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TEK SERVICE MANUAL

070-5857-00
Product Group 38

24X5A/2467 OPTIONS SERVICE

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER TO OPERATORS SAFETY SUMMARY AND SERVICE SAFETY SUMMARY PRIOR TO PERFORMING ANY SERVICE.

Please Check for CHANGE INFORMATION at the Rear of This Manual

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INSTRUMENT SERIAL NUMBERS

Each instrument has a serial number on a panel insert, tag, or stamped on the chassis. The first number or letter designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

B000000	Tektronix, Inc., Beaverton, Oregon, USA
100000	Tektronix Guernsey, Ltd., Channel Islands
200000	Tektronix United Kingdom, Ltd., London
300000	Sony/Tektronix, Japan
700000	Tektronix Holland, NV, Heerenveen, The Netherlands

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PREFACE

This manual contains service information about the following options to the TEKTRONIX 2445A, 2455A, 2465A, and 2467 Oscilloscopes:

- Option 10 (GPIB)
- Option 05 (TV)
- Option 06 (CTT) and Option 09 (CTT and WR)
- Option 01 (DMM)

Option 10 makes it possible to remotely control the instrument through the General Purpose Interface Bus; Option 05 makes it easier to trigger and view television signals; Option 06 and Option 09 give the oscilloscope increased measurement, counting, and triggering capability through the Counter/Timer/Trigger and Word Recognizer; Option 01 adds a fully autoranging digital multimeter. Operating information for the options is contained in the Operators manual for the oscilloscope.

A few words about the organization of this manual should be helpful. Some sections deal with each option individually and some sections apply to all the options. The lists of replaceable electrical and mechanical parts include all the options, but are separated according to oscilloscope model numbers.

Sections 1 through 4 are each devoted to one of the options. They include these topics: Specifications, Preparation for Use, Theory of Operation, and Performance Check and Calibration Procedures.

Section 5 covers Maintenance for all the options.

Sections 6 through 9 are the four Replaceable Electrical Parts lists, one for each separate instrument.

Section 10 contains diagrams on foldout pages. The first few deal with the Buffer Board, which is common to all the options. Then the diagrams for each specific option are grouped in order, with the Detailed Block Diagram first and the Troubleshooting Procedure last. The Interconnection Charts and Interconnection Diagram complete Section 10.

Sections 11 through 14 consist of Replaceable Mechanical Parts lists and exploded drawings for all the options.

At the back of the manual there is a place to insert Change Information.

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OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply and do not appear in this summary.

Terms in This Manual

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

Terms as Marked on Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the markings, or a hazard to property, including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

Symbols in This Manual



This symbol indicates where applicable cautionary or other information is to be found.

Symbols as Marked on Equipment



DANGER — High voltage.



Protective ground (earth) terminal.



ATTENTION — Refer to manual.

Power Source

This product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Grounding the Product

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before making any connections to the product input or output terminals. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Danger Arising from Loss of Ground

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulated) can render an electric shock.

Use the Proper Power Cord

Use only the power cord and connector specified for your product.

Use only a power cord that is in good condition.

Use the Proper Fuse

To avoid fire hazard, use only a fuse of the correct type, voltage rating and current rating as specified in the parts list for your product.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this instrument in an explosive atmosphere unless it has been specifically certified for such operation.

Do Not Remove Covers or Panels

To avoid personal injury, do not remove the product covers or panels. Do not operate the instrument without the covers and panels properly installed.

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SERVICING SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

Refer also to the preceding Operators Safety Summary.

Do Not Service Alone

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

Use Care When Servicing With Power On

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections or components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

Power Source

This product is intended to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

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Section 1

GPIB

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SPECIFICATION

INTRODUCTION

Option 10 to the 24X5A and 2467 Oscilloscopes adds the hardware and software that allows these instruments to be remotely controlled and queried using a standard interface system. The interface implemented conforms to the specifications contained in *IEEE Standard Digital Interface for Programmable Instrumentation (ANSI/IEEE Std 488-1978)*, commonly referred to as the General Purpose Interface Bus (GPIB). It also complies with a Tektronix Standard relating to GPIB Codes, Formats, Conventions and Features.

This manual describes GPIB operational elements only in relation to communication between the oscilloscope and the remote controller by way of the bus. For complete information regarding GPIB electrical, mechanical, and functional aspects, refer to ANSI/IEEE Std 488-1978, which is published by:

The Institute of Electrical and Electronics Engineers, Inc.
345 East 47th Street
New York, New York 10017

Messages originating from a remote controlling device and transmitted over the GPIB perform one of three functions:

1. Set the oscilloscope operating mode.
2. Query the state of the oscilloscope.
3. Query the results of measurements made.

All oscilloscope front-panel functions are controllable through the GPIB interface, with these exceptions: BEAM FIND, FOCUS, TRACE ROTATION, ASTIG, SCALE ILLUM, and POWER. Structure and format of the commands and queries executable by the GPIB Option are explained in Section 5, "Communication Between Oscilloscope and Controller," of the 24X5A/2467 Option 10 Instrument Interfacing Guide (IIG). A listing of command headers and arguments, along with concise descriptions, is provided in Section 6 of the IIG.

The alphanumeric CRT readout is used to display measurement results, diagnostic test messages, exercise messages, and calibration messages. Any measurement result that is displayed on the CRT readout can also be transmitted over the GPIB.

ACCESSORIES AND SOFTWARE

Standard Accessory

In addition to the standard accessories listed in the oscilloscope manuals, one copy of the following Option 10 accessory is provided:

24X5A/2467 Option 10 Instrument Interfacing Guide

Optional Accessories

The optional accessories for Option 10 are:

24X5A/2467 Options Service Manual

GPIB Cables—1 m, 2 m and 4 m double shield, low EMC

Protective Waterproof Vinyl Cover

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Software

The following software is available for instruments with GPIB:

EZ-TEK 2400 Test Program Generator

EZ-TEK 2400 PC Test Program Generator (requires GURU hardware)

GPIB User's Resource Utility (GURU)

The service manual and all other optional accessories and software can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

STANDARD FUNCTIONS, FORMATS, AND FEATURES

The total interface-function repertoire of an instrument on the GPIB, in terms of interface-function subsets, is identified in *ANSI/IEEE Std 488-1978*. The status of subsets applicable to 24X5A and 2467 Oscilloscopes with Option 10 are listed in Table 1-1.

A Tektronix standard identifies the format and features of messages sent over the bus to communicate with other instruments equipped with a GPIB interface. Specific features implemented in the 24X5A and 2467 Oscilloscopes are listed in Table 1-2, and specific formats are shown in Table 1-3.

Table 1-1
ANSI/IEEE Std 488-1978 (GPIB) Functions

Function	Description
SH1	Source Handshake. Complete capability.
AH1	Acceptor Handshake. Complete capability.
T6	Basic Talker. Responds to Serial Poll. Unaddress if My Listen Address (MLA) is received.
L3	Basic Listener. Listen Only. Unaddress if My Talk Address (MTA) is received.
SR1	Service Request. Complete capability.
RL1	Remote-Local. Complete capability.
DC1	Device Clear. Complete capability.
PP0	Parallel Poll. Does not respond to Parallel Poll.
DT0	Device Trigger. Does not have Device Trigger capability.
C0	Controller. Does not have Controller capabilities.

NOTE

Open collector bus drivers (E1) are used by this instrument.

Table 1-2
Specific Features Implemented

Feature	Description
Indicators	REM (remote), SRQ (service request), and LOCK (front-panel lockout) indicators are included.
Parameter Selection	Selection is via diagnostic menu and CRT readout. Nonvolatile storage is in the base instrument's RAM. No hard-wired switches are provided for this feature.
Secondary Addressing	Not implemented.

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Table 1-3
Specific Format Choices

Format Parameter	Description
Format Characters	Not transmitted; ignored on reception.
Message Terminator	Either the End-or-Identify (EOI) or the Line-Feed (LF) mode can be selected.
Measurement Terminator	Follows program message-unit syntax, which allows numeric characters in headers and alphabetic data arguments for reporting.
Link Data (Arguments)	Used in Listen and Talk modes.
Instrument Identification Query	Descriptors are added for other installed options.
SETtings Query	Extended, using LLSet commands, to allow block binary response.
INIt Command	Causes the oscilloscope to return to a power-on condition. All operating modes then agree with actual front-panel settings.
Return to Local (rtl) Message	Asserted when any front-panel control attempts to change a GPIB-controllable function.
Time/Date Commands	Not implemented.
Stored Setting Commands	Not implemented.
Waveform Transmission	Not implemented.
Device Trigger (DT)	Not implemented.
Multiple Event Reporting	Not implemented.
IEEE 728	Compliance not intended.

PERFORMANCE CONDITIONS

Except as noted in Tables 1-4 and 1-5 of this manual, the electrical, environmental, and mechanical characteristics of Option 10 instruments (including the performance conditions) are identical to those specified in the respective 24X5A and 2467 Oscilloscope Operators manual.

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Table 1-4
Option 10 Electrical Characteristics

Characteristics	Performance Requirements
Vertical Position Accuracy	Position accuracy is only valid when: 1. Positioning occurs after a BALance command is invoked at the ambient temperature in which the instrument is operating. 2. The VOLTS/DIV VAR control is in the calibrated detent.
CH 1, CH 2 (noninverted)	
+15°C to +35°C	±(0.3 division + 3% of distance from center screen in div + 0.5 mV/V/DIV setting).
CH 2 Inverted	Add 0.2 div.
−15°C to +15°C and +35°C to +55°C	Add 1.5 mV/V/DIV setting.
CH 3 and CH 4	±(0.7 division + 3% of distance from center screen in divs.)
IEEE 488 Outputs	
Volts Out for True (I_{OT} = 48 mA)	Max 0.5 V.[a]
Volts Out for False (I_{OF} = −5.2 mA)	Min 2.5 V.[a]
Volts Out with Output Disabled	Max 3.7 V, Min 2.5 V.[a]
Output Leakage Current with Power OFF (0 V < V_{IN} < 2.5 V)	Max 40 μA.[a]
IEEE 488 Inputs	
Volts In for True	Max 0.8 V, Min 0 V.[a]
Volts In for False	Max 5.5 V, Min 2.0 V.[a]
Current In for True (V_{IT} = 0.5 V)	Max −0.1 mA.[a]
Current In for False (V_{IF} = 2.7 V)	Max 20 μA.[a]

[a]**Performance Requirement not checked in manual.**

Table 1-5
Option 10 Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Probes, Operators Manual, and Options	⩽ 12.0 kg (26.4 lb).
Domestic Shipping Weight	⩽ 17.6 kg (38.8 lb).

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GPIB PREPARATION FOR USE

Before initially turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

POWER-UP SEQUENCE

The power-up tests, automatically performed each time the oscilloscope is turned on, examine both the oscilloscope circuitry and the Option 10 GPIB circuitry. Tests that apply to the GPIB Option are integrated into the power-up tests for the host oscilloscope; they include the GPIB Kernel tests and a Confidence test.

Kernel Tests

Operation of the Option 10 memory (ROM) is checked by Kernel tests. Failure of any GPIB Kernel test is also signaled by a flashing A SWP TRIG'D indicator on the instrument front panel.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labeled A/B MENU.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable.

Confidence Test

Failure of the GPIB Confidence test during power-up is indicated in the bottom line of the CRT readout. The failure display has the following format:

GP TEST 11 FAIL YY

where **YY** represents the code for the failed test segment.

A Confidence test failure may not render the GPIB interface inoperable. Pressing in the A/B TRIG button may still place the instrument into the normal operating mode; however, it may not meet all GPIB specifications.

Successful Power-Up Sequencing

When the power-up routine is successfully completed without a failure indication, five instrument events occur:

1. The oscilloscope enters the normal operating mode.

2. The GPIB interface enters the Local State (LOCS).

3. The GPIB interface asserts Service Request (SRQ) provided the Request Service (RQS) status is ON. (See the RQS System Command description in Table 6-5 of the 24X5A/2467 Option 10 Instrument Interfacing Guide.)

4. The oscilloscope functions are set to the values which were established before the instrument was last turned off, with front-panel settings taking precedence.

5. The GPIB interface responds to a controller's serial poll with a status byte of 65 (decimal), meaning that all tests were successful and power is on, provided the Request Service (RQS) stored status is ON. (See the RQS System Command description in Table 6-5 of the 24X5A/2467 Option 10 Instrument Interfacing Guide.)

The instrument is now ready to make measurements as required.

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Unsuccessful Power-Up Sequencing

If power-up tests fail, four instrument events occur:

1. The oscilloscope does not enter the normal operating mode.

2. The GPIB interface enters the Local State (LOCS).

3. The GPIB interface asserts Service Request (SRQ) provided the Request Service (RQS) stored status is ON. (See the RQS System Command description in Table 6-5 of the 24X5A/2467 Instrument Interfacing Guide.)

4. The GPIB interface responds to a controller's serial poll with a status byte of 65 (decimal), meaning that power is on, provided the Request Service (RQS) stored status is ON. (See the RQS System Command description in Table 6-5 of the 24X5A/2467 Option 10 Instrument Interfacing Guide.)

As explained in preceding paragraphs, it may be possible, after a power-up test failure, to place the instrument into a normal operating mode by pressing the A/B TRIG button. If it then functions adequately for your particular measurement requirement, the instrument can be used, but refer it to a qualified service technician for repair of the problem as soon as possible.

POWER-DOWN SEQUENCE

There are no special sequences associated with powering down the instrument. When the POWER switch is set to OFF, the instrument powers down and the most recent RQS ON or RQS OFF command determines whether the GPIB interface will assert the Service Request (SRQ) message at the next power-on.

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THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 10 (GPIB) circuitry for the 24X5A and 2467 Oscilloscopes. The discussion begins with an overview of the option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For optimum understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to help you understand overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-4. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to 24X5A and 2467 Oscilloscope circuitry without option circuitry.

The activities of the option are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the option, monitors the option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable programmable read only memory (EPROM) contained in the Buffer and option circuit boards, and the nonvolatile RAM in the base instrument provide these storage locations.

BUFFER BOARD

The option circuit board connects to the standard oscilloscope through the Buffer circuit board. The Buffer board performs the following functions:

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1. Buffers and modifies the timing of the microprocessor bus.

2. Distributes the microprocessor bus, power supplies, and analog signals from the standard oscilloscope to the options.

3. Provides additional ROM for interfacing options to the standard instrument.

4. Provides a mechanical interface.

The microprocessor control bus, address bus, and data bus are buffered by Buffer board circuitry. Microprocessor bus timing for the option is modified by buffers on the Buffer board to make bus timing more compatible with the options. Address bus decoding allows individual circuits to be addressed.

These signal paths are used for communication between the option and the standard oscilloscope and involve both data and control signals. The main oscilloscope circuitry uses them to control the option. The option uses them to send information to the standard oscilloscope for display and to control the standard oscilloscope.

GPIB BOARD

The GPIB option adds a GPIB port to the instrument. The standard oscilloscope and the option are interconnected by the Buffer board.

