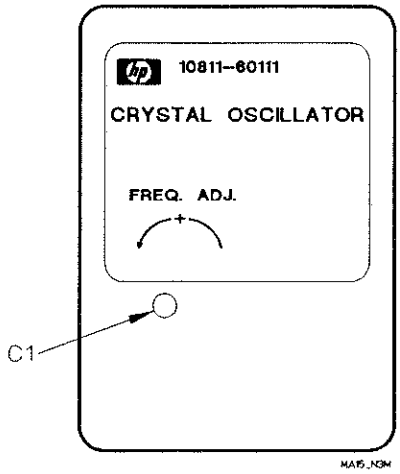

Figure 3-24. A15 Oven Oscillator Adjustment Locator

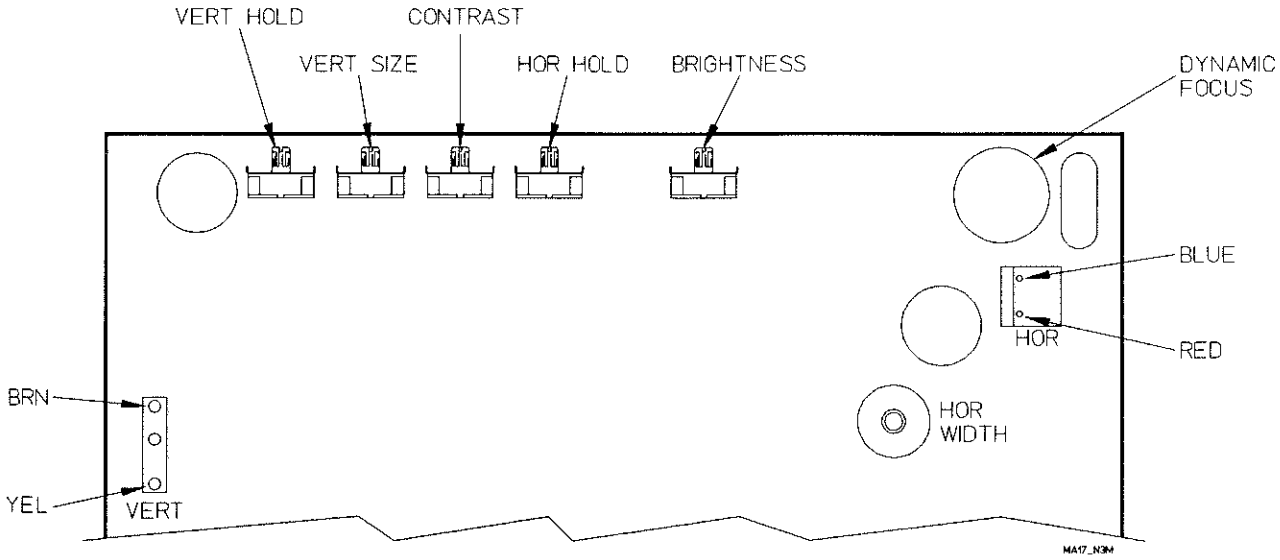

Figure 3-25. A17 CRT Driver Board Adjustment Locator

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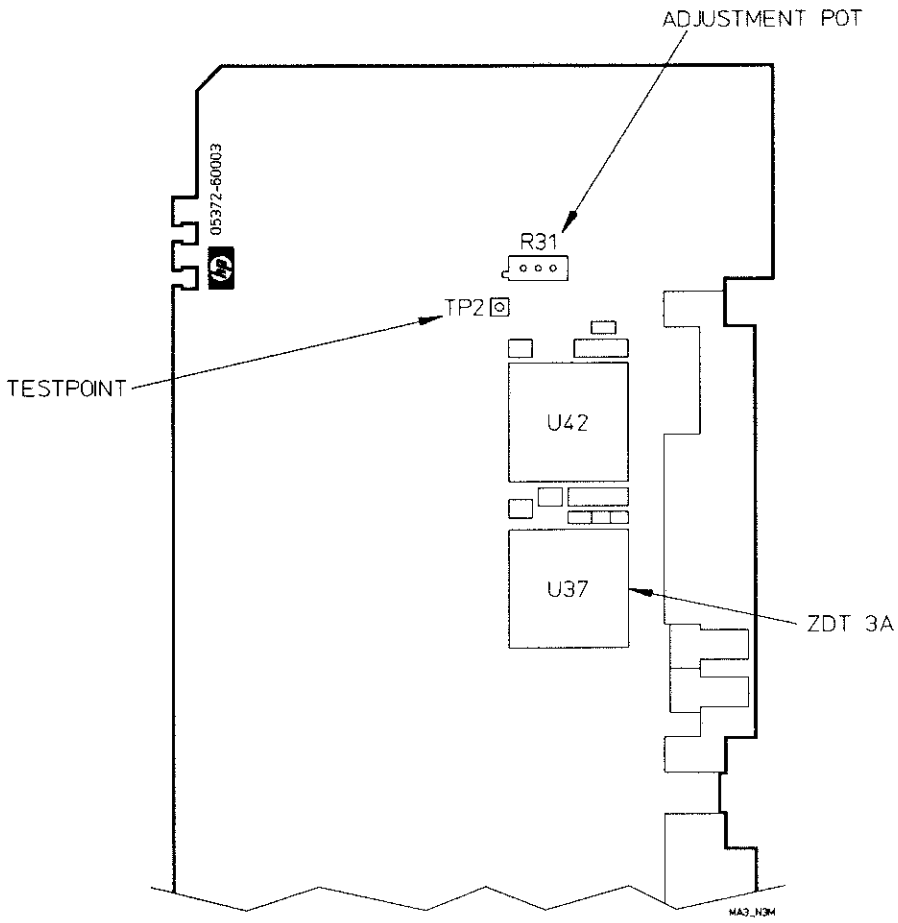

Figure 3-26. A3 Time Board Adjustment Locator

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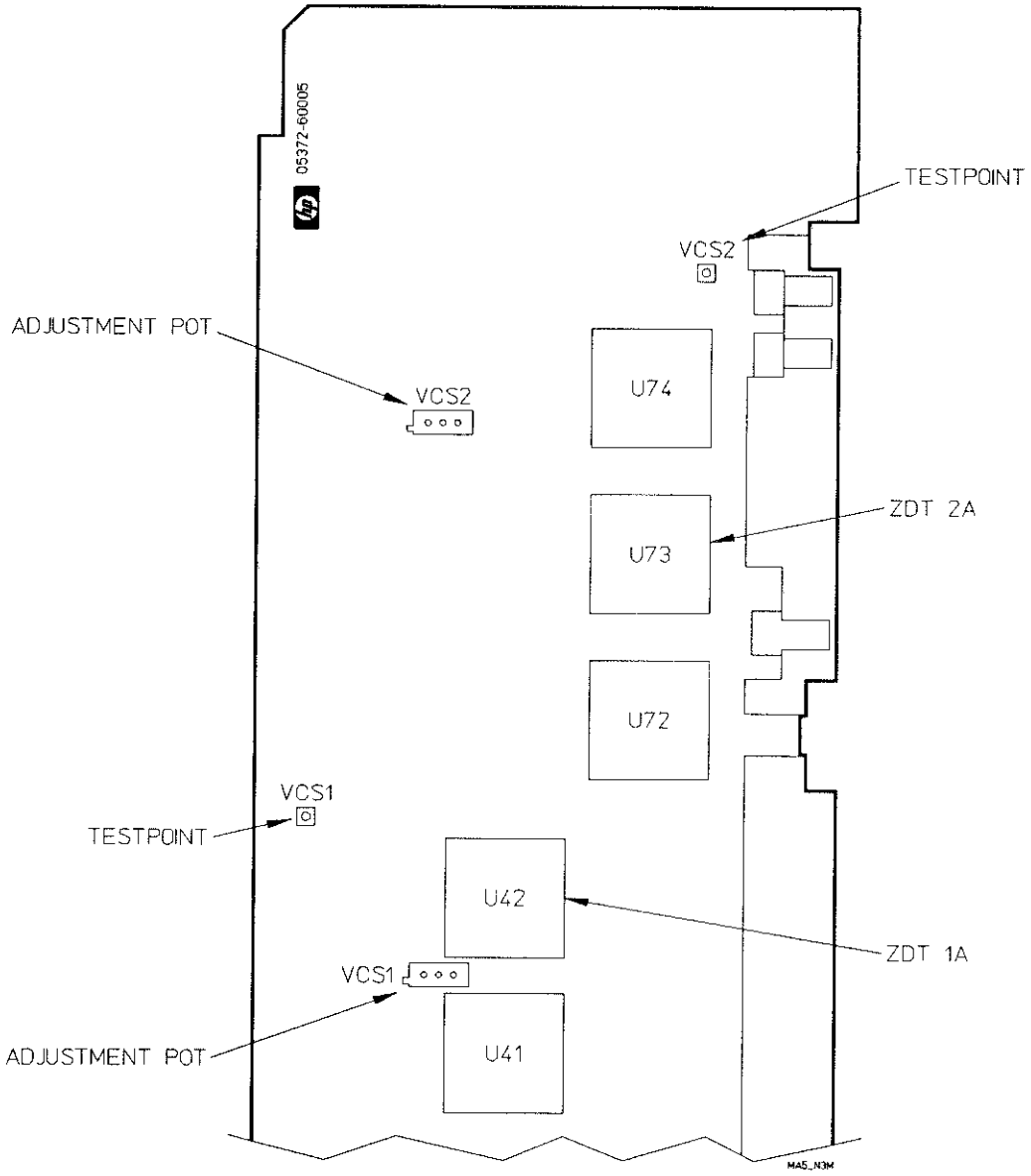

Figure 3-27. A5 Event Board Adjustment Locator

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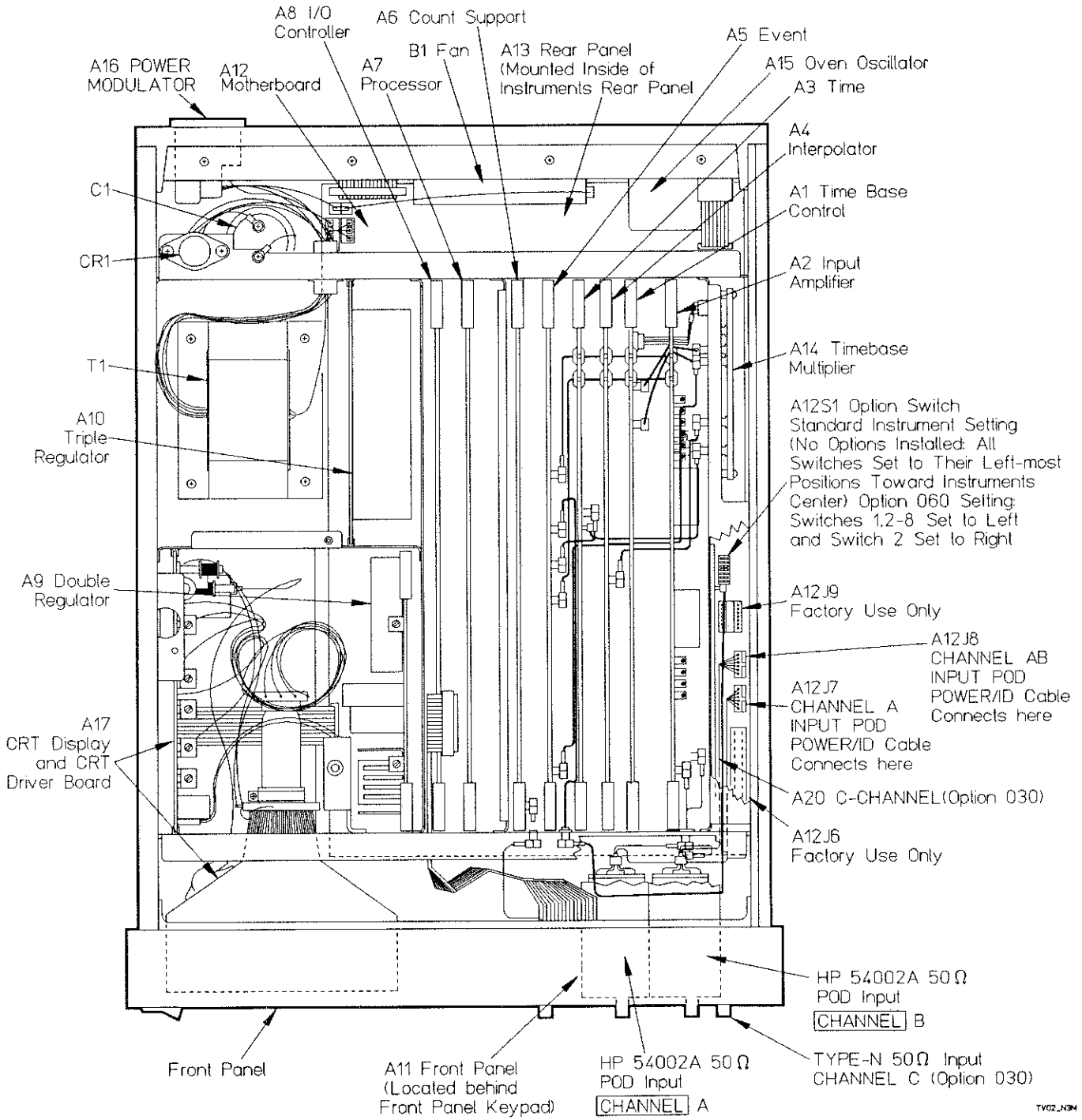

Figure 3-28. HP 5372A Assembly Locator (Instrument Top View)

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ADJUSTMENTS RECORD (PAGE 1 OF 2)

HEWLETT-PACKARD MODEL 5372A
FREQUENCY AND TIME INTERVAL ANALYZER

Serial Number:_____ Repair/Work Order No._____

Test Performed by:_____ Temperature: _____

Date:_____ Relative Humidity:_____

Notes: _____

SECTION NO.	TEST	RESULTS		
		MINIMUM	ACTUAL	MAXIMUM
3-8.	**A9 & A10 Regulators**			
	–5.2 V	–5.21 V	_____	–5.19 V
	–3.3 V(on A3 board)	–3.31 V	_____	–3.29 V
	–15 V	–15.01 V	_____	–14.99 V
	+15 V	14.99 V	_____	15.01 V
	+ 5 V	4.8 V	_____	5.2 V
3-11.	**A15 Oven Oscillator**			
	Offset	0.0	_____	$5*10^{-10}$
3-14.	**A4 Interpolator**			
	Resolution			
	Interpolator 1 (Start)		PASS _____	FAIL _____
	Interpolator 2 (Stop)		PASS _____	FAIL _____
	CI-to-CLKA Phase			
	Interpolator 1 (Start)		_____	
	Interpolator 2 (Stop)		_____	
3-25.	**A3 and A5 ZDT Bias Adjustments**			
	–3.30V Adj	–3.31 V	_____	–3.29 V
	VCS – A5U42 ZDT Label	_____	_____	
	VCS -- A5U73 ZDT Label	_____	_____	
	VCS -- A3U37 ZDT Label	_____	_____	
3-29.	**A2 Input Amplifier**			
	Input Bias Loop			
	Channel A	1.0 mV	_____	15.0 mV
	Channel B	1.0 mV	_____	15.0 mV

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ADJUSTMENTS RECORD (PAGE 2 OF 2)				
SECTION NO.	TEST	RESULTS		
		MINIMUM	ACTUAL	MAXIMUM
	DC Offset			
	Channel A	0.0 mV	_____	1.0 mV
	Channel B	0.0 mV	_____	1.0 mV
	Hysteresis Width			
	Channel A	12 mV	_____	
	Channel B	12 mV	_____	
	DC Offset Refinement			
	Channel A	49.8%	_____	50.2%
	Channel B	49.8%	_____	50.2%
	Hysteresis Refinement			
	Channel A	900.0 Hz	_____	1000.0 Hz
	Channel B	900.0 Hz	_____	1000.0 Hz
	DC Offset Control Gain			
	Channel A	1.000 V	_____	1.001 V
	Channel B	1.000 V	_____	1.001 V
3-62.	**A17 CRT**			
			PASS _____	FAIL _____

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4 REPLACEABLE PARTS

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4

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4-3. Special Parts Replacement Considerations 4-2
4-4. Abbreviations and Reference Designations 4-2
4-5. Ordering Information 4-2
4-6. Direct Mail Order System 4-3

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4

REPLACEABLE PARTS

4-1. INTRODUCTION

This chapter contains information for ordering replacement parts for the HP 5372A Frequency and Time Interval Analyzer. Part numbers for all replacement parts are provided in tabulated lists. Purchase Order and Direct Mail Order information is also provided in this chapter.

Table 4-1 provides abbreviations and reference designators used in the parts list, and throughout the HP 5372A Service Manual. *Table 4-2* provides information for all replaceable parts. *Table 4-3* provides a code list of manufacturers of all parts.

4-2. REPLACEABLE PARTS LIST

Table 4-2 lists pc board-mounted and miscellaneous chassis-mounted replaceable parts. They are organized by electrical assemblies with their components listed in alphanumerical order by reference designation.

The information given for each part consists of the following:

a. Hewlett-Packard part number.

b. Part number check digit (CD).

c. Total quantity (Qty) in each assembly.

d. Description of the part.

e. Typical manufacturer of the part in a five-digit code.

f. Manufacturer's number for the part.

The total quantity for each assembly is given only once; at the first appearance of the part number in the list for that assembly (A1, A3, etc.).

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4-3. SPECIAL PARTS REPLACEMENT CONSIDERATIONS

Certain electrical components require the following special considerations:

a. A17 CRT and Driver Board (HP Part Number 2090-0209): The front-panel Cathode Ray Tube (CRT) Display and its Driver Board are NOT field repairable. The CRT and pc board are shipped as a single unit under the given HP part number. If either the CRT or Driver Board fail, replace them both.

b. The following 5372A assemblies are also NOT field repairable.

- A1 Time Base Control Board (HP Part Number 05371-60001)
- A6 Count Support Board (HP Part Number 05372-60006)
- A7 Processor Board (HP Part Number 05372-60007)
- A8 I/O Controller Board (HP Part Number 05372-60008)
- A9 Double Regulator Board (HP Part Number 05372-60009)
- A10 Triple Regulator Board (HP Part Number 51089-60015)
- A11 Front Panel Board (HP Part Number 05371-60011)
- A13 Rear Panel Board (HP Part Number 05372-60013)
- A14 Time Base Multiplier Board (HP Part Number 05371-60014)
- A15 Oven Oscillator (HP Part Number 10811-60111)
- A22 FastPort Output [Option 020] (HP Part Number 05372-60022)

4-4. ABBREVIATIONS AND REFERENCE DESIGNATIONS

Table 4-1 lists abbreviations used in the parts list, the schematics and throughout the manual. In some cases, two forms of the abbreviations are used, one in all capital letters, and one partial or no capital letters. This occurs because the abbreviations in the parts list are always all capital letters. However, in the schematics and the other parts of the manual, other abbreviation forms are used with both upper and lower case letters.

4-5. ORDERING INFORMATION

To order a part listed in the replaceable parts tables or figures, quote the Hewlett-Packard part number, indicate the quantity required, and address the order to the nearest Hewlett-Packard office.

To order a part that is not listed in this chapter, include the instrument model number, instrument serial number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard office.

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4-6. DIRECT MAIL ORDER SYSTEM

Within the USA, Hewlett-Packard can supply parts through a direct mail order system. Advantages of using the system are as follows:

a. Direct ordering and shipment from the HP Parts Center in Roseville, California.

b. No maximum or minimum on any mail order (there is a minimum order amount for parts ordered through a local HP office when the orders require billing and invoicing).

c. Prepaid transportation (there is a small handling charge for each order).

d. No invoices – to provide these advantages, a check or money order must accompany each order. Payment may be made using Visa or MasterCard by supplying credit card number, its expiration date, and an authorized signature.

Mail order forms and specific ordering information is available through your local HP office. Addresses and phone numbers are located at the back of this manual. Parts may also be obtained through HP Parts Hotlines. In North America call (800) 227-8164, and in Europe contact the European Parts Center at (49/7031) 14-0.

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Table 4-1. Reference Designations and Abbreviations

REFERENCE DESIGNATIONS

A = assembly	DS = annunciator; signaling device audio or visual; lamp; LED	LS = audible alarm; audible signaling device; buzzer; transducer	TB = terminal board
AT = attenuator, isolator; termination	E = miscellaneous electrical part	M = metre	TC = thermocouple
B = fan, motor	F = fuse	MP = miscellaneous mechanical part	TP = test point
BT = battery	FL = filter	P = electrical connector, movable portion; plug	U = integrated circuit; microcircuit
C = capacitor	H = hardware	Q = transistor; SCR; triode thyristor	V = electron tube
CP = coupler	HY = circulator	R = resistor	VR = voltage regulator; breakdown diode
CR = diode; diode thyristor; varactor	J = electrical connector stationary portion, jack	RT = thermistor	W = cable; transmission path; wire; jumper
DC = directional coupler	K = relay	S = switch	X = socket
DL = delay line	L = coil; inductor	T = transformer	Y = crystal unit-piezo-electric
			Z = tuned cavity; tuned circuit

ABBREVIATIONS

A = ampere	HD = head	N/C = normally closed	SHF = super-high frequency
ac = alternating current	HDW = hardware	NE = neon	SI = silicon
ACCESS = accessory	HF = high frequency	NEG = negative	SIL = silver
ADJ = adjustment	HG = mercury	nF = nanofarad	SL = slide
A/D = analog-to-digital	HI = high	NI PL = nickel plate	SNR = signal-to-noise ratio
AF = audio frequency	HP = Hewlett-Packard	N/O = normally open	SPDT = single-pole, double-throw
AFC = automatic frequency control	HPF = high pass filter	NOM = nominal	SPG = spring
AGC = automatic gain control	HR = hour (used in parts list)	NORM = normal	SPL = special
AL = aluminum	HV = high voltage	NPN = negative-positive-negative	SPST = single-pole, single-throw
ALC = automatic level control	Hz = hertz	NP0 = negative-positive zero (zero temperature coefficient)	SR = split ring
AM = amplitude modulation	IC = integrated circuit	NRFR = not recommended for field replacement	SSB = single sideband
AMPL = amplifier	ID = inside diameter	ns = nanosecond	SST = stainless steel
APC = automatic phase control	IF = intermediate frequency	NSR = not separately replaceable	STL = steel
ASSY = assembly	IMPG = impregnated	nW = nanowatt	SQ = square
AUX = auxiliary	in = inch	OBD = order by description	SWR = standing-wave ratio
AVG = average	INCD = incandescent	OD = outside diameter	SYNC = synchronize
AWG = american wire gauge	INCL = include(s)	OH = oval head	T = timed (slow-blow fuse)
BAL = balance	INP = input	OP AMPL = operational amplifier	TA = tantalum
BCD = binary-coded decimal	INS = insulation	OPT = option	TC = temperature compensating
BD = board	INT = internal	OSC = oscillator	TD = time delay
BE CU = beryllium copper	kg = kilogram	OX = oxide	TERM = terminal
BFO = beat frequency oscillator	kHz = kilohertz	oz = ounce	TFT = thin-film transistor
BH = binder head	kΩ = kilohm	Ω = ohm	TGL = toggle
BKDN = breakdown	kV = kilovolt	P = peak (used in parts list)	THD = thread
BP = bandpass	lb = pound	PAM = pulse-amplitude modulation	THRU = through
BPF = bandpass filter	LC = inductance-capacitance	PC = printed circuit	TI = titanium
BRS = brass	LED = light-emitting diode	PCM = pulse-code modulation; pulse-count modulation	TOL = tolerance
BWO = backward wave oscillator	LF = low frequency	PDM = pulse-duration modulation	TRIM = trimmer
CAL = calibrate	LG = long	pF = picofarad	TSTR = transistor
ccw = counterclockwise	LH = left hand	PH BRZ = phosphor bronze	TTL = transistor-transistor logic
CER = ceramic	LIM = limit	PHL = phillips	TV = television
CHAN = channel	LIN = linear taper (used in parts list)	PIN = positive-intrinsic-negative	TVI = television interference
cm = centimeter	lin = linear	PIV = peak inverse voltage	TWT = traveling wave tube
CMO = cabinet mount only	LK WASH = lock washer	pk = peak	U = micro (10^{-6}) (used in parts list)
COEF = coefficient	LO = low; local oscillator	PL = phase lock	UF = microfarad (used in parts list)
COM = common	LOG = logarithmic taper (used in parts list)	PLL = phase-lock loop	UHF = ultra-high frequency
COMP = composition	log = logarithmic	PLO = phase lock oscillator	UNREG = unregulated
COMPL = complete	LPF = low pass filter	PM = phase modulation	V = volt
CONN = connector	LV = low voltage	PNP = positive-negative-positive	VA = voltampere
CP = cadmium plate	m = metre (distance)	P/O = part of	Vac = volts ac
CRT = cathode ray tube	mA = milliampere	POLY = polystyrene	VAR = variable
CTL = complementary transistor logic	MAX = maximum	PORC = porcelain	VCO = voltage-controlled oscillator
CW = continuous wave	MΩ = megohm	POS = positive; position(s) (used in parts list)	Vdc = volts dc
cw = clockwise	MEG = meg (10^6) (used in parts list)	POSN = position	VDCW = volts, dc, working (used in parts list)
D/A = digital-to-analog	MET FILM = metal film	POT = potentiometer	V(F) = volts, filtered
dB = decibel	MET OX = metal oxide	p-p = peak-to-peak	VFO = variable-frequency oscillator
dBm = decibel referred to 1mW	MF = medium frequency; microfarad (used in parts list)	PP = peak-to-peak (used in parts list)	VHF = very-high frequency
dc = direct current	MFR = manufacturer	PPM = pulse-position modulation	Vpk = volts peak
deg = degree (temperture interval or difference)	mg = milligram	PREAMPL = preamplifier	Vp-p = volts peak-to-peak
...° = degree (plane angle)	MHz = megahertz	PRF = pulse-repetition frequency	Vrms = volts rms
°C = degree Celsius (centigrade)	mH = millihenry	PRR = pulse-repetition rate	VSWR = votage standing wave ratio
°F = degree Fahrenheit	mho = conductance	ps = picosecond	VTO = voltage-tuned oscillator
°K = degree Kelvin	MIN = minimum	PT = point	VTVM = vacuum-tube voltmeter
DEPC = deposited carbon	min = minute (time)	PTM = pulse-time modulation	V(X) = volts, switched
DET = detector	... ' = minute (plane angle)	PWM = pulse-width modulation	W = watt
diam = diameter	MINAT = miniature	PWV = peak working voltage	W/ = with
DIA = diameter (used in parts list)	mm = millimeter	RC = resistance capacitance	WIV = working inverse voltage
DIFF AMPL = differential amplifier	MOD = modulator	RECT = rectifier	WW = wirewound
div = division	MOM = momentary	REF = reference	W/O = without
DPDT = double-pole, double-throw	MOS = metal-oxide semiconductor	REG = regulated	YIG = yttrium-iron-garnet
DR = drive	ms = millisecond	REPL = replaceable	Zo = characteristic impedance
DSB = double sideband	MTG = mounting	RF = radio frequency	
DTL = diode-transistor logic	MTR = meter (indicating device)	RFI = radio frequency interference	
DVM = digital voltmeter	MUX = multiplexer	RH = round head; right hand	
ECL = emitter-coupled logic	mV = millivolt	RLC = resistance-inductance-capacitance	
EMF = electromotive force	mVac = millivolt, ac	RMO = rack mount only	
EDP = electronic data processing	mVdc = millivolt, dc	rms = root-mean-square	
ELECT = electrolytic	mVpk = millivolt, peak	RND = round	
ENCAP = encapsulated	mVp-p = millivolt, peak-to-peak	ROM = read-only memory	
EXT = external	mVrms = millivolt, rms	R&P = rack and panel	
F = farad	mW = milliwatt	RWV = reverse working voltage	
FET = field-effect transistor	MY = mylar	S = scattering parameter	
F/F = flip-flop	µA = microampere	s = second (time)	
FH = flat head	µF = microfarad	... " = second (plane angle)	
FIL H = fillister head	µH = microhenry	S-B = slow-blow fuse (used in parts list)	
FM = frequency modulation	µmho = micromho	SCR = silicon controlled rectifier; screw	
FP = front panel	µs = microsecond	SE = selenium	
FREQ = frequency	µV = microvolt	SECT = sections	
FXD = fixed	µVac = microvolt, ac	SEMICON = semiconductor	
g = gram	µVdc = microvolt, dc		
GE = germanium	µVpk = microvolt, peak		
GHz = gigahertz	µVp-p = microvolt, peak-to-peak		
GL = glass	µVrms = microvolt, rms		
GND = ground(ed)	µW = microwatt		
H = henry	nA = nanoampere		
h = hour	NC = no connection		
HET = heterodyne			
HEX = hexagonal			

NOTE

All abbreviations in the parts list will be in upper case.

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
µ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

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Table 4-2. Replaceable Parts

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				5372A		
A2	05372-60002	3	1	INPUT AMPLIFIER BOARD	28480	05372-60002
A2C1	0180-2207	5	2	CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C2	0160-0576	5	23	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C3	0180-0098	8	2	CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C4	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C5	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C6	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C7	0180-0098	8		CAP-FXD 100uF 20 V TA	56289	150D107X0020S2
A2C8	0160-4371	6	4	CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C9	0160-3879	7	6	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C10	0180-3847	1	4	CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C11	0160-4040	6	2	CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C12	0180-3941	6	2	CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C16	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C18	0160-3728	5	4	CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C19	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C22	0180-3775	4	4	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C23	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C24	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C31	0160-4040	6		CAP-FXD 1000pF 100 V	09969	RPE121-105C0G102J100V
A2C32	0180-3941	6		CAP-FXD 100uF 10 V TA	12344	T396J107K010AS
A2C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C34	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C36	0160-4371	6		CAP-FXD 680pF 100 V	09969	RPE121-105C0G681J100V
A2C37	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C41	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C42	0160-3728	5		CAP-FXD 0.01uF 50 V	00843	1005X103M2P
A2C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C44	0160-3875	3	2	CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C45	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C46	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A2C47	0180-3847	1		CAP-FXD 22uF 25 V TA	12344	T398H226K025AS
A2C48	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A2C49	0180-2207	5		CAP-FXD 100uF 10 V TA	56289	150D107X9010R2
A2C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A2C51	0160-3875	3		CAP-FXD 22pF 200 V	09969	RPE121-105C0G220J200V
A2C201	0160-4557	0	7	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C202	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C203	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C204	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C205	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C206	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C207	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C208	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A2C209	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C210	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C211	0160-4801	7	2	CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V
A2C212	0160-4791	4	2	CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C213	0160-4791	4		CAP-FXD 10pF 100 V	09969	RPA10C0G100D100
A2C214	0160-4801	7		CAP-FXD 100pF 100 V	09969	RPA10C0G101J100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2C215	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2C216	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A2CR1	1902-0959	3	2	DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR2	1902-0956	0	2	DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR3	1902-0953	7	2	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR4	1901-0050	3	7	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR5	1902-0945	7	4	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR6	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR8	1902-0959	3		DIODE-ZNR 11V 5% DO-35 PD=.4W TC=+.076%	28480	1902-0959
A2CR9	1902-0953	7		DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A2CR10	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR12	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR13	1902-0945	7		DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A2CR14	1902-0956	0		DIODE-ZNR 8.2V 5% DO-35 PD=.4W TC=+.065%	28480	1902-0956
A2CR201	1902-0943	5	2	DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR202	1902-0943	5		DIODE-ZNR 2.4V 5% DO-35 PD=.4W TC=-.037%	28480	1902-0943
A2CR203	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR204	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2CR205	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A2H1	0515-0659	8	16	SCREW-MACHINE ASSEMBLY M2 X 0.4 8MM-LG	00000	ORDER BY DESCRIPTION
A2H2	05371-20201	9	4	HEATSINK	28480	05371-20201
A2H3	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A2H4	0380-1731	2	16	SPACER-PRESS-IN 1.70 MM LG; 2.38 MM ID	46384	YC3-4564
A2H5	3050-0891	7	1	WASHER-FL MTLC 3.0 MM 3.3-MM-ID	28480	3050-0891
A2H6	0535-0004	9	1	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
A2H7	0515-0406	3	1	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
A2J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J2	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2J3	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A2J4	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A2K1	0490-1554	0	8	RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K2	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K3	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K4	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K5	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K6	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K7	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2K8	0490-1554	0		RELAY 1C 5VDC-COIL .01A 24VDC	5N615	G5Y-154P-5VDC
A2L1	9140-1170	4	10	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L3	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L4	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L5	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L6	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L7	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L8	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L9	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2L201	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A2MP1	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
A2MP2	54100-29101	2	4	SPRING-HYBRID	28480	54100-29101
A2MP3	54100-29104	5	1	CLAMP-HYBRID	28480	54100-29104
A2P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A2P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A2P3	1250-2052	8	1	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A2Q1	1853-0314	9	4	TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q2	~~1854-0090~~ 1854-0039	0	4	TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q3	1854-0686	0	5	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q4	1854-0092	2	4	TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q5	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5

1854-0090 ⇒ 1854-0039 PCO 2-21750

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q7	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q8	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q9	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q10	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q11	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q12	1854-0092	2		TRANSISTOR NPN SI PD=200MW FT=600MHZ	27014	PN3563-5
A2Q13	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2Q14	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q15	1853-0314	9		TRANSISTOR PNP 2N2905A SI TO-39 PD=600MW	04713	2N2905A
A2Q16	1854-0090	0		TRANSISTOR NPN SI TO-39 PD=1W FT=100MHZ	28480	1854-0090
A2Q201	1854-0215	1	2	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q202	1854-0215	1		TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A2Q203	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A2R1	2100-3749	6	2	RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R2	2100-0545	4	2	RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R3	2100-3749	6		RESISTOR-TRMR 5K 10% TKF SIDE-ADJ 17-TRN	09969	3105X502
A2R4	2100-0545	4		RESISTOR-TRMR 1K 10% TKF SIDE-ADJ 17-TRN	09969	3105X102
A2R5	0698-3446	3	4	RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R6	0698-7196	8	3	RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R7	0698-3613	6	4	RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R8	0698-7212	9	8	RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R9	0698-7254	9	4	RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R10	2100-3750	9	4	RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R11	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R12	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R13	2100-3750	9		RESISTOR-TRMR 20K 10% TKF SIDE-ADJ	09969	3105X203
A2R14	2100-3759	8	2	RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R15	2100-3759	8		RESISTOR-TRMR 2K 10% TKF SIDE-ADJ 17-TRN	09969	3105X202
A2R16	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R17	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R18	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R19	0699-1320	0	4	RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R20	0699-2358	6	2	RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R21	0699-2263	2	2	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R22	0698-7246	9	2	RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R23	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R24	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R25	0699-2245	0	2	RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R26	0699-1542	8	19	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R27	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R28	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R29	0698-7234	5	2	RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R30	0698-7256	1	3	RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R31	0698-7232	3	2	RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R32	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R33	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R34	0698-7262	9	2	RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R38	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R39	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R40	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R41	0698-7236	7	7	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R42	0699-1769	1	2	RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R43	0698-7220	9	7	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R44	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R45	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R46	0698-7260	7	12	RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R47	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R48	0698-7188	8	4	RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R49	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R50	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A2R51	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R52	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R53	0699-2358	6		RESISTOR 68 +-1% .125W TF TC=0+-50	11837	RE15YQ-680-F
A2R54	0698-7246	9		RESISTOR 2.61K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2611-F
A2R55	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R56	0698-7234	5		RESISTOR 825 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-825R-F
A2R57	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A2R58	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R59	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R60	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R61	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R62	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R63	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R66	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R67	0699-2245	0		RESISTOR 1K +-1% .125W TF TC=0+-50	11837	RE15YQ-102-F
A2R68	0698-7256	1		RESISTOR 6.81K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-6811-F
A2R69	0698-7232	3		RESISTOR 681 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-681R-F
A2R70	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R71	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A2R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R74	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R75	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A2R76	0698-7262	9		RESISTOR 12.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1212-F
A2R77	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R78	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R79	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R80	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R81	0698-7196	8		RESISTOR 21.5 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-21R5-F
A2R82	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R83	0699-1320	0		RESISTOR 19.6K +-1% .125W TKF TC=0+-100	19701	9C12063AFKR
A2R84	0698-7257	2	2	RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F
A2R85	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R86	0698-6360	6	2	RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R87	0698-7237	8	3	RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R88	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R89	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R90	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R91	0698-7188	8		RESISTOR 10 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-10R-F
A2R92	0699-1769	1		RESISTOR 51 +-1% .25W TF TC=0+-50	10214	RE35-510-F
A2R93	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R94	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R95	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R96	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R98	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R99	0698-7212	9		RESISTOR 100 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-100R-F
A2R100	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R101	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R102	0698-8812	7	1	RESISTOR 1 +-1% .125W TF TC=0+-100	12498	L04D
A2R103	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R104	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R105	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R106	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R107	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R108	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R109	0698-7235	6	1	RESISTOR 909 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-909R-F
A2R110	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A2R111	0698-7260	7		RESISTOR 10K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1002-F
A2R112	0698-3613	6		RESISTOR 39 +-5% 2W MO TC=0+-200	12498	FP-69
A2R113	0698-3430	5	1	RESISTOR 21.5 +-1% .125W TF TC=0+-100	D8439	MK2
A2R114	0698-3446	3		RESISTOR 383 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-383R-F
A2R115	0698-7237	8		RESISTOR 1.1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1101-F
A2R116	0698-7254	9		RESISTOR 5.62K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-5621-F
A2R117	0698-7257	2		RESISTOR 7.5K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-7501-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A2R118	0698-6360	6		RESISTOR 10K +-0.1% .125W TF TC=0+-25	12498	NE55
A2R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R202	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R203	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R204	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A2R205	0698-7240	3	2	RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R206	0698-7238	9	2	RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R207	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A2R208	0757-0441	8	2	RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R209	0757-0441	8		RESISTOR 8.25K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-8251-F
A2R210	0699-1991	1	1	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A2R211	0757-0416	7	2	RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R212	0757-0416	7		RESISTOR 511 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-511R-F
A2R213	1810-0203	5	1	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A2R214	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A2R215	0757-0401	0	2	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R216	0757-0428	1	2	RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R217	0757-0428	1		RESISTOR 1.62K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1621-F
A2R218	0757-0401	0		RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A2R219	0698-7240	3		RESISTOR 1.47K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1471-F
A2R220	0698-7238	9		RESISTOR 1.21K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1211-F
A2R221	0757-0420	3	1	RESISTOR 750 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-751-F
A2U1	0955-0404	3	2	U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U2	1NB7-8076	3	2	DCOFFSET HYBRID	28480	1NB7-8076
A2U3	1826-0275	4	2	IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U4	1NB7-8109	3	2	SYNC COMP HYBRID	28480	1NB7-8109
A2U5	1820-2000	5	2	IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A2U6	1826-0311	9	2	IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U7	1826-0609	8	2	ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U8	1826-1049	2	2	IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U9	1826-0282	3	2	IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U10	1826-0285	6	2	IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U11	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A2U12	1820-3394	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS09N
A2U13	0955-0404	3		U-WAVE ATTENUATOR 1.5 GHZ MAX	15542	AT-8
A2U14	1NB7-8076	3		DCOFFSET HYBRID	28480	1NB7-8076
A2U15	1NB7-8109	3		SYNC COMP HYBRID	28480	1NB7-8109
A2U16	1820-1730	6	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U17	1826-0275	4		IC V RGLTR-FXD-POS 11.5/12.5V TO-92 PKG	04713	MC78L12ACP
A2U18	1826-0311	9		IC OP AMP GP 8-DIP-P PKG	04713	LM201AN
A2U19	1826-0635	0	2	IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U20	1826-1246	1	2	D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U21	1826-0609	8		ANALOG MULTIPLEXER 8 CHNL 16 -CERDIP	06665	MUX-08FQ
A2U22	1826-1049	2		IC OP AMP PRCN 8-DIP-C PKG	06665	OP-27GZ
A2U23	1826-0285	6		IC V RGLTR-FXD-NEG -4.8/-5.2V TO-92 PKG	04713	MC79L05ACP
A2U24	1826-0282	3		IC V RGLTR-FXD-NEG 11.4/12.6V TO-92 PKG	04713	MC79L12ACP
A2U25	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A2U26	1820-2273	4	1	IC-INTERFACE DRVR PERIPHERAL GENERAL	56289	UDN-2981A
A2U27	1820-1730	6		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS273N
A2U28	1820-1201	6	1	IC GATE TTL LS AND QUAD 2-INP	01295	SN74LS08N
A2U29	1826-0635	0		IC OP AMP LOW-OFS 8-DIP-P PKG	06665	OP-07CP
A2U30	1826-1246	1		D/A 12-BIT 28-CERDIP BPLR	24355	AD667AD
A2U201	1820-2849	0	1	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A2U202	1820-2956	0	1	IC GATE ECL/10KH EXCL-OR/NOR TPL 2-INP	04713	MC10H107P
A2U203	1820-3579	5	2	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U204	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A2U205	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A2U206	1826-0521	3	1	IC OP AMP LOW-BIAS-H-IMPD DUAL 8-DIP-P	01295	TL072CP
A2U207	1826-1204	1	1	D/A 8-BIT 20-PLASTIC CMOS	24355	AD7528JN
	0340-0864	6	1	INSULATOR-XSTR THRM-CNDCT	18565	69-11-A536-1671
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A3	05372-60003	4	1	TIME BOARD	28480	05372-60003
A3C	0160-0576	5	52	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A3C	0160-3879	7	3	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A3C	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3C	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A3	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A7	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A8	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A12	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A20	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A21	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A22	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A32	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A33	0160-4521	8	1	CAP-FXD 12pF 200 V	09969	RPE121-105C0G120J200V
A34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A41	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A42	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A43	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A44	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A45	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A46	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A47	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A48	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A49	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A50	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A51	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A52	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A53	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A58	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A59	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A60	0160-4031	5	4	CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3C61	0160-4031	5		CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V
A3C62	0160-4031	5		CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V
A3C63	0160-4031	5		CAP-FXD 330pF 100 V	09969	RPE121-105C0G331J100V
A3CR1	1901-0050	3	1	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A3DL1	1810-1019	3	1	DELAY LINE ACTIVE DEVICE W/DUAL IN-LINE	92912	0447-0051-85
A3DL2	1810-1326	5	3	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL3	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL4	1810-1326	5		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-30
A3DL5	1810-1107	0	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3DL6	1810-1107	0		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-10
A3J1	1250-0835	1	2	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A3J2	1250-0835	1		CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A3L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A3P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A3P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A3P3	1250-2052	8	2	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3P4	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A3R1	1810-0367	2	1	NETWORK-RES 6-SIP 4.7K OHM X 5	C1433	750-61
A3R2	0699-2263	2	6	RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R3	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R4	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R5	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R6	1810-0800	8	1	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A3R7	1810-0341	2	1	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A3R8	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R9	0699-2263	2		RESISTOR 100 +-1% .125W TF TC=0+-50	11837	RE15YQ-101-F
A3R10	1810-0280	8	7	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R11	0699-1542	8	6	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R12	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R13	1810-0270	6	4	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R14	0699-2253	0	3	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R15	0699-2252	9	3	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R16	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R17	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R18	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A3R19	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A3R20	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R22	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R25	1810-0366	1	2	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R26	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R28	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A3R29	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A3R30	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A3R31	2100-3751	0	1	RESISTOR-TRMR 10 10% TKF SIDE-ADJ 17-TRN	09969	3105X100
A3R32	0757-0489	4	2	RESISTOR 10 +-1% .25W TF TC=0+-100	19701	5043R-1/4-T0-10R0-F
A3R33	0757-0489	4		RESISTOR 10 +-1% .25W TF TC=0+-100	19701	5043R-1/4-T0-10R0-F
A3R34	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R35	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A3TP2	0360-0124	3	1	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A3U1	1818-4675	9	3	IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U2	1820-2698	7	1	IC DRVR TTL F LINE DRVR OCTL	18324	74F240N
A3U3	1820-2691	0	1	IC FF TTL F D-TYPE POS-EDGE-TRIG	18324	74F74N
A3U4	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U5	1820-3143	9	1	IC FF TTL ALS D-TYPE POS-EDGE-TRIG DUAL	01295	SN74ALS874NT

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A3U6	1818-4675	9		IC CMOS 16384 (16K) STAT RAM 35-NS 3-S	10380	IDT7142SA35P
A3U7	1820-3438	5	1	IC MUXR/DATA-SEL TTL ALS 2-TO-1-LINE	01295	SN74ALS257N
A3U8	1820-2701	3	2	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U9	1820-3227	0	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F257N
A3U10	1820-6535	9	1	IC GATE-ARY CMOS	10411	LMA9284
A3U11	1820-2701	3		IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F374N
A3U12	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U13	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U14	1820-4350	2	1	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS241BN
A3U15	1820-3121	3	7	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U16	1820-2848	9	1	IC RCVR ECL/10KH LINE RCVR TPL	04713	MC10H116P
A3U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U18	1820-2654	5	1	IC MUXR/DATA-SEL TTL F 2-TO-1-LINE QUAD	18324	74F157N
A3U19	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U20	1820-3707	1	5	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U21	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U22	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A3U23	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A3U24	1820-5821	4	1	IC FF TTL F D-TYPE POS-EDGE-TRIG COM	18324	74F574N
A3U25	1818-4134	5	5	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U26	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U27	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U28	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U29	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U30	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U31	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A3U32	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U33	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U34	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A3U35	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U36	1820-5789	3	4	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U37	05371-80046	6	1	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A3U38	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U39	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U40	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U41	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3U42	05371-80046	6	1	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A3U43	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A3U44	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A3XU10	1200-1470	7	1	SOCKET-IC-PGA 145-CONT SQUARE DIP-SLDR	00779	55275-4
A3XU37	1200-1372	8	2	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A3XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4	05372-60004	5	1	INTERPOLATOR BOARD	28480	05372-60004
A4C2	0160-3879	7	50	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C6	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C7	0180-3813	1	4	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A4C8	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A4C9	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C10	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C11	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C12	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C13	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C14	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C15	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C16	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C17	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C18	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C19	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C23	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C24	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C25	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C26	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C27	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C28	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A4C29	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C31	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C33	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C34	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C35	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C36	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C37	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C38	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C39	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C40	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C46	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A4C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C54	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C55	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4C56	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A4CR1	1901-0050	3	4	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR3	1901-0539	3	2	DIODE-SCHOTTKY SM SIG	28480	1901-0539
A4CR4	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A4CR5	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4CR6	1901-0539	3		DIODE-SCHOTTKY SM SIG	28480	1901-0539
A4DL300	1810-1025	1	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-20
A4DL301	1810-1327	6	2	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A4DL302	8159-0005	0	5	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A4DL303	1810-1025	1		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-20
A4DL304	1810-1327	6		DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A4DL305	1810-1104	7	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-04
A4H1	3050-0098	6	2	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2
A4J2	1250-0836	2	1	CONNECTOR-RF SMC M PC 50-OHM	16179	5064-5006-09
A4L1	9140-1170	4	2	INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A4L2	9140-1170	4		INDUCTOR 1.2UH +-20% .198D-INX.448LG-IN	24226	18M121M-1
A4MP1	0403-0543	2	2	EXTR-PC BD NAT NYL .093-IN-BD-THKNS	13103	5021-09N
A4MP2	0403-0543	2		EXTR-PC BD NAT NYL .093-IN-BD-THKNS	13103	5021-09N
A4P1	1251-7986	9	1	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7986
A4P2	1250-2052	8	4	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A4P3	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A4P4	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A4P5	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A4P6	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A4Q1	1854-0686	0	6	TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A4Q2	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A4Q3	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A4Q4	1854-0019	3	2	TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A4Q5	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A4Q6	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A4Q7	1854-0686	0		TRANSISTOR NPN SI TO-72 PD=200MW FT=4GHZ	28480	1854-0686
A4Q8	1854-0019	3		TRANSISTOR NPN SI TO-18 PD=360MW	28480	1854-0019
A4R2	0699-1991	1	8	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R5	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R6	2100-1984	7	2	RESISTOR-TRMR 100 10% TKF TOP-ADJ 1-TRN	73138	82PR100
A4R7	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R9	0699-1542	8	36	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R10	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A4R11	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R12	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R13	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R14	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R15	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R16	0698-7220	9	2	RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-215R-F
A4R17	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R18	0698-7236	7	2	RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1001-F
A4R19	2100-2061	3	18	RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R20	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R21	0699-2253	0	18	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R22	0698-7205	0	18	RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R23	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R24	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R25	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R26	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R27	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R28	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R29	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R30	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R31	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R32	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R33	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R34	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R35	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R36	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R37	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F
A4R38	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R39	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-51R1-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A4R40	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R41	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R42	0698-7190	2	2	RESISTOR 12.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-12R1-F
A4R43	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R44	0698-7219	6	2	RESISTOR 196 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-196R-F
A4R45	1810-0366	1	2	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A4R46	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R47	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R48	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-2151-F
A4R49	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R50	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R51	0698-7225	4	1	RESISTOR 348 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-348R-F
A4R52	0698-7222	1	2	RESISTOR 261 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-261R-F
A4R53	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R54	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R56	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R59	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R60	2100-1984	7		RESISTOR-TRMR 100 10% TKF TOP-ADJ 1-TRN	73138	82PR100
A4R61	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R64	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-2151-F
A4R65	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R66	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A4R67	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R68	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R69	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R70	0698-7220	9		RESISTOR 215 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-215R-F
A4R71	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R72	0698-7236	7		RESISTOR 1K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-1001-F
A4R73	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R74	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R75	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R76	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R78	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R79	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R80	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R82	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R83	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-2151-F
A4R84	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R85	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R86	0698-7222	1		RESISTOR 261 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-261R-F
A4R87	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R88	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R89	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R90	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A4R91	0698-7219	6		RESISTOR 196 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-196R-F
A4R92	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R93	0698-7190	2		RESISTOR 12.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-12R1-F
A4R94	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R95	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R96	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R97	2100-2061	3		RESISTOR-TRMR 200 10% TKF TOP-ADJ 1-TRN	73138	82PR200
A4R98	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R99	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R100	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R101	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R102	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R103	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R104	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A4R105	0698-7205	0		RESISTOR 51.1 +-1% .05W TF TC=0+-100	12498	C3-1/8-TO-51R1-F
A4R200	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R201	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R300	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A4R301	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R302	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R303	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R304	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R305	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R306	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R307	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R308	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R309	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R310	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R311	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R312	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R313	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R314	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R315	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R316	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4R317	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A4TP1A	1251-2229	3	2	CONNECTOR-SGL CONT SKT .033-IN-BSC-SZ	00779	1-331677-3
A4TP1B	1251-4045	5	2	SOCKET-GROUND SPRING STEEL; 0.190IN ID	28480	1251-4045
A4TP2A	1251-2229	3		CONNECTOR-SGL CONT SKT .033-IN-BSC-SZ	00779	1-331677-3
A4TP2B	1251-4045	5		SOCKET-GROUND SPRING STEEL; 0.190IN ID	28480	1251-4045
A4U2	1820-2000	5	22	IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U3	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U4	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U5	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U6	1858-0055	5	8	TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U7	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U8	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U9	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U10	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U11	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U12	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U13	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U14	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U15	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U16	1820-4079	2	2	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A4U17	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U19	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U20	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U21	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U22	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U23	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U24	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U25	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U26	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U27	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A4U28	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U29	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U30	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U31	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U32	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U33	1820-2000	5		IC FF ECL D-M/S POS-EDGE-TRIG	28480	B196D-0100
A4U34	1858-0055	5		TRANSISTOR ARRAY 14-PIN PLSTC DIP	04713	MPQ2369
A4U300	1NB7-8216	3	2	FLIPFLOP HYBRID	28480	1NB7-8216
A4U301	1NB7-8216	3		FLIPFLOP HYBRID	28480	1NB7-8216
A4W2	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A4W3	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A4W8	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
A4W9	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZ0 1/4
	0361-0028	8	2	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5	05372-60005	6	1	EVENT BOARD	28480	05372-60005
A5C1	0160-3879	7	47	CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C2	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C3	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C4	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C5	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C6	0160-0576	5	49	CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C7	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C8	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C9	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C10	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C11	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C12	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C13	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C14	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C15	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C16	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C17	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C18	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C19	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C20	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C21	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C22	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C23	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C24	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C25	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C26	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C27	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C28	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C29	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C30	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C31	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C32	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C33	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C34	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C35	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C36	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C37	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C38	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C39	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C40	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C41	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C42	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C43	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C44	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C45	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C46	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C47	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C48	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C49	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C50	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C51	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C52	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C53	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C54	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C55	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C56	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C57	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C58	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C59	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C60	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5C61	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C62	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C63	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C64	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C65	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C66	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C67	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C68	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C69	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C70	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C71	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C72	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C73	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C74	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C75	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C76	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C77	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C78	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C79	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C80	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C81	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C82	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C83	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C84	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C85	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C86	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C87	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C88	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C89	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C90	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C91	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C92	0180-3775	4	3	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C93	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C94	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C95	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C96	0180-3775	4		CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A5C97	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5C98	0160-0576	5		CAP-FXD 0.1uF 50 V	09969	RPE121-105X7R104M50V
A5C99	0160-3879	7		CAP-FXD 0.01uF 100 V	09969	RPE121-105X7R103M100V
A5CR1	1901-0050	3	3	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR2	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5CR3	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A5DL1	1810-1327	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-50
A5DL2	1810-1361	8	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-24
A5DL3	1810-1111	6	1	DELAY LINE PASSIVE DEVICE W/SINGLE	11837	DL-1L6-18
A5J1	1250-0835	1	1	CONNECTOR-RF SMC M PC 50-OHM	24931	37JR104-2
A5J3	1250-1692	0	1	CONNECTOR-RF SMA FEM PC 50-OHM	98291	50-663-0099-31
A5J6	1250-2052	8	3	CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J7	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5J8	1250-2052	8		CONNECTOR-RF SM-SNP M PC	00779	221162-1
A5L1	9140-0249	6	3	INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L2	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L3	9140-0249	6		INDUCTOR 30UH .4D-INX.875LG-IN Q=25	54670	3L18-FS
A5L4	9100-0566	6	1	INDUCTOR RF-CH-MLD 4.7UH +-5%	91637	IM-2 4.7UH 5%
A5P1	1252-1755	0	1	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1755
A5P2	1252-1546	7	1	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1546
A5R1	1810-0800	8	8	NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R2	1810-0341	2	8	NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R3	1810-0203	5	3	NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R4	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R5	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R6	1810-0273	9	1	NETWORK-RES 10-SIP 470.0 OHM X 9	C1433	750-101
A5R7	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R8	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R9	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R10	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A5R11	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R13	2100-3751	0	2	RESISTOR-TRMR 10 10% TKF SIDE-ADJ 17-TRN	09969	3105X100
A5R14	0757-0346	2	4	RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A5R15	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A5R16	8159-0005	0	3	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R17	0698-3439	4	2	RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R18	0699-1542	8	8	RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R19	1810-0270	6	8	NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R20	1810-0280	8	10	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R21	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R22	2100-3751	0		RESISTOR-TRMR 10 10% TKF SIDE-ADJ 17-TRN	09969	3105X100
A5R23	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R24	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R25	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R26	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R27	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R28	1810-0203	5		NETWORK-RES 8-SIP 470.0 OHM X 7	C1433	750-81
A5R29	1810-0364	9	1	NETWORK-RES 6-SIP 470.0 OHM X 5	C1433	750-61
A5R30	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R31	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R32	1810-0366	1	4	NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R33	0699-2253	0	11	RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R34	0699-2252	9	11	RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R35	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R36	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R37	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R38	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R39	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R40	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R41	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R42	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R43	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R44	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R45	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R46	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R47	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R48	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R49	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R50	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R51	1810-0270	6		NETWORK-RES 10-SIP 680.0 OHM X 9	C1433	750-101
A5R52	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R53	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R54	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R55	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R56	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R57	1810-0318	3	2	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R58	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R59	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R60	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R61	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R62	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R63	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R64	1810-0800	8		NETWORK-RES 10-SIP 82.0 OHM X 9	91637	MSP10A01
A5R65	1810-0341	2		NETWORK-RES 10-SIP 120.0 OHM X 9	C1433	750-101
A5R66	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R67	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R68	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R69	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R71	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R72	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R73	0699-1542	8		RESISTOR 51 +-1% .125W TF TC=0+-50	11837	RE15YQ-51-F
A5R74	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R75	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R76	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R77	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5R78	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5R79	0699-2254	1	1	RESISTOR 470 +-1% .125W TF TC=0+-50	11837	RE15YQ-471-F
A5R80	0698-3439	4		RESISTOR 178 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-178R-F
A5R81	0699-2253	0		RESISTOR 120 +-1% .125W TF TC=0+-50	11837	RE15YQ-121-F
A5R82	0699-2252	9		RESISTOR 82 +-1% .125W TF TC=0+-50	11837	RE15YQ-82-F
A5R83	1810-0366	1		NETWORK-RES 6-SIP 220.0 OHM X 5	C1433	750-61
A5R84	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A5R85	0757-0346	2		RESISTOR 10 +-1% .125W TF TC=0+-100	D8439	MK2
A5R86	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R87	1810-0280	8		NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A5R88	1810-0318	3		NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A5R91	0699-2281	4	2	RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R92	0699-1991	1	2	RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5R93	0699-2281	4		RESISTOR 330 +-1% .125W TF TC=0+-50	11837	RE15YQ-331-F
A5R94	0699-1991	1		RESISTOR 33 +-1% .125W TF TC=0+-50	11837	RE15 33 OHM F
A5TP1	0360-0124	3	2	CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A5TP4	0360-0124	3		CONNECTOR-SGL CONT PIN .04-IN-BSC-SZ RND	28480	0360-0124
A5U1	1820-4079	2	4	IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U2	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U3	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U4	1820-2849	0	8	IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U5	1818-4134	5	8	IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U6	1820-3121	3	10	IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U7	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U8	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U9	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U10	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U11	1820-3707	1	6	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U12	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U13	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U14	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U15	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U16	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U17	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U18	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U19	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U20	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U21	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U22	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U23	1818-4134	5		IC CMOS 65536 (64K) STAT RAM 35-NS 3-S	S0166	MB81C78A-35PSK
A5U24	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U25	1820-2700	2	2	IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U26	1820-4125	9	2	IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U27	1820-2700	2		IC LCH TTL F D-TYPE OCTL	18324	74F373N
A5U28	1820-4125	9		IC CNTR TTL F BIN UP/DOWN SYNCHRO	18324	74F269N
A5U29	05372-80025	2	1	PAL DMA STA MACH	28480	05372-80025
A5U30	1820-4081	6	2	IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U31	1820-4081	6		IC XLTR ECL/10KH TTL-TO-ECL QUAD	04713	MC10H124P
A5U32	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U33	1820-3579	5	6	IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U34	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U35	1820-3338	4	1	IC GATE ECL/10KH OR-AND-INV DUAL 2-INP	04713	MC10H117P
A5U36	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U37	1820-2900	4	1	IC GATE ECL/10KH OR-NOR DUAL 4-5-INP	04713	MC10H109P
A5U38	1820-2822	9	1	IC GATE ECL/10KH OR-NOR TPL	04713	MC10H105P
A5U39	1820-4159	9	1	IC CNTR ECL/10KH BIN SYNCHRO 4-BIT	04713	MC10H016P
A5U40	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U41	05371-80046	6	1	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U42	05371-80046	6	1	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U43	1820-2635	2	1	IC GATE TTL ALS AND QUAD 2-INP	01295	SN74ALS08N
A5U44	1820-4079	2		IC XLTR ECL/10KH ECL-TO-TTL QUAD	04713	MC10H125P
A5U45	1820-5789	3	8	IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U46	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U47	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U48	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U49	1820-4077	0	2	IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N
A5U50	1820-4077	0		IC LCH TTL AS TRANSPARENT OCTL	01295	SN74AS580N

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A5U51	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U52	1820-2757	9	2	IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U53	1820-2757	9		IC FF TTL ALS D-TYPE POS-EDGE-TRIG OCTL	01295	SN74ALS574BN
A5U54	1820-3707	1		IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A5U55	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U56	1820-3337	3	2	IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U57	1820-2963	9	1	IC GATE ECL/10KH OR DUAL 3-INP	04713	MC10H210P
A5U58	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U59	1820-2823	0	1	IC GATE ECL/10KH NOR QUAD 2-INP	04713	MC10H102P
A5U60	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U61	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U62	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U63	1820-3918	6	1	IC GATE ECL/10KH NOR TPL	04713	MC10H106P
A5U64	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U65	1820-3337	3		IC GATE ECL/10KH AND QUAD 2-INP	04713	MC10H104P
A5U66	1820-2849	0		IC FF ECL/10KH D-M/S DUAL	04713	MC10H131P
A5U67	1820-3579	5		IC SHF-RGTR ECL/10KH BIDIR PAR/SERIAL-IN	04713	MC10H141P
A5U68	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U69	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U70	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U71	1820-5789	3		IC TRANSCEIVER TTL F BUS OCTL	18324	74F646N
A5U72	1DK6-0001	8	1	IC:SEQUENCER	28480	1DK6-0001
A5U73	05371-80046	6	1	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U74	05371-80046	6	1	IC ZERO DEAD TIME COUNTER	28480	05371-80046
A5U75	1820-2693	2	1	IC FF TTL F J-K BAR POS-EDGE-TRIG	18324	74F109N
A5U76	1820-2685	2	1	IC GATE TTL F NOR QUAD 2-INP	18324	74F02N
A5U77	1820-3226	9	2	IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U78	1820-3226	9		IC MUXR/DATA-SEL TTL F 4-TO-1-LINE DUAL	18324	74F253N
A5U79	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U80	1820-3121	3		IC TRANSCEIVER TTL ALS BUS OCTL	01295	SN74ALS245AN
A5U81	1820-3145	1	1	IC DRVR TTL ALS BUS OCTL	01295	SN74ALS244BN
A5W1	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	11502	YZO 1/4
A5XU41	1200-1372	8	5	SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU42	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU72	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU73	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
A5XU74	1200-1372	8		SOCKET-IC-PGA 72-CONT SQUARE DIP-SLDR	10899	1CS072-01TG
	0361-0028	8	4	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0403-0620	6	2	EXTR-PC BD NAT NYL .07-IN-BD-THKNS	13103	5021
	05371-60218	2	2	CBL ASSY COUNT	28480	05371-60218
	05372-60233	2	1	CBL AY-500 MHZ S	28480	05372-60233
	1200-0607	0	2	SOCKET-IC-DIP 16-CONT DIP DIP-SLDR	01295	C8716-01
	1400-0249	0	3	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
	3050-0098	6	4	WASHER-FL MTLC NO. 2 .094-IN-ID	80120	AN960 C2

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A12	05372-60012	5	1	MOTHERBOARD	28480	05372-60012
A12C1	0180-3775	4	1	CAP-FXD 68uF 10 V TA	12344	T398H686K010AS
A12C2	0180-2827	5	1	CAP-FXD 47uF 40 V AL-ELCTLT	56289	672D476H040CD5C
A12C3	0160-4557	0	12	CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C4	0160-4554	7	5	CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C5	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C6	0180-3813	1	2	CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C7	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C8	0180-3831	3	1	CAP-FXD 10uF 35 V TA	12344	T398G106K035AS
A12C9	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C10	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C11	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C12	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C13	0180-3813	1		CAP-FXD 10uF 10 V TA	12344	T398C106K010AS
A12C14	0180-3909	6	1	CAP-FXD 22uF 50 V AL-ELCTLT	00494	SM050T22RM7X20LLV
A12C15	0160-5286	4	6	CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C16	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C17	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C18	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C19	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C20	0160-5286	4		CAP-FXD 0.47uF 100 V	09969	RPE114-477X7R474M100V
A12C21	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C22	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C23	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C24	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C25	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C26	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12C27	0160-4822	2	1	CAP-FXD 1000pF 100 V	09969	RPA20C0G102J100V
A12C28	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C29	0160-4554	7		CAP-FXD 0.01uF 50 V	09969	RPA10X7R103M50V
A12C30	0180-3771	0	1	CAP-FXD 1uF 35 V TA	12344	T398A105K035AS
A12C31	0160-4557	0		CAP-FXD 0.1uF 50 V	09969	RPA30X7R104M50V
A12CR1	1902-1412	5	1	DIODE-ZNR 39V 5% DO-35 PD=.4W TC=+.113%	28480	1902-1412
A12CR2	1884-0310	0	1	THYRISTOR-SCR TO-220AB	04713	MCR69-3
A12CR3	1902-0939	9	1	VOLTAGE SUPPRESSOR VR=5.0V,VC=8V	11961	1N5908
A12CR4	1901-0033	2	3	DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR5	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR6	1901-0050	3	11	DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR7	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR8	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR9	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR10	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR11	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR12	1902-0960	6	1	DIODE-ZNR 12V 5% DO-35 PD=.4W TC=+.077%	50088	1N963B
A12CR13	1901-0518	8	1	DIODE-SCHOTTKY SM SIG	12403	5082-2800
A12CR14	1902-0953	7	1	DIODE-ZNR 6.2V 5% DO-35 PD=.4W TC=+.053%	28480	1902-0953
A12CR15	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR16	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR17	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR18	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12CR19	1901-0033	2		DIODE-GEN PRP 180V 200MA DO-35	9N171	1N645
A12CR20	1902-0952	6	1	DIODE-ZNR 5.6V 5% DO-35 PD=.4W TC=+.046%	28480	1902-0952
A12CR21	1902-0945	7	1	DIODE-ZNR 3V 5% DO-35 PD=.4W TC=-.043%	28480	1902-0945
A12CR22	1901-0050	3		DIODE-SWITCHING 80V 200MA 2NS DO-35	9N171	1N4150
A12J1	1252-2057	7	1	CONN-POST TYPE .156-PIN-SPCG 10-CONT	28480	1252-2057
A12J2	1252-1026	8	3	CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J3	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J4	1252-1026	8		CONN-POST TYPE .100-PIN-SPCG 26-CONT	28480	1252-1026
A12J5	1252-1283	9	1	CONN-POST TYPE .100-PIN-SPCG 24-CONT	28480	1252-1283

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A12J6	1252-0033	5	1	CONN-UTIL P-&-SKT 4-CKT 4-CONT	27264	15-31-1046
A12J7	1251-8339	8	1	CONN-UTIL P-&-SKT 3-CKT 3-CONT	27264	15-31-1036
A12J8	1252-0055	1	1	CONN-POST TYPE .156-PIN-SPCG 2-CONT	28480	1252-0055
A12J9	1251-8837	1	1	CONN-POST TYPE .100-PIN-SPCG 16-CONT	28480	1251-8837
A12J10	1252-1022	4	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-1022
A12J11	1251-6080	2	2	CONN-POST TYPE 2.5-PIN-SPCG 6-CONT	28480	1251-6080
A12J12	1251-6080	2		CONN-POST TYPE 2.5-PIN-SPCG 6-CONT	28480	1251-6080
A12J13	1252-1284	0	1	CONN-POST TYPE .100-PIN-SPCG 40-CONT	28480	1252-1284
A12L1	9100-1788	6	2	CORE-FERRITE CHOKE-WIDEBAND;IMP:>680	11214	LB2/2.5ZB
A12L2	9100-1788	6		CORE-FERRITE CHOKE-WIDEBAND;IMP:>680	11214	LB2/2.5ZB
A12L3	9140-0333	9	2	INDUCTOR RF-CH-MLD 910NH +-5%	91637	IM-2 .91UH 5%
A12L4	9140-0333	9		INDUCTOR RF-CH-MLD 910NH +-5%	91637	IM-2 .91UH 5%
A12Q1	1853-0371	8	1	TRANSISTOR PNP 2N6107 SI TO-220AB	04713	2N6107
A12Q2	1854-0215	1	1	TRANSISTOR NPN SI TO-92 PD=350MW	04713	2N3904
A12R1	0811-1732	8	6	RESISTOR 1 +-5% 3W PWI TC=0+-50	01686	T2B-79
A12R2	0811-1732	8		RESISTOR 1 +-5% 3W PWI TC=0+-50	01686	T2B-79
A12R3	0811-1732	8		RESISTOR 1 +-5% 3W PWI TC=0+-50	01686	T2B-79
A12R4	0698-3429	2	1	RESISTOR 19.6 +-1% .125W TF TC=0+-100	2M627	CRB14 OR CRB2S
A12R5	0811-1732	8		RESISTOR 1 +-5% 3W PWI TC=0+-50	01686	T2B-79
A12R6	0811-1732	8		RESISTOR 1 +-5% 3W PWI TC=0+-50	01686	T2B-79
A12R7	0811-1732	8		RESISTOR 1 +-5% 3W PWI TC=0+-50	01686	T2B-79
A12R8	1810-0280	8	1	NETWORK-RES 10-SIP 10.0K OHM X 9	C1433	750-101
A12R9	0757-0280	3	3	RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A12R10	0757-0442	9	5	RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A12R11	0698-3348	4	1	RESISTOR 4.64K +-1% .5W TF TC=0+-100	K8479	H2
A12R12	0698-3260	9	2	RESISTOR 464K +-1% .125W TF TC=0+-100	12498	CT4
A12R13	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A12R14	0698-3156	2	1	RESISTOR 14.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1472-F
A12R15	0698-3158	4	1	RESISTOR 23.7K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2372-F
A12R16	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A12R17	0698-3154	0	1	RESISTOR 4.22K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4221-F
A12R18	0757-0290	5	1	RESISTOR 6.19K +-1% .125W TF TC=0+-100	19701	5033R-1/8-T0-6191-F
A12R19	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A12R20	1810-0318	3	1	NETWORK-RES 6-SIP 1.0K OHM X 5	C1433	750-61
A12R21	0757-0394	0	5	RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A12R22	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A12R23	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A12R24	0757-0401	0	1	RESISTOR 100 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-101-F
A12R25	0698-3441	8	2	RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A12R27	0837-0175	5	1	POSISTOR 100 OHMS AT 25 DEG C	09969	PTH487A01BC471TS
A12R28	0698-3447	4	1	RESISTOR 422 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-422R-F
A12R29	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A12R30	0757-0394	0		RESISTOR 51.1 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-51R1-F
A12R31	0698-3162	0	2	RESISTOR 46.4K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4642-F
A12R32	0757-0442	9		RESISTOR 10K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1002-F
A12R33	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A12R34	0757-0279	0	1	RESISTOR 3.16K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3161-F
A12R35	0698-3260	9		RESISTOR 464K +-1% .125W TF TC=0+-100	12498	CT4
A12R36	0698-3441	8		RESISTOR 215 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-215R-F
A12R37	0698-8958	2	1	RESISTOR 511K +-1% .125W TF TC=0+-100	12498	CT4
A12R38	1810-0277	3	1	NETWORK-RES 10-SIP 2.2K OHM X 9	C1433	750-101
A12R39	0698-3153	9	1	RESISTOR 3.83K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-3831-F
A12R40	0698-4421	6	1	RESISTOR 249 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-249R-F
A12R41	0698-3243	8	1	RESISTOR 178K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1783-F
A12R42	0757-0280	3		RESISTOR 1K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-1001-F
A12R43	0698-3132	4	1	RESISTOR 261 +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-2610-F
A12R44	0698-3162	0		RESISTOR 46.4K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-4642-F
A12R45	0698-8827	4	1	RESISTOR 1M +-1% .125W TF TC=0+-100	12498	CT4
A12R46	0757-0462	3	1	RESISTOR 75K +-1% .125W TF TC=0+-100	12498	CT4-1/8-T0-7502-F
A12R47	0699-0068	1	1	RESISTOR 1.47M +-1% .125W TF TC=0+-100	D8439	MK2
A12R48	0698-7288	9	1	RESISTOR 147K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-1473-F
A12R49	0698-7244	7	4	RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A12R50	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A12R51	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	CD	Qty	Description	Mfr Code	Mfr Part Number
A12R52	0698-7244	7		RESISTOR 2.15K +-1% .05W TF TC=0+-100	12498	C3-1/8-T0-2151-F
A12S1	3101-2747	5	1	SWITCH-DIP SL 8-1A 0.1A 30VDC	11236	207-8
A12U1	1820-3707	1	1	IC DRVR TTL ALS LINE OCTL	01295	SN74ALS541N
A12U2	1826-0122	0	1	IC V RGLTR-FXD-POS 4.8/5.2V TO-220 PKG	27014	LM340T-5
A12U3	1820-2657	8	1	IC GATE TTL ALS OR QUAD 2-INP	01295	SN74ALS32N
A12U4	1826-1816	1	1	IC TEMP XDCR 3-TO-92 PKG	27014	LM35DZ
A12U5	1820-3560	4	1	IC DRVR TTL ALS NAND LINE HEX 2-INP	01295	SN74ALS804N
A12U6	1826-0147	9	1	IC V RGLTR-FXD-POS 11.5/12.5V TO-220 PKG	04713	UA7812UC
A12U7	1826-0138	8	2	IC COMPARATOR GP QUAD 14-DIP-P PKG	27014	LM339N
A12U8	1820-3270	3	2	IC GATE TTL ALS NAND QUAD 2-INP	01295	SN74ALS03BN
A12U9	1826-0493	8	1	IC OP AMP LOW-BIAS-H-IMPD 8-DIP-P PKG	27014	LM308AN
A12U10	1820-3270	3		IC GATE TTL ALS NAND QUAD 2-INP	01295	SN74ALS03BN
A12U11	1826-0393	7	1	IC V RGLTR-ADJ-POS 1.2/37V TO-220 PKG	27014	LM317T
A12U12	1826-0138	8		IC COMPARATOR GP QUAD 14-DIP-P PKG	27014	LM339N
A12U13	1826-0117	3	1	IC V RGLTR-FXD-POS 11.5/12.5V TO-3 PKG	27014	LM7812KC
A12XA1P1	1251-7865	3	4	CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7865
A12XA1P5	1252-1547	8	5	CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1547
A12XA1P6	1250-2057	3	13	CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA1P7	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA1P8	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA2P1	1251-7865	3		CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7865
A12XA2P5	1252-1547	8		CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1547
A12XA2P7	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA3P1	1252-1726	5	2	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1726
A12XA3P3	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA3P4	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA3P5	1252-1547	8		CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1547
A12XA4P1	1251-7865	3		CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7865
A12XA4P2	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA4P3	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA4P4	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA4P5	1252-1547	8		CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1547
A12XA4P6	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA5P1	1252-1726	5		CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1726
A12XA5P2	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA5P5	1252-1547	8		CONN-POST TYPE .100-PIN-SPCG 64-CONT	28480	1252-1547
A12XA5P6	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA5P8	1250-2057	3		CONNECTOR-RF SM-SLD FEM PC	00779	221158-1
A12XA6P1	1252-1815	3	3	CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1815
A12XA7P1	1252-1815	3		CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1815
A12XA8P1	1252-1815	3		CONN-POST TYPE .100-PIN-SPCG 140-CONT	28480	1252-1815
A12XA9	1251-7865	3		CONN-POST TYPE .100-PIN-SPCG 50-CONT	28480	1251-7865
A12XA10P1	1251-2034	8	3	CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	91637	EB81-BN10TGW
A12XA10P2	1251-2034	8		CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	91637	EB81-BN10TGW
A12XA16	1251-2034	8		CONNECTOR-PC EDGE 10-CONT/ROW 2-ROWS	91637	EB81-BN10TGW
A12XU2A	1252-1861	9	2	CONNECTOR-SGL CONT SKT .041-IN-BSC-SZ	00779	50865-8
A12XU2B	1252-1861	9		CONNECTOR-SGL CONT SKT .041-IN-BSC-SZ	00779	50865-8
	0515-0886	3	1	SCREW-MACH M3 X 0.5 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	1400-1439	2	4	CLAMP-FL-CA .375-WD NYL	02768	8511-46-00-9909
	0515-0897	6	1	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	0535-0004	9	2	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A20	05372-60020	5	1	C-CHANNEL BOARD	28480	05372-60020
A20C1	0160-6100	3	8	CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C2	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C3	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C5	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C7	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C9	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C11	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C12	0160-6100	3		CAP-FXD 1000pF 50 V	06352	C3216CH1H102J
A20C13	0160-7193	6	8	CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C14	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C15	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C16	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C17	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C18	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C19	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20C20	0160-5789	2	2	CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C21	0180-3922	3	1	CAP-FXD 15 uF 20 V	00039	NRD156M20R12
A20C22	0180-3755	0	1	CAP-FXD 33 uF 10 V	00039	NRD336M10R12
A20C23	0160-5789	2		CAP-FXD 33 pF 50 V	06352	C3216CH1H330J
A20C24	0160-7193	6		CAP-FXD 680 pF 50 V	05668	VJ0805A681JXZZT
A20D1	1900-0231	0	3	DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D2	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D3	1900-0231	0		DIODE-SCHOTTKY RING QUAD	05-00	5082-2279
A20D4	1902-1544	4	1	DIODE-ZNR 10 V X% .35W		
A20J1	1250-1675	9	2	CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J2	1250-1675	9		CONNECTOR-RF SMA FEM PC 50-OHM	24931	39JR127-1
A20J3	1252-3345	8	1	CONN-POST TYPE .100-PIN-SPCG 10-CONT	28480	1252-3345
A20L1	9140-1117	9	5	COIL 47 uH 5%	06352	NL45323T-470J
A20L2	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L3	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L4	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L5	9140-1117	9		COIL 47 uH 5%	06352	NL45323T-470J
A20L7	9140-1109	9	2	COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L8	9140-1109	9		COIL 4.7 uH 5%	06352	NL4532332T-4R7J
A20L9	9140-1075	8	4	COIL 1 uH 30%	05826	9140-1075
A20L10	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L11	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20L12	9140-1075	8		COIL 1 uH 30%	05826	9140-1075
A20R1	0699-1318	6	1	RESISTOR 1K +-1% .125W	05524	CRCW1206F
A20R2	0699-2697	6	4	RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R3	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R4	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20R5	0699-2697	6		RESISTOR 200 +-5% 1W	00746	MRC100JZHWJ
A20U1	5088-7037	8	1	1.6 GHZ ATTEN	28480	5088-7037
A20U2	1826-1613	6	4	IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U3	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U4	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U5	1826-1613	6		IC RF/IF AMPL IF 4-CUSTOM PKG	24539	MSA-0485
A20U6	1820-6555	3	1	IC DIVR ECL DIV-X-4	28480	QDMP-7004
	0361-0028	8	14	RIVET-SEMITUB OVH .089DIA .312LG	12014	R-4008
	0515-0894	3	6	SCREW-MACH M2.5 X 0.45 6MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
	05305-00010	6	1	CLAMP-GRNDING	28480	05305-00010
	0535-0008	3	2	NUT-HEX DBL-CHAM M2.5 X 0.45 2MM-THK	00000	ORDER BY DESCRIPTION
	05372-20203	2	1	HEATSINK	28480	05372-20203
	05372-00025	4	1	HYBRID CLAMP	28480	05372-00025
	05372-64020	3	1	BD AY-PCL 68020	28480	05372-64020

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
				MISCELLANEOUS HARDWARE AND CHASSIS PARTS		
A1	05372-60001	8	1	BD AY-TB CONTROL	28480	05372-60001
A2	05372-60002	9	1	BD AY-INPUT AMP	28480	05372-60002
A3	05372-60003	0	1	BD AY-TIME	28480	05372-60003
A4	05372-60004	1	1	BD AY-INTERP	28480	05372-60004
A5	05372-60005	2	1	BD AY-EVENT	28480	05372-60005
A6	05372-60006	3	1	BD AY-CNT SPRT	28480	05372-60006
A7	05372-60007	4	1	BD AY-PROCESSOR	28480	05372-60007
A7U16	05372-80032	3	1	EPROM-80032	28480	05372-80032
A7U17	05372-83033	4	1	EPROM-80033	28480	05372-80003
A7U18	05372-80034	5	1	EPROM-80034	28480	05372-80034
A7U19	05372-83035	6	1	EPROM-80035	28480	05372-80005
A7U52	05372-80036	7	1	EPROM-80036	28480	05372-80036
A7U53	05372-80037	8	1	EPROM-80037	28480	05372-80037
A7U54	05372-80038	9	1	EPROM-80038	28480	05372-80038
A7U55	05372-80039	0	1	EPROM-80039	28480	05372-80039
A8	05372-60008	5	1	BD AY-IO CONTROL	28480	05372-60008
A9	05372-60009	6	1	BD AY-DOUBLE REG	28480	05372-60009
A10	51089-60015	1	1	BD AY TRIPLE REG	28480	51089-60015
A11	05371-60011	3	1	BD AY-FRONT PNL	28480	05371-60011
A12	05372-60012	1	1	BD AY-MOTHER	28480	05372-60012
A13	05372-60013	6	1	BD AY-REAR PANEL	28480	05372-60013
A14	05371-60014	6	1	BD AY-TB MULT	28480	05371-60014
A15	10811-60111	8	1	QUARTZ OSC 10MHZ	28480	10811-60111
A16	51083-60108	7	1	CBL AY-PWR MOD	28480	51083-60108
A17	2090-0209	4	1	CRT ASSY-7" W/PCB	28480	2090-0209
A20	05372-60020	1	1	BD AY-C CHAN 030	28480	05372-60020
A20	05372-60020	1	1	BD AY-C CHAN 090	28480	05372-60020
A22	05372-60022	3	1	BD AY-FAST PORT 020	28480	05372-60022
B1	3160-0521	3	1	FAN-TBAX 100-CFM 12VDC	11045	4312-26
C1	0180-3572	9	1	CAP-FXD 50 V AL-ELCTLT	56289	36DE373G050BF2A
C2	0160-3036	8	4	CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C3	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C4	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
C5	0160-3036	8		CAP-FXD 5000PF 0 V	09553	2425-011 X5V 502Z
CR1	1906-0231	2	1	DIODE-CT-RECT 200V 15A	28480	1906-0231
F1	2110-0303	9	1	FUSE (INCH) 2A 250V NTD FE UL (SLOW BLO)	75915	312 002
F1	2110-0055	2	1	FUSE (INCH) 4A 250V NTD FE UL (SLOW BLO)	75915	312 004
H1	0380-1523	0	2	STANDOFF-HEX 10.1-MM-LG M3.5 X 0.6-THD	14480	TJL 100.305
H3	0515-0411	0	4	SCREW-MACH M3 X 0.5 22MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H4	0515-0885	2	19	SCREW-MACH M4 X 0.7 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6		SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-0897	6	77	SCREW-MACH M3 X 0.5 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H6	0515-0896	5	14	SCREW-MACH M4 X 0.7 10MM-LG	00000	ORDER BY DESCRIPTION
H7	0515-1110	8	6	SCREW-MACH M3 X 0.5 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H8	0515-1132	4	4	SCREW-MACH M5 X 0.8 10MM-LG	00000	ORDER BY DESCRIPTION
H9	0515-1232	5	10	SCREW-MACH M3.5 X 0.6 8MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H10	0515-1323	5	20	SCREW-MACH M3 X 0.5 30MM-LG PAN-HD	00000	ORDER BY DESCRIPTION

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
H11	0515-1331	5	16	SCREW-METRIC SPECIALTY M4 X 0.7 THD; 7MM	00000	ORDER BY DESCRIPTION
H13	0515-1430	5	11	SCREW-MACH M3 X 0.5 8MM-LG 90-DEG-FLH-HD	00000	ORDER BY DESCRIPTION
H15	0515-1824	1	4	SCREW-TPG M4 X 0.7 12MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H16	0535-0004	9	2	NUT-HEX DBL-CHAM M3 X 0.5 2.9MM-THK	00000	ORDER BY DESCRIPTION
H17	0535-0110	8	29	NUT-SPECIALTY LKG 2.41MM-THK 9.53MM-WD	00000	ORDER BY DESCRIPTION
H18	0361-1272	6	4	FASTNER, PLASTIC PUSH	00000	ORDER BY DESCRIPTION
H19	2190-0011	8	2	WASHER-LK INTL T NO. 10 .195-IN-ID	78189	1910-00
H20	2190-0102	8		WASHER-LK INTL T 15/32 IN .472-IN-ID	78189	1922-01
H21	2190-0577	1	2	WASHER-LK HLCL NO. 10 .194-IN-ID	28480	2190-0577
H22	2360-0115	4	2	SCREW-MACH 6-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H23	2360-0201	9	2	SCREW-MACH 6-32 .5-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H23	6960-0002	4	3	PLUG-HOLE TR-HD FOR .5-D-HOLE STL	71785	SS-48152-K1110
H24	2680-0129	8	2	SCREW-MACH 10-32 .312-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H25	2950-0035	8	8	NUT-HEX-DBL-CHAM 15/32-32-THD	00000	ORDER BY DESCRIPTION
H26	3050-0589	0	12	WASHER-FL NM NO. 5 .136-IN-ID .375-IN-OD	86928	5610-12-32
H27	5081-7683	6	1	NUT-BNC	28480	5081-7683
H29	05371-20205	3	1	PLUG-OPTION 060	28480	05371-20205
H30	54100-25701	0	1	NUT-POD LOCK	28480	54100-25701
H31	0515-1105	1	2	SCREW-MACH M3 X 0.5 10MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H37	0624-0481	5	2	SCREW-TPG 2-28 .219-IN-LG PAN-HD-POZI	00000	ORDER BY DESCRIPTION
H38	0590-0505	1		NUT KNURLED 030	00000	ORDER BY DESCRIPTION
H38	0590-0505	1	2	NUT KNURLED 090	00000	ORDER BY DESCRIPTION
H40	6960-0010	4	1	PLUG-HOLE TR-HD FOR .625-D-HOLE STL	71785	SS-48172-K1110
MP1	05371-00009	3	1	SHIELD-RF CAVITY	28480	05371-00009
MP2	05372-00010	7	1	CAGE-CARD	28480	05372-00010
MP3	05371-00011	7	1	BRKT-PROBE	28480	05371-00011
MP4	9100-4807	6	1	XFMR-PWR 100/120/220/240V	09535	5181-0138
MP5	05372-00014	1	1	COV-RF CAVITY	28480	05372-00014
MP6	05372-00015	2	1	PANEL-REAR	28480	05372-00015
MP7	05372-00016	3	1	COV-PWR SPLY	28480	05372-00016
MP8	05371-40001	9	1	PANEL-FRONT	28480	05371-40001
MP9	05372-40001	0	1	KEY PAD	28480	05372-40001
MP10	05371-80004	6	1	WINDOW-5371	28480	05371-80004
MP11	05371-80021	7	1	SHIELD DUST CRT	28480	05371-80021
MP12	1400-0611	0	2	CLAMP-FL-CA 1-WD	06383	FCC-A-C8
MP13	1460-1345	5	2	TILT STAND SST	28480	1460-1345
MP14	3160-0562	2	1	FINGER GUARD	10960	08213
MP15	5001-0540	2	2	SIDE-TRIM	28480	5001-0540
MP16	5021-8405	6	1	FRAME-FRONT	28480	5021-8405
MP17	5021-5806	5	1	FRAME-REAR	28480	5021-5806
MP18	5021-5838	3	4	CORNER STRUT	28480	5021-5838
MP19	5041-8801	8	4	FOOT	28480	5041-8801
MP20	5041-8802	9	1	TOP-TRIM	28480	5041-8802
MP21	5041-8821	2	4	STANDOFF-REAR	28480	5041-8821
MP22	5041-8819	8	2	STRP-HDLE CAP TR	28480	5041-8819
MP23	5041-8820	1	2	STRP-HDLE CAP R	28480	5041-8820
MP24	5062-3705	5	2	STRAP HANDLE AY	28480	5062-3705
MP25	5062-3736	2	1	TOP COVER	28480	5062-3736
MP26	5062-3990	0	1	KIT-HANDL7"SYS2+	28480	5062-3990
MP27	01650-47401	7	1	KNOB	28480	01650-47401
MP28	05371-00024	2	1	BOTTOM-COVER	28480	05371-00024
MP29	05371-00025	3	2	SIDE COVER	28480	05371-00025
MP30	05371-00021	9	1	BRKT-CRT PCB	28480	05371-00021
MP31	05371-20204	2	1	CAVITY-RF	28480	05371-20204
MP32	54100-45201	7	2	PROBE GUIDE	28480	54100-45201
MP33	54100-64101	6		COVER-POD 060	28480	54100-64101
MP33	54100-64101	6	4	COVER-POD 090	28480	54100-64101
MP34	05371-80025	1	1	INSULATOR	28480	05371-80025
MP35	0340-0596	1	1	INSULATOR-XSTR THRM-CNDCT	55285	7403-09FR-04
MP36	0340-0685	9	1	INSULATOR MYLAR CLEAR	28480	0340-0685
MP37	05371-00022	0	1	SHIELD SAFETY	28480	05371-00022
MP38	05371-00023	1	1	SHIELD-CABLE	28480	05371-00023
MP39	1400-0249	0	6	CABLE TIE .062-.625-DIA .091-WD NYL	16956	08-465/GRAY
MP40	3160-0583	7	4	FASTENING CLIP FOR USE WITH MOUNTING	11045	LZ212
MP41	1250-1562	3	1	ADAPTER-COAX STR F-N M-SMA	16179	CD705488-002
MP42	1400-1231	2	5	CLIP-CORD 1.0 IN BY 0.5 IN; ADHESIVE	02768	8511-37-00

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Table 4-2. Replaceable Parts (Continued)

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
S1	3101-2906	8	1	SWITCH-RKR SUBMIN SPDT 3A 250VAC	78553	B123J1ZQ1E
T1	9100-4807	3	1	TRANSFORMER-POWER 100/120/220/240V	28480	9100-4807
W3	8120-5321	2	1	CABLE ASSEMBLY-COAXIAL 50 OHM; RIBBON	00779	413438-1
W4	05372-60201	4	1	CBL-AY PWR SUP	28480	05372-60201
W5	05371-60202	4	1	CBL AY FRT PANEL	28480	05371-60202
W7	05372-60205	8	1	CBL-AY HPIB	28480	05372-60205
W9	05371-60207	9	1	CBL AY X CHANNEL	28480	05371-60207
W10	05371-60208	0	2	CBL AY REAR INPT060	28480	05371-60208
W11	05371-60208	0		CBL AY REAR INPT090	28480	05371-60208
W12	05372-60215	0		CBL-AY X CHANNEL060	28480	05372-60215
W12	05372-60215	0	2	CBL-AY X CHANNEL090	28480	05372-60215
W13	05372-60216	1	2	CBL-AY-CLK SHORT	28480	05372-60216
W14	05372-60216	1		CBL-AY-CLK SHORT	28480	05372-60216
W15	05372-60217	2	1	CBL-AY-CLK LONG	28480	05372-60217
W16	05371-60220	6	2	CBL ASSY CLOCK	28480	05371-60220
W17	05371-60220	6		CBL ASSY CLOCK	28480	05371-60220
W18	05372-60221	8	1	CBL-AY TB POWER	28480	05372-60221
W19	05371-60222	8	2	CBL AY-POD	28480	05371-60222
W20	05371-60222	8		CBL AY-POD	28480	05371-60222
W21	05371-60223	9	1	CBL AY-XCHAN EXT	28480	05371-60223
W22	8120-1378	1	1	POWER CORD SET 18-AWG 3-COND 90-IN-LG	11383	PS-204-625
W23	54100-67602	8	2	CUSTOMER CONN ASSY	28480	54100-67602
W24	54100-67602	8		CUSTOMER CONN ASSY	28480	54100-67602
W26	05372-60224	1	1	CBL-AY FRNT PNL 030	28480	05372-60224
W27	05372-60229	6		CBL-AY-PWR C-CHL030	28480	05372-60229
W27	05372-60229	6	2	CBL-AY-PWR C-CHL090	28480	05372-60229
W28	05372-60230	9		CBL-AY C CHANNEL030	28480	05372-60230
W28	05372-60230	9	2	CBL-AY C CHANNEL090	28480	05372-60230
W29	05372-60231	0		CBL AY-CCHAN EXT030	28480	05372-60231
W29	05372-60231	0	2	CBL AY-CCHAN EXT090	28480	05372-60231
W30	05372-60232	1	1	CBL-AY RR PNL CH090	28480	05372-60232
W31	05372-60225	2	1	CBL-AY FST PRT 1020	28480	05372-60225
W32	05372-60226	3	1	CBL-AY FST PRT 2020	28480	05372-60226
W33	05372-60227	4	1	CBL-AY FST PRT 3020	28480	05372-60227
	05372-00027	6	1	SHLD-TRANS	28480	05372-00027
	05372-80001	4	1	LABEL-FRONT 5372A	28480	05372-80001
	05372-80010	5	1	LABEL-FRONT OPT 030	28480	05372-80010
	05372-90001	5	1	MNL-OPERATING	28480	05372-90001
	05372-90003	7	1	MNL-PROGRAMMING	28480	05372-90003
	05372-90005	9	1	MNL-OPERATING	28480	05372-90005
	05372-90006	0	1	MNL-PROGRAMMING	28480	05372-90006
	05372-90007	1	1	MNL-GETTING STR	28480	05372-90007
	05372-90010	6	1	MNL-GETTING STR	28480	05372-90010
	05372-90012	8	1	MANUAL-OPT #20 020	28480	05372-90012
	0590-1251	6	3	NUT-SPCLY 15/32-32-THD .1-IN-THK .562-WD	00000	ORDER BY DESCRIPTION
	1252-3348	1	3	CONN-RECT D-MICROMIN 40-CKT 40-CONT	28480	1252-3348
	1400-0507	3	1	CABLE TIE .062-2-DIA .095-WD NYL	06383	PLT-2M-M
	1400-1439	2	1	CLAMP-FL-CA .375-WD NYL	02768	8511-46-00-9909
	2190-0102	8	6	WASHER-LK INTL T 15/32 IN .472-IN-ID	78189	1922-01
	5040-6967	1	8	CTN	28480	5040-6967
	5040-6974	0	1	COVER-FRONT	28480	5040-6974
	5062-1234	1	1	LBL KIT OPT W30	28480	5062-1234
	8120-5322	3	3	MULTI-CONTACT ASSY 28-AWG 40-COND	00779	749658-1
	9211-6317	2	1	CARTON-CORRUGATED RSC 36.25-IN-LG	28480	9211-6317
	9220-4722	8	2	PAD-CORR SCRD 40IN-LG 11.437IN-WD	28480	9220-4722
	9220-4723	9	1	PAD-CORR SCRD 58.5IN-LG 11.437IN-WD	28480	9220-4723
	9220-4724	0	1	SEPARATOR-CORR 16.75-IN-LG 16.75-IN-WD	28480	9220-4724
	9222-0533	5	3	BAG-PLSTC POLYETH FLM ENV 2X0-IN-OPNG	28480	9222-0533
	5062-3978	4	1	RACK MOUNT KIT 908	28480	5062-3978
	5062-4072	1	1	RACK MOUNT KIT 913	28480	5062-4072
	54002A	3	1	50 OHM POD	28480	54002A

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Table 4-3. Code List of Manufacturers

Mfr Code	Manufacturer Name	Address	Zip Code
C1433	AB ELEKTRONIK GMBH	SALZBURG AU	A-501
D8439	ROEDERSTEIN/RESISTA GMBH	LANDSHUT GM	8300
K8479	HOLSWORTHY ELECTRONICS LTD	HOLSWORTHY EG	
S0166	FUJI KOHKI LTD	JP	
S0562	TOSHIBA CORP	TOKYO JP	
00000	ANY SATISFACTORY SUPPLIER		
00494	ADDRESSOGRAPH FARRINGTON	TREVOSE PA	44117
00779	AMP INC	HARRISBURG PA US	17111
00843	HOFFMAN ENG CO DIV OF FED CARTRIDGE	ANOKA MN	55303
01295	TEXAS INSTRUMENTS INC	DALLAS TX US	75265
01686	RCL ELECTRONICS INC	NORTHBROOK IL US	60062
02768	ITW FASTEX	DES PLAINES IL US	60016
04713	MOTOROLA INC	ROSELLE IL US	60195
06383	PANDUIT CORP	TINLEY PARK IL US	60477
06665	PRECISION MONOLITHICS INC	SANTA CLARA CA US	95054
09535	JOHNSON MATTHEY AND MALLORY LTD	TORONTO CN	
09553	MARCONI INSTR DIV ENGLISH ELEC CORP	ENGLEWOOD NJ	07631
09969	DALE ELECTRONICS INC	YANKTON SD US	57078
10214	GENERAL TRANSISTOR WESTERN CORP	LOS ANGELES CA	90000
10380	CAMBRIDGE WIRE CLOTH CO THE	CAMBRIDGE MA	21613
10411	TI-TAL INC	SANTA MONICA CA	90405
10899	EASTERN AIR DEVICES INC	GREAT NECK NY	11021
10960	T D R ELECTRONICS INC	BRISTOL RI	02809
11045	AM CASTLE & CO INC	FRANKLIN PARK IL US	60131
11214	HARDIGG IND INC	S DEERFIELD MA	01373
11236	CTS CORP	ELKHART IN US	46514
11383	AMETEK/ALUMINUM EXTRUSION	LOS ANGELES CA	90065
11502	IRC INC	BOONE NC US	28607
11837	ELECTRO SCIENTIFIC INDUSTRIES INC	PORTLAND OR	97229
11961	SEMICON INC	BURLINGTON MA	01803
12014	CHICAGO RIVET & MACHINE CO	NAPERVILLE IL US	60540
12344	TALLY CORP	KENT WA	98031
12403	CANFIELD H O CO OF INDIANA INC THE	SEYMOUR IN	47274
12498	CRYSTALONICS, DIV TELEDYNE	CAMBRIDGE MA	02140
13103	THERMALLOY INC	DALLAS TX US	75234
14480	LOBAUGH ROLLIN J	SOUTH SAN FRANC CA US	94080
15542	MINI-CIRCUITS LAB	BROOKLYN NY US	11235
16179	M/A-COM INC	BURLINGTON MA US	01803
16956	DENNISON MFG CO	FRAMINGHAM MA US	01701
18324	SIGNETICS CORP	SUNNYVALE CA US	94086
18565	CHOMERICS INC	WOBURN MA	01801
19701	MEPCO/CENTRALAB INC	RIVIERA FL US	33404
2M627	ROHM CORP	IRVINE CA US	92713
24226	GOWANDA ELECTRONICS CORP	GOWANDA NY US	14070
24355	ANALOG DEVICES INC	NORWOOD MA US	02062
24539	AVANTEK INC	SANTA CLARA CA US	95054
24931	SPECIALTY CONNECTOR CO	FRANKLIN IN US	46131
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA CA US	95052
27264	MOLEX INC	LISLE IL US	60532
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO CA	94304
34649	INTEL CORP	SANTA CLARA CA US	95054
46384	PENN ENGINEERING & MFG CORP	DOYLESTOWN PA US	18901
5N615	OMRON CORPORATION OF AMERICA	SCHAUMBURG IL	60172
50088	SGS-THOMSON MICROELECTRONICS INC	PHOENIX AZ US	85022
54670	ARIZONA COIL INC	NOGALES AZ	85621
55285	BERGQUIST CO	MINNEAPOLIS MN	55420
56289	SPRAGUE ELECTRIC CO	LEXINGTON MA US	02173
71785	TRW INC	CLEVELAND OH US	44124
73138	BECKMAN INDUSTRIAL CORP	FULLERTON CA US	92635
75915	LITTELFUSE INC	DES PLAINES IL US	60016
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF	ELGIN IL	60126
80120	SCHNITZER ALLOY PRODUCTS CO	ELIZABETH NJ	07206
86928	SEASTROM MFG CO	GLENDALE CA	91201
9N171	UNITRODE CORP	LEXINGTON MA US	02173
91637	DALE ELECTRONICS INC	COLUMBUS NE US	68601
92912	BEL FUSE INC	JERSEY CITY NJ US	07302
98291	ITT SEALECTRO CORP	TRUMBULL CT US	06611

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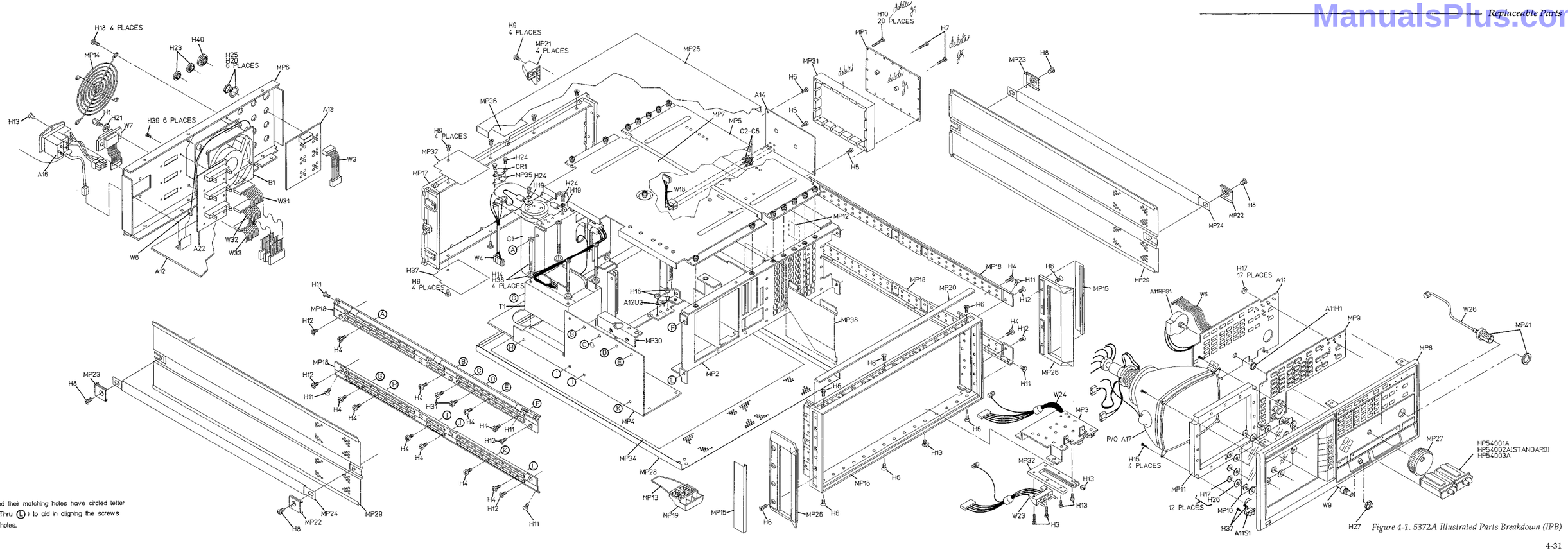

NOTE:
Some screws and their matching holes have circled letter references (Ⓐ Thru Ⓛ) to aid in aligning the screws with the correct holes.

Figure 4-1. 5372A Illustrated Parts Breakdown (IPB)

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5

OVERALL TROUBLESHOOTING

5-1. INTRODUCTION

The HP 5372A Service Manual provides both component and assembly level troubleshooting information. The service strategy for the HP 5372A is to repair specific boards to the component level and all others to the assembly level. This chapter provides troubleshooting procedures which will help determine the faulty assembly. Then, one of three actions should be taken:

1. replace specified component(s),
2. replace the assembly, or
3. further troubleshoot the assembly to the component level.

The course of action will depend upon whether a diagnostic test failure message appears on the CRT display, and which assembly has been determined to be faulty. The following six boards are to be serviced to the component level:

A2 Input Amplifier Board
A3 Time Board
A4 Interpolator Board
A5 Event Board
A12 Motherboard
A20 C-Channel Board

The remaining boards within the HP 5372A are to be serviced to the assembly level, except when a diagnostic test failure message specifies a specific faulty component.

NOTE

Component level circuit descriptions and troubleshooting procedures for the A2, A3, A4, A5, A12, and A20 assemblies are located in Chapters 7 through 12, respectively.

5-2. DIAGNOSTICS

The HP 5372A has built-in diagnostics that help in the troubleshooting of faulty components and assemblies. There are three types of diagnostics:

1. Power-Up Self Test: A series of tests automatically executed when the HP 5372A is powered up.

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2. User-selected Self Test: A series of tests executed by selecting "Self Test" via the Test key.
3. User-selected Diagnostics: Individual tests that exercise specific circuitry within the HP 5372A. These tests are executed manually by selecting the individual tests via the Test key.

NOTE

Detailed information on each diagnostic test is listed in Appendix C.

5-3. Diagnostic Test Procedure

Before removing the top cover of the instrument, the front panel diagnostic test routines should be used to help identify the faulty assembly. In this procedure, the Power-up Self Test is executed automatically, and then additional diagnostic tests are executed manually. The Power-up Self Test exercises diagnostic tests 2 through 16, test 18, and two additional tests, Back-up RAM and Front Panel Keyboard Initialization.

1. Before connecting the power cord and switching on the instrument, be sure that the line voltage selector is properly set, the correct fuse is installed, and all safety precautions have been observed.
2. Connect the HP 5372A power cord to the primary power source, and set the STBY-ON power switch to ON. Verify the Power-up Self Test routine, as follows:
   a. After 3 seconds, the screen displays the words "Performing Self Test ..."
   b. After a few more seconds, and if there are no error or failure messages, the Function screen is displayed.
   c. If the HP 5372A CRT displays an error or failure message, refer to *Table 5-1*, "Summary of HP 5372A Failure Symptoms". If the CRT does not display an error or failure message, then continue with step 3.

NOTE

When the built-in diagnostics detect a failure, the CRT may display specific faulty components. If only one component is specified, then this component should be replaced first before any other troubleshooting action is taken. However, if more than one component is specified, the fault is usually the support circuitry for the specified ICs. In this case, refer to Appendix C for detailed information on the diagnostic test(s).

3. Press HP 5372A Test key.
4. Press "19" on the DATA ENTRY numeric keypad, and then press the Enter key.
5. Press the **Run** softkey.

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6. Press the front panel keys one at a time and verify the key name corresponds to the Front Panel Test "Key" field. Also, move the ENTRY/MARKER knob in both directions and verify the direction with the Front Panel Test "Key" field. If the "key" field does not correspond to the key pressed or to the knob direction, then replace the A11 Front Panel board.
7. Press "21" on the DATA ENTRY numeric keypad, and then press the ENTER key.
8. Press the **Run** softkey.
9. Verify that the CRT pattern covers the CRT display with a medium green color, and then press the Test key. If the CRT pattern is not correct, perform the A17 CRT and CRT Driver Board Adjustment Procedure located in chapter 3. If that doesn't correct the problem, then replace the A17 CRT and CRT Driver Board.
10. Press "22" on the DATA ENTRY numeric keypad, press the ENTER key, and then press the **Run** softkey. The CRT displays a simulated waveform of the comparator output of the External Arm circuit. With no signal applied to the External Arm input, the CRT should display the External Amp level as "LO". If the CRT does not indicate the correct level, then replace the A6 Count Support Board.
11. Using an HP 3325A, input a 10 MHz, 1 Vp-p sinewave to the External Arm input, and verify the CRT indicates the External Amp is now at the "HI" level. If the CRT does not indicate the correct level, then replace the A6 Count Support Board.
12. Press the **Stop** softkey when satisfied the External Amplifier Test has passed.
13. Press "23" on the DATA ENTRY numeric keypad, and then press the Enter key.
14. Using an HP 3325A, input a 10 MHz, 1 Vp-p sinewave to the Channel A input pod.
15. Press the **Run** softkey.
16. After 30 seconds, verify that there are no Randomizer test failures, and then press the **Stop** softkey. If there are Randomizer test failures, refer to the A2 Input Amplifier Troubleshooting in chapter 7.
17. If there have not been any diagnostic test failures, refer to the Summary of HP 5372A Failure Symptoms for other non-diagnostic failure symptoms.

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5-4. SUMMARY OF HP 5372A FAILURE SYMPTOMS

This summary lists all diagnostic test failures and a specific troubleshooting procedure for each. In addition, other possible failure symptoms are listed.

Table 5-1. Summary of HP 5372A Failure Symptoms

FAILURE SYMPTOM	TROUBLESHOOTING PROCEDURE
Diagnostic Test 2 – Time Base	See section 5-8 (A1/A14 Troubleshooting)
Diagnostic Test 3 – Input Pods	1. Replace Ch A and/or Ch B input pods 2. Replace A1 assembly
Diagnostic Test 4 – Input Amps	Proceed to chapter 7 (A2 Input Amplifier)
Diagnostic Test 5 – Histogram	Proceed to chapter 8 (A3 Time)
Diagnostic Test 6 – Count ICs	Proceed to chapter 10 (A5 Event)
Diagnostic Test 7 – Gate Timer	Replace A6 assembly
Diagnostic Test 8 – Measurement RAM	Proceed to chapter 10 (A5 Event)
Diagnostic Test 9 – System ROM	1. Replace specified A7 IC(s) U16 (HP P/N 05372-80002) U17 (HP P/N 05372-80003) U18 (HP P/N 05372-80004) U19 (HP P/N 05372-80005) U52 (HP P/N 05372-80006) U53 (HP P/N 05372-80007) U54 (HP P/N 05372-80008) U55 (HP P/N 05372-80009) 2. See section 5-19 (A7 Troubleshooting) 3. Replace A7 assembly
Diagnostic Test 10 – System RAM	1. Replace specified A7 IC(s) U10 (HP P/N 1818-4036) U11 (HP P/N 1818-4036) U12 (HP P/N 1818-4036) U13 (HP P/N 1818-4036) U34 (HP P/N 1818-4036) U35 (HP P/N 1818-4036) U36 (HP P/N 1818-4036) U37 (HP P/N 1818-4036) 2. See section 5-19 (A7 Troubleshooting) 3. Replace A7 assembly
Diagnostic Test 11 – Non-volatile RAM	1. Replace specified A7 IC(s) U20 (HP P/N 1818-3760) U56 (HP P/N 1818-3760) 2. See section 5-19 (A7 Troubleshooting) 3. Replace A7 assembly
Diagnostic Test 12 – Real Time Clock	1. Probe pin 13 of A7U78 (1 Hz expected) Probe pin 2 of A7Y2 (32.7 kHz expected) Replace IC(s) if needed: A7U78 (HP P/N 1820-3834) A7Y2 (HP P/N 0410-1617) 2. Replace A7 assembly
Diagnostic Test 13 – Coprocessor	1. Replace A7U22 (HP P/N 1820-4141) 2. See section 5-19 (A7 Troubleshooting) 3. Replace A7 assembly

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Table 5-1. Summary of HP 5372A Failure Symptoms (Continued)

FAILURE SYMPTOM	TROUBLESHOOTING PROCEDURE
Diagnostic Test 14 – CRT RAM	1. Replace specified A8 IC(s) U15 (HP P/N 1818-3538) U19 (HP P/N 1818-3538) U23 (HP P/N 1818-3538) U27 (HP P/N 1818-3538) 2. See section 5-20 (A8 Troubleshooting) 3. Replace A8 assembly
Diagnostic Test 15 – LED Latch	1. Replace specified A8 IC(s) 2. See section 5-20 (A8 Troubleshooting) 3. Replace A8 assembly
Diagnostic Test 16 – CRT Controller	1. Replace A8U12 (HP P/N 1820-2546) 2. Replace A8U7 (HP P/N 05372-80024) 3. See section 5-20 (A8 Troubleshooting) 4. Replace A8 assembly
Diagnostic Test 17 – Key Controller	1. Replace A8U1 (HP P/N 1820-2564) 2. See section 5-20 (A8 Troubleshooting) 3. Replace A8 assembly
Diagnostic Test 18 – DMA Controller	1. Replace A8U30 (HP P/N 1820-2732) 2. See section 5-20 (A8 Troubleshooting) 3. Replace A8 assembly
Diagnostic Test 19 – Front Panel	Replace A11 assembly
Diagnostic Test 21 – CRT Video Pattern	1. Perform A17 CRT adjustments (Ch 3) 2. Replace A17 assembly (CRT and board)
Diagnostic Test 22 – External Amp	Replace A6 assembly
Diagnostic Test 23 – Randomizer	Proceed to chapter 7 (A2 Input Amplifiers)
Error 107 – Time Base unlocked	See section 5-8 (A1/A14 Troubleshooting)
Error 108 – Channel A and B overvoltage	Replace A1 assembly
Error 109 – Channel A overvoltage	Replace A1 assembly
Error 110 – Channel B overvoltage	Replace A1 assembly
Error 160 – Out of sensitivity cal.	1. Check A7 battery A7BT1 (3.6 V expected). Replace if needed (HP P/N 1420-0331) 2. Perform Cal. Sensitivity adjustment (refer to Chapter 3, A2 Adjustments).
Dead Instrument – No display	See section 5-5 (Dead Instrument Troubleshooting)
Measurement Accuracy is 2 ns or worse	Proceed to chapter 9 (A4 Interpolator)
Unstable Measurements	Proceed to chapter 9 (A4 Interpolator)
Large Miscount Errors	Proceed to chapter 10 (A5 Event)
Front Panel Lock Up	Replace A6 assembly
HP-IB Binary Output failing	Replace A6 assembly
HP 5372A display never updates	Replace A6 assembly
Incorrect Measurement Results	Replace A6 assembly
HP 5372A External Arm Input not functioning	Replace A6 assembly
HP 5372A Totalize function not working	Proceed to chapter 8 (A3 Time)

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5-5. DEAD INSTRUMENT TROUBLESHOOTING

This section is to be followed when the screen diagnostics are unusable.

NOTE

EXTREMELY HIGH VOLTAGE LEVELS ARE PRESENT IN THE AREA OF THE CATHODE RAY TUBE (CRT) AND DRIVER BOARD ASSEMBLY WHEN THE HP 5372A IS CONNECTED TO AC POWER. USE EXTREME CAUTION WHEN TROUBLESHOOTING WITH THE POWER SUPPLY COVER REMOVED.

1. Connect the HP 5372A to the primary power source, and set the front panel STBY-ON power switch to STBY. Verify that the STBY LED (red LED on front panel) is illuminated. If the LED is ON, then proceed with Step 2. If the LED is Off, then perform the following sequence:
   a. Check the line fuse and line voltage setting on the power module (rear panel).
   b. Verify the voltage on capacitor C1 is 28 V. If the voltage is not correct, then perform the following:
      1) Verify the voltage at both the blue wires of A12J6 is 56 V (A12J6 is marked "26 V" on the top side of the A12 Motherboard). If this voltage is not correct, then replace CR1 and C1.
2. Measure voltage regulators as shown in *Figure 5-1*.
   a. The regulators are interlocked as follows:
      - The A10 Triple Regulator (+5V, +15V, and –15V) SHUTDOWN input must be at a low (0V) logic level. (This level will be measured in Step 3.)
      - The –15V must be present before the the +5V and +15V can come up.
      - The A9 Dual Regulator (–5.2V and –3.3V) will not come up until the A10 Triple Regulator is operating.
   b. If either of the regulators are faulty, replace with new assemblies.
3. Measure voltages and signals on the bottom side of the A12 Motherboard as shown in *Figure 5-2*.
4. If the CRT screen is blank and the input signals +12, VIDEO, HSYNC, and VSYNC are present on the A12 Motherboard, replace the CRT assembly. The CRT is replaceable as a complete unit (CRT and Driver Board). You may want to swap just the PC board portion first to see if that corrects the problem.
5. If the A9 and A10 Regulator, and A12 Motherboard voltages are okay, continue troubleshooting the A7 Processor and A8 I/O Controller boards (sections 5-19 and 5-20, respectively).

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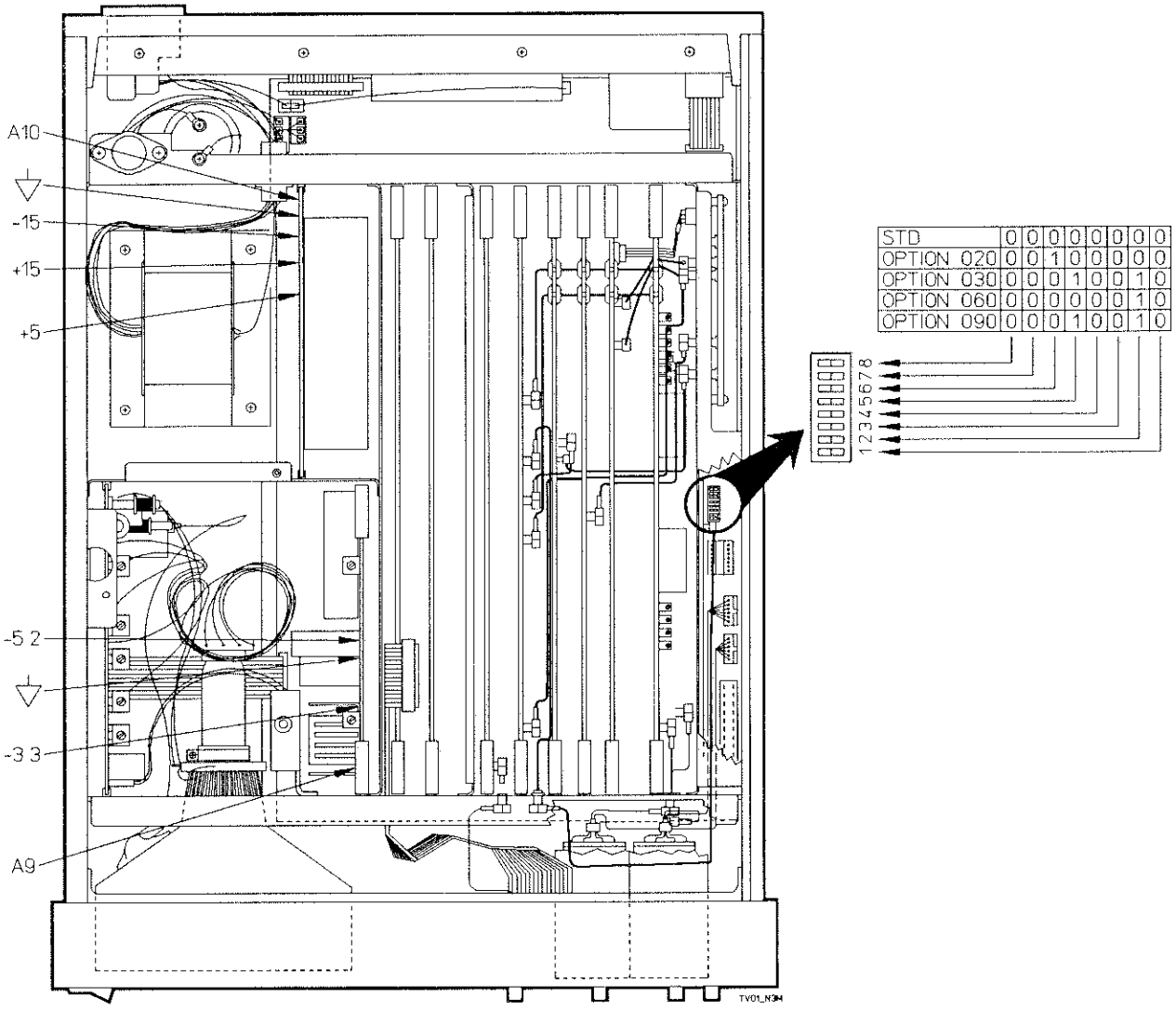

Figure 5-1. HP 5372A Power Supply Locator (Instrument Top View)

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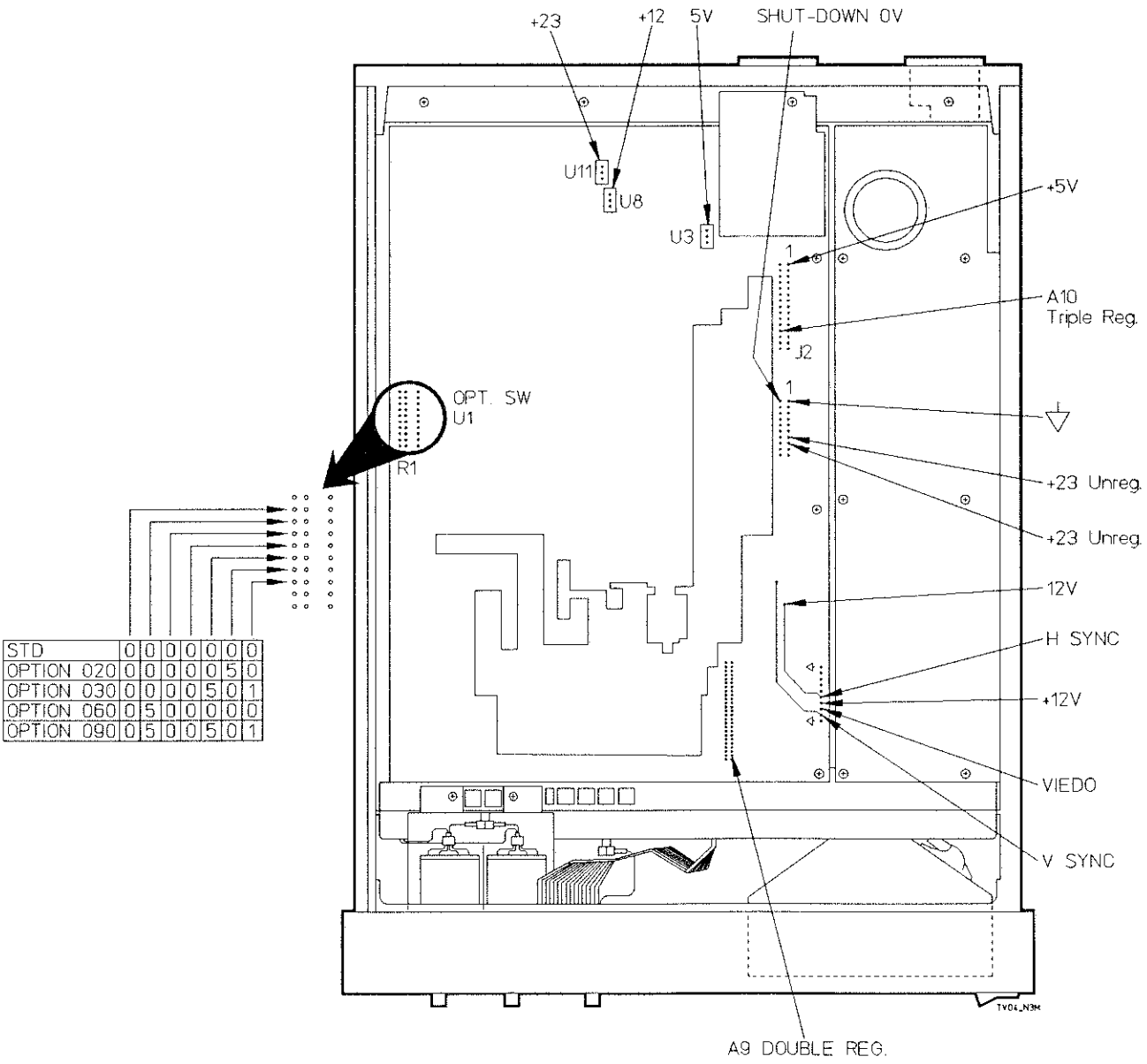

Figure 5-2. A12 Motherboard Voltage Probe Locator

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5-6. AFTER SERVICE PRODUCT SAFETY CHECKS

The following safety checks must be performed after any troubleshooting and repair procedures have been completed to ensure the safe operation of the instrument.

WARNING

RESISTANCE CHECKS DESCRIBED BELOW REQUIRE THAT THE POWER CORD BE CONNECTED TO THE THE HP 5372A AND THAT AC POWER BE DISCONNECTED. BE SURE THAT THE POWER CORD IS NOT CONNECTED TO POWER BEFORE PERFORMING ANY SAFETY CHECKS.

1. VISUAL INSPECTION. Visually inspect the interior of the instrument for any signs of abnormal internally generated heat, such as discolored printed circuit boards or components, damaged insulation, or evidence of arcing. Determine and remedy the cause of any such condition.
2. GROUND CONTINUITY TEST. Plug the power cord (W22) into the rear-panel power module. (DO NOT CONNECT THE INSTRUMENT TO AC POWER.) Using a suitable ohmmeter, check resistance from the instrument enclosure (chassis) to the ground pin on the power cord plug. The reading must be less than 1 Ohm. Flex the power cord while making this measurement to determine whether intermittent discontinuities exist.
3. Check any indicated front- or rear-panel ground terminals marked, using the above procedure.
4. INSULATION RESISTANCE TEST. Tie the line and neutral pins of the power cord plug together. Measure the resistance from the instrument enclosure (chassis) to the line and neutral pins of the power cord plug. The minimum acceptable resistance is 2 MΩ. Replace any component which results in a failure.
5. A16 POWER MODULE CHECK. Check the line fuse and the power line selector (turret wheel) to verify that the correctly rated fuse is installed and that the instrument is properly set for the AC power source applied.

5-7. ASSEMBLY LEVEL TROUBLESHOOTING

The following sections contain assembly level troubleshooting information for all assemblies.

5-8. A1 Time Base Control/A14 Time Base Multiplier Troubleshooting

Perform the A1 and A14 troubleshooting procedures if either of the following conditions exist:

- Diagnostic Test 2 Time Base Failed
- Error 107 – Time Base unlocked

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5-9. BACKGROUND

The A1 Timebase Control and the A14 Timebase Multiplier Assemblies work closely together. The A14 assembly receives a 1 MHz signal from the A1 assembly and multiplies it to 500 MHz. A phase-lock loop circuit keeps the 500 MHz signal locked at 500 MHz and produces a VCO tuning voltage for out-of-lock detection on the A1 assembly. The A1 out-of-lock detection circuit in turn controls the A1 1 MHz signal that is routed to the A14 assembly. Together, these two boards create one large feedback loop. If something fails in this loop, the entire loop becomes inoperative.

Other functions of the A1 assembly include:

1. buffering, detecting and selecting either the 1, 2, 5, or 10 MHz external time base input or the internal ovenized 10811-60111 oscillator,
2. overvoltage detection for both Channel A and B inputs,
3. input pod detection, and
4. buffering the 10 MHz reference for rear panel output.

Other functions of the A14 assembly include:

1. the generation of the DMA clock (125 MHz) for the A5 Event board's RAM-Write circuit, and
2. the generation of the 10 MHz reference frequency.

	EECL	ECL	TTL
Logic 1	0 V	–0.9 V	+2.0 V to 5.0 V
Logic 0	–0.8 V	–1.8 V	0 V to +0.8 V

5-10. A1 AND A14 TROUBLESHOOTING PREPARATION

Remove the top cover of the HP 5372A and place the A1 assembly on its extender board, HP P/N 05371-60016.

5-11. A1 AND A14 TROUBLESHOOTING PROCEDURE

The A1 and A14 Troubleshootiong Procedure consists of two separate procedures. The first verifies operation with the internal time base, and the second verifies operation with an external time base. These two procedures must be performed in the order presented.

5-12. Internal Time Base

The procedure to verify correct operation with the internal timebase is described both in *Figure 5-3*, "A1/A4 Troubleshooting – Internal Time Base," and the text immediately following this figure. In some cases, the text contains information not included in *Figure 5-3*.

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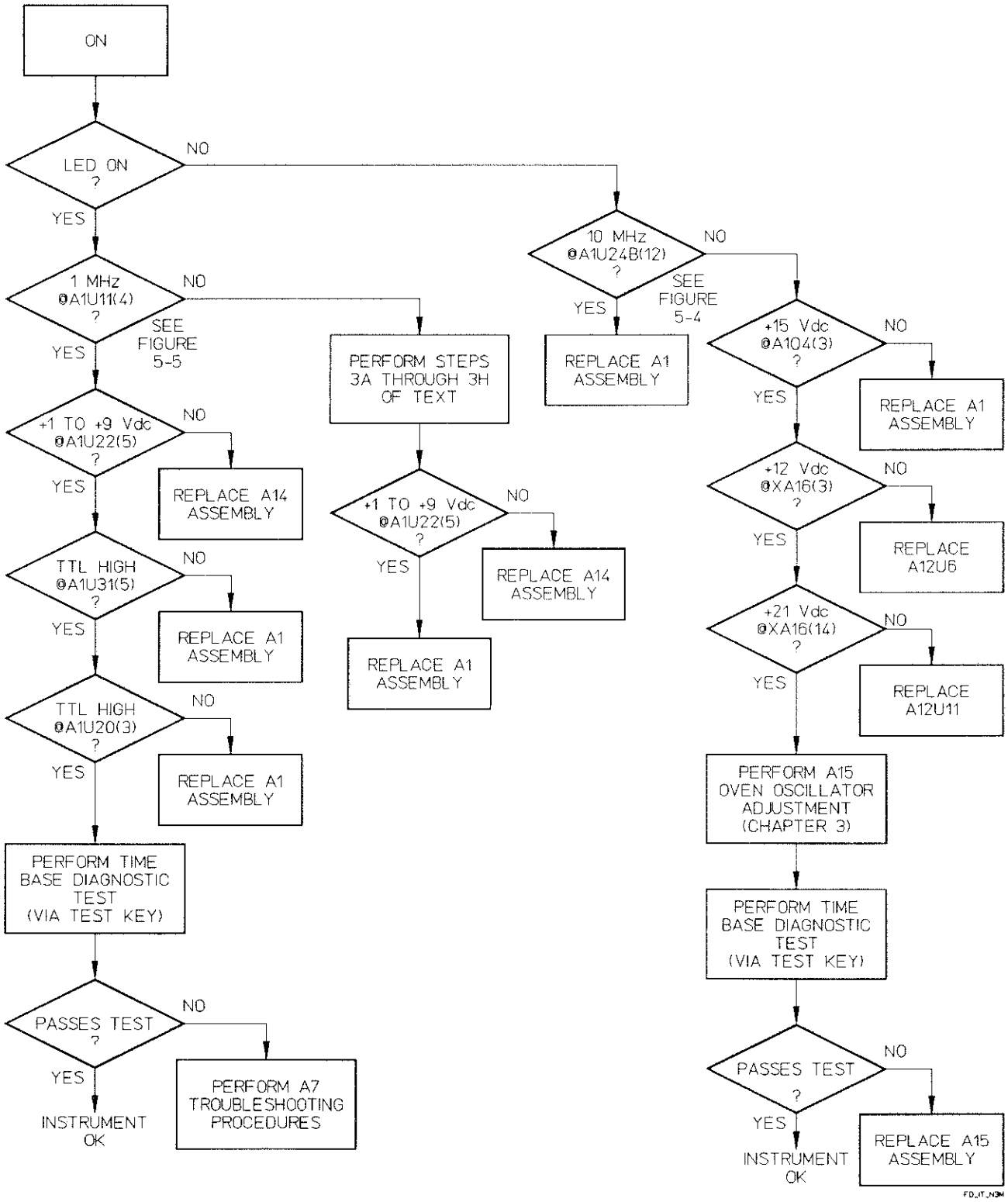

Figure 5-3. A1/A14 Troubleshooting – Internal Time Base

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1. Set the HP 5372A STBY-ON power switch to ON.
2. Verify that LED DS1 is ON. If not, proceed with step 2A.
   a. Verify the presence of a 10 MHz signal at A1U24B(12). See *Figure 5-4*. If the signal is correct, then replace the A1 assembly. If the signal is not present or is not correct, then verify the following:

      1) A1Q4(3) should be appproximately +15 Vdc. If not, replace the A1 assembly.

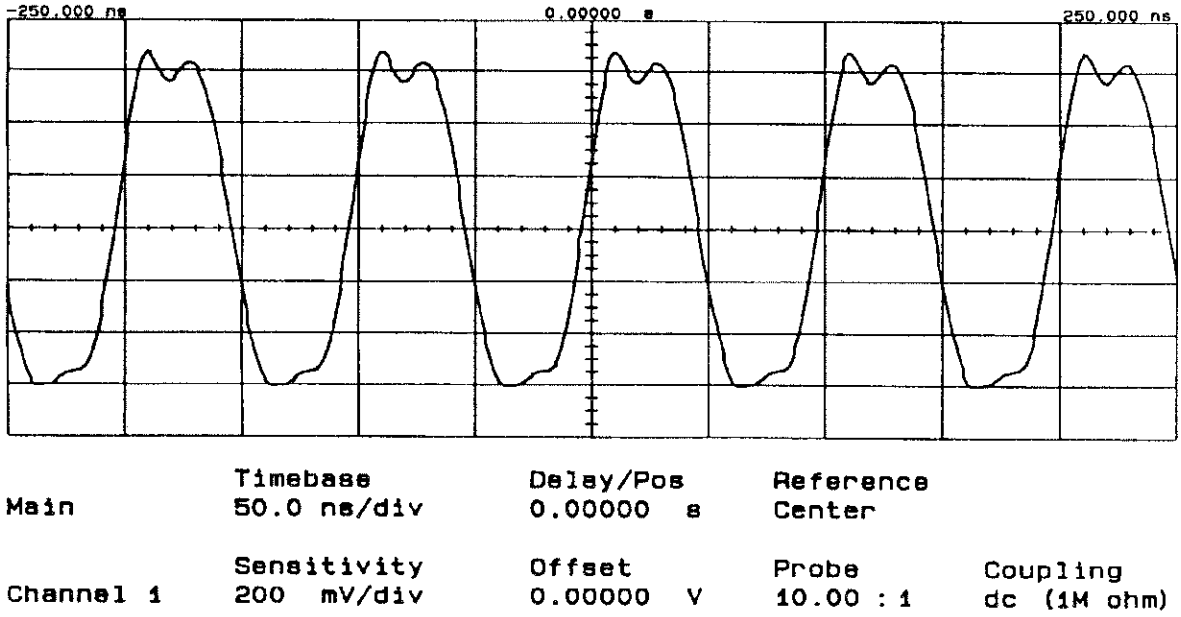

Figure 5-4. Waveform at A1U24B(12)

NOTE

Remove the HP 5372A bottom panel to access the signals on the A12 Motherboard.

      2) XA16(3) should be approximately +12 Vdc. If not, replace A12U6.

      3) XA16(14) should be approximately +21 Vdc. If not, replace A12U11.

      4) Perform the A15 Oven Oscillator Adjustment, located in chapter 3.

      5) Perform Diagnostic Test 2 – Time Base, accessed via the Test key. If the test passes, then the instrument is functioning correctly. If the test does not pass, then replace the A15 Oven Oscillator assembly.

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3. Verify the presence of a 1 MHz signal at A1U11(4). See *Figure 5-5*. If the signal is not present or is not correct, then proceed with step 3a.

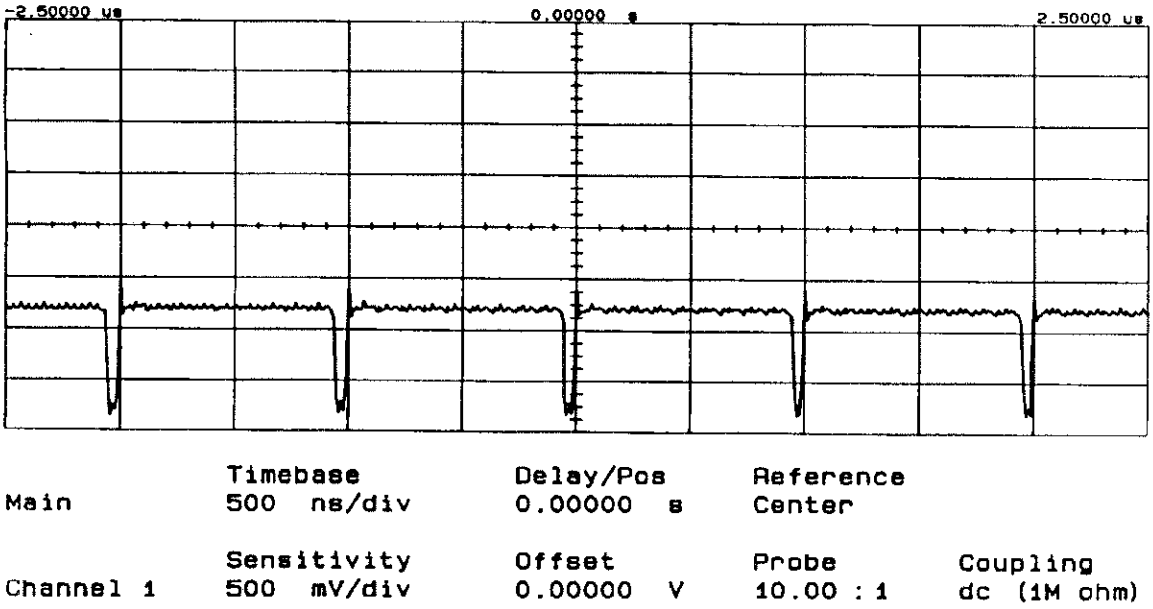

Figure 5-5. Waveform at A1U11(4)

a. Set up an HP 8161A for a 10 MHz ECL signal as follows:

- Period = 1.00 µs
- Delay = 0 ns
- Width = 900 ns
- LEE = 1.3 ns
- TRE = 1.3 ns
- HIL = -.80 V
- LOL = -1.80 V

NOTE

Enable the OUTPUT by ensuring the COMPL and DISABLE LEDs are OFF.

b. Connect a BNC cable to the HP 8161A OUTPUT.

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c. Connect a 50 ohm Feedthrough Termination (HP P/N 10100C) to the open end of the BNC cable.

d. Connect a BNC(f)-to-SMA(f) Adapter (HP P/N 1250-0724) to the open end of the 50 ohm Feedthrough Termination.

e. Connect a SMA(m)-to-SMA(m) Adapter (Sealectro P/N 51-072-0000) to the BNC-to-SMA adapter.

f. Disconnect the SMA cable from the J1 connector of the HP 5372A A1 Timebase Control Board (this cable is between the A1 extender board and the A1 Time Base Control Board).

g. Connect the SMA cable to the open end of the SMA-to-SMA adapter (inputs the 1 MHz signal directly to the A14 assemblie's PLL).

h. Verify the voltage at A1U22(5) is between +1 and +9 Volts (typically +4.5 Vdc). If the voltage is correct, then replace the A1 assembly. If the voltage is not correct, then replace the A14 assembly.

4. Verify the voltage at A1U22(5) is between +1 and +9 Volts (typically at +4.5 Vdc). If the voltage is not correct, then replace the A14 assembly.
5. Verify the voltage at A1U31(5) is a TTL logic level high. If not, replace the A1 assembly.
6. Verify the voltage at A1U20(3) is a TTL logic level high. If not, replace the A1 assembly.
7. Perform Diagnostic Test 2 – Time Base, accessed via the Test key. If the test passes, the instrument is operating correctly. If the test does not pass, then refer to the A7 Troubleshooting Procedures.

5-13. External Time Base

1. Using an HP 3325A, apply a 10 MHz, 2 Vp-p sinewave to the HP 5372A FREQUENCY STANDARD EXTERNAL INPUT.
2. Verify the presence of a 1 MHz signal at A1U11(4). See *Figure 5-5*. If the signal is not present or is not correct, then perform steps 3a through 3h of the Internal Time Base troubleshooting.
3. Verify the voltage at A1U22(5) is between +1 and +9 Volts (typically +4.5 Vdc). If the voltage is correct, then replace the A1 assembly. If the voltage is not correct, then replace the A14 assembly.
4. Verify the voltage at A1U31(2) is a TTL logic level high. If not, replace the A1 assembly.
5. Perform Diagnostic Test 2 - Time Base, accessed via the Test key. If the test passes, the instrument is operating correctly. If the test does not pass, then refer to the A7 Troubleshooting Procedures.

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5-14. A2 Input Amplifier Board Troubleshooting

Proceed to chapter 7, "A2 Input Amplifier," if either of the following conditions exist:

1. Diagnostic test 4 (Input Amps) fails.
2. Dagnostic test 23 (Randomizer) fails.

5-15. A3 Time Board Troubleshooting

Proceed to chapter 8, "A3 Time," if any of the following conditions exist:

1. Diagnostic test 6 (Count ICs) fails and indicates a failed component on the A3 board.
2. Diagnostic test 8 (Measurment RAM) fails and indicates a failed compoment on the A3 board.
3. Diagnostic test 5 (Histogram) fails.
4. The Totalize function does not operate correctly.

5-16. A4 Interpolator Board Troubleshooting

Proceed to chapter 9, "A4 Interpolator," if either of the following conditions exist:

1. Measurement accuracy is 2 ns or worse.
2. The measurements are unstable.

5-17. A5 Event Board Troubleshooting

Proceed to chapter 10, "A5 Event," if either of the following conditions exist:

1. Diagnostic test 6 (Count ICs) fails and indicates a failed component on the A5 assembly, or indicates that all six Count ICs have failed.
2. Diagnostic test 8 (Measurement RAM) fails and indicates a failed component on the A5 assembly, or indicates that all seven Measurment RAMs have failed.

5-18. A6 Count Support Board Troubleshooting

Replace the A6 Count Support Board if diagnostic test 22 (External Amp) fails, or if there are no error messages and any of the following conditions exist:

- The HP 5372A Front Panel is locked up.
- The HP-IB Binary Output fails.
- The HP 5372A CRT does not update.
- The Measurement Results are incorrect.
- The External Arm Input does not function correctly.
- The HP 5372A will not correctly end a block of measurements.
- The HP 5372A does not operate correctly with either the interval sampling or any of the holdoff/interval sampling arming modes.
- The Pre-trigger control does not function correctly.

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- The C-Channel attenuation does not function correctly.
- The rear-panel Measurement Inhibit Input does not function correctly.

5-19. A7 Processor Board Troubleshooting

Perform the A7 Processor Board Troubleshooting if replacing the specified component(s) from the diagnostic test failure message did not correct the fault.

Troubleshoot the A7 Board as follows:

1. Check the two clock signals:

   A7Y1 Crystal: 32 MHz
   A7Y2 Crystal: 32.7 KHz

   If either of the clock signals are not present or are oscillating at an incorrect frequency, replace the appropriate crystal.

   A7Y1 (HP P/N 1813-0242)
   A7Y2 (HP P/N 0410-1617)

2. Check that all jumpers are installed correctly:

   There are 11 jumpers on the A7 board. All jumpers which can be loaded in one of two ways should be loaded in the left or upper positions. The table below lists the normal connections for the jumpers:

Jumper	Purpose	Position
W1	CACHE DIS	NOT LOADED
W2	FREE RUN	UPPER POSITION
W3	FREE RUN	UPPER POSITION
W4	ROM/RAM	UPPER POSITION
W6	~BERR	LOADED
W7	MONITOR	NOT LOADED
W8	2M EPROM	LEFT POSITION
W9	FREE RUN	UPPER POSITION
W10	FREE RUN	UPPER POSITION
W11	256K SRAM	UPPER POSITION
W12	INTERRUPT	LOADED

3. Check A7 Test Points:

   There are six A7 test points located at the top of the A7 board. Check to make sure the correct signals are present.

   TP1 – This pin is a buffered +5 V. If the +5 V is not present, check the +5 V on the A10 regulator board; replace the regulator board if it is faulty.

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TP2 – This pin is a buffered 16 MHz clock signal. If this signal is not present or is at an incorrect frequency, check the A7Y1 crystal.

TP3 – This pin is ground.

TP4 – This pin is the RESET signal. It should normally be a TTL high. It will be low during the power-up reset time and while the red reset switch on the A7 is pressed.

TP5 – This pin is ground.

TP6 – This pin is connected to the DRAM refresh request signal. It should have a period of approximately 14 us and should be low for approximately 62.5 ns.

4. Check A7 LEDs:

There are six green LEDs at the top of the A7 board. They are visible when the board is installed. They can be used to indicate the status of the processor.

Description of LEDs:

LED 1 – FC2

This LED should be lit during supervisor accesses and during CPU space cycles. It should be lit on power-up and should blink after power-up.

LED 2 – HALT

This LED is lit when the processor halts. This should not normally happen. It could be caused by misloaded or bad EPROMs, stuck address or data lines, or problems with the PALs, read/write circuit, or DSACK circuit.

LED 3 – FC1

This LED is on or off depending on whether the 68020 is accessing data or instructions.

LED 4 – FPCS

This LED should light when the 68881 coprocessor is accessed. It should normally blink. It will be brighter when analyzing the measurement results after the count hardware finishes the measurement.

LED 5 – IACK

This LED will light when the 68020 recognizes an interrupt request.

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LED 6 – RESET

This LED will light when ~RESETb is low. This should happen on power-up and when the red reset switch on the A7 is pressed.

The power up sequence should be as follows:

Connect a BNC cable from the rear panel FREQUENCY STANDARD OUTPUT to the Channel A input, power on the 5372A, and verify the sequence of the A7 board LEDs.

LED 1 – On during entire power up sequence.
LED 2 – Off
LED 3 – On after LEDs 5 and 6 turn off.
LED 4 – Off
LED 5 – On momentarily
LED 6 – On momentarily

After the power on sequence is complete the LEDs should be lit as follows:

NOTE: A BNC cable should be connected from the rear panel FREQUENCY STANDARD OUTPUT to the Channel A input.

LED 1 – Blinking
LED 2 – Off
LED 3 – On
LED 4 – Blinking
LED 5 – Off
LED 6 – Off

5. Check the RESET circuit by pressing the red RST button on the top of the A7 board. While the button is pressed, the 1st, 5th, and 6th LEDs should be lit. After the button is released the analyzer will go through its power up routine.

In a situation where the:

- A7Y1 and A7Y2 crystals are oscillating at the correct frequency
- All the jumpers are loaded properly
- Correct signals are present at all six test points
- The six LEDs are lit in the correct sequence

the A7 board is most likely functioning properly.

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If the A7 board is getting the +5 V power and the crystals are oscillating at the correct frequencies, but the LEDs are not lit in the correct sequence then:

a. Replace the eight socketed EPROMs:

A7U16 – 05372-80002
A7U17 – 05372-80003
A7U18 – 05372-80004
A7U19 – 05372-80005
A7U52 – 05372-80006
A7U53 – 05372-80007
A7U54 – 05372-80008
A7U55 – 05372-80009

b. If the problem persists replace the A7 Microprocessor board.