The GPIB board contains the microprocessor interface, including RAM and EPROM, that permits the microprocessor to control the option. A GPIB interface IC, buffers, and connector provide the actual interface connection to the GPIB. Status indicators located on the front panel indicate the current status of the GPIB interface.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the GPIB Option. Unique circuitry in this option is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-9) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

BUFFER BOARD DIGITAL DISTRIBUTION

The Buffer Board Digital Distribution circuitry (see diagram 20) interconnects the standard oscilloscope and the GPIB board. Most of the microprocessor signals are buffered and have their timing modified. In addition, some of the memory used for option functions is included on the Buffer board. The calibration constants and power-down settings of the option are stored in the nonvolatile RAM of the base instrument.

Address Decoding

Gates U4240A and U4240C partially decode the address bus. Enable BVMA (U4240C, pin 8) is HI for addresses from 1000-7FFF, the address space used by the options and the Buffer board. (This and all other address references are in hexadecimal.)

Enable $\overline{\text{BUFEN}}$ (U4250C, pin 8) is LO for the address space of 1000-1FFF. Address strobe $\overline{\text{LOWAD}}$ is active LO for the address space of XFFC-XFFF (where X is a don't care). These decoded address signals are used in selecting ROM U4260 on the Buffer board and disabling data bus buffer U4255.

Buffer Board ROM

Buffer board ROM U4260 is used to interface the option to the main oscilloscope. Its output enable (at pin 20) is $\overline{\text{ROMEN}}$. The signals $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ are the same if P4256 is present. With $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ the same, the Buffer board ROM address space is 1000-1FFF. Whenever the Buffer board ROM is addressed, U4275 (the

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shift register that controls the data bus buffer) is reset by $\overline{\text{ROMEN}}$. This prevents the Buffer board data bus buffer and the Buffer board ROM from driving the microprocessor side of the data bus at the same time.

Bus Buffers

The 10-MHz clock signal of the standard oscilloscope is buffered by U4265D. The buffered clock (B10MHZ) clocks the shift register (U4275) and is also sent to the options.

The $\overline{E}$ clock, $\overline{\text{RESET}}$, VMA, and R/$\overline{W}$ are buffered by latch U4225. The pull-up on pin 12 of U4225 allows $\overline{\text{RESET}}$ and $\overline{E}$ to pass through the latch unmodified. The buffered E clock is delayed >30 ns by R4265, C4265, and U4265C. This delayed BE clock latches $\overline{\text{VMA}}$, R/$\overline{W}$ (U4225) and the address bus (U4235 and U4245), providing extra hold time on these signals for the options.

Data Bus Buffer

Data bus buffer U4255 is a bidirectional bus driver that is controlled by the signals on pin 1 and pin 19. Pin 1 controls the direction of data flow through the buffer, and pin 19 turns the drivers on and off. When pin 1 is HI, the buffer is configured to drive data from the microprocessor to the options. Conversely when pin 1 is LO, the buffer is configured to drive data from an option to the microprocessor. Pin 1 is always HI, except when the microprocessor is reading data from an option. U4255 is inactive when pin 19 is HI.

Signals on pin 1 and pin 19 coordinate the states of U4255 so that data bus contention never occurs. Buffer U4255 drives two buses: the bus between U4255 and the Control board of the standard oscilloscope, and the bus between U4255 and the options. Both of these must be kept free of contentions (i.e., it is not allowed for more than one device to drive the bus at the same time). These two buses will be examined individually.

The bus between the Control board and U4255 is driven by the Control board during a write bus cycle, driven by the Control board during a read cycle from nonoption space (0000-0FFF and 8000-FFFF), driven by U4255 during a read cycle from option space (2000-7FFF), and driven by U4260 during a read from Buffer board ROM (1000-1FFF). The Control board changes its drivers from output to input on the rising edge of E (this is the high-true E, not the low-true $\overline{E}$ used by the option) when going from a write to a read cycle. It changes from input to output on the falling edge of R/$\overline{W}$ when going from a read to a write cycle. Data buffer U4255 drives the Control board data bus only when BVMA and BR/$\overline{W}$ are both true, i.e., a read cycle from the option is being performed. This is done by driving U4255 pin 1 from BVMA NANDed with BR/$\overline{W}$ (after passing through a delay consisting of two cycles of the 10-MHz clock). Pin 19 of IC U4255 is driven by $\overline{E}$ delayed for two cycles of the 10-MHz clock. This two-cycle delay ensures that U4255 will be driving the Control board data bus only in a read cycle from option address space, during a time interval starting after the rising edge of E and ending after the falling edge of E. A delay of two cycles of the 10-MHz clock is necessary to guarantee that the Control board data bus drivers have turned off before U4255 starts driving the bus. This is a period of time when the Control board never drives the data bus during a read cycle. Shift register stages in U4275 are cleared by $\overline{\text{ROMEN}}$, forcing U4255 pin 19 HI while Buffer board ROM is being read.

The bus between U4255 and the options must be driven by U4255 during a write cycle to the options (2000-7FFF) and may be driven by an option only during a read cycle from the option (2000-7FFF). Bus driver U4255 actually drives the bus to the options during all cycles except read cycles from 1000-7FFF. The bus is driven by an option only while E is true during an option read cycle. Address bus driver U4255 drives the bus during an option write cycle while U4255 pin 19 is LO, but in this case pin 19 is delayed from $\overline{E}$ only by one cycle of the 10-MHz clock, driving the data to the options as soon as it is available from the microprocessor.

GPIB CIRCUIT BOARD

The GPIB circuit board (see diagram 22) provides a GPIB port to the instrument and its options. It contains the following digital circuits:

Address Bus and Decoding

The microprocessor address bus is buffered by U4501 and U4505.

The address decode circuitry generates enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices as in the standard oscilloscope (see "Address Decode" description in the Service manual of the standard oscilloscope). The memory map for the GPIB option is shown in Table 1-6.

Page register U4838B enables and disables access to paged EPROM U4715 and is selected by U4601. Whenever there is a write to address 7FFF, data bus line D0 is latched by the page register. If D0 is latched HI, paged EPROM U4715 will be selected for memory accesses

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Table 1-6
GPIB Option Memory Map

ADDRESS	DESCRIPTION	DEVICE NO.
1000-1FFF	Buffer board ROM	U4260
2000-3BFF	Non-paged EPROM	U4710
3C00-3F7F	RAM	U4811
3FB0-3FB7	GPIB interface IC	U4818
3FCX	Input multiplexer latch	U4625
3FDX	Output multiplexer latch	U4626
3FEX	Status register	U4701
4000-7FFF	Paged EPROM	U4715
7FFF	Page register	U4838

within the paged address space. The paged EPROMs address is decoded by U4705B. Both the paged address range and the page register output signals are combined in U4705C to give PAGE (TP4748), the enable signal for the paged EPROM (U4715 pin 20).

Nonpaged EPROM U4710, RAM U4811, and I/O decoder addresses are decoded by U4605, U4606, U4738, and U4706. The lower address lines (BA12 to BA7) determine whether the nonpaged EPROM, RAM, or the I/O decoder is selected. A LO $\overline{\text{ROM}}$ signal (TP4841) indicates that EPROM U4710 is selected. A LO $\overline{\text{RAM}}$ signal (TP4843) indicates that RAM U4811 is selected. One-of-eight decoder U4708 decodes the I/O. Its gate inputs, pins 4 through 6, select the address range from 3F80 through 3FFF. Only four of the eight outputs are used:

STATUS—pin 9 selects status register U4701.

OUTMUX—pin 10 selects output multiplexer register U4626.

INMUX—pin 11 selects input multiplexer register U4625.

GPIB—12 selects GPIB interface IC U4818.

A write strobe, $\overline{\text{GW}}$, is generated by U4831C. A LO $\overline{\text{GW}}$ indicates bus data should be written to the enabled device. Similarly, read strobes $\overline{\text{GR}}$ and GR are generated by U4706D and U4705D. They are used to identify microprocessor read cycles. All three strobes are generated from $\overline{\text{ECK}}$ and R/$\overline{\text{W}}$.

The three major address-space strobes, for the page register and the unpaged and paged ROMs, are brought together at U4738B to generate OPTS. It will be HI whenever the option is addressed.

Data Bus Buffers

The data bus is buffered by bidirectional buffer U4608. This buffer is enabled by OPTS and $\overline{\text{E}}$ through U4706A and U4705A. The direction of data is controlled by the delayed R/$\overline{\text{W}}$ signal. This delayed R/$\overline{\text{W}}$ signal, which extends the time data buffer U4608 is enabled, is generated through latch U4801 pins 4, 5, 3, and 2 which are connected to form a two-bit shift register clocked by the 10-MHz clock. This delay is required whenever there is a write to either the RAM or the GPIB interface IC.

Wait State Generator

A wait state is required any time the GPIB interface IC is written to. The wait state (MR LO, U4730D) is started by $\overline{\text{GW}}$ and $\overline{\text{GPIB}}$ through U4831B, U4706B, and U4730D. It continues until the same signals are clocked through shift register U4801, latch U4838A, and U4730D. The shift register and latch combination provide a delay of 500-600 ns.

GPIB Interface IC and Buffers

The actual interface to the IEEE 488 bus is accomplished by GPIB interface IC U4818 and buffers U4805 and U4808. The GPIB interface IC is enabled by $\overline{\text{GPIB}}$, which is generated by U4708. Bus data is gated out of and into the IC by GR and $\overline{\text{GW}}$. The microprocessor enable line $\overline{\text{ECK}}$ is used as a clock at pin 18. Address lines A0, A1, and A2 are applied to register select pins 6, 7, and 8 to select registers internal to the interface IC. Data bus lines are reversed, D0 for D7, to accommodate the GPIB interface IC's internal convention. The TRIG signal, pin 39, is sensed by STATUS register pin 4 for a diagnostic check of the GPIB interface IC. Bus buffers U4805 and U4808 provide the drive characteristics required by IEEE 488 bus standards.

GPIB Buffer Power Switch

To prevent glitches occurring at power-up from disturbing the GPIB bus, a fast-rise-time power-supply switch is provided for GPIB buffers U4805 and U4808. At power-up $\overline{\text{RST}}$ clears U4801 via pin 1. With U4801 reset, both Q4745 and Q4743 are held OFF, preventing the buffers from receiving power. Both inputs to U4735D are LO after reset, keeping U4801 pin 17 LO and the buffer power switch off. The first time that status register U4701 is

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enabled and read, pin 13 of both U4701 and U4735D go LO. This causes U4801 pins 16 and 17 to change states and to stay HI, applying power to the GPIB buffers.

Status Register

This tristate buffer (U4701) is used for the following diagnostic and operational functions:

Check GPIB interface IC U4818 via pin 5.

Check the GPIB buffer's switched 5 V supply via pin 3.

Check wait state generation via pin 7.

Check latches U4625 and U4626 and light-emitting diode (LED) driver U4730 via pins 9 and 11.

Control the GPIB buffer's switched supply via pin 13.

Light-Emitting Diode Drivers and LED Board GPIB status U4626

Open collector, inverting buffers U4730A, U4730B, and U4730C drive the remotely located LED board. Series resistors at the output of each buffer limit LED current. Two of the buffer outputs are sensed by the Status register U4701 for diagnostic purposes.

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PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 10 (GPIB) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 1-4. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 1-4.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20°C and +30°C and is operating in an ambient temperature between −15°C and +55°C. The instrument also must have had at least a 20 minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing the GPIB Option checks and adjustment, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

Test equipment listed in Table 1-7 is required to perform this procedure. Since detailed operating instructions for the test equipment are not provided in this procedure, refer to the appropriate test-equipment instruction manual if additional information is required.

Table 1-7
Test Equipment Required

Item and Description	Specification	Examples of Applicable Test Equipment
1. GPIB Controller	IEEE-488-1978 compatible.	TEKTRONIX 4050-Series Computers.
2. GPIB cable	IEEE-488-1978 compatible.	Tektronix Part Number 012-0630-03.

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PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using the operator accessible front- and rear-panel controls and connectors.

Turn the instrument on and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

Set the oscilloscope's GPIB address to 1, the end-of-message terminator to EOI, and the talk/listen mode to TALK LISTEN. To set these parameters:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT."**

2. Press and hold the lower Trigger MODE button to sequence through the TEST and EXER routine labels until the message **"GP EXER 11"** appears at the lower left corner of the CRT.

3. Press the upper Trigger COUPLING button, causing the top row of the readout to display **"GPIB ADDRESS nn"** (where nn is a primary address within the range 0 through 31).

4. Turn the Δ control to select the desired address (1).

5. Press the lower Trigger COUPLING button to update the stored address and return the oscilloscope to the Diagnostic Menu.

6. Briefly press the upper Trigger MODE button, causing the message **"GP EXER 12"** to appear at the lower left corner of the CRT.

7. Press the upper Trigger COUPLING button, causing the top row of the readout to display

   "TERMINATOR __ MODE _____"

   where the terminator may be either **"LF"** or **"EOI"** and the mode may be either **"LISTEN ONLY"** or **"TALK LISTEN".**

8. Press one of the Trigger MODE buttons to select the desired terminator (EOI) and press one of the Trigger SOURCE buttons to select the desired mode (TALK LISTEN).

9. Press the lower Trigger COUPLING button to update the stored terminator and mode settings and return to the Diagnostic Menu.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labeled A/B MENU.

10. Press A/B TRIG to return to normal instrument operation.

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GPIB OPTION CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

a. Set:

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4	On
ADD, and INVERT	Off
CHOP/ALT	ALT (button out)
20 MHz BW LIMIT	Off

VOLTS/DIV

CH 1 and CH 2	1 V
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

Input Coupling

CH 1 and CH 2	1 MΩ GND

Horizontal

A SEC/DIV	1 ms (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
TRACE SEP	Fully CW

Delta

Δt and ΔV	Off (press and release until associated readout is off)
TRACKING	Off

Trigger

HOLDOFF	Fully CCW
LEVEL	Midrange
SLOPE	+ (plus)
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

1. Verify GPIB STATUS Indicators.

a. Set:

CH 2, CH 3, and CH 4	Off

b. Set the oscilloscope's POWER button to OFF and then to ON.

c. VERIFY—All three GPIB STATUS indicators illuminate during the oscilloscope's power-up sequence.

d.VERIFY—The GPIB STATUS SRQ indicator is still illuminated when the power-up sequence is finished.

NOTE

If the RQS stored status is Off, the indicator will not be illuminated.

e. Turn on the controller and enter "Program A" from the "Programming" part of Section 2 of this manual.

f. Run "Program A".

g. Connect the GPIB controller to the oscilloscope's rear-panel GPIB CONNECTOR using the GPIB cable.

h. Enter 1 in response to the controller's prompt for the oscilloscope's address.

i. VERIFY—Response displayed by the controller is:

ERROR - SRQ CODE 65
- EVENT NO. 401

NOTE

If the RQS stored status is Off, there will be no SRQ or EVENT code displayed.

j. VERIFY—The GPIB STATUS SRQ indicator is no longer illuminated.

k. VERIFY—The GPIB STATUS REM indicator is now illuminated.

To perform the checks that follow, enter the commands exactly as shown. You must include spaces and punctuation (final periods excluded), but the lowercase letters are optional and the uppercase letters may be entered in lowercase.