5-20. A8 I/O Controller Board Troubleshooting

Perform the A8 I/O Controller Board Troubleshooting if any of the following conditions exist:

- The CRT does not provide the correct display.
- The Analyzer does not respond to instructions from the front panel.
- The Analyzer has trouble communicating with a computer or other peripheral devices.
- The LED indicators on the front panel malfunction.

Perform the A8 Troubleshooting as follows:

1. Check the input and output of the A8U11 Clock Driver.
   - A 5 MHz signal should exist at A8U11(9).
   - If the signal does not exist, verify that the A12 board supplies a 10 MHz signal to A8U11(11). If the 10 MHz input exists and the 5 MHz output does not exist replace A8U11 (HP P/N 1820-2488).
   - If both input and output are present go to step 2.
2. Check that the A8Y1 crystal's output is 19.7 MHz. If the signal is not present or is oscillating at an incorrect frequency, replace Y1 (HP P/N 1813-0143).
3. If the Analyzer has trouble communicating with a computer or other peripheral device make sure that the HP-IB cable is connected securely to the HP 5372A's rear panel HP-IB connector, and to the external device. Check that the addresses of all devices are correct. Press the HP 5372A's System hardkey. The HP 5372A should be set to the "Talk/Listen" mode if it is connected to an external controller and to the "Talk Only" mode if it is connected only to a printer or plotter.

If the HP 5372A's HP-IB failures persist, replace A8U50 (HP P/N 1820-2548). If this does not correct the problem, then replace the A8 assembly.

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5-21. A9 Double and A10 Triple Regulator Troubleshooting

The A9 Double Regulator provides –5.2 Vdc (for ECL circuits) from a switching supply and –3.3 Vdc (for EFL circuits) from a linear supply. The linear –3.3 Vdc suppply is driven from the –5.2 Vdc supply output. Both supplies are protected by 10-amp fuse A9F1. The A10 Triple Regulator Board is comprised of three switching regulator circuits capable of producing +5, +15, and –15 volt outputs. Verify correct operation of the A9 and A10 assemblies as follows:

1. Check line fuse and line voltage setting.
2. Remove both top covers (see note below).

> ***NOTE***
> *EXTREMELY HIGH VOLTAGE LEVELS ARE PRESENT IN THE AREA OF THE CATHODE RAY TUBE (CRT) AND DRIVER BOARD ASSEMBLY WHEN THE HP 5372A IS CONNECTED TO AC POWER. USE EXTREME CAUTION WHEN TROUBLESHOOTING WITH THE POWER SUPPLY COVER REMOVED.*

3. The regulators are interlocked as follows:
   - The A10 Triple Regulator (+5 V, +15 V, and –15 V) must be operating before the A9 Double Regulator (–5.2 V and –3.3 V) will operate.
   - The –15 V must be operating before the +5 V and +15 V will operate.
   - The A10 Triple Regulator SHUTDOWN input must be at a low logic level (0 V).
4. Measure the voltage regulators and verify the values are within the limits listed in *Table 5-2.*

> ***NOTE***
> *The –3.3 V test point is on the A3 Time Board. This test point may be printed as –3.25 V, however, the correct voltage for this test point is –3.30 V.*

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Table 5-2. Power Supply Limits

ASSEMBLY	TEST POINT	LIMIT RANGE
A3	–3.3V	–3.31V to –3.29V
A9	–5.2V	–5.21V to –5.19V
A10	–15V	–15.01V to –14.99V
A10	+15V	+14.99V to +15.01V

5. Remove the bottom panel from the HP 5372A (this allows access to the interconnection signals on the A12 Motherboard). (See *Figure 5-2.*)
6. Measure the SHUTDOWN pin and verify that the voltage is approximately 0 V.
7. If either of the regulators are not operating correctly, replace with new assemblies.

5-22. A11 Front Panel Troubleshooting

The A11 Front Panel Board contains LEDs and switches for the HP 5372A front panel. The ENTRY/MARKER control and STBY-ON switch are also contained in the Front Panel Board. If a fault is determined with any of the above mentioned items, replace the A11 assembly.

5-23. A12 Motherboard Troubleshooting

The A12 Motherboard provides power distribution, power-up control, rear-panel signal buffering, communication paths between the different assemblies (i.e., A1, A2, etc.), power regulation for the internal reference oscillator's oven and crystal, fan control, power failure monitering circuitry, and thermal overload control. If a fault is determined with any of the above mentioned items, then refer to chapter 11, "A12 Motherboard".

5-24. A13 Rear Panel Troubleshooting

The A13 Rear Panel Board serves to interconnect signals from the A12 Motherboard to the rear panel output. If any rear panel output is not operating correctly, use *Figure 6-3,* HP 5372A Assembly Level Block Diagram, as a guide to determine which board generates the signal in question and then troubleshoot that board. If this does not correct the probelm, then replace the A13 Rear Panel assembly.

5-25. A15 Oven Oscillator Troubleshooting

The A15 Oven Oscillator is used as the internal time base. If the A15 Oscillator is not operating correctly, perform the A15 Oven Oscillator Adjustment in chapter 3. If this does not correct the problem, then replace the A15 Oven Oscillator assembly.

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5-26. A17 CRT and CRT Driver Board Troubleshooting

If the CRT is not operating correctly, perform the A17 CRT and CRT Driver Adjustments, located in chapter 3. If this does not correct the problem, then replace the A17 CRT and CRT Driver assembly. HP recommends the board be replaced first to see if that corrects the problem.

1. Remove the bottom panel from the HP 5372A (allows access to the Motherboard Interconnection signals).
2. Measure the +12, VIDEO, HSYNC, and VSYNC interconnection pins (see *Figure* 5-2).
3. If the CRT screen is blank and the input signals +12, VIDEO, HSYNC, and VSYNC are present on the A12 Motherboard, replace the CRT assembly. The CRT is replaceable as a complete unit (CRT and CRT Driver Board). HP recommends swapping the CRT Driver Board first to see if that corrects the problem.

5-27. A20 C-Channel Board (optional) Troubleshooting

Proceed to chapter 12, "A20 C-Channel," if the HP 5372A does not correctly perform C-Channel measurements.

5-28. A22 FastPort Output (optional) Troubleshooting

Replace the A22 FastPort Output Board (rear panel) if the HP 5372A does not correctly perform FastPort measurements.

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6

THEORY OF OPERATION

6-1. INTRODUCTION

The HP 5372A FREQUENCY AND TIME INTERVAL ANALYZER is a high-performance universal frequency counter and a high-precision time interval analyzer. It has two matched inputs, Channel A and Channel B, which can measure frequencies to 500 MHz (the optional C-Channel extends the frequency range to 2 GHz). It also has a 100 MHz External Arming input which can be used to control the measurement. The major features of the HP 5372A are "continuous measurement acquisition" and the built-in analysis functions.

The HP 5372A uses a sampling technique which acquires measurements in a continuous manner with no processing or "dead time" between measurements. Dead time occurs in traditional counters when the instrument completes a measurement, stops, processes the measurement, and then prepares for the next measurement. The HP 5372A does not stop between measurements.

By sampling the input signal fast enough, the time variation of frequency (FM or PM) or time interval data can be reconstructed. This effectively adds a new measurement domain, the Modulation Domain, to the familiar Time and Frequency Domains. *Figure 6-1* illustrates the relationships between measurements of a frequency-hopping signal in the Time Domain (oscilloscope), the Frequency Domain (spectrum analyzer), and the new Modulation Domain (HP 5371A/5372A).

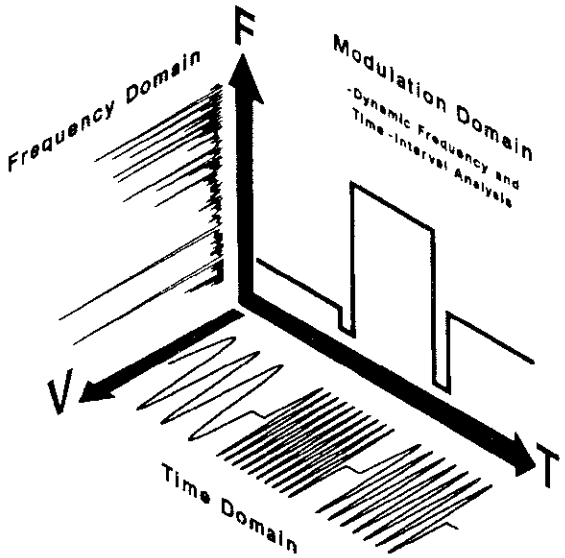

Figure 6-1. The Modulation Domain

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6-2. GENERAL HARDWARE DESCRIPTION

The HP 5372A has two 500 MHz input channels, Channels A and B, and one 100 MHz External Arming input (see *Figure 6-2*). A 2 GHz input channel, Channel C, is optional. The Input Amplifiers convert zero-crossings of the input signals into digital signals, and then routes the digital signals to the Sequencer. Each digital signal is a square wave signal with the rising edges corresponding to the zero-crossings of the input signal. Thus, each rising edge represents an input trigger event. The Divide-By-4 Prescaler converts zero-crossings of the C-Channel signal into a digital signal, and then routes every fourth edge to the Sequencer.

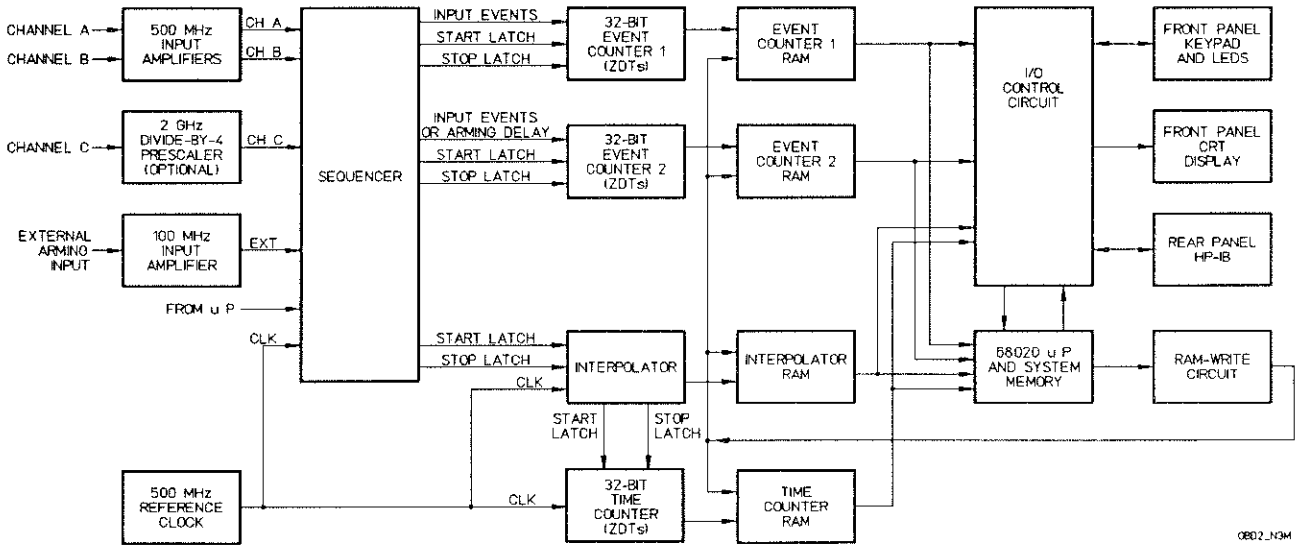

Figure 6-2. HP 5372A General Block Diagram

The Sequencer, which is responsible for the arming control of the measurement (via the μP), routes the input events to the appropriate Event Counter. It also routes the 500 MHz reference clock to Event Counter 2 if an arming delay is specified by the user. In addition, the Sequencer generates latching signals for the Event Counters, the Interpolator, and the Time Counter (via the Interpolator). These latching signals are used to sample the current event and time data.

The 32-bit Event Counters each consist of two 16-bit zero-dead-time counters (ZDTs) arranged in series. These ZDTs perform the counting of the input trigger events or arming delay. When a latch signal from the Sequencer is received, the current count value of the counter is read and stored in internal ZDT latches, without interrupting the counting process. This is where the term "zero-dead-time" or "continuous" counter originates, because there is no "dead time" while the counter is being read.

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The Interpolator synchronizes the event latch signal with the 500 MHz reference clock (transforming it into a time latch), and then quantizes the time interval between the event latch and the time latch to 200 ps resolution. The Interpolator also routes the synchronized time latch signal to the Time Counter. This process is performed for both the start and stop latch signals.

The 32-bit Time Counter consists of two 16-bit zero-dead-time counters arranged in series. These ZDTs count the number of periods of the 500 MHz reference clock (2 ns resolution). When a latch signal is received from the Interpolator, the current count value of the counter is read and stored in internal ZDT latches, without interrupting the counting process (no "dead time" while the counter is being read).

The RAM-Write Circuit generates signals to store (in Counter and Interpolator RAMs) the latched count values from the Event and Time Counters, and the value from the Interpolator. The RAMs can store up to 8192 samples, with each individual sample consisting of an Event Counter result, a Time Counter result, and an Interpolator result.

The 68020 microprocessor and I/O Control Circuit comprise the overall control hardware. The microprocessor performs the measurement processing and control, while the I/O Control Circuit provides the interface with the user via the front-panel CRT display or an external HP-IB compatible controller. The microprocessor sends the measurement setup control instructions to the Sequencer, and sends the processed measurement results to the front-panel CRT display or HP-IB.

Unprocessed event and time data is available via the HP-IB, at rates up to 20,000 binary results/second. Processed measurement results are available via HP-IB in ASCII and Floating Point format at lower transfer rates.

6-3. ASSEMBLY LEVEL DESCRIPTIONS

The major functions and interconnections of each assembly are identified in the foldout at the end of this chapter, *Figure 6-3*, HP 5372A Assembly Level Block Diagram.

6-4. A1 Time Base Control Board

The A1 Time Base Control Board performs several functions. These include:

- Buffering, detecting, and selecting either the 1, 2, 5, 10 MHz external time base input (via the HP 5372A rear-panel) or the internal ovenized 10 MHz oscillator (10811-60111).
- Generating a 1 MHz reference signal to the A14 Time Base Multiplier phase-locked-loop.
- Detecting loss-of-lock in the A14 phase-locked-loop.
- Determining the type of input pod installed on the HP 5372A and informing the microprocessor.

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- Providing operating voltages and over-voltage detection to the input pods.
- Buffering the 10 MHz A14 Time Base Multiplier output for rear-panel output.
- Controlling power to the A15 oven oscillator by controlling the +12V regulator located on the A12 Motherboard. The A15 oscillator plugs into connector J5 on the A12 board.

6-5. A2 Input Amplifier Board

The A2 Input Amplifier Board contains two identical DC coupled 500 MHz amplifier circuits, Channel A and Channel B. Both circuits accept input signals from either the front-panel input pods or the rear-panel (Option 060/090) 50Ω inputs. The input signals are conditioned and translated to EECL logic level square waves and then routed directly to the A5 Sequencer IC.

Both input amplifier channels provide the circuitry that control the input impedance, trigger slope and trigger level, circuit termination, and over-voltage protection for the HP 5372A. The two identical amplifiers are fully programmable and designed to optimize pulse fidelity. Other functions include:

- Attenuating (8 dB) input signals
- Terminating (0 or –2 Volts) input signals
- Setting trigger levels
- Measuring peak amplitude of input signals
- Variable hysteresis; user selects either Min. or Max. which is used to determine a hysteresis from 12 mV to ≥ 50 mV.
- Generating random arming (for Time Interval measurements only). Random arming puts the instrument in a mode where the measurement sample is collected after a random number of event edges on Channel A (the random number of edges varies from 4 to 15 between each stored measurement sample).
- Providing front-end over-voltage protection.
- Controlling trigger levels for Channel A and Channel B inputs based on user-specified conditions:

1. Manual Trigger — Trigger levels are set by specifying the voltage. The range is ± 2 Vdc in 2 mV steps with the attenuator in the 1:1 position. In the 2.5:1 position, the range is ±5 Vdc in 5 mV steps.

2. Single Auto Trigger — The user selects the trigger level as a percentage of the input peak-to-peak signal. The instrument sets and displays the corresponding voltage level at the beginning of the measurement session. The range is 0% to 100% in 1% steps.

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3. Repetitive Auto Trigger — This is similar to Single Auto Trigger mode except that the HP 5372A sets the corresponding voltage at the beginning of each measurement block for multiple block measurements.

6-6. A3 Time Board

The major function of the A3 Time Board is to count the number of periods of the 500 MHz reference clock. This board consists of the Time Counter, the Time Counter RAM, the Interpolator RAM, the Totalize circuit, and the Histogram Gate Array IC.

The time count hardware consists of the A3 Time Counter and the A4 Interpolator. The 32-bit Time Counter is made up of two 16-bit zero-dead-time counters (ZDTs) arranged in cascade. These ZDTs count the number of periods of the 500 MHz reference clock. When a latch signal is received from the Interpolator, the current count value of the counter is read and stored in internal ZDT latches, without interrupting the counting process. The latched count values are then stored in RAM ICs associated with each ZDT. The results are accessed and sent to either the A7 Processor Board and then to the front-panel CRT for display, or to the A8 I/O Controller Board directly, where the unprocessed binary data is routed through the HP-IB interface to an external controller for processing.

The Interpolator RAM stores the 4-bit result of the A4 Interpolators and 4 bits of status data; the 2-bit output of the Totalize circuit, the start of block bit, and the histogram enable bit.

A Totalize measurement counts the number of events of the input signal during a specified period of time, between a pair of designated edges, or between presses of the MANUAL ARM key. Totalize measurements are sampled differently from Frequency/Period measurements. For totalize measurements, the sampling is synchronous with the interval, edge, or manual key-press, depending on the arming mode. The sampling point is not synchronous to the trigger event. At the time count hardware level, this means that sample latches and events (CLKA and CLKB) are asynchronous.

The Histogram Gate Array IC performs statistical calculations of time interval measurements. This IC provides hardware histogramming of measurements only when the following measurements functions are selected: Histogram Time Interval, Histogram Continuous Time Interval, or Histogram ± Time Interval. When other measurement functions are selected, the histogram that is available via the Graphic Results key is software processed. The Histogram IC also provides the TI Trigger signal which is used as the rear panel TI Detect output. The TI Detect signal will remain TTL low for the entire period of time the measurements are outside the specified time interval range (set via the Pretrigger key). This TI Detect feature is also available as a pre-trigger source.

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6-7. A4 Interpolator Board

The A4 Interpolator Board determines the time interval, to a resolution of 200 ps, between the edge of the event being counted and the edge of the next 500 MHz reference clock. This process is performed at both the beginning and end of each measurement. The Interpolator results are combined with the main count derived from the Time Counter to obtain the total sample time, to a resolution of 200 ps.

The Interpolator receives a start latch, IT1, from the A5 Sequencer, at the beginning of a measurement. It first synchronizes this latch signal with the 500 MHz reference clock. A copy of the synchronized latch, CI1, is sent to the A3 Time Counter, which it then uses to latch the current count value. Another copy of CI1 is used for the Start Interpolator. The Start Interpolator detects the point of coincidence between the start latch, IT1, and the 500 MHz reference clock. It then generates a 4-bit binary code representing the time interval. This 4-bit result is then sent to the A3 Time Board and stored in the Interpolator RAM. This process is repeated when the Interpolator receives the stop latch, IT2, at the end of the measurement.

6-8. A5 Event Board

The major function of the A5 Event Board is to count the number of input trigger events. This board consists of the Sequencer IC, the two 32-bit Event Counters (ZDTs), the Event Counter RAM, the RAM-Write circuit, the DMA Address Generation circuit, the ZDT Address Generation circuit, and the Rear-Panel Monitor circuit.

The event count hardware consists of the Sequencer IC and the two 32-bit Event Counters. The Sequencer routes the input trigger events, and arming delay signals for holdoff arming modes, to the appropriate Event Counter. It also generates latching signals for these Event Counters, which are used to sample the current event data. The 32-bit Event Counters each consists of two 16-bit zero-dead-time counters (ZDTs) arranged in cascade. The ZDTs perform the counting of the input trigger events or arming delay. When a latch signal from the Sequencer is received, the current count values of the counters are read and stored in internal ZDT latches, without interrupting the counting process. The latched count values are then stored in RAM ICs associated with each ZDT.

The main function of the RAM-Write circuit is to generate a write pulse to store the latched count values from the Event and Time Counters, and the value from the Interpolator, to memory. The RAM-Write circuit also generates pulses for enabling and clocking the Histogram IC, changing the ZDT Address (so that the counters can alternate the output of two-latch data), and resetting the ZDTs and then the Sequencer at the end of each measurement cycle. In addition, the RAM-Write circuit controls the width of stored measurements, which indirectly controls the sample speed of the instrument.

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Other circuits on the Event Board include:

- The DMA Address Generation circuit, which generates addresses for the A5 Event Counter RAMs, the A3 Time Counter RAMs, and the A3 Interpolator RAM. At the beginning of each measurement block, the microprocessor programs the address counters to the starting address of the RAMs. This address is then latched and sent to the RAMs. After the RAM-Write circuit generates the pulse to store the data in RAMs, the address counters are incremented by one. Again the address is latched, sent to the RAMs, and then data is stored at the new address location. The process of incrementing the address counters by one is continued until the address counters reach the terminal count (TC).

- The ZDT Address Generation circuit, which controls the addresses to the A5 Event and A3 Time Counters (ZDTs). The ZDT address counters change the addresses depending of whether the ZDTs are performing a measurement, being setup, or are being fast re-armed.

6-9. A6 Count Support Board

The major function of the A6 Count Support Board is to control the storing of:

- the latched count values from the A5 Event Counters to the A5 Event Counter RAMs,

- latched count values from the A3 Time Counter to the A3 Time Counter RAMs, and

- the value from the A4 Interpolator to the A3 Interpolator RAM.

Four uniquely programmed PAL ICs and four decoder ICs perform this function by decoding address and control signals originating on the A7 Processor Board, and providing enable and control signals to the A3 Time, A5 Event, and A6 Count Support Boards.

Other circuits on the Count Support Board include:

- The Gate Timer, which generates the timing signal TG1. This signal is used as the sample arming signal to the A5 Sequencer IC. TG1 is a continuous series of pulses that corresponds to the "gate time" of the measurement (the "gate time" represents the time during which measurement data is taken during "interval sampling".) The period of each signal is controlled by the microprocessor. The Sequencer sends a Timing Trigger Signal (TTR) when all arming conditions have been met, and informing the Gate Timer to begin outputting the TG1 signal.

- The Control Word Latches, which latch the control word generated by the microprocessor. This is a 16-bit write-only register containing bits which control different functions in the count hardware. This register is written-to prior to the start of a new measurement, and is clocked by the microprocessor (via an A6 decoder).

- The Fast Re-arm circuit, which allows multiple block measurements with less than 1.5 us dead time between blocks. This circuit is active to begin all measurements and to begin new blocks of measurements when the total number of measurements fits

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within the 8191 memory locations. This circuit determines when all measurements start, complete, and when blocks are full and a fast re-arm should occur.

- The External Arm Input Amplifier, a 100 MHz amplifier that buffers, shapes, and translates the External Arm input signal to ECL logic levels. It then routes the ECL signal to the A5 Sequencer IC, for use during externally gated sampling. The External Arm Input Amp has five stages: a signal conditioning stage, a high and low frequency amplifier stage, a Schmitt stage, a buffer stage, and a digital-to-analog stage.

- The Measurement Inhibit circuit, which controls when the HP 5372A acquires measurements. The input signal to this circuit is from a rear panel BNC connector.

- The C-Channel DACs, which controls the variable attenuation of the C-Channel input.

- The Pre-trigger circuit, which allows the measurement to trigger on the edge of either an External Arming input or a user-specified time interval. The HP 5372A can store up to 8191 measurements near the pre-trigger event. The measurements stored can be all before the pre-trigger event, all after, or any combination in between up to the memory limit.

- The Block/Pre-trigger Counter, a 16-bit counter that serves two functions: the first is to count the number of samples that have been stored in the count hardware, and to inform the Fast Re-arm circuit when a specified number has been reached. In this mode, the counter is operating as a number of samples per block counter. The second function is to count the number of samples taken after a Pre-trigger has occurred.

- The Binary Output Controller circuit, which controls the transfer of unprocessed binary measurement data from the A3 Interpolator RAM, the A3 Time Counter RAMs, and the A5 Event Counter RAMs, to an external controller via the A8 HP-IB Control Circuit.

- The Arm Status circuit, which stores the armed condition so that the Pre-trigger and software can determine the arming status.

6-10. A7 Processor Board

A 32-bit 68020 microprocessor is the overall controller of the HP 5372A. The microprocessor performs both measurement control and processing. It accepts commands from the instrument front-panel or the HP-IB. It sends measurement setup control instructions to the counter's measurement hardware. The microprocessor performs all measurement processing, and then sends the processed measurement to the A8 I/O Controller Board, where it then goes to either the front-panel CRT display or HP-IB bus. The microprocessor interacts with the A8 HP-IB controller when data is transferred over the HP-IB.

A 68881 floating point coprocessor is used to improve the processing speed of the instrument. A real time clock IC is used to keep track of the time and date, and to generate periodic interrupts.

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The A7 board has eight 1 Mbit RAM ICs having a total system memory of 256K long words, each 32-bits wide. When the instrument is in the Standby mode, with front-panel STBY-ON switch in the STBY position, a voltage line derived on the A12 assembly, called LP, supplies two CMOS RAM ICs, used for back-up memory storage, with back-up power. If the AC power cable is disconnected from the HP 5372A or the A7 Processor is physically removed from the instrument's chassis, then power is provided by battery A7BT1. The microprocessor, through its structured interrupt system, senses any loss of power and initiates a power-down sequence. During this power-down sequence, the instrument's programmed front panel/HP-IB settings and HP-IB address are stored in the back-up non-volatile RAMs. When power recovers, this saved configuration is read from RAM during the microprocessor's power-up sequence. The program is stored in 768 Kbytes of ROM (four 128 Kbyte EPROMs and four 64 Kbyte EPROMs).

Most control, data, and address communication takes place via two busses, a System Bus and a Count Hardware Bus. The system bus is used for address, data, and control signals to the A8 I/O Controller. The Count Hardware Bus is buffered from the System Bus on the Processor board. All address, data, and control signals to the measurement boards (A2, A3, A5, and A6) travel via this bus.

6-11. A8 I/O Controller Board

The A8 I/O Controller Board works with the A7 Processor Board to control the overall operation of the HP 5372A. Its main functions include:

- Providing the interface capabilities between the 68020 microprocessor, located on the A7 assembly, and the A17 CRT and CRT Driver Board
- Generating the synchronization signals required by the CRT Display Driver
- Scanning the front-panel keypad
- Receiving and processing signals from the front-panel ENTRY/MARKER Knob (Rotary Pulse Generator, or RPG)
- Driving front-panel HP-IB STATUS LEDs DS1 through DS4 (RMT, LSN, TLK, and SRQ, respectively) and INSTRUMENT CONTROL LEDs DS5 and DS6 (GATE and SINGLE, respectively)
- Controlling the flow of input and output through the rear-panel HP-IB port
- Coordinating the DMA transfer of data between either the 68020 microprocessor or measurement RAM and the rear-panel HP-IB port

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6-12. A9 Double Regulator Board

The A9 Double Regulator uses the unregulated +25 Volts from the A12 Motherboard to generate a switching –5.2 Volts supply and a –3.3 Volt linear supply. The +25 volt unregulated input is fused at 10 Amps by A9F1. The –3.3 volt supply's input is the output of the –5.2 volt supply. The –5.2 volt supply is adjusted by potentiometer A9R14 and the –3.3 volt supply is adjusted by A9R24. Heat-sensitive posistor R36 protects against overheating of the HP 5372A due to circulating fan B1 failure. This posistor generates the HOT signal that effectively shuts down the HP 5372A circuitry. The –5.2V output supplies power to all ECL ICs and the –3.3V supplies power to the EFL ICs.

6-13. A10 Triple Regulator Board

The A10 Triple Regulator uses the unregulated +25 Volts from the A12 Motherboard to generate switching +5, +15, and –15 Volt power supplies.

6-14. A11 Front Panel Board

The Front Panel board contains the numeric keypad and control knob (RPG) which routes, via a flat ribbon cable, all data entries to the A8 I/O Controller board. The A11 board also contains 10 LEDs for feedback to the user. Four LEDs are for HP-IB operation, three LEDs are input channel trigger indicators, two LEDs are instrument control indicators, and one LED is for power/standby indication.

6-15. A12 Motherboard

The A12 Motherboard provides power and signal flow paths (busses) for all printed circuit boards installed in the HP 5372A card cage. The major signals are the system data lines, measurement data lines, address lines, HP-IB lines, miscellaneous control lines, and all power distribution lines. The digital signals are divided into two different busses, the System Bus and the Count Hardware bus, to isolate the digital noise from the counting hardware. Each bus consists of data, address, and control lines. The Count hardware bus is turned off when not in use.

The A12 Motherboard also has miscellaneous circuitry such as power-up control, rear-panel signal buffering, power regulation for the A15 Oven Oscillator's oven and crystal, fan control, power failure monitoring circuits, overvoltage crowbar, and Option switch S1.

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6-16. A13 Rear Panel Board

The A13 Rear Panel Board is equipped with eight female BNC connectors. These BNC connectors are used as follows:

- A Frequency Standard External Input which allows the user to input a 1, 2, 5, or 10 MHz signal that will be used as the internal reference source for the HP 5372A.
- A Frequency Standard Output which allows access to the 10 MHz signal that is used as the internal reference source if the rear panel External Input is not used.
- Gate Outputs (2) which provide signals that indicate when measurement sampling occurs. A falling-edge occurs at one of the outputs when a measurement sample is acquired.
- Arm Delay Outputs (2) which provide signals that indicate when arming conditions have been satisfied. A falling-edge occurs at one of the outputs at the completion of an arming condition.
- A Measurement Inhibit Input which allows the user to control when the HP 5372A acquires measurements. The user specifies the conditions under which the instrument will acquire measurements in the Pre-trigger menu.
- A TI Detect Output which provides a signal that indicates when a measured time interval is either above or below a time interval value or inside or outside a range of interval values. The user specifies the conditions in the Pre-trigger menu.

Table 6-1. Rear Panel Connectors

Connector	Connector Label	Specification
A13J2	EXTERNAL INPUT	>0.5 Vp-p, 1K ohms (nominal)
A13J3	OUTPUT	>1 Vp-p into 50 ohms
A13J4	GATE 1	0 to 1 V into 50 ohms TTL into ≥ 10K ohms
A13J5	GATE 2	0 to 1 V into 50 ohms TTL into ≥ 10K ohms
A13J6	ARM DELAY 1	0V to 1V into 50 ohms TTL into ≥ 10K ohms
A13J7	ARM DELAY 2	0V to 1V into 50 ohms TTL into ≥ 10K ohms
A13J8	INHIBIT INPUT	+5V MAX TTL, 10K ohms (nominal)
A13J9	TI DETECT OUTPUT	0V to 1V into 50 ohms TTL into ≥ 10K ohms

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6-17. A14 Time Base Multiplier Board

The A14 Time Base Multiplier Assembly is basically a phase-locked- loop (PLL) frequency synthesizer with an output buffer stage that operates in conjunction with the A1 Time Base Controller to generate the 500 MHz clock frequency. The 1 MHz input frequency to the PLL is derived on the A1 assembly from either the internal 10 MHz oscillator or a 1, 2, 5, or 10 MHz external reference source. In addition to the 500 MHz clock generation, the A14 Time Base Multiplier produces both the rear-panel 10 MHz Frequency Standard Output and the 125 MHz ECL clock used for various count hardware functions.

When the 500 MHz PLL is operating correctly, the 500 MHz voltage controlled oscillator (VCO) is locked to the 1 MHz reference frequency; effectively multiplying it by 500. A1 derives the 1 MHz PLL input by dividing either the internal or external reference frequency by either 1, 2, 5, or 10. The result of the division is always 1 MHz. The value of the divisor is selected by successively incrementing the divisor until the A1 loss-of-lock window detector located at the A14 loop filter output detects lock. At this point, the divisor is frozen.

6-18. A15 Oven Oscillator

The A15 Oven Oscillator is an extremely stable, compact, low-power 10 MHz source. The crystal, along with the oscillator, circuit buffer, and oven control circuits are all mounted inside a thermal housing. The oscillator's oven heater is powered from the unregulated +25V, via the A12 Motherboard.

6-19. A17 CRT and CRT Driver Board

The CRT display unit consists of the CRT and CRT Driver Board. The Cathode Ray Tube (CRT) is a 7-inch, medium resolution unit. Menus of measurement functions, arming and input options, and other operating conditions are displayed on the CRT. Also accessible are status messages which are enhanced descriptions of instrument settings. "Help" screens assist in the configuration of the HP 5372A. After processing, measurement results can be displayed numerically or graphically in Historgram, Time Variation, or Event Timing form.

6-20. A20 C-Channel Input Board (Optional)

The optional C-Channel is a divide-by-4 prescaler which feeds into the measurement count hardware of the 5372A. This circuit accepts input signals from either the front-panel Type-N connector (option 030) or the rear-panel input (option 090). The input impedance for both options is 50Ω. The input signal is conditioned and translated to EECL logic level square waves and then routed directly to the A5 Sequencer IC. Since the HP 5372A count hardware operates at 500 MHz, the C-Channel input can be used up to frequencies of 2 GHz. This channel is AC coupled with a low frequency cutoff of 100 MHz.

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6-21. A22 FastPort Output (Optional)

The optional FastPort Output consists of three 40-pin connectors, located on the rear panel of the HP 5372A, which allow the user to access buffered unprocessed event and time data. Each output consists of 16 bits of data, 2 clock lines, and 20 grounds. The top connector contains 16 bits of events data from the Event Counter chain that is counting the current measurement. The middle connector contains 16 bits of time data from the time ZDT chain. The bottom connector contains 4 bits of interpolator data, 4 bits of status data, and 8 bits of time data.

6-22. HP 5372A MEASUREMENT CYCLE

In a typical measurement cycle, the HP 5372A performs the following sequence of activities:

A. At power-up, the microprocessor performs a Self Test check, which is a subset of the diagnostics tests. These tests check the overall operation of the A2 Input Amplifier Board, A3 Time Board, A5 Event Board, A6 Gate Timer circuit, A7 Processor Board, and A8 I/O Controller Board.

   In checking the memory, a checksum is performed on the A7 back-up CMOS RAMs. If the checksum results prove invalid, the RAMs are initialized to a known state. If results are valid, the microprocessor assumes that the RAM contents are correct. If back-up RAMs fail to initialize, the A7 Real-Time Clock also initializes because the microprocessor will assume that the back-up battery has failed and consequently the clock is not properly initialized.

B. All software "tasks" responsible for running the instrument are then initiated.

C. The first menu is displayed and the 5372A waits for further instructions.

D. The HP 5372A can either be in the Single mode, where it will acquire one block of measurements and then stop, or in the Repetitive mode, where it will continuously acquire a new block after finishing the current block. If the 5372A is in the Single mode, the measurement cycle is started by depressing a front-panel key or by sending a command over the HP-IB. If a front-panel key is depressed, a microprocessor interrupt is generated. The microprocessor services the interrupt by fetching that key from the keyboard Controller IC located on the A8 I/O Controller Board. The microprocessor then determines and validates the depressed key.

E. At this point, the user can select the measurement function and arming mode.

F. The microprocessor will set up the variables and processes required for the desired measurement. The variables include the ones used to program the A5 ZDT Counter and Sequencer ICs, the A5 DMA circuits, the A6 Gate Timer, and Binary Output Counter. The process determines from where the measurement variables originate, and where the measurement data will be stored.

G. The ZDT count support hardware is set up next. The microprocessor sends the Measurement Control Word to the A6 board where the control word is latched by a

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16-bit write-only register. This register contains static bits that control different count hardware functions on the A3, A5, and A6 boards.

H. Next, the ZDTs are programmed. The 13-bit control word is sent followed by the 16-bit preset. The programming of each ZDT is dependent on the type of measurement to be made, whether it is to be in continuous or non-continuous mode, and the type of arming mode used.

I. The same Measurement Control Word used to initialize the DMA assembly earlier is now sent to set the board for a specific measurement and to determine the starting measurement RAM and Interpolator RAM address. Also at this time, the number of ZDT Counters needed to perform this particular measurement is determined.

For example, assume you want to make ten continuous frequency measurements on one channel. The microprocessor will be programmed to expect 4 bytes of data from Event Counter 1, 4 bytes from the Timing Counter, and 2 bytes from the Interpolator. The microprocessor calculates the starting addresss using the top RAM address (F000), the programmed block size (number of measurements in the block), and the number of latch signals required to make the measurement. In this example, the sum of the measurements in the block and the number of latches required to perform each measurement, is subtracted from the top address of the measurement RAMs. The starting address for this example measurement would be calculated as follows:

Top Address — (Block Size + number of latches) = Starting Address

F000 (Hexadecimal) — (10 + 1) = EFEF (Hexadecimal)

As the 10 measurements proceed, the data is stored in the A5 measurement RAMs starting at address EFEF. After completion of all ten measurements, the top address (F000) is reached, generating and sending an interrupt to the microprocessor informing it that the measurement is complete.

J. The microprocessor sets up the starting address of the ZDT RAM (EFEF in this example).

K. The microprocessor now determines if the raw measurement data is to be sent directly to the HP-IB (Binary Output) or to the microprocessor for processing. If the data is to be sent over the HP-IB, then the A6 Binary Output Counter is programmed to the number of ZDTs that will be acquiring data.

L. Next, the DMA Address Generation counter hardware is programmed to the starting addresses of the ZDT RAMs and the Interpolator RAM.

M. If the 5372A is performing a "continuous measurement" using interval sampling arming, then the microprocessor programs the A6 Gate Timer to generate an interval pulse, TG1, after the Gate Timer receives the Timing Trigger signal (TTR) from the A5 Sequencer. The interval pulse TG1 is used to sample or latch the count values once each interval.

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N. Next, the eight internal control registers (Start Arm, Stop Arm, Event 1 ZDT, Event 2 ZDT, Clock 1, Clock 2, and Miscellaneous) of the Sequencer are programmed with the variables set up earlier.

O. The DMA is now turned on by switching ~MEAS signal low.

P. Next, the arming mode is programmed. If the arming mode is automatic, then the hardware is ready to begin measuring. To set the measurement mode to automatic, a bit in the Miscellaneous Control Register must be set.

Q. The counting begins and continues until the top RAM address is reached. At this point, the A5 Count Address Generation Counter generates a terminal count (TC). The TC is latched and used to generate a microprocessor interrupt informing it that the measurement is complete.

R. Next, the DMA Measurement Control Word is re-initialized which turns the DMA off, and stops the A6 Gate Timer and the A5 Sequencer. The ZDTs may or may not stop, depending on the type of measurement made.

S. The raw measurement data is copied to the Processor RAMs located on the A7 Board.

T. The A7 measurement data is now checked for count overflow and compensated for via internal software.

U. Results are then calculated.

V. The results are then displayed or sent to the HP-IB for output.

6-23. CIRCUIT LEVEL DESCRIPTIONS OF MEASUREMENT ACQUISITION

The HP 5372A has two measurement acquisition modes: continuous and non-continuous. In the continuous mode, the measurements are either sampled in a "back-to-back" fashion, where the measurements are all contiguous ("stop" of the nth measurement is the "start" of the n+1 measurement), or in a "individual" fashion, where only the first "start" and "stop" trigger events cause time-sampling. In the non-continuous mode, only one measurement is sampled per block, with only the first "start" and "stop" trigger events causing sampling to occur.

6-24. Continuous Mode (Using Interval Sampling)

Prior to the start of a measurement sequence, the microprocessor programs the A6 Gate Timer to generate an interval pulse, TG1, that will be used to sample or latch the count values once each interval. The microprocessor also presets the A5 Count Address Generation Counter to its terminal count (TC) minus the user-defined number of measurements in the measurement block. In addition, the A5 Sequencer sets the Latch 11 signal high to arm the RAM-Write

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circuit. After all Block Holdoff arming conditions have been met, the A5 Sequencer sends the Timing Trigger signal, TTR, to the Gate Timer, instructing it to begin ouput of the gate signal TG1.

The Gate Timer then outputs TG1, which is a continuous series of pulses (100 ns to 8 seconds apart) that corresponds to the "gate time" of the measurement (the "gate time" represents the time during which measurement data is taken.) The measurement begins when the Sequencer detects the first TG1 signal, which it uses as the first Sample Arm. The Sequencer then sends signal Latch 12 to ZDT Counter #1, which latches the current value of the counter without interrupting the counting process. Latch 12 then causes the RAM-Write circuit to write the latched counter values and the timing information into ZDT RAMs. The write circuit also generates signals that enables: 1) the ZDT counters to receive another latch signal, 2) the Sequencer to initiate another sample, 3) the interpolator circuits to perform another measurement, and 4) increments the A5 Count Address Generation Counter. The ZDT counters continue to count events. The Sequencer uses this next TG1 signal as the next Sample Arm and sends another Latch 12 signal to the ZDT counters, and the process of storing measurement data into RAM is repeated until the programmed number of measurements has been completed.

When completed, the A5 Count Address Generation Counter sends a TC pulse to the microprocessor informing it that the measurement block is complete and that the measurement data is ready to transfer from the measurement RAMs to A7 memory for processing. After the block is processed, the next block of measurements begins.

6-25. Non-Continuous Mode (Using Time Sampling)

After the A5 Sequencer detects the Start Arm (from the A6 Gate Timer), it sends a CLK and a latch signal to the A5 ZDT Counter #1. The latch signal, Latch 11, latches the initial value of the counter and arms the RAM-Write circuit. When the Sequencer detects the Stop Arm, it sends another latch signal to A5 ZDT Counter #1. This latch signal, Latch 12, latches the final counter value and causes the RAM-Write circuit to generate a write pulse. The write pulse copies, to ZDT RAM, the contents of Latch 11 (Start value of Event ZDT Counter #1), Latch 12 (Stop value of Event ZDT Counter #1), Latch CI1 (Start value of Time ZDT Counter), Latch CI2 (Stop value of Time ZDT Counter), and the Start/Stop interpolated binary code. This write pulse also causes reset signals to be sent, after the data has been stored in RAM, to the A5 Sequencer, A4 interpolator, and the ZDT counters. The write pulse also increments the A5 Count Address Generation Counter. This count is preset to its terminal count (TC) minus 1. This means the increment causes a TC to be generated. The TC is latched and generates an interrupt (~INTX). The interrupt notifies the microprocessor that the measurement is complete and that data is ready to transfer. The transfer of data from the counter RAMs is controlled jointly by the A7 Processor and A8 I/O Controller Boards. The μP processes the data, displays it on the front-panel CRT, and starts another measurement.

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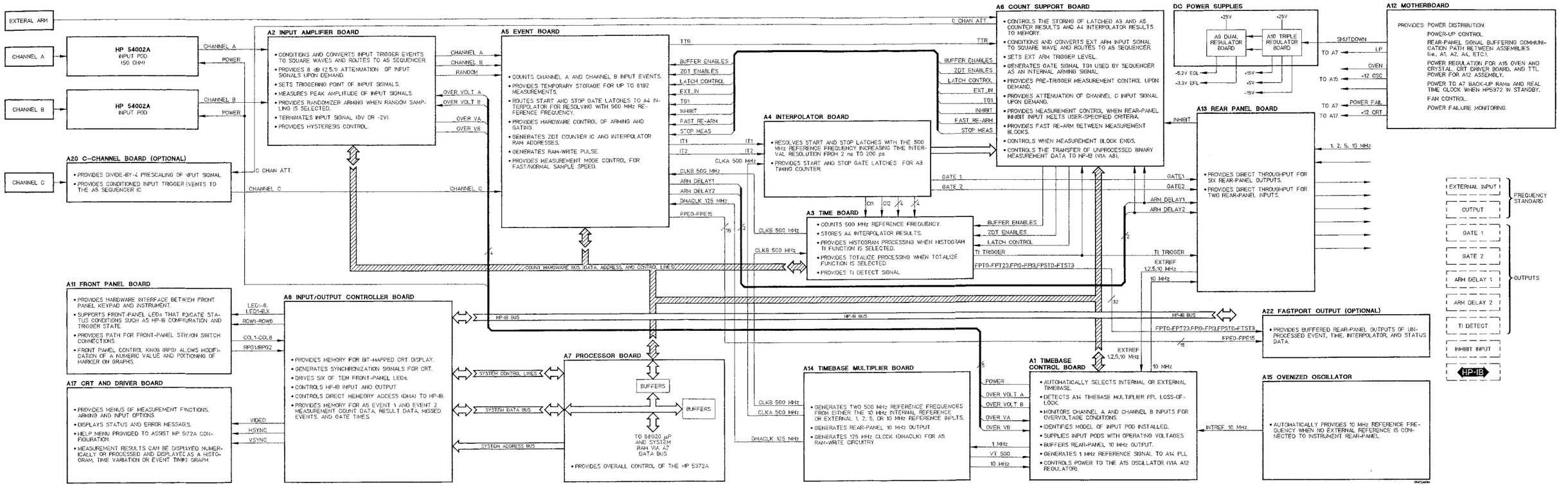

Figure 6-3. HP 5372A Assembly Level Block Diagram

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7

A2 INPUT AMPLIFIER

7-1. INTRODUCTION

The A2 Input Amplifier Board contains two identical DC coupled 500 MHz amplifier circuits, Channel A and Channel B. Both circuits accept input signals from either the front-panel input pods or the rear-panel inputs (Option 060 or 090), without any loss of input sensitivity or change in input impedance. The input signals are conditioned and translated to EECL logic level square waves (0V logic "high", –800 mV logic "low"), and then routed through coaxial cables to the A5 Event Board's counting circuitry. The A2 assembly hardware can be configured from either the HP 5372A front panel INPUT menu screen or via the HP-IB interface. All data transfer occurs over the Count Hardware Data Bus (CTD0-CTD11).

Signal conditioning is controlled by relay switches A2K1 through A2K4. These relays set X2.5 or X1 attenuation, COMMON A or SEPARATE signal paths, 0 or –2 V termination bias voltage, and provide over-voltage protection for the input circuitry. The relays are driven by a TTL driver, which is programmed by the A7 Processor Board's 68020 microprocessor via the Count Hardware Data Bus lines (CTD0-CTD7). The signal conditioning parameters are set according to the front panel CRT setup or HP-IB commands.

In summary, the functions performed by the A2 Input Amplifier Board are as follows:

- Provides hardware control of signal pathways when either the COMMON or SEPARATE input channel modes are selected.
- Controls the trigger slope and trigger level voltage setting.
- Provides 50Ω signal path termination.
- Allows selection of either 0-volt (TTL logic) or –2-volt (ECL logic) termination bias voltage.
- Provides hysteresis control of the Channel A and/or Channel B input sensitivity.
- Generates random arming (for Time Interval Measurements only) which allows the instrument to randomly sample input trigger events.
- Provides over-voltage protection for the HP 5372A.
- Detects presence of an input signal at the front panel Channel A and/or B input pods.
- Measures ± peak voltages used for Peak Amplitude Measurements and for setting the automatic trigger level (Single and Repetitive modes).

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The two identical A2 amplifiers are fully programmable and designed to optimize pulse fidelity. The following theory describes only Channel A, since the Channel B circuit is identical. See the "A2 Input Amplifier Board Block Diagram" in *Figure 7-9* for reference.

7-2. SEPARATE/COMMON INPUT MODE

Channel A is the primary input channel for the HP 5372A. All counter measurement functions can be performed on a signal applied to this channel. Channel B is an alternate input channel with input characteristics matching those of Channel A. To use each channel separately, the SEPARATE input mode is selected via the INPUT menu. The signal from Channel A can also be simultaneously applied to Channel B by selecting the COMMON input mode. When COMMON input mode is selected, relays A2K1, K2, K4, and K8 route the input signal at Channel A to both the Channel A and Channel B input and counting circuitry. Simultaneously, relay A2K8 disconnects Channel B input signal from Channel B input and counting circuitry and is routed by relay A2K7 to the Channel A *Termination* and *Termination Bias* circuitry. This ensures proper loading of both user signal source inputs. The counter's input impedance and signal sensitivity does not change when input modes are changed from SEPARATE to COMMON and vice versa. This process maintains waveform fidelity and the counter's frequency response.

7-3. TERMINATION BIAS VOLTAGE

With the 50Ω HP 54002A Input Pod installed, either Channel A, B, or A & B, may be programmed to route the input signal through the diode-clamped DC Offset IC input pin 2 (pin 4 for Channel B), through a 50Ω resistor (A2R42), and into 0 or –2 Volts of termination bias voltage. The –2-volt bias voltage preserves the fidelity of high-speed ECL signals and eliminates the need for external probing when measuring ECL circuits. The 8 dB attenuator (A2U1) cannot be programmed when ECL attenuation has been selected since ECL input signals are already low in amplitude. –2 Volt ECL termination is programmable only with the 50Ω Pod (HP 54002A) installed. The HP 54001A [1 GHz Miniature Active Probe (10:1, 10 kilohm)] and HP 54003A [1 Megohm Pod (with 10:1 scope probe)] are isolated by high impedance from the A2 Input Amplifier Board. When either the HP 54001A or HP 54003A input pods are installed, the 0 Volt termination voltage is programmed automatically.

7-4. CHANNEL A INPUT DESCRIPTION

7-5. Channel A Input

After passing through the input pod, the input signal is routed through coaxial cable W24, joins cable W19 at the forward chassis bulkhead, and continues on through cable W19 to connector A2J1. The input signal then travels in one of two directions. If the 1:1 (0 dB) attenuation setting is selected, relays A2K1 and K2 short Channel A attenuator A2U1 out of the circuit. In the 2.5:1 (8 dB) attenuation setting, A2U1 is placed in series with the Channel A input signal. This setting allows the application of an input signal with a peak voltage of 2.5 times the normal operating range. Immediately following relay A2K2, the voltage of the input signal is measured and routed to the A1 Timebase Control Board's *Overload Sense* circuit via

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signal path SENSE A. This circuit protects the A2 Input Amplifier by opening relays A2K1 and K2 when the input voltage exceeds the nominal value of ±2.7 Volts. See *Path Selection (Relay Control)* circuit description for more details.

7-6. DC Offset

The Channel A input signal continues to Channel A DC Offset IC A2U2, pin 2. A2U2 is simply a buffer amplifier, having an operating range of 0 to 500 MHz, that allows application of a programmable ± 2 VDC offset to the input signal. (Refer to *Figure 7-1.*) At pin 2 (pin 4 for Channel B), the input signal is diode-clamped to ±5 Volts for over-current protection. The input signal exits A2U2 through pin 4 (pin 2 for Channel B) for off-chip termination through 50Ω resistor (A2R42) and into 0V or –2V termination bias voltage of the *Termination Bias* circuitry. The DC levels of the input and output signals are sampled by the A2U2's external feedback loop comprised of comparator A2U6. The INPUT SENSE DC level, A2U2 (pin 1), and the OUTPUT SENSE DC level, A2U2 (pin 13), are compared by A2U6. The output error voltage of A2U6, pin 6, returns to the *DC Offset* stage of the DC Offset IC where it sets the programmed DC output level. This external feedback loop is adjustable for unity gain over A2U2's usable bandwidth using potentiometer A2R4, the CHA DC Offset Adjust. When this loop is properly adjusted, the low frequency response matches the high frequency response. Consequently, no error voltage is introduced by lower frequency input signals. This error voltage is also routed through connector A2P1 (pin 49) to Test Connector A12J6 and used for in-factory test purposes. Diodes A2CR5 and CR6 prevent the latch-up of the external feedback loop.

Adjustable resistor A2R3, CH A Input Bias Loop Adjust, allows for elimination of offsets caused by internal resistances of the DC Offset IC. This adjustment is made by applying a 10 Hz signal and adjusting A2R3 until the control voltage measured at pin 17 of A2U2 is minimized.

Transistor A2Q2, Zener diode A2CR2, and associated resistors provide the DC Offset IC A2U2 (pin 16) with +8 Volts power. Transistor A2Q1, Zener A2CR1, and its associated resistors provide A2U2 (pin 10) with –10 Volt power.

The programmable trigger level is applied to the Channel A input signal at pin 14 of DC Offset IC, A2U2. The analog trigger level voltage is generated by a 12-bit digital-to-analog converter (DAC), A2U20, which is programmable in discrete steps over the input range of the instrument. The DAC interfaces directly with the CTD0-CTD11 bits of the Count Hardware Data Bus. The DAC is enabled by toggling its Chip Select (~CS) pin low with signal DAC 4 generated by the A1 Timebase Control Board. Before the DC offset voltage is applied to the DC Offset IC, the DAC's output passes through an inverting buffer amplifier A2U19. Adjustment potentiometer A2R14, CHA Input Amp Gain Adjust, allows compensation of the circuit for any offsets introduced by the circuit components. (See *Trigger Level Control* paragraphs for a more detailed description of how the HP 5372A sets input trigger level and performs peak amplitude measurements.)

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Pin 12 of the DC Offset IC, A2U2, is the signal output port of the This signal has an amplitude equal to the input signal at pin 2 minus the programmed offset at pin 14. From here, the input signal connects directly to input pin 3 of Channel A's Comparator IC, A2U4.

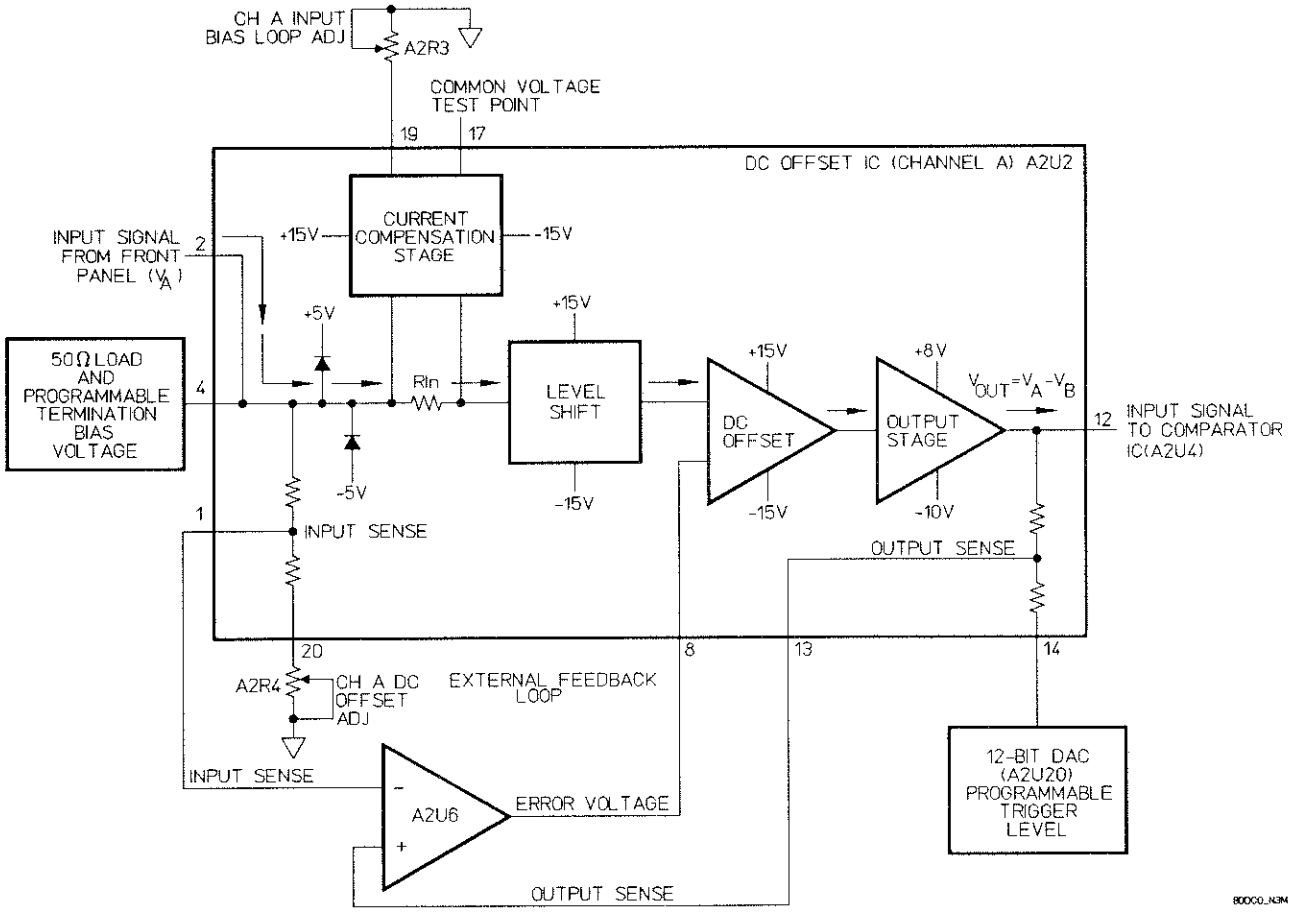

Figure 7-1. DC Offset IC Simplified Block Diagram

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7-7. Comparator IC

Comparator IC A2U4 converts the single-ended signal from the DC Offset IC, A2U2, to a differential EECL-level, digital output signal for use by the A5 Event Board's counting hardware. (Refer to *Figure 7-2.*) Respectively, the comparator's *Impedance Switching Bridge* and *Input Diode Bridge* stages terminate the input signal into 50 Ohms and protect the IC from over-voltage conditions. The input amplifier stage converts the single-ended input to a differential output. The signal is then applied to a *Schmitt Trigger* stage which incorporates hysteresis and slope control. The differential, open-collector outputs at pins 13 and 14 are EECL-level digital outputs with amplitudes of 0 Volts (logic "high") or –800 mV (logic "low") when terminated into 50 Ohms. The signals at pins 13 and 14 are 180° out of phase with respect to one another. Pin 13 provides the A5 assembly with Channel A count data and Pin 14 output drives the Channel A trigger LED control circuitry.

The Comparator IC permits adjustment of total system offset (A2R10), upper and lower hysteresis limits (A2R12), and control of trigger slope selection.

- Channel A Total System Offset Adjust (A2R10) — This adjustment establishes the trigger level at zero (0) Volts on a low distortion sine wave. This adjustment is made with a Channel A input of 1 kHz at 30 mV p-p sine wave and the Channel A DAC (A2U20) set at mid-range (i.e., 0 Volts). The output amplitude of comparator A2U4, as measured between resistor A2R24 and connector A2P2 (pin 44), is set at its minimum level by adjusting A2R10.

- Channel A Hysteresis Adjust (A2R12) — This adjustment is made with a 100 Hz at 100 mV p-p sine wave applied to the Channel A input, and the Channel A DAC (A2U20) set at mid-range (i.e., 0 Volts). The hysteresis is then adjusted so that the hysteresis window difference between the upper hysteresis point and lower hysteresis point is 12 mV p-p (or 0 ± 6 mV). This adjustment sets the minimum hysteresis points. The hysteresis circuit consists of a dual 8-bit DAC (A2U207) and a dual comparator (A2U206). The microprocessor selects which DAC to program via control signal CTA1, and programs the DAC via the microprocessor data bus lines D0-D7. The control signals DAC_CS and DAC3 come from the A1 assembly. The maximum hysteresis points are set during the Cal. Sensitivity adjustment (diagnostic test 25).

- Channel A Slope Control — Slope control determines whether the A2U4 Comparator IC triggers an output at the upper hysteresis limit (+6 mV at minimum hysteresis) on the input signal's positive-going edge, or at the lower hysteresis limit (–6 mV at minimum hysteresis) on the input signal's negative-going edge. Slope control is programmed by the A7 Processor Board's 68020 microprocessor in the form of TTL level 0- or +4-volt bit. Flip-flop A2U16, pin 16, is set at 0 Volts for a positive trigger slope, and +4 Volts for a negative trigger slope. This TTL signal is applied to the *Schmitt Comparator* stage of A2U4 via pin 18.

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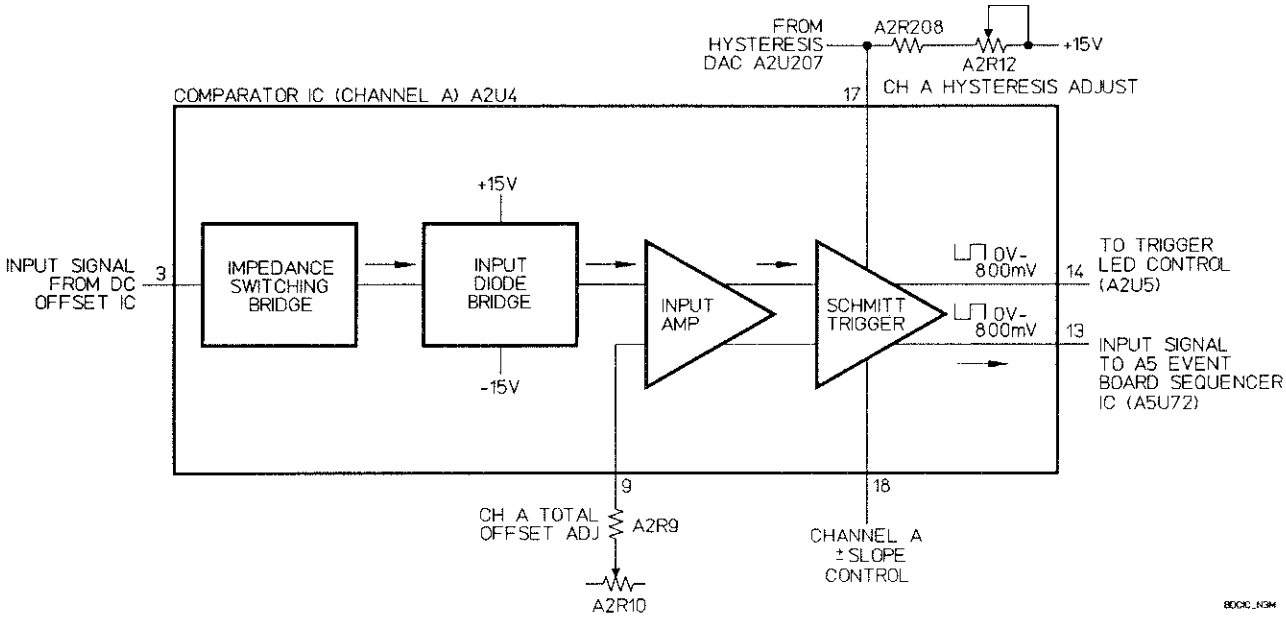

Figure 7-2. Comparator IC Simplified Block Diagram

7-8. Trigger Level Control and Peak Amplitude Measurement

The trigger level control circuit varies the DC content of the input signal until the positive and negative edges pass through the upper and lower hysteresis limits (+6 mV and –6 mV, respectively at minimum hysteresis) of Comparator IC, A2U4. The hysteresis limits are the voltage levels required by the Comparator IC to trigger and change its output state. Selection of positive slope triggering forces the Comparator IC to trigger at its upper hysteresis limit while selection of negative slope triggering forces triggering at its lower hysteresis limit. Once the Comparator IC has triggered, it cannot retrigger until the input signal crosses the opposite hysteresis limit. In the case of the Comparator IC, the signal must pass through a hysteresis window of 12 mV p-p centered at zero Volts (at minimum hysteresis). (Refer to *Figure* 7-3.)

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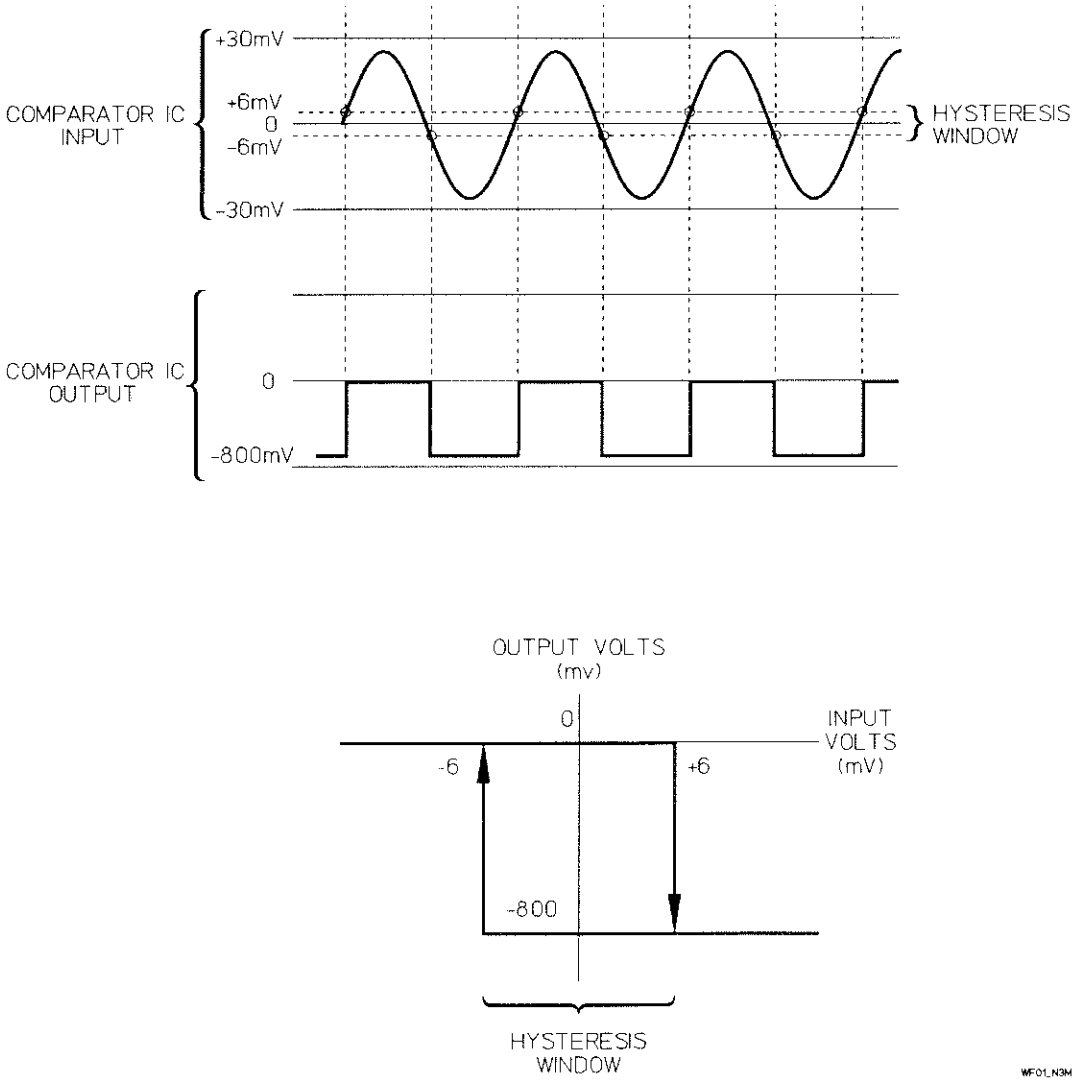

Figure 7-3. Comparator IC Hysteresis Window at Minimum Hysteresis

The method used for setting the input trigger level depends on which HP 5372A trigger mode is selected: Manual or Automatic. In the Manual Trigger mode, the numeric value of the DC offset is manually entered (with 2 mV resolution) through the front-panel DATA ENTRY keypad or ENTRY/MARKER control knob. The A7 Processor Board's 68020 microprocessor reads the data entered and sends a 12-bit digital offset equivalent to A2 assembly's Digital-to-Analog Converter (DAC), A2U20. The DAC's output is buffered and applied to pin 14 of the DC Offset IC, A2U14, where it adds to or subtracts from the DC content of the input signal. The programmed offset and choice of trigger slope specifies at which hysteresis limit the Comparator IC will trigger. The front-panel Channel A trigger LED will flash at a 10 Hz

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rate when the DC offset is adjusted correctly. The flashing trigger LED indicates that the input signal passes through the upper and lower hysteresis limits (+6 mV and -6mV, respectively at minimum hysteresis).

Two Automatic Trigger level setting modes can be selected: Single or Repetitive. In both Single and Repetitive Automatic Trigger modes, the maximum and minimum signal amplitudes are measured and then the Automatic trigger level voltage is set by selecting a percentage (0% to 100%) of the measured peak-to-peak amplitude. The trigger level percentage is user-selected, in 1% increments, via the front-panel DATA ENTRY keypad or ENTRY/MARKER control knob. When set in SINGLE AUTO TRIGger mode, the trigger level voltage is set automatically either at the beginning of the first measurement block, whenever SINGLE AUTO TRIGger mode is selected, after the front-panel RESTART key is pressed, or at any time a measurement restarts as a result of making a parameter change via the FUNCTION or INPUT menu screens. The trigger level voltage is maintained for subsequent measurement blocks. But when REPETITIVE AUTO TRIGger mode is used, the trigger level voltage is set at the beginning of each measurement block or whenever REPETITIVE AUTO TRIGger mode is selected.

The Automatic Trigger level voltage is set as follows. (Refer to *Figure 7-4.*) Assume that an AC signal within the dynamic operating range of the HP 5372A, and having sufficient positive DC offset so that the Comparator IC will not trigger, is applied to the front-panel Channel A input pod (*Figure 7-4A*). The Comparator IC output is monitored by the A1 Timebase Control Board's *CHA Auxiliary Comparator* stage, via the ~A COMP signal line. The output of the auxiliary comparator is latched onto the Count Hardware Data Bus (bits CTD0-CTD7) by the A1 *Pod ID Latches* stage. The A7 Processor Board's 68020 microprocessor (A7U1) reads and interprets this bit, and responds with an incremental change in offset value. This modified offset data returns to the A2 assembly's DAC, A2U20, via the Count Hardware Data Bus (bits CTD0-CTD11). This DC offset output level is buffered and inverted by amplifier A2U19 and applied to the DC Offset IC at pin 14. Monitoring of the Comparator IC output and the incremental change of the DC offset continues until the input signal's AC component passes through the upper and lower hysteresis limits, triggering the Comparator IC (*Figure 7-4B*). The DC offset is again modified until the positive peak of the input signal falls just below the upper hysteresis limit of +6 mV, at minimum hysteresis. At this point, the Comparator IC will again stop triggering (*Figure 7-4C*). The 68020 microprocessor records the total amount of DC offset applied so far. The polarity of the DC offset is now reversed and applied in increments until the Comparator IC begins to trigger again (*Figure 7-4D*). The DC offset continues to change until the input signal's negative peak no longer crosses the lower hysteresis limit of –6 mV, at minimum hysteresis. Again, the Comparator IC stops triggering (*Figure 7-4E*). The 68020 microprocessor uses the ± DC offsets to calculate the +Vp, –Vp, and Vp-p of the Channel A input signal. Vp-p is multiplied by the user-selected percentage trigger point. A DC offset that shifts the input signal so that the selected trigger percentage point of V p-p coincides with the upper hysteresis limit (+6 mV at minimum hysteresis) of the IC Comparator IC is now applied (*Figure 7-4F*).

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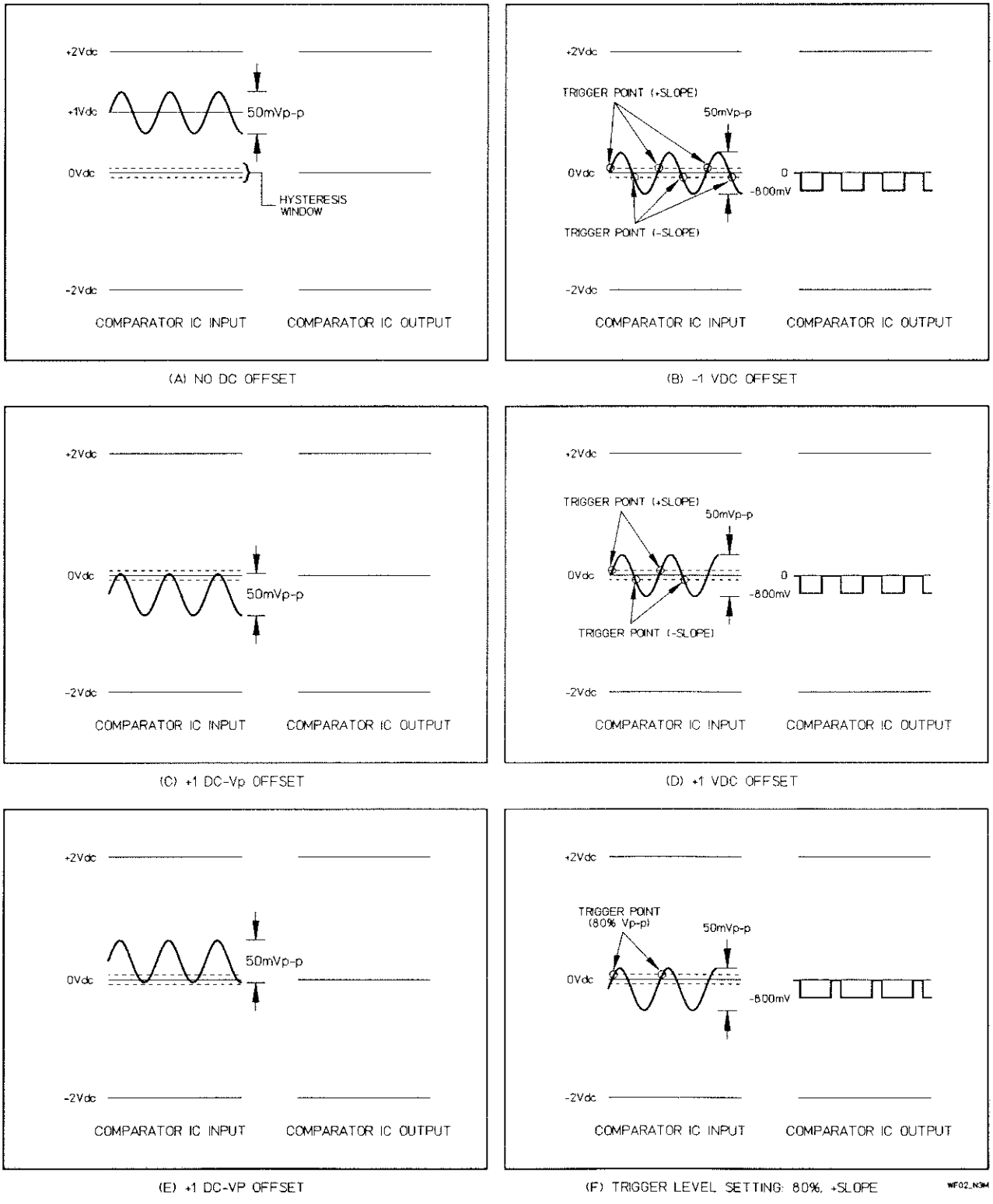

Figure 7-4. Trigger Level Voltage and Peak Amplitude Measurement

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7-9. Trigger LED Control

Output pin 14 of Comparator IC A2U4 is terminated into 50 Ohms (A2R35) and routed to flip-flop A2U5, which is designed specifically for high speed EECL signals. This flip-flop, along with a printed circuit board delay line, stretches the pulse to between 1 and 2 nanoseconds. The signal then enters a one-shot multivibrator comprised of transistors A2Q3 and Q6, producing a 400 nanosecond negative-going pulse. This 400 nanosecond pulse is again stretched to 100 milliseconds (10 Hz) by transistors A2Q4 and Q5. The output signal, which is tapped off the collector of A2Q5, routes through NAND gate A2U12A, and drives the front-panel Channel A trigger LED (A11DS8). The Channel A trigger LED provides the user with a visual indication that adequate Channel A input signal is present to trigger a measurement. The LED flashes at a 10 Hz rate when Channel A is triggering, but remains off when the input signal is above or below the desired trigger level setting.

7-10. Path Selection (Relay Control)

Relays A2K1 through K7 have 50Ω characteristic impedance and low crosstalk characteristics. All relays are controlled by the A7's 68020 microprocessor via Count Hardware Data Bus lines CTD0 through CTD7. The instructions for both Channel's A and B are decoded by flip-flop A7U27. The relays are set by clocking A2U27 with the RELAY CLK signal generated by the A1 Timebase Control Board. The eight A2U27 outputs are sent to relay driver A2U26, which supplies the TTL level voltages required to open and close the relays. A2U27 control bits for relays A2K3, K4, K7, and K8 are routed directly to relay driver A2U26. On the other hand, the A2U27 control bits for Channel A and Channel B relays, A2K1-K2 and A2K5-K6 respectively, are first ANDED with the over-voltage signals generated by the A1 Timebase Control Board circuitry before going to relay driver A2U26. Control bits for relays A2K1 and K2 are ANDed with SENSE A and control bits for relays A2K5 and K6 are ANDed with SENSE B. A TTL logic "low" signal on either SENSE A or SENSE B disables the appropriate Channel A and B relays, providing protection against over-voltage conditions. A hardware interrupt is also generated by the A1 Timebase Control and A2 Input Amplifier circuitry. Over-voltage sense lines A and B are routed from Channel A and B inputs respectively to the *Overload Sense* circuitry located on the A1 Timebase Control Board. If a voltage level greater than approximately ±2.7 Volts is detected at the front-panel input connector, the A1 circuits notify the Hardware Over-ride circuits (A2U28) located on the A2 Input Amplifier Board, which open the appropriate relay disconnecting the over-voltage condition from the HP 5372A. After the relays open, which occurs within milliseconds of the over-voltage detection, an error message is displayed on the CRT display. It is left to the user to correct the over-voltage condition and reset the HP 5372A. An example of an error message displayed for an over-voltage condition on Channel A would be "Error 109: Ch A Overvoltage".

7-11. Bias, ±Slope, Trigger LED Control Switc

Flip-flop A2U16 latches the Termination Bias, ±Slope, and Trigger LED control bits from the Count Hardware Data Bus. Data is clocked from the bus by the positive-going edge of the

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TTL-level MISC CLK signal generated by the A1 Timebase Control Board. The function of these control bits are as follows:

- Data bits CTD0 and CTD1 provide a two-bit binary address to four-channel multiplexer A2U7.
- Data bits CTD2 and CTD3 provide a two-bit binary address to four-channel multiplexer A2U21.
- Data bit CTD4 provides independent enabling of Channel B's front-panel trigger LED.
- Data bit CTD5 provides independent enabling of Channel A's front-panel trigger LED.
- Data bit CTD6 provides slope control to the Channel A Comparator IC, A2U4. A TTL low (0 Volts) instructs the Comparator IC to generate an output pulse on the positive-going edge of the input signal, while a TTL high (+4 Volts) instructs it to generate an output pulse on the negative-going edge of the input signal.
- Data bit CTD7 provides slope control to the Channel B Comparator IC, A2U14. A TTL low (0 Volts) instructs the Comparator IC to generate an output pulse on the positive-going edge of the input signal, while a TTL high (+4 Volts) instructs it to generate an output pulse on the negative-going edge of the input signal.

7-12. Termination Bias Selection

The main function of A2U7 and U21 multiplexers is the programming of the input channel termination bias voltage to either zero Volts or an ECL level of –2 Volts. A2U7 and op-amp A2U8 set the bias of input Channel A while A2U21 and op-amp A2U22 set the bias of input Channel B. Another function of the multiplexers is to facilitate troubleshooting of Channel A and B hardware. The bias level of both channels can be set at + 1 V p-p for troubleshooting purposes. The relays can be programmed to use Channel A multiplexer A2U7 in Channel B and Channel B's multiplexer A2U21 in Channel A.

Multiplexers A2U7 and U21 provide programmable paths for four inputs (pins 4, 5, 6, and 7) to a common output (pin 8) as programmed by address lines A0 and A1 (pins 1 and 16 respectively). A2U7 output (pin 8) goes to the non-inverting input (pin 3) of op-amp A2U8, which sets the DC bias to transistors A2Q7 and Q8 such that their emitter circuits are at 0, –2, or +1 V p-p. Multiplexer A2U21 behaves in a similar fashion.

As mentioned earlier, each multiplexer has four inputs and each input can be selected by a two-bit address specified by the A7 68020 microprocessor. The four possible inputs for the Channel A multiplexer A2U7 are: 1) Ground (pin 4), 2) –2 VDC (pin 5), 3) VREF OUT (pin 6) from Channel A DAC A2U20 pin 6, and 4) Channel B DC Offset as set by Channel B DAC A2U30 pin 9. The four possible inputs for the Channel B multiplexer A2U21 are: 1) Ground (pin 4), 2) –2 VDC (pin 5), 3) VREF OUT (pin 6) from Channel A DAC A2U20 (pin 6), and 4) Channel A DC Offset as set by Channel A DAC A2U20 pin 9.

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7-13. RANDOMIZER

The Randomizer circuit allows the HP 5372A to randomly sample Time Interval measurements. In this mode, a measurement is acquired after a random number of edges on Channel A (the random number of edges varies from 6 to 17 between each acquired measurement). Random sampling can be used with signals up to 100 MHz on Channel A.

The Randomizer consists of two shift registers (A2U203 and A2U204), an exclusive-OR gate (A2U202), a D-type flip-flop (A2U201), and a synchronous 4-bit binary counter (A2U205). At the beginning of a block of measurements, the microprocessor sends two reset signals, ~RAN_INIT and DIS. ~RAN_INIT is used to reset the flip-flop, while DIS is used to reset the counter. The flip-flop then presets the two shift registers (with at least one input being set to a binary one). The counter begins counting the Channel A edges (from Channel A Comparator IC output pin 13). When the counter receives the fourth edge, it outputs a signal which begins the pseudo-random sequence generator.

The pseudo-random sequence generator consists of the two shift registers and one exclusive-OR gate. The shift registers begin shifting the data in a 217 state pseudo-random sequence. This sequence will give 54 arming edges for every cycle of the 217 state sequence. The output of the sequence generator is A2U204(2), which is sent to the A5 Sequencer to arm each measurement.

NOTE

The pseudo-random sequence generator operates in a "free-run" mode. Because of this, the first measurement in a sequence can occur after fewer than four edges on Channel A. For the measurements that follow, the pseudo-random sequence generator arms a measurement every six to seventeen edges on Channel A.

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7-14. A2 INPUT AMPLIFIER BOARD TROUBLESHOOTING

7-15. Test Equipment Required

- HP 54503A Digitizing Oscilloscope
- 1MΩ 10:1 Probe (HP Part Number 10435A)
- A19 RF Extender Board (HP 05372-60016)

NOTE

The following procedure applies to both Channel A and Channel B. For Channel B, the relevant ICs and pins are placed within brackets.

7-16. Diagnostics

Diagnostic Test 4. Input Amplifier Test

This test checks the following A2 circuit functions:

- Comparators will trigger when an input signal within specs is applied to front panel Channel A or B input,
- Comparators will not trigger when input signals are removed from front panel Channel A or B input,
- Comparators will trigger on either the positive or negative slope of the front panel Channel A or B input,
- Relays K1-K8 are tested in various combinations to ensure functionality, and
- Termination Bias Selection Multiplexers for both Channel A and B are programmed and a peak search is performed on the resulting level.

NOTE

Refer to Appendix C for a more detailed description of Test 4.

To run Test 4, perform the following steps:

A. Turn 5372A front-panel STBY-ON power switch to ON. Wait 4-5 seconds to allow unit self testing to finish.

B. Press 5372A TEST menu selection key. The TEST menu screen is displayed.

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C. Move menu cursor to the test desired or enter the test number in the "Test Number" field using the DATA ENTRY numeric keys.

D. Press the RUN softkey to start the test. The Diagnostic Test screen is displayed. The test will run continually until the Stop softkey is pressed, or until another menu key is selected.

E. The test can temporarily halted by pressing the Pause softkey. This suspends the test and freezes any messages on the front-panel CRT display. To resume the test, press Run softkey.

F. The test can also be executed in "Until Fail" mode. The selected test will run continually until a failure occurs. At that time the test enters "pause" mode. Press the "Until Fail" softkey to turn on this function.

7-17. Background

The A2 Input Amplifier Board conditions and converts the Channel A and B input signals into EECL-level square waves of the same frequency. The square waves are then routed to the A5 Event board.

7-18. A2 Troubleshooting Approach

To check the overall functionality of the A2 assembly, the EECL-level square wave for CHANNELs A and B are verified. The board trouble can be isolated into three major areas; (1) the DC Offset Circuit, (2) the comparator circuit, and (3) Trigger Level Control circuit.

7-19. A2 Troubleshooting Procedure

A. Set front panel STBY-ON power switch to STBY.

B. Install A2 assembly in the A19 RF Extender Board, HP Part Number 05372-60016. An SMA(f)-to-SMA(m) adapter cable must be used with the Channel A input.

C. Connect the 5372A rear-panel 10 MHZ OUTPUT signal to 5372A front-panel Channel A input.

D. Set the STBY-ON power switch to ON, press the Preset key, press the Input key, move the cursor to the Channel A [B] mode field, and then press the **Manual** softkey.

E. Move the cursor to the Channel A [B] level field. Using the ENTRY/MARKER knob, vary the triggering voltage –480 mV to +480 mV. Verify that A2J2 [A2J4] outputs an EECL 10 MHz square wave throughout the whole range of triggering voltage. (See *Figure* 7-5.)

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F. If the signals displayed at output connectors A2J2 [A2J4] are as expected, the A2 assembly is functioning properly. If signals are not as expected, proceed with these procedures.

G. Select SINGLE AUTO trigger. The trigger level voltage should be approximately 0 Volts.

7-20. DC OFFSET HYBRID IC

A2U2 [A2U14] is the DC Offset Hybrid that offsets the input signal by a dc voltage equal to the programmed trigger level voltage.

A. Measure the signal at input connector A2J1 [A2J3]. This signal comes directly from the input pod, which is receiving the rear panel FREQUENCY STANDARD OUTPUT. The signal should be approximately 1 Vp-p.

B. Set trigger level voltage to +480 mV. (Press Input key, move cursor to Channel A [B] Mode field, press the **Manual** softkey, move cursor to the Channel A [B] Level field, press 480 on the DATA ENTRY keypad, and then press the **mV** softkey.)

C. Pins A2U2(2) and A2U14(2) are the input pins to Channel A and B DC Offset Hybrids respectively. Verify that a 10 MHz square wave (1 Vp-p nominal) is at each input (see *Figure 7-6*). If A2U2(2) [A2U14(4)] appears to be different, check the input paths from input connector A2J1 [A2J3]. If the input path is OK, check and replace the relays A2K1, K2, K3, and K4 [A2K5,K6,K7, and K8]. Diagnostic Test 4 will check the operation of all relays.

D. Using an HP 3458A, verify that A2U2(14) [A2U14(14)] is approximately +480 mV. If A2U2(14) [A2U14(14)] is not correct, proceed to the "Trigger Level Control Check".

E. Observe DC Offset Hybrid output pin A2U2(12) [A2U14(12)]. In MANUAL trigger mode, use the ENTRY/MARKER knob to vary the trigger level and observe the signal as the dc level shifts.

F. If both signals are not correct, replace A2U2 [A2U14].

G. Nominal signal levels of the DC Offset Hybrids, A2U2 [A2U14], are listed in *Table 7-1*.

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Table 7-1. DC Offset Hybrid Pin Voltages

Pins	Signal
1	400 mV (p-p) (triangle wave)
2	Input Signal
3	–5.2V dc
4	Input Signal
5	+5V dc
6	–15V dc
7	GND
8	–5.2V dc
9	GND
10	–10V dc
11	GND
12	Output Signal
13	400 mV (p-p) (triangle wave)
14	Equal to trigger level setting
15	GND
16	+8V dc
17	–2.5V dc
18	+15V dc
19	0V (Adjustable)
20	0V (Adjustable)

7-21. COMPARATOR HYBRID IC

The Comparator Hybrid IC, A2U4 [A2U15], which behaves like a Schmitt trigger, outputs a digital EECL square wave whenever the input crosses the ICs hysteresis points of 0 ±6 mV, at minimum hysteresis. The Comparator output is sent via a coaxial cable to the A5 Event Board for counting.

A. Set triggering level voltage to +480 mV.

B. Measure Comparator input pin A2U4(3) [A2U15(3)]. Ensure that a 10 MHz square wave having a DC offset of –480 mV is measured (see *Figure 7-7*).

C. Observe A2U4(3) [A2U15(3)]. While in MANUAL trigger mode, vary the level and observe the signal as its dc level shifts. The Comparator's output always switches at the zero crossing point. Changing the point at which the Comparator triggers is controlled by the DC Offset Hybrid when it shifts the dc level of the input signal.

D. Measure A2U2(4) [A2U14(4)] DC Offset Hybrid input pin. It should measure 1 Vp-p.

E. Measure Comparator Hybrid output pin A2U4(13) [A2U15(13)]. This point should measure 0.9 Vp-p nominal. (The gain of the Comparator Hybrid is somewhat less than unity). The A2U4 [A2U14] Comparator output pin is a EECL-level digital signal that varies between 0V and –0.8 V *nominal* (See *Figure 7-8*).

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F. If the signal is observed, replace A2U4 [A215].

G. Nominal signal levels of the Comparator Hybrid ICs, A2U4 [A2U15], are listed in *Table 7-2.*

Table 7-2. Comparator Hybrid IC Pin Voltages

Pins	Signal
1	+15V dc
2	GND
3	Input Signal
4	GND
5	–15V dc
6	No Connection
7	0V
8	+5V dc (Adjustable)
9	No Connection
10	No Connection
11	–5.2V dc
12	GND
13	Output Signal
14	No Connection
15	GND
16	–15V dc
17	–8V dc (Adjustable)
18	+100 mV
19	+15V dc
20	–5.2V dc

7-22. TRIGGER LEVEL CONTROL

(The triggering voltage entered from the front panel is in digital form. Therefore, U20 converts it into analog form and passes it through a unit inverter, U19.)

A. Set trigger level voltage to +480 mV.

B. Verify that the analog output of D/A Converter, A2U20(9) [A2U30(9)], and the output of operational amplifier A2U19 [A2U29] is approximately –480 mV. If these two voltages differ, operational amplifier, A2U19 [A2U29], is malfunctioning. Replace A2U19 [A2U29]. However, if these two voltages approximate one another but do not equal –480 mV, the D/A Converter, A2U20 [A2U30], is malfunctioning. Replace A2U20 [A2U30].

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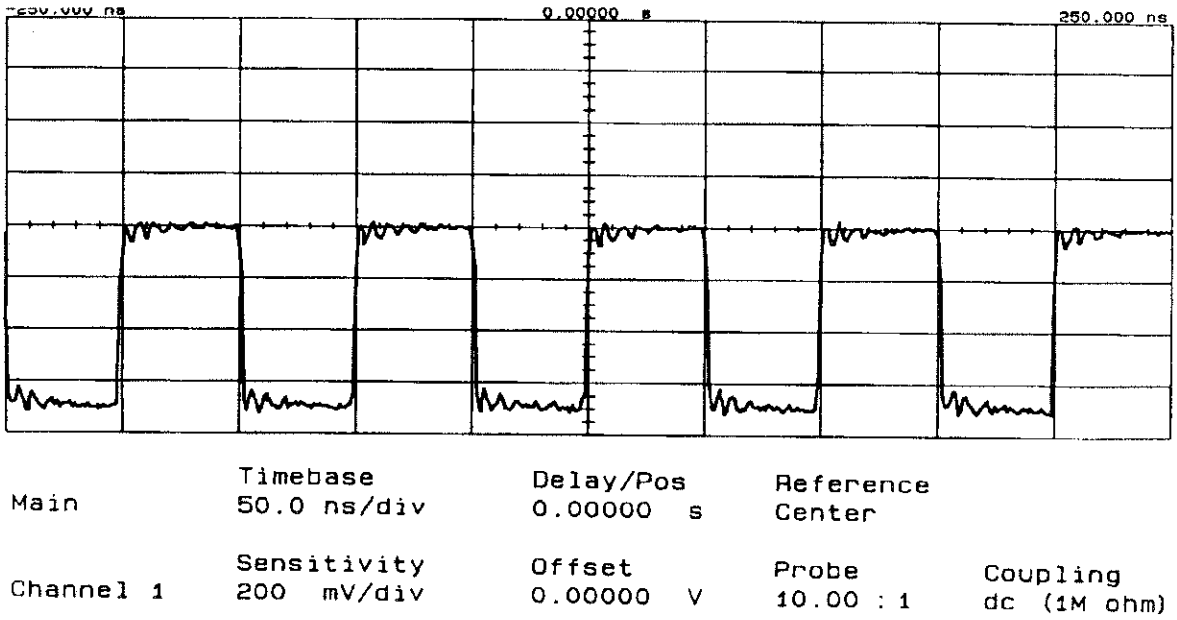

Figure 7-5. Waveforms at A2J2 and A2J4

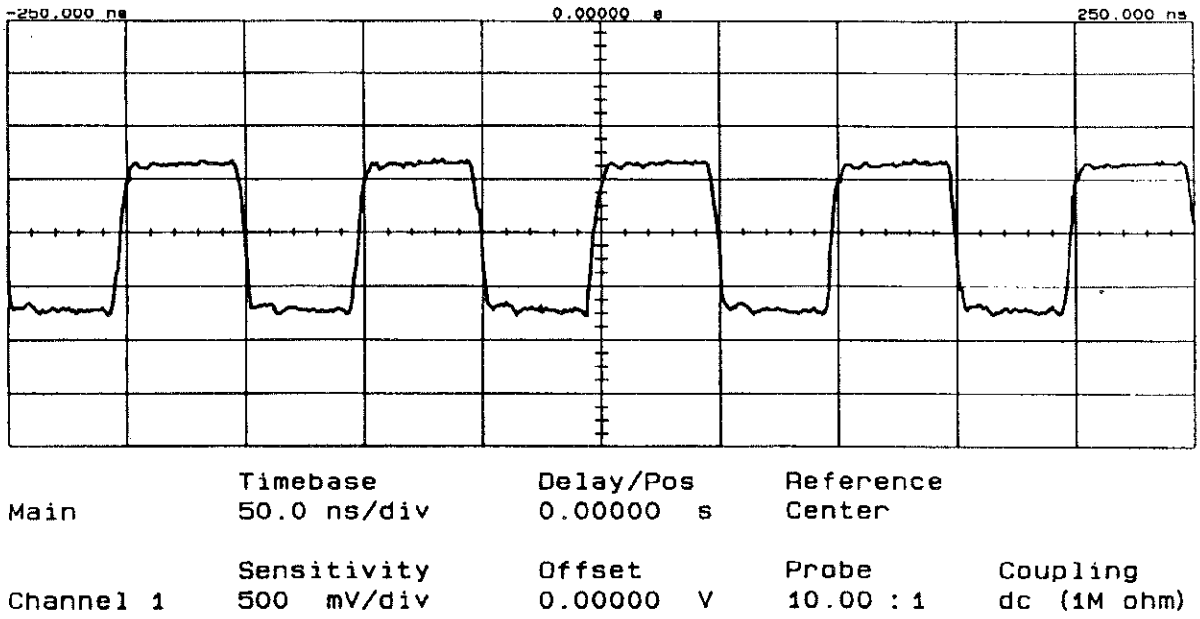

Figure 7-6. Waveforms at A2U2(2) and A2U14(2)

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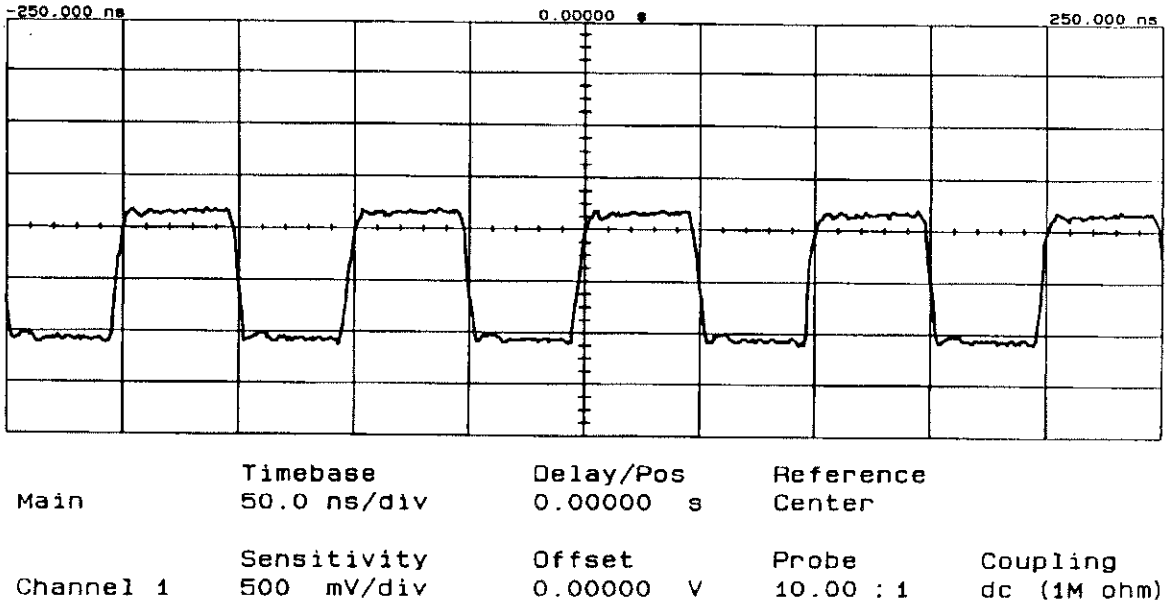

Figure 7-7. Waveforms at A2U4(3) and A2U15(3)

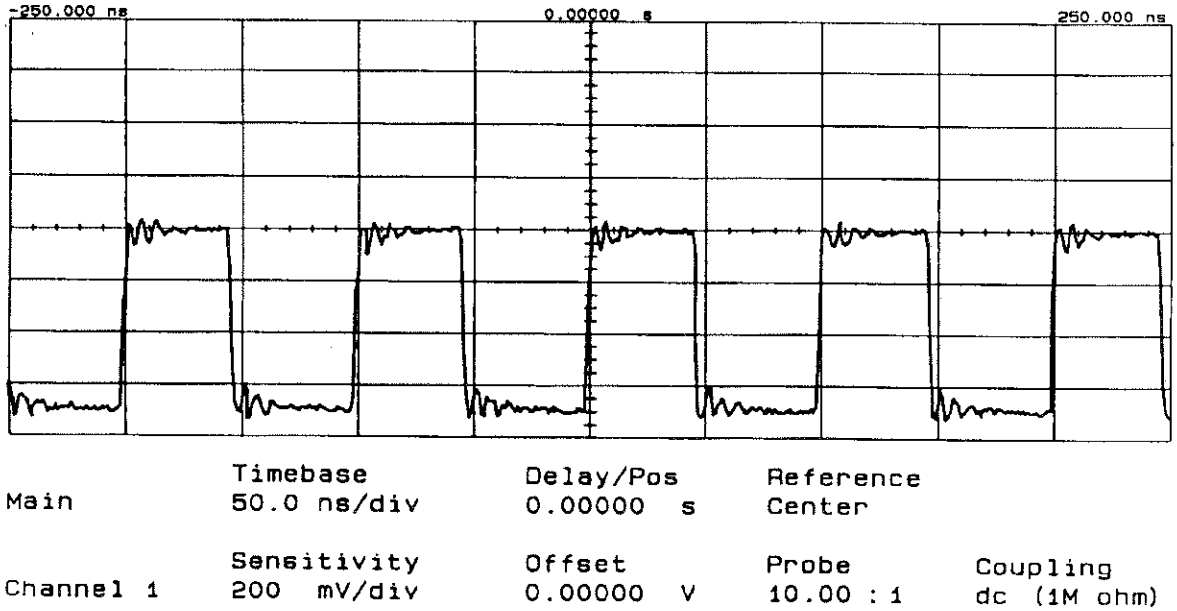

Figure 7-8. Waveforms at A2U4(13) and A2U15(13)

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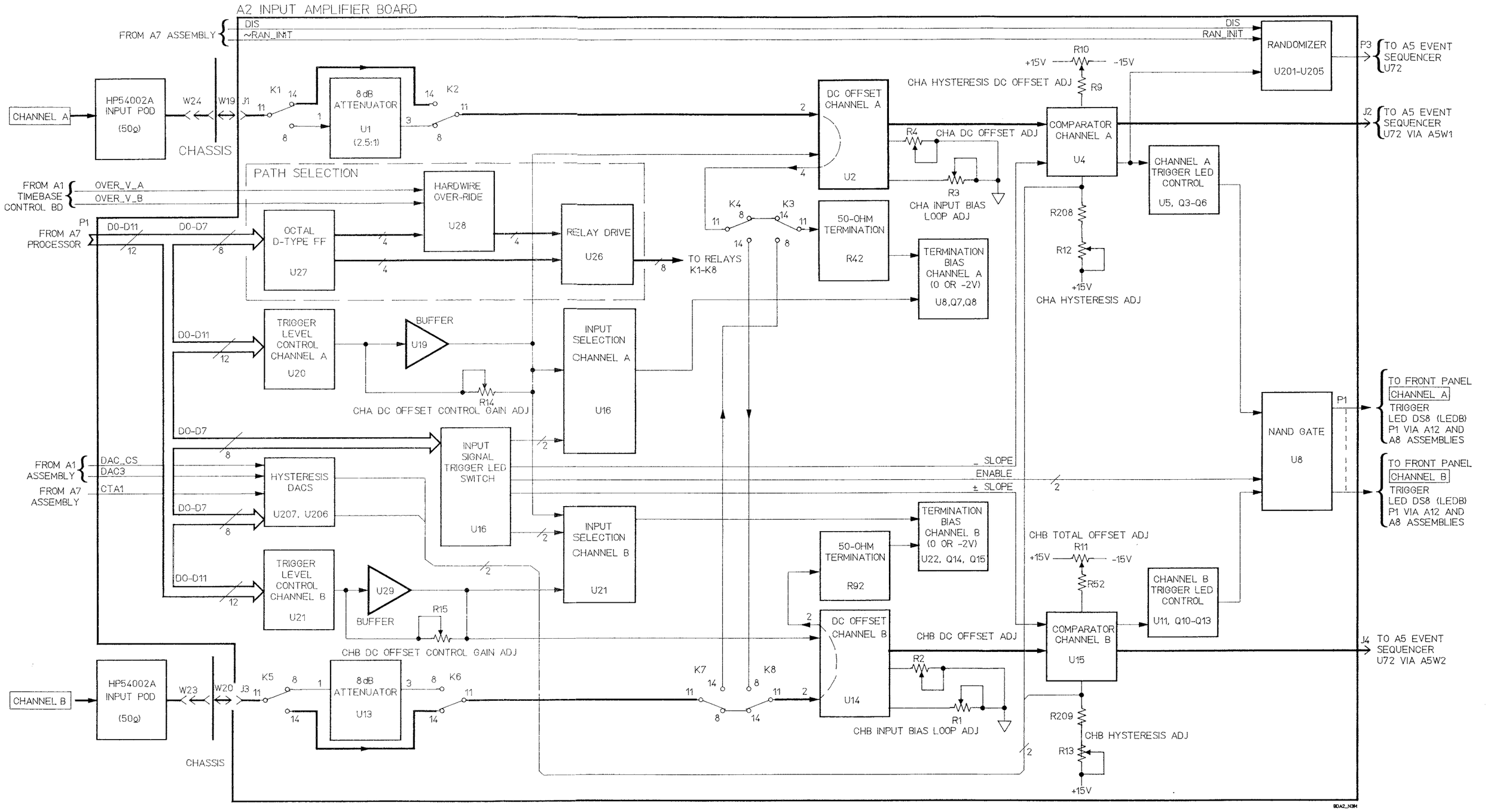

Figure 7-9. A2 Input Amplifier Board Block Diagram

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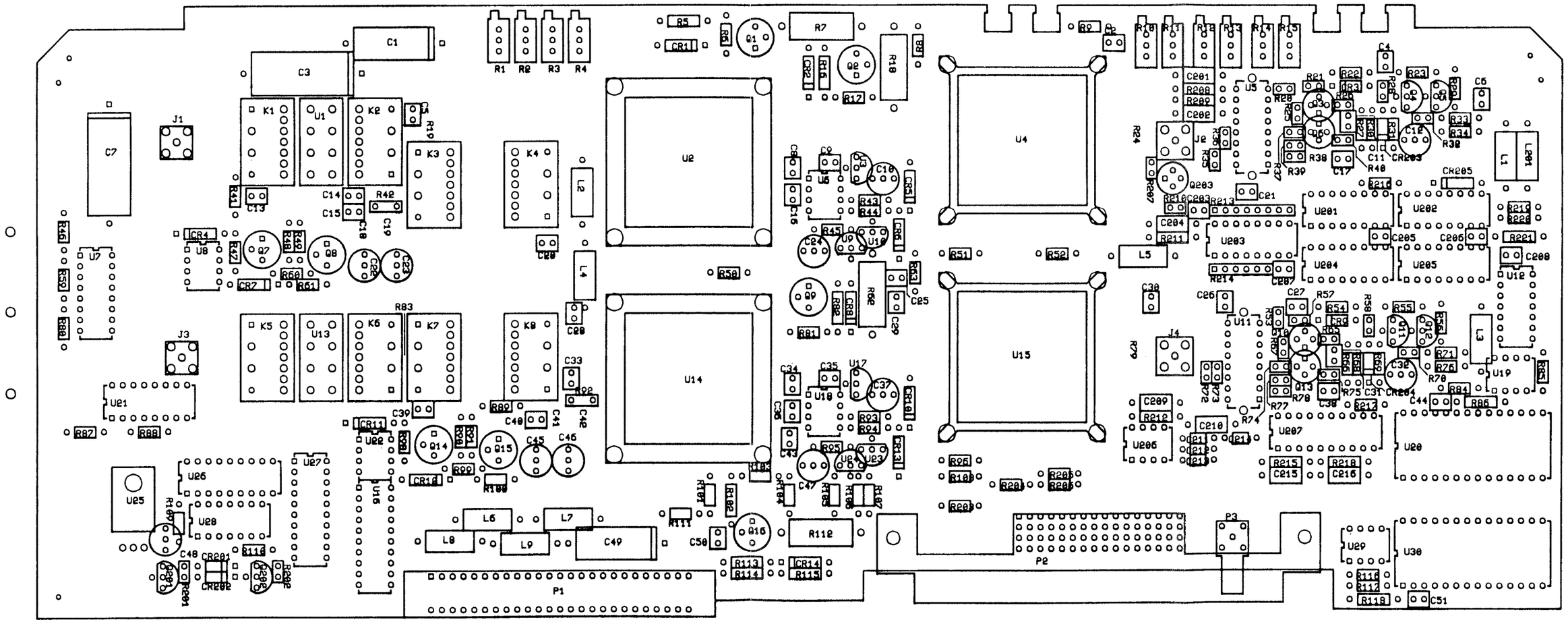

Figure 7-10. A2 Input Amplifier Board, Component Locator

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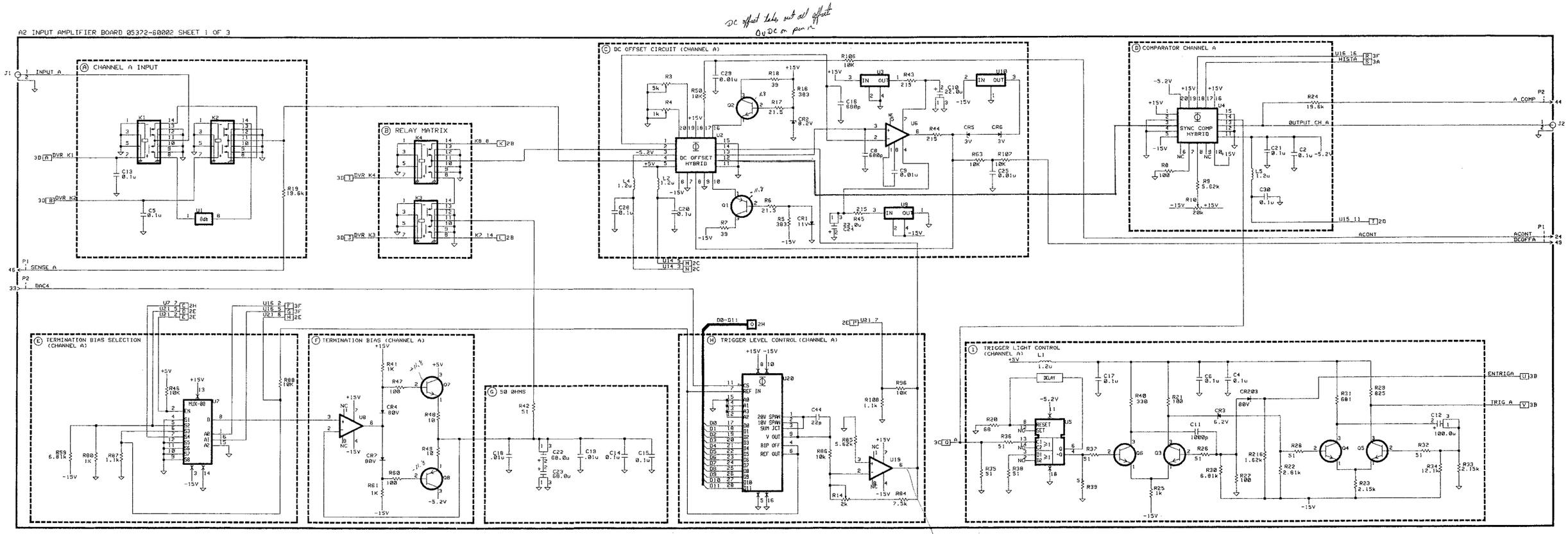

A2 SCHEMATIC DIAGRAM NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD A2 ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN FARADS, INDUCTANCE IN HENRIES.
3. ASETERISK (*) INDICATES FACTORY SELECTED COMPONENT. AVERAGE VALUE SHOWN.
4. TILDE ("~") PRECEDING A SIGNAL INDICATES A NEGATIVE-TRUE SIGNAL.

Figure 7-11. A2 Input Amplifier Board, Schematic Diagram (Sheet 1 of 3)

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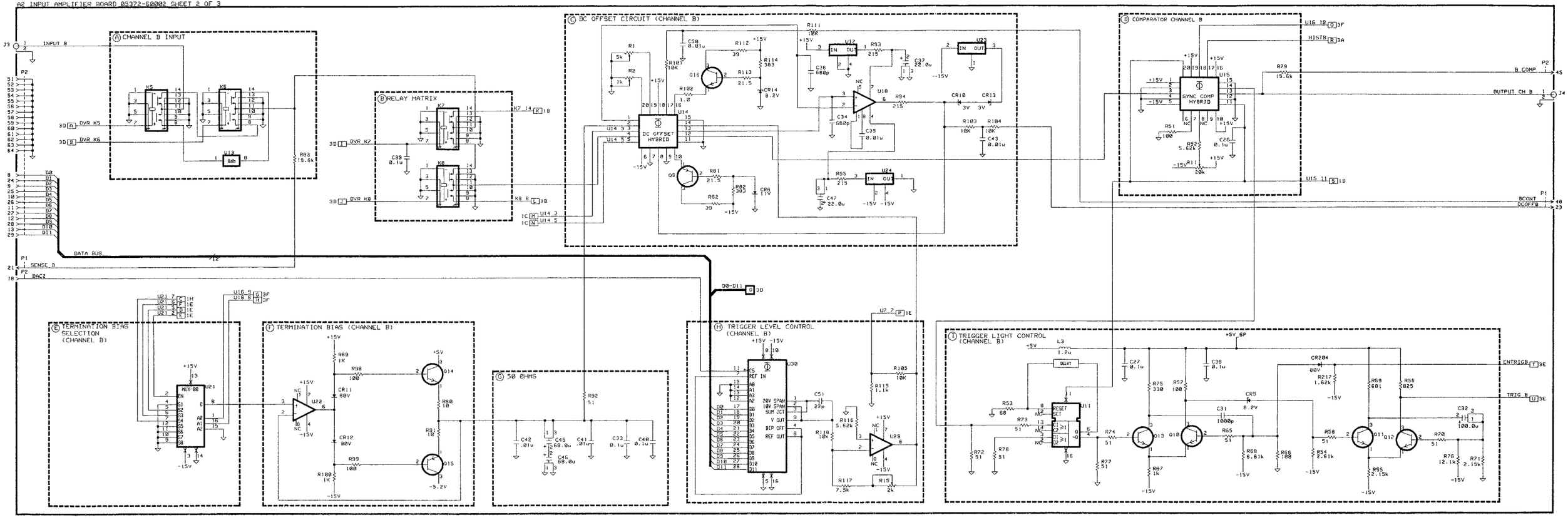

Figure 7-11. A2 Input Amplifier Board, Schematic Diagram (Sheet 2 of 3)

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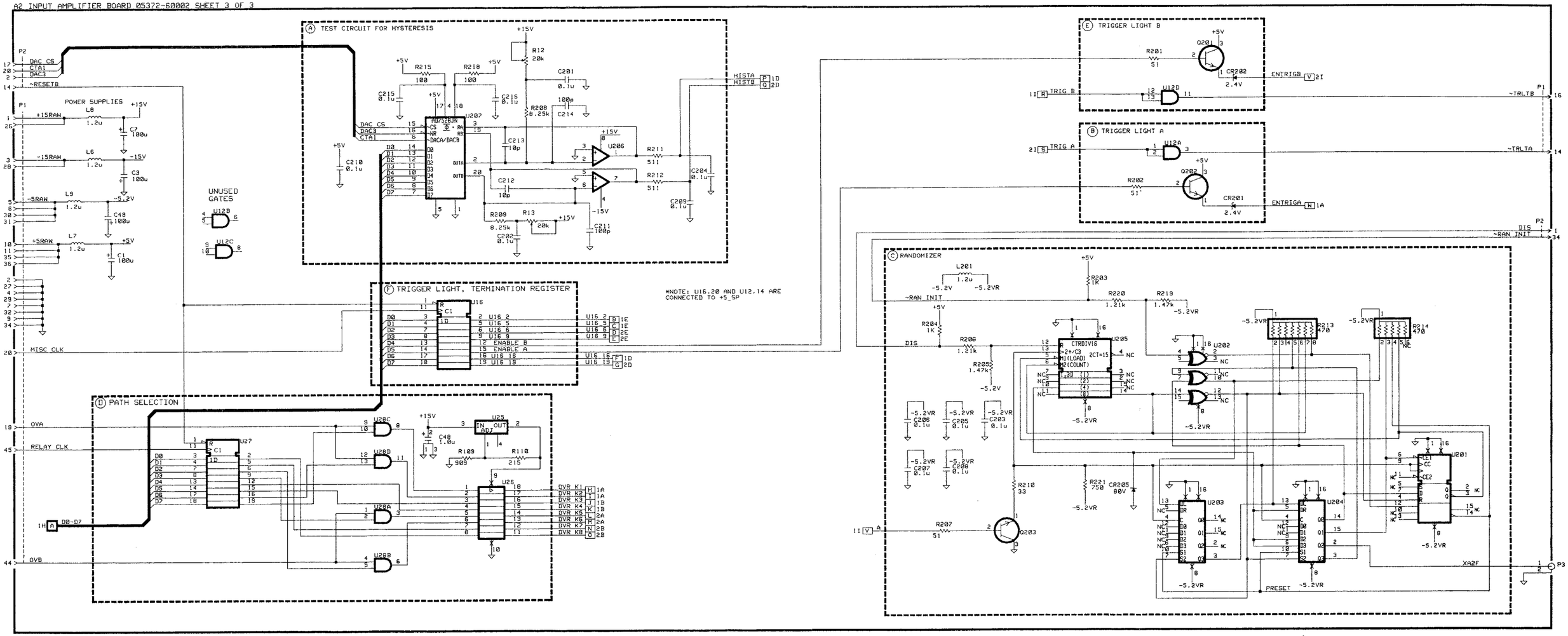

Figure 7-11. A2 Input Amplifier Board, Schematic Diagram (Sheet 3 of 3)

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8

A3 TIME

8-1. INTRODUCTION

The major function of the A3 Time Board is to count the number of periods of the 500 MHz reference clock. Secondary functions include:

1. storing, in RAM, the time values from the Time Counter and the Interpolator,
2. monitoring the Event Counter latch-carryout signals during Totalize measurements, and
3. performing the histogram calculations during Histogram time interval measurements.

The A3 board contains the Time Counter chain, an Event Board Interface circuit, an Address Buffer, a System Buffer, the Totalize circuit, the Interpolator RAM circuit, and the Histogram circuit. For reference, see *Figure 8-2*, "A3 Time Board Block Diagram," and *Figure 6-2*, "HP 5372A General Block Diagram".

8-2. Time Counter

The 32-bit Time Counter consists of two 16-bit zero-dead-time counters (ZDTs) arranged in cascade. These ZDTs count the number of periods of the 500 MHz reference clock (CLKB), from the A14 Time Base Multiplier Board. When the ZDTs receive a latch signal from the Sequencer, via the A4 Interpolators, the current count value of the counter is read and stored in internal ZDT latches. The latched count value is then transferred through a transceiver to either:

1. the Time Counter RAMs for storing,
2. the Internal Bus Buffers, which sends the data to either the A7 Processor or A8 I/O Controller Boards, or
3. the Line Drivers, which sends the data to the A22 Fastport Board (optional).

Figure 8-1, "Counting Chains," illustrates the relationship between the Time Counter, the Interpolators, and the Sequencer IC. Note that the latch signals, IT1 and IT2, from the Sequencer, are first sent to the A4 Interpolator board. There they are synchronized to the 500 MHz clock, and then sent as latch signals, CI1 and CI2, to the Time Counter.

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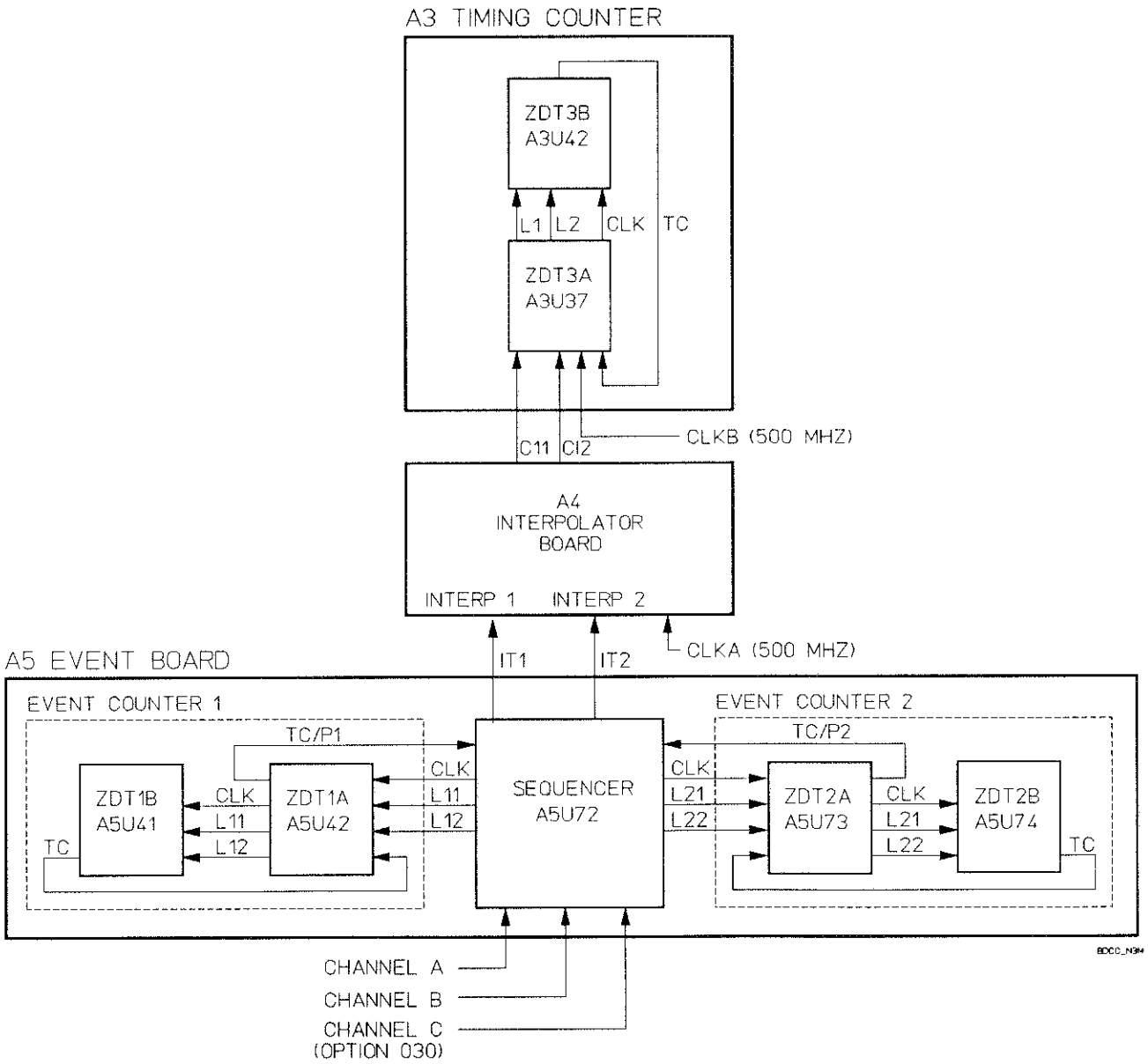

Figure 8-1. Counting Chains

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8-3. Event Board Interface

The Event Board Interface circuit allows ECL signals generated from the A5 RAM-Write circuit to interface with circuits on the A3 Time Board. This interface circuit consists of one line driver (A3U16), three ECL-to-TTL translators (A3U13, A3U19, and A3U23), and one multiplexer (A3U18). The line driver and translators convert differential signals into the following signals for the A3 board:

1. a write signal, RAM_WR_INIT, for the Time Counter Transceivers,
2. write signals, RAM_WR_3A and RAM_WR_3B, for the Time Counter RAMs and the Interpolator RAM,
3. a reset signal, ZDT_RS, for the ZDTs in the Time Counter,
4. a clock signal, ADD_LAT, for the Address Buffer,
5. an enable signal, HIST_EN, and a clock signl, HIST_CLK, for the Histogram IC, and
6. a control signal, ~RAM_WR, for the Totalize Circuit and the Interpolator RAM circuit.

The multiplexer provides address lines, ZDTA0-ZDTA2, for the ZDTs in the Time Counter. ZDTA0 is also used as a clock signal for multiplexer A3U9, in the Interpolator RAM circuit, and for multiplexer A3U7, in the Totalize circuit.

8-4. Address Buffer

The Address Buffers (A3U21 and A3U22) interface the ram addresses generated by the A5 DMA Address Generation circuit to the A3 Time Counter RAMs and the A3 Interpolator RAM. These address buffers are clocked by the ADD_LAT signal from the A3 Event Board Interface circuit.

8-5. System Buffer

The bidirectional System Buffers A3U15 and A3U17 connect the A3 Time board's DI/O00-DI/O15 data bus lines to the Count Hardware Data Bus (CTD0-CTD15). The direction of data flow through the buffers is controlled by the microprocessor's count read/write signal CTR/W. When CTR/W is logic high, the buffers allow the Time board to pass data from its own data bus to the Count Hardware Data Bus. When CTR/W is logic low, the buffers allow data to pass from the Count Hardware Data Bus to the Time board's data bus. The A6 Count Support Board's ~ENTBUF signal controls both buffer enable lines. ~ENTBUF is at logic low during all data transfers. Setting ~ENTBUF to a logic high isolates the Count Hardware Data Bus from the Time board's data bus.

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8-6. Totalize Circuit

The Totalize function counts the number of events on the input signal during a specified period of time, between a pair of designated edges, or between key pressings of the MANUAL ARM key. Totalize measurements are sampled differently from Frequency/Period measurements. For Totalize measurements, the sampling is synchronous with the interval, edge, or manual key-press, depending on the arming mode. The sampling point is not synchronous to the trigger event. At the A5 Event Board count hardware level, this means that sample latches and events (CLK1 and CLK2) are asynchronous. The Totalize circuit overcomes this by monitoring Event Counter 1B and 2B latch-carryout signals (Z1BL1CO, Z1BL2CO, Z2BL1CO, and Z2BL2CO). A latch-carryout is generated when each respective ZDT counter receives a latch signal before a clock (event) signal. Therefore, a logic "high" on the latch-carryout line at the end of a write means that an event clock (CLK1 or CLK2) came during a write. This means that the data stored would be erroneous by ±1 count. The Totalize circuit latches the ZDT counter latch-carryout signal at the end of each write and stores it in D-type Flip Flop A3U5A. Because of the propagation delays introduced by the A5 Event Board's counting chains, an event clock that occurs right at the end of a write will not cause a latch-carryout to go "high" immediately. Therefore, the Totalize circuit latches after the write by an amount equal to maximum ZDT count chain delay. The write pulse, ~RAM_WR, is delayed by approximately 25 ns by Active Delay Line A3DL1, before clocking flip flop A3U5A. If the latch-carryout signal is at logic "high" prior to being latched by the delayed write pulse, the write data is interpreted as being correct. But if the latch-carryout signal is at "logic" low when latched, the data could be erroneous. The possibility of introducing ±1 count error during Totalize measurements is overcome by writing the measurement data into RAM more than once. Writing twice gives at least one valid set of data since the event clock that arrives during the first write is latched and ensures correct data during the second write.

8-7. Interpolator RAM

The Interpolator RAM (A3U25) stores the 4-bit data from the A4 Interpolator Board and four bits of status data; two totalize bits, the start of block bit, and the histogram enable bit. When the 4-bit interpolator data is valid, ZDT address signal ZDTA0, from the A3 Event Board Interface circuit, controls multiplexer A3U9, placing the interpolator data at the input of D-type flip flop A3U24. The start of block bit, ~RA_ZDT_ADDR, from the A6 Count Support Board, and the histogram enable bit, HISTO_EN, from the A5 RAM-Write circuit, are placed at the inputs of A3U24 by clock signal ~RAM_WR, from A3 Event Board Interface circuit. Enable signal ~EN_MEAS, from the A6 Count Support Board, then enables A3U24, while clock signal ~RAM_WR clocks the 4-bit interpolator data and four bits of status data to the inputs of the Interpolator RAM.

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8-8. Histogram Circuit

The Histogram circuit performs statistical calculations of time interval measurements. This circuit consists of a Gate Array IC (A3U10), three static RAMs (A3U1, A3U4, and A3U6), one line driver (A3U14), and two D-type Flip Flops (A3U8 and A3U11).

The Gate Array IC provides hardware histogramming of measurements only when the following measurements are selected: Histogram Time Interval, Histogram Continuous Time Interval, or Histogram ±Time Interval. When other measurement functions are selected, the histogram that is displayed is software processed.

At the beginning of a measurement, the microprocessor programs the Gate Array IC via address lines CTA1-CTA6, and data lines CTD0-CTD7. The Gate Array IC is then enabled by the HIST_EN signal, from the A3 Event Board Interface circut. The HIST_CLK signal, also from the A3 Event Board Interface circuit, then clocks in the output of the Time ZDTs, which is sent via the Transceivers to the Gate Array IC. The Gate Array IC processes the data and sends it to the histogram RAM for storing.

In addition to providing graphical histogram displays, the Histogram circuit also provides the TI Trigger signal which is used as the rear panel TI Detect output. This TI Detect signal will remain TTL low for the entire period of time the measurements are outside the specified time interval range (set via the Pretrigger key under Menu Selection). The TI Detect feature can be used as a pretrigger source.

8-9. A3 TIME BOARD TROUBLESHOOTING

8-10. Test Equipment Required

- HP 3325A Synthesizer/Function Generator
- HP 54503A Digitizing Oscilloscope
- A17 Count Extender Board (HP P/N 05372-60225)
- DMA Extender Cable (HP P/N 05371-60225)

8-11. Diagnostics

- Diagnostic Test 5. Histogram
- Diagnostic Test 6. Count ICs
- Diagnostic Test 8. Measurement RAM

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8-12. Background

The A3 Time Board, HP P/N 05372-60003, counts the periods of the 500 MHz reference frequency, as specified by the latching signals from the Sequencer IC (A5U72), via the A4 Interpolators. This assembly contains one 32-bit Time Counter, which contains two 16-bit zero-dead-time counters (ZDTs), arranged in cascade. The support circuitry for each ZDT includes two tranceivers, two measurement RAMs, and two internal bus buffers. In addition, the first ZDT in the chain has two line drivers included in the support circuitry, while the second ZDT in the chain has one.

The following are definitions of the various logic levels used in the troubleshooting procedure.

	EECL	ECL	TTL
Logic 1	0 V	–0.9 V	5 V
Logic 0	–0.8 V	–1.8 V	0 V

8-13. A3 Troubleshooting Approach

The Count ICs (ZDTs) and Measurement RAMs on the A3 board are controlled by circuitry on the A5 Event Board. Therefore, if diagnostic test 6 (Count ICs) or/and diagnostic test 8 (Measurement RAMs) fails, first verify that the A5 assembly is operating correctly (refer to chapter 10 – A5 Event). If the A5 assembly is operating correctly, then use the A5 Troubleshooting Procedures as a guide to determine the fault on the A3 Time Board. If diagnostic test 5 (Histogram) fails, then refer to the histogram test failure messages, listed in Appendix C, for the appropriate troubleshooting procedure.

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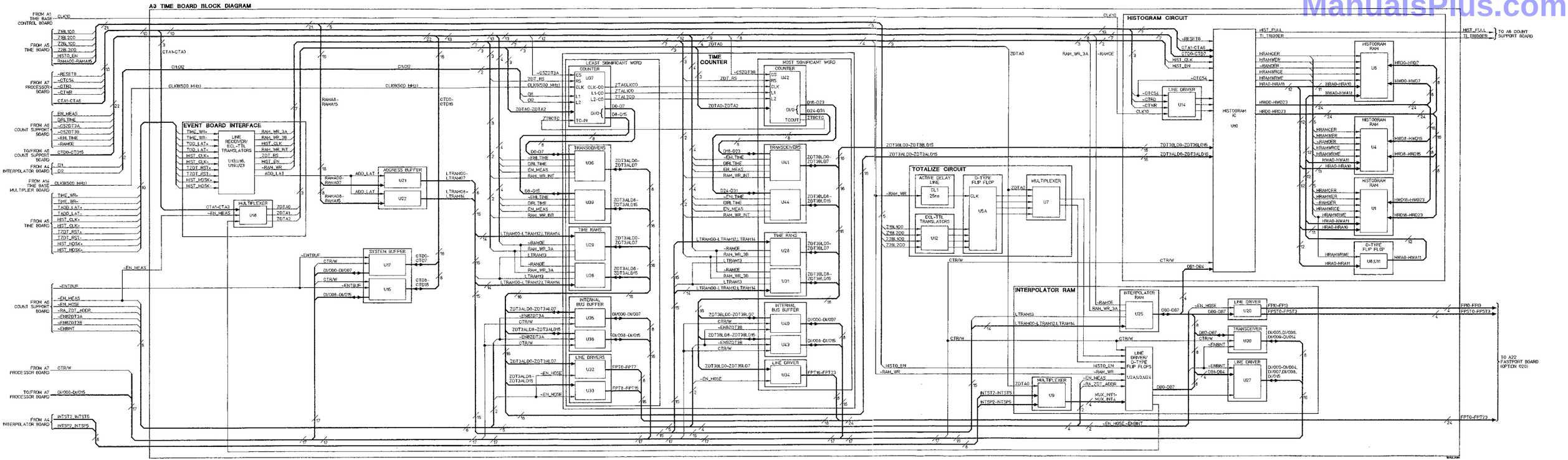

Figure 8-2. A3 Time Board Block Diagram

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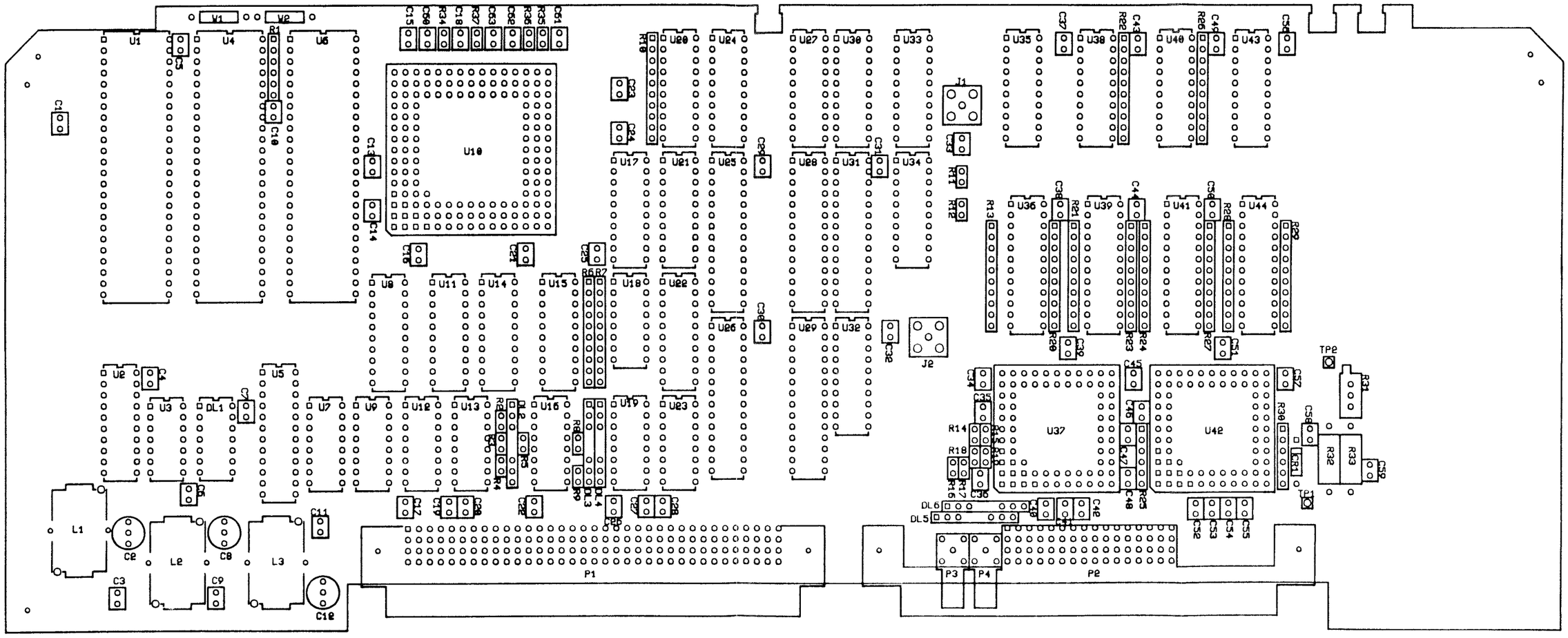

Figure 8-3. A3 Time Board, Component Locator

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A3 SCHEMATIC DIAGRAM NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD A3 ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN FARADS, INDUCTANCE IN HENRIES.
3. ASETERISK (*) INDICATES FACTORY SELECTED COMPONENT. AVERAGE VALUE SHOWN.
4. TILDE (~) PRECEDING A SIGNAL INDICATES A NEGATIVE-TRUE SIGNAL.

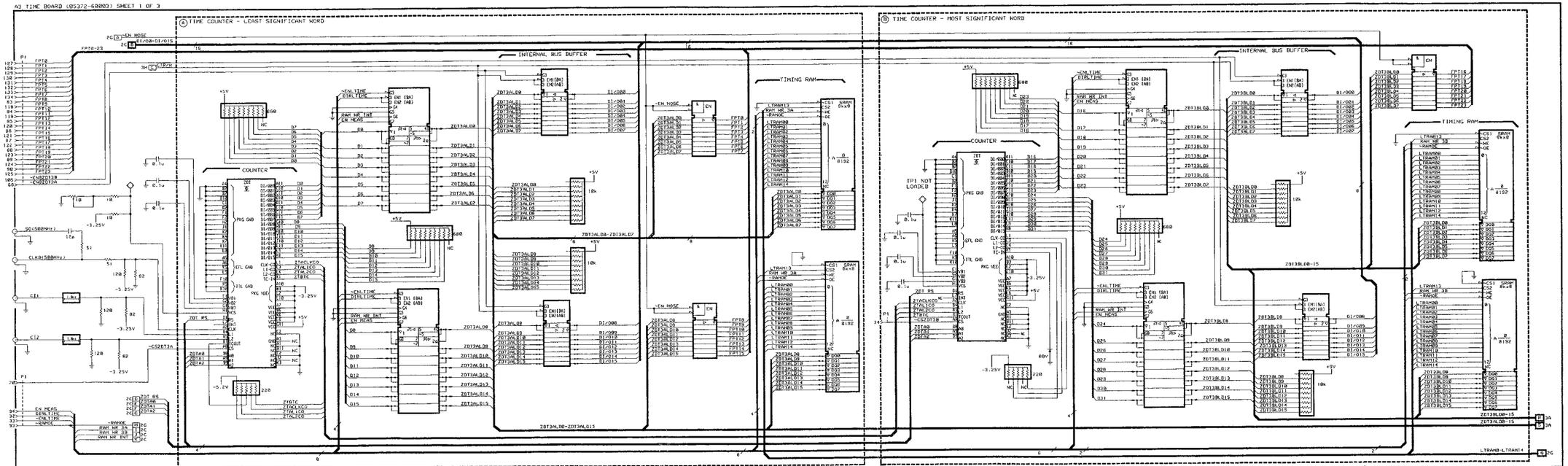

Figure 8-4. A3 Time Board, Schematic Diagram (Sheet 1 of 3)

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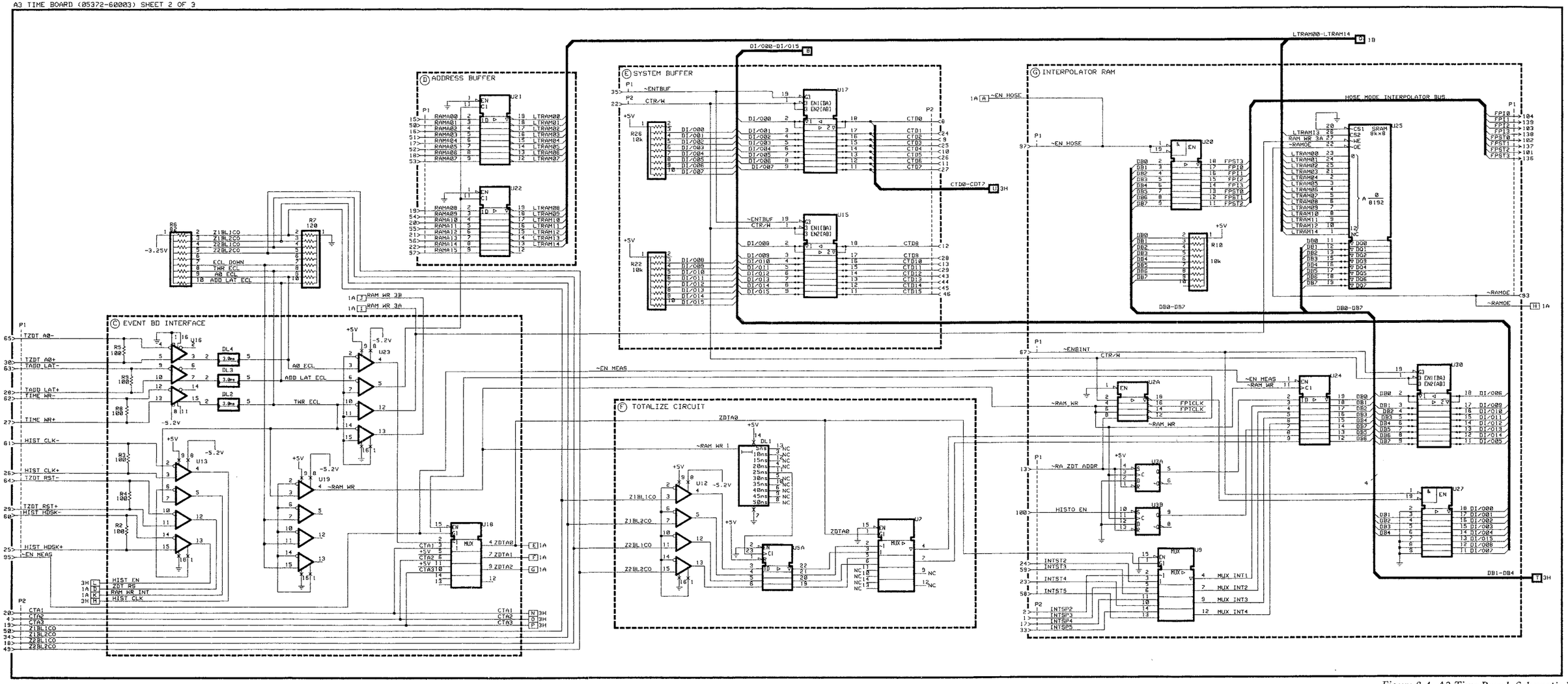

Figure 8-4. A3 Time Board, Schematic Diagram (Sheet 2 of 3)

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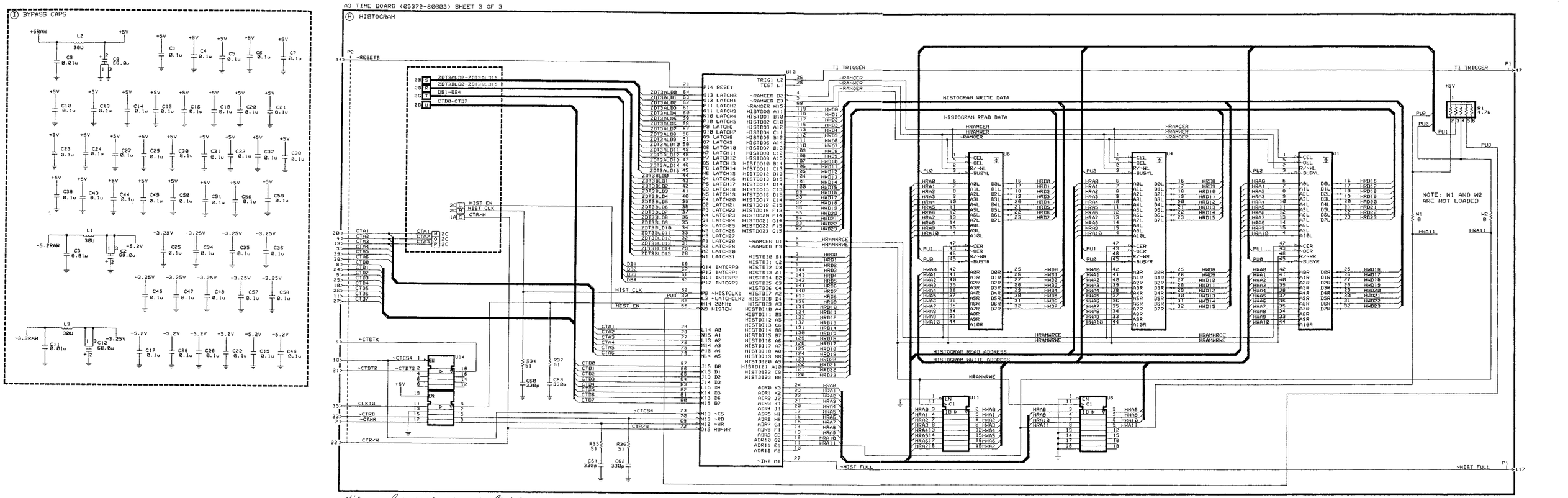

Figure 8-4. A3 Time Board, Schematic Diagram (Sheet 3 of 3)

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9

A4 INTERPOLATOR

9-1. INTRODUCTION

The A4 Interpolator Board increases the resolution of measurements from 2 ns to 200 ps. This is accomplished by using accurate copper-etched printed circuit board delays ("D1", "D2", ... , and "D9") configured to detect coincidence between the start event and stop event pulses, IT1 and IT2 respectively, and the 500 MHz reference timebase (CLKA). The amount of delay detected by each interpolator is encoded as a 4-bit, TTL-level binary code and is used with accumulated timebase data accumulated by the A3 Time Counter to generate a measurement gate time having a resolution of 200 ps. The main functions of the interpolator can be summarized as follows:

- Resolves Start and Stop (IT1 and IT2) event pulse times to multiples of 200 ps.
- Generates CI1 to latch the current count value of the A3 Time Counter at the start of a measurement.
- Generates CI2 to latch the current count value of the A3 Time Counter at the stop of a measurement.
- Generates a 4-bit, TTL-level binary code equivalent to the measured time difference between the event-edge trigger (IT1 and IT2) and the 500 MHz reference timebase (CLKA).

The A4 assembly has two identical interpolator circuits; Interpolator 1 (Start) and Interpolator 2 (Stop). Single-channel measurements use Interpolator 1 for the measurement start and Interpolator 2 for the measurement stop. For dual channel measurements, Interpolator 1 is used to resolve the start of the gate, while Interpolator 2 is used to resolve the stop of the gate. The following theory refers to Interpolator 1 (Start) but can be applied to Interpolator 2 (Stop) as well. See "A4 Interpolator Board Block Diagram" in *Figure 9-15* for reference.