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2. Check GPIB Vertical Position Accuracy.

a. Enter the BALance command.

b. Enter the command CH1 POS:3.0.

c. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions above the center horizontal graticule line.

d. Enter the command CH1 POS:−3.0.

e. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions below the center horizontal graticule line.

f. Enter the command CH1 POS:0.0.

g. CHECK—The oscilloscope trace is within 0.3 division of the center horizontal graticule line.

h. Enter the VMOde CH1:OFF,CH2:ON;CH2 POS:3.0 commands.

i. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions above the center horizontal graticule line.

j. Enter the command CH2 POS:−3.0.

k. CHECK—The oscilloscope trace is between 2.6 and 3.4 divisions below the center horizontal graticule line.

l. Enter the command CH2 POS:0.0.

m. CHECK—The oscilloscope trace is within 0.3 division of the center horizontal graticule line.

n. Enter the VMOde CH2:OFF,CH3:ON;CH3 POS:3.0 commands.

o. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions above the center horizontal graticule line.

p. Enter the command CH3 POS:−3.0.

q. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions below the center horizontal graticule line.

r. Enter the command CH3 POS:0.0.

s. CHECK—The oscilloscope trace is within 0.7 division of the center horizontal graticule line.

t. Enter the VMOde CH3:OFF,CH4:ON;CH4 POS:3.0 commands.

u. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions above the center horizontal graticule line.

v. Enter the command CH4 POS:−3.0.

w. CHECK—The oscilloscope trace is between 2.2 and 3.8 divisions below the center horizontal graticule line.

x. Enter the command CH4 POS:0.0.

y. CHECK—The oscilloscope trace is within 0.7 division of the center horizontal graticule line.

z. Enter the VMOde CH4:OFF,CH2:ON,INVert:ON;CH2 POS:3.0 commands.

aa. CHECK—The oscilloscope trace is between 2.4 and 3.6 divisions above the center horizontal graticule line.

bb. Enter the command CH2? POS.

cc. VERIFY—Response displayed by the controller is:

CH2 POS:<X>

where <X> is between 2.98 and 3.01.

dd. Enter the command CH2 POS:−3.0.

ee. CHECK—The oscilloscope trace is between 2.4 and 3.6 divisions below the center horizontal graticule line.

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ff. Enter the command CH2 POS:0.0.

gg. CHECK—The oscilloscope trace is within 0.5 division of the center horizontal graticule line.

3. Verify GPIB Trace Separation.

a. Enter the VMOde CH2:OFF, INVert:OFF, CH1:ON;CH1 POS:3.0 commands.

b. Enter the command HMode ALTernate.

c. Enter the HORizontal ASEcdiv:1E−3,BSEcdiv:.5E−3,TRACEsep:−4.0 command.

d. VERIFY—There are two traces on the CRT.

e. Disconnect the test setup.

ADJUSTMENT PROCEDURE

INTRODUCTION

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 1-4. Adjustment of the instrument must be done at an ambient temperature between +20°C and +30°C, and the instrument must have had a warm-up period of at least 20 minutes. Performing this procedure while the temperature is drifting or before the standard instrument is calibrated may cause erroneous calibration settings.

NOTE

When performing any of the automatic calibration routines, such as CAL 02 and BU CAL F1, the CAL/NO CAL jumper P501 must be moved to its CAL postion (between pins 1 and 2) before turning on the power. When the desired calibration has been performed, return the jumper to its NO CAL position.

GPIB-controlled instrument functions are automatically adjusted as part of the standard instrument CAL 02 procedure. If it is suspected that these functions need to be adjusted, refer to the "Adjustment Procedure" section of the standard instrument Service manual. Instructions on running the CAL 02 routine are under "Automatic Calibration Constants, Horizontal and Vertical Gain, Centering, and Transient Response Adjustments".

The calibration procedure BU CAL F1 applies to all of the options. It may be invoked at any time and as often as desired by performing these steps:

a. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to access the Diagnostic Menu.

NOTE

If the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

b. Press the lower Trigger MODE button until the message **"BU CAL F1"** appears in the Diagnostic Menu of the CRT readout.

c. Press the upper Trigger COUPLING button.

d. After about 3 seconds, the **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** message should appear in the Diagnostic Menu of the CRT readout.

e. Press the A/B TRIG (or A/B MENU) button to exit the Diagnostic Menu.

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APPENDIX A

SAMPLE PROGRAM A

The program that follows is written to run on TEKTRONIX 4050-series controllers. It first asks for the GPIB address of the oscilloscope, then repeatedly asks for a command to be entered. When a command is entered at the controller, the program sends it to the oscilloscope. Any response from the oscilloscope is printed on the controller's display. If there are any service requests, a serial poll is performed. The service request and the EVENT codes are then printed before returning to the main part of the program.

```
100  REM       Program  to send  commands  and  queries  to and receive
110  REM       responses  from  TEKTRONIX  2445  and  2465  Oscilloscopes
120  INIT
125  PAGE
130  REM  Disable  SRQ  Handler  until  ready
140  ON  SRQ  THEN  570
150  REM  * Page  when  screen  is  full  *
160  PRINT  @32,26:2
170  REM
180  REM
190  PRINT  "Enter  address  of  the  oscilloscope  ";
200  REM  * Get  address  and  put  in  variable  A *
210  INPUT  A
220  REM  * Enable  SRQ  handler  *
230  ON  SRQ  THEN  440
240  REM
250  PRINT
260  PRINT  "*******"
270  PRINT  "ENTER  COMMAND  OR  QUERY:  ";
280  REM  * Put  command  or  query  in  string  Z$  *
290  INPUT  Z$
300  REM  * Send  string  Z$  to  the  oscilloscope  *
310  PRINT  @A:Z$
320  REM  * Get  response  (if  any)  and  put  in  string  S$  *
330  INPUT  @A:S$
340  REM  * Check  if  there  is  a  response  *
350  REM  *     If  not  then  ready  to  send  another  command  or  query  *
360  REM  *     If  yes  then  print  the  response  *
370  IF  LEN(S$)=0  THEN  250
380  PRINT
390  PRINT  "RESPONSE  FROM  THE  OSCILLOSCOPE  IS:  "
400  PRINT  S$
410  REM  * Ready  to  send  another  command  or  query  *
```

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```
420  GO  TO  250
430  REM  ***  SRQ  HANDLER   ***
440  POLL  D,C;A
450  REM  * Look  for  an  Event  and  put  Event  in  E  *
460  REM  *       If  EVENT=0   then  no  error   *
470  REM  *       If  EVENT<>0   then  warn  the  user  and
480  REM  *              print  SRQ  Code  and  EVENT  NO.
490  REM  *
500  PRINT  @A:  "EVENT?"
510  INPUT  @A:E
520  IF  E=0  THEN  570
530  PRINT  "    ERROR  -  SRQ  CODE  ";
540  PRINT  C;
550  PRINT  "  -  EVENT  NO.  ";
560  PRINT  E
570  RETURN
```

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SAMPLE PROGRAM B

The program example that follows performs functions similar to Sample Program A, but is written to run on a TEKTRONIX 4041 controller.

```
100     !       Program   to  send   commands   and  queries   to  and  receive
110     !       responses    from   TEKTRONIX    2445   and   2465   Oscilloscopes
120     !
130       Init  all
140     !       Disable   SRQ   handler    until   ready
150       Disable   srq
160     ! Get   address   of   the   oscilloscope
170       Print   "Enter   the   GPIB   address   of   the   2445/65:    ";
180       Input   addr$
190     ! Set   up   physical    and   logical    unit   -
200     ! Set   up   so   only   EOI   can   terminate    the   communication.
210     !
220       Set   driver    "gpib0 (eom=<0>):"
230       Open   #1:"gpib0 (pri="&addr$&",eom=<0>):"
240     !
250     !       Enable   SRQ   handler
260       On   srq   then   gosub   srqhdl
270       Enable   srq
280     !
290  Repeat:      ! Sending   command   or   query
300       Print   "******"
310       Print
320       Print   "Enter   command   or   query   :";
330     ! Get   the   command
340       Input   a$
350     ! Send   command   or   query   to   scope
360       Print   #1:a$
370     ! Get   response    if   there   is   any
380       DIM   resp$   to   2000
390       Input   #1:resp$
400       Print
410     ! If   no   response    then   prompt    for   another    command
420       If   len (resp$)=0    then   goto   repeat
430     ! If   yes   then   print    the   response
440       Print   "Response    from   the   oscilloscope     is:"
450       Print   resp$
460       Goto   repeat
470  Srqhdl:      ! routine   to   handle   the   srq
480         Poll   stb,dev
490         Print   #dev:"event?"
500       ! Get   event   number
510         Input   #dev:event
520         Print   "Instrument    #";dev;"   status   byte   =  ";stb;",    event   =  ";event
530         Resume
```

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SAMPLE PROGRAM C

The program example that follows performs functions similar to Sample Programs A and B, but is written to run on the Hewlett-Packard 9836C controller.