9-2. A4 INTERPOLATOR OPERATION OVERVIEW

When the HP 5372A performs a measurement, there is an inherent ±1 count uncertainty introduced by opening and closing the counting gate. Usually the gate, as defined by Start (IT1) and Stop (IT2) event pulses, does not open or close at the same time the positive edge of the 500 MHz timebase pulse occurs. The A3 Time Counter chain counts the integral number of 500 MHz reference timebase pulses while the counting gate is open. The A4 Interpolator 1

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(Start) and Interpolator 2 (stop) circuits synchronize the 500 MHz reference timebase to the asynchronous Start and Stop event pulses, IT1 and IT2, and measures the fractional time difference between the positive edge of the first and last gated event pulse and the next positive-edge of the 500 MHz reference timebase pulse. This process increases the HP 5372A's time resolution tenfold without increasing the instrument's timebase frequency. The A5 Sequencer IC (A5U72) sends the "Start" event pulse, IT1, to the interpolator board, where it is synchronized with the 500 MHz reference timebase (CLKA). For each IT1 pulse received, the *Synchronizer* stage outputs an IT and CI pulse. The relative timing of these two pulses correspond in time to the original IT1 and the next 500 MHz clock edge to follow IT1. IT and CI edges propagate down a pair of controlled transmission lines through a chain of high-speed, edge-triggered flip-flops located in the *10-Stage Flash Interpolator Chain* stage. The CI edge clocks all the flip-flops, and the IT signal drives the data input of the flip-flops. Between consecutive flip-flops, the IT signal is delayed 200 ps relative to CI. IT led CI by up to 2 ns (10 × 200 ps) when the two signals entered the chain. As the two edges propagate down the chain, IT loses this lead in 200 ps increments. The flip-flops compare the phases of CI and IT. If IT leads CI at a given flip-flop, that flip-flop latches a logical "one". If IT lags CI, the flip-flop latches a logical "zero". The outputs of the flip-flops form a "thermometer" code representative of the time by which IT originally led CI. After passing through the entire chain, CI is terminated, and IT is sent to A4U3 to reset the *Synchronizer* stage. A copy of the synchronized latch CI, called CI1, is sent to the A3 Time Counter chain to latch the current count value of the Time Counter. The latched value is then stored in the A3 Time Counter RAM. The A4 circuits detect and encode the point of coincidence between the "Start" event pulse, IT1, and the 500 MHz reference timebase, CLKA. This 4-bit, TTL-level binary code is sent to the A3 Time Board and temporarily stored in the Interpolator RAM, A3U25. This process is repeated for the Sequencer's "Stop" event pulse, IT2.

Then, under A7 Processor Board control, the start and stop interpolation results and the A3 Time Counter results are read from memory and either stored in the A7 processor RAM area or the raw binary data is "dumped" directly to the HP-IB interface via the A8 I/O Controller Board. The A7 68020 microprocessor or an external controller can then determine the actual gate time factor for calculating the time interval, thus eliminating the ±1 count uncertainty. (See *Figure 9-1.*) By using this interpolation process, resolution of gate times can be improved from 2 ns to multiples of 200 ps.

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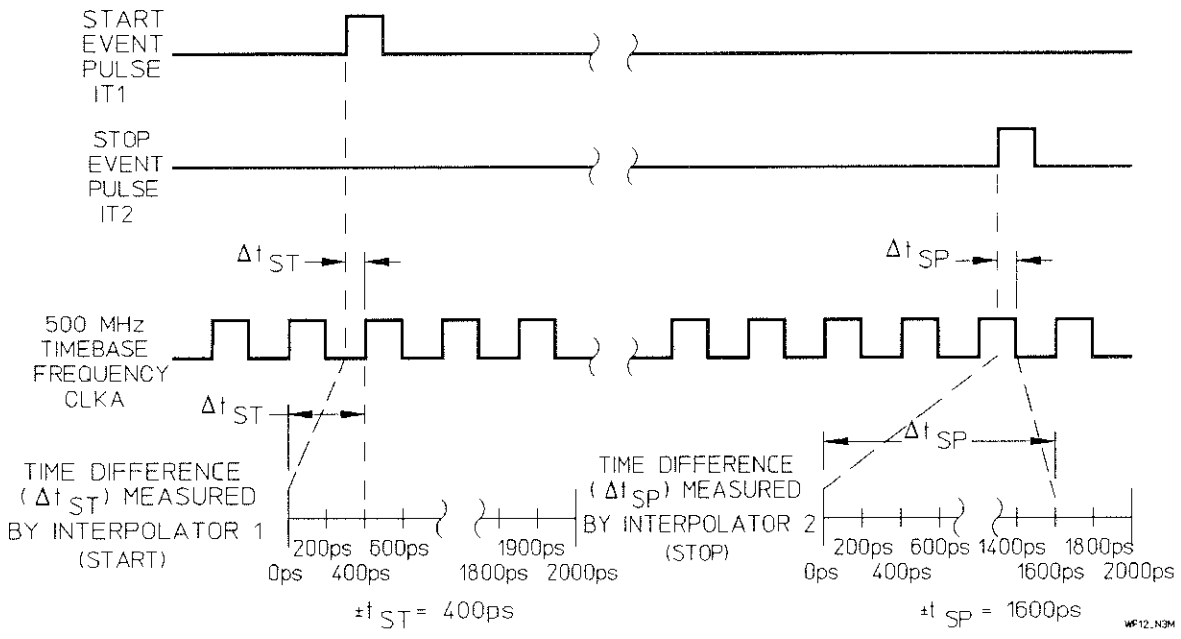

Figure 9-1. Interpolator Timing Diagram

9-3. 500 MHz Splitter

Both interpolator circuits require a 500 MHz reference timebase. The 500 MHz signal, CLKA, is supplied by the A14 Timebase Multiplier Board. The splitter's resistive divider network comprised of A4R51, R53 and R54, preserves the 50 Ohm loading of the 500 MHz source and supplies Interpolator 1 (Start) and Interpolator 2 (Stop) circuits with a 500 MHz reference timebase input. The 500 MHz is distributed to both interpolators over matched length transmission lines. Equal time delay paths through both circuits is necessary for proper timebase latching.

9-4. Synchronizer

Time Interval measurements are defined by a start pulse (IT1) and a Stop pulse (IT2). The IT1 and IT2 pulses are not synchronous with the 500 MHz reference timebase, so there is some fraction of a clock-cycle which occurs between the positive edge of each of these pulses and the next positive edge of the 500 MHz reference timebase. This fraction of a cycle is between 0 and 2.0 ns long. The overall function of the A4 Interpolator is to measure the time of these fractional clock-cycles. The *Synchronizer* stage receives an IT1 (or IT2) pulse from the Sequencer IC (A5U72), selects the next positive edge of the reference timebase, and outputs two positive edges which are spaced in time as IT1 and the reference timebase. The two edges, IT and CI, then propagate through the *10-Stage Flash Interpolator Chain.*

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The 500 MHz reference timebase continuously clocks flip-flops A4U2 and U300. When a "Start" event pulse (IT1) occurs, flip-flop A4U2 arms and its output goes high at the next positive clock edge. But since the IT1 pulse is asynchronous (i.e., it can occur at any time relative to the clock phase), occasionally the A4U2 output will float in a metastable state (i.e., teeter), unable to determine whether the IT1 edge arrived before or after the clock edge. Flip-flop A4U2 drives the data input of A4U300A. A delayed version of the clock drives A4U300A-D. This allows A4U2 to teeter for up to approximately 1 clock pulse width (2 ns) before its output is clocked into A4U300A. The resulting output of A4U300D is CI. Flip-flop A4U3 ensures that the path from IT1 to IT is the same length as the path from the *500 MHz Splitter* stage to CI. Potentiometer A4R6 permits balance adjustment of the CI and IT path delays. A4U3 also uses its own IT signal, after it has been delayed by 2 ns in the *10-Stage Flash Interpolator Chain* stage, to reset the *Synchronizer* stage.

9-5. GATE 1 Output EECL-To-TTL Inverter

One of the signals generated by the *Synchronizer* stage is GATE 1. Gate 1 is a copy of the IT1 pulse, which is generated by the A5 assembly's Sequencer IC after all arming conditions for a particular measurement have been met. Gate 1 indicates the start of a measurement sample. Gate 1 is generated by flip-flop A4U3, pin 4. From here the signal is inverted and shifted to TTL logic levels by common-emitter amplifier A4Q4 of the *Gate 1 Output EECL-to-TTL Inverter* stage. Gate 1 drives buffer A12U5C located on the A12 Motherboard. The buffer, in turn, drives the rear-panel GATE 1 output BNC at TTL voltage levels.

9-6. CI1 EECL-To-ECL Inverter and Selectable Delay

Signal ~CI, generated by the *Synchronizer* stage, is inverted and level shifted by cascaded common-emitter amplifier, A4Q1 and Q3, and common-collector amplifier, A4Q2, providing an ECL positive-edge signal, CI1. Jumpers A4W1 through A4W5 comprise the selectable delay circuit. This circuit ensures that CI leads the 500 MHz clock edge by 750 ± 700 ps as measured at ZDT counter A3U37. A4W2 and W3 are loaded at the factory for a nominal delay of 660 ps, which yields the proper CI-to-500 MHz delay of 750 ps measured under nominal conditions. CI1 is sent to the A3 Time Counter (ZDT3A), triggering it to begin counting the 2 ns timebase pulses.

9-7. 10-Stage Flash Interpolator Chain

This circuit measures the time between the synchronized CI to IT edges. The 2 ns period of the reference timebase is divided into 10 sub-periods. Each sub-period is detected by one of nine D-type flip-flops (A4U4, U5, U7, U8, U10, U12, U14, U15, and U17) of the *10-Stage Flash Interpolator Chain*. Imagine a race down the interpolator chain between signals CI and IT, where after each stage of comparison, the IT pulse is given a data-to-timebase 200 ps increment of delay. The two signals are then again compared at the next flip-flop stage. Therefore, signals IT and CI are traveling down two parallel paths having nine D-type flip-flops at set time intervals along this path. IT is delayed after every flip-flop by 200 ps so that IT is sequentially walked through the 2 ns in 200 ps steps. The phase comparison is performed by flip-flops which are clocked by the CI signal and use IT as the data input. If IT

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reaches a given flip-flop before CI, the flip-flop is clocked with a logical "one" (see *Figure 9-2*). Conversely, if IT reaches a given flip-flop after CI, the flip-flop is clocked with a "zero" (see *Figure 9-3*). The output of all nine flip-flops logically combine to form an EECL-level "thermometer" code. For example, if an 1800 ps start delay is detected, flip-flop A4U17 output is set at a logical "one" while flip-flops A4U3-5, U7, U8, U10, U12, U15, and U14 are set at "logical "zeros". Likewise, if a 0 ps delay is detected, all the flip-flops in the interpolator chain are programmed at a logical "one". The "Q" output of one flip-flop is then wire-ANDed with the "~Q" output of the following flip-flop, generating a one-hot code that corresponds to the "thermometer" code output.

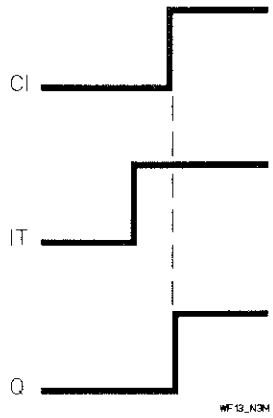

Figure 9-2. IT Leading CI

Adjustment of potentiometers A4R19, R20, R24, R27, R31 R35, R38, R41, and R46, which are located on the timebase input of each flip-flop stage, eliminate any offsets that may exist between the timebase input CI and data input IT. By adjusting these pots, the propagation delay differences between the IT and CI flip-flops are zeroed, thus improving interpolator linearity.

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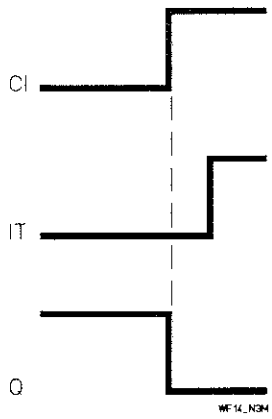

Figure 9-3. IT Lagging CI

9-8. One-Hot-To-Binary Encoder

The *One-Hot-To-Binary Encoder* encodes the one-hot code to an ECL level binary number equivalent to the delay detected by the interpolator chain. Transistors A4U6ABCD, U9ABCD, U11ABCD, and U13ABC detect the cross-over point between logical "ones" and "zeros" at the outputs of the flip-flop chain and translate this information into a single-bit, ECL level "one-hot" code. For example, if flip-flops A4U3-5, U7, U8, and U10 are set at logical "zero" and flip-flops A4U12, U14, U15, and U17 are set at logical "ones", bits INTST3 and INTST4 are asserted while bits INST2 and INST5 remain at logical "zero". As shown in the previous example, if flip-flop A4U16 (pin 6) is asserted, the ECL-to-TTL Translator's (A4U16) outputs would be a 4-bit binary 0101. This is the binary equivalent of a interpolated delay of 1000 ps (D1 + D2 + D3 + D4 + D5 = 200 ps + 200 ps + 200 ps + 200 ps + 200 ps = 1000 ps). This digital information, comprised of signals INTST2, INTST3, INTST4 and INTST5, is sent to the A3 Time Board's Interpolator RAM for temporary storage.

9-9. ECL-To-TTL Translator

Translator A4U16 converts the 4-bit, ECL-level binary code "Start" interpolation result to TTL-level signals (INST2, INST3, INST4 and INST5) and provides the current to drive latch A3U9 located on the A3 Time Board. Transistor A4U13D and passive components A4R44, R42, C26 and C28, provide –1.04 reference Volts to A4U16.

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9-10. A4 INTERPOLATOR BOARD TROUBLESHOOTING

9-11. Test Equipment Required

- HP 3325A Synthesizer/Function Generator
- HP 8663A Synthesized Signal Generator
- HP 1250-0780 N(m)-to-BNC(f) Adapter
- HP 05371-60229 CI Phase Cable Assembly
- HP 54503A Digitizing Oscilloscope
- HP 10020-67703 500 Ohm 10:1 Divider Probe
- HP 05371-60229 BNC(m)-to-SMA(f) Cable Assembly
- Probe ground lead

9-12. Background

The A4 Interpolator Board, HP Part Number 05372-60004, provides the HP 5372A with the ability to resolve measurements down to 200 ps. Without the A4 assembly, the 5372A would only be able to resolve measurements down to 2ns. The Interpolator Board is made up of two identical circuits: Interpolator 1 (start) and Interpolator 2 (stop). When viewed from the component side, Interpolator 1 is the left half of the board; the right half is Interpolator 2.

	EECL	ECL	TTL
Logic 1	0 V	–0.9 V	5 V
Logic 0	–0.8 V	–1.8 V	0 V

9-13. A4 Troubleshooting Approach

To troubleshoot the A4 assembly, you must first isolate the failure to Interpolator 1 or Interpolator 2. The signals are then traced back to the failed component.

9-14. A4 Failure Symptoms

A. Using an HP 3325A, apply a 10 MHz, 2 Vp-p square wave to the HP 5372A Channel A input pod.

B. Press the HP 5372A Preset key. If the A4 assembly is operating correctly, then the CRT will display a measurement result of 100 ± .2 ns (the instrument is in the repetitive acquisition mode and will be constantly updating the CRT with a new measurement result.) If the A4 assembly has failed, then either of the following symptoms may be observed:

- Measurement accuracy is not within ± .2 ns.
- Measurement readings are unstable and frequently erroneous.

C. Press the HP 5372A Test key.

D. Press "6" on the DATA ENTRY keypad, and then press the Enter key.

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E. Press the **Run** softkey.

F. If Diagnostic Test 6, "Count ICs", indicates a failure with ZDT3A and ZDT3B, then the most probable cause is that these two ZDT counters, located on the A3 assembly, are not receiving the required latch signals from the A4 assembly.

G. Disconnect power to the HP 5372A, and then place the A4 Interpolator Board on the A19 RF Extender Board, HP Part Number 05371-60016.

NOTE

It may be necessary to temporarily remove the A1 Time Base Control Board to install the A19 RF Extender Board.

NOTE

Do not connect the cable from the RF Extender Board to the A4J2 connector.

H. Setup an HP 8663A for a 499.983 333 MHz, +10 dBm signal.

I. Connect a N(m)-to-BNC(f) adapter to the HP 8663A RF OUTPUT connector.

J. Connect the CI phase cable assembly to the BNC cable.

K. Connect the open end of the CI phase cable assembly to A4J2.

L. Connect a BNC cable from the HP 8663A rear panel 10 MHz output to the HP 5372A Channel A input pod.

M. Repower-up the HP 5372A and then press the Preset key.

N. Move the cursor to the "Pre-trigger" field.

O. Press the **Pretrigger On** softkey.

P. Press the Pretrigger key (under Menu Selection).

Q. Press the **External Arm** softkey.

NOTE

Do not connect a signal to the HP 5372A External Arm input. Without a signal applied to this input, the instrument's counter circuitry is in a free-run mode. In this mode, the GATE LED should be ON. If the GATE LED is OFF or goes OFF during the troubleshooting procedure, press the Restart key.

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R. Press Test key.

S. Press "24" on the DATA ENTRY keypad, and then press the Enter key.

T. Press the **Run softkey.**

U. The interpolator 1 channel is working correctly if a stair-case step pattern appears on the CRT. If the CRT display is correct, then press the **Interp** softkey (this is a toggle softkey which sets up and runs the interpolator 2 test). If the CRT display is not correct for either interpolator channel, then perform the A4 Interpolator Resolution Adjustment, located in chapter 3.

9-15. A4 Troubleshooting Procedure

NOTE

Steps G through Q of the A4 Failure Symptoms MUST be performed to correctly setup the test system.

NOTE

The waveforms located at the end of this procedure were generated using a digitizing oscilloscope. The waveforms in Figures 9-5 through 9-14 were generated with a 500 Ohm 10:1 divider probe, terminated into 50 ohms. It is necessary to install a probe ground lead between the 500 Ohm 10:1 divider probe and the BNC-to-SMA cable assembly.

9-16. INTERPOLATOR 1 (START)

A. Using an oscilloscope, verify the presence of the GATE 1 signal (*Figure 9-4*) at the 5372A rear-panel output. If the signal is bad, trace the failure back through A4Q4, then to A4U3(4) (EECL level), then to the IT1 signal (*Figure 9-5*) at A4P2(1).

B. Verify the presence of CI1 at TP1 (*Figure 9-6*). If the signal is bad, trace the failure back through A4Q1-A4Q3, then to A4U300(18) (*Figure 9-7*), then to A4U2(6). Verify that the START_SYNC_500MHz signal is present at A4U2(13).

C. Verify the presence of the CI signal at A4U300(17) (*Figure 9-8*), and the IT signal at A4U3(6) (*Figure 9-9*). If the signals are not present or are not correct, then trace the failure back through A4U300D and A4U3.

D. Verify the presence of signals at the outputs of the 10-stage flash interpolator (start) flip-flops at A4U4(6) (see *Figure 9-10*) , A4U5(6), A4U7(6), A4U8(6), A4U10(6), A4U12(6), A4U14(6), A4U15(6) and A4U17(6). Verify the signals in the order listed. If a flip-flop output is not present or is not correct, then replace the first flip-flop with a bad output.

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E. Verify the presence of a signal at A4U16(3,7,11,15). See *Figures 9-11* through *9-14*. If any of the signals are not correct or are not present, then trace the failure to one of the following transistor packs: A4U6, A4U9, A4U11, or A4U13.

F. Verify that the outputs of A4U16(4,5,12,13) are the same as their respective inputs, A4U16(3,7,11,15), in step E. See *Figures 9-11* through *9-14*.

G. If the signals in Steps A through F are good, then continue with the Stop Interpolator troubleshooting procedure.

9-17. INTERPOLATOR 2 (STOP)

A. Using an oscilloscope, verify the presence of the GATE 2 signal (see *Figure 9-4*) at the 5372A rear-panel output. If the signal is bad, trace the failure back through A4Q8, then to A4U20(4) (EECL level), then to the IT2 signal (see *Figure 9-5*) at A4P6(1).

B. Verify the presence of CI2 at A4P3(1) (TP2) (see *Figure 9-6*). If the signal is bad, trace the failure back through A4Q5 – A5Q7, then to A4U301(18) (see *Figure 9-7*), then to A4U19(6). Lastly, verify the presence of the STOP_SYNC_500MHz signal at A4U19(13).

C. Verify the presence of the CI signal at A4U301(17) (*Figure 9-8*), and the IT signal at A4U20(6) (*Figure 9-9*). If the signals are not present or are not correct, then trace the failure back through A4U301 and A4U20.

D. Verify the presence of an output at A4U21(6), A4U22(6), A4U23(6), A4U24(6) A4U25(6), A4U26(6), A4U28(6), A4U31(6) and A4U33(6). See *Figure 9-10*.

E. Verify the presence of a signal at A4U27(3,7,11,15). See *Figures 9-11* through *9-14*. If any of the signals are not correct or are not present, then trace the failure back to one of the following transistor packs: A4U29, A4U30, A4U32 or A4U34.

F. Verify that the outputs of A4U27(4,5,12,13) are the same as their respective inputs, A4U27(3,7,11,15), in step E. See *Figures 9-11* through *9-14*.

G. If the signals in steps A through F are good, then the A4 Interpolator board is operating correctly.

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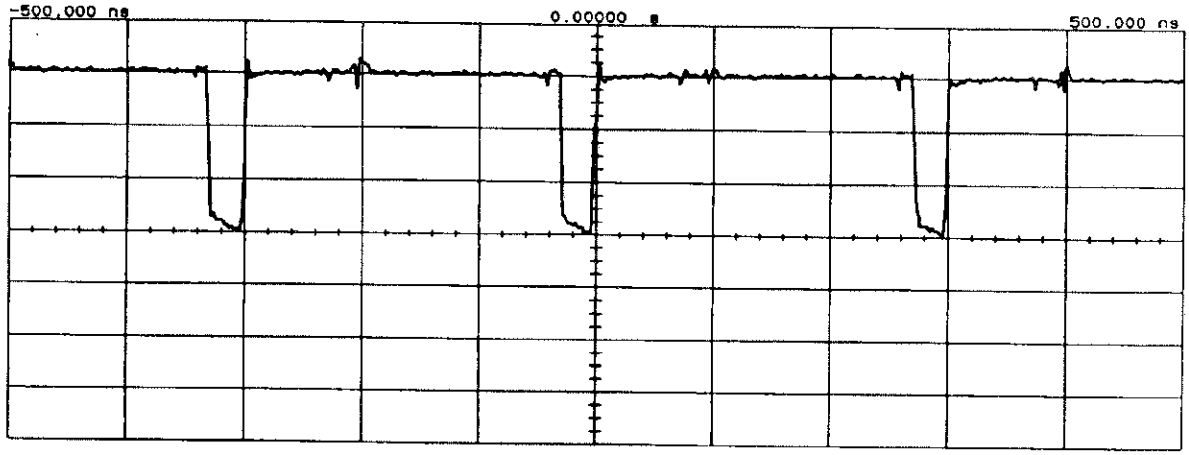
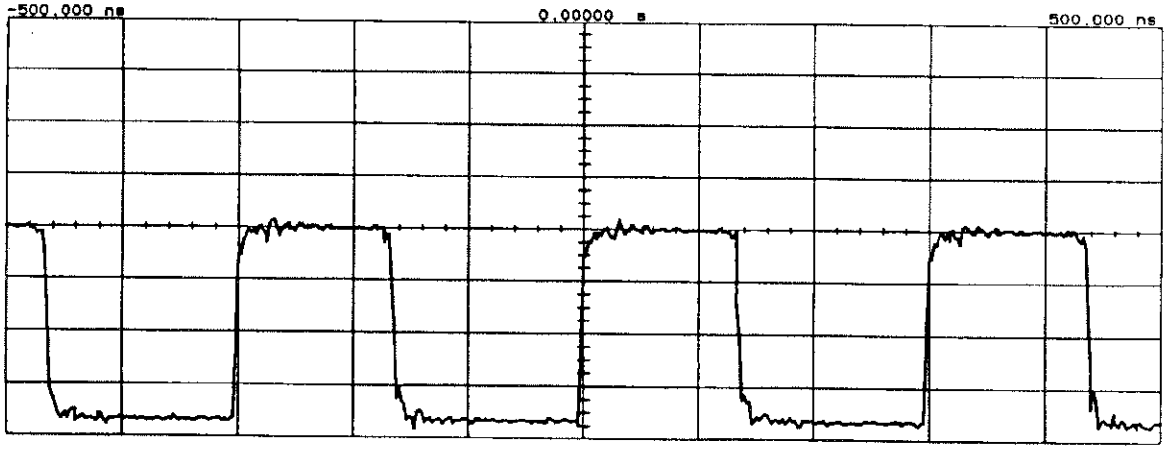


	Timebase	Delay/Pos	Reference	
Main	100 ns/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	500 mV/div	0.00000 V	1.000 : 1	dc (50 ohm)

Figure 9-4. GATE 1 and GATE 2 signals at Rear Panel



	Timebase	Delay/Pos	Reference	
Main	100 ns/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	0.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-5. Waveforms at A4P2(1) and A4P6(1)

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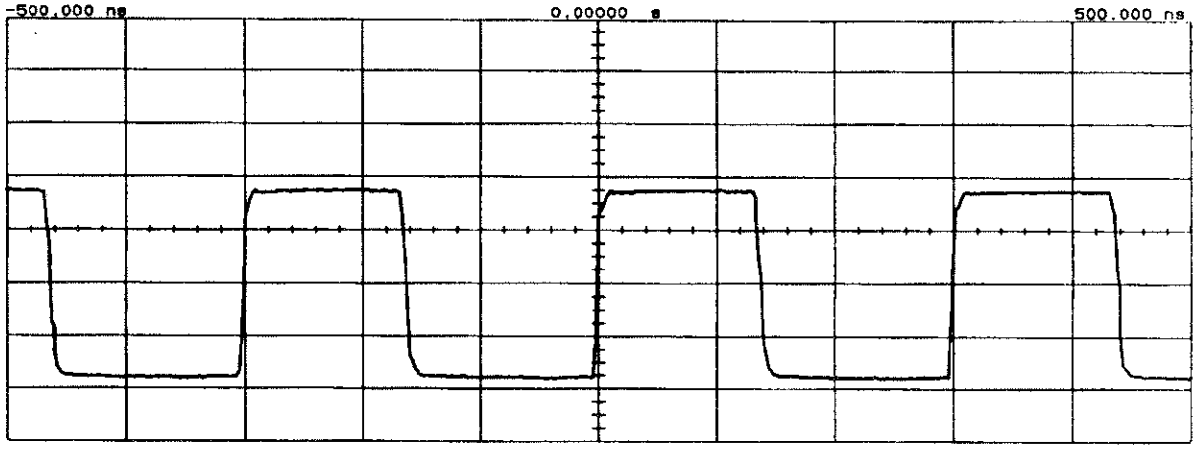
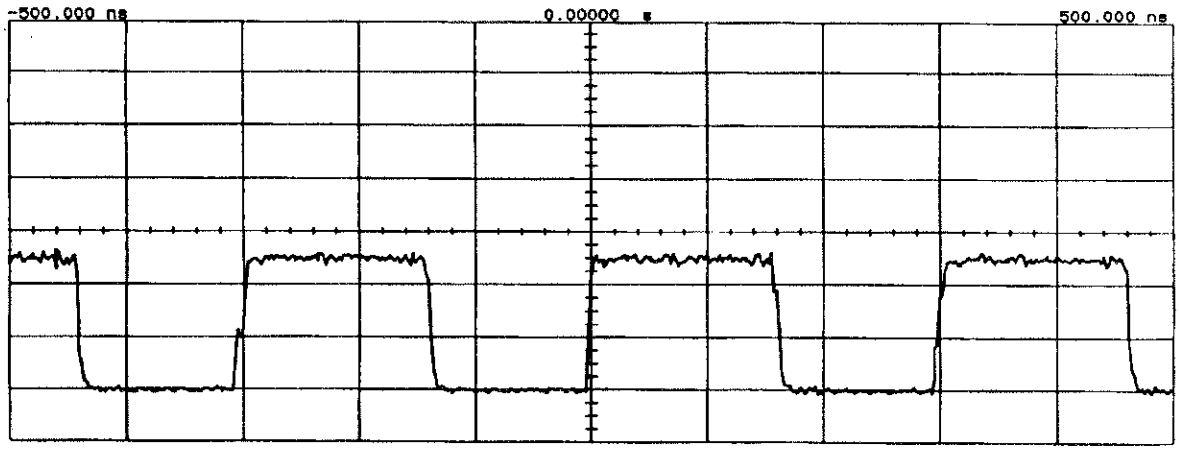


	Timebase	Delay/Pos	Reference	
Main	100 ns/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	-1.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-6. Waveforms at TP1 and TP2



	Timebase	Delay/Pos	Reference	
Main	100 ns/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	0.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-7. Waveforms at A4U300(18) and A4U301(18)

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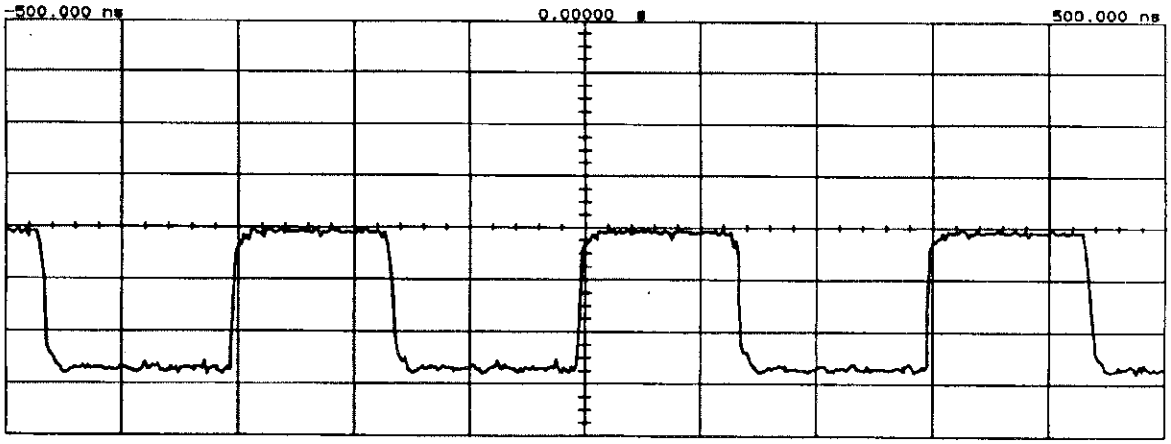
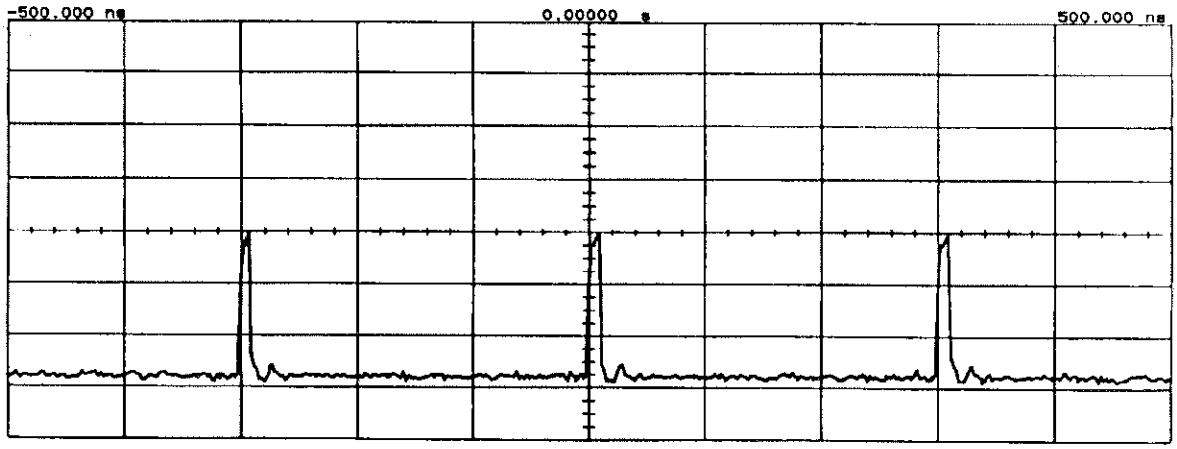


	Timebase	Delay/Pos	Reference	
Main	100 ns/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	0.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-8. Waveforms at A4U300(17) and A4U301(17)



	Timebase	Delay/Pos	Reference	
Main	100 ns/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	0.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-9. Waveforms at A4U3(6) and A4U20(6)

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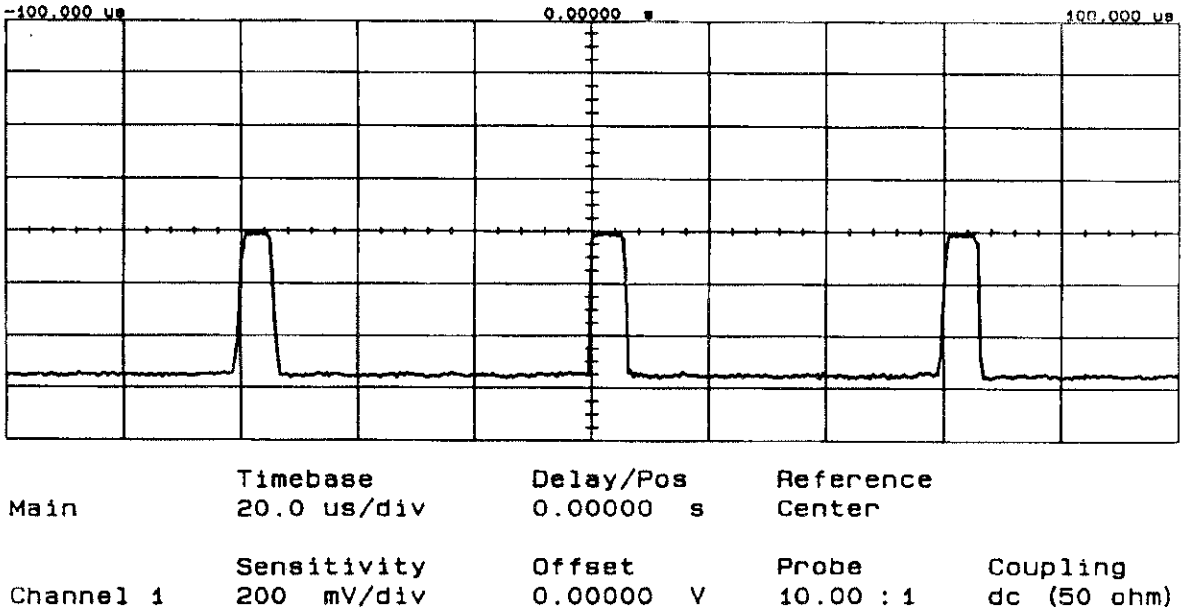

Figure 9-10. Waveforms at Pin 6 of A4U(4,5,7,8,10,12,14,15,17,21-26,28,31,33)

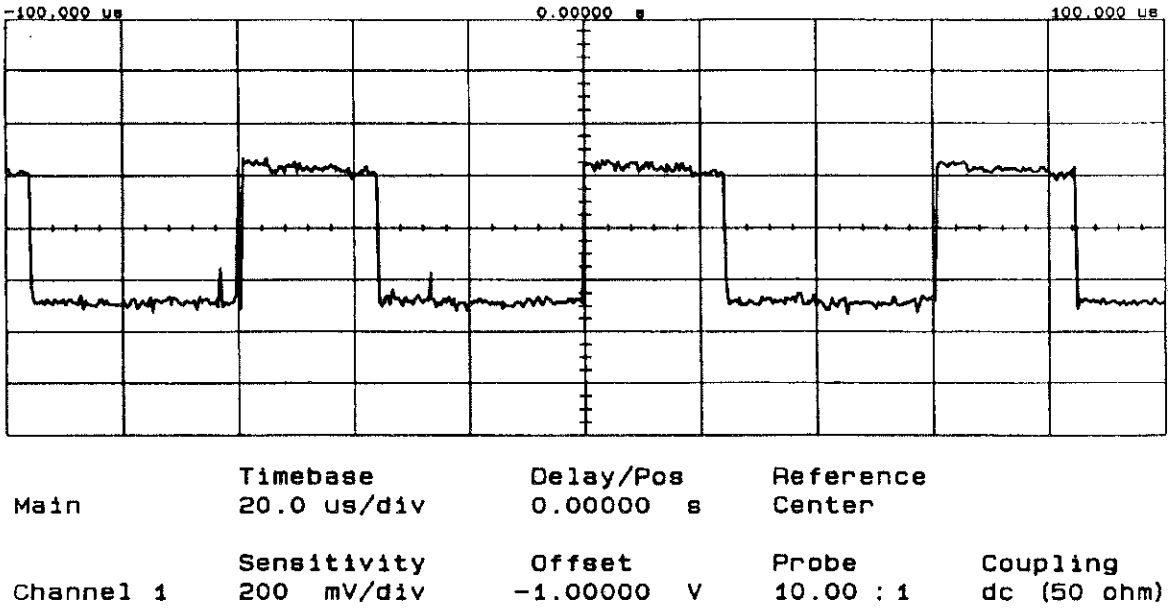

Figure 9-11. Waveforms at A4U16(3) and A4U27(3)

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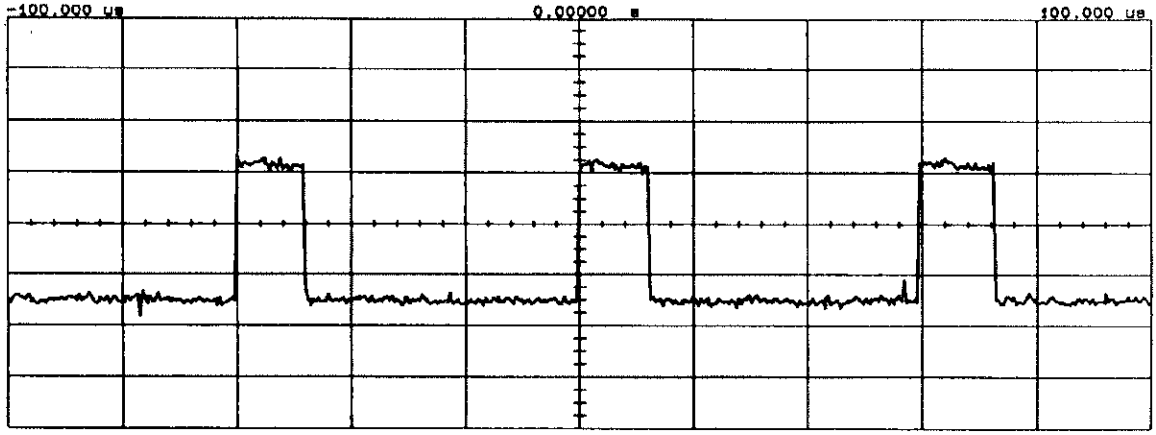
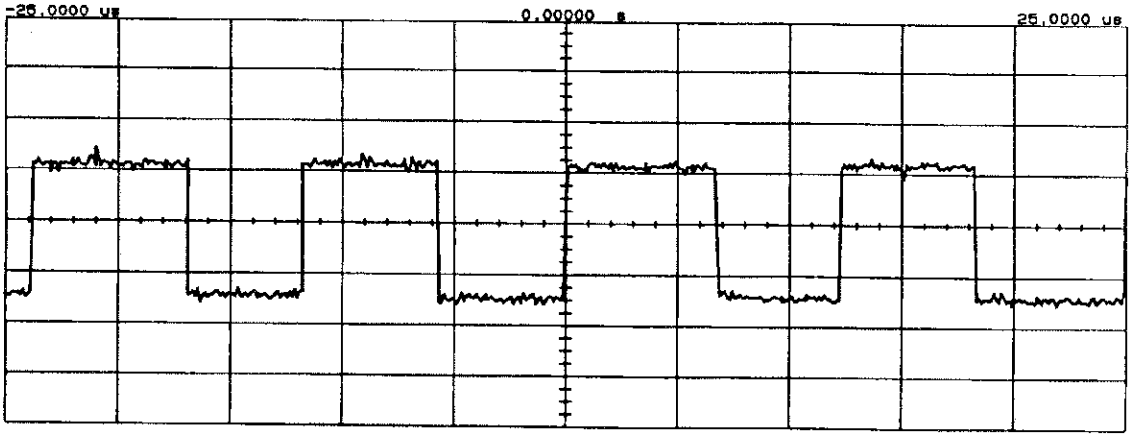


	Timebase	Delay/Pos	Reference	
Main	20.0 us/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	-1.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-12. Waveforms at A4U16(7) and A4U27(7)



	Timebase	Delay/Pos	Reference	
Main	5.00 us/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	200 mV/div	-1.00000 V	10.00 : 1	dc (50 ohm)

Figure 9-13. Waveforms at A4U16(11) and A4U27(11)

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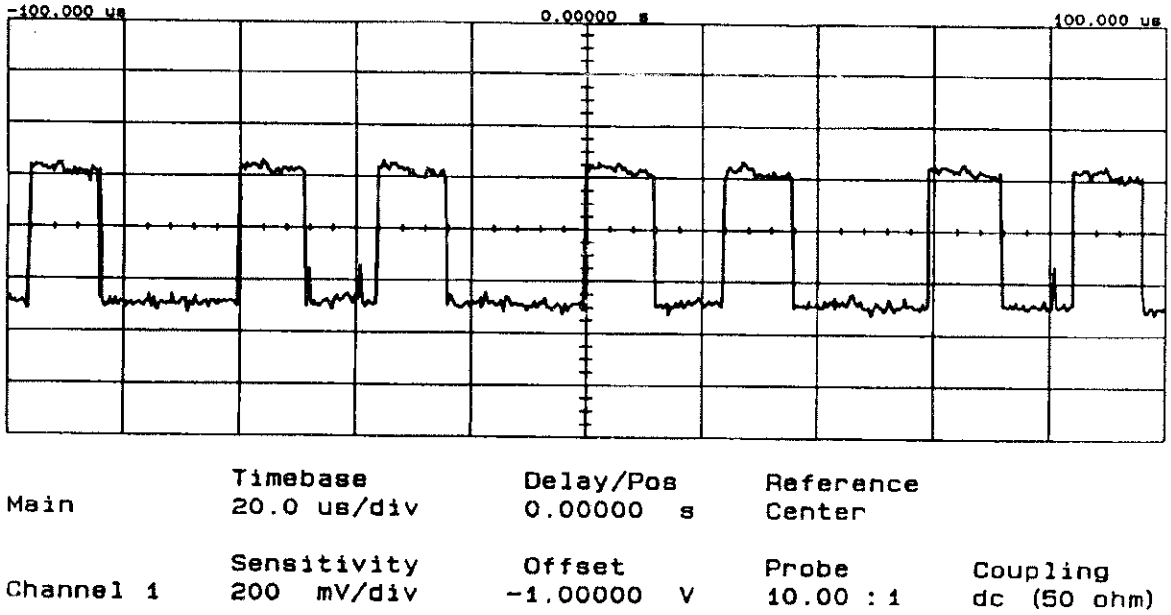

Figure 9-14. Waveforms at A4U16(15) and A4U27(15)

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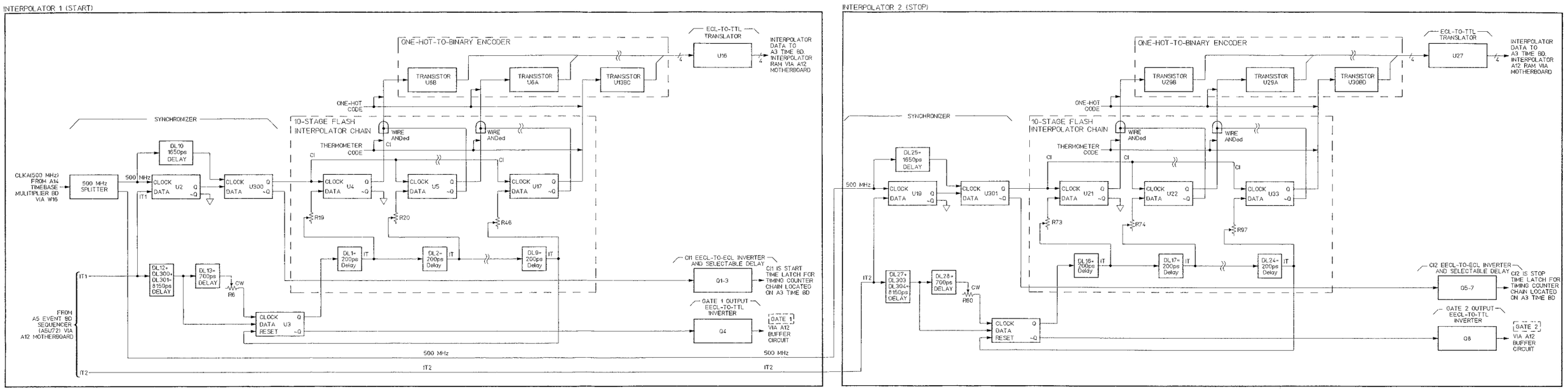

Figure 9-15. A4 Interpolator Board Block Diagram

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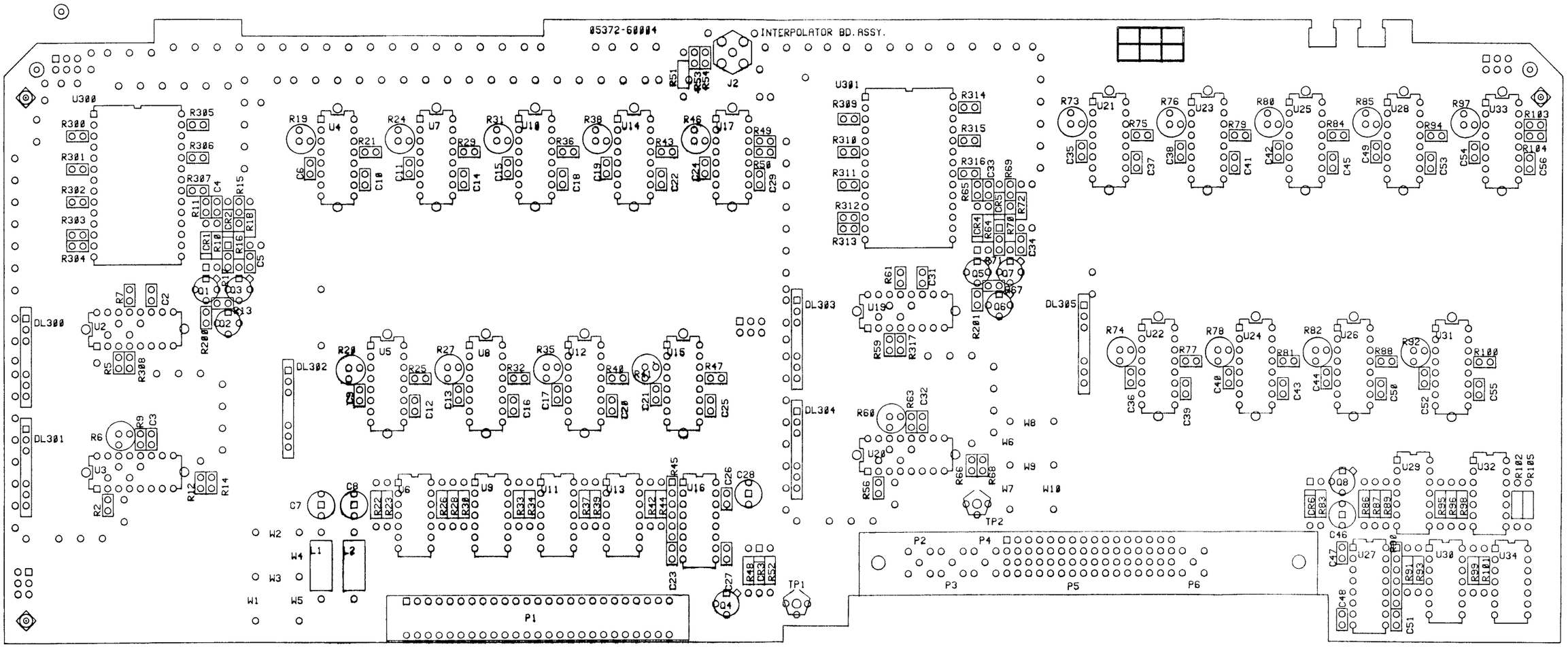

NOTE: W1-W10 FACTORY SELECT. TYPICALLY,
W2, W3, W8 AND W9 LOADED.

DL302 IS A ZERO OHM JUMPER
LOADED BETWEEN PINS 2 AND 5 OF DL302.

Figure 9-16. A4 Interpolator Board, Component Locator

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A4 SCHEMATIC DIAGRAM NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD A4 ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN FARADS, INDUCTANCE IN HENRIES.
3. ASETERISK (*) INDICATES FACTORY SELECTED COMPONENT. AVERAGE VALUE SHOWN.
4. TILDE ("~") PRECEDING A SIGNAL INDICATES A NEGATIVE-TRUE SIGNAL.

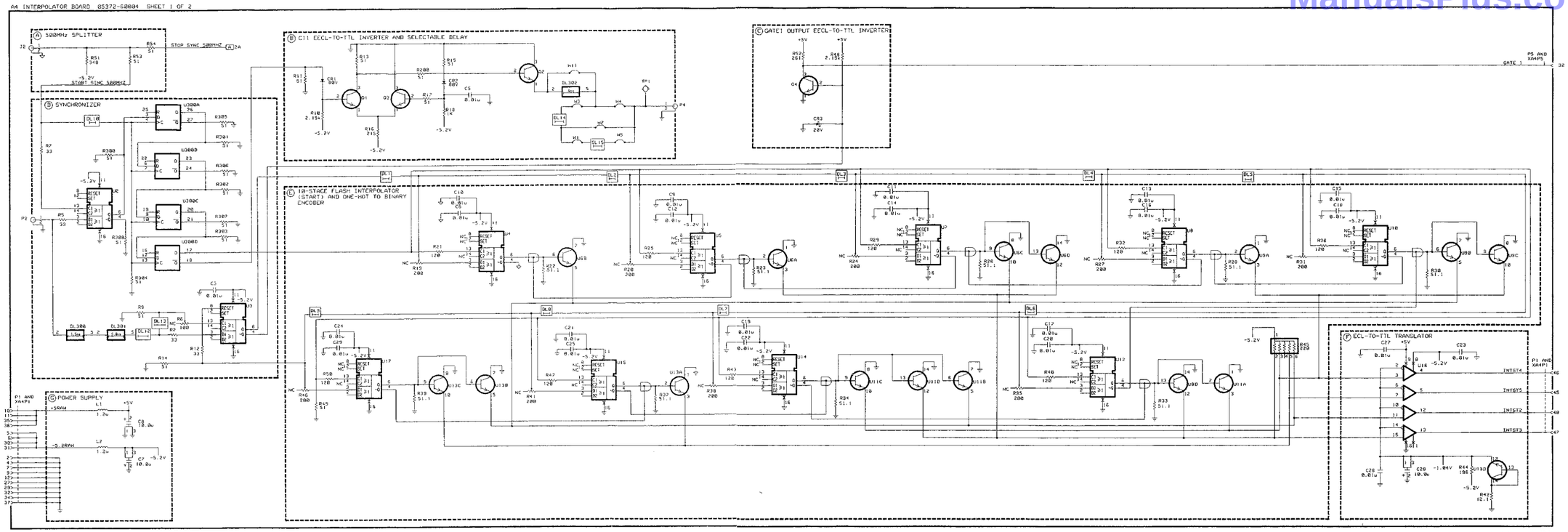

Figure 9-17. A4 Interpolator Board, Schematic Diagram (Sheet 1 of 2)

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A4 INTERPOLATOR BOARD 05372-60004 SHEET 2 OF 2

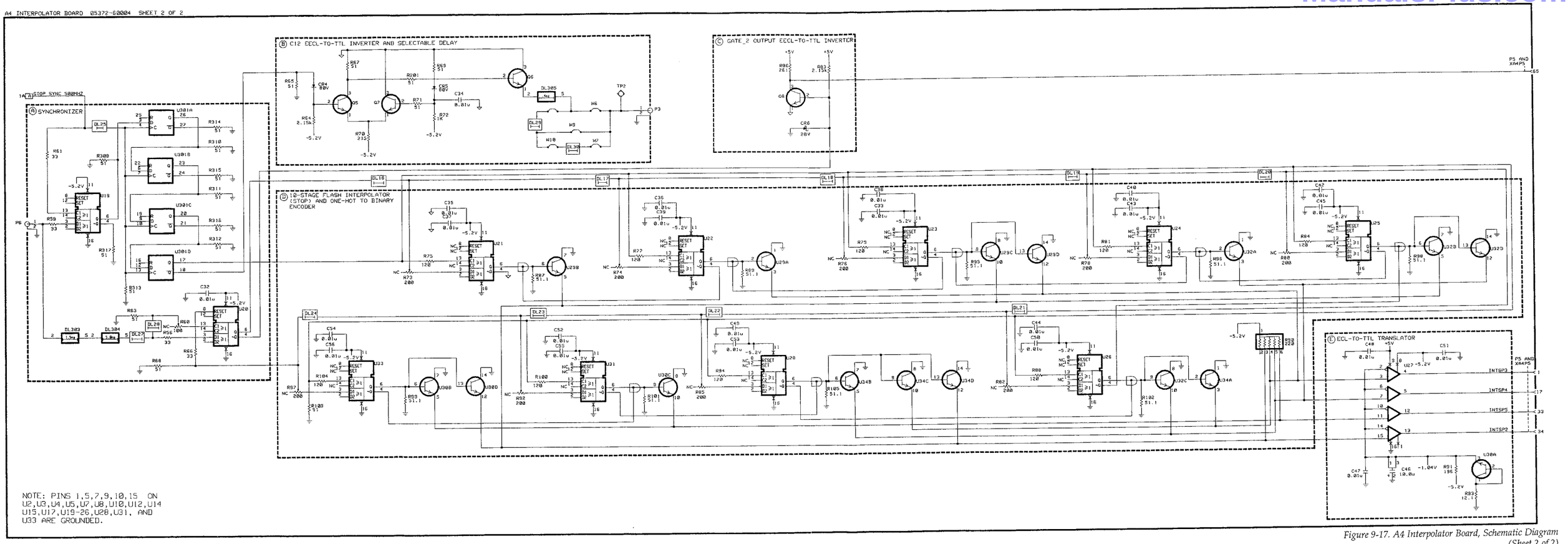

Figure 9-17. A4 Interpolator Board, Schematic Diagram (Sheet 2 of 2)

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10

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10

A5 EVENT

10-1. INTRODUCTION

The major function of the A5 Event Board is to count the number of input trigger events. The primary circuits that perform this function are the Sequencer IC, and the two Event Counters. Each Event Counter consists of two zero-dead-time counters (ZDTs), arranged in cascade. These ZDTs count the number of input events continuously, and latch the current count values when they receive a latch signal from the Sequencer IC. These latched count values are then stored in memory. *Figure 10-1*, "Counting Chains," illustrates the relationship between the Sequencer IC and the Event Counters. Secondary functions of the A5 board include:

- Generating the DMA Addresses for the Event and Time Counter RAMs, and the Interpolator RAM.
- Generating the write pulses to store the event and time data in RAMs.
- Controlling whether the Event Counters are performing a measurement, being setup, or are being fast re-armed.
- Controlling the width (16/32-bit) of stored event and time data to RAM, which indirectly controls the sample speed of the instrument.

For reference, see *Figure 10-8*, "A5 Event Board Block Diagram," and *Figure 6-2*, "HP 5372A General Block Diagram".

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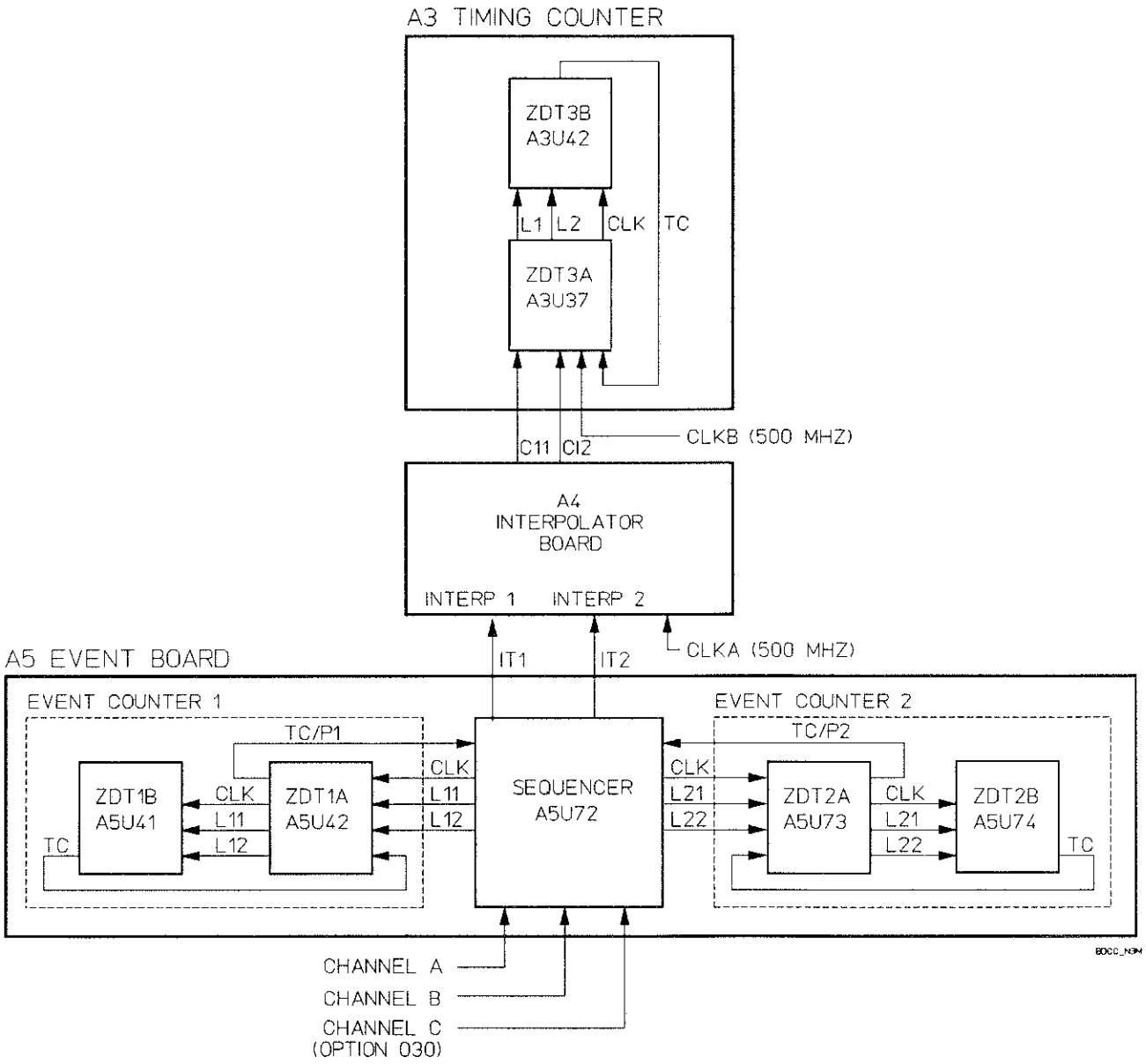

Figure 10-1. Counting Chains

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10-2. Sequencer IC

The Sequencer distributes:

1) the input signals, as clock inputs, to the Event Counters,

2) latch signals to the Event Counters, and

3) latch signals to the A4 Interpolator assembly.

A simplified block diagram of the Sequencer IC is shown in *Figure 10-2*. The Sequencer features:

1) two-stage sequential arming for both "start-arm" and "stop-arm",

2) external control by terminal count of the selected counting inputs, and

3) a phase comparator for plus- or minus- time interval measurements.

To the microprocessor, the sequencer appears as a bank of control bit registers that must be programmed for the HP 5372A to perform a desired measurement.

The Sequencer is organized into two almost identical channels, each containing an "arming" and a "clock" chapter. The "clock" chapter selects the input from either the Channel A, Channel B, or Channel C (option 030) line and routes it to the appropriate ZDT clock input. Within the "arming" chapter there is a start arm and a stop arm subsection. Each subsection consists of a two-stage multiplexer-latch arming structure and synchronizer. When the arming structure qualifies the input signal, the synchronizer is enabled and produces a latch synchronized to the clock output. The "arming" chapter selects the sources of the latch signals to be sent to the ZDT latch inputs at the appropriate time, after the arming and gating requirements have been satisfied. This chapter has two similar clock subsections, one for each event ZDT count chain. Once enabled by the "start" arming circuit, each clock subsection is capable of switching the clock source upon receipt of the Terminal Count (TC) signal from the event-count chain.

The count output may be switched in measurement, if the appropriate Terminal count (TC) is asserted. This process allows one ZDT to perform double duty, first as part of the arming circuit and then as a measuring counter.

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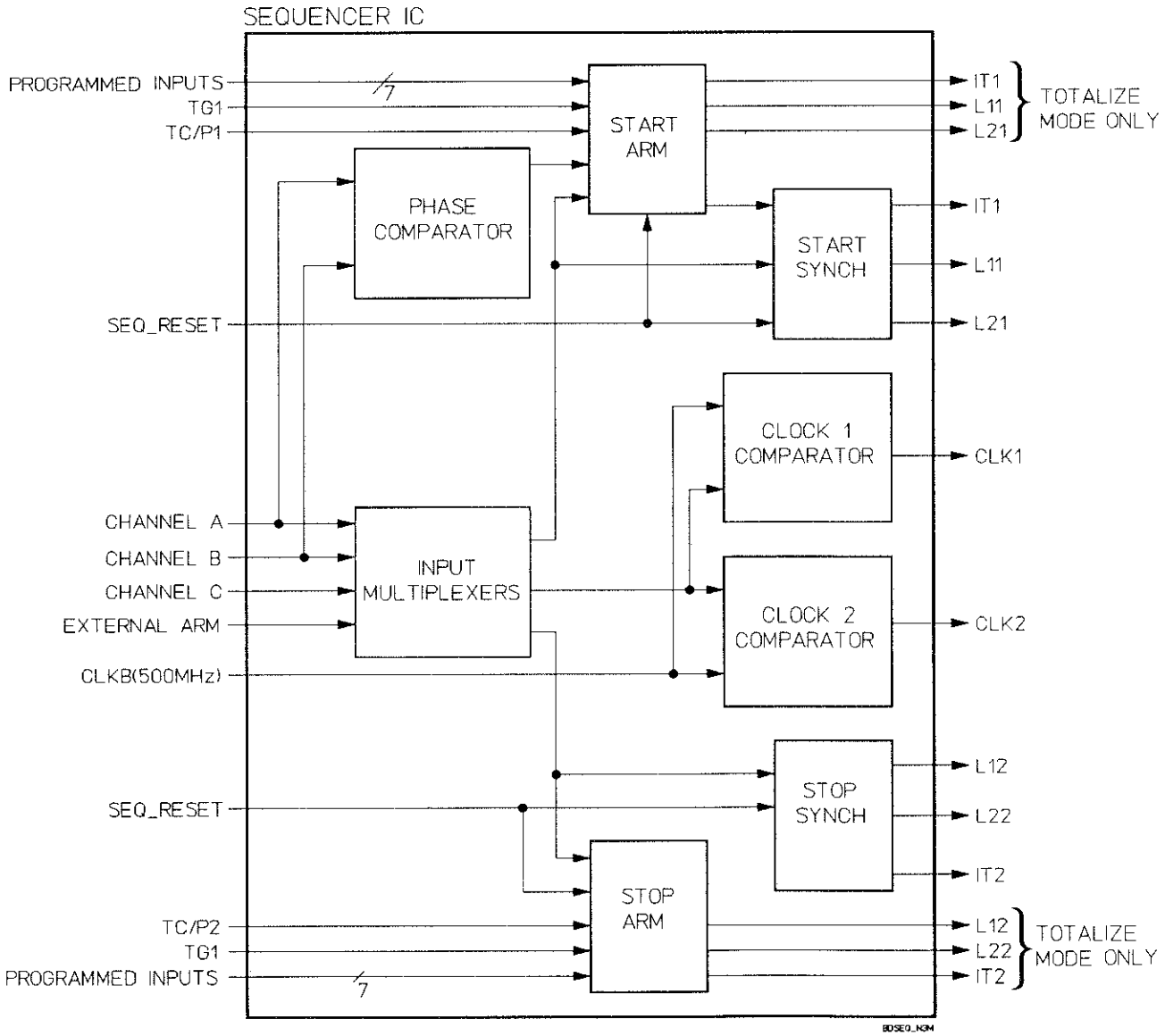

Figure 10-2. Simplified Sequencer IC Block Diagram

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10-3. Event Counters

The 32-bit Event Counters each consist of two 16-bit zero-dead-time counters (ZDTs) arranged in series. These ZDTs perform the counting of the input trigger events or arming delay. When a latch signal from the Sequencer is received, the current count value of the counter is read and stored in internal ZDT latches, without interrupting the counting process. This is where the term "zero-dead-time" or "continuous" counter orginates, because there is no "dead time" while the counter is being read. The latched count value is then transferred through a Transceiver to either:

1. the Event Counter RAMs for storing,

2. the Internal Bus Buffers, which sends the data to either the A7 Processor or A8 I/O Controller Boards, or

3. the Line Drivers, which sends the data to the A22 FastPort Board (option 020).

Incoming events or clock pulses are routed to an 8-bit synchronous counter. See *Figure 10-3*, "Simplified Zero-Dead-Time Counter (ZDT) Block Diagram". The MSB of this counter ripples to the input of another 8-bit synchronous counter giving a total counter length of 16 bits. This 16-bit counter synchronizes the latch with the clock signal. The output of both counter's binary stages are routed to two separately addressable latch pairs, totaling 16 bits per pair. Upon receiving a read command from whichever destination requests the read, the 16-bit data word exits the ZDT IC through the chips Input/Output buffers and routes it to either the A7 microprocessor, the A8 DMA/HP-IB circuitry, or into the ZDT's corresponding RAM. If an internal latch command edge is sent to the clock inputs of the ZDT's latches, then the latch clock line goes low, freezing the bit pattern present at the latch input at the instant the latch command became effective. Note that the Sequencer doesn't always produce synchronized latches or the time latch may not be synchronized. To ensure that the latch is synchronized with the clock, the incoming "Latch 1" and "Latch 2" are both synchronized to the incoming clock signal.

The clock output, the 16th (MSB) of the second 8-bit synchronous counter, and the inhibited Latch 1 and Latch 2 signals, are buffered and sent to the second ZDT in the chain, thus allowing extension to 32 bits counter data.

The Terminal Count circuitry of the ZDT detects a state of all logic level "1" in the binary output of the two 8-bit synchronous counters. The TC/P signal line is used to signal the Sequencer when this occurs. The HP 5372A uses the ZDT to signal when some predetermined (preset) time period, or any number "N" of events has occurred. The number "N" can be preset into the counter (ZDT). The ZDT counts up until the Terminal Count (TC) is reached. To generate a TC on a number of events (i.e., measurement input) the Sequencer connects the input channel carrying the events to the ZDT. To generate a time delay, the Sequencer routes the 500 MHz reference frequency (CLK B) to the ZDT. In both cases, the number preset into the ZDT is input 16 bits at a time, and is the number of events or number of clock periods desired. If two cascaded ZDT ICs are preset, the most significant bit ZDT is programmed to propagate down a "TC" true.

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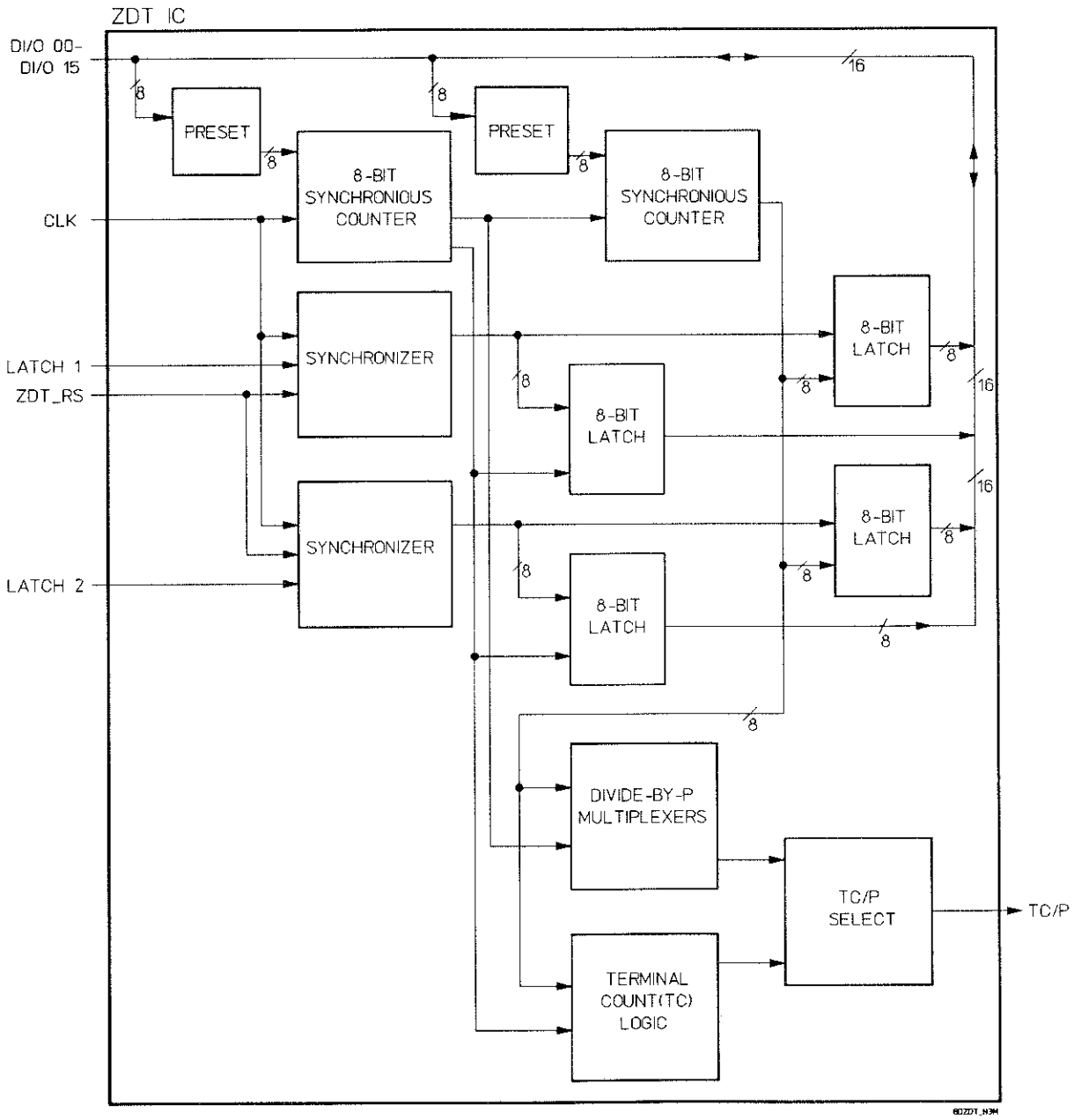

Figure 10-3. Simplified Zero-Dead-Time Counter (ZDT) Block Diagram

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10-4. DMA Address Generation

The DMA Address Generation circuit produces addresses for the A5 Event Counter RAMs, the A3 Time Counter RAMs, and the A3 Interpolator RAM. At the beginning of each measurement block, the microprocessor programs the address counters to the starting address of the RAMs. This address is then latched and sent to the RAMs. After the data has been stored in RAMs at the current address, the address counters are incremented by one. Again the address is latched, sent to RAMs, and then new data is stored in RAMs at the new address location. This process of incrementing the address counters by one is continued until the address counters reach the terminal count (RAM_TC).

The DMA Address Generation circuit consists of the following components:

1) two 8-bit synchronous counters, A5U26 and A5U28,

2) two Event Counter RAM address latches , A5U49 and A5U50,

3) two Time Counter and Interpolator RAM address latches, A5U25 and A5U27,

4) two buffers, A5U51 and A5U54,

5) two registers, A5U52 and A5U53, and

6) a dual J-K flip-flop, A5U75.

Latches A5U49 and A5U50 latch the address counter outputs and provide address lines, ADDR00-ADDR15, to the A5 Event Counter RAMs. In a similar way, latches A5U25 and A5U27 provide address lines, RAMA00-RAMA12, to the A3 Time Counter RAMs and the A3 Interpolator RAM.

At the beginning of each measurement block, the microprocessor places a 16-bit word (DI/O00-DI/O15) at the inputs of the address counters. The thirteen low-order bits represent the ZDT and interpolator RAM address at which the first measurement result will be stored (the three high-order bits are set to logic high). The microprocessor then generates an active-low counter load pulse, ~LOAD_AC, and applies it to the address counters, via the A6 Count Support Board. This signal latches the initial memory address into the address counters. Signal ACNTRCLK, from the RAM-Write circuit, then clocks the address counters, which places the counter output on the CTR00-CTR15 lines. Next, signal ACTRLATCH, from the RAM-Write circuit, clocks the Event and Time/Interpolator latches, and places the data on the CTR00-CTR15 lines onto bus lines ADDR00-ADDR15 and RAMA00-RAMA15.