```
100  !This program is written for the Hewlett-Packard 9836C controller.
110  !It is designed for a single instrument on the GPIB bus. The user
120  !is asked for the address and termination mode of the instrument,
130  !and then it will send commands and receive query responses from that
140  !instrument, as well as handle service requests (SRQ's).
150  !
160  INPUT "Instrument address (0-30)?",Address
170  IF (Address<0 OR Address>30) THEN 150
180  Address=Address+700
190  INPUT "LF (1) or EOI (2) termination?",Termin
200  IF (Termin<1 OR Termin>2) THEN 180
210  IF (Termin=1) THEN
220    !use three character escape sequence for ^L, hex 0AH
230    ASSIGN @Instr TO Address;EOL "^L"
240  ELSE
250    !use three character escape sequence for ^M, hex 0DH
260    ASSIGN @Instr TO Address;EOL "^M" END
270  END IF
280  DIM Response$[4000]
290  DIM Event$[100]
300  ON INTR 7 GOSUB 480
310  Mask=2
320  ENABLE INTR 7;Mask
330  Response$=""
340  LINPUT "Command?";Response$
350  IF (LEN(Response$)=0) THEN 340
360  PRINT "TO instrument : ";Response$
370  OUTPUT @Instr;Response$
380  Query=0
390  FOR I=1 TO LEN(Response$)
400    IF (Response$[I,I]="?") THEN Query=1
410  NEXT I
420  IF (Query=1) THEN
430    ENTER @Instr;Response$
440    PRINT "FROM instrument : ";Response$
450  END IF
460  SEND 7;UNT UNL
470  GOTO 330
480  Stbyte=SPOLL(@Instr)
490  OUTPUT @Instr;"EVENT?"
500  ENTER @Instr;Event$
510  PRINT Event$
520  SEND 7;UNT UNL
530  ENABLE INTR 7
540  RETURN
550  STOP
560  END
```

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APPENDIX B

STATUS AND ERROR REPORTING

The status and error reporting system used by the GPIB Option interrupts the bus controller by asserting the Service Request (SRQ) line on the GPIB. This SRQ provides the means of indicating that an event (either a change in status or an error) has occurred. To service a request, the controller performs a Serial Poll; in response, the instrument returns a Status Byte (STB), which indicates the type of event that occurred. Bit 4 of the Serial-Poll Status Byte is used to indicate that the command processor is active. This bit will be set when the command processor is executing a command, and reset when it is not. The Status Byte, therefore, provides a limited amount of information about the specific cause of the SRQ. The various status events and errors that can occur are divided into several categories as defined in Table B-1.

Each serial poll can in turn cause a second SRQ assertion, if more than one error exists. The most serious error at the time of the serial poll is the reported error. An EVEnt? query returns a number which can be used as an index to the specific type of error that occurred. Table B-2 lists the Serial-Poll Status Bytes and the associated EVEnt? codes generated by the GPIB Option.

If there is more than one event to be reported, the instrument reasserts SRQ until it reports all events. Each event is automatically cleared when it is reported via serial poll. The Device Clear (DCL) interface message may be used to clear all events, except the power-on event.

Table B-1
Status Event and Error Categories

Category	Serial-Poll Status Byte	Description
Command Error	97 or 113	The instrument received a command that it cannot understand.
Execution Error	98 or 114	The instrument received a command that it cannot execute. This is caused by either out-of-range arguments or settings that conflict.
Internal Error	99 or 115	The instrument detected a hardware condition or a firmware problem that prevents operation.
System Events	65-67 and 81-83	Events common to instruments in a system (e.g., Power-on and User Request).
Execution Error Warning	101 or 117	The instrument received a command and is executing it, but a potential problem may exist. For example, the instrument is out of range, but is sending a reading anyway.
Internal Warning	102 or 118	The instrument detected a problem. It remains operational, but the problem should be corrected (e.g., out of calibration).
Device Status	0 or 16, 193-238, and 209-254	Device-dependent events.

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With both the RQS OFF and the WARning OFF commands invoked, all service requests are inhibited. In this mode, the EVEnt? query allows the controller to determine event status without first performing a serial poll. The controller may then send the EVEnt? query at any time, and the instrument returns the code for an event waiting to be reported. The controller can clear all events by repeatedly sending the EVEnt? query until a zero Status Byte is returned. An alternative method for clearing all events (except power-on) is the use of the Device Clear (DCL) interface message.

Table B-2
GPIB Status Codes

Serial-Poll Status Byte	EVENT? Code	Instrument Status
00, 16	000	No status to report
65, 81	401	Power on
66, 82	402	Operation complete
67, 83	403	User request
97, 113	101	Command header error
97, 113	102	Header delimiter error
97, 113	103	Command argument error
97, 113	104	Argument delimiter error
97, 113	105	Non-numeric argument, numeric expected
97, 113	106	Missing argument
97, 113	107	Invalid message-unit delimiter
97, 113	108	Checksum error
97, 113	109	Byte-count error
98, 114	201	Remote-only command in Local mode
98, 114	202	Pending settings lost on rtl
98, 114	203	I/O deadlock detected
98, 114	204	Setting conflict
98, 114	205	Argument out of range
98, 114	250	Diagnostic in progress
98, 114	251	Diagnostic step in progress
98, 114	252	In normal mode
98, 114	253	Option not installed
98, 114	254	Option not in correct mode
98, 114	255	GPIB command lost to local override
99, 115	302	System error
99, 115	350	Math pack error

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Table B-2 (cont)
GPIB Status Codes

Serial-Poll Status Byte	EVENT? Code	Instrument Status
101, 117	550	Warning of possible conflict
102, 118	650	Warning that measurement not yet available
193, 209	750	Asynchronous option error
194, 210	751	Overrange error
195, 211	752	No probe installed
196, 212	753	Fifty-ohm overload
200, 216	770	Oscilloscope test/cal/exer complete, passed
201, 217	779	Oscilloscope test complete, failed
231, 247	771	Option 1 measurement complete
232, 248	772	Option 2 measurement complete
233, 249	773	Option 3 measurement complete
234, 250	774	Option 4 measurement complete
235, 251	775	Option 5 measurement complete
236, 252	776	Option 6 measurement complete
237, 253	777	Option 7 measurement complete
238, 254	778	Option 8 measurement complete

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Section 2

TELEVISION

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SPECIFICATION

INTRODUCTION

The TV Option (Option 05) to the TEKTRONIX 24X5A and 2467 Oscilloscopes provides additional hardware and software to simplify triggering and viewing of television signals. The option adds TV (Back Porch) Clamp circuitry to the Channel 2 input and provides TV trigger coupling modes that allow a user to select either horizontal or vertical sync pulses to obtain horizontal-line-sync or field-sync pulse triggering. This option also permits the user to trigger on a specific line number within a TV field and provides sync polarity switching for either sync-negative or sync-positive composite video signals.

NOTE

Composite video is the picture waveform complete with vertical and horizontal blanking and sync. Composite sync is vertical and horizontal sync combined as a single waveform, but without video (picture) waveforms.

Both system-M and nonsystem-M protocols are available, providing compatibility with most television signal line-numbering protocols.

Stable video rejection and sync separation are obtained from sync-positive or sync-negative composite video signals having interlaced or non-interlaced scan, 525 to 1280 horizontal lines per frame, and 50- or 60-Hz field rates.

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following TV Option accessories are provided:

1	CCIR Graticule CRT Filter
1	NTSC Graticule CRT Filter
1	Polarized Collapsible Viewing Hood

Optional Accessories

The following optional accessories are also available:

24X5A/2467 Options Service Manual
Protective Waterproof Vinyl cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

PERFORMANCE CONDITIONS

Except as noted in Tables 2-1 and 2-2 of this manual, the electrical, environmental, and mechanical characteristics of TV Option instruments are identical to those specified for standard instruments in the respective 24X5A and 2467 Oscilloscope manuals.

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Table 2-1
Option 05 Electrical Characteristics

Characteristics	Performance Requirements
VERTICAL DEFLECTION SYSTEM—CHANNEL 1 AND CHANNEL 2	
Frequency Response	For VOLTS/DIV switch settings between 5 mV and 200 mV/div with VAR control in calibrated detent. Five-division, 50-kHz reference signal from a 50-Ω system with external 50-Ω termination on 1-MΩ input.
Full Bandwidth	
50 kHz to 5 MHz	Within ±1%.
>5 MHz to 10 MHz	Within +1%, −2%.
>10 MHz to 30 MHz	Within +2%, −3%.
Bandwidth Limit	
50 kHz to 5 MHz	Within +1%, −4%.
Square Wave Flatness	With fast-rise step (rise time ≤1 ns), 1-MΩ dc input coupling, an external 50-Ω termination, and VAR VOLTS/DIV control in calibrated detent. Exclude the first 50 ns following the step transition. For signals with rise times ≤10 ns, add 2% p-p between 155 ns and 165 ns after step transition.
Field Rate	
5 mV/div to 10 mV/div	1.5% p-p at 60 Hz with input signal of 0.1 V.[a]
20 mV/div	1% p-p at 60 Hz with input signal of 0.1 V.
50 mV/div	1% p-p at 60 Hz with input signal of 1.0 V.
Line Rate	
5 mV/div to 10 mV/div	1.5% p-p at 15 kHz with input signal of 0.1 V.[a]
20 mV/div	1% p-p at 15 kHz with input signal of 0.1 V.
50 mV/div	1% p-p at 15 kHz with input signal of 1.0 V.
TV (Back-Porch) Clamp (CH 2 only)	For VOLTS/DIV switch settings between 5mV and 200 mV with VAR control in calibrated detent. Six-division reference signal.
60-Hz Attenuation	≥18 dB.
Back-Porch Reference	Within 1.0 division of ground reference.

[a]**Performance requirement not checked in manual.**

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Table 2-1 (cont)

Characteristics	Performance Requirements
TRIGGERING	
Sync Separation	Stable video rejection and sync separation from sync-positive or sync-negative composite video, 525 to 1280 lines, 50 Hz or 60 Hz, interlaced or noninterlaced systems. For noninterlaced scan systems, the video signal source must start and end with full lines of video for correct line identification in the field trigger modes.
Line Selection Range in FLD 1, FLD 2, or Both Coupling Modes	The lesser of 1280 or the number of lines in the field.
Input Signal Amplitude for Stable Triggering	
Channel 1 or Channel 2	Minimum sync-pulse amplitude within 18 divisions of input ground reference.
Composite Video	1 division.
Composite Sync	0.3 division.
Channel 3 or Channel 4	Minimum sync-pulse amplitude within 9 divisions of input ground reference.
Composite Video	0.5 division.
Composite Sync	0.25 division.

Table 2-2
Option 05 Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Probes, Operators Manual, and Options	≤12.0 kg (26.4 lb).
Domestic Shipping Weight	≤17.6 kg (38.8 lb).

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PREPARATION FOR USE

This part of the manual contains information related to the power-up of the standard instrument containing the TV Option. The power-up sequence of the oscilloscope is described, along with explanations of potential option-related error messages that may occur if the instrument is not functioning properly. Also included is initial setup information for the selection of the TV protocol and the line number format parameters.

FILTER/GRATICULE REPLACEMENT

The plastic filter or graticule over the CRT faceplate can be removed by sliding the filter or graticule up until the bottom edge is exposed. Pull the bottom edge out and slide the filter or graticule down.

POWER-UP SEQUENCE

Before initially turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, test both the standard oscilloscope circuitry and the TV Option circuitry. The TV Kernel test is integrated into the power-up tests for the host oscilloscope.

Kernel Test

Operation of the TV Option memory (ROM) is checked by the standard instrument Kernel test. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labeled A/B MENU.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable. If the instrument then functions adequately for your particular measurement requirement, it can be used; but refer it to a qualified service technician for repair of the problem as soon as possible.

Successful Power-Up Sequencing

When the power-up routine is successfully completed without a failure indication, the oscilloscope enters the normal operating state. The oscilloscope parameters are set to correspond with current front-panel settings and functions that were established before instrument power was last turned off. The instrument is now ready to make measurements as required.

POWER-DOWN SEQUENCE

When the POWER switch is set to OFF, the instrument powers down and the instrument front panel settings that were established prior to power off will be stored for use the next time power is applied to the instrument.

TV PROTOCOL AND LINE-NUMBERING FORMAT SELECTION

The following procedures are used to select a particular protocol or line-numbering format. Both involve access to Diagnostic monitor routines (TV EXER 61 and TV EXER 62) and affect field triggering only (FLD 1, Alternate FLD 1—FLD 2, or FLD 2). TV protocol selection allows the user to choose between system-M and nonsystem-M protocols. Selecting the incorrect system for a given TV protocol will not affect the ability to trigger on a given TV waveform. It will, however, cause the line number displayed to be inaccurate. Line-numbering format selection allows the user to

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select a preferred line-numbering scheme. Format 1 references line one from the beginning of the field being used for trigger reference. Format 2 always references line one from the first line of Field 1.

Exercise procedure TV EXER 61, accessed via the oscilloscope Diagnostic Menu, allows the user to select between system-M and nonsystem-M television protocols. When system-M is selected, the line count begins three lines before the field-sync pulse is encountered. If nonsystem-M is selected, the line count begins with the field-sync pulse.

Exercise procedure TV EXER 62, accessed via the oscilloscope Diagnostic Menu, allows the user to select one of two line-number formats. When Format 1 is selected, field 1 uses line numbers 1 through 263 and field 2 uses line numbers 1 through 262. When Format 2 is selected, field 1 uses line numbers 1 through 263 and field 2 uses line numbers 264 through 525. Clockwise rotation of the FLD LINE # control increases the line number. Counterclockwise rotation of the FLD LINE # control decreases the line number.

To choose or determine the TV protocol:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of the readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT."**

2. Press and hold the upper or lower Trigger MODE button to sequence through the TEST and EXER routine labels until the message **"TV EXER 61"** appears at the lower left corner of the CRT.

3. Press the upper Trigger COUPLING button, causing the currently selected protocol to appear at the top of the CRT display. The message meanings are as follows:

LINE 1 OCCURS PRIOR TO FLD SYNC—System-M protocol is currently selected.

LINE 1 COINCIDENT WITH FLD SYNC—Nonsystem-M protocol is currently selected.

4. If the desired protocol is not displayed, press the upper Trigger COUPLING button. The desired protocol message should now be displayed.

5. Press the lower Trigger COUPLING button to store the selected protocol and return the oscilloscope to the Diagnostic Menu.

To choose or determine the line number format:

6. Briefly press the upper Trigger MODE button, causing the message **"TV EXER 62"** to appear at the lower left corner of the CRT.

7. Press the upper Trigger COUPLING button to display the currently selected format at the top of the CRT. The message meanings are as follows:

LINE NO RESETS ON EACH FIELD—Format 1 is selected; line numbering begins with the first line of both field 1 and field 2.

LINE NO RESETS ON FLD 1 ONLY—Format 2 is selected; line numbering begins at the first line of field 1 and continues through field 2.

8. If the desired line format message is displayed, exit the Diagnostic Menu by pressing the A/B TRIG button to resume normal oscilloscope operation.

9. If the desired line format message is not displayed, press the upper Trigger COUPLING button. The desired line format message should now be displayed.

10. Press the lower Trigger Coupling button to store the selected line format and return to the Diagnostic Menu.

11. Press the A/B TRIG button to exit the Diagnostic Menu and resume normal oscilloscope operation.

AUTOMATIC SYNC SELECTION

Automatic sync selection allows the user to preselect the polarity of sync used most often. Automatic sync selection will change the sync to the preselected polarity when the user enters a TV trigger coupling selection. Once

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TV trigger has been activated, the user may change the polarity as desired. Changing trigger coupling selections within the TV Option area will not cause the sync selection to be changed. There are three possible sync selections:

POSITIVE:	TV Option will select sync positive when entering TV trigger.
NEGATIVE:	TV Option will select sync negative when entering TV trigger.
SLOPE DEFAULT:	TV Option will default to the A trigger slope.

To choose or determine automatic sync polarity, enter the Diagnostic Monitor and choose TV EXER 63 (see instructions 1 and 2 under "TV Protocol and Line-Numbering Format Selection"). After entering TV EXER 63, the top line of the CRT display will read:

"TV SYNC:POSITIVE"

or

"TV SYNC:NEGATIVE"

or

"TV SYNC:SLOPE DEFAULT"

Press the upper Trigger COUPLING button to cycle through these states. When the desired state is displayed, press the lower Trigger COUPLING button to store the selection and return to the Diagnostic Menu. Press the A/B TRIG button to return to normal oscilloscope operation.

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THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 05 (TV Option) circuitry for the 24X5A and 2467 Oscilloscopes. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For optimum understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-5. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to the 24X5A and 2467 Oscilloscopes without option circuitry.

The activities of the option are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the option, monitors the option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable programmable read only memory (EPROM) contained in the Buffer and option circuit boards and the nonvolatile RAM in the base instrument provide these storage locations.

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BUFFER BOARD

The TV option connects to the standard oscilloscope through the Buffer circuit board. The Buffer board performs the following functions:

1. Buffers and modifies the timing of the microprocessor bus.

2. Distributes the microprocessor bus, power supplies, and analog signals from the standard oscilloscope to the options.

3. Provides additional ROM for interfacing options to the standard instrument.

4. Provides a mechanical interface.

The microprocessor control bus, address bus, and data bus are buffered by Buffer board circuitry. Microprocessor bus timing for the options is modified by buffers on the Buffer board to make bus timing compatible with the options. Address bus decoding allows individual circuits to be addressed.

These signal paths are used for communication between the TV option and the standard oscilloscope and involve both data and control signals. The main oscilloscope circuitry uses them to control the option. The option uses them to send information to the standard oscilloscope for display and to control the standard oscilloscope.

TV BOARD

The TV option adds hardware and software to the standard oscilloscope that make it possible to trigger on and view complex television signals. The standard oscilloscope and the option are interconnected by the Buffer board. The TV board is divided into analog and digital sections.

Circuitry in the analog section of the TV board processes composite video from the selected trigger source. If enabled, the TV (Back Porch) Clamp acts as a dc restorer to eliminate waveform tilt and prevent level changes due to changes in average picture level (APL). Sync pulses are extracted from the composite video by the Sync Pickoff comparator. The horizontal and vertical sync pulses are separated and used to produce the horizontal clock and field signals used by the digital circuitry.

The digital section of the TV board contains the microprocessor interface, which allows the microprocessor to control the option. It includes the Data Bus buffer, the Memory and I/O decoders, the Option Select register, and the EPROM. The TV Control register stores the option's control information. Sync pulses for TV field(s) are counted by counters in the Counter/Timer integrated circuit (IC). The Mode Select logic selects the proper signal to arm the Auxiliary Trigger generator. The Auxiliary Trigger generator triggers the standard instrument's sweep generator when sweep holdoff has ended and the selected horizontal sync pulse arrives.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the 24X5A and 2467 Buffer board and Television circuitry. Unique circuitry is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-12) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

BUFFER BOARD DIGITAL DISTRIBUTION

The Buffer Board Digital Distribution circuitry (see Diagram 20) interconnects the standard oscilloscope and the TV board. Most of the microprocessor signals are buffered and have their timing modified. In addition, some of the memory used for option functions is included on the Buffer board. The calibration constants and power-down settings of the option are stored in the nonvolatile RAM of the base instrument.

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Address Decoding

Gates U4240A and U4240C partially decode the address bus. Enable BVMA (U4240C, pin 8) is HI for addresses from 1000-7FFF, the address space used by the options including the Buffer board. (This and all other address references are in hexadecimal.)

Enable $\overline{\text{BUFEN}}$ (U4250C, pin 8) is LO for the address space of 1000-1FFF. Address strobe $\overline{\text{LOWAD}}$ is active LO for the address space of XFFC-XFFF (where X is a don't care). These decoded address signals are used in selecting ROM U4260 on the Buffer board and disabling data bus buffer U4255.

Buffer Board ROM

Buffer board ROM U4260 is used to interface the option to the standard oscilloscope. Its output enable (at pin 20) is $\overline{\text{ROMEN}}$. The signals $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ are the same if P4256 is present. With $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ the same, the Buffer board ROM address space is 1000-1FFF. Whenever the Buffer board ROM is addressed, U4275 (the shift register that controls the data bus buffer) is reset by $\overline{\text{ROMEN}}$. This prevents the Buffer board data bus buffer and the Buffer board ROM from driving the microprocessor side of the data bus at the same time.

Bus Buffers

The 10-MHz clock signal of the standard oscilloscope is buffered by U4265D. The buffered clock (B10MHZ) clocks shift register U4275 and is also sent to the options.

The $\overline{\text{E}}$ clock, $\overline{\text{RESET}}$, VMA, and R/ $\overline{\text{W}}$ are buffered by latch U4225. The pull-up on pin 12 of U4225 allows $\overline{\text{RESET}}$ and $\overline{\text{E}}$ to pass through the latch unmodified. The buffered E clock is delayed more than 30 ns by R4265, C4265, and U4265C. This delayed BE clock latches $\overline{\text{VMA}}$, R/ $\overline{\text{W}}$ (U4225), and the address bus (U4235 and U4245), providing extra hold time on these signals for the options.

Data Bus Buffer

Data bus buffer U4255 is a bidirectional bus driver that is controlled by the signals on pin 1 and pin 19. Pin 1 controls the direction of data flow through the buffer, and pin 19 turns the drivers on and off. When pin 1 is HI, the buffer is configured to drive data from the microprocessor to the options. Conversely, when pin 1 is LO, the buffer is configured to drive data from an option to the microprocessor. Pin 1 is always HI except when the microprocessor is reading data from an option. U4255 is inactive when pin 19 is HI.

Signals on pin 1 and pin 19 coordinate the states of U4255 so that data bus contention never occurs. Buffer U4255 drives two buses: the bus between U4255 and the Control board of the standard oscilloscope, and the bus between U4255 and the options. Both of these must be kept free of contentions (i.e., it is not allowed for more than one device to drive the bus at the same time). These two buses will be examined individually.

The bus between the Control board and U4255 is driven by the Control board during a write bus cycle, driven by the Control board during a read cycle from non-option space (0000-0FFF and 8000-FFFF), driven by U4255 during a read cycle from option space (2000-7FFF), and driven by U4260 during a read from Buffer board ROM (1000-1FFF). The Control board changes its drivers from output to input on the rising edge of E (this is the high-true E, not the low-true $\overline{\text{E}}$ used by the option) when going from a write to a read cycle. It changes from input to output on the falling edge of R/ $\overline{\text{W}}$ when going from a read to a write cycle. Data buffer U4255 drives the Control board data bus only when BVMA and BR/ $\overline{\text{W}}$ are both true, i.e., a read cycle from the option is being performed. This is done by driving U4255 pin 1 from BVMA NANDed with BR/ $\overline{\text{W}}$ (after passing through a delay consisting of two cycles of the 10-MHz clock). Pin 19 of U4255 is driven by $\overline{\text{E}}$ delayed for two cycles of the 10-MHz clock. This two-cycle delay ensures that U4255 will be driving the Control board data bus only in a read cycle from option address space, during a time interval starting after the rising edge of E and ending after the falling edge of E. A delay of two cycles of the 10-MHz clock is necessary to guarantee that the Control board data bus drivers have turned off before U4255 starts driving the bus. This is a period of time when the Control board never drives the data bus during a read cycle. Shift register stages in U4275 are cleared by $\overline{\text{ROMEN}}$, forcing U4255 pin 19 HI while Buffer board ROM is being read.

The bus between U4255 and the options must be driven by U4255 during a write cycle to the options (2000-7FFF) and may be driven by an option only during a read cycle from the option (2000-7FFF). Bus driver U4255 actually drives the bus to the option during all cycles except read cycles from 1000-7FFF. The bus is driven by an option only while E is true during an option read cycle. Address bus driver U4255 drives the bus during an option write cycle while U4255 pin 19 is LO, but in this case pin 19 is delayed from $\overline{\text{E}}$ only by one cycle of the 10-MHz clock, driving the data to the options as soon as it is available from the microprocessor.

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TELEVISION OPTION CIRCUIT BOARD

The TV Option circuit board adds hardware and firmware that make it possible to trigger on and view television signals. The TV board is divided into analog and digital sections. The following descriptions are supported by the circuit timing diagram (Figure 10-14) located in the tabbed foldout pages in the rear of the manual.

The analog section contains the composite video signal processing circuitry. It includes signal amplification, automatic gain control, back-porch clamping, sync pickoff, and sync separation circuitry. Clocks at the horizontal (line) rate and a field indicator signal are sent to the digital section. The digital section contains the microprocessor interface and circuitry that triggers the standard instrument's sweep generator. The trigger is generated when the selected horizontal sync pulse (line) occurs.

Analog Circuitry

The TV option Analog circuitry (see Diagram 23) processes the composite video. Back-porch level control, horizontal clock, and vertical field signals are produced for other circuitry in the instrument.

VARIABLE GAIN AMPLIFIER. The Variable Gain Amplifier stage amplifies the input composite video signal. The front-panel SLOPE selector determines whether the amplifier is inverting or noninverting.

Differential amplifier U5436 amplifies the input composite video signal. It contains two pairs of switching transistors that provide signal inversion when desired. The Sync Tip Clamp and Automatic Gain Control circuitry controls the channel resistance of Q5530, which determines the gain of the amplifier. The gain is automatically adjusted to maintain proper sync-tip level. With no input signal, the gain is maximum.

The composite video signal is applied to one input of the differential amplifier (U5436, pin 3) and to its dc offset amplifier (U5636B). The input to the dc offset amplifier is low-pass filtered by R5433 and C5630, so that its output is the dc component of the composite video signal. This filtered output is then applied to the other input of the differential amplifier (U5436, pin 11).

Four transistors of U5436 are controlled by the SLOPE signal from U5764. When SLOPE is HI, the transistors connected to pins 2 and 9 will be biased on, and the collector signal at pin 8 will drive Q5528. When SLOPE is LO, the transistors connected to pins 13 and 6 will be on, and the collector signal at pin 14, which is inverted with respect to both the input signal and the signal at pin 8, will drive Q5528.

Common-base transistor Q5528 level shifts the signal from U5436 and provides voltage gain to drive U5427D. For stable triggering, the composite video signal which drives U5427D must be sync-negative; if the displayed input signal is sync-positive, the SLOPE button must be pushed to invert the signal.

FIXED GAIN AMPLIFIER AND BACK-PORCH CLAMP. The second-stage amplifier circuitry provides additional gain to the video signal from the Variable Gain Amplifier. Also, additional start-up circuitry is used to set amplifier parameters when a signal is first applied.

Additional amplification is provided by U5427. Transistors U5427A and U5427B form a differential amplifier, with U5427C supplying their emitter current. The output of U5427B drives the input of the Sync Pickoff comparator.

When a signal is first applied, the amplifier operating levels are established by feedback. The channel resistance of Q5530 is minimum when no signal is applied. This will set up the circuitry for maximum gain to enable the feedback circuits, the Back Porch clamp, and the Sync Tip Clamp and Automatic Gain Control. Once a signal is applied, Q5625 and associated circuitry will increase the dc level associated with the input signal if any of the signal is below ground. When the signal is below ground, diode CR5526 will forward bias, shutting off Q5625 and forward biasing CR5623. This reduces the output voltage of U5636C and decreases the base drive voltage on U5427B. This raises the transistor's collector voltage and turns off CR5526.

SYNC PICKOFF COMPARATOR. The comparator, composed of Q5515 and Q5512, is switched by the sync pulse. The switching threshold is set at about 50% of the sync level by the values of resistors R5611 and R5622. The collector output of Q5512 is the composite sync waveform; the output of Q5515 is the inverse of the output of Q5512.

SYNC-TIP CLAMP AND AUTOMATIC GAIN CONTROL. Transconductance operational amplifier U5410 acts as a sync-tip clamp and controls the gain of U5436 by altering the channel resistance of Q5530. The operational amplifier's gain is determined by the current into pin 5. The amplifier is enabled on sync tips when pin 5

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is HI (−14.4 V). One input of the operational amplifier is grounded, and the other has the collector signal of U5427B applied through R5525. The operational amplifier, when enabled at the start of a sync pulse by the collector of Q5512 going LO, alters the channel resistance of Q5530, keeping the signal level at the collector of U5427B at about 0.5 V for the duration of the sync pulse. When pin 5 is LO (−15 V), U5410 is off and C5419 acts as a sample and hold to maintain bias on Q5530.

Diode CR5522 reduces amplifier gain when the sync tip is below −0.2 V. If the diode becomes forward biased, Q5518 turns on (if it is not on already). Amplifier U5410 can then increase the channel resistance of Q5530 and thus reduce the amplifier gain.