The ACNTRCLK signal increments the address counters until the terminal count is reached. The output at pin 14 of A5U26, the highest order address counter, generates a signal which identifies a terminal count condition. A5U75A output, RAM_TC, which is the terminal count signal delayed by one write cycle, ensures that the A6 Count Support Board generates a microprocessor interrupt (~INT1) AFTER the last set of measurement data is loaded into memory.

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Buffers A5U51 and A5U54 are also part of the DMA Address Generation circuit. These line drivers place the address counter's outputs on the Event board's DI\O00-DI\O15 data bus, which allows the microprocessor to read the data. The microprocessor sends signal ~RDMEMADD, via the A6 Count Support Board, which enables both line drivers, and places the data on the CRT00-CRT15 lines onto the DI\O00-DI\O15 bus. This data's usefulness is limited to 5372A diagnostics and troubleshooting.

10-5. RAM-Write Circuit

The major function of the RAM-Write circuit is to generate signals to store the latched count values from the Event and Time Counters, and the value from the Interpolator, to memory. Secondary functions of the RAM-Write circuit include generating signals for:

1) changing the ZDT addresses so the ZDTs can alternate the output of two-latch data,

2) clocking the DMA Address Counters,

3) clocking the DMA RAM Address Latches,

4) resetting the ZDTs and then the Sequencer at the end of each measurement block, and

5) enabling and clocking the A3 Histogram IC.

The RAM-Write Circuit writes the measurement data into RAM whenever latch signals, LATCH11 and LATCH12, from the Sequencer, go high, which indicates the measurement is complete. This is true for all modes except "time stamp the block arm," which only needs one latch, LATCH11, to begin a write to memory. All of the RAM-Write circuits described in the following sections are clocked by the 125 MHz DMA Clock, which comes from the A14 Time Base Multiplier Board. This signal enters the A5 assembly at A5J1, and is distributed to the various RAM-Write circuits by OR gate A5U57B. For reference on the various RAM-Write circuits, refer to *Figure 10-8*, "A5 Event Board Block Diagram," and sheets 4 and 5 of the A5 Event Board schematics.

10-6. START UP/DELAY GENERATOR

The RAM-Write circuit begins at shift register A5U67, which synchronizes the latch signals, LATCH11 and LATCH12, to the 125 MHz DMA Clock. Both synchronized signals (1Q0 and 1Q1) are delayed by AND gate A5U65 and OR gate A5U57A, and then sent back to A5U67 for additional delay. This delayed signal, 1Q2, is then sent to the Pulse Generator/Selector circuit. The total delay is at least 32 ns, which is necessary for the ZDT outputs to stabilize before being clocked into the Transceivers.

The synchronized LATCH11 signal, 1Q0, is also routed to AND gate A5U56, where it is ANDed with the TS_MODE signal. This TS_MODE signal is only high during "time stamp the block arm" mode, in which the write circuit produces a pulse to write the value in latch 1 immediately. In this case, the output of AND gate A5U56 is sent to OR gate A5U57A and then back to shift register A5U67, which then generates the 1Q2 signal.

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10-7. STOP MEASURE/INHIBIT/META STABLE DETECTOR

This circuit generates the INH/STOP signal, which is sent to the Pulse Generator/Selector circuit, and controls when the measurement is inhibited or stopped. The circuit detects inhibit being true when either LATCH11 or LATCH12 goes high, and detects possible metastable condition when in TI mode (e.g., in TI A→B, if B comes before A, data is skipped by forcing inhibit true).

10-8. PULSE GENERATOR/SELECTOR

The Pulse Generator/Selector circuit generates an 8 ns pulse, TIMINGPULSE, which is clocked through all following circuits to generate exact timing. The circuit also selects between the inhibit pulse, INH/STOP, which immediately resets the ZDTs and the Sequencer, and the TIMING PULSE, which causes data to be stored as well as resetting appropriately. This circuit also generates the HISTO_EN signal, which enables the A3 Histogram IC to perform histogram time interval measurements. In addition, the circuit generates the HISTO_EN signal, which is sent to the A3 Interpolator RAM circuit, and stored as one of the four status bits.

10-9. MODE CONTROL

The Mode Control circuit uses three lines from the A7 Processor Board to determine the mode: single latch/single write, double latch/double write, timestamp, double latch, quadruple write, and double latch/double write without metastability filter. This circuit is also used to initialize the mode after receiving the ECLSYS_INIT and ENDOFINHIBIT signals. In addition, the Mode Control circuit generates the ZDT_ADDRESS1 signal, which changes the ZDT addresses so the ZDTs can alternate the output of two-latch data.

10-10. PULSE STRETCHER/DELAY SELECTOR

The Pulse Stretcher/Delay Selector circuit stretches the 8 ns TIMING PULSE to 32 ns for the RAM-Write pulse, and switches in extra delay for the 32-bit mode (normal mode) to allow for propagation delay between low order and high order ZDTs.

10-11. HISTOGRAM CLOCK GENERATOR/SYNCHRONIZER

The Histogram Clock Generator/Synchronizer circuit generates differential signals, HIST_CLK+ and HIST_CLK-, which clock the A3 Histogram IC.

10-12. RAM ADDRESS COUNTER CLOCK DELAY

The RAM Address Counter Clock Delay circuit generates the ACNTRCLK signal, which clocks the DMA Address Counters, A5U26 and A5U28. This clock pulse is generated after appropriate delay relative to writing data in RAM.

10-13. RAM-WRITE PULSE/ZDT DATA CLOCK SYNCHRONIZER

The RAM-Write Pulse/ZDT Data Clock Synchronizer circuit generates signals to write the ZDT outputs to the Transceivers and then to the RAMs for storing. This circuit generates signals, WR_646A and WR646B, to write the Event ZDT outputs into the Event transceivers. It then generates signals, RAM_WR1A through RAM_WR2B, to write the Transceiver data into the Event Counter RAMs. This circuit also generates differential signals, TIME_WR+ and

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TIME_WR-, which writes the the Time ZDT output into the Time Transceivers and then writes this data into the Time Counter RAMs. These differential signals also write the Interpolator data into the Interpolator RAM. In addition, this circuit generates the ACTRLATCH signal, which clocks the DMA Address Latches (A5U25, A5U27, A5U49, and A5U50).

10-14. ZDT AND SEQUENCER RESET

The ZDT and Sequencer Reset circuit generates signals to reset the ZDTs and then the Sequencer at the end of each measurement block. This circuit generates Event Counter reset signals, ZDT_RS1, for Event Counter 1, and ZDT_RS2, for Event Counter 2. It also generates differential signals, TZDT_RST+ and TZDT_RST-, to reset the ZDTs in the A3 Time Counter. In addition, this circuit generates the SEQ_RESET signal, which is used to reset the Sequencer AFTER the ZDTs have been reset.

10-15. ZDT Address Multiplexers

Multiplexers A5U77 and A5U78 provide address lines, ZDTA0-ZDTA2, for the ZDTs in the Event Counter chains. These multiplexers are primarily controlled by signals RA_ZDT_ADDR and ~EN_MEAS, from the A6 Count Support Board. The multiplexers control whether the Event ZDTs are being accessed by the microprocessor, performing a measurement, or are performing a fast re-arm.

10-16. System Buffers

The bidirectional System Buffers A5U79 and A5U80 connect the A5 Event board's DI/O00-DI/015 data bus to the Count Hardware Data Bus (CTD0-CTD15). The direction of data flow through the buffers is controlled by the microprocessor's count read/write signal CTR/W. When CTR/W is logic high, the buffers allow the Event board to pass data from its own data bus to the Count Hardware Data Bus. When CTR/W is logic low, the buffers allow data to pass from the Count Hardware Data Bus to the Event board's data bus. The A6 Count Support Board's ~ENEBUF signal controls both buffer enable lines. ~ENEBUF is at logic low during all data transfers. Setting ~ENEBUF to a logic high isolates the Count Hardware Data Bus from the Event board's data bus.

10-17. Rear Panel Moniter

The Rear Panel Moniter circuit consists of an ECL-to-TTL translator (A5U44), which interfaces three ECL signals from the Sequencer IC to other assemblies. Two signals, ARM DELAY 1 and ARM DELAY 2, indicate the completion of the start and stop arming condition, respectively. These signals are routed to both the A6 Count Support Board and the A13 Rear Panel Board. The third signal is the timing trigger signal, TTR, which is sent to the A6 Gate Timer circuit, indicating that the arming mode includes "interval sampling" and that the Gate Timer should begin output of the TG1 pulses.

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10-18. A5 EVENT BOARD TROUBLESHOOTING

10-19. Test Equipment Required

- HP 1725A Oscilloscope
- HP 3325 Function Generator
- A17 Count Extender Board (HP Part Number 05372-60023)
- DMA Extender Cable (HP Part Number 05371-60225)

10-20. Diagnostics

- Diagnostic Test 6. Count ICs
- Diagnostic Test 8. Measurement RAM

10-21. Background

The A5 Event Board, HP P/N 05372-60005, counts the input trigger events as specified by latching signals from the Sequencer IC (A5U72). This assembly contains two 32-bit Event Counters, each of which contain two 16-bit zero-dead-time counters (ZDTs), arranged in cascade. The support circuitry for each ZDT includes two tranceivers, two measurement RAMs, and two internal bus buffers. The first ZDT in each chain also has two line drivers included in the support circuitry. The A5 assembly also generates the addresses for the measurement RAMs, and the ram-write pulses to store the data in these RAMs.

The following are definitions of the various logic levels used in the troubleshooting procedure.

	EECL	ECL	TTL
Logic 1	0 V	–0.9 V	5 V
Logic 0	–0.8 V	–1.8 V	0 V

10-22. A5 Troubleshooting Approach

The overall functionality of the A5 assembly can be verified by running diagnostic test 6 (Count ICs) and diagnostic test 8 (Measurement RAM). These two diagnostics exercise circuitry on both the A5 Event Board and the A3 Time Board. If both of these tests pass, then the A5 and A3 assemblies are probably operating correctly. If either or both of the tests fail, the CRT will display a failure message(s) indicating faulty ciruitry on the A5 or/and A3 assemblies. Since the Count ICs and Measurement RAMs located on the A3 assembly are controlled by circuitry on the A5 assembly, a failure message indicating faulty circuitry on the A3 assembly could be caused by a fault on the A5 assembly. Therefore, first verify that the A5

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assembly is operating correctly before troubleshooting the A3 assembly. If both diagnostics fail, then first perform the Measurment RAM troubleshooting, and then continue with the Count ICs troubleshooting.

10-23. A5 Troubleshooting Preparation

1. Set the HP 5372A STBY-ON power switch to STBY, and disconnect the power cord from the primary power source.

2. Place the A5 board on the 05372-60023 Extender board as follows:

   a. Remove the instrument top cover and sub covers.

   b. Lift the A5 Event board partially out of the cardcage, and unscrew the 125 MHz SMC cable from the upper left edge of the A5 board.

   c. Lift the A5 board completely out of the cardcage.

   d. Connect the 125 MHz cable to the 05372-60023 Extender board's SMC connector, and slide the Extender board in A5 board's slot.

   e. Place the A5 board on the Extender board and connect the 125 MHz Extender board cable to the A5 board (the SMC jack is located on the upper left corner of the A5 board).

10-24. A5 Troubleshooting Procedure

10-25. DIAGNOSTIC TEST 8 FAILURE (MEASUREMENT RAM)

If the HP 5372A fails test 8 (Measurement RAM test) the following troubleshooting procedure should be used:

Diagnostic test 8 (Measurement RAM test), verifies correct operation of the measurement RAMs and the read/write circuitry. The test first attempts to write the pattern "101010..." (AAAAH) into all the RAM memory locations. The test then reads back the value one address at a time. If it reads the correct value, "010101..." (5555H) is written into the same memory location and the new value is read back. If correct data is read back, 8888H is written into the same memory location. If both reads are successful (the value read back is the same as the value written to memory), the memory address is decremented and the process is repeated at all other memory locations. 8888H is the last data written to each location in order to determine if the addresses are decremented properly. If the address bits are stuck, the data read back will be 8888H instead of AAAAH.

The diagnostic failure message will either indicate that all the Measurement RAMs failed or it will specify which particular RAM set failed. A RAM set consists of two 8 bit RAMs which support one ZDT. If all the RAMs fail the diagnostic test, the following error message will be displayed:

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"Measurement RAM FAILED: 1A 1B 2A 2B 3A 3B INT"

If only one set of RAM fails the diagnostic test, the following error message will be displayed:

"Measurement RAM 1A [Fail]: 800 W:AAAA R:8888"

The message indicates which RAM set failed, the address at which the failure occurred, and the data that is written to and read from the RAM. In the example above:

- "1A" represents the RAM set that is exhibiting the failure. A RAM set refers to two 8 bit RAMs which support one ZDT. Although the diagnostic may detect a failure in only one RAM, the diagnostic indicates that the set of two RAMs failed. In order to determine the reference designators of the failing RAMs refer to *Figure 10-1* (RAM set 1A refers to A5U10 and A5U13 which are the RAMs supporting ZDT1A (A5U42)).
- "800" represents the address at which the failure occurred.
- "AAAA" represents the data which was written to the RAM.
- "8888" represents the data which was read from the RAM.

NOTE

If the Measurement RAM test indicates that all measurement RAMs have failed, then the support circuitry which affects all the RAMs is probably the cause of the failure. The following troubleshooting procedure should be used:

1. If the diagnostic tests fails at the first test location [2000H] then:

   a. Verify that the 125 MHz (1 Vp-p) sine wave is present on the center-pin of A5J1. If the signal is not present, refer to the A1/A14 troubleshooting procedure, located in chapter 5.

   b. Verify the signal path through the write circuit by running diagnostic test 8 in the Until Fail Off mode and verifying the following signals:

   - Verify the "WRRAM" TTL signal, shown in *Figure 10-4*, is present at A5U31(5). If this signal is not correct or is not present, then replace the A6 Count Support Board.

   Note: For the "WRRAM" signal to be present, the Test 8 (Measurement RAM test) must be running repetitively with the "Until Fail" mode off.

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- Verify that the "ECL WRRAM" signal shown in *Figure 10-5* is present at A5U31(4), and that this signal continues through the following path: A5U37(11) to A5U37(15), A5U37(11) to A5U37(15), A5U32(7) to A5U32(15) and through the buffers on A5U1 and A5U2.
- Verify that the counter clock "INC_ADD" TTL signal, shown in *Figure 10-6*, is present at A5U30(7). If this signal is not correct or is not present, then replace the A6 Count Support Board.

Note: For the "INC_ADD" signal to be present, the Test 8 (Measurement RAM test) must be running repetitively with the "Until Fail" mode off.

- Verify that the "ECL INC_ADD", signal shown in *Figure 10-7*, is present at A5U30(3), and that this signal continues through the following path: A5U37(7) to A5U37(3), A5U33(6) to A5U33(3), A5U3(15) to A5U3(13), and then output to counters U26 and U28.

2. If the Measurement RAM test passes the first location but fails on the second location [1FFFH], then the "INC_ADD" signal path should be checked as described above. If this path is intact, then look for an addressing problem in the counters and the circuitry that loads the counters (A5U52 and A5U53) and that buffers the counters (A5U49, A5U50, A5U25, and A5U27). These verifications should be performed while running the Measurement RAM test with the "Until Fail" mode off.

3. If the Measurement RAM test continues beyond the first two locations but stops before completion, the problem is almost certainly in the address lines. For example, if the address counts down to 1FFBH and fails, the third address bit most likely failed (B in hex is 1011 in binary, which is the first time the third bit is exercised). The corresponding address bit should be checked in both the buffer feeding the address counter and the counter outputs themselves. If only the RAMs located on the A5 board fail (1A,1B,2A,2B) then the suspect address buffers are A5U49 and A5U50. If only the RAMs located on the A3 board fail (3A,3B) then the suspect address buffers are A5U25 and A5U27.

NOTE

If the Measurement RAM test indicates that only one set of RAM fails then assume that either one of the two RAMs in the RAM set failed, or that the circuitry that supports one of the two RAMs failed. The following troubleshooting procedure should be used:

4. First determine the reference designators of the failing RAM as described at the beginning of this section and then determine which RAM is failing as follows:

   a. Compare the data written to the RAM with the data read back from the RAM. If neither the lower byte or the upper byte match, then check the enable signals to the two RAMs and their buffers. If only the lower byte does not match, then look at the RAM with ZDT0 through ZDT7 inputs and its buffer. For example, if measurement RAM 1A is failing and the test indicates that AAAAH was written and AAABH was read, then look for a problem on the least significant bit of ZDT chain 1A. In this case, look at U12(2), R52(3), U13(11), and U71(20).

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10-26. DIAGNOSTIC TEST 6 FAILURE (COUNT ICS)

If the HP 5372A fails diagnostic test 6 (Count ICs test) the following troubleshooting procedure should be used:

Diagnostic test 6 (Count ICs test), verifies the operation of the ZDTs, the latching signals, and the read/write signals. For a complete description of this test see Appendix C, which contains a description of all the diagnostic tests.

Diagnostic test 6 first attempts to write data to the ZDTs and then read the same data back from the ZDTs. It first sets the internal count value to AAAAH. Forced latches are then performed on Latches 1 (L11 and L21) and Latches 2 (L12 and L22). The results are then read back and compared to the initial preset value. This test is then repeated for the 5555H pattern.

1. If the HP 5372A passes test 8 (Measurement RAM test) and fails the Count ICs read/write test then the problem is in the particular ZDT or in its corresponding Transceiver. For example, if the failure message is:

   ZDT1A FAILED: Read bad preset value through forced latch1 RD:FFFF WR:AAAA

   then check that the ZDT reset line A5U42(6) is not stuck at a TTL High. If it is not replace ZDT A5U42. If the problem persists, replace Transceivers A5U71 and A5U70.

2. If the HP 5372A passes the Count ICs read/write test but fails one of the Count ICs Latch tests replace the appropriate ZDT. If the problem persists, replace the ZDT Address MUX's A5U77 and A5U78.

3. If the HP 5372A fails the Count ICs count test and the result of the count is zero (ie. ZDT1A chain FAILED – incorrect count total [4.5 µs gate] 7FE[000]) then:

   a. Verify that the A14's 500 MHz 100 mV signal is present at A5J2.

   b. Verify that the appropriate ZDT reset line is not stuck at a TTL High.

   c. Replace the Sequencer IC A5U72.

4. If the HP 5372A fails the Count ICs count test and the result of the count is not zero (ie. ZDT1A chain FAILED – incorrect count total [4.5 us gate] 7FE[000]) then a problem most likely exists in the write circuit.

10-27. INHIBIT CIRCUIT

The inhibit input is not tested in any of the self-test diagnostics. If the inhibit input fails, then the following troubleshooting procedure should be used:

1. Connect the rear panel FREQUENCY STANDARD Output to the rear panel Inhibit input.

2. Press the front panel Pretrigger key and turn Inhibit on.

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3. Use the softkeys to inhibit measurements when inhibit input is "Above GND [0.0 V]"
4. Verify that a 10 MHz TTL signal is present on A5U31(7).
5. If the signal is not present replace the A6 Assembly.
6. If the 10 MHz signal is present at A5U31(7) then check for a 10 MHz ECL signal at U31's output A5U31(1).

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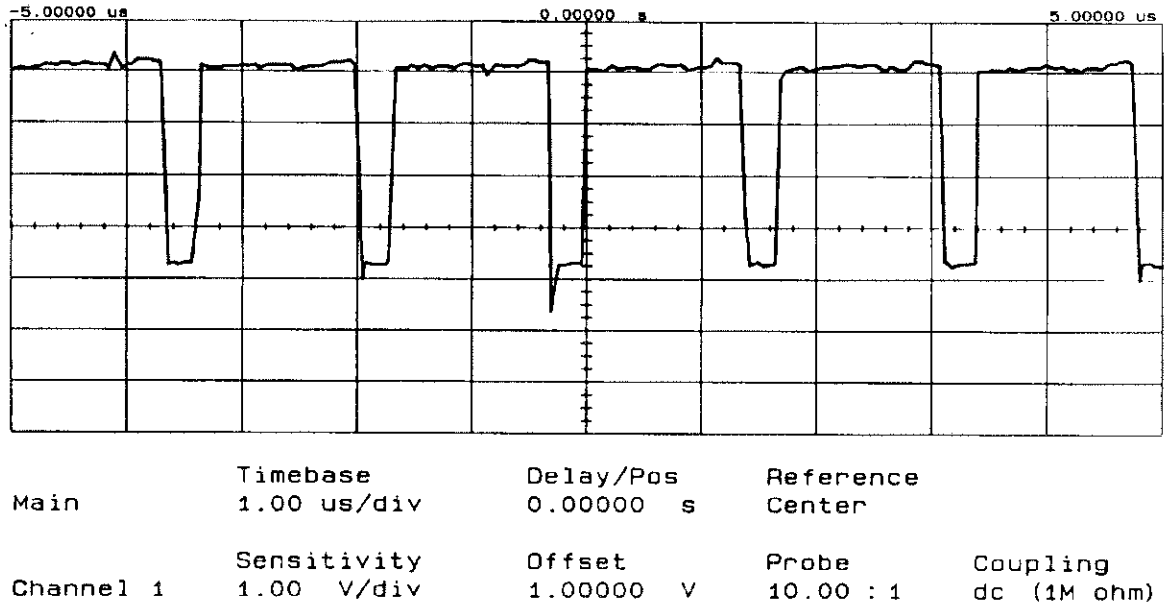

Figure 10-4. Waveform at A5U31(5)

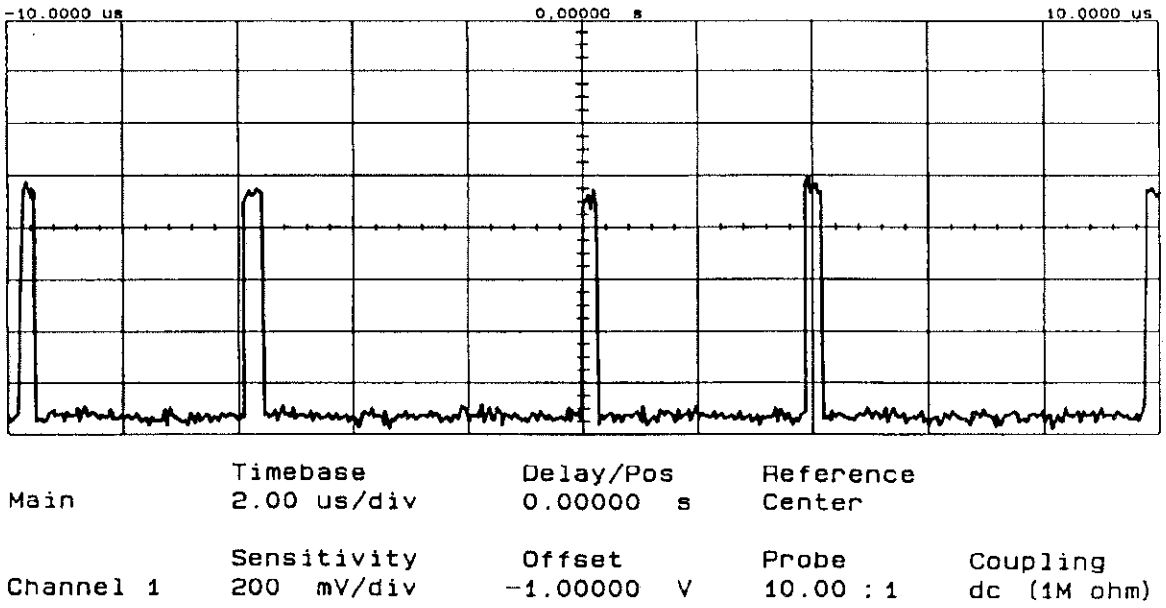

Figure 10-5. Waveform at A5U31(4)

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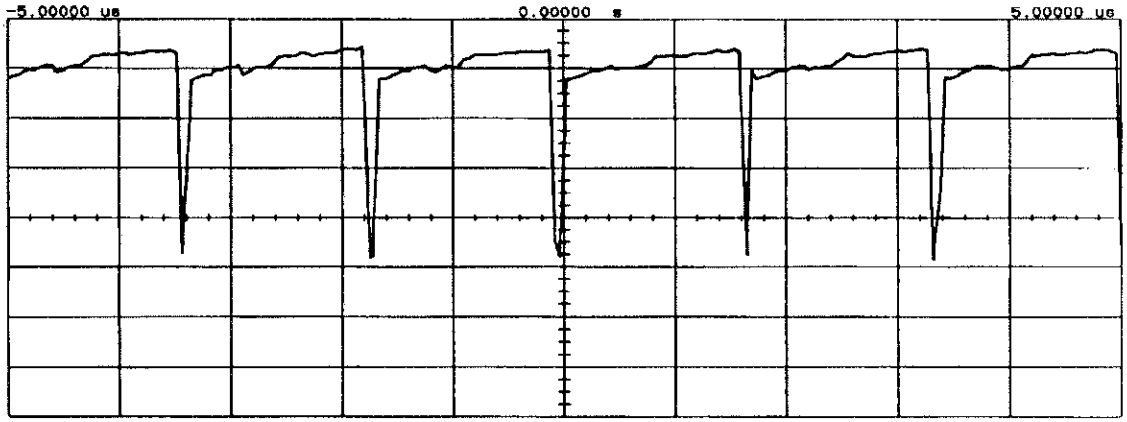
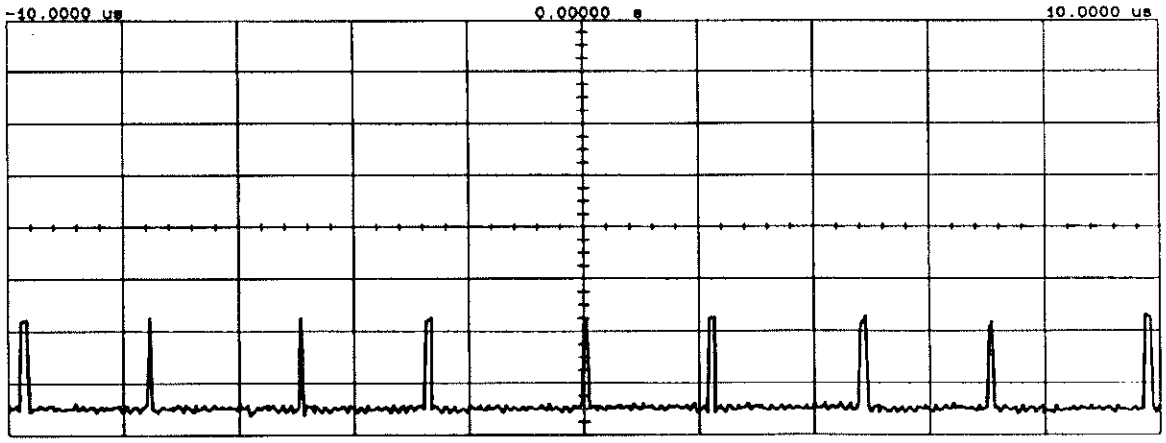


	Timebase	Delay/Pos	Reference	
Main	1.00 us/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	1.00 V/div	1.00000 V	10.00 : 1	dc (1M ohm)

Figure 10-6. Waveform at A5U30(7)



	Timebase	Delay/Pos	Reference	
Main	2.00 us/div	0.00000 s	Center	
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	500 mV/div	0.00000 V	10.00 : 1	dc (1M ohm)

Figure 10-7. Waveform at A5U30(3)

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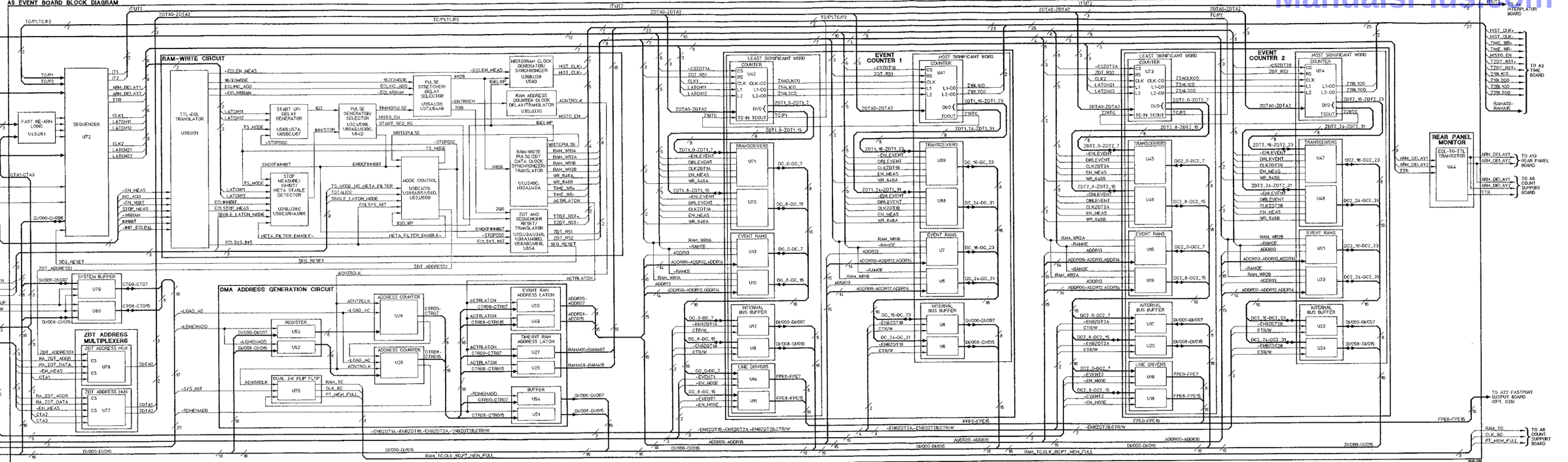

Figure 10-8. A5 Event Board Block Diagram

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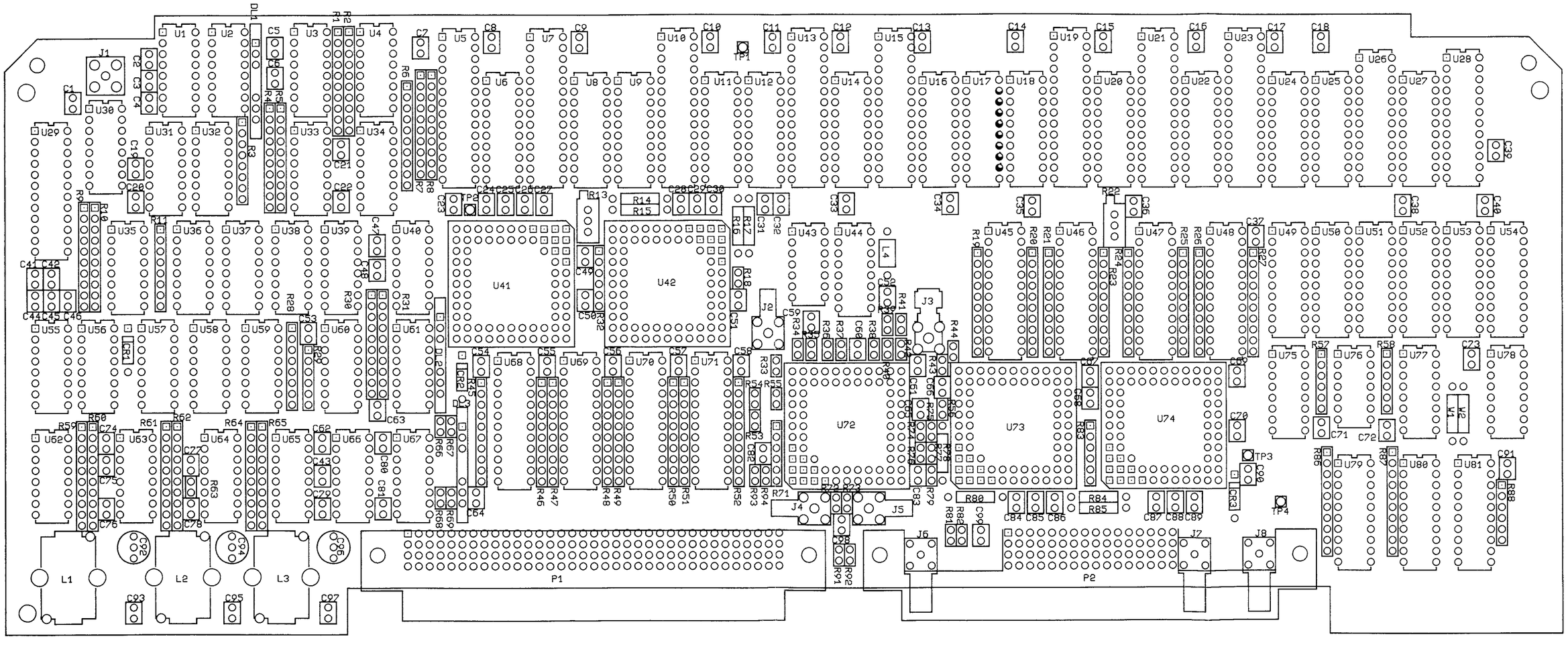

Figure 10-9. A5 Event Board, Component Locator

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A5 SCHEMATIC DIAGRAM NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD A5 ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN FARADS, INDUCTANCE IN HENRIES.
3. ASETERISK (*) INDICATES FACTORY SELECTED COMPONENT. AVERAGE VALUE SHOWN.
4. TILDE ("~") PRECEDING A SIGNAL INDICATES A NEGATIVE-TRUE SIGNAL.

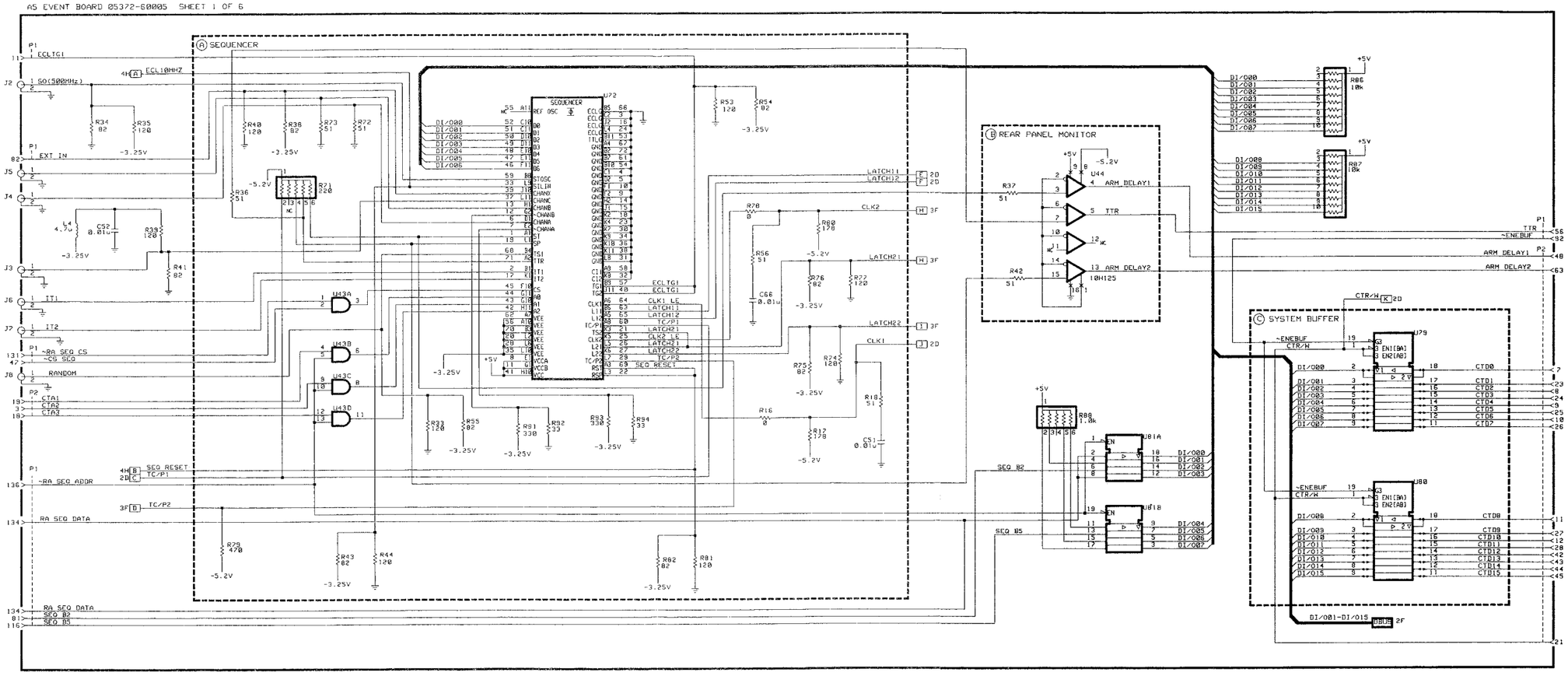

Figure 10-10. A5 Event Board, Schematic Diagram (Sheet 1 of 6)

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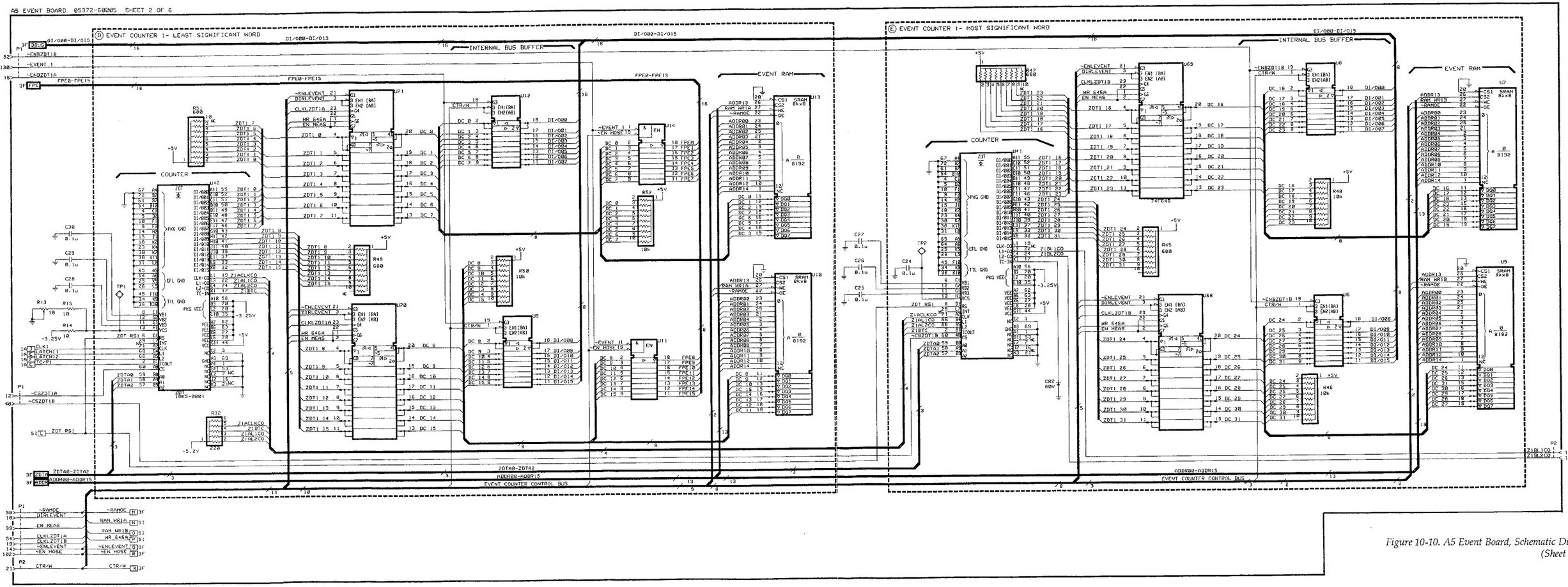

Figure 10-10. A5 Event Board, Schematic Diagram (Sheet 2 of 6)

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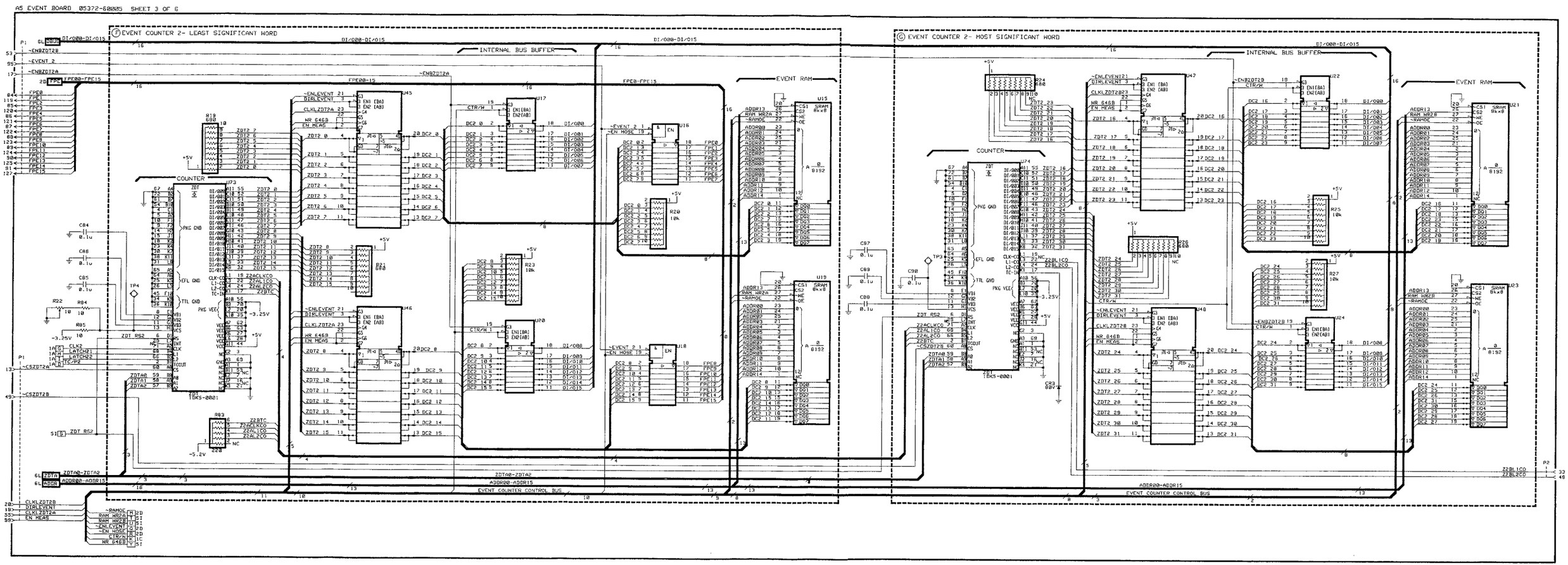

Figure 10-10. A5 Event Board, Schematic Diagram (Sheet 3 of 6)

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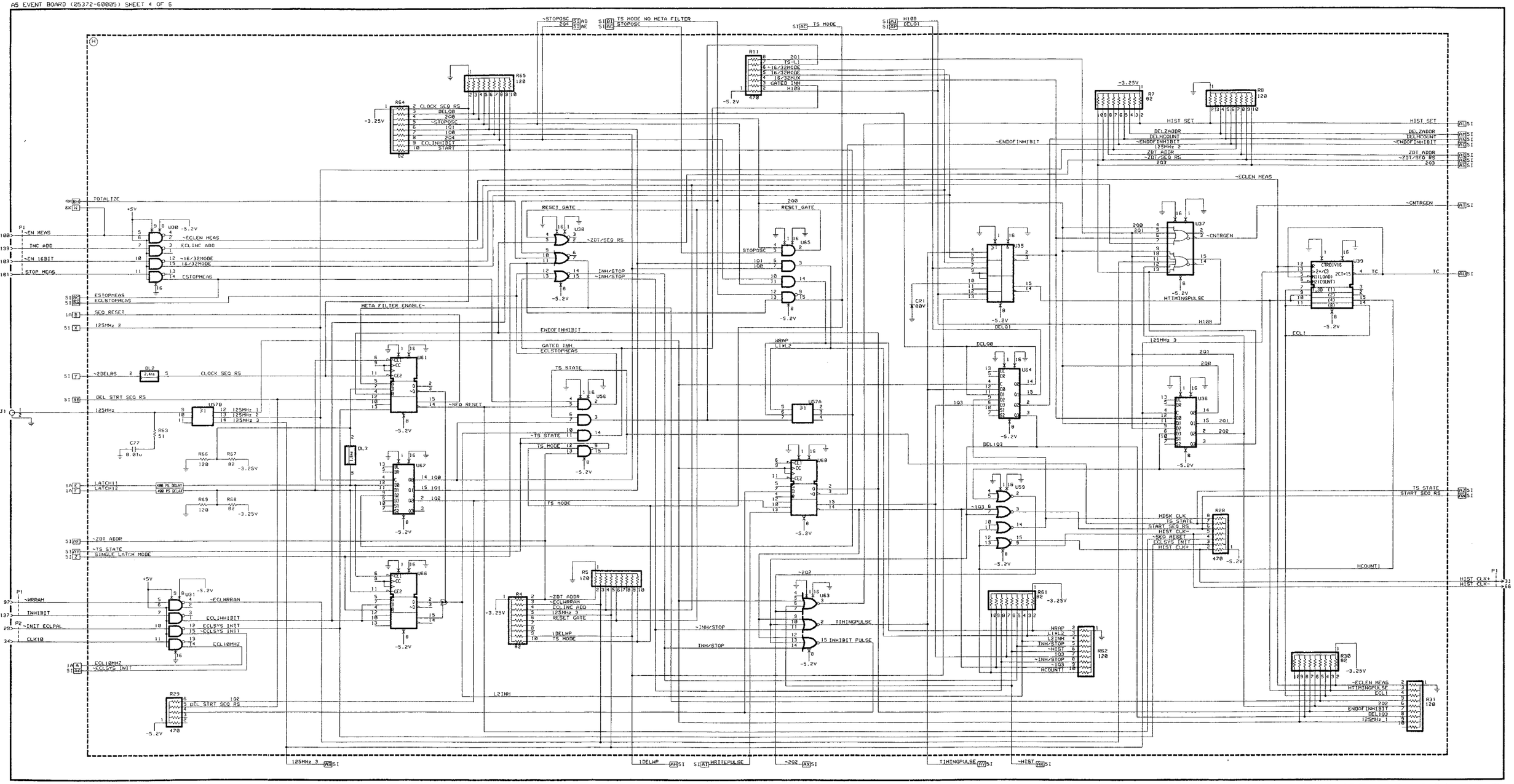

Figure 10-10. A5 Event Board, Schematic Diagram (Sheet 4 of 6)

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A5 EVENT BOARD (05372-60005) SHEET 5 OF 6

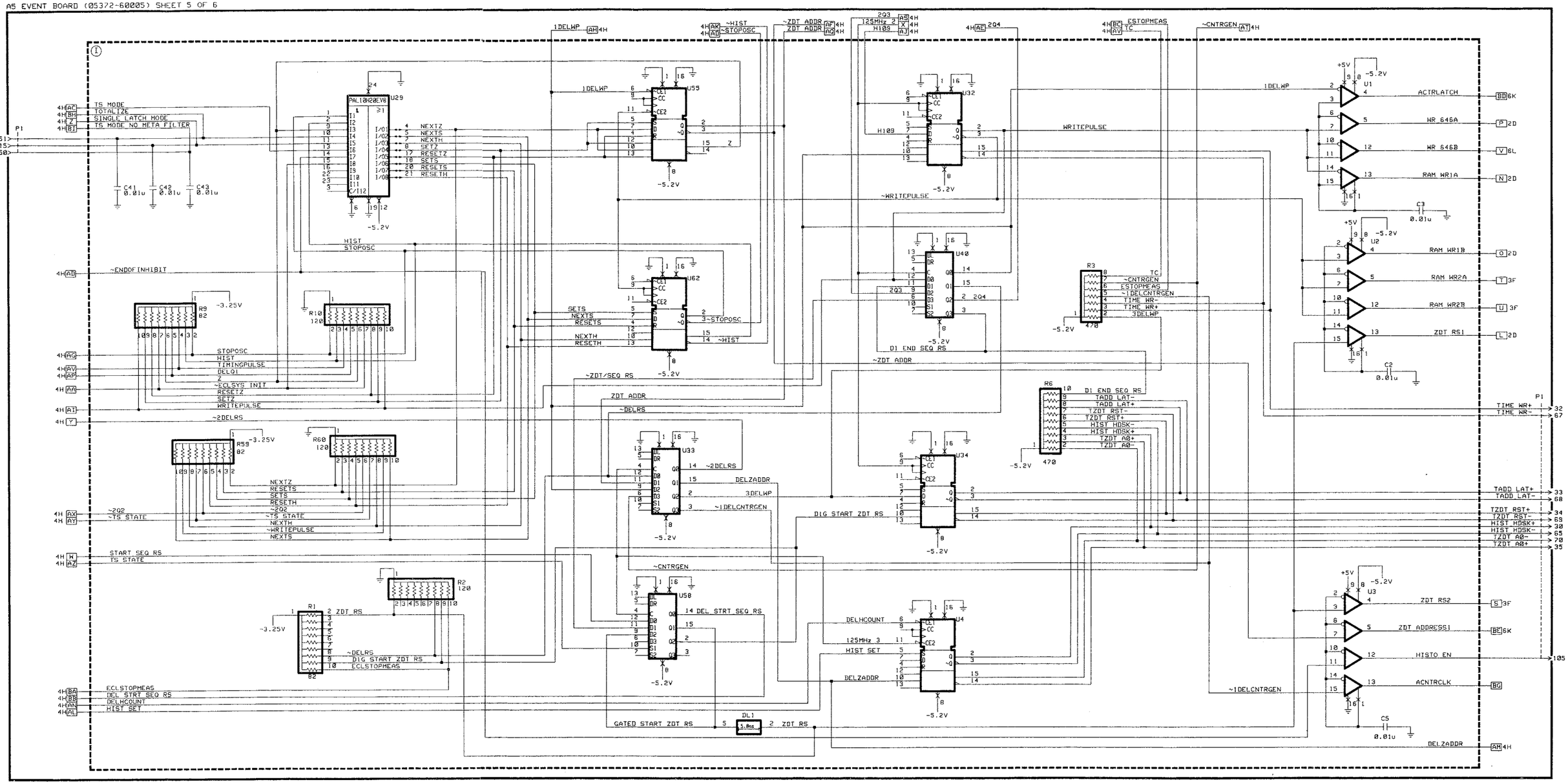

Figure 10-10. A5 Event Board, Schematic Diagram (Sheet 5 of 6)

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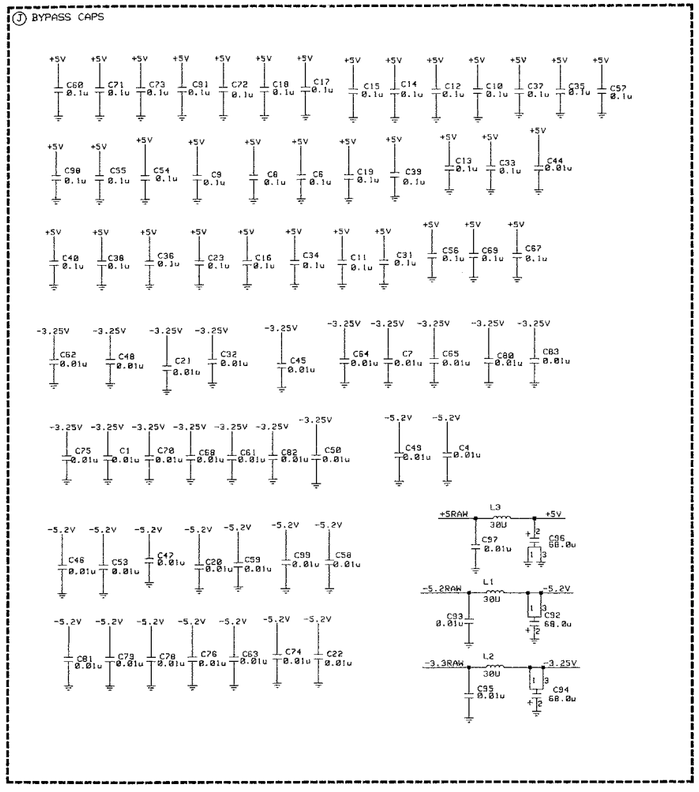

A5 EVENT BOARD (05372-60005) SHEET 6 OF 6

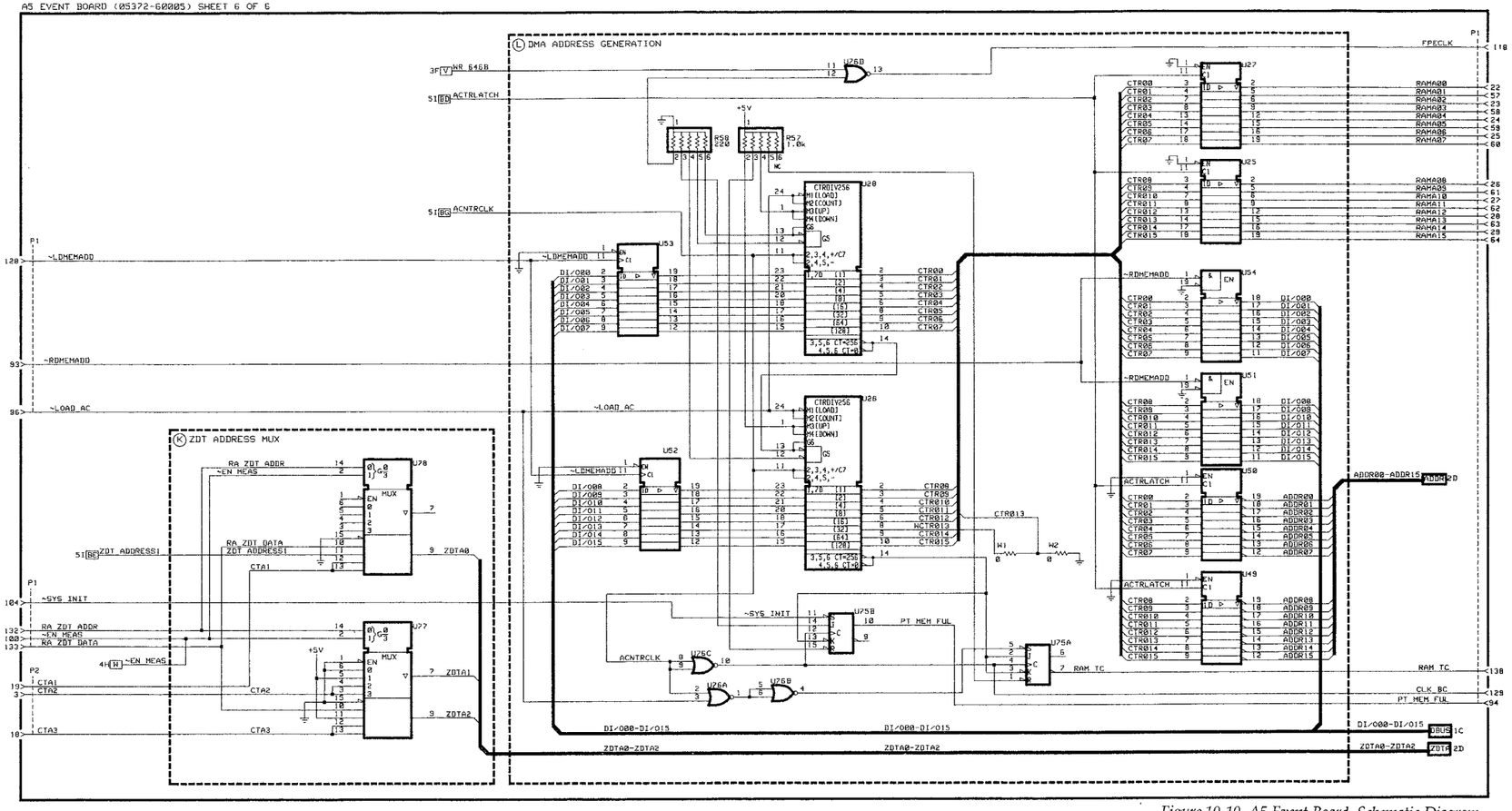

Figure 10-10. A5 Event Board, Schematic Diagram (Sheet 6 of 6)

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11

A12 MOTHERBOARD

11-1. INTRODUCTION

The A12 Motherboard provides power distribution, power-up control, rear-panel signal buffering, communication paths between the different assemblies (i.e., A1, A2, A4, A5 . . . etc.), power regulation for the internal reference oscillator's oven and crystal, fan control, power failure monitoring circuitry, and thermal overload control. See the "A12 Motherboard Block Diagram" in *Figure 11-1* for reference.

The communication paths are provided in the form of busses that allow the boards installed to interact. The busses consist of data lines, address lines, and several control lines. The A12 Motherboard provides power and signal flow paths (busses) for all printed circuit boards installed in the HP 5372A card cage. The major signals are the system data lines, measurement data lines, address lines, HP-IB lines, miscellaneous control lines, and all power distribution lines. The digital signals are divided into two different busses, the System Bus and the Count Hardware bus, to isolate the digital noise from the counting hardware. Data, address, and control lines are latched though buffers located on the A7 Processor Board. The Count hardware bus can be turned off when not in use.

The OFF signal has two states, depending on the front-panel ON-STBY switch (S1). When in the ON position, the OFF signal is grounded. On the A12 assembly, the OFF signal influences the Off Delay, Fan Control, and Power Fail Interrupt circuitry.

When the front-panel STBY-ON power switch is placed in the STBY position, the OFF signal line goes high (+25 Volts nominal unregulated, but can reach voltages up to +35 Volts nominal) and grounds the cathode side of the front-panel STANDBY LED (A11DS10). This lights the STANDBY LED. By placing the instrument in standby, you effectively remove all power except the power applied (signal LP) to back-up RAMs A7U20 and A7U56, located on the A7 Processor Board, and the A15 oscillator's internal oven. The "Power Fail Interrupt Control" circuit generates an interrupt signal called ~POWERFAIL that informs the A7 assembly's 68020 microprocessor that power has been removed. Upon switching the front-panel STBY-ON power switch to ON, the microprocessor resets this circuit via the ~RESET signal.

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11-2. Overvoltage Transorber

A12CR3, mounted on the A12 Motherboard, prevents the +5 Volts derived on the A10 Triple Regulator Board from rising to levels that could damage the components using this power source. A12CR3 clamps the +5-volt line to approximately 6 Volts. The extra current flow through CR3 will cause the line fuse F1 to open.

11-3. +5P Motherboard Power Supply

This "permanent" +5 Volt supply is used for the A12 Motherboard circuitry only. Regulator A12U2 drops +25V unregulated to a regulated +5 Volts (+5P).

11-4. Power-on Reset

This circuit ensures that the Regulator Control circuit is in the proper state following application of power to the HP 5372A. When the +5P power source reaches the required threshold, the circuit output sets the "Regulator Control" circuit.

11-5. +21V Oven Power Supply

The +21V Oven Regulator U11 regulates the +25V unregulated voltage down to approximately +21 Volts. +21 Volts is the voltage required to operate the internal oven of the A15 Oven Oscillator. This power supply is on as long as the HP 5372A is connected to AC power.

11-6. +12OSC Power Supply

When a rear-panel "External Input" frequency standard is not detected by the A1 Timebase Control assembly, the +15OSC line is enabled. This in turn provides the input voltage to regulator A12U6 on the A12 assembly. Regulator A12U6 output, +12OSC, supplies power to the internal 10 MHz A15 Oven Oscillator assembly.

11-7. Brownout Detector

The Brownout Detector circuit prevents the line fuse from blowing during brownout (reduced line voltages) by causing the instrument to shut down. Comparator A12U12B compares the reference voltage generated by 12 V zener diode A12CR12, to the voltage derived from the rectified 25 Vdc output of the transformer (T1). During normal operation, the rectified 25 Vdc output of the transformer causes input pin 5 of the comparator to be at a higher voltage than the reference voltage. This causes the output of the comparator to be high, which has no effect on other circuits. When the rectified voltage falls below approximately 20 V (as in a brownout condition), the comparator output will go low, which will then cause the "regulator control" circuit to initiate an instrument shutdown.

The comparator reference voltage of the Brownout Detector circuit is also in the Power-Fail Detect circuit and the Power-On Reset circuit.

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11-8. Fan Circuit Protection

The "fan protection" circuit provides protection to A12Q1, of the "fan control" circuit, whenever the fan stops during normal operation. This type of stop could occur if a pencil or other object was accidentially pushed into the fan. Whenever this type of stop occurs, the fan control circuit interprets this as a short circuit. If this happens, an overload of current flows through this transistor and causes it to fail. The "fan protection" circuit prevents the transistor from failing by causing the instrument to shut down.

The fan protection circuit consists of comparator A12U7C, and resistors R24, R25, R27, R36, and R37. R24 and R25 provide a reference voltage at pin 8 of A12U7C. R27 and R36 supply a voltage to pin 9 of A12U7C. R37 provides hysteresis by connecting the output of the comparator to the input pin 9. R27 is a special resistor that is attached to A12Q1 with a nut and bolt. The resistance of this resistor is temperature dependent; at normal operating temperature the resistance is approximately 50 Ohms, and at higher temperatures the resistance increases.

During normal operation, the low resistance of R27 provides a higher voltage at pin 9 of A12U7C than at pin 8. This caues the output of the comparator to be high, which has no effect on other circuits. When A12Q1 begins to increases in temperature, as when the fan stops during normal operation, R27 begins to increase in temperature and thus the resistance increases. This causes the voltage at pin 9 of the comparator to decrease. When the voltage at pin 8 is higher than at pin 9, the comparator output will go low. This causes the "regulator control" circuit to initate an instrument shut down.

11-9. Regulator Control

The Regulator Control circuitry determines whether the A10 Triple Regulator or the A9 Dual Regulator assembly are generating output voltages or not.

The HOT signal, which terminates in the A12 "Regulator Control" circuit (A12U8C pin 10), originates from excessive heat generated by pass transistor A9Q5 of the –3.3V power supply of the A9 Double Regulator Board. A thermal overload condition causes the HOT signal to set and latch the "Regulator Control" flip-flop. This circuit shuts down the A10 Triple Regulator and then the A9 Double Regulator assemblies.

When the front-panel STBY-ON power switch is set to ON (STBY LED OFF), the fan turns on. When the instrument is turned off (LED is off), the fan remains on. To turn the A10 and A9 regulators on after cool-down, the front-panel STBY-ON switch must be turned from ON-to-STBY-to ON. This process resets the "Regulator Control" circuit. This circuit requires user intervention following a thermal overload.

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11-10. Off Delay

When the front-panel STBY-ON power switch is set to STBY, the Regulator Control circuit sends a signal to the Off Delay circuit. The Off Delay circuit delays for a specific time (allows the microprocessor to perform power down checksums) and then outputs the SHUTDOWN signal. This SHUTDOWN signal is routed to the A10 Triple Regulator Board, where it shuts down the +5V, +15V, and –15V switching power supplies. The +5V and –15V supplies, in turn, shut down the –5.2 and –3.3 Volt output voltages of the A9 Double Regulator Board.

11-11. +12CRT Power Supply

This power supply provides the CRT Driver Board with +12 Volts. +15 Volts from the A10 assembly is regulated down to +12 Volts by regulator A12U13.

11-12. Power-Fail Detect

The "Power-Fail Detect" circuit monitors the unfiltered AC voltage, AC1 and AC2, from the secondary of center-tapped power transformer T1. Diodes A12CR4 and CR5 locally rectify AC1 and AC2. If the rectified voltage drops below a set threshold of approximately +12.5 Volts, op-amp A12U7D generates a pulse and sends it to the "Power-Fail Interrupt Control" circuit. This circuit responds by generating an interrupt and sending it on to the A7 Processor Board's 68020 microprocessor. The interrupt is generated fast enough so that the microprocessor can execute its power-down sequence prior to chassis-mounted, filter capacitor C1 (+25V unregulated) having a chance to discharge.

"LP" is the low power applied to the A7 back-up A7 RAMs A7U20 and A7U56 when the front-panel STBY-ON power switch is set to STBY. This supply saves battery A7BT1, mounted on the A7 Processor Board, for use when the HP 5372A is disconnected from AC power or when the A7 assembly is physically removed from the instrument's chassis. The local rectifier, A12CR4 and A12CR5, is the point of origin for the LP voltage.

11-13. Fan Control

The Fan Control circuit controls the speed of the DC fan (B1), by adjusting the fan voltage supply (VFAN), depending on the temperature of the instrument. Adjustable regulator A12U9 regulates the voltage to the DC fan by regulating the +15 V supply from 8 V to 13 V, depending on the temperature of thermistor A12U4. As the temperature increases, the resistance of the thermistor increases, which in turn allows the voltage across the thermistor to increase. Since this voltage is used as the control voltage for the regulator, as this voltage increases, the regulator output voltage increases, which in turn increases the speed of the fan. When the instrument is in the STBY mode, the +15 V supply is off. Thus, the fan automatically goes off in STBY.

11-14. Power-Fail Interrupt Control

During a temporary power loss, such as could occur when the STBY-ON power switch is turned ON-to-STBY-to-ON rapidly, the "Power Fail Interrupt Control" circuit generates and latches an interrupt signal (~POWERFAIL) and sends it to the microprocessor. The

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microprocessor goes through an internal power-down subroutine, senses that the power interruption was a temporary one, and initiates a power-up sequence, then resets the A12U10B and U10D flip-flop via the ~RESET signal.

11-15. Overvoltage Crowbar

The overvoltage crowbar circuit provides protection against accidentially connecting the instrument to 220 Volts, when it is set to 120 Volts, by causing the line fuse to blow. This circuit consists of a triac (A12CR2), 6 power dissipating resistors (A12R1 through A12R7), and a trigger zener diode (A12CR1). When the rectified DC output voltage of transformer B1 increases above approximately 40 V, the zener diode triggers the triac. This causes the triac to send enough current to blow the line fuse. The power dissipating resistors are used to insure the triac does not fail when triggered. Resistor A12R4 limits the current into the gate of the triac, while capacitor A12C4 prevents noise from accidentially triggering the circuit.

11-16. Rear Panel Output Buffers

The Rear Panel Output Buffers, A12U5ABCEF, provide signals [falling-edge active, TTL levels into ≥10KΩ or 0V-to-1V (minimum) into 50Ω] to the instrument's rear panel OUTPUTS BNC connectors via coaxial W3 and the A13 Rear Panel Board. GATE 1 (Start) and GATE 2 (Stop) outputs are buffered by A12U5BC and provide an indication of when measurement samples occur. Both signals are essentially buffered versions of the IT1 (Start) and IT2 (Stop) interpolator trigger signals generated by the A5 Event Board. The ARM DELAY 1 and ARM DELAY 2 outputs are buffered by A12U5EF and indicate when time or event conditions have been satisfied. The ARM DELAY signals are buffered versions of the TC1/P1 and TC/P2 signals generated by the A5 ZDT counter ICs.

11-17. Option Switch Circuit

Option Switch A12S1 is preset at the factory to correspond to any options provided with the HP 5372A. Currently, five settings are possible: 1) all switches closed (in their left-most position) for a standard unit (no options), 2) switch 6 (sixth from front of instrument) open for option 020 (Rear-panel Fastport Output), 3) switch 5 open for option 030 (Channel C), 4) switch 2 open for Option 060 (Rear-panel inputs), and 5) switches 2 and 5 open for Option 090 (Rear-panel inputs including Channel C).

A12S1 determines the bit configuration read by the A7 microprocessor, via Count Hardware Data Bus (CTD0-CTD6), when the HP 5372A is first powered on. Line driver A12U1 places the bit configuration on the Count Hardware Bus when signal CTCS7 (from demultiplexer A7U41) switches low. Signal ~CTDTK is also simultaneously sent to PAL IC A1U21, where it is decoded and controls the reading of POD I.D. information by the A7 68020 microprocessor.

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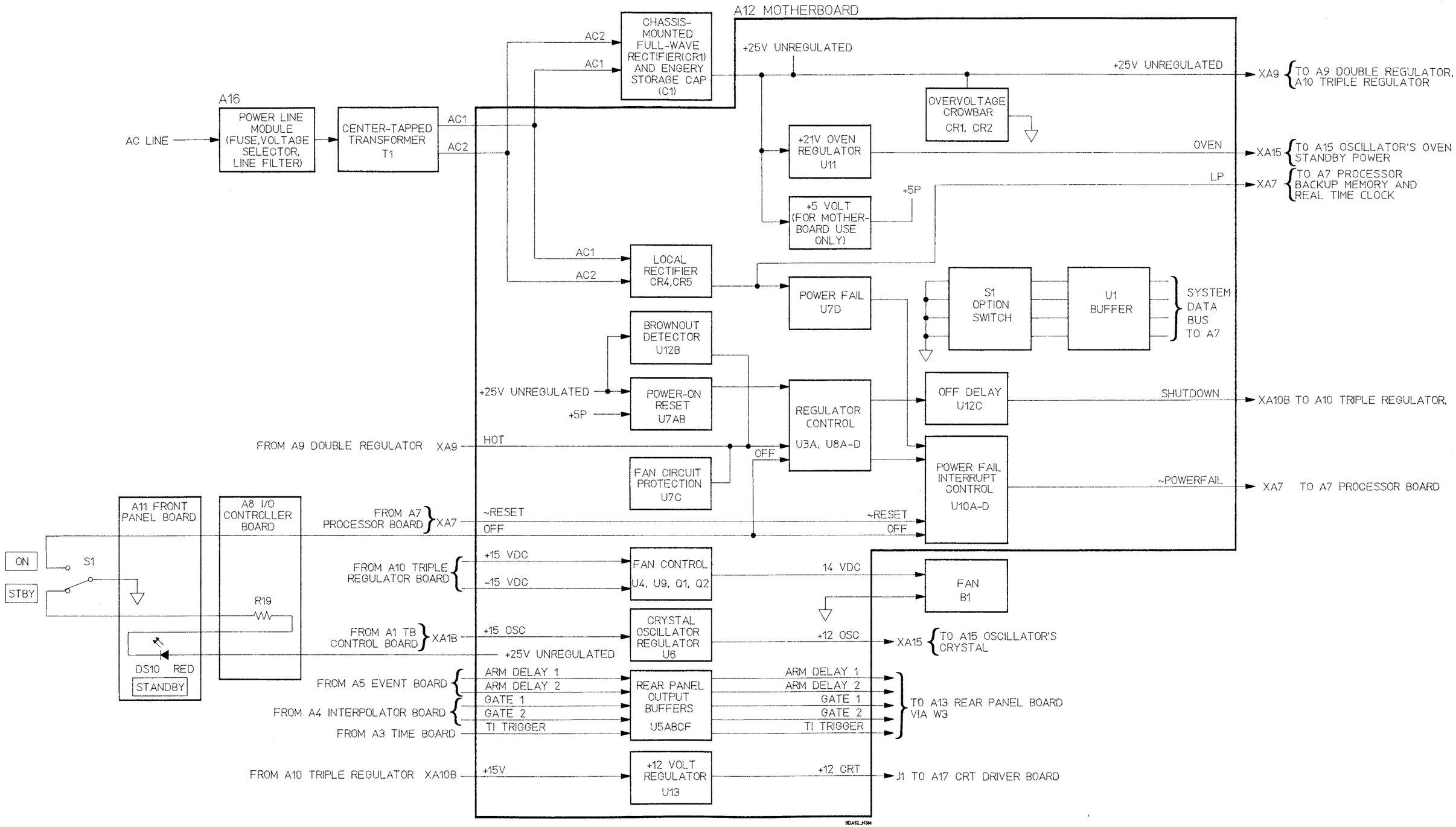

Figure 11-1. A12 Motherboard Block Diagram

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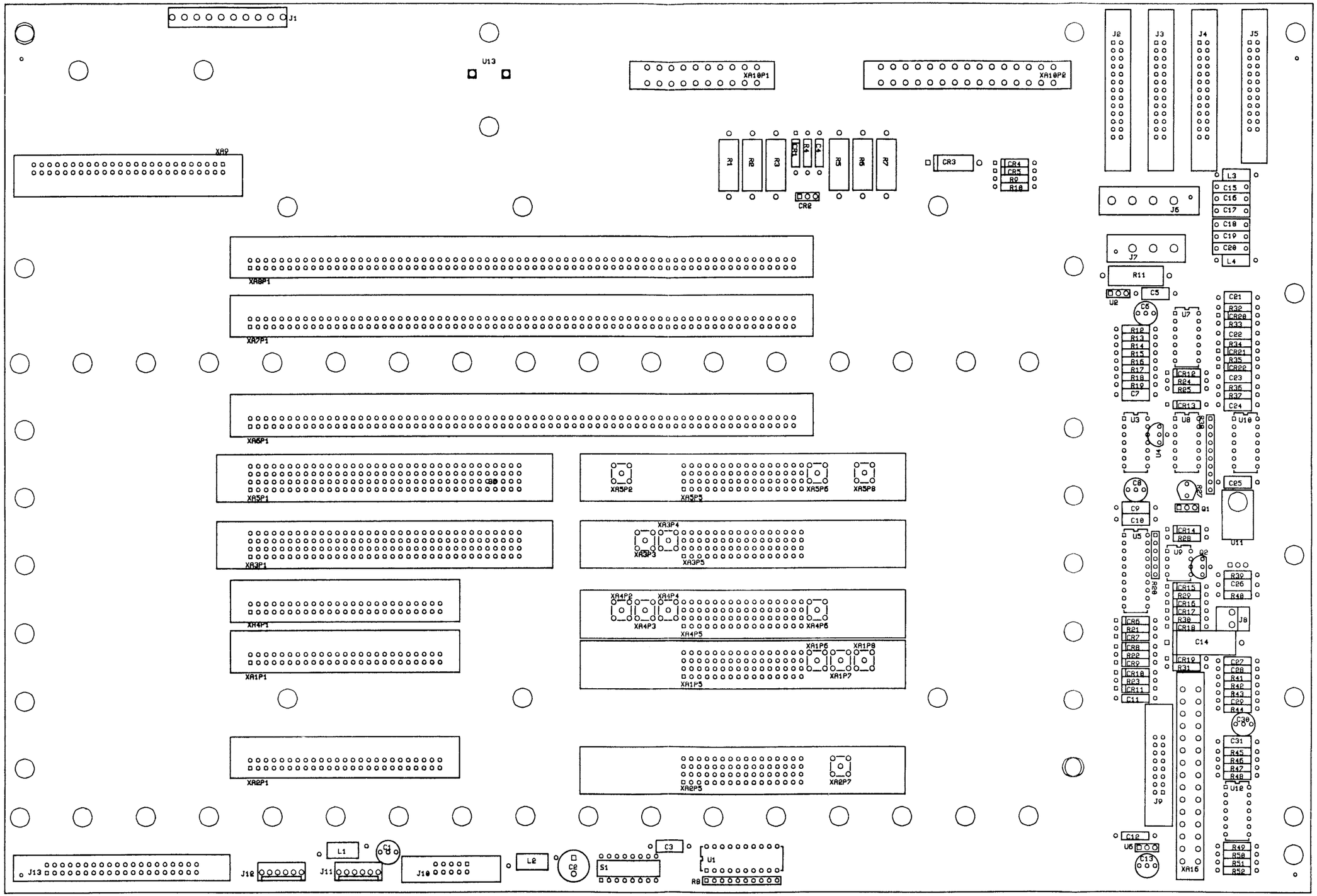

Figure 11-2. A12 Motherboard, Component Locator

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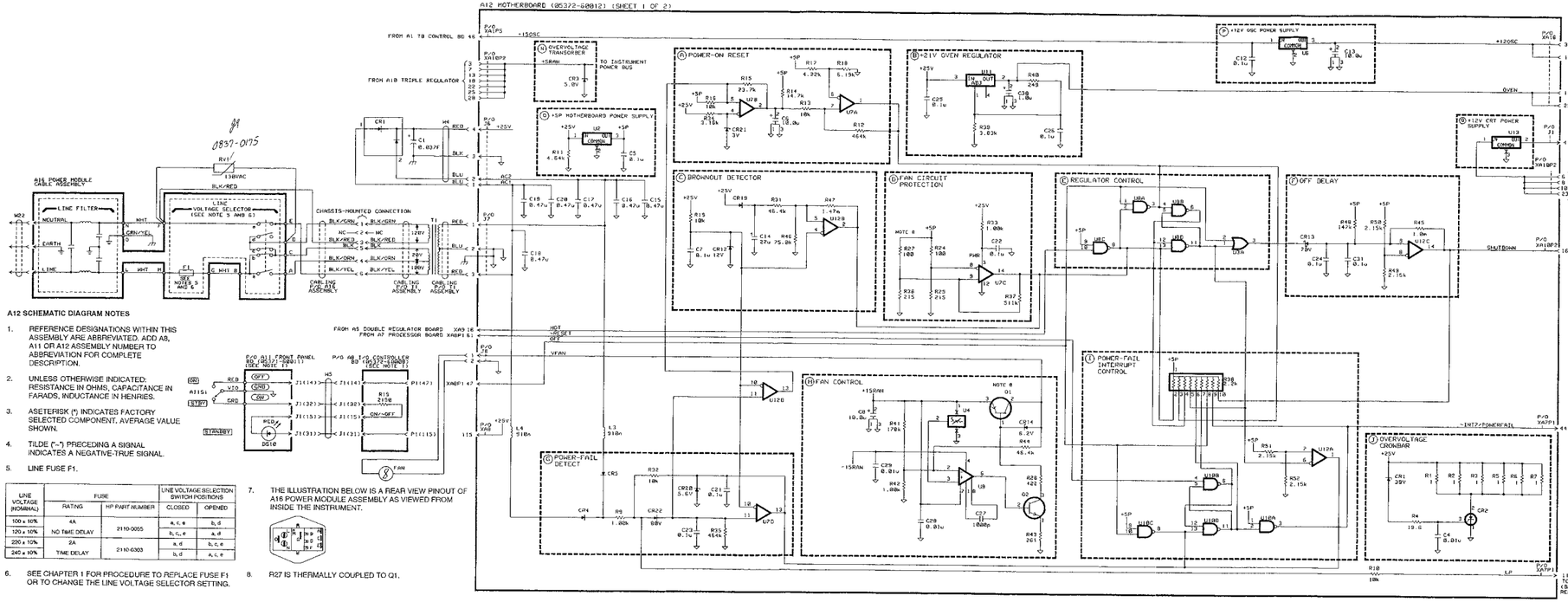

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD A8, A11 OR A12 ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN FARADS, INDUCTANCE IN HENRIES.
3. ASTERISK (*) INDICATES FACTORY SELECTED COMPONENT. AVERAGE VALUE SHOWN.
4. TILDE (~) PRECEDING A SIGNAL INDICATES A NEGATIVE-TRUE SIGNAL.
5. LINE FUSE F1.

LINE VOLTAGE (NOMINAL)	FUSE RATING	FUSE HP PART NUMBER	LINE VOLTAGE SELECTION SWITCH POSITIONS CLOSED	SWITCH POSITIONS OPENED
100 ± 10%	4A	2110-0055	a, c, e	b, d
120 ± 10%	NO TIME DELAY		b, c, e	a, d
220 ± 10%	2A	2110-0303	a, d	b, c, e
240 ± 10%	TIME DELAY		b, d	a, c, e

6. SEE CHAPTER 1 FOR PROCEDURE TO REPLACE FUSE F1 OR TO CHANGE THE LINE VOLTAGE SELECTOR SETTING.
7. THE ILLUSTRATION BELOW IS A REAR VIEW PINOUT OF A16 POWER MODULE ASSEMBLY AS VIEWED FROM INSIDE THE INSTRUMENT.

8. R27 IS THERMALLY COUPLED TO Q1.

Figure 11-3. A12 Motherboard, Schematic Diagram

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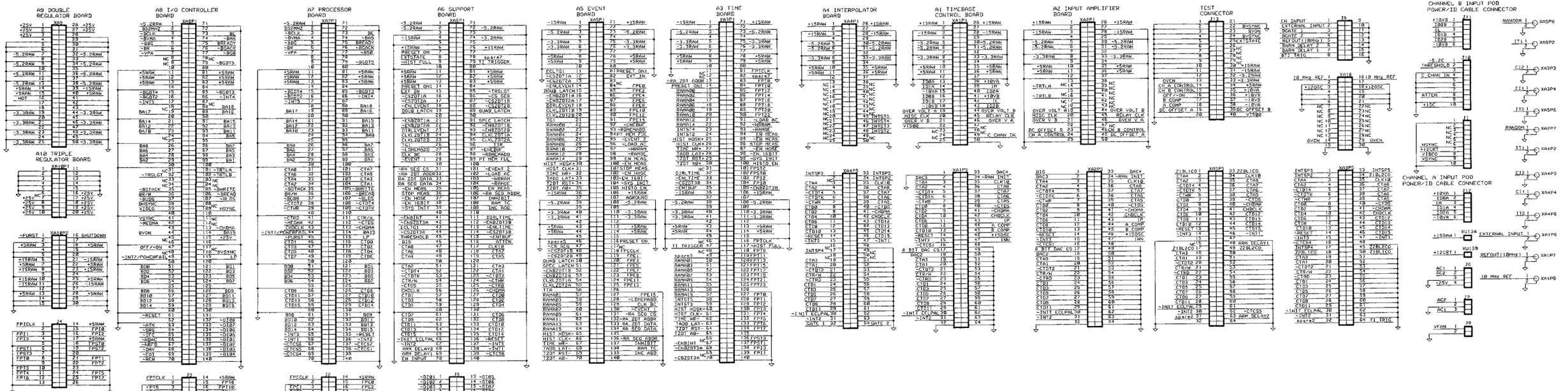

Figure 11-4. A12 Motherboard, Interconnection Diagram

12 A20 C-CHANNEL

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12

A20 C-CHANNEL

12-1. INTRODUCTION

The optional A20 C-Channel Board contains an AC coupled 100 MHz to 2 GHz amplifier followed by a divide-by-four prescaler. The A20 assembly accepts input signals from either the front panel (option 030) or rear panel (option 090) Type-N connector. The input impedance for both options is 50 Ohms. The input signal is conditioned, translated to EECL logic level square waves, prescaled by four, and then routed directly to the A5 Sequencer IC. Since the HP 5372A count hardware operates at 500 MHz, the Channel C input can be used with frequencies up to 2 GHz.

The A20 assembly consists of four major circuits: 1) an externally controlled attenuator, 2) four amplifier stages, 3) voltage limiter circuits, and 4) a divide-by-four prescaler. See "A20 C-Channel Board Block Diagram" in *Figure 12-2* for reference.

12-2. Attenuator

The A20 C-Channel Board attenuator is a constant 50 Ohm impedance input, which accepts the Channel C signal from either the front or rear panel Type-N input connector (via connector A20J1). The attenuator decreases the voltage amplitude of the signal depending on the bias voltages applied to it. One bias voltage, applied to pin 2, is constant at 10 V. This sets the attenuation with a correct VSWR over the entire attenuation range. The other bias voltage, applied to pin 1, is set anywhere from 2 V to 14 V. This bias voltage controls the level of attenuation.

The bias voltage applied to pin 1 is generated by the C Channel DACs, located on the A6 Count Support Board. The DACs are programmed by the microprocessor whenever the attenuation is changed by the user. The user can select Channel C attenuation values from 0% to 100%, in 25% increments (via the Input key). A 0% attenuation corresponds to a 14 V signal applied to pin 1, and a 100% attenuation corresponds to a 2 V signal. Inductors L1 and L8, and capacitors C1 and C20 act as a filter for this bias voltage. The 2 V to 14 V range corresponds to an attenuation range of 30 dB from 100 MHz to 1.5 GHz, and 25 dB from 1.5 GHz to 2.0 GHz.

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12-3. Amplifiers

The A20 assembly contains four stages of amplifiers, each increasing the amplitude of the Channel C signal by approximately 7 dB. The amplifiers increase the signal depending on the bias voltage applied to pin 3. For the first amplifer (A20U2), inductors L2 and L9, and resistor R2 supply the correct bias voltage of approximately 5.0 V. L9 also acts as a high-frequency decoupling bias inductor, while C3 is a bypass capicator for the bias circuit.

The input signal to the first amplifer comes directly from the output of the attenuator. This amplifer increases the signal by at least 6 dB, and then outputs the signal at pin 3. Capacitors C13 and C14, between the first two amplifier stages, act as DC coupling capicators and center the amplified signal at 1.7 V. The signal then enters the next amplifier stage and the process of amplification is repeated.

The Channel C signal is amplified by four identical amplifer stages, with the ouput of the last stage sent to the divide-by-four prescaler IC (A20U6).

12-4. Limiters

Diode Limiters D1, D2, and D3 act as voltage limiters. These limit the amplitude of the signal to approximately 10 dBm. This limit does depend somewhat on the input frequency; at higher frequencies the limiting action is less. The A20 assemly contains three voltage limiter circuits; after the second, third, and fourth amplifier stages.

12-5. Divide-By-Four Prescaler

The divide-by-four prescaler IC (A20U6) receives the output signal from the last amplifer. The signal is prescaled by 4, translated to EECL logic level square waves, and then sent to the A5 Sequencer IC. The prescaler IC generates the bias voltage internally. This voltage, located at pin 1 of A20U6, ranges from –1.2 V to –1.4 V. This bias voltage controls the trigger level of the prescaler. Inductor L7 acts as a filter component, while capacitors C11, C12, and C22 act as bypass capacitors.

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12-6. A20 C-CHANNEL BOARD TROUBLESHOOTING

12-7. Test Equipment Required

- HP 8663A Synthesized Signal Generator
- HP 3458A Digital Multimeter
- HP 8566B Spectrum Analyzer
- HP 54503A Digitizing Oscilloscope
- HP 10020-67703 500 Ohm 10:1 Divider Probe
- HP 05371-60229 BNC(m)-to-SMA(f) Cable Assembly
- HP 1250-1696 BNC(f)-to-SMA(f) Adapter

12-8. A20 Troubleshooting Approach

The overall functionality of the A20 assembly is checked by applying a 100 MHz, –10 dBm signal to the Channel C input, and verifying that the A20 assembly output, A20J2(1), is approximately 25 MHz, ≥600 mV (see *Figure 12-1*). The procedure to verify correct operation of the A20 assembly is as follows:

A. Disconnect the C-Channel cable end from the card cage (viewed from the front, with the top cover removed, this point is just to the right of the A5 assembly; approximately four inches directly behind the "5" on the DATA ENTRY keypad).

B. Set the oscilloscope to 50Ω termination and 1:1 probe attenuation.

C. Connect a BNC cable to the oscilloscope.

D. Connect a BNC(f)-to-SMA(f) adapter (HP P/N 1250-1696) to the BNC cable.

E. Connect the SMA end of the BNC-to-SMA adapter to the C-Channel cable.

F. Using an HP 8663A, apply a 100 MHz, –10 dBm signal to the C-Channel input.

G. Verify the signal is approximately 25 MHz, ≥600 mVp-p.

The A20 assembly consists of four major circuits: 1) an externally controlled attenuator, 2) four amplifier stages, 3) voltage limiter circuits, and 4) a divide-by-four prescaler. The functionality of each circuit is verified separately.

NOTE

The A20 Troubleshooting Procedure MUST be performed in the order presented.

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12-9. A20 Troubleshooting Preparation

A. Set the HP 5372A STBY-ON power switch to STBY, and disconnect the power cord from the primary power source.

B. Remove the instrument top cover.

C. Remove the right side cover (as viewed from the front of the instrument).

D. Remove the semi-rigid cable between the front panel C-Channel input and the C-Channel connector, A20J1.

E. Remove the C-Channel N(f)-to-SMA(m) adapter, located on the front panel.

F. Remove the screws holding the A20 assembly to the chassis.

NOTE

Do not remove the ribbon cable between the A20 assembly and the A12 Motherboard.

G. Position the A20 assembly so that the circuit side of the C-Channel board is facing up.

H. Reconnect the semi-rigid cable and N-to-SMA adapter to the C-Channel connector, A20J1.

12-10. A20 Troubleshooting Procedure

NOTE

When installing any new component on the A20 C-Channel Board, ALWAYS use SN-65 silver bearing solder. This solder must be used to ensure a lasting connection.

NOTE

Hewlett-Packard recommends the use of a X50 magnification microscope to verify soldered connections.

12-11. ATTENUATOR

A. Press the HP 5372A Input key.

B. Move the cursor to the Channel C Attenuation field.

C. Press the **0% softkey.**

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D. Using an HP 3458A, verify the voltage at A20U1(1) is approximately 14.0 V. If the voltage is not correct, then verify the voltage at A20J3(8) is approximately 14 V. If this voltage is not correct, then replace the A6 Count Support Board.

E. Press the **100% softkey.**

F. Verify the voltage at A20U1(1) is approximately 2.0 V. If the voltage is not correct, then verify the voltage at A20J3(8) is approximately 2 V. If this voltage is not correct, then replace the A6 Count Support Board.

G. Verfiy the voltage at A20U1(2) is between 9.4 V and 10.6 V. If the voltage is not correct, then verify the voltage at A20J3(10) is approximately 15 V. If this voltage is not correct, then trace the signal to the A10 Triple Regulator Board.

H. Verify the voltage between the metal case of A20U1 and the ground plane (point where underside of A20U1 connects to the A20 assembly) is approximately 0 V. If the voltage is not correct, then remove the IC and reinstall.

NOTE

When reinstalling A20U1 or installing a new A20U1 IC, connect the IC with the screws and nuts before soldering. This will ensure a good ground contact between the metal case and ground plane.

I. Setup the HP 8566B Spectrum Analyzer for a Center Frequency of 100 MHz and a Frequency Span of 1 MHz.

J. Connect the BNC-to-SMA cable assembly (HP P/N 05371-60229) to the capacitive coupled input of the HP 8566B.

K. Connect the 500 Ohm 10:1 Divider Probe to the SMA end of the cable.

NOTE

It is necessary to install a probe ground lead between the 500 Ω 10:1 divider probe and the BNC-to-SMA cable assembly. When probing, connect this ground lead to the ground point closest to the test point.

L. Using an HP 8663A, apply a 100 MHz, –10 dBm signal to the Channel C input.

M. Connect the 500 Ohm 10:1 Divider Probe to A20U1(4) (pin 4 of A20U1 is the input of the attenuator).

NOTE

The Channel C attenuation should be set to 100%.

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N. Press the HP 8566B Reference Line Display Line Enter key to activate the marker and use the RPG Knob to determine the maximum amplitude of the center frequency. Record this value, and use it as the reference value.

O. Disconnect the probe from A20U1(4), and connect it to A20U1(3) (pin 3 of A20U1 is the output of the attenuator). Verify the difference between the reference level and pin 3 is ≥30 dBm. If the attenuation is less then 30 dBm, then verify the voltage at A20U1(2) is approximately 10 V. If the voltage is not correct, then proceed to step G of this procedure. If the voltage is correct, then replace A20U1.

P. Press the **0% softkey.**

Q. Verify the difference between the reference level and pin 3 is less than 4 dBm. If the difference is greater than 4 dBm, then verify the voltage at A20U1(2) is approximately 10 V. If the voltage is not correct, then proceed to step G of this procedure. If the voltage is correct, then replace A20U1.

12-12. AMPLIFIERS

A. Using an HP 8663A, apply a 100 MHz, –10 dBm signal to the Channel C input.

B. Using an HP 3458A, verify the voltages at pin 3 of A20U2, A20U3, A20U4, and A20U5 are between 4.8 V and 5.2 V. If the voltage is not correct at any of the above ICs, then trace signal from A20J3(10) to the appropriate IC (pin 10 of A20J3 is located at the top left edge of the connector when the circuit side of the board is facing up). Check for open inductors or incorrect resistance values. If the inductors and resistors are correct, then verify the voltage at pin 1 of the appropriate IC is between 1.68 V to 1.78 V. If this voltage is not correct, then trace the signal back through the coupling capacitors and the limiter circuit.

C. Setup the HP 8566B Spectrum Analyzer as follows:

Frequency Band	0-2.5 GHz
Center Frequency	100 MHz
Frequency Span	1 MHz
Reference Level	0 dBm
Atten	10 dBm
Amplitude Scale	5 dBm/Div

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D. Perform the following sequence on each of the four amplifier ICs (A20U2, A20U3, A20U4, and A20U5):

1. Using the 500 Ohm 10:1 Divider Probe, connect the probe to pin 3.

2. Adjust the voltage level output of the HP 8663A until the peak amplitude displayed on the HP 8566B CRT is –24 dBm.

3. Disconnect the probe from pin 3, and connect it to pin 1. The difference between the pin 3 and pin 1 should be ≥ 6 dBm. If the difference is not correct, then replace the faulty IC.

12-13. LIMITERS

A. Using an HP 8663A, apply a 100 MHz, –10 dBm signal to the Channel C input.

B. Perform the following sequence on each of the three limiter circuits (A20D1, A20D2, and A20D3):

1. Using the 500 Ohm 10:1 Divider Probe, connect the probe to pin 2 (connect the ground lead of the probe to pin 1 or pin 3).

2. Adjust the voltage level output of the HP 8663A until the peak amplitude displayed on the HP 8566B CRT is –24 dBm.

3. Press the HP 8566B Reference Line Display Line Enter key to activate the marker and use the RPG Knob to determine the maximum amplitude of the center frequency. Record this value, and use it as the reference value for step 5.

4. Increase the voltage output of the HP 8663A by +10 dBm.

5. Use the HP 8566B Marker to determine the maximum amplitude of the center frequency. The CRT should display an increase of approximately 7.5 dBm. If the increase is correct, then record the marker value and use this and the reference for step 7. If the increase is 9 dBm greater, then replace the faulty limiter.

6. Increase the voltage output of the HP 8663A by +10 dBm.

7. Use the HP 8566B Marker to determine the maximum amplitude of the center frequency. The CRT should display an increase of approximately 5 dBm. If the increase is 8 dBm or greater, then replace the faulty limiter.

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12-14. DIVIDE-BY-FOUR PRESCALER

A. Using an HP 3458A, verify the voltages at A20U6(1) and A20U6(11) are both between –1.2 V and –1.4 V. If either of the voltages are not correct, then replace A20U6.

B. Using an HP 8663A, apply a 100 MHz, –20 dBm signal to the Channel C input.

C. Verify the voltage at A20U6(8) is approximately –5.2 V. If the voltage is not correct, then verify the voltage at the –5.2 V test point on the A9 assembly is correct. If this voltage is not correct, then proceed to the A9 Double and A10 Triple Regulator Adjustments, located in chapter 3.

D. Perform Steps A through G of the A20 Troubleshooting Approach to verify the signal at A20J2(1) is approximately 25 MHz, ≥ 600 mV (see *Figure 12-1*). If the signal does not have the correct frequency or is less than 600 mVp-p, then replace A20U6.

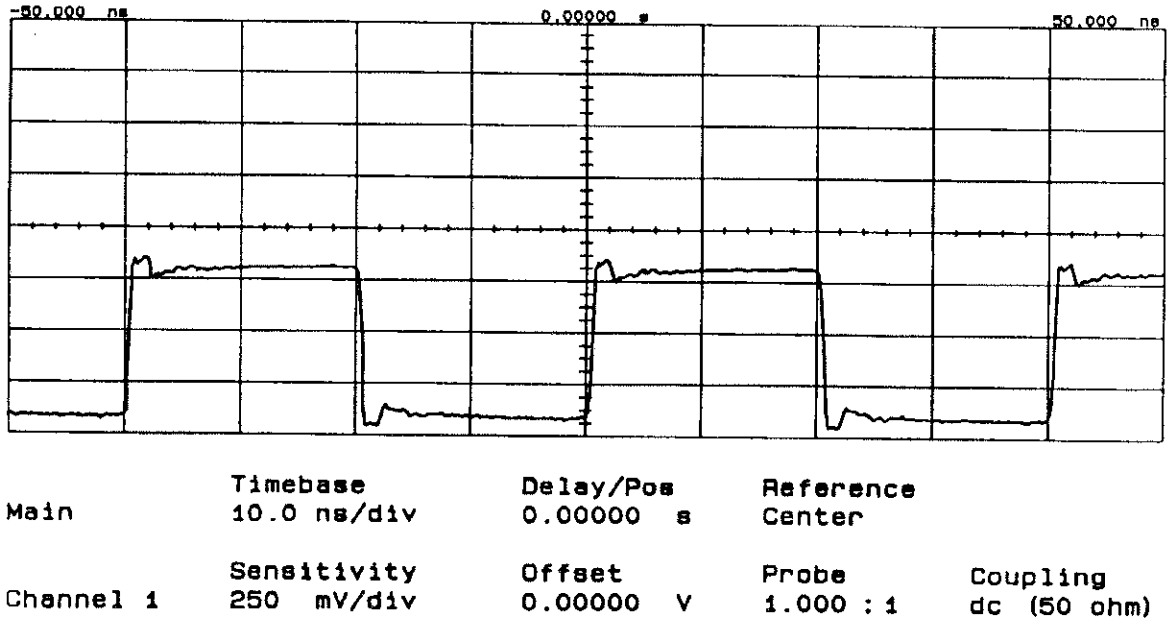

Figure 12-1. Waveform at A20J2(1)

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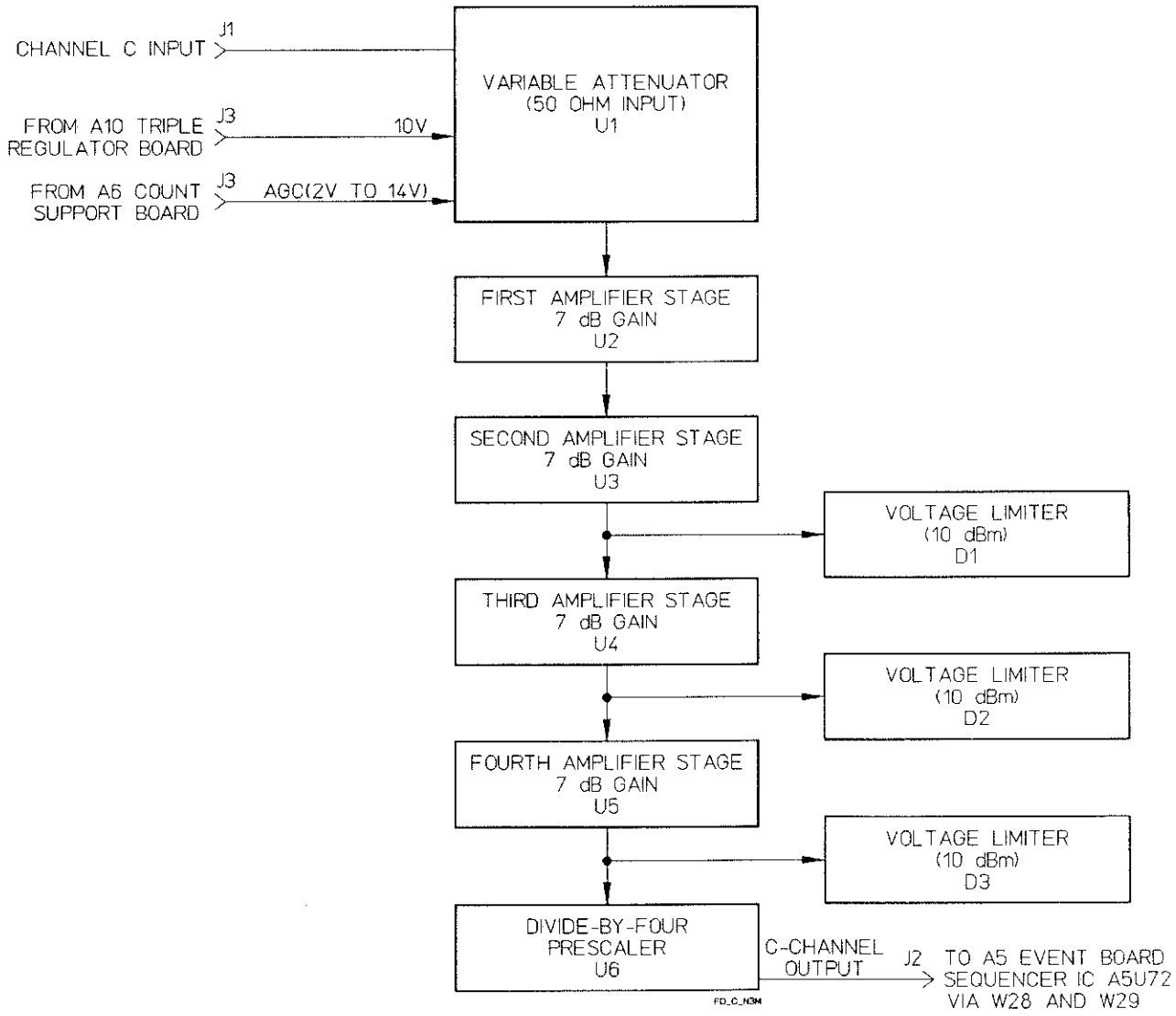

Figure 12-2. A20 C-Channel Board Block Diagram

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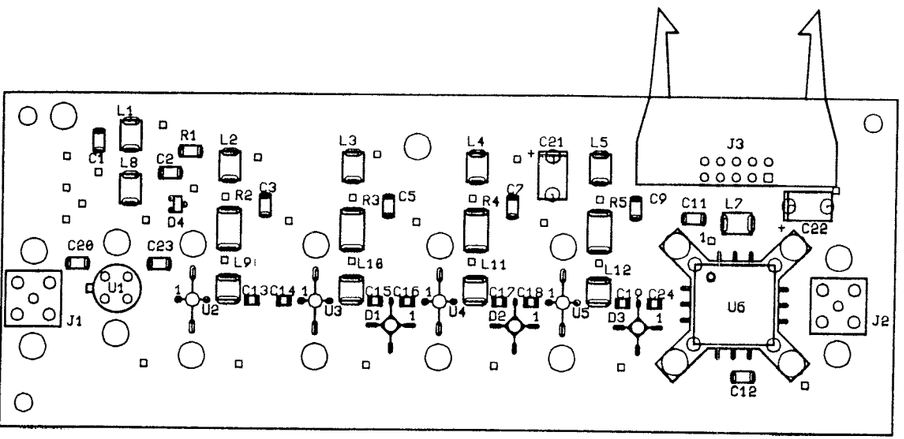
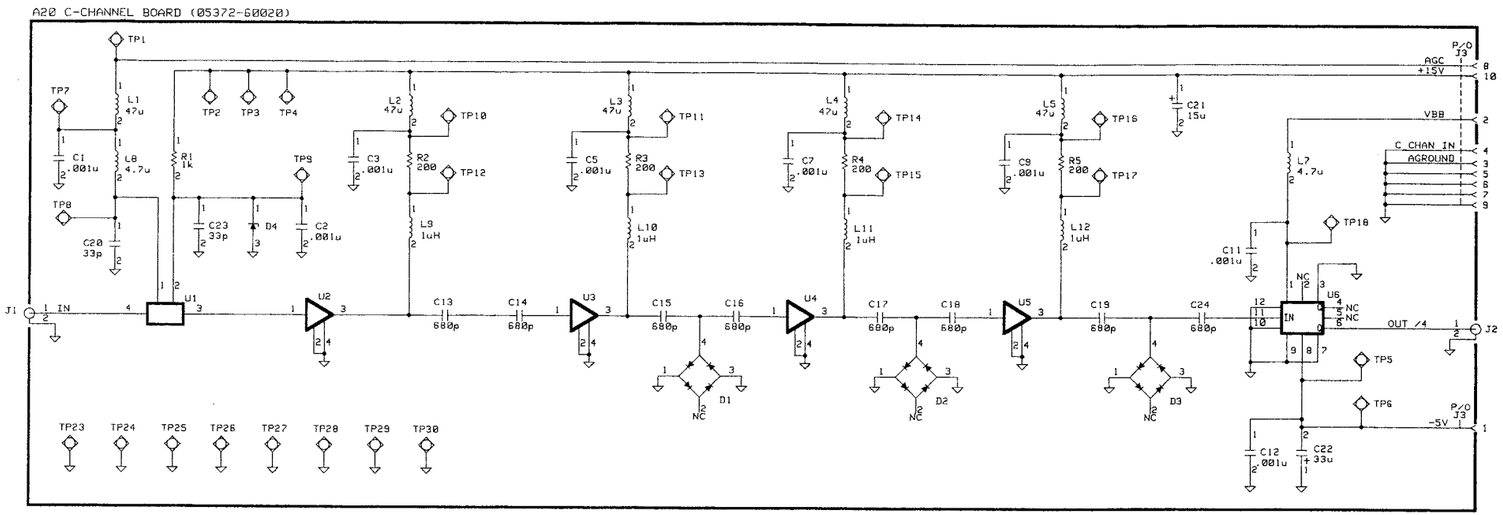


Figure 12-3. A20 C-Channel Board, Component Locator



A20 SCHEMATIC DIAGRAM NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD A20 ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN FARADS, INDUCTANCE IN HENRIES.
3. ASETERISK (*) INDICATES FACTORY SELECTED COMPONENT. AVERAGE VALUE SHOWN.
4. TILDE ("~") PRECEDING A SIGNAL INDICATES A NEGATIVE-TRUE SIGNAL.

NOTE: TEST POINTS ARE FOR TESTING PURPOSES ONLY, PARTS ARE NOT ACTUALLY LOADED.

Figure 12-4. A20 C-Channel Board, Schematic Diagram

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C-CHANNEL TROUBLSHOOTING

1. The C-Channel consist of the following circuits: External controlled Attenuator, four amplifier stages, one prescaler divide-by-four.

2. Trouble Shooting the Attenuator (U1)

   1) DC Test: The dc voltage on PIN 1 of U1 should have a range of approxomately 2.0V to 14.0V. The higher voltage will have min. attenuation. 2.0V will have 25db to 30db attenuation pending on frequency. The dc bias voltage on PIN 2 is fixed between 9.4V to 10.6V.

   2) AC Test: (a) Make sure that the case of the TO5 can is well grounded, the base of the can should make good contact with the ground plane of the PC board. If the attenuator has to be replaced make sure that the TO5 can is clamped down with the 2 screws first before soldering down the four pins. This will assure that the base makes good contact.

   (b) Connect a 100MHz signal with a power level of -10dBm to INPUT C

   (c) Now using an HP8566B Spectrum Analyzer with a center frequency of 100MHz and a frequency span of 1MHz connect a resistive probe of 20:1 to the capacitive coupled input of the spectrum analyzer. Touch the center pin of J1 (input to C-Channel) and use that level as a reference level, now move the resistive probe to PIN 3 of Attenuator, U1, this is the output of the Attenuator. With the dc voltage of 14 volt on PIN 1 of U1 the difference of the two levels should be less than 4db.

   (d) By changing the dc voltage from 14V to 2V there should be an attenuation of $\geq$30db. If there is no Attenuation or less than 20db of attenuation and the bias voltage of 10V is present replace the TO5 Attenuator.

   (e) Setup the HP8566B Spectrum Analyzer as follows:

   INPUT CAPACTIVE COUPLED (externally)
   Frequency Span/Div
   Frequency Band 0-2.5GHz
   Center Frequency 100MHz
   Frequency Span 1MHz
   Coupled Function AUTO
   Reference Level/Input Atten.
   Reference Level 0dBm
   Atten 10db
   Amplitude Scale 5db/Div

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3. TROUBLE SHOOTING THE AMPLIFIERS. (U2, 3, 4, 5)

(a) Connect a 100MHz signal to the input C Connector.

(b) Check dc voltage, at PIN 1 and PIN 3 of U2, 3, 4, 5 if there is no voltage at P1 and PIN3 of U2, 3, 4, 5 check L 9, 10, 11, 12 for open. Also, check L 2, 3, 4, 5 and R 2, 3, 4, 5 for open or wrong resistor values.

(c) Connect a resistive probe 20:1 to PIN 3 of U2 (output) connect the ground side of the resistive probe to PIN2 or PIN4.

(d) Press PEAK SEARCH on Spectrum Analyzer.

(e) Adjust input power level to -30db displayed at the Spectrum Analyzer.

(f) Now connect the resistive probe 20:1 to PIN 1 this will measure the input power to the amplifier. The difference between step e and step f (input vs output) is the gain of that stage. Refere to Fig. 1 for gain data.

(g) Connect resistive probe 20:1 to PIN 3 of U3 (output) connect the ground side of the resistive probe to PIN 2 or PIN 4.

(h) Repeat step e and f.

(i) Connect resistive probe to PIN 3 of U4 (output). Connect the ground side of the resistive probe to PIN 2 or PIN 4.

(j) Repeat step e and f.

(k) Connect resistive probe to PIN 3 of U5 (output). Connect the ground side of the restive probe to PIN 2 or PIN 4.

(l) Repeat step e and f.

(m) Connect restive probe to PIN 3 of U5 (output). Connect the ground side of the resistive probe to PIN 2 or PIN 4.

(n) Repeat step e and f.

TROUBLESHOOTING THE LIMITER (D1, 2, 3)

(a) Connect a 100MHz signal to the input C Connector.

(b) Connect a resistive probe 20:1 to PIN 2 of limiter D1 connect the ground side of the resistive probe to PIN 1 to PIN 3.

(c) Press PEAK SEARCH on Spectrun Analyzer.

(d) Adjust input power level to -30db displayed at the spectrum analyzer.

(e) Increase input power level by 10dBm. The spectrum analyzer

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should display approximately 7.5db increase only.

(f) Increase input power level by 10dBm. The spectrum analyzer should display approximately 5db increase. If in step e and step f the increase is 10db, replace the limiter.

(g) Connect a resistive probe to PIN 2 of limiter D2. Connect the ground side of the resistive probe to PIN 1 or PIN 3.

(h) Repeat step d, e, and f.

(i) Connect a resistive probe to PIN 2 of limiter D3. Connect the ground side of the resistive probe to PIN 1 or PIN 3.

(j) Repeat step d, e, and f.

TROUBLE SHOOTING THE PRESCALER DIVIDE-BY-FOUR (U6)

(a) Connect a dc voltmeter to PIN 3 of J3 (VBB). The dc voltage should be between -1.20V to -1.40V.

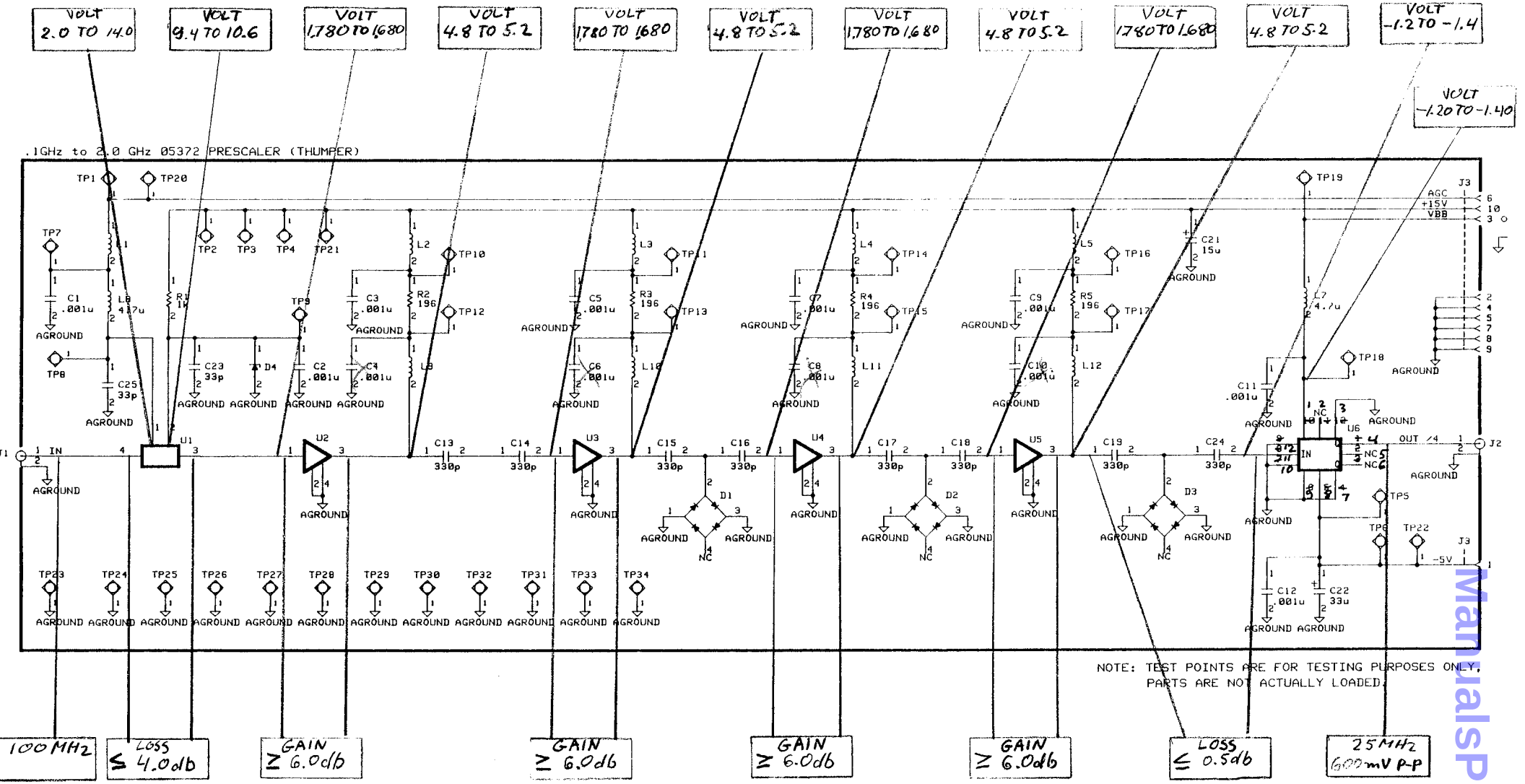
(b) Connect a dc voltmeter to PIN 11 of U6 (CLK input to divider circuit). The dc voltage should be -1.20V to -1.40V. If the dc voltage from test a and test b are not correct replace U6.

(c) Connect a 100MHz signal to the input C Connector.

(d) Set input power to -20dBm.

(e) Check that -5.2V is present at PIN 8 of U6.

(f) Connect scope to SMA connector J2 (divide-by-four output) input frequency to C-Channel should be divided-by-four. Output swing shsould be $\geq$600mV P-P. Replace divide-by-four if swing is less than 600mV P-P.



NOTE: TEST POINTS ARE FOR TESTING PURPOSES ONLY. PARTS ARE NOT ACTUALLY LOADED.

NOTE: GAIN AND LOSS MEASUREMENTS ARE MADE AT 100 MHz

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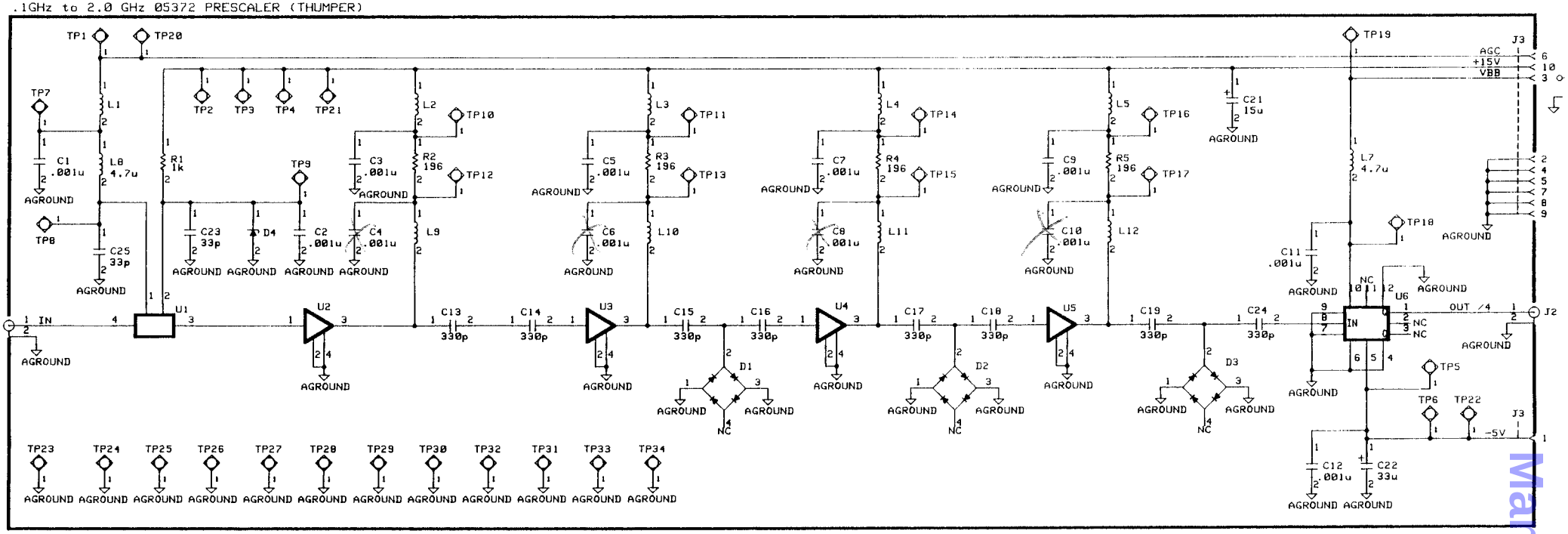
.1GHz to 2.0 GHz 05372 PRESCALER (THUMPER)



NOTE: TEST POINTS ARE FOR TESTING PURPOSES ONLY.
PARTS ARE NOT ACTUALLY LOADED.

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A SPECIFICATIONS

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A

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APPENDIX
A

SPECIFICATIONS

WARRANTED SPECIFICATIONS

The HP 5372A has two measurement modes - Normal and Fast. If there are differences in the two modes, **parameters pertaining to the Fast mode will be contained in brackets [ ].**

Measurement Functions

Frequency

RANGE

Single Channel Measurements:

Channels A and B: **125 mHz [8 kHz] to 500 MHz.**
Channel C: **100 MHz to 2 GHz.**

Dual Channel Measurements:

Channels A and B: **250 mHz [16 kHz] to 500 MHz.**
Channel C: **100 MHz to 2 GHz.**

FOR A SINGLE MEASUREMENT

Least Significant Digit Displayed:

$$\pm \frac{200\text{ps}}{\text{Sample Interval}} \times \text{Frequency}$$

Resolution:

$$\pm \frac{150\text{ps rms} + (1.4 \times \text{Trigger Error})}{\text{Sample Interval}} \times \text{Frequency}$$

Accuracy:

± Resolution ± (Time Base Aging x Frequency).

MEAN ESTIMATION FOR AVERAGE MEASUREMENTS

rms Resolution:

Continuous Measurements (Number of Measurements per Block ≥3):

$$\frac{\sqrt{13.5} \times (150\text{ps rms} + 1.4 \times \text{Trigger Error})}{(\text{Number of Blocks})^{1/2} \times (\text{Number of Measurements per Block})^{3/2} \times \text{Sample Interval}} \times \text{Frequency}$$

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WARRANTED SPECIFICATIONS (Continued)

All other Measurements:

N = number of measurements averaged.

$$\pm \frac{150\text{ ps rms} + (1.4 \times \text{Trigger Error})}{\text{Sample Interval} \times \sqrt{N}} \times \text{Frequency}$$

Accuracy:

± Resolution ± (Time Base Aging x Frequency).

Period

RANGE

Single Channel Measurements:

Channels A and B: **2 ns to 8.0 s [131 µs].**
Channel C: **0.5 ns to 10 ns.**

Dual Channel Measurements:

Channels A and B: **2 ns to 4.0 s [65 µs].**
Channel C: **0.5 ns to 10 ns.**

FOR A SINGLE MEASUREMENT

Least Significant Digit Displayed:

$$\pm \frac{200\text{ps}}{\text{Sample Interval}} \times \text{Period}$$

Resolution:

$$\pm \frac{150\text{ps rms} + (1.4 \times \text{Trigger Error})}{\text{Sample Interval}} \times \text{Period}$$

Accuracy:

± Resolution ± (Time Base Aging x Period).

MEAN ESTIMATION FOR AVERAGED MEASUREMENTS

rms Resolution:

Continuous Measurements (Number of Measurements per Block ≥3):

$$\frac{\sqrt{13.5} \times \left(150\text{ps rms} + (1.4 \times \text{Trigger Error})\right)}{(\text{Number of Blocks})^{1/2} \times (\text{Number of Measurements per Block})^{3/2} \times \text{Sample Interval}} \times \text{Period}$$

All other Measurements:

N = number of measurements averaged.

$$\pm \frac{150\text{ps rms} + (1.4 \times \text{Trigger Error})}{\text{Sample Interval} \times \sqrt{N}} \times \text{Period}$$

Accuracy:

± Resolution ± (Time Base Aging x Period).

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WARRANTED SPECIFICATIONS (Continued)

Frequency or Period Ratio

Range:

Channel A and B: **250 mHz [16 kHz] to 500 MHz (2 ns to 4.0 s [65 µs]).**

Channel C: **100 MHz to 2 GHz (0.5 ns to 10 ns).**

Least Significant Digit Displayed:

$$\pm \frac{200\text{ps}}{\text{Sample Interval}} \times \text{Ratio}$$

Resolution:

$$\pm \frac{150\text{ps rms} + (1.4 \times \text{Trigger Error})}{\text{Sample Interval}} \times \text{Ratio}$$

Accuracy (for Frequency A/B):

$$\pm \text{Resolution} \pm \frac{\text{Time Base Aging} \times \text{Frequency A}}{\text{Time Base Aging} \times \text{Frequency B}}$$

Totalize

Resolution:

± 1 count of input per measurement sample, for each channel.

For A/B:

$$\pm \frac{\text{Totalize Result A} \pm 1}{\text{Totalize Result B} \mp 1}$$

For B/A:

$$\pm \frac{\text{Totalize Result B} \pm 1}{\text{Totalize Result A} \mp 1}$$

Accuracy:

± Resolution

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WARRANTED SPECIFICATIONS (Continued)

Time Interval

Range:

Time Interval: **10 ns to 8.0 s [131 μs].**

Continuous Time Interval: **100 ns [75 ns] to 8.0 s [131 μs].**

± Time Interval: **- 4.0 s [- 65 μs] to +4.0 [+ 65 μs], including 0 seconds.**

Least Significant Digit Displayed:

N = number of measurements averaged.

$$\pm \frac{200\ \text{ps}}{\sqrt{N}}$$

Resolution:

$$\pm \frac{150\ \text{ps rms} \pm \text{Start Trigger Error} \pm \text{Stop Trigger Error}}{\sqrt{N}}$$

Accuracy:

± Resolution ± (Time Base Aging x Time Interval) ± Trigger Level Timing Error ± 1 ns Systematic Error.

Time Deviation

Signal Input Range:

2 ns to 8.0 s [131 μs].

Least Significant Digit Displayed:

± 200 ps.

Resolution:

±150 ps rms ± (1.4 x Trigger Error).

Accuracy:

±Resolution± (Time Base Aging x Time Interval) ± 1 ns Systematic Error.

Automatic Carrier Determination

rms Resolution (for Number of Measurements per Block ≥3):

$$\frac{\sqrt{13.5} \times (150\text{ps rms} + 1.4 \times \text{Trigger Error})}{(\text{Number of Blocks})^{1/2} \times (\text{Number of Measurements per Block})^{3/2} \times \text{Sample Interval}} \times \text{Frequency}$$

Accuracy:

± Resolution ± (Time Base Aging x Frequency).

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WARRANTED SPECIFICATIONS (Continued)

Rise Time A and Fall Time A

Range:

1 ns to 100 us transitions (auto trigger).

Repetition Rate:

≥ 0.5 Hz.

Time between pulses:

≥ 8 ns.

Minimum Pulse Height (X1 Attenuation, Minimum Hysteresis):

200 $mV_{pk\text{-}pk}$ (auto trigger).

Least Significant Digit Displayed:

N = number of measurements averaged.

$$\pm \frac{200\ ps}{\sqrt{N}}$$

Resolution:

$$\pm \frac{150\ ps\ rms \pm Start\ Trigger\ Error \pm Stop\ Trigger\ Error}{\sqrt{N}}$$

Accuracy:

± Resolution ± (Time Base Aging x Rise Time) ± Trigger Level Timing Error ± 1 ns Systematic Error

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WARRANTED SPECIFICATIONS (Continued)

Positive and Negative Pulse Width A

Range:

1 ns to 1 ms pulse width (auto trigger).

Repetition Rate:

≥ 0.5 Hz.

Time between pulses:

≥ 8 ns.

Minimum Pulse Height (X1 Attenuation, Minimum Hysteresis):

200 $mV_{pk\text{-}pk}$ (auto trigger).

Least Significant Digit Displayed:

N = number of measurements averaged.

$$\pm \frac{200\ ps}{\sqrt{N}}$$

Resolution:

$$\pm \frac{150\ ps\ rms \pm Start\ Trigger\ Error \pm Stop\ Trigger\ Error}{\sqrt{N}}$$

Accuracy:

± Resolution ± (Time Base Aging x Pulse Width) ± Trigger Level Timing Error ± 1 ns Systematic Error*

*Systematic error can be significantly reduced with the HP J06-59992A Time Interval Calibrator.

Duty Cycle A

Range:

0% to 100% (provided pulse width is > 1 ns, and signal period is:

< 1 ms (auto trigger).
< 2 s [32.5 µs] (manual trigger).

Repetition Rate:

≤ 0.5 Hz.

Time between pulses:

≥ 8 ns.

Minimum Pulse Height (X1 Attenuation, Minimum Hysteresis):

200 $mV_{pk\text{-}pk}$ (auto trigger).

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WARRANTED SPECIFICATIONS (Continued)

Least Significant Digit Displayed:

$$\pm \frac{200\text{ps}}{\text{Period}} \times 100\%$$

Resolution:

$$\pm \text{Duty Cycle} \times \left(150\text{ ps rms} \pm (1.4 \times \text{Trigger Error})\right) \times \sqrt{\frac{1}{(t_2 - t_1)^2} + \frac{1}{(t_3 - t_1)^2}}$$

Accuracy:

$$\pm \text{Resolution} \pm \left(\frac{\text{Trigger Level Timing Error} \pm 1\text{ ns}}{\text{Period}} \right) \times 100\%$$

Phase

Signal Input Range:

250 mHz [16 kHz] to 500 MHz.

Least Significant Digit Displayed:

$$\pm \frac{200\text{ ps}}{\text{Period}} \times 360°$$

Resolution: A relative to B (B relative to A)

$$\pm \text{Phase} \times \left(150\text{ ps rms} \pm (1.4 \times \text{Trigger Error})\right) \times \sqrt{\frac{1}{(t_4 - t_3)^2} + \frac{1}{(t_3 - t_1)^2}}$$

Accuracy: A relative to B (B relative to A)

$$\pm \text{Resolution} \pm \left(\frac{\text{Trigger Level Timing Error} \pm 1\text{ ns}}{\text{Period}} \right) \times 360°$$

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WARRANTED SPECIFICATIONS (Continued)

Phase Deviation

Signal Input Range:

125 mHz [8 kHz] to 500 MHz.

Least Significant Digit Displayed:

$$\pm \frac{200\ \text{ps}}{\text{Reference Period}} \times 360°$$

Resolution:

$$\pm \left(\frac{150\ \text{ps rms} \pm (1.4 \times \text{Trigger Error})}{\text{Reference Period}} \right) \times 360°$$

Accuracy:

$$\pm \text{Resolution} \pm \left(\frac{(\text{Time Base Aging} \times \text{Time Interval}) \pm \text{Trigger Level Timing Error} \pm 1\ \text{ns Systematic Error}}{\text{Reference Period}} \right) \times 360°$$

Automatic Carrier Determination

rms Resolution (for Number of Measurements per Block ≥3):

$$\frac{\sqrt{13.5} \times (150\text{ps rms} + 1.4 \times \text{Trigger Error})}{(\text{Number of Blocks})^{1/2} \times (\text{Number of Measurements per Block})^{3/2} \times \text{Sample Interval}} \times \text{Frequency}$$

Accuracy:

± Resolution ± (Time Base Aging x Frequency).

Peak Amplitudes A, B

Frequency Range:

1 kHz to 200 MHz.

Amplitude Range (X1 Attenuation):

200 $mV_{pk\text{-}pk}$ to 2 $V_{pk\text{-}pk}$.

Accuracy:

± 20% of peak-to-peak amplitude, 1 kHz to 200 MHz.

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WARRANTED SPECIFICATIONS (Continued)

Input

Channel A and B

All input signals refer to sinusoidal signals, except where noted.

Input Pods

The following specifications refer to pods installed in an HP 5372A system.

HP 54002A

Bandwidth:
dc to 500 MHz.

Maximum input voltage:
X1: **±2V.**
X2.5: **±5V.**

HP 54001A

Bandwidth:
dc to 500 MHz.

Maximum input voltage:
±20V.

HP 54003A with 10:1 probe

Bandwidth:
dc to 300 MHz.

Maximum input voltage:
±20V.

HP 54003A without 10:1 probe

Bandwidth:
dc to 300 MHz.

Maximum input voltage:
±2V.

The following specifications refer to an HP 5372A with HP 54002A pods installed.

Range:
dc coupled to 500 MHz.

Sensitivity (X1 Attenuation, Minimum Hysteresis):
15 mV rms sine wave (45 mV_{pk-pk}).
45 mV_{pk-pk} for a minimum pulse width.

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WARRANTED SPECIFICATIONS (Continued)

Minimum pulse width:

For all measurement modes except Holdoff Arming: **1 ns** (at a minimum amplitude).

Holdoff Arming modes: **1.5 ns** (at a minimum amplitude).

Dynamic Range:

X1: **45 mV_{pk-pk} to 2 V_{pk-pk}.**

Signal Operating Range:

X1: **-2 Vdc < dc ± ac pk < +2 Vdc.**

Damage Level:

X1: **± 2.5 V (dc ± ac pk).**

X2.5: **± 5.5 V (dc ± ac pk).**

Input Triggering Characteristics

	Manual Triggering	Auto Triggering (Single or Repetitive)
Voltage Range: X1: X2.5:	 **-2 Vdc to +2 Vdc** **-5 Vdc to +5 Vdc**	 **-2 Vdc to +2 Vdc** **-5 Vdc to +5 Vdc**
Frequency Range:	**dc to 500 MHz**	**1 kHz to 200 MHz**
Accuracy:	**20 mV ± 1% of setting**	**±20% of $_{pk-pk}$ amplitude (200 mV_{pk-pk} minimum)**

External Arm

In addition to the External Arm input, both input channels A and B may also be used as high performance arming inputs.

Range:

dc coupled to 100 MHz.

Sensitivity:

50 mV rms sine wave.
140 mV_{pk-pk} at a minimum pulse width.

Minimum Pulse Width:

5 ns at a minimum amplitude.

Dynamic Range:

140 mV_{pk-pk} to 5 V_{pk-pk}.

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WARRANTED SPECIFICATIONS (Continued)

Signal Operating Range:

-5 Vdc < dc ± ac pk < + 5 Vdc.

Damage Level:

5 V rms (±15 V_{pk-pk}, dc ± peak ac).

Channel C (Option 030 or Option 090)

The following applies to the optional high frequency measurement channel included with Option 030 and Option 090.

Range:

100 MHz to 2 GHz.

Sensitivity (0% attenuation):

100 MHz to 1.5 GHz: - 25 dBm.
>1.5 GHz to 2.0 GHz: - 20 dBm.

Dynamic Range (0% attenuation):

100 MHz to 1.5 GHz: - 25 dBm to + 7 dBm.
>1.5 GHz to 2.0 GHz: - 20 dBm to + 7 dBm.

Signal Operating Range:

- 5 Vdc to +5 Vdc.

Damage Level:

AC > +20 dBm.
DC ± 5 V.

Rear Panel Connectors

Frequency Standard External Input

Input Level Range:

1.0 V_{pk-pk} to 5.0 V_{pk-pk}.

Acceptable Frequencies:

1 MHz, 2 MHz, 5 MHz, or 10 MHz, ± 1%.

Damage Level:

10 V (dc ± peak ac).

Inhibit

Damage Level:

± 5.5 V.

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WARRANTED SPECIFICATIONS (Continued)

Option 060 Rear Panel Inputs

Input channel A and B performance is equivalent to front panel performance. External Arm performance for the Option 060 configuration is as follows:

Range:

dc coupled to 100 MHz.

Sensitivity:

100 mV rms sine wave.
280 mV_{pk-pk} at a minimum pulse width.

Minimum Pulse Width:

5 ns at a minimum amplitude.

Dynamic Range:

280 mV_{pk-pk} to 5 V_{pk-pk}, dc to 20 MHz.
280 mV_{pk-pk} to 2.5 V_{pk-pk}, 20 MHz to 100 MHz.

Signal Operating Range:

±5 Vdc.

Damage Level:

5 V rms (±15 V_{pk-pk}, dc ± peak ac).

All triggering specifications are the same as for the front panel configuration.

Time Base

Frequency

10 MHz.

Stability

Aging Rate:

< 5 X 10^{-10} per day after a 24 hour warm-up
when:

1. oscillator off-time* was less than 24 hours.
2. oscillator aging rate was < 5 x 10^{-10} per day prior to turn-off.*

< 5 x 10^{-10} per day in less than 30 days of continuous operation for off-time* greater than 24 hours.

< 1 x 10^{-7} per year for continuous operation.

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WARRANTED SPECIFICATIONS (Continued)

Short Term:

< 1 x 10^{-10} for a 1 second average.

Temperature:

< 7 x 10^{-9}, 0 to 40° C ambient temperature.

Line Voltage:

< 1 x 10^{-10} for 10% change from the Nominal line voltage.

Warm-up:

Within 5 x 10^{-9} of final value, 10 minutes after turn-on** when:

1. HP 5372A is operated in a 25° C environment.
2. Oscillator off-time* was less than 24 hours.
3. Oscillator aging rate was < 5 x 10^{-10} per day prior to turn-off*.

General

Operating Temperature:

0 to 40° C.

Power Requirements:

Voltages:

100, 120, 220 or 240 Vac, ± 10%.

Frequencies:

45 - 66 Hz for all voltages.
360 - 440 Hz for 100 and 120 Vac.

Maximum Power:

500 VA.

---

* "Turn-off", "turn-on", and "off-time" apply to periods when power is disconnected from the HP 5372A rear panel. Stand-by operation provides power to the oscillator's oven.

** Final value is defined as oscillator frequency 24 hours after turn-on*.

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OPERATING CHARACTERISTICS

The operating characteristics listed are typical, but non-warranted, performance parameters.

ARMING MODES

Holdoff Arming

EDGE HOLDOFF

Setup Time:

External Arm arms Channel A or B: <15 ns.
Channel B arms Channel A: <8 ns.
Channel A arms Channel B: <8 ns.
Channel A arms Channel A: <5 ns.
Channel B arms Channel B: <5 ns.

TIME HOLDOFF

Settable Resolution: 2 ns.

Setup Time: <25 ns after the specified time has elapsed.

EVENT HOLDOFF

Resolution: ±1 count of input signal.

Setup Time: <25 ns after completion of event countdown.

Sample Arming

INTERVAL SAMPLING

Settable Resolution: 100 ns.

Setup Delay: The first interval will begin <200 ns after the block becomes armed.

CYCLE SAMPLING

Resolution: 2 ns, or 1 edge of input signal.

EDGE SAMPLING and REPETITIVE EDGE SAMPLING

Setup Time:

External Arm arms Channel A or B: <15 ns.
Channel B arms Channel A: <8 ns.
Channel A arms Channel B: <8 ns.
Channel A arms Channel A: <5 ns.
Channel B arms Channel B: <5 ns.

RANDOM SAMPLING

Maximum Input Frequency: 100 MHz.

Minimum Pulse Width: 5 ns.

TIME SAMPLING

Settable Resolution: 2 ns.

Setup Time: <25 ns after the specified time has elapsed.

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OPERATING CHARACTERISTICS (Continued)

Holdoff/Sample Arming

EXTERNALLY GATED

Setup Delay: 30 ns.

EDGE/TIME

Holdoff Setup Time: <25 ns.

Settable Sample Resolution: 2 ns.

Sample Setup Time: <25 ns after the specified time has elapsed.

EDGE/EVENT

Holdoff Setup Time: <25 ns.

Sample Resolution: ±1 count of input signal.

Sample Setup Time: <25 ns upon completion of event countdown.

EVENT/EVENT

Holdoff and Sample Resolution: ±1 count of input signal.

Holdoff and Sample Setup Time: <25 ns upon completion of event countdown.

TIME/TIME

Settable Holdoff and Sample Resolution: 2 ns.

Holdoff and Sample Setup Time: <25 ns after the specified time has elapsed.

PRE-TRIGGER

Setup Time:

External Arm: <50 ns.
Time Interval Detect: <600 ns.

Pre-trigger Accuracy: ±2 measurements.

REAR PANEL CONNECTORS

Gate Outputs 1 and 2

A falling edge indicates when measurement samples occur.

Delay: 30 ns.

Output Level: Falling edge active, TTL levels into ≥ 10 kΩ. >1 V to 0 V into 50Ω.

Pulse Width: >25 ns into 50Ω.

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OPERATING CHARACTERISTICS (Continued)

Arm Delay Outputs 1 and 2

A falling edge indicates the completion of the arming condition.

Delay: 30 ns.

Output Level: Falling edge active, TTL levels into ≥ 10 kΩ. >1 V to 0 V into 50Ω.

Inhibit Input

Input Level Range: –2 V to 5 V.

Minimum Pulse Height: 200 mV pk-pk.

Impedance: 10 kΩ shunted by <100 pF.

Setup Time: The inhibit signal must be enabled >25 ns prior to the input transition to be inhibited.

Hold Time: The inhibit signal must be enabled >10 ns after the input transition to be inhibited.

Maximum Repetition Rate: 10 MHz.

TI Detect Output

The TI Detect output will remain TTL low for the entire period of time the measurements are outside the specified range.

Level: Falling edge active, TTL levels into ≥ 10 kΩ. >1 V (minimum) to 0 V into 50Ω.

Minimum Pulse Width: 50 ns.

Measurement to TI Detect Output Delay: <600 ns.

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MEASUREMENT UNCERTAINTY DEFINITIONS

All measured values have associated uncertainties. The following are definitions of terms used to describe these uncertainties. For frequency and time interval measurements and other specific implementations (i.e. rise time, pulse width, duty cycle, etc.) this measurement uncertainty is composed of three factors: Least Significant Digit (LSD), Resolution, and Accuracy.

Least Significant Digit, Resolution, and Accuracy

Least Significant Digit is the smallest incremental value displayed in a measurement. The LSD for the HP 5372A is 200 ps, therefore, the smallest displayed increment that two single-shot time interval measurements will differ by is 200 ps.

Resolution is the smallest difference in measurements that the instrument can discern. Measurement resolution is of primary concern when comparing data gathered by a single instrument; in other words, the meaning of results when compared against one another. Resolution describes uncertainty due to random effects, including short-term oscillator stability, trigger error, and the internal noise of the instrument itself. Since these effects are random, the resolution uncertainty is specified on an rms basis rather than a peak value. The time interval single-shot resolution of the HP 5372A is 150 ps rms. Resolution can also be improved by averaging single measurements, or in the case of frequency and period measurements, by increasing the measurement gate time as well as averaging measurements.

Accuracy is defined to be the combination of random uncertainties and systematic or bias uncertainties in a measurement. Accuracy is of primary concern when comparing data in an absolute sense, such as one production test station to the next. Systematic uncertainties include differential channel delay, long term drift or time base oscillator aging, and Trigger Level Timing Error. These uncertainties may be measured and removed from subsequent measurement data by subtracting the measured bias. Two methods are available to do this with the HP 5372A:

1) the Set Reference feature for each input channel, or
2) the HP J06-59992A Time Interval Calibrator.

Accuracy = Random Errors + Systematic Errors

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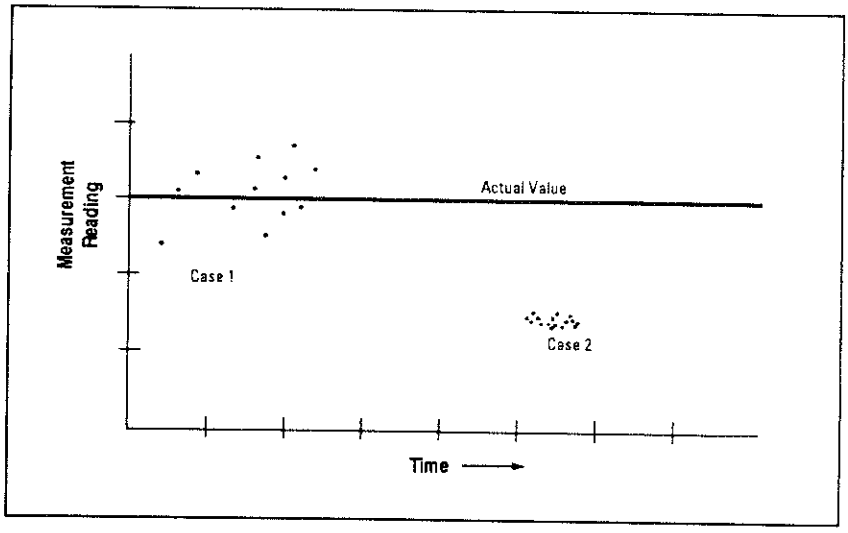
MEASUREMENT UNCERTAINTY DEFINITIONS (Continued)



Case 1 shows the results of random uncertainties (resolution) limiting measurement precision. Case 2 shows the results of systematic uncertainty limiting measurement precision. Accuracy specifications must include both systematic and random effects.

Trigger Error and Trigger Level Timing Error

Resolution and accuracy equations consist of two terms which describe uncertainties due specifically to triggering. These terms are separated from others since they are, in general, dependent upon the user's signal. The following describes these input trigger uncertainties.

Trigger Error is a random uncertainty caused by noise on the input signal. Trigger Error can be minimized by careful grounding and shielding techniques to minimize noise, and maintaining as high a signal slew rate as possible for the input to the HP 5372A. The following equation is used to quantify trigger error.

$$\text{Trigger Error} = \frac{\sqrt{(E_{amp})^2 + (E_n)^2}}{\text{Input Signal Slew Rate}}$$

Where:

E_{amp} is the typical rms input amplifier noise (200 μV rms typical).

E_n is the rms noise of the input signal over a 500 MHz bandwidth.

The input signal slew rate value is determined at the trigger point.

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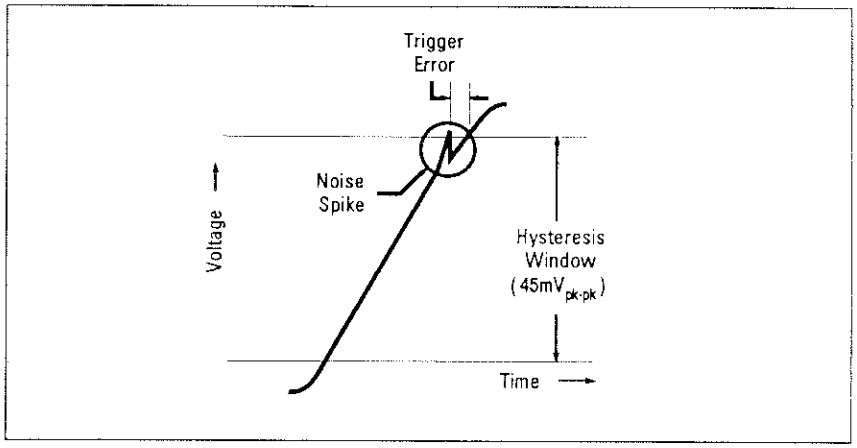
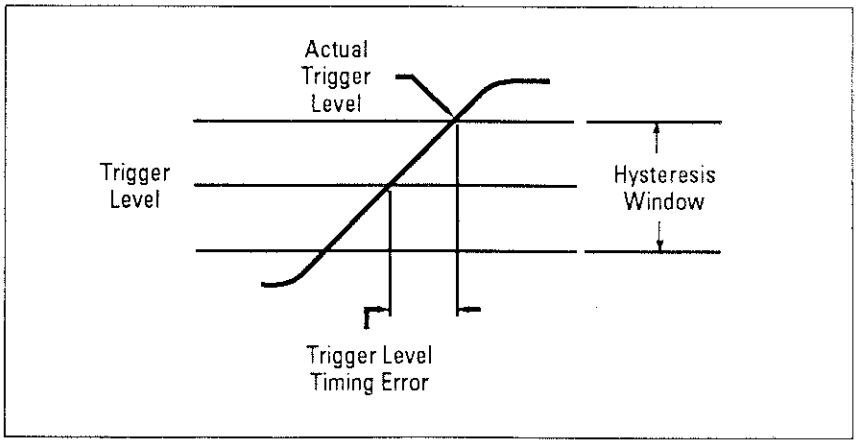
MEASUREMENT UNCERTAINTY DEFINITIONS (Continued)



Trigger Error is due to noise on the input signal. Here a noise spike causes an 'early' trigger.

Trigger Level Timing Error is a systematic uncertainty due to the input hysteresis of the HP 5372A. Trigger Level Timing Error is a constant value for any particular signal and slew rate, but the effects will vary with amplitude and slew rate. Trigger Level Timing Error can be minimized by maintaining as high an input signal slew rate as possible, and can be removed by careful calibration with the HP J06-59992A Time Interval Calibrator.

$$\text{Trigger Level Timing Error} = \left(\frac{0.5 \times \text{Hysteresis Window}}{\text{Start Input Signal Slew Rate}} - \frac{0.5 \times \text{Hysteresis Window}}{\text{Stop Input Signal Slew Rate}} \right) \pm \frac{\text{Trigger Level Accuracy (start)}}{\text{Start Input Signal Slew Rate}} \pm \frac{\text{Trigger Level Accuracy (stop)}}{\text{Stop Input Signal Slew Rate}}$$



Trigger Level Timing Error is a systematic uncertainty. It is constant for any particular signal slew rate.