BACK-PORCH CLAMP. Transconductance operational amplifier U5310 acts as a back-porch clamp to control the level of the video signal during the back-porch period. Its gain is determined by the current into pin 5. When the amplifier is enabled, pin 5 is HI (−14.6 V). When the collector signal of Q5515 goes negative, the resulting pulse coupled through C5726 turns off U5712A. The positive-going signal on the collector of U5712A enables U5310 during the back-porch time. The output of U5310 drives voltage-follower U5636C, which in turn establishes the base voltage of U5427B. The collector signal of U5427B drives U5310 pin 3 through R5525 and R5523. This feedback loop will establish zero volts on pin 3 of U5310 during the back-porch time, with a resulting collector voltage on U5427B of about 4.5 V. When U5310 pin 5 is LO (−15 V), U5310 is turned off and C5631 acts as a sample and hold to maintain the bias on U5427B.

VERTICAL BACK-PORCH CLAMP. The Vertical Back-Porch Clamp clamps the back-porch level of the displayed signal to about zero volts.

Input to level comparators U5755 and U5855 is a sample of the signal (CH2 PO) in the Channel 2 vertical preamp. The output of the clamp, CH2 OFFSET, supplies a dc offset to the vertical preamp. The level comparators supply a dc offset of the proper polarity and magnitude to cause CH2 PO to be about zero volts during the back-porch interval.

Any color burst on the signal is removed by R5754 and C5755. The signal is then compared to ground during the back-porch interval by either U5755 or U5855. The dc offset required to bring the back-porch level to zero volts is sampled and held by C5640 and C5545. Operational amplifiers U5636D and U5636A supply the drive required by the preamp.

When CH 2 VOLTS/DIV is at 2 mV, 5 mV, 10 mV, 100 mV, or 1 V/DIV; FAST/SLOW is LO, turning on U5728E. The channel resistance of Q5442 will then decrease, making C5640 part of the sample-and-hold capacitance. R5812, R5820, C5545, and C5640 control the large signal ac response of the Vertical Back-Porch Clamp during the sampling period.

BACK-PORCH CLAMP SWITCHING. The Back-Porch Clamp Switching circuitry determines when the Vertical Back-Porch Clamp is active and which of its level comparators is used.

When the back-porch clamp is not enabled, CLAMP will be LO, turning U5728D on. The HI on the collector of U5728D turns on U5712B, 5712C, and Q5736. This keeps both comparators (U5755 and U5855) off and the inputs to U5636A and U5636D grounded. With this circuitry disabled, the Channel 2 vertical preamp circuitry does not receive a dc offset voltage from the comparators.

When the back-porch clamp is enabled, CLAMP will be HI, turning U5728D off. The LO on the collector of U5728D turns Q5736 off, enabling U5636A and U5636D. It also allows U5712E and U5712D to turn off either U5712B or U5712C, turning on the corresponding comparator (U5855 or U5755). Either U5755 or U5855 is gated on during the back-porch interval when U5712A turns off. With the Vertical Back-Porch Clamp enabled, the back porch of the displayed signal is clamped to ground. However, when the Phase Locked Loop is not locked, the Vertical Back-Porch Clamp is turned off through R5831.

Comparator selection, either U5755 or U5855, is controlled by the CH2 INVERT signal. The signal from Channel 2 is inverted by U5855, but not by U5755. If the front-panel INVERT is selected, the signal from the preamp must be inverted by U5855. This is because the preamp's signal is sampled after inversion takes place in the preamp. If CH2 INVERT is LO, U5712E is on and U5712D is off. The HI on the collector of U5712E turns on U5712B which turns off U5855. If U5855 is off, the input signal will not be inverted. The LO on the collector of U5712D turns off U5712C, enabling U5755; during the back-porch interval the collector of U5712A will be HI, turning on U5755. If CH2 INVERT is HI, the circuitry operates similarly. However, this time U5755 is turned off and U5855 is turned on, inverting the signal from the preamp.

If the back-porch clamp is enabled during the back-porch interval, transistor U5712A turns on either U5755 or U5855. However, the dc offset generated by U5755 and U5855 must be maintained during the entire horizontal

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interval. Between back-porch intervals, while U5755 and U5855 are turned off, the required offset is maintained by C5545 and, if Q5442 is on, by C5640.

PULSE STRETCHER, EQUALIZING PULSE REMOVER, AND AUTO BASELINE GENERATOR. The Pulse Stretcher stretches the horizontal sync pulses and the Equalizing Pulse Remover removes alternate equalizing pulses from the input composite sync. The Auto Baseline Generator produces the HORIZ CLK signal used in generating triggers.

The leading edge of each sync pulse turns on U5728C. This reverse biases CR5831, turning off U5728B. The HI on the collector of U5728B keeps U5728C on and reverse biases CR5735. The collector of U5728B remains HI until C5830 charges to about 1.4 volts. The resulting square wave passes through CR5774, becoming HORIZ CLK.

To avoid passing every equalizing pulse and serrated pulse, the output of the Delayed Horizontal Clock circuit is coupled through R5832, keeping U5728B turned on and its collector LO midway between horizontal sync pulses.

The Auto Baseline Generator combines (ORs) the horizontal sync stripped from the input signal and the H clock produced by the Phase Locked Loop divider. The H clock is first delayed by R5864 and C5773. The H clock input allows HORIZ CLK to be produced when in LINES TRIGGER COUPLING, both when there is no input signal and during non-serrated vertical sync pulses. Producing HORIZ CLK at these times generates a trigger and therefore a base-line trace.

PHASE LOCKED LOOP. The Phase Locked Loop (PLL) generates signals used in identifying individual fields in interlaced scan systems.

PLL U5845 operates at twice the horizontal clock frequency. Its output, 2XH, is divided by two by U5645B, producing both H and $\overline{\text{HORIZ CLK}}$. Horizontal sync from the input signal is input to U5845 at pin 14. The $\overline{\text{HORIZ CLK}}$ generated by the PLL through U5645B is input to U5845 at pin 3. Equalizing pulses and the vertical sync are removed from the PLL inputs by U5838B and U5838C (see Figure 10-14).

Pin 1 of the Phase Locked Loop (U5845) is LO whenever the signals on pin 3 and pin 14 do not coincide (horizontal sync at pin 14 not in phase with $\overline{\text{HORIZ CLK}}$ at pin 3). The PLL error signal at pin 1 is stretched by R5755 and C5865 and then inverted by Q5860. When the collector of Q5860 is HI, Vertical Sync (U5756A) and the Delayed Horizontal Clock (U4645A) are reset, and the equalizing pulses and vertical sync are no longer removed from the inputs by U5838B and U5838C. This lets the Phase Locked Loop see the entire input signal while it's trying to lock on the input.

DELAYED HORIZONTAL CLOCK. The Delayed Horizontal Clock is used to remove equalizing pulses from the horizontal sync. The horizontal clock (H) is clocked through U5645A by $\overline{\text{2XH}}$. This delays the horizontal clock by ¼ of a horizontal clock cycle.

VERTICAL SYNC. The Vertical Sync circuitry outputs a pulse for both the Field 1 and the Field 2 vertical sync pulses. The VERTICAL SYNC signal is produced by clocking $\overline{\text{COMPOSITE SYNC}}$ into U5756A using the inverted two times horizontal clock ($\overline{\text{2XH}}$). During the period of vertical sync, $\overline{\text{COMPOSITE SYNC}}$ will be HI during the rising edge of $\overline{\text{2XH}}$. During the remainder of the field, $\overline{\text{COMPOSITE SYNC}}$ will be LO during the rising edge of $\overline{\text{2XH}}$.

FIELD SYNC GENERATOR. The Field Sync Generator generates FIELD using the Horizontal clock (H) and VERTICAL SYNC signals. (For interlaced scan signals it identifies the field, while for noninterlaced scan signals it identifies vertical sync only.) Counters in the digital section use FIELD in selecting either the Field 1 or Field 2 line counter.

Both U5456B and U5756B generate FIELD ID at the same time. On interlaced scan signals, FIELD ID is produced at pin 12 of U5456B. It is HI during Field 1 and LO during Field 2. The FIELD ID signal generated by U5456B identifies fields of interlaced scan signals.

Both changing FIELD ID signals will be absent in noninterlaced scan systems. This absence, at U5756B, is detected by the interlaced scan detector (U5756B, U5728A, and Q5735). When the FIELD ID signal is static, the interlaced scan detector enables circuitry that generates FIELD at the vertical rate.

During interlaced scan signals, the changing FIELD ID signal from U5756B keeps U5728A and Q5735 on. The LO on the collector of U5728A allows U5456B to continue generating the normal FIELD signal. The HI on the emitter of Q5735 keeps U5456A set, preventing it from affecting the FIELD signal.

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During a noninterlaced scan signal, the FIELD ID signals generated by U5756B and U5456B will be static. The dc level on U5756B is blocked by C5651, turning off U5728A and Q5735. The HI on the collector of U5728A resets U5456B, preventing it from affecting the FIELD signal. The LO on the collector of Q5735 allows VERTICAL SYNC to clock U5456A, producing FIELD. The FIELD signal generated by U5456A has no relation to Field 1 and Field 2.

The AND gate composed of CR5653, CR5655, and R5652 selects the signal produced by either U5456B or U5456A. The selected signal becomes FIELD.

Digital Circuitry

The TV Option Digital circuitry (see Diagram 24) provides an interface to the microprocessor and generates a trigger to the standard instrument's sweep generator.

MEMORY AND I/O DECODERS. This circuitry decodes the address bus, generating enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices, as in the standard oscilloscope (see "Address Decode" description in the Service manual of the standard oscilloscope). The TV Option memory map is shown in Table 2-3.

Table 2-3
TV Option Memory Map

Address	Description	Device No.
1000-1FFF	Buffer board ROM	U4260
4000-7FFF	Data Bus buffer	U5459
4000-5FFF	ROM	U5565
6000-7F7F	ROM image	U5565
7F80-7F87	Counter/Timer IC registers	U5575
7F88-7F8E	TV Control register images	U5764
7F8F	TV Control register, write only	U5764
7F90-7F97	Counter/Timer image	U5575
7F98-7F9E	Mode Select register images	U5880A,B,C
7F9F	Mode Select register, write only	U5880A,B,C
7FA0-7FA7	Counter/Timer image	U5575
7FA8-7FAF	TV Control register images	U5764
7FB0-7FB7	Counter/Timer image	U5575
7FB8-7FBF	Mode Select register images	U5880A,B,C
7FC0-7FFE	Option Select register images	U5880D
7FFF	Option Select register	U5880D

OPTION SELECT REGISTER. The Option Select register, U5880D, enables and disables access to TV option circuitry. Whenever there is a write to address 7FFF, data bus line BBD5 is latched into the register. If BBD5 is HI, TV option circuitry will be selected for memory and I/O accesses within the paged address space (4000-7FFF). If BBD5 is LO, the TV option is deselected. While the TV option is deselected, the Option Select register is the only TV circuitry that can be accessed by the microprocessor.

DATA BUS BUFFER. The data bus is buffered by bidirectional buffer U5459. It is enabled by BVMA, BA14, and the Option Select register through U5790A, U5390A, and U5390B. The direction of data is controlled by BR/ $\overline{W}$.

EPROM. The EPROM U5565 is enabled by the Option Select register through U5770E. Data from the EPROM is sent over the data bus when one of its addresses is decoded by U5790C, U5380, U5390B, and U5390A.

TV CONTROL REGISTER. The TV Control register is written to by the microprocessor to:

1. Control the polarity (SLOPE) of the sync tips of the composite video used in the analog section of the circuitry.

2. Control the back-porch clamp circuitry (CH2 INVERT, CLAMP, and FAST/ $\overline{SLOW}$).

3. Enable the TV Option's Auxiliary Trigger generator.

The microprocessor writes to the register whenever the option is selected and the register's address is decoded by U5680A, U5890A, U5680C, U5390C, U5580E, U5380, and U5390B.

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COUNTER/TIMER. Counter/Timer U5575 contains three programmable counters used to determine the maximum number of lines in a given field and to produce a variable delay. The delay is varied to select any specific line in the selected field as the trigger point.

The Counter/Timer is enabled whenever its address is decoded by U5680C and BA3 is LO. Access to the internal registers is controlled by BA0, BA1, BA2, and BR/ $\overline{W}$.

Counters 1 and 2 are used in single-shot mode to delay the trigger points by the proper amounts from the Field 1 and Field 2 vertical sync pulses, respectively. Each counter counts $\overline{\text{HORIZ CLK}}$ (applied to the C inputs) during the respective counter's field. The FIELD pulse is applied to inputs G1 and G3; the pulse is inverted by U5770F and applied to input G2.

The outputs of Counters 1 and 2 provide a LO pulse out to U5775D and U5775A. The pulse out occurs when the sync pulse for the line prior to the one selected is reached. If the desired line is too near the start of its field, the counter for the other field is used, and the counter starts counting at the beginning of its field. Counting continues until the desired sync pulse for the line prior to the one selected is reached; this may mean counting past the start of the next field. Then, the counter generates the output pulse.

Starting the count at the beginning of the previous field is necessary for the first three lines of a field in systems where line 1 is coincident with the field pulse (nonsystem-M), and for the first six lines in systems where line 1 is three lines before the field pulse (system-M). Lines 1 through 3 of system-M signals cannot be delayed from their corresponding field sync pulse because they occur before the field pulse. The following three lines for system-M signals (where line 1 is three lines before the field sync) and the first three lines for nonsystem-M signals (where line 1 is coincident with the field pulse) must be delayed from the previous field because:

1. The horizontal clock coincident with the field pulse does not cause a count to occur; it only starts the counting process.

2. The counters must arm the trigger generator on the line preceding the selected line.

3. The counter will not generate a delay of zero (there must be at least a one count delay).

4. The counter's output goes LO one count (line) after the count reaches zero.

AUXILIARY TRIGGER GENERATOR. The Auxiliary Trigger generator produces the signal that triggers the sweep generator in the standard instrument when the appropriate horizontal line is reached.

Trigger generation in the option and in the standard instrument is similar. Neither is allowed to produce triggers during sweep retrace (holdoff). After holdoff, the trigger circuitry is made ready to produce a trigger (armed). In the standard instrument and for LINES TV TRIGGER COUPLING in the option, the triggers are armed at the end of holdoff. For FLD1, FLD2, and ALT TV TRIGGER COUPLING in the option, the Auxiliary Trigger generator is not armed until the sync pulse for the line prior to the one selected is reached. When the next horizontal sync pulse (the line selected for triggering) is reached, the trigger circuitry produces the trigger.

Trigger holdoff information is provided by AHO through U5580F to U5590A pin 1. When AHO is HI, both U5590A and U5590B are reset, holding off the generation of triggers. After holdoff time has ended (AHO LO), the Mode Selection logic will set U5590A, arming the trigger generator. The next time HORIZ CLK goes HI at U5590B pin 11, U5590B will set, generating a trigger.

MODE SELECT LOGIC. The Mode Select Logic selects the signal used to arm the Auxiliary Trigger generator. The three arming signals used are: the output of Counter 1 at U5575 pin 27 (Field 1 line counter), the output of Counter 2 at U5575 pin 3 (Field 2 line counter), and the A Holdoff at U5580F pin 13 (AHO) going LO.

The arming signal selected is controlled by the Mode Select register (U5880A, U5880B, and U5880C). The register receives the present TV Trigger mode information from the microprocessor. The three select lines are: Alt (U5880A pin 5), DSMODE (U5880B pin 6), and LINES (U5880C pin 15). If LINES TV TRIGGER COUPLING is selected, LINES will be HI. If ALT FLD TV TRIGGER COUPLING is selected, ALT will be HI. In Alternate mode, DSMODE selects Field 1 or Field 2.

A trigger can not occur until after holdoff ends (holdoff ends when AHO goes LO) and the Auxiliary Trigger generator is armed. In the following discussion, it is assumed that holdoff has just ended. This means AHO U5580F pin 13 just went LO and no longer holds the arming flip-flop, U5590A, reset.

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In Lines mode, U5880C pin 15 is HI, enabling U5790B. Whenever holdoff ends, AHO goes LO, U5580F pin 12 and U5790B pin 4 go HI, and U5790B pin 6 and U5590A pin 4 go LO, setting arming flip-flop U5590A. With the arming flip-flop set, trigger generator U5590B is no longer held reset. The next HORIZ CLK to U5590B pin 11 sets the flip-flop, generating a trigger.