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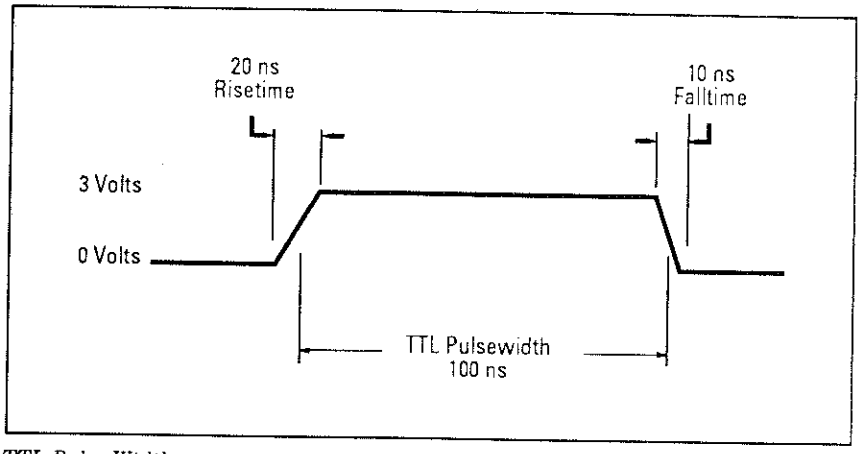
EXAMPLE MEASUREMENTS AND UNCERTAINTY CALCULATIONS

The following are measurement examples to illustrate the use of the measurement uncertainty equations for typical measurement applications. In these examples, the specific values have been entered into the complete equation. In practice, the associated graphs of these equations can be used to determine various uncertainties.

TTL Pulse Width Measurement

A single-shot Pulse Width measurement is made with a value of 100.0 ns. The signal has 10 mV rms (28 $mV_{pk\text{-}pk}$) noise, a rise time of 20 ns, and a fall time of 10 ns over a 3 volt swing. The measurement is made using the HP 54003A 1 MΩ input pod with a 10:1 divider probe. It has been 1 month since the HP 5372A time base has been calibrated.



TTL Pulse Width measurement uncertainty example.

Least Significant Digit Displayed:

= ± 200 ps

Resolution:

= ± 150 ps rms ± Start Trigger Error ± Stop Trigger Error

$$= \pm 150\ \text{ps rms} \pm \frac{\sqrt{(200\ \mu\text{V rms})^2 + (10\ \text{mV rms})^2}}{15\ \text{V/}\mu\text{s}} \pm \frac{\sqrt{(200\ \mu\text{V rms})^2 + (10\ \text{mV rms})^2}}{30\ \text{V/}\mu\text{s}}$$

$$= \pm 1.15\ \text{ns rms}$$

Accuracy:

= ± Resolution ± (Time Base Aging x Pulse Width) ± Trigger Level Timing Error ± 1 ns Systematic Error

$$= \pm 1.15\ \text{ns rms} \pm (5 \times 10^{-10} \times 30\ \text{days} \times 100\ \text{ns}) \pm \left[\left(\frac{22.5\ \text{mV}}{15\ \text{V/}\mu\text{s}} - \frac{22.5\ \text{mV}}{30\ \text{V/}\mu\text{s}} \right) \pm \frac{21.5\ \text{mV}}{15\ \text{V/}\mu\text{s}} \pm \frac{21.5\ \text{mV}}{30\ \text{V/}\mu\text{s}} \right]$$
$$\pm 1\ \text{ns Systematic Error}$$

$$= \pm 3.62\ \text{ns}$$

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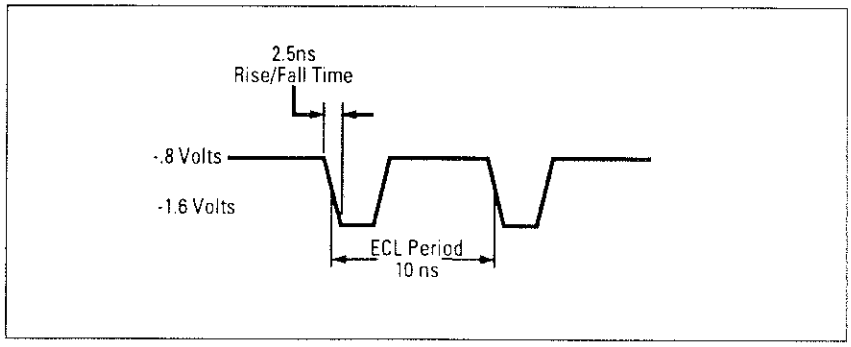
EXAMPLE MEASUREMENTS AND UNCERTAINTY CALCULATIONS (Continued)

ECL Edge-to-Edge, or Single-Period Measurement

A single-shot period measurement is made from falling edge to falling edge of a ECL signal. The input signal has 1 mV rms of noise with a fall time of 2.5 ns over an 800 mV swing. The HP 54002A 50Ω input pod is used with a -2 volt termination. The measured value is 10.0 ns. It has been 1 month since the HP 5372A time base has been calibrated.



Measurement uncertainty example using Time Interval to measure from falling edge to falling edge of an ECL signal.

Least Significant Digit Displayed:

= ± 200 ps

Resolution:

= ± 150 ps rms ± Start Trigger Error ± Stop Trigger Error

$$= \pm 150 \text{ ps rms} \pm \frac{\sqrt{(200\ \mu\text{V rms})^2 + (1\ \text{mV rms})^2}}{0.32\ \text{V/ns}} \pm \frac{\sqrt{(200\ \mu\text{V rms})^2 + (1\ \text{mV rms})^2}}{0.32\ \text{V/ns}}$$

$$= \pm 156 \text{ ps rms}$$

Accuracy:

= ± Resolution ± (Time Base Aging x Pulse Width) ± Trigger Level Timing Error ± 1 ns Systematic Error

$$= \pm 156 \text{ ps rms} \pm (5 \times 10^{-10} \times 30 \text{ days} \times 10 \text{ ns}) \pm \left[\left(\frac{22.5\ \text{mV}}{0.32\ \text{V/ns}} - \frac{22.5\ \text{mV}}{0.32\ \text{V/ns}} \right) \pm \frac{24\ \text{mV}}{0.32\ \text{V/ns}} \pm \frac{24\ \text{mV}}{0.32\ \text{V/ns}} \right]$$
$$\pm 1 \text{ ns Systematic Error}$$

$$= \pm 1.31 \text{ ns}$$

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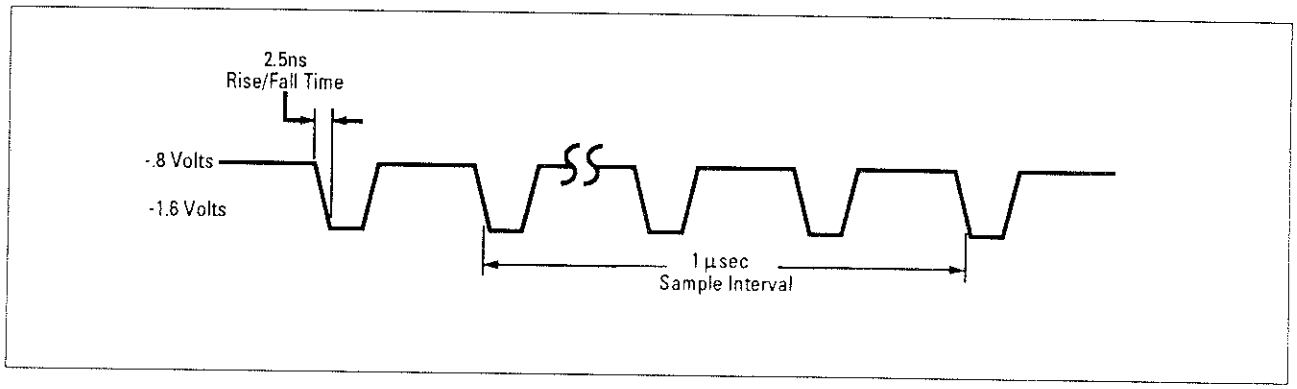
EXAMPLE MEASUREMENTS AND UNCERTAINTY CALCULATIONS (Continued)

Note that a major portion of the measurement accuracy consists of the 1 ns systematic term. This can be reduced to less than 10 ps with careful calibration using the HP J06-59992A Time Interval Calibrator.

ECL Frequency Measurement

A Frequency measurement is made on a 100 MHz ECL signal with a 1 µs sample interval. The signal has 1 mV of noise with a transition time of 2.5 ns over an 800 mV swing. The HP 54002A 50Ω input pod is used with a -2 volt termination. It has been 1 month since the HP 5372A time base has been calibrated.



Measurement uncertainty example for a Frequency measurement on an ECL signal.

Least Significant Digit Displayed:

$$= \pm \frac{\textbf{200 ps}}{\textbf{Sample Interval}} \textbf{ x Frequency}$$

$$= \pm \frac{200\text{ ps}}{1\ \mu\text{s}} \times 100\text{ MHz}$$

$$= \pm 20\text{ kHz}$$

Resolution:

$$= \pm \frac{\textbf{150 ps rms + (1.4 x Trigger Error)}}{\textbf{Sample Interval}}$$

$$= \pm \frac{150\text{ ps rms} + \left(1.4 \times \frac{\sqrt{(200\ \mu\text{V rms})^2 + (1\text{ mV rms})^2}}{0.32\text{ V/ns}}\right)}{1\ \mu\text{s}} \times 100\text{ MHz}$$

$$= \pm 15.4\text{ kHz}$$

Accuracy:

$$\textbf{= ± Resolution ± (Time Base Aging x Frequency)}$$

$$= \pm 15.4\text{ kHz} \pm (5 \times 10^{-10} \times 30\text{ days} \times 100\text{ MHz})$$

$$= \pm 15.4\text{ kHz}$$

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B

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APPENDIX
B

MEASUREMENT FUNCTIONS/ ARMING MODES

B-1. MEASUREMENT FUNCTIONS

The HP 5372A measurement capabilities fall into three broad categories: Frequency, Totalize, and Time Interval. Frequency measurements are determined by computing the ratio of an integral number of input events to the time period. The process is based on a reciprocating counting technique with digital ("flash") interpolation for finer resolution. A Totalize result is simply the number of events that occur within a given time period. A Time Interval (TI) measurement is the elapsed time between two specific events. The TI measurement is also used to determine Risetime, Falltime, Pulse Width, Duty Cycle and Phase.

B-2. Time Interval

This measures positive time intervals from 10 ns to 8 seconds in duration, with 150 ps rms resolution. Measurements can be made from channels A→B, B→A, A or B, where the first channel listed is the Start channel and the second is the Stop channel. These are "individual" type measurements with a 200 ns minimum spacing requirement between measurements. If the spacing between time intervals is less than 200 ns, trigger events will be counted but not timed. When 200 ns has elapsed, the next time interval will be measured. Displayed results will show the time interval measurements and, on the Numeric and Graphic screens, the number of trigger events that occurred between the two time intervals. Automatic arming allows the measurement of every time interval received, provided the 200 ns spacing requirement is met. Time Interval measurements operate in one of three modes: +TI, ±TI, or Continuous TI.

B-3. Continuous Time Interval

This measurement can only be made between similar trigger events (input voltage and slope) on a given input channel (A or B). Continuous Time Interval is a "back-to-back" measurement and all arming modes are continuous. When the sample interval is longer than the period, the measurements are not automatically averaged. The measurement results displayed will be the number of events (periods) that took place during the sample interval and the exact time of the interval.

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B-4. ±Time Interval

With this measurement, both positive and negative time intervals of up to ± 4 seconds duration can be measured. Measurements can be made from channels A→B, B→A, A or B, where the first channel listed is defined as the Start channel and the second is the Stop channel. If a Stop trigger event occurs before a Start trigger event, the time interval displayed will be negative. These are "individual" measurements with a 200 ns minimum spacing requirement. If the spacing between time intervals is less, the displayed results will be the same as for Time Interval. Automatic arming allows the measurement of every time interval provided the 200 ns spacing is met. Other arming modes allow the skipping of unwanted time interval measurements. The unique Parity arming modes allow the user to specify a relationship (a pairing) between two similar signals at the beginning of a measurement series. This relationship is then held throughout the series, even if the spacing between measurements becomes less than 200 ns. All three Parity arming modes (Parity Sampling, Edge/Parity, and Repetitive Parity) establish the pairing relationship after the arming of the first block and before the first measurement is made. The first trigger events received on Channel A and B become the pair. From that point on, every subsequent pair produces an internal signal that synchronizes all further arming.

A. In +TI A→B measurements, the A signal always acts as the start signal and the B signal as the stop signal. In +TI B→A measurements, the B signal always acts as the start signal and the A signal as the stop signal.

B. In ±TI measurements, either the A or B signal can act as the start or stop gate. Whichever signal occurs first will act as the start gate with the other acting as the stop gate. In some ±TI measurements, a phase-detector found in the A5 Event Board's Sequencer IC will determine which of the two input signals, A or B, actually occurs first. The start and stop gates will occur such that the time between events A and B will be measured, regardless of which event actually occurs first.

   Time Interval A→B or B→A in +TI or ±TI modes allows the measurement and storage of the time of occurrence of every sequential input event on Channel A and B, up to a maximum measurement rate of 5 MHz.

C. The Continuous Time Interval mode measures and stores the time of occurrence of every sequential input event on a single channel up to a maximum measurement rate of 10 MHz. Measurement results are calculated using the following relationship:

   - Time Interval = Time (Stop) – Time (Start)

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B-5. Frequency and Period

Frequency and Period are armed and measured in the same way. They differ only in the computation of the measurements (Frequency = $\frac{1}{\text{Period}}$). Single-channel measurements can be made on either Channel A, B or C. Dual-channel measurements (A&B, A&C, B&C, A/B, A/C, B/A, B/C, C/A, C/B, A+B, A+C, B+C, A-B, A-C, B-A, B-C, C-A, C-B) are made simultaneously (i.e., two channels at the same time), with full accuracy on both channels. Both Single- and Dual-channel measurements can be made "back-to-back". The processor calculates the measurement results using the following relationships:

- Frequency = Events/Time
- Period = Time/Events

Frequency/Period measurements are taken over a user-specified sample interval that is synchronized to the input signal's trigger events. If this interval is equal to the period of the signal, then a single cycle measurement is performed. If the interval is shorter than the period of the signal, then the sample interval defaults to the period of the signal, resulting in a single cycle measurement. If the interval is longer than the period of the signal, the calculations will be the averaged value of the Frequency/Period during that time. For Dual-channel measurements (A&B, etc.), the slower of the two input signals will determine the sample interval.

Automatic arming sets the sample interval to 100 ns for Single-channel measurements. Therefore, all Frequency/Period measurements of 10 MHz and below are single cycle measurements and measurements above 10 MHz are averaged measurements. For Dual-channel measurements these numbers become 200 ns and 5 MHz. Non-continuous arming modes allow sample intervals of less than 100 ns.

B-6. Totalize

This feature allows the HP 5372A to process and display data, while continuing to totalize the input signal, and output the current totalized count. The processing and display process does not affect the total count or cause the loss of any measured input event. Single-channel Totalize measurements can be made on Channels A or B. Dual-channel Totalize measurements (A&B, B&C, A/B, B/A, A+B, A-B, B-A) are made simultaneously. These are "back-to-back" measurements. Totalize measurements are made over a user-specified sample interval that is not synchronized to the input signal's trigger events. For all arming modes, except Manual, the count total is reset with each measurement. For Manual arming, the cumulative count total is displayed until the Restart key is pressed, regardless of the number of times the count is started and stopped.

- Totalize = Event (Stop) – Event (Start)

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B-7. Risetime/Falltime

The risetime and falltime of a signal can be measured on Channel A input only. Common A input mode is used with default trigger levels of 20% and 80%. Results are calculated using the following relationships:

The Start and Stop points are automatically set to 20% and 80% of the input signal's peak-to-peak amplitude. Percentages may be modified by the user or trigger level voltages may be specified.

- Risetime = Time (80% point of positive slope) – Time (20% point of positive slope)
- Falltime = Time (20% point of negative slope) – Time (80% point of negative slope)

B-8. Positive/Negative Pulse Width

The pulse width of an input signal can be measured using Channel A input. Common A input mode is used with either a default trigger level setting of 50% or a user-selected trigger level. Results are calculated using the following relationships:

- Positive Pulse Width = Time (50% point of negative slope) – Time (50% point of positive slope)
- Negative Pulse Width = Time (50% point of positive slope) – Time (50% point of negative slope)

The Start and Stop points are automatically set on opposite slopes to 50% of the input signal's peak-to-peak amplitude. Every other pulse width is measured since one width is required to arm the measurement. Pulse Widths are "individual" measurements with a 200 ns minimum spacing requirement and they can be made on Channel A only. If the spacing between the measurements is less than 200 ns, the displayed results show the count of the number of events missed as well as the timed results.

B-9. Duty Cycle

The Duty Cycle measures the positive pulse width as a percentage of the signal's period. This is an "individual" measurement with a 200 ns minimum spacing requirement and it can be made on Channel A only. The measurement is a combination of two measurements: a Period measurement and a Positive Pulse Width measurement. Both measurements are made simultaneously at the 50% point of the signal. The trigger level percentage may be modified by the user or trigger level voltages may be set. Every other period is measured since one period is required to arm the measurement. If the period is less than 200 ns, the instrument will average over the 200 ns.

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Results are calculated using the following relationship:

- $\text{Duty Cycle} = \dfrac{\text{Time (50\% point of negative slope)} - \text{Time (50\% of positive slope)}}{\text{Period}}$

B-10. Multiple Period Phase Measurement

This function measures the relative phase of two input signals by determining the time interval between their respective edges and each signal's period. Results are calculated using the following relationship:

- $\text{Phase} = \dfrac{\text{Time (Channel B)} - \text{Time (Channel A)}}{\text{Period}} \times 360°$

Phase measurements require a reference signal, which can be supplied to either Channel A or B. The measurements available are Phase A Relative to B, or Phase B Relative to A, expressed in degrees. This measurement is the combination of two measurements: a Period measurement and a ±Time Interval measurement. The Period measurement is performed on the reference signal while a simultaneous ± Time Interval measurement is being performed between the positive edges (50% points) of the two signals. If the reference signal's edge occurs before the test signal's edge, the Phase is positive. All phase changes are referenced to the first measurement in the block, so measurements of more than 360 degrees are possible within a block.

B-11. Phase/Time Deviation

The Phase Deviation and Time Deviation functions display the phase difference and time difference, respectively, between a Channel A input signal and a reference value over some period of time. The reference signal can be either the calculated mean of a block of measurements, or a manually entered carrier frequency value.

B-12. Peak Amplitude

This function measures the minimum and maximum amplitudes of the input signal. This is a non-continuous, free-running measurement of Channel A or B peak-to-peak amplitudes. AC voltages at frequencies of 1 kHz to 200 MHz with amplitudes of 200 mV to 2 V p-p can be measured.

B-13. ARMING MODES

Arming provides control over acquisition of all measurements. When the HP 5372A is "armed", it is "ready" to store the Event and Time Counter values, and the Interpolator value, at the next input trigger event.

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The HP 5372A uses two methods for acquiring measurements, continuous and non-continuous measurement acquisition. In most cases, the measurement function selected determines whether the acquisition is continuous or non-continuous. However, for frequency, period, totalize, or two-channel ± time interval measurements, the arming mode selected will determine if a measurement will be made with continuous or non-continuous acquisition. The HP 5372A Function and Arming Summary, listed at the end of this Appendix, contains information on the type of measurement acquisition for each measurement function and arming mode.

For non-continuous measurement acquisition, Start Arm specifies the conditions which must be satisfied before a trigger event can initiate a measurement. Once the Start Arm is satisfied and the measurement is initiated, the Stop Arm conditions must be satisfied before a trigger event can end a measurement.

For continuous measurement acquisition, Block Holdoff specifies the conditions which must be satisfied before a trigger event can initiate a block of measurements. Once the Block Holdoff is satisfied, the Sample Arm conditions must then be satisfied before each sample within the block can be acquired. Once the specified number of samples have been acquired, the block of measurements will end.

The HP 5372A performs two basic types of continuous measurements:

1. "Back-to-Back" Continuous Measurements — Measurements are contiguous with one another and are related in time. In other words, the "stop" of the nth measurement is the "start" of the n+1 measurement. The measurement sample-interval may be anywhere between 75 ns and 131 us in the Fast Measurement Mode, or 100 ns and 8 seconds in the Normal Measurement Mode.

2. "Individual" Continuous Measurements — After arming occurs, the first, and only the first, "start" and "stop" trigger events cause time-sampling to occur. Subsequent "start" and "stop" trigger events are ignored until the arming conditon is once again satisfied. All time samples are related to each other in time. The start-to-stop (measurement) must be less than 8 seconds. The time from stop to the next start must be at least 200 ns.

The HP 5372A offers 25 different arming modes, which are divided into four major categories (for an overview of the Arming Modes, refer to the HP 5372A Function and Arming Summary at the end of this appendix). The four major categores are:

1. Automatic mode — measurements are made as soon and as fast as possible.

2. Holdoff mode — the start of the measurement block is held off, but the measurements within the block are made as quickly as possible.

3. Sampling modes — the block starts as soon as possible, but the measurements within the block are paced.

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4. Holdoff/Sampling modes — the start of the block is held off, and the measurements within the block are paced.

The term "Holdoff" applies to when a block of measurements begins and the term "Sampling" applies to when the measurements are armed to be made within the block.

There are seven non-continuous arming modes. For these modes, arming primarily controls the measurement's duration as opposed to continuous measurements where arming controls their pace. The "block/measurement" arming becomes "start/stop" arming of a single measurement rather than a series of measurements.

B-14. Holdoff (Block) Arming Capabilities

There are four ways to control when a block of measurements will be started. Once the block is started, measurements are made as quickly as possible.

1. Edge Holdoff — the measurement series is armed to start after a user-specified trigger event (input voltage and slope) on Channels A, B, or the External Arm input.

2. Time Holdoff — similar to Edge Holdoff except that a user-specified time delay is added between the trigger event edge and the arming of the measurement series.

3. Event Holdoff — similar to Edge Holdoff except that a user-specified number of Channel A or B events is added between the trigger event edge and the arming of the series.

B-15. Sample (Measurement) Arming Capabilities

There are six basic ways to control the pace at which measurements are made within a block. The block will start automatically.

1. Interval Sampling — sampling is armed at a user-specified rate (interval of time). The interval is referenced from either the arming of the block or the end of the previous interval.

2. Time Sampling — performs a non-continuous frequency or period measurement with a user-specified sample interval. The sample-interval time resolution is more precise in this mode than for Interval Sampling. The measurement begins when the HP 5372A is ready.

3. Cycle Sampling — a user-specified number of Channel A, B, or 2 ns timebase events (cycles) is used to determine the sample interval. Choices for the number of events is restricted to 2^4, 2^8, 2^{12}, 2^{16}, 2^{24}, or 2^{28}.

4. Edge Sampling and Repetitive Edge Sampling — sampling is armed to occur after a trigger event (edge) on Channels A, B, or External Arm. This is called "Edge Sampling" for frequency, period, and totalize measurements, and "Repetitive Edge" for time interval measurements.

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5. Parity and Repetitive Parity Sampling — Parity Sampling occurs after a parity signal is generated (parity = two sample arming edges.) The block will start automatically. Repetitive Parity Sampling occurs after an edge on Channels A, B, or External Arm is received and a parity signal is generated. The block will start automatically. Both parity arming modes are available for ± Time Interval measurements only.

6. Random Sampling — Each sample is collected after a random number of event edges on Channel A (the random number of edges varies from 4 to 15 between each processed measurement).

B-16. Holdoff/Sample Arming Capabilities

The following 13 modes are basically combinations of the Holdoff and Sample modes. Holdoff will arm the start of the measurement block and Sample will set the pace at which the measurements are made within the block. For non-continuous measurements, Holdoff (Start) arms the beginning of a single measurement and Sampling (Stop) arms its end.

1. Edge/Interval — measurements are armed to start after an edge on Channels A, B, or External Arm and arming is paced by the user-specified interval.

2. Edge/Time — a non-continuous mode that arms a measurement to begin after an edge on Channels A, B, or External Arm and to end after a user-specified time.

3. Edge/Edge — measurements are armed to start after an edge on Channels A, B, or External Arm and are paced by an edge on Channels A, B, or External Arm.

4. Externally Gated — a non-continuous mode that uses a positive or negative pulse width of a signal on Channels A, B, or External Arm to arm the beginning and end of the measurement. The minimum time between measurements is 200 ns.

5. Edge/Cycle — measurements are armed to start after an edge on Channels A, B, or External Arm and arming is paced by the user-specified number of Channel A, B, or internal timebase (2 ns) events (cycles). Choices for the number of events is restricted to 2^4, 2^8, 2^{12}, 2^{16}, 2^{24}, or 2^{28}.

6. Edge/Event — a non-continuous mode that arms a measurement to begin after an edge on Channels A, B, or External Arm and end after a user-specified number of Channel A or B events.

7. Edge/Parity — measurement block is armed to start after an edge on Channels A, B, or External Arm is received and a parity signal is generated. The block will start automatically. The Edge/Parity arming mode is used for ±Time Interval measurements only.

8. Time/Interval — measurements are armed to start after a user-specified time that is referenced to an edge on Channels A, B, or External Arm. The arming of the measurement series is paced by a user-specified interval.

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9. Time/Time — a non-continuous mode that arms a measurement to begin after a user-specified time that is referenced to an edge on Channels A, B, or External Arm. The measurement is armed to end after a separately set, user-specified time that is referenced to the same edge.

10. Event/Interval — measurements are armed to start after a user-specified number of Channel A or B events which are referenced to an edge on Channels A, B, or External Arm. The measurement arming is paced by a user-specified interval.

11. Event/Event — a non-continuous mode that arms a measurement to begin after a user-specified number of Channel A or B events and is armed to end after a separately specified number of events. Both are referenced to an edge on Channels A, B, or External Arm.

12. Edge/Random — the measurement block is armed to start after a user-specified trigger event on Channel A, B, or External Arm inputs. Each sample is collected after a random number of event edges on Channel A (the random number of edges varies from 4 to 15 between each processed measurement.)

13. Manual — a non-continuous mode for use with the Totalize function. The measurement is armed to begin and end after pressing the Manual Arm hardkey. The duration of the measurement is the time between key presses.

Additional information on arming modes is contained in Chapter 5 of the HP 5372A Operating Manual.

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HP 5372A Function and Arming Summary

ARMING MODE	MEASUREMENT FUNCTION													
	TIME INTERVAL OR HISTOGRAM TI		CONTINUOUS TIME INTERVAL OR HISTOGRAM CTI	±TIME INTERVAL OR HISTOGRAM ±TI		FREQUENCY, PERIOD		TOTALIZE		POS WIDTH NEG WIDTH RISE TIME FALL TIME DUTY CYCLE	PHASE	PEAK AMPLITUDE	PHASE DEVIATION	TIME DEVIATION
	A	A→B	A	A	A→B	A	DUAL[1]	A	DUAL[1]	A	A rel B	A	A	A
	B	B→A	B	B	B→A	B	RATIO[2]	B	RATIO[2]		B rel A	B	B	B
						C	SUM[3]		SUM[3]					
							DIFF[4]		DIFF[4]					
AUTOMATIC														
AUTOMATIC	C*	C*	C*		C*	C*	C*			C*	C*	N*	C*	C*
HOLDOFF														
EDGE HOLDOFF	C	C	C		C	C					C		C	C
TIME HOLDOFF	C	C	C			C								
EVENT HOLDOFF	C	C	C			C								
SAMPLING														
INTERVAL SAMPLING	C	C	C		C	C	C	C*	C*		C		C	C
TIME SAMPLING						N								
CYCLE SAMPLING						C								
EDGE SAMPLING						C	C	C	C					
PARITY SAMPLING					C									
REPET EDGE SAMPLING	C	C	C		C									
REPET EDGE-PARITY SAMPLING					C									
RANDOM SAMPLING	C	C			C									
HOLDOFF/SAMPLING														
EDGE/INTERVAL	C	C	C		C	C	C	C	C		C		C	C
EDGE/TIME						N								
EDGE/EDGE						C		C	C					
EDGE/CYCLE						C								
EDGE/EVENT				N	N	N								
EDGE/PARITY					C									
EDGE/RANDOM	C	C			C									
TIME/INTERVAL						C		C						
TIME/TIME				N	N	N								
EVENT/INTERVAL						C								
EVENT/EVENT				N*	N	N								
EXTERNALLY GATED						C		C	C					
MANUAL								N	N					

Symbol C or N indicates that a measurement can be made using the corresponding combination of Function, Channel, and Arming selections.

C = Continuous Arming, (Block/Sample Arming)

N = Non-Continuous arming, (Start/Stop Arming), setups are limited to M blocks of 1 measurement.

1. DUAL. Simultaneous Dual-channel, (2 results). Frequency and Period options are: A&B, A&C, B&C. Totalize option is: A&B.
2. RATIO. Frequency and Period ratio options are: A/B, A/C, B/A, B/C, C/A, C/B. Totalize ratio options are: A/B, B/A.
3. SUM. Frequency and Period sum options are: A+B, A+C, B+C. Totalize sum option is: A+B.
4. DIFFERENCE. Frequency and Period difference options are: A–B, A–C, B–A, B–C, C–A, C–B. Totalize difference options are: A–B, B–A.

* = Default Arming

ARMING CATEGORIES

Category	Continuous Arming Modes	Non-Continuous Arming Modes
Automatic	Block Holdoff is Automatic Sample Arm is Automatic	none
Holdoff Modes	Block Holdoff is User-defined Sample Arm is Automatic	none
Sampling Modes	Block Holdoff is Automatic Sample Arm is User-defined	Start Arm is Automatic Stop Arm is User-defined
Holdoff/Sampling Modes	Block Holdoff is User-defined Sample Arm is User-defined	Start Arm is User-defined Stop Arm is User-defined

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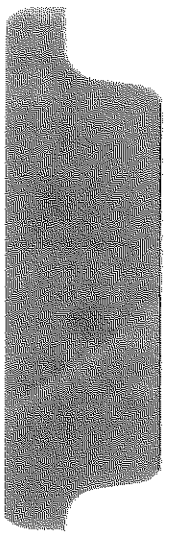

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C

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APPENDIX
C

DIAGNOSTICS

C-1. INTRODUCTION

This appendix contains information on the built-in diagnostics of the HP 5372A. These diagnostics help in the troubleshooting of faulty components and assemblies. There are three types of diagnostics:

1. Power-Up Self Test: A series of tests automatically executed when the HP 5372A is powered up.

2. User-selected Self Test: A series of tests executed by selecting "Self Test" via the Test key.

3. User-selected Diagnostics: Individual tests that exercise specific circuitry within the HP 5372A. These tests are executed by selecting the individual tests via the Test key.

C-2. Power-Up Self Tests

The tests executed during power-up are those requiring no user interaction. If a failure is detected, an explanatory error message is displayed on the instrument's CRT. When all diagnostics are completed, the 5372A pauses and waits for the user to press any front-panel key. After the key has been pressed, the instrument attempts to operate in a normal fashion even though a failure has been detected. The following tests are executed during the power-up process:

- Back-up RAM Test
- Front Panel Controller Initialization Test
- Test 2. Time Base Test
- Test 3. Input Pods Test
- Test 4. Input Amplifiers Test
- Test 5. Histogram Test
- Test 6. Count ICs Test
- Test 7. Gate Timer Test
- Test 8. Measurement RAM Test
- Test 9. System ROM Test
- Test 10. System RAM Test
- Test 11. Non-volatile RAM Test
- Test 12. Real time Clock Test

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- Test 13. Coprocessor Test
- Test 14. CRT RAM Test
- Test 15. LED Latch Test
- Test 16. CRT Controller Test
- Test 18. DMA Controller Test

The System RAM, CRT Display RAM, and Measurement RAM tests, which are performed during power-up initialization, check for unique address locations and therefore are destructive to the data contained in the RAM locations. The only data retained during the RAM tests is that stored in the CMOS battery back-up ICs, A7U20 and U56. Less comprehensive and therefore non-destructive System RAM and CRT RAM tests are used after power-up to prevent loss of data during testing. Testing performed on the Measurement RAMs is always destructive to data.

The Back-up RAM and the Front Panel Controller Initialization Tests are performed only during the power-up testing sequence. A description of these two tests follows.

C-3. BACK-UP RAM TEST

This test checks back-up RAMs A7U20 and A7U56 which are powered by battery A7BT1 during AC power loss. These RAMs contain variables that are saved when the instrument is powered down. When the 5372A is powered down, the 68020 μP performs a checksum test for back-up RAM memory space. When the instrument is powered up, the checksums are again calculated and should match those saved at power-down. If the checksums do not match, all the variables in the back-up RAM memory space are initialized to default values.

```
Messages:

Back-up RAM PASSED
Instrument setup lost. Reset to default.
```

This message is displayed at instrument power-up if the checksums for the Back-up RAM space containing the instrument setup are not correct.

```
Saved configuration lost.
```

This message is displayed at instrument power-up if the checksums for the Back-up RAM space containing the saved instrument setups are not correct.

C-4. FRONT PANEL KEYBOARD CONTROLLER INITIALIZATION TEST

Prior to writing a parameter to the Front Panel keyboard Controller IC, A8U1, the 68020 μP waits for the controller to set bit 1 of the key-status register to 0. If this does not occur before a software wait loop times out, this test will fail. This test is performed during power-up sequence only.

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C-5. Diagnostic Test Screen

Eighteen of the diagnostic tests listed on the TEST Menu Screen (i.e., Tests 2 through 18 and Test 23) display test results using the Diagnostic Test Screen. This screen displays the number of times the test is executed and the number of times the test fails. Also displayed are the "CURRENT RESULT" and "LAST FAILURE RESULT" along with the time at which the associated messages are displayed. The "CURRENT RESULT" field shows either the message returned the last time the test was executed, or an intermediate result displayed while the test is running. The Memory and Count ICs Tests display intermediate results to give more detailed failure information that can't fit into the return message. The "LAST FAILURE RESULT" field shows the message returned by the test the last time it failed. Intermediate results are not displayed in the "LAST FAILURE RESULT" field.

A test selected from the TEST Menu Screen and initiated by pressing **Run** softkey, is repeated continuously until the **Stop** softkey is pressed. If the **Pause** softkey is pressed while the test is running, the test pauses until the **Run** softkey is again pressed. The test can also be executed in "Until Fail" mode, where the test pauses when a failure occurs.

C-6. TEST DESCRIPTIONS

The following paragraphs describe each diagnostic test and lists possible messages and results.

C-7. Test 1. Self Test

The Self Tests are a series of tests that exercise various sections of the 5372A. Self Test requires no user interaction and since Measurement RAM locations are tested, is always destructive to data stored in memory.

The results of the self tests are displayed on the Self-test screen. Each test is listed on the screen, grouped by board assembly number (i.e., indicated inside brackets [1]), and is followed by PASS or FAIL indicating whether the test passed or failed. The name of the test currently being executed is highlighted on the Self-test screen. The screen also displays the message and the time of last failure associated with the last observed failure. The system keeps track of the number of times the Self-test is performed and the number of times the Self-test fails. The following tests are executed during Self-test:

- Test 2. Time Base Test
- Test 3. Input Pods Test
- Test 4. Input Amplifiers Test
- Test 5. Histogram Test
- Test 6. Count ICs Test
- Test 7. Gate Timer Test
- Test 8. Measurement RAM Test
- Test 9. System ROM Test
- Test 10. System RAM Test
- Test 11. Non-volatile RAM Test

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- Test 12. Real time Clock Test
- Test 13. Coprocessor Test
- Test 14. CRT RAM Test
- Test 15. LED Latch Test
- Test 16. CRT Controller Test
- Test 17. Key Controller Test
- Test 18. DMA Controller Test

C-8. Test 2. Time Base Test

During this test, the 68020 µP (located on A7 Processor Board) reads a 16-bit status byte to determine the state of the 5372A timebase reference source. The test passes if both the internal 10 MHz A15 Oven Oscillator (HP Part Number 10811-60111) and 500 MHz reference frequency are locked. The return message indicates if the oscillator source is generated internally or externally (via the rear-panel EXTERNAL INPUT connector).

The status word is latched onto the Count Hardware Bus by buffer A1U31, which is located on the A1 Timebase Control Board. The status word, located at address 60E20030 (hexadecimal) in memory, is addressed by PAL IC A1U21 to enable A1U31. Only the lower status word byte contains actual data. The status word bits are mapped as in *Table C-1*.

Table C-1. Timebase Status Word Bit Map

Bit	Description
0	Bit 0 = 1 if External Source Present
1	Not Used
2	Bit 2 = 1 if Internal Timebase Source Present
3	Bit 3 = 1 if Phase-locked Loop is Locked
4	Not Used
5	Bit 5 = 1 if a Timebase Reference Change From Internal to External Source Occurs
6	Bit 6 = 1 if a Timebase Reference Change From External to Internal Source Occurs
7	Bit 7 = 1 if Phase-locked Loop loses lock
8-15	Contain No Usable Data

The Timebase Test examines Bit 3 to check if the A14 Timebase Multiplier Board's phase-locked loop circuit is locked. If Bit 3 is set to 1, the test passes. If, on the other hand, a 0 is detected, the test fails with the "Unlocked" failure. Bits 0 and 2 are also examined. One bit should be set to 1, while the other should be set to 0. If both are set to 1, then the test fails the "Ext & Int Source" failure. If both are set to 0, then the test fails the "No Source" failure.

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```
Messages:

Reference Oscillator PASSED Source: [EXTERNAL]
Reference Oscillator FAILED Source: [INTERNAL] Unlocked: [ 10 500]
```

Indicates that the oscillator is not locked.

```
Reference Oscillator FAILED - Ext & Int Source: [EXTERNAL INTERNAL]
```

The status bits indicate that both an internal and external timebase reference are present. This condition should never occur. If it does, erroneous data is being sent from the status register, which is located on the A1 Timebase Control Board.

```
Reference Oscillator FAILED - No Source []
```

The status bits indicate that neither an internal or external timebase reference are present. This condition should never occur. If it does, erroneous data is being sent from the status register, which is located on the A1 Timebase Control Board.

C-9. Test 3. Input Pod Test

This test checks for proper installation of both Channel A and Channel B Input Pods. Three ID (Identification) bits generated by each pod determine which type (i.e., HP 54001A, 54002A, or 54003A), or if any, pods are installed in the 5372A. This test passes only if pods are installed in BOTH pod locations. The type of pod installed in each location is identified in the return message. If your HP 5372A is equipped with Option 060, Rear Panel Inputs, then the input pod test is not performed.

```
Messages:

Pods Present - PASSED A:[54002] B:[54001]
Pods Missing - FAILED A:[NO_POD] B:[NO_POD]
Rear panel inputs installed, POD test not performed.
```

During the Input Pod Test, the 68020 µP reads POD ID Latch, A1U29, located on the A1 Timebase Control Board. The POD ID latch, which is located at address 60E20041 (hexadecimal), drives the byte of information onto the Count Hardware Data Bus. PAL IC, A1U21, decodes the address to enable A1U29.

Each input channel pod generates a 3-bit signal that is pulled to +5V through A1R95 on the A1 Timebase Control Board. Each type of pod inserted in the front panel has a unique pattern of shorting these three lines to ground. The bits for POD ID latch are mapped as indicated in *Table C-2.*

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Table C-2. POD ID Bit Map

Bit	Input Pod Channel	Bit Description
0	A	LSB
1	A	Bit
2	A	MSB
3	Not Used	0
4	B	LSB
5	B	Bit
6	B	MSB
7	Not Used	0

After the test reads the output of the POD ID Latch, the data read is divided into two parts; one for Channel A Input Pod, and one for Channel B Input Pod. The data should correspond to the values listed in *Table C-3*. Any value not listed generates a "NO POD" failure.

Table C-3. Input Pod ID Data

Bits			Input Pod Type
ID2n* (MSB)	ID1n*	ID0n* (LSB)	
1	1	0	HP 54001A
1	0	0	HP 54002A
1	0	1	HP 54003A
*n = A or B, depending on which channel the pod is installed.			

C-10. Test 4. Input Amplifier Test

The *Input Amplifier Test* perform a series of tests on the A2 Input Amplifier Board. The description of each test follows:

A. Comparators A2U4 and U15 are tested to ensure that they will not toggle when inputs are removed from each channel. The trigger level and input bias voltages are set to 0 V on both channels. The counting hardware is programmed to count pulses generated by both comparators. If pulses are counted on either channel, the test fails.

B. The auxiliary comparator (A1U15AB) outputs are tested by forcing them low and then high. This is accomplished by setting the input biases to 0 V, then setting the trigger levels to 1 V, then –1 V. With the trigger level set to 1 V, the auxiliary comparators should indicate that the signal is below the trigger level. With the trigger level set to –1 V, the auxiliary comparators should indicate that the signal is above the trigger level.

C. The slope controls lines are tested by changing them from positive to negative. With the input bias still at 0 V and the trigger level still at –1 V, the output of the auxiliary comparators should change.

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D. This test ensures that the comparators trigger on the correct number of events as detected by the counting hardware. The counting hardware is programmed to count events from the channel being tested. A forced latch is performed and the count is saved. Then, 100 pulses are generated using the signal from the bias MUX which is controlled by the trigger level DAC of the channel not currently being tested. Approximately 100 events should be counted. A second forced latch is then performed and a second set of 100 events is counted and added to the first set. If the difference between the two forced latches is within 15% of 100, the test passes. This test is performed once for each channel.

E. *Input Switching Test 1*: Tests relays A2K2, K3 and K4 as a unit. These relays are set up so that the input level to Channel A of the input amplifier is 1 V. A peak search is performed on the input level; if it is within 15% of the expected value, the test passes.

F. *Input Switching Test 2*: Tests relay A2K2. Relays A2K1 and K2 are switched from the previous setup so that the input level to Channel A is 575 mV. A peak search is performed on the input level; if it is within 15% of the expected value, the test passes. If this test fails and the previous tests passed, relay A2K2 must be at fault.

G. *Input Switching Test 3*: Tests relay A2K3. Relay A2K3 is switched from the previous setup so that the input level to Channel A is 0 V. A peak search is performed on the input level; if it is within 15% of the expected value, the test passes. If this test fails and the previous tests passed, relay A2K3 must be at fault.

H. *Input Switching Test 4*: Tests relay A2K4. The relays are set up so that the input level to Channel A of the input amplifier is –2 V. A peak search is performed on the input level; if it is within 15% of the expected value, the test passes. If this test fails and the previous tests passed, relay A2K4 must be at fault.

I. *Input Switching Test 5*: Tests relays A2K6, K7 and K8 as a unit. The relays are set up so that the input level to Channel B of the input amplifier is 575 mV. A peak search is performed on the input level; if it is within 15% of the expected value, the test passes.

J. *Input Switching Test 6*: Tests relay A2K8. Relay A2K8 is switched from the previous setup so that the input level to Channel B is 1 V. A peak search is performed on the input level and if it is within 15% of the expected value, the test passes. If this test fails and the previous tests passed, relay A2K8 must be at fault.

K. *Input Switching Test 7*: Tests relay A2K7. Relay A2K7 is switched from the previous setup so that the input level to Channel B is 575 mV. A peak search is performed on the input level; if it is within 15% of the expected value, the test passes. If this test fails and the previous tests passed, relay A2K7 must be at fault.

L. *Input Switching Test 8*: Tests relay A2K6. Relays A2K5 and K6 are switched from the previous setup so that the input level to Channel A is 1 V. A peak search is performed on the input level: if it is within 15% of the expected value, the test passes. If this test fails and the previous tests passed, relay A2K6 must be at fault.

M. *Bias MUX Test*. Tests Termination Bias Selection Multiplexers (MUXs) A2U7 and U21. Each input of the bias MUX is sent to the input channels. A peak search is performed on each of the levels to determine if they are within an acceptable range. The four MUX

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inputs are –2 V, 1 V, 0 V, and DAC control level. The DAC control levels are set to 2 V. The expected voltage level is 1/10 of 2 V DAC control level (200 mV). Eight tests are performed; Tests 1, 3, 5, and 7 test the –2 V, 1 V, 0 V, and DAC biases respectively for Channel A while tests 2, 4, 6, and 8 check the same voltage levels for Channel B.

When both the relay (input switching) and bias tests are complete, a message is returned indicating whether one or the other type of test has failed (or both types, if applicable).

NOTE

Failure messages may be caused by input amplifiers being out of adjustment.

Messages:

```
Input Amp Test PASSED
Input Amp Test FAILED – Input Amp Oscillating A[313] B[0]
```

The input amplifier is oscillating with no input signal. The number of counts detected for each channel is returned in the error message.

```
Input Amp Test FAILED – Bad comparator result A: Stuck High B: Stuck Low
```

The auxiliary comparators returned bad results. The results are returned in the error message along with the expected results in parentheses.

```
Input Amp Test FAILED – Slope control failed: [Channel A] [Channel B]
```

The input amplifier slope control failed. The results are returned in the error message along with the expected results in parentheses. Both comparators should change to the low state.

```
Input Amp Test FAILED – Bad Counts A[0] B[100]
```

An incorrect number of events was detected by the counting hardware (100 events were expected on each channel). The actual number of counts detected on each channel is returned in brackets in the error message.

```
Input Amp Test FAILED – Input Switching Failure
```

This message is returned if any of the relay tests fail.

```
Input Amp Test FAILED – Input Bias Failure
```

This message is returned if any of the bias tests fail.

```
Input Amp Test FAILED – Input Switching or Input Bias Failure
```

This message is returned if any of the relay tests or bias tests fail.

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```
Intermediate Messages:

Input Switching Test 1: Max: 1038 (Min: 1040) [1115 1360]
```

If a relay test fails, an intermediate message containing the DAC result followed by the acceptable range in brackets is displayed. The minimum peak level is also searched for and returned if an error is detected.

```
Input Bias Test 5: Max: 2072 (Min: 2070) [2191 2235]
```

If a bias test fails, an intermediate message containing the DAC result followed by the acceptable range in brackets is displayed. The minimum peak level is also searched for and returned if an error is detected.

C-11. Test 5. Histogram Test

The Histogram test exercises the hardware histogram circuit, located on the A3 assembly. This circuit consists of the histogram IC (A3U10), three dual port RAM ICs (A3U1, A3U4, and A3U6), and two address latch ICs (A3U8 and A3U11). The test performs: 1) read and write operations on the internal counter of the histogram IC, 2) read and write operations on the RAM ICs, 3) a fast clear operation on the RAM ICs, 4) a fast incrementer operation on the RAM ICs, and 5) a check to determine if the RAM ICs have latching sense amplifiers which prevent updated data from being output under certain conditions.

```
Messages:

Meas Counter 5 FAILED RD: 00 [AA]
```

If this message is displayed on the CRT, then the internal counter of the histogram IC has failed.

```
Histogram RAM FAILED d RD: 888888 [AAAAAA]
```

If this message is displayed on the CRT, then a RAM IC has failed.

```
Histogram Clear FAILED d RD: FFFFFF [0]
```

If this message is displayed on the CRT, then a RAM IC has failed.

```
Fast Incrementer FAILED <1> RD: 1 <2
```

If this message is displayed on the CRT, then a RAM IC has failed.

```
Dual Port RAM Read Failure
```

If this message is displayed on the CRT, then the diagnostic has detected a RAM IC which does not allow updated data from being output under certain conditions. This is usually caused by a RAM IC with latching sense amplifiers. Replace the RAM IC with the recommended part.

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C-12. Test 6. Count ICs Test

The Count ICs test exercises the Sequencer IC and Event Counters on the A5 assembly, and the Time Counter on the A3 assembly. These counters are custom ICs which perform the actual event and time counting measurements of the HP 5372A. Each ZDT has an internal 16-bit counter with two 16-bit latches that are capable of latching (sampling) the contents of the counter without disturbing the count. The Sequencer acts as traffic cop to control which signals are counted and which signals control the measurement. To test the ZDTs, the Sequencer is programmed to gate the 500 MHz reference frequency to the Event 1 and Event 2 Counter chain clock inputs. The 500 MHz signal is hard-wired to the Timing Counter ZDT chain clock input. Since the ZDTs are configured into three chains comprised of two cascaded ZDTs each, each chain can be tested separately. The ZDT are tested by the following pairs: Event Counter 1 (ZDT1A & ZDT1B), Event Counter 2 (ZDT2A and ZDT2B), and the Timing Counter (ZDT3A & ZDT3B). Each of the three ZDT chains are exercised as follows:

A. The data paths to the ZDT chain are tested. The ZDTs are preset to the value AAAA (hexadecimal). This prevents them from counting and sets the internal count value to AAAA (hexadecimal). Forced latches are then performed on Latches 1 (L11 and L21) and Latches 2 (12 and 22). The results are then read back and compared to the initial preset value. This test is then repeated for the 5555 (hexadecimal) pattern.

B. The latch status bits for Latches 1 (L11 and L21) and 2 (L12 and L22) are checked. They should be set already since the last action performed by the previous test was a forced latch.

C. The ZDTs are reset and the latch status bits are checked again. The bits should now be cleared.

D. The Terminal Count (TC) bits are tested. A reset is performed first. This clears the terminal count bits. The ZDTs are then preset to FFFF (hexadecimal). ZDTxB is then programmed to FF00 (hexadecimal) causing a carry-out from the first stage ZDTxB. This should cause the terminal count bit of ZDTxB to set. Then ZDTxA is programmed to FF00 (hexadecimal) causing a carry-out from the first stage of ZDTxA. This causes the terminal count bit of ZDTxA to set.

E. The ZDTs are tested to check their ability to count. The ZDTs are preset to 0 and then a reset is performed enabling counting. A software delay loop is executed and Latches 1 (L11 and L21) and 2 (L12 and L22) are forced. The values of the forced latches should differ from the initial preset values.

F. The latches are read a second time to see if they held the latched values. The values read the second time should match the value read the first time.

G. The enable latch function is tested. The latches are enabled, a software delay loop is executed, and Latches 1 (L11 and L21) and 2 (L12 and L22) are forced. The values read the second time should be different from the values of the latches before they were enabled.

H. Two Totalize measurements using the Gate Timer circuit are performed to test the accuracy of the ZDT count ICs. The 500 MHz reference frequency is routed to each of the

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ZDT chains. Measurements using a 4.6 µs and 4.1902 ms gate times are made on each ZDT chain. The 4.6 us gate time measurement should return a result of 8FC (hexadecimal) ±3, while the 4.1902 ms gate time measurement should return a result of 1FF7FC (hexadecimal) ± 3. Two measurements are made to ensure that the high and low order ZDTs are tested. The values 4.6 µs and 4.1902 ms were chosen because they have values that end with the bit pattern FC. The test is more likely to fail when there are numerous 1's in the expected pattern.

NOTE

If a test fails, a failure message is displayed. If Test H causes the ZDT being tested to lock up and no failure messages are displayed, then Tests A through G have passed.

```
Messages:

Count ICs PASSED
Count ICs FAILED: A5U42,A5U41,A5U73,A5U74,A3U37,A3U42

Intermediate Messages:

A5U42 FAILED: Read bad preset value thru forced latch1 RD: FFFF WR: AAAA
A5U42 FAILED: Read bad preset value thru forced latch2 RD: FFFF WR: AAAA
A5U42 FAILED: Latch1 status bit not set after forced latch RD: FFFF WR: 0000
A5U42 FAILED: Latch2 status bit not set after forced latch RD: FFFF WR: 0000
A5U42 FAILED: Latch1 status bit set after ZDTs reset RD: FFFF WR: 0000
A5U42 FAILED: Latch2 status bit set after ZDTs reset RD: FFFF WR: 0000
A5U42 FAILED: Terminal Count not cleared after reset RD: FFFF WR: 0000
A5U42 FAILED: Terminal Count not set after 0FFFFH preset RD: FFFF WR: 0000
A5U42 FAILED: Latch1 is not changing after a reset RD: FFFF WR: 0000
A5U42 FAILED: Latch2 is not changing after a reset RD: FFFF WR: 0000
A5U42 FAILED: Latch1 is changing after a forced latch RD: FFFF WR: 0000
A5U42 FAILED: Latch2 is changing after a forced latch RD: FFFF WR: 0000
A5U42 FAILED: Latch1 is not changing after an enable latch RD: FFFF WR: 0000
A5U42 FAILED: Latch2 is not changing after an enable latch RD: FFFF WR: 0000
A5U41,42 chain FAILED – BAD count [4.6 us gate]: [00000921][000008FC]
```

The ZDT counter ICs are tested by writing and reading patterns to each IC and comparing the patterns to expected results. The decoding for the ZDTs and Sequencer is performed by PAL IC A6U48 located on the A6 Count Support Board. The ZDTs are connected through transceivers to Event 1 & 2 and Timing Counter Measurement RAMs, and to numerous bus buffers. These bus buffers are controlled by PAL IC A6U49, also located on the A6 Count Support Board.

If all ZDTs indicate a similar failure mechanism, the cause may be something other than the ZDTs. If the patterns "AAAA" and "5555" are incorrect, a bit located either on the Count Hardware Data Bus or the A5 Event Board could be stuck. If data read is "FFFF", the ZDT buffers may not be enabled.

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NOTE

Test 8, Measurement RAM Test, also tests the ZDT buffers. Therefore, if Test 8 passes, the ZDT buffers should be operational.

Tests E and H check the ability of the ZDT counter chains to count. If Tests E and/or H fails, the ZDTs may not be receiving the 500 MHz reference frequency. No clock or wrong clock frequency could cause Tests E and H to fail.

Test H uses the Gate Timer circuit and count hardware control circuits. If all three ZDT chains fail or lock up, check these circuits. Remember that the Gate Timer Test, Test 7, does not test the TTR, or TG1 signal paths. Test H uses the double-latch setup in the Count hardware control circuits.

C-13. Test 7. Gate Timer Test

This test exercises the A6 Gate Timer circuit, which is responsible for generating the sample intervals (gate times). The Microprocessor programs the the gate timer through A6U4, A6U6, A6U18, and A6U20 to count down from an initial value of 200000 and is allowed to count down for 20 ms (determined by a software loop). The sequencer IC, A5U72, is programmed to send the TTR signal to initiate the count-down sequence. The TEST TG1 line on A6U8B(9) is then polled by the microprocessor in a software loop which counts the number of loops completed. When this line goes high, the loop stops and the value of the loup count is checked. If the value is not correct, the gate timer test fails and the actual count value is displayed. If the test fails, check the 10 MHz BCLK line A6U58D(11) (this signal needs to be exactly 10 MHz for the test to pass). If the BCLK signal is correct, and the Gate Timer test fails, replace the A6 board.

NOTE

The TG1 Gate Timer signal path from the Gate Timer circuit to the Sequencer IC (A5U72) is not tested by Test 7, Gate Timer Test.

```
Messages:

Gate Timer PASSED: count = [6430]
Gate Timer FAILED: count = [200000]
```

If the software loop count is not within the acceptable range, the test fails and the bad count is included in the return message.

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C-14. Test 8. Measurement RAM Test

NOTE

The Measurement Ram Test always destroys data stored in memory regardless of whether it is run at power-up, from diagnostics, or via HP-IB.

This test exercises the measurement RAM ICs used to store data output by the ZDT counters and the Interpolators. The Event ZDT counter output is stored on the A5 Event Board, while the Time ZDT counter output and the Interpolator output are stored on the A3 Time Board. The counter RAMs are 8-bit wide devices, while the ZDT counters are 16-bit wide devices. Therefore, each ZDT counter has two RAMs in which to store its latched data output. The 4-bit wide Interpolator data is combined with status information in a single 8-bit wide RAM. The Measurement Ram Test exercises both RAMs associated with each ZDT counter at the same time.

The RAMs are tested by writing and reading patterns to each memory location and comparing these patterns to expected results. The addresses for each RAM location are generated by the DMA Address Generation counters A5U26 and A5U28. Memory PAL IC (A6U52) enables the RAM Output Enable (~RAMOE) for all the measurement RAMs during a read cycle. The latches that buffer each set of RAMs from the data bus are controlled by the Buffer PAL IC (A6U49).

The test begins with the two RAMs associated with counter ZDT1A. Hexidecimal AAAA is written to all measurement locations. Next, the first memory location is read. If AAAA (hexadecimal) is not read, the test fails and ends. If data read is OK, 5555 (hexadecimal) is written to the first memory location. Next, the memory location is read. If 5555 (hexadecimal) is not read, the test fails and ends. If the data read is OK, then 8888 (hexadecimal) is written to the first memory location. This checks for uniqueness at all RAM locations. The test just described is repeated for all memory locations.

If all the measurement RAMs fail in a similar fashion, the problem could be caused by something other than the RAMs being tested. If the patterns AAAA and 5555 are incorrect, check the Count Hardware Data Bus path on the A5 Event, A6 Count Support, and A12 Motherboard. If all the RAMs read back 8888 instead of AAAA, then the RAM Address Counters (A5U26 and A5U28) or the RAM Address Latches could be defective. A5U50 and A5U49 are the RAM Address Latches for the Event ZDT counters. A5U27, A5U25, A3U21, and A3U22 are the RAM address latches for the Time ZDT counter and the Interpolator. If all the data read back is FFFF, then the buffer ICs that buffer the RAMs may not be enabled. First, check for the write pulse in the RAM-Write circuit and the increment pulse to the DMA Address Generation Counters. If the problem persists, replace the A6 Count Support Board.

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If only one set of RAMs fails, then the RAMs or the associated ZDT counter could be suspect. If the ZDT counter is installed incorrectly or has an output that won't toggle, the test might fail. Check each pair of latches, or buffers, for proper control signals.

```
Messages:
Measurement RAM PASSED
Measurement RAM FAILED: 1A 1B 2A 2B 3A 3B INT
```

A list of the failed measurement RAMs is returned.

```
Intermediate Messages:

Measurement RAM 1A [Fail]: 800 W: AAAA R: 8888
```

If a measurement memory failure is detected, the address at which the failure occurs and the data that was written and read are displayed in the intermediate message.

C-15. Test 9. System ROM Test

The System ROMs located on the A7 Processor Board are tested by performing a checksum on each ROM.

```
Messages:
System ROM PASSED
System ROM FAILED: U55 U19 U54 U18 U53 U17 U52 U16
```

A list of System ROMs that fail the checksum test is returned.

```
Intermediate Messages:

System ROM U16 [Fail] Sum = 001ACD54 [00678C18]
```

If an incorrect checksum is detected, the measured checksum value and the expected checksum value (in brackets) are displayed in the intermediate message.

C-16. Test 10. System RAM Test

The System RAM ICs located on the A7 Processor Board are tested by writing and reading hexadecimal bit patterns (AAAAAAAA and 55555555) to and from each 32-bit memory location. This test is non-destructive to the data stored in System RAM when the test is run from the TEST menu. The current data stored in each memory location is stored prior to testing that memory location. Following the test of each memory location, the original contents of the memory are restored.

When this test is performed during the instrument power-up sequence, a destructive test that establishes a unique relationship between memory locations is performed. All memory locations are preset to hexadecimal AAAAAAAA, read, set to 55555555, read, and set to 88888888. If any two memory locations are mapped to the same memory location, bit pattern 88888888 is read instead of the expected AAAAAAAA.

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```
Messages:
System RAM PASSED
System RAM FAILED: U34 U36 U10 U12 U35 U37 U11 U13
```

A list of System RAM ICs that fail is returned.

```
Intermediate Messages:

System RAM U10 [Fail]: 20451E72 W:A R:8
```

If a memory failure is detected, the address at which the failure occurred and the data written to that location are displayed in an intermediate message.

C-17. Test 11. Non-volatile RAM Test

This test checks back-up RAMs A7U20 and A7U56 which are powered by battery A7BT1 during AC power loss. These RAMs contain variables that are saved when the instrument is powered down. The non-volatile RAMs are tested by writing and reading hexadecimal bit patterns (AA, 55, and 88) to and from each memory location. The current data stored in each memory location is stored prior to testing that memory location. Following the test of each memory location, the original contents of the memory are restored.

```
Messages:

NV RAM U20 [Fail]: 50822564 W:AA R:88
```

C-18. Test 12. Real Time Clock Test

This test checks the tenths-of-a-second register of the Real time Clock IC (A7U78) to ensure that it is incrementing. The number of times the wait loop is executed before a change in the tenths register is detected is included in the return message.

```
Messages:

Real Time Clock PASSED: Count = [245] 21 Nov 1989 09:54:55
Real Time Clock FAILED: Not Responding - Timeout Occurred.
```

If a change in the tenths register is not detected within the timeout period, the "Not Responding" error message is returned. The two bracketed numbers that precede the count are the contents of the tenths register before and after executing the wait loop.

```
Real time Clock FAILED: Non-consecutive Increment [1] [3] Count = [244]
```

If the value of the tenths register changes by an amount other than +1, the "Non-consecutive Increment" error message is returned. The two bracketed numbers that precedes the count are the contents of the tenths register before and after executing the wait loop.

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C-19. Test 13. Coprocessor Test

The coprocessor test exercises the floating point coprocessor, A7U22, located on the A7 Processor Board. The test performs an addition, a multiplication, and an arcos operation.

The operands of the addition operation check all 32 data bits. The multiplication and arccos operations comprehensively check additional circuitry of the coprocessor.

```
Messages:

Coprocessor not responding
```

If this message is displayed on the CRT, then either the chip select circuit (A7U8 and A7U29) is defective, or the coprocessor IC is defective.

```
Coprocessor FAILED: Add
Coprocessor FAILED: Multiply
Coprocessor FAILED: Add Arccos
Coprocessor FAILED: Add Multiply Arccos
```

If any of these messages are displayed on the CRT, then the coprocessor IC is defective.

C-20. Test 14. CRT RAM Test

The CRT Display RAM ICs (A8U15, U19, U23, and U27) are located on the A8 I/O Controller Board. This memory, which stores the bit-mapped front-panel CRT Display image, is tested by writing and reading hexadecimal bit patterns A and 5 to and from each 4-bit memory location. Each word of CRT Display Memory is stored in four 4-bit wide RAMS. This test checks each Display RAM IC individually.

This test is non-destructive to the data stored in Display RAM if the test is run from the TEST menu. The data currently stored in each memory location is stored prior to testing that memory location. Following the test of each memory location, the original contents of the memory are restored.

This test is destructive to memory if performed during the instrument power-up sequence since the test establishes a unique relationship between memory locations. All memory locations are preset to hexadecimal AA, read, set to 55, read, and set to 88. If any two memory locations are mapped to the same memory location, bit pattern 88 is read instead of the expected AA.

```
Messages:

CRT RAM PASSED
CRT RAM FAILED: U19 U15 U27 U23
CRT Display RAM ICs that fail the test are returned with the error message.
```

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```
Intermediate Messages:

CRT RAM U19 [Fail]: 0 W: 0A R: 0F
```

If a memory failure is detected, the address at which the failure occurs, and the data that was written to and read from are displayed with the intermediate message.

C-21. Test 15. LED Latch Test

Two unique bit pattern, 10101010 and 01010101, are written and read from the 8-bit LED Latches, A8U6 and A8U9. The test passes only if the data written matches the data read.

```
Messages:

LED Latch PASSED
LED Latch FAILED W: AA R:FF
```

C-22. Test 16. CRT Controller Test

The CRT Controller Test verifies that the CRT Controller (A8U12) is active and receiving commands. Data is written and than read from one of the IC's cursor registers. Bit patterns 10101010 and 01010101 are written and read from the controller. If the test fails, the bit patterns that were written and read are displayed in hexadecimal format in the return message.

If the CRT Controller is failing, the front-panel CRT can not function properly since the proper horizontal and vertical synchronization signals are not being received. Another possible cause for failure is the dynamic CRT Display RAM ICs (DRAMs) are not being refreshed. The 5372A will still power-up but will be unable to display anything on the CRT.

```
Messages:

CRT Controller PASSED
CRT Controller FAILED W: AA R: FF
```

C-23. Test 17. Key Controller Test

The Key Controller Test verifies that the front panel keyboard controller (A8U1) is active and responds to commands. Hexadecimal bit patterns AA and 55 are written to and then read from the match-value registers of the controller IC.

To write data to the controller, a "write" command followed by the data is sent to the controller. To read the data back, a "query" command is sent to the controller. When the controller is ready to be read, it sends an interrupt to the 68020 µP. The microprocessor now reads the data from the controller's data buffer.

```
Messages:

Front Panel Controller PASSED
Front Panel Controller FAILED Front Panel Controller Not Responding
```

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Prior to sending a command to the front panel, the instrument's software waits for the controller to set the status register bit 1 to 0. If this doesn't occur within the timeout period, the above "Not Responding" error message is returned.

```
Front Panel Controller FAILED Front Panel Controller Not Interrupting
```

When reading a parameter from the controller, the instrument's software sends the controller a query command and then waits for it to send an interrupt back to the 68020 μP. The data is then read from the controller's data register. If the interrupt is not generated within a timeout period, the "Not Interrupting" error message is returned.

```
Front Panel Controller FAILED W: AA R: 00 W: 55 R: 00
```

If the incorrect bit pattern is read from the controller, the data written and read are displayed in the error message.

C-24. Test 18. DMA Controller Test

The DMA Controller IC (A8U30) is located on the A8 I/O Controller Board. The data path to controller is tested by writing and then reading hexadecimal bit patterns AAAA and 5555 to the IC's Channel 0 Current Address Register. The controller is then functionally tested by exercising it in "verify" mode. In this mode, the DMA Controller IC performs a DMA transfer with the measurement memory and I/O lines inactive. NO data is actually transferred.

In the "verify" mode, the DMA Controller is set up to "transfer" 10 bytes on Channel 1. The transfer is started and the test enters a loop that polls the status of the DMA Controller. If the transfer is not completed within a certain time, the loop is exited and a failure message is returned. If the transfer is completed, the actual count is read from the controller and should equal –1. The address is then read from the controller and should be 11. The controller passes this test only if both conditions are true.

```
Messages:

DMA Controller PASSED
DMA Controller FAILED W: AAAA R: EAAA
```

If the test of the data path fails, both the value that was written and read are returned in the error message.

```
DMA Controller FAILED: Not Responding
```

If the DMA Controller does not indicate that the test transfer is complete within a specified timeout period, the "Not Responding" error message is returned.

```
DMA Controller FAILED: Bad Count [0]
```

Following the test transfer, the byte count should equal –1. If not, the "Bad Count" error message is returned along with the contents of the count register.

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```
DMA Controller FAILED: Bad Address [0]
```

Also following the test transfer, the current address register should be 11. If not, the "Bad Address" error message is returned along with the contents of the current address register.

```
DMA Controller Test STOPPED
```

This message is returned if the DMA Controller test never has a chance to run before a STOP command is received. This situation could occur if the HP-IB is tying up the DMA Controller. This test returns a PASSED status even though the test was never executed.

```
Intermediate Messages:

DMA Controller busy, waiting...
```

If the HP-IB is being used, an intermediate wait message is displayed

C-25. Test 19. Front Panel Test

This test allows the user to check the front-panel keypad and Rotary Pulse Generator [RPG or Data Entry Knob (DEK)]. A graphical representation of the 5372A front panel is displayed on the CRT with each keypad location highlighted. When a key is pressed, the corresponding location on the CRT turns off. When the RPG is rotated either clockwise or counterclockwise, the corresponding directional arrow on the CRT turns off. The Front Panel Test passes only after all keys have been pressed and the RPG has been rotated in the clockwise and counterclockwise directions. The test is aborted if no key depressions or RPG rotations have been detected within approximately 10 seconds. The 68020 µP-controlled LEDs are also illuminated for a visual check.

C-26. Test 20. CRT Adjustment Pattern

A pattern is displayed to assist in the adjustment of the CRT. Lines marking the border of the active display area and the vertical and horizontal centers of the screen are displayed. Two solid rectangles are displayed, one at full-bright and one at half-bright intensity. These rectangles assist with the brightness adjustments. The pattern is displayed until any front-panel key is pressed.

C-27. Test 21. CRT Video Pattern

A pattern of alternating full-bright and half-bright vertical lines is displayed on the CRT. Each line is one pixel wide, separated from the next pixel by a space one pixel wide. Each line runs from the top to the bottom of the display area.

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C-28. Test 22. External Amplifier Test

This test monitors the output of comparator A6U29 of the "External Input Amp" circuit, located on the A6 Count Support Board. The CRT displays a simulated oscillscope waveform indicating whether the comparator is set high or low. When no signal is applied to the External Arm input, the CRT should display a low level. When a signal greater than the sensitivity of the External Arm input is applied, the simulated waveform should display a high level. This test runs until the user presses the Stop softkey.

C-29. Test 23. Randomizer Test

When the randomizer test is initiated, the HP 5372A performs a randomly armed, continuous time interval measurement of a 10 MHz signal. The instrument acquires each measurement after a random number of edges on Channel A (the random number of edges varies from 4 to 15 between each acquired measurement). The HP 5372A then measures both the total time of the measurement and the time between acquired measurements. Since the period of the input signal is known (100 ns), the HP 5372A divides the time between acquired measurements by the known period to determine the number of edges between acquired measurements. The instrument then compares the distribution of the edges to the expected distribution and determines whether the measurements were acquired randomly.

The randomizer, located on the A2 assembly, is a 217 state pseudorandom sequence generator, which produces 54 arming edges for every cycle of the 217 state sequence. These 54 arming edges correspond to 6 to 17 edges between each acquired measurement. The randomizer circuit is clocked by the Channel A input signal, and requires 433 input events to cycle through all 217 states.

In performing the test, the HP 5372A attempts to make a measurement that is exactly four cycles of the randomizer sequence. If the measurement does not complete, within a specified timeout, then the test will fail with the message "Randomizer failed, measurement not complete, no input signal?". If the measurement does complete, then the HP 5372A will first measure the total time of the measurement, which should be 433 × 4 × 100 ns = 173, 200 ns. If the total time is not correct, then the test will fail with the message "Randomizer failed, total time of measurement". If the total time is correct, the HP 5372A will calculate the number of edges between each acquired measurement, histogram these results, and then compare the height of each bin to the expected height. If any of the bin heights are not correct, then the message "Randomizer failed, distribution off" appears.

```
Messages:

Randomizer failed, measurement not complete, no input signal?
Randomizer failed, total time of measurement
Randomizer failed, distribution off
```

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NOTE

If a randomizer failure message is displayed on the CRT, first verify that the test signal applied to Channel A is a 10 MHz, 50% duty cyle signal centered at 0 V. If the test signal is correct, then refer to the Randomizer section in chapter 7.

C-30. Test 24. Calibrate Interps

This routine aids in the calibration of the A4 interpolators. The A5 Sequencer IC, A5U72, is programmed so that the interpolator trigger outputs are driven by the Channel A input signal. 800 samples are taken and stored in the A6 Interpolator Ram. A part of this data is processed and displayed graphically on the CRT Display.

When the frequency of the signal coming in on Channel A approaches a multiple of the 500 MHz reference frequency, the data read from the interpolators stabilizes. To calibrate the interpolators, a signal is selected so that the data changes slowly. When this data is shown graphically, it appears as a stair-step pattern. The interpolator stages are adjusted so that all the steps in the stair-step pattern are the same. Vertical reference lines are displayed to mark the expected length of the stair-step pattern. These lines can be switched on and off by pressing the **GRID~ON/OFF** softkey.

By pressing the **AVERAGE~ON/OFF** softkey, the above routine is put into an averaging mode that displays the average lengths for the last 10 measurements. The data used in the averaging comes from the first set of data that cycles from zero through nine. The averaging feature permits a more stable display making it easier to make fine-tuned adjustments to the interpolator stages.

This test is performed on both Interpolator 1 (Start) and Interpolator 2 (Start) on the A4 assembly. When the routine is run, data patterns from Interpolator 1 (Start) are shown first. Pressing the **INTERP 2** softkey displays the data patterns generated by Interpolator 2 (Stop).

C-31. Test 25. Cal. Sensitivity

The Calibration Sensitivity test is an adjustment procedure that sets the maximum hysteresis levels for both Channel A and Channel B. This calibration procedure can also be used to verify previously set maximum hysteresis levels.

When the calibration routine is initiated, the instrument is automatically placed in the maximum hysteresis mode. The adjustment is then performed by applying a 10 KHz, 60 mVp-p signal to the Channel A input, and adjusting softkeys until the CRT displays a frequency value between 9000 and 9900 Hz. Adjusting the softkeys changes the previously set calibration value of the instrument. This new calibration value is then stored in memory, and is used by the microprocessor to program the hysteresis DAC (A2U207) whenever Channel A and/or Channel B is placed in the maximum hysteresis mode. In the maximum hysteresis

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mode, the hysteresis DAC outputs a voltage which is applied to the hysteresis adjustment pin (pin 17) of the Comparator Hybrid IC(s), located on the A2 assembly.

NOTE

When performing the calibration sensitivity adjustment, keep the signal applied to the Channel A input for both the Channel A and Channel B calibration sensitivity adjustments.

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