In Lines mode: a trigger is generated, the sweep runs, holdoff occurs, the trigger generator is armed as soon as holdoff goes LO, and the next trigger occurs when the next horizontal sync pulse arrives. This gives a trace which is stable with respect to horizontal sync pulses (lines), but is not stable with respect to vertical sync pulses (fields) or the video information on any given line.

If Field 1 or Field 2 TV Trigger modes are selected, the ALT, DSMODE, and LINES signals are all LO. With ALT LO, U5775B pin 4 and U5775C pin 10 are both LO. This makes U5775B pin 6, U5775A pin 2, U5775C pin 8, and U5775D pin 12 all HI, enabling U5775A and U5775D. With both gates enabled, either the Field 1 counter or the Field 2 counter can arm the trigger generator.

The counter used is determined by the microprocessor's setup of the Counter/Timer. The output of the unused counter is LO. Depending on which counter is selected, when the trigger count is reached, the output of either U5775A or U5775D will go HI. This will make both inputs of U5790D HI, and its output LO. The LO is inverted to a HI by U5580D, setting arming flip-flop U5590A.

In the field modes: a trigger is generated; the sweep runs; holdoff occurs; holdoff ends; the sync pulse for the line prior to the selected horizontal line occurs, arming the Auxiliary Trigger generator; and the next horizontal sync pulse arrives, generating the next trigger. This gives a trace which is stable with respect to horizontal sync pulses (lines), vertical sync pulses (fields), and the video information on the selected lines.

Alternate TV Trigger mode may be used with Alternate Vertical mode. In Alternate TV Trigger mode, the selected horizontal line of Field 1 triggers the sweep for the first active vertical channel, and the selected horizontal line of Field 2 triggers the sweep for the next active vertical channel.

If Alternate TV Trigger mode is selected, the ALT signal is HI, and the DSMODE signal controls whether or not the $\overline{DS}$ signal is inverted. With ALT HI, both U5775B and U5775C are enabled. With DSMODE LO, the output of U5890B will be the input $\overline{DS}$. $\overline{DS}$ will be HI during the sweep for the first active vertical channel, and LO during the sweep of the next active vertical channel. The $\overline{DS}$ signal through U5775B and U5775C allows only one counter's output at a time to get through to arm the Auxiliary Trigger generator. The state of $\overline{DS}$ changes with each sweep, allowing the opposite counter (field) to arm the trigger generator.

When the DSMODE signal is HI, U5890B inverts $\overline{DS}$. Operation of the circuitry is now the same as stated for Alternate TV Trigger mode except: Counter 2 arms the trigger generator for the first active channel's sweep, and Counter 1 arms the trigger generator for the next active channel's sweep. This reversal of roles is required whenever the line selected for triggering is near the start of the field.

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PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 05 (TV) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 2-1. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 2-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20°C and +30°C and is operating in an ambient temperature between −15°C and +55°C. The instrument also must have had at least a 20-minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

The test equipment listed in Table 2-4 is a complete list of the equipment required to accomplish both the "Performance Check Procedure" and the "Adjustment Procedure." To assure accurate measurements, it is important that test equipment used for making these checks meets or exceeds the specifications described in Table 2-4. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will suffice.

The procedures in this section are written using the equipment listed in Table 2-4. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Detailed operating instructions for test equipment are not given in this procedure. If more operating information is required, refer to the appropriate test-equipment instruction manual.

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Table 2-4
Test Equipment Required

Item No. and Description	Minimum Specification	Examples of Suitable Test Equipment
1. TV Mainframe	Conforms to TV system requirements.	TEKTRONIX 1410 (NTSC Systems). TEKTRONIX 1211 (PAL Systems). TEKTRONIX 1412 (PAL-M Systems).
2. Sync Generator	Conforms to TV system requirements. Variable amplitude sync.	TEKTRONIX SPG2 (NTSC Systems).[a] TEKTRONIX SPG12 (PAL Systems).[a] TEKTRONIX SPG22 (PAL-M Systems).[a]
3. Linearity Generator	Conforms to TV system requirements.	TEKTRONIX TSG3 (NTSC Systems). TEKTRONIX TSG13 (PAL Systems). TEKTRONIX TSG23 (PAL-M Systems).
4. Sinewave Oscillator	Frequency: Adjustableto 60 Hz. Amplitude: Adjustable to 3 V p-p into 75 Ω.	TEKTRONIX SG 502 RC Oscillator.[b]
5. Leveled Sinewave Generator	Frequency: 250 kHz to 30 MHz. Output amplitude: variable to 5 V p-p. Output impedance: 50 Ω. Reference frequency: 50 kHz. Amplitude accuracy: constant within 3% of a reference frequency as output frequency changes.	TEKTRONIX SG 503 Leveled Sinewave Generator.[b]
6. Pulse Generator	Period: variable to 15 μs. Pulse width: 2 μs	TEKTRONIX PG 502 Pulse Generator.[b]
7. Calibration Generator	Fast-rise signal level: 1 V. Repetition rate: variable to 100 kHz. Rise time: 1 ns or less. Flatness: ±0.5%. Leading edge aberrations: within 2%.	TEKTRONIX PG 506 Calibration Generator.[b]
8. Precision Cable	Impedance: 50 Ω.	TEKTRONIX Part No. 012-0482-00.
9. Cable	Impedance: 50 Ω.	TEKTRONIX Part No. 012-0057-01.
10. Cable (2 required)	Impedance: 75 Ω.	TEKTRONIX Part No. 012-0074-00.
11. Termination	Impedance: 50 Ω.	TEKTRONIX Part No. 011-0049-01.
12. Termination	Impedance: 75 Ω.	TEKTRONIX Part No. 011-0055-00.
13. 10X Attenuator (2 required)	Ratio: 10X. Impedance: 50 Ω.	TEKTRONIX Part No. 011-0059-02.
14. 10X Attenuator	Ratio: 10X. Impedance: 75 Ω.	TEKTRONIX Part No. 011-0061-00.

[a]With Option AA.

[b]Requires a TM 5000-Series power-module mainframe.

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PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option and may be used to determine the need for readjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using operator accessible controls and connectors.

Turn on the instrument and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

Set the TV protocol and format by following these steps:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT".**

2. Press and hold the lower Trigger MODE button until the message **"TV EXER 61"** appears at the lower left corner of the CRT display.

3. Press the upper Trigger COUPLING button. The currently selected TV protocol will appear at the top of the CRT display. If necessary, change the selected TV protocol by pressing the upper Trigger COUPLING button again. For an NTSC system, select **"LINE 1 OCCURS PRIOR TO FLD SYNC"**; for PAL or SECAM systems, select **"LINE 1 COINCIDENT WITH FLD SYNC"**; for other systems make the appropriate selection.

4. Press the lower Trigger COUPLING button to store the selected protocol and return to the Diagnostic Menu.

5. Press the upper Trigger MODE button. The message **"TV EXER 62"** will be displayed at the lower left corner of the CRT display.

6. Press the upper Trigger COUPLING button. The currently selected format will appear at the top of the CRT display. If necessary, change the selected format by pressing the upper Trigger COUPLING button again. For an NTSC system, select **"LINE NO RESETS ON EACH FIELD"**; for PAL or SECAM systems, select **"LINE NO RESETS ON FLD 1 ONLY"**; for other systems make the appropriate selection.

7. Press the lower Trigger COUPLING button to store the selected format and return to the Diagnostic Menu.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labelled A/B MENU.

8. Press the A/B TRIG button to exit the Diagnostic Menu and return to normal oscilloscope operation.

TV OPTION CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

POSITION Controls	Midrange

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NOTE

Select channels to set VOLTS/DIV.

VOLTS/DIV

CH 1	200 mV
CH 2	50 mV
CH 3 and CH 4	0.1 V
CH 1 and CH 2 VAR	In detent

VERTICAL MODE

CH 1	On
CH 2, CH 3, CH 4, ADD and INVERT	Off
ALT/CHOP	ALT
20 MHz BW LIMIT	On

Input Coupling

CH 1 and CH 2	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	2 ms
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Delta Function Controls

ΔV and Δt	Off (turn off readout by pressing associated button)
TRACKING	Off (not lighted)

Trigger

HOLDOFF	MIN (Fully CCW)
LEVEL	Midrange
SLOPE	+
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

1. Check Square-Wave Flatness

a. Connect a fast-rise positive-going square-wave output via a 50-Ω cable and a 50-Ω termination to the CH 1 input connector.

b. Set the generator to produce a 60-Hz, 5-division display.

c. Set CH 1 VOLTS/DIV to 50 mV. Use the CH 1 POSITION control to bring the top of the waveform on screen.

NOTE

As a convenient way to exclude the first 50 ns of the trace in the following parts, reduce the trace intensity until the leading edge of the signal is not visible.

d. CHECK—Display aberrations are within 1% (0.2 division or less). Exclude the first 50 ns following the step transition from the measurement.

e. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On

f. Move the cable from the CH 1 input connector to the CH 2 input connector. Use the CH 2 POSITION control to bring the top of the waveform on screen.

g. CHECK—Display aberrations are within 1% (0.2 division or less). Exclude the first 50 ns following the step transition from the measurement.

h. Set CH 2 VOLTS/DIV to 20 mV.

i. Set the generator to produce a 5-division display.

j. CHECK—Display aberrations are within 1% (0.05 division or less). Exclude the first 50 ns following the step transition from the measurement.

k. Set:

CH 1 VERTICAL MODE	On
CH 2 VERTICAL MODE	Off
CH 1 VOLTS/DIV	20 mV

l. Move the cable from the CH 2 input connector to the CH 1 input connector.

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m. CHECK—Display aberrations are within 1% (0.05 division or less). Exclude the first 50 ns following the step transition from the measurement.

n. Set:

CH 1 VOLTS/DIV	200 mV
CH 2 VOLTS/DIV	50 mV
A SEC/DIV	10 μs

o. Set the generator to produce a 15-kHz, 5-division display.

p. Repeat parts c through m.

q. Disconnect the test equipment from the instrument.

2. Check Frequency Bandwidth Limit

a. Set:

CH 1 VOLTS/DIV	10 mV
CH 2 VOLTS/DIV	10 mV
A SEC/DIV	100 μs
A TRIGGER MODE	AUTO

b. Connect the leveled sine-wave generator output via a precision 50-Ω cable, two 50-Ω 10X attenuators, and a 50-Ω termination to the CH 1 input connector.

c. Set the generator to produce a 50-kHz, 5-division display.

d. Increase the generator output frequency to 5 MHz.

e. CHECK—Display amplitude is between 4.80 and 5.05 divisions in amplitude.

f. Set the 20 MHz BW LIMIT to Off (not lighted).

g. Repeat parts c and d.

h. CHECK—Display amplitude is between 4.95 and 5.05 divisions in amplitude.

i. Increase the generator output frequency to 10 MHz.

j. CHECK—Display amplitude is between 4.90 and 5.05 divisions in amplitude.

k. Increase the generator output frequency to 30 MHz.

l. CHECK—Display amplitude is between 4.85 and 5.10 divisions in amplitude.

m. Set:

CH 1 VOLTS/DIV	50 mV
20 MHz BW LIMIT	On

n. Remove one of the 10X attenuators from the input signal path.

o. Repeat parts c through l.

p. Set:

CH 1 VOLTS/DIV	200 mV
20 MHz BW LIMIT	On

q. Remove the last 10X attenuator from the input signal path.

r. Repeat parts c through l.

s. Move the cable from the CH 1 input connector to the CH 2 input connector and add the two 10X attenuators back into the signal path.

t. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
20 MHz BW LIMIT	On

u. Repeat parts c through r using the Channel 2 controls.

v. Disconnect the test equipment from the instrument.

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3. Check TV (Back-Porch) Clamp (CH 2 only)

a. Set:

20 MHz BW LIMIT	On
CH 1 VOLTS/DIV	500 mV
CH 2 VOLTS/DIV	50 mV
A SEC/DIV	10 μs
SLOPE	– (minus)
TRIGGER MODE	AUTO LVL
TRIGGER SOURCE	LINE

b. Connect the sine-wave oscillator output via a 75-Ω cable to the CH 2 input connector.

c. Connect the composite sync output via a 75-Ω cable and a 75-Ω termination to the CH 1 input connector.

d. Set the oscillator to produce a 60-Hz, 6-division display. Adjust the oscillator frequency control to produce as stable a display as possible.

e. Set:

CH 2 Input Coupling	TV CLAMP
A SEC/DIV	100 μs
TRIGGER SOURCE	CH 1
TRIGGER COUPLING	LINES

f. CHECK—Display amplitude is 1 division or less.

g. Set:

CH 2 VOLTS/DIV	100 mV
CH 2 Input Coupling	1 MΩ DC

h. Set the oscillator to produce a 6-division display.

i. Set the CH 2 Input Coupling to TV CLAMP.

j. CHECK—Display amplitude is 1 division or less.

k. Set:

CH 2 VOLTS/DIV	200 mV
CH 2 Input Coupling	1 MΩ DC

l. Repeat parts h through j.

m. Disconnect the test equipment from the instrument.

4. Check Back-Porch Reference

a. Set:

CH 2 Input Coupling	GND
A SEC/DIV	1 μs
TRIGGER SOURCE	VERT

b. Set the trace to the center horizontal graticule line using the CH 2 POSITION control.

c. Connect a 100%-modulated composite video signal via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

d. Set the CH 2 Input Coupling to TV CLAMP.

e. CHECK—That the back-porch level is within 1 division of the center horizontal graticule line.

f. Disconnect the test equipment from the instrument.

5. Check Triggering

a. Set:

CH 2 VOLTS/DIV	20 mV
CH 2 Input Coupling	1 MΩ DC
A SEC/DIV	2 μs
Δt	On
TRACKING	On
TRIGGER MODE	AUTO LVL
TRIGGER COUPLING	DC

b. Use the Δ REF OR DLY POS control to align its cursor with the second vertical graticule line.

c. Use the Δ control to produce a Δt reading of 2 μs.

d. Connect the pulse generator output via a 50-Ω cable, a 50-Ω 10X attenuator, and a 50-Ω termination to the CH 2 input connector.

e. Use the Δ control to produce a Δt reading of 15 μs. Set the generator to produce a signal that has a negative pulse 3 divisions in amplitude, 2 μs wide, and a period of approximately 15 μs.

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f. Set TRIGGER COUPLING to LINES.

g. Use the Horizontal POSITION control to align the positive edge of the first pulse with the Δ REF OR DLY POS cursor.

h. Set CH 2 VOLTS/DIV to 200 mV. Use the Δ control to produce a Δt reading of 13 μs.

i. Reduce the generator period to the point at which the display is stably triggered, but any further reduction would result in an unstable display.

j. CHECK—That the positive edge of the second pulse is located in the area between the two cursors.

k. Set:

CH 2 INVERT	On
TRIGGER SLOPE	+

l. Adjust the pulse width so that the negative edge of the second pulse is aligned with the second cursor.

m. Reduce the generator period to the point at which the display is stably triggered, but any further reduction would result in an unstable display.

n. CHECK—That the negative edge of the second pulse is located in the area between the two cursors.

o. Disconnect the test equipment from the instrument.

6. Check Trigger Modes

a. Set:

CH 2 INVERT	Off
CH 2 VOLTS/DIV	500 mV
ΔV and Δt	Off
A SEC/DIV	100 μs
TRIGGER SLOPE	− (minus)
TRIGGER COUPLING	FLD 1

b. Connect the composite sync output via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

c. Rotate the Δ control until the readout indicates that the first line of the video signal is displayed (**"F1:1"**).

d. CHECK—That the oscilloscope is triggered on the first line of Field 1.

e. CHECK—That a slight counterclockwise rotation of the Δ control changes the readout to indicate the highest line number in the previous field for a multifield input signal. For example, using an NTSC signal, the readout would be **"F2:262"**.

f. CHECK—That the oscilloscope is triggered on the last line of Field 2.

g. CHECK—That rotating the Δ control counterclockwise backward through the second field of the signal eventually changes the readout to indicate the highest line number in the previous field for a multifield input signal. For example, using an NTSC signal, the readout would change to **"F1:263"**.

h. CHECK—That the oscilloscope is triggered on the last line of Field 1.

i. Set TRIGGER COUPLING to ALT.

j. Rotate the Δ control until the readout indicates that the first lines of the two frames are displayed (**"ALT:1"**).

k. CHECK—That the oscilloscope is triggered on the correct lines of the two fields.

l. CHECK—That a slight counterclockwise rotation of the Δ control changes the readout to indicate the highest line number common to both fields for a multifield input signal. For example, using an NTSC signal, the readout would be **"ALT:262"**.

m. CHECK—That the oscilloscope is triggered on the correct lines of the two fields.

n. Disconnect the test equipment from the instrument.

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7. Check Input Signal Amplitude

a. Set:

CH 1 VOLTS/DIV	1 V
CH 2 VOLTS/DIV	100 mV
A SEC/DIV	200 μs
TRIGGER COUPLING	FLD 1

b. Connect the linearity generator output via a 75-Ω cable and a 75-Ω termination to the CH 2 input connector.

c. Set the generator to produce an output of full field and an IRE level of 0. Set all other generator buttons out. Then remove the color-burst signal by setting the sync generator GEN LOCK button out.

d. Rotate the Δ control until the readout indicates that the first line of the video signal is displayed (**"F1:1"**).

e. Set CH 2 VOLTS/DIV to 1 V.

f. CHECK—That the display is triggered and stable.

g. Set:

CH 2 INVERT	On
TRIGGER SLOPE	+

h. CHECK—That the display is triggered and stable.

i. Move the cable from the CH 2 input connector to the CH 1 input connector.

j. Set:

CH 1 VERTICAL MODE	On
CH 2 VERTICAL MODE	Off
TRIGGER SLOPE	– (minus)

k. CHECK—That the display is triggered and stable.

l. Change the generator output to produce a 100 IRE level signal.

m. CHECK—That the display is triggered and stable.

n. Set:

CH 1 VERTICAL MODE	Off
CH 2 VERTICAL MODE	On
CH 2 Input Coupling	TV CLAMP
TRIGGER SLOPE	+

o. Move the cable from the CH 1 input connector to the CH 2 input connector.

p. CHECK—That the display is triggered and stable.

q. Set:

CH 2 INVERT	Off
TRIGGER SLOPE	– (minus)

r. CHECK—That the display is triggered and stable.

s. Disconnect the signal from the CH 2 input connector. Connect the output of the composite sync generator to the CH 3 input connector via a 75-Ω cable, a 75-Ω 10X attenuator, and a 75-Ω termination.

t. Set:

CH 1 VERTICAL MODE	Off
CH 3 VERTICAL MODE	On

u. Adjust the generator output to produce a 1.25-division display.

v. Set CH 3 VOLTS/DIV to 0.5 V.

w. CHECK—That the display is triggered and stable.

x. Set:

CH 3 VERTICAL MODE	Off
CH 4 VERTICAL MODE	On

y. Move the signal input from the CH 3 input connector to the CH 4 input connector.

z. Repeat parts u through w using the Channel 4 controls.

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aa. Disconnect the cable from the composite sync output and connect it to the linearity generator output.

bb. Set CH 3 and CH 4 VOLTS/DIV to 0.1 V.

cc. Adjust the generator output to produce a 0.5-division display by varying the signal IRE level.

dd. CHECK—That the display is triggered and stable.

ee. Move the signal input from the CH 4 input connector to the CH 3 input connector.

ff. Set:

CH 3 VERTICAL MODE On
CH 4 VERTICAL MODE Off

gg. Repeat parts cc and dd.

hh. Disconnect the test equipment from the instrument.

ADJUSTMENT PROCEDURE

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 2-1. The TV Option should only be adjusted when the standard instrument is known to meet its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

Adjustment of the instrument must be done at an ambient temperature between +20°C and +30°C, and the instrument must have had a warm-up period of at least 20 minutes. Performing this procedure while the temperature is drifting or before the standard instrument is calibrated may cause erroneous calibration settings.

To perform this procedure, it is necessary to remove the wrap-around cabinet from the instrument. See the standard instrument "Maintenance" section for instructions on removing the cabinet.

NOTE

When performing any of the automatic calibration routines, such as BU CAL F1, the CAL/NO CAL jumper P501 must be moved to its CAL position (between pins 1 and 2) before turning on the power. When the desired calibration has been performed, return the jumper to its NO CAL position.

The calibration procedure BU CAL F1 applies to all of the options. It may be invoked at any time and as often as desired by performing these steps:

a. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to access the Diagnostic Menu.

NOTE

If the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

b. Press the lower Trigger MODE button until the message **"BU CAL F1"** appears in the Diagnostic Menu of the CRT readout.

c. Press the upper Trigger COUPLING button.

d. After about 3 seconds, the **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** message should appear in the Diagnostic Menu of the CRT readout.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labelled A/B MENU.

e. Press the A/B TRIG button to exit the Diagnostic Menu.

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Equipment Required (see Table 2-4)

- Leveled Sinewave Generator (Item 5)
- Calibration Generator (Item 7)
- Precision 50-Ω Cable (Item 8)
- 50-Ω Termination (Item 11)
- Two 50-Ω 10X Attenuators (Item 13)

Initial Control Settings

Vertical

CH 1 POSITION	Midrange

MODE

CH 1	On
CH 2, CH 3, and CH 4	Off
20 MHz BW LIMIT	On

VOLTS/DIV

CH 1	10 mV
CH 1 VAR	In detent

Input Coupling

CH 1	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	1 μs
SEC/DIV VAR	In detent
X10 MAG	Off
Sweep	A

Trigger

HOLDOFF	MIN (Fully CCW)
LEVEL	Midrange
SLOPE	+
A/B TRIG	A
MODE	AUTO LVL
SOURCE	VERT
COUPLING	DC

Adjust Flatness

a. Connect a fast-rise, positive-going square-wave output via a precision 50-Ω cable, a 50-Ω 10X attenuator, and a 50-Ω termination to the CH 1 input connector.

b. Set the generator to produce a 100-kHz, 5-division display.

NOTE

Adjust the coils in the following part so that their slugs are out approximately the same amount.

c. ADJUST—Coils L619 and L644 for as flat a response as possible. These coils are located on the Main circuit board, which is part of the standard instrument. See the standard instrument Service manual for coil locations.

d. Disconnect the test equipment from the instrument.

e. Set the A SEC/DIV control to 100 μs.

f. Connect the leveled sine-wave generator output via a precision 50-Ω cable, two 50-Ω 10X attenuators, and a 50-Ω termination to the CH 1 input connector.

g. Set the generator to produce a 50-kHz, 5-division display.

h. Increase the generator output frequency to 5 MHz.

i. CHECK—Display amplitude is between 4.80 and 5.05 divisions in amplitude.

j. Set the A SEC/DIV control to 1 μs and disconnect the test equipment from the instrument.

k. Repeat parts a through j until no further improvement is noted.

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Section 3

CTT & WR

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SPECIFICATION

INTRODUCTION

The Counter/Timer/Trigger (Option 06) and Counter/Timer/Trigger with Word Recognizer (Option 09) add the following four capabilities to the TEKTRONIX 24X5A and 2467 Oscilloscopes:

1. Precision time-interval measurement.
2. Event and frequency counting.
3. Delay-by-events triggering.
4. Logic triggering.

The 17-bit Word Recognizer probe of Option 09 extends the capabilities of these functions. The functions described in this manual which use the Word Recognizer require the Word Recognizer Option 09 and the 17-bit Word Recognizer probe.

The Counter/Timer/Trigger (CTT) and the Counter/Timer/Trigger with Word Recognizer (WR) options use the standard instrument's alphanumeric CRT readout to display configuration menus and function results.

The oscilloscope Operators manual should be consulted for operating information regarding the standard instrument. The operation and specifications of functions not described in this manual remain unchanged.

There are currently no options available for the CTT and WR. Also, Option 11 (rear panel probe-power connectors) described in the 24X5A and 2467 manuals, and Option 09 (Word Recognizer) described in this manual, are not available in the same instrument.

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following are provided with each instrument containing the Counter/Timer/Trigger (Option 06):

20	grabber tips
2	10-inch, 10-wide combs

Each instrument containing the Word Recognizer (Option 09) is provided with the following standard accessory in addition to those mentioned for the Counter/Timer/Trigger:

1	Word Recognizer probe

Optional Accessories

The following optional accessories are also available:

24X5A/2467 Options Service manual
Protective Waterproof Vinyl Cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

DESCRIPTION OF FUNCTIONS

Precision Time-Interval Measurements

Precision delay and precision delta-time measurements are made possible by a precision timer which directly measures the time interval between the start of the A

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Sweep and the start of the B Sweep. Direct measurement capability operates when the B Sweep is triggerable after delay as well as in RUN AFTER DLY. Direct measurement increases resolution and accuracy.

Only one of the four functions provided by the Counter/Timer/Trigger Option (Precision Time-Interval Measurement, Event Counting, Delay-by-Events Triggering, and Logic Triggering) can be active at a given time with the exception that precision time measurements are available with the Logic Trigger function when the B Sweep is triggered by the Word Recognizer.

When timing measurements are requested while a conflicting Counter/Timer/Trigger (CTT) function is operating, the timing measurement is displayed with the accuracy and resolution associated with the standard oscilloscope not equipped with the CTT Option. The word **"SET"** following the time measurement indicates this condition.

Pulse-width measurement is made easier by using the B TRIG Δ DLY mode. When this mode is selected, pressing the lower Trigger MODE button alternates between TRIG AFT DLY and TRIG Δ DLY and the trigger controls are alternately directed to the two triggers. Direct pulse-width timing measurements are made by selecting opposite slopes for TRIG AFT DLY and TRIG Δ DLY and adjusting trigger levels accordingly.

Event Counting (COUNT)

The Event-Counting function has three modes: Frequency, Period, and Totalize. Either the A-Trigger events or the 17-bit Word Recognizer (WR) events (if the Option 09 Word Recognizer is present) can be counted.

Delay-by-Events (DLY/EVTS)

The Delay-by-Events function adds the ability to delay a sweep by a number of events, rather than by an absolute time interval. Either the A or the B Sweep can be delayed; the delay period begins when a "Start" event occurs, and the duration of the delay is determined by a number of occurrences of a "Delaying" event. The sweep to be delayed, the "Start" event, the "Delaying" event, and the number of occurrences of the "Delaying" event are all operator selected.

Logic Trigger (LOGIC-TRIG)

This function adds logic-triggering capabilities. The A Sweep can trigger on any of the following:

1. The logical AND of the A and the B triggers going TRUE.
2. The logical OR of the A and the B triggers going TRUE.
3. The occurrence of a word recognized by the Word Recognizer.

The B Sweep can trigger on the word recognized by the Word Recognizer.

Word Recognizer

The 17-bit Word Recognizer detects any 17-bit digital word, either synchronously with an external clock, or asynchronously. Word occurrences may be counted for frequency, period, or totalize measurements. A word can trigger either the A or B Sweep, or the word can be a delaying event in the Delay-by-Events function. The Word Recognizer probe is shown in Figure 3-1.

PERFORMANCE CONDITIONS

Except as noted in Tables 3-1 through 3-3 of this manual, the electrical, environmental, and mechanical characteristics of Option 06 and 09 instruments are identical to those specified in the respective 24X5A and 2467 Oscilloscope Operators manuals.

The electrical characteristics are valid when the instrument has been adjusted at an ambient temperature between +20 °C and +30 °C, has had a warm-up period of at least 20 minutes, and is operated at an ambient temperature between −15 °C and +55 °C (unless otherwise noted).

Items listed in the "Performance Requirements" column are verifiable qualitative or quantitative limits that define the measurement capabilities of the instrument.

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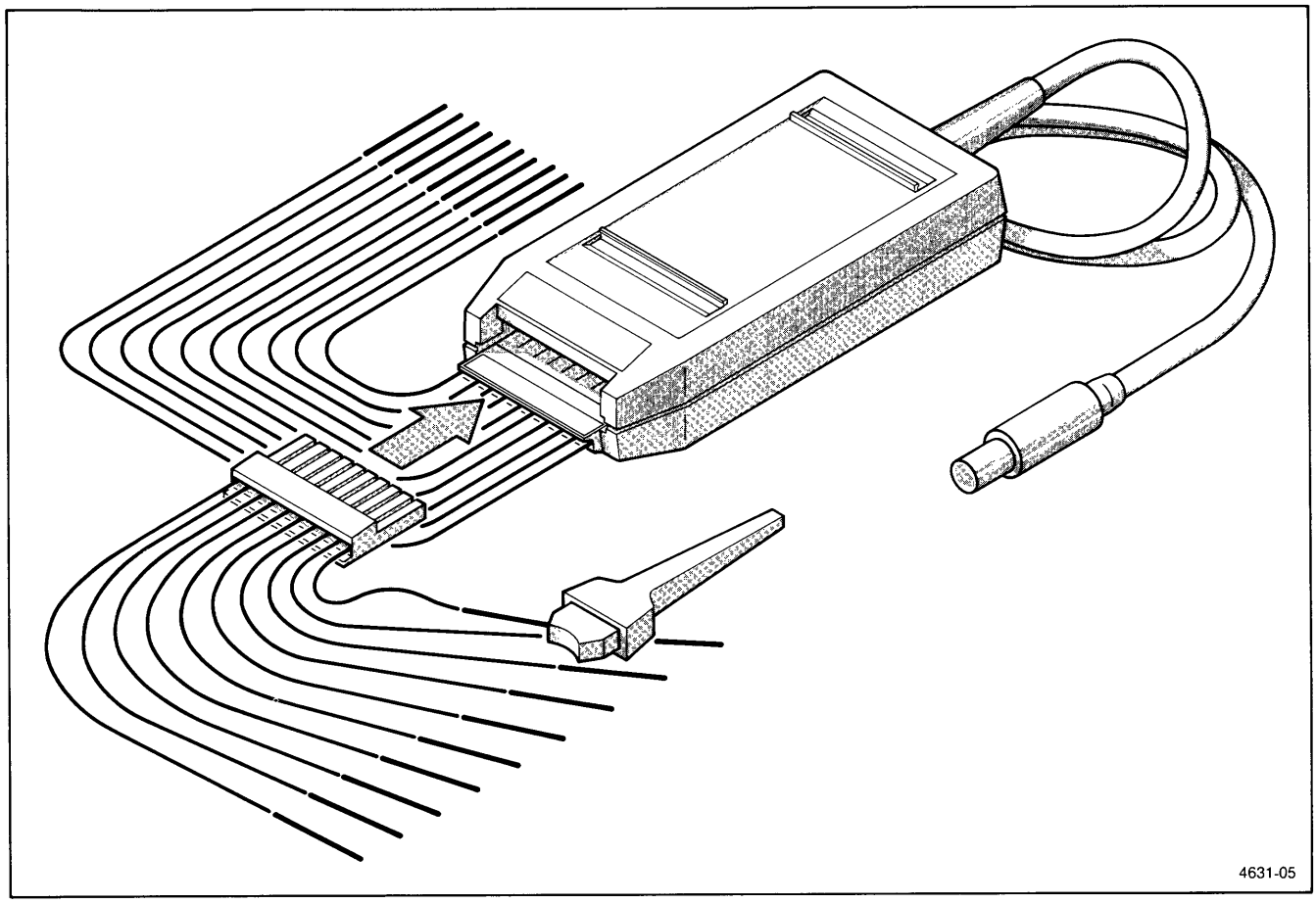


Figure 3-1. The Word Recognizer Probe.

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Table 3-1
Counter/Timer/Trigger Electrical Characteristics

Characteristics	Performance Requirements
SIGNAL INPUT	
	For Count and Delay-by-Events with DC Coupling of A Trigger and B Trigger.
Maximum Input Frequency	⩾150 MHz.
Minimum Width of High or Low State of Input Signal	⩽3.3 ns.
Sensitivity	For Count, Delay-by-Events, and Logic Trigger Functions Excluding Word Recognizer.
DC to 50 MHz (0.5 Hz to 50 MHz for Frequency and Period)	
CH 1 and CH 2	1.5 divisions.[a]
CH 3 and CH 4	0.75 division.[a]
50 MHz to 150 MHz	
CH 1 and CH 2	4.0 divisions.[a]
CH 3 and CH 4	2.0 divisions.[a]
FREQUENCY	
Ranges	**RANGE** — **LSD[bc]** 1 Hz — 100 nHz 10 Hz — 1 μHz 100 Hz — 10 μHz 1 kHz — 100 μHz 10 kHz — 1 mHz 100 kHz — 10 mHz 1 MHz — 100 mHz 10 MHz — 1 Hz 100 MHz — 10 Hz 150 MHz — 100 Hz
Automatic Ranging	Upranges at 100% of full scale; downranges at 9% of full scale. Downrange occurs at 90 MHz on 150 MHz range.[c] Full scale corresponds to the value given in the Range column. The maximum displayed value for any range is the Range value minus the LSD value.
Accuracy	±[Resolution + (Frequency × TBE)] Hz.
Time Base Error (TBE)	10 ppm with less than 5 ppm per year drift.[c]
Resolution	$\frac{1.4 \times \text{Frequency}^2 \times \text{TJE}}{\text{N}} + \text{LSD}$.[c]
Display Update Rate	Twice per second or twice the period of the input signal, whichever is slower.[c]

[a]Performance requirement not checked in manual (except Frequency using CH 1).

[b]Least significant digit.

[c]Performance Requirement not checked in manual.

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Table 3-1 (cont)

Characteristics	Performance Requirements	
PERIOD		
Ranges	**RANGE**	**LSD[bc]**
	10 ns	1 fs
	100 ns	10 fs
	1 μs	100 fs
	10 μs	1 ps
	100 μs	10 ps
	1 ms	100 ps
	10 ms	1 ns
	100 ms	10 ns
	1 s	100 ns
	2 s	1 μs
Minimum Period	≤6.7 ns.[c]	
Automatic Ranging	Upranges at 100% of full scale; downranges at 9% of full scale.[c] Full scale corresponds to the value given in the Range column. The maximum displayed value for any range is the Range value minus the LSD value.	
Accuracy	±[Resolution + (TBE × Period)].[c]	
Resolution	±[LSD + (1.4 × TJE)/N].[c]	
Display Update Rate	Twice per second or twice the period of the input signal, whichever is slower.[c]	
TOTALIZE		
Maximum Count	9999999.[c]	
Display Update Rate	Twice per second or once per event, whichever is slower.[c]	
DELAY BY EVENTS		
Maximum Event Count	4194303.[c]	
Minimum Time from Start Signal to Any Delay Event	4 ns.[c]	
LOGIC TRIGGER		
Minimum Function-True Time	4 ns.	
Minimum Function-False Time	4 ns.[c]	

[b]Least significant digit.

[c]Performance requirement not checked in manual.

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Table 3-1 (cont)

Characteristics	Performance Requirements
ADDED DELAY TIME CHARACTERISTICS WITH CTT	
Run After Delay	
Accuracy	LSD[d] + [0.0012 × (A SEC/DIV)] + [0.03 × (B Time/Div)[e] + A Trigger Level Error + 50 ns.[c] When the A Sweep is triggered by the Word Recognizer in synchronous mode, add 100 ns for probe delay; in asynchronous mode, add 200 ns for probe delay. *NOTE* *"SET" in the readout indicates an indirect measurement, inferred from the control settings. The delay time measured by the CTT will be slightly different, as explained under "Precision Timing" in section 2 of the Operators manual for the instrument.*
Triggerable After Delay	
Accuracy	LSD[d] + [10 ppm × (measured interval)] + TJE + A-Trigger Level Error + B-Trigger Level Error + 0.5 ns.[c] If the A and B Sweeps are triggered from different channels, then add 0.5 ns for channel-to-channel mismatch. When the A Sweep is triggered by the Word Recognizer in synchronous mode, add 100 ns for probe delay; in asynchronous mode, add 200 ns for probe delay.
Minimum Measurable Delay Time	≤70 ns.
Display Update Rate	In Auto Resolution, twice per second or once for every sweep, whichever is slower.[c] In 1 ns, 100 ps, and 10 ps resolution modes, the update rate depends on the A SEC/DIV setting and the trigger repetition rate.

[c]**Performance requirement not checked in manual.**

[d]**See Tables 3-4 and 3-5.**

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Table 3-1 (cont)

Characteristics	Performance Requirements
ADDED DELTA-DELAY-TIME CHARACTERISTICS WITH CTT	
Run After Delay	
Accuracy	LSD[d] + [0.008 × (A SEC/DIV)] + [0.01 × (B Time/Div)[e]] + 83 ps.[c] When the A Sweep is triggered by the Word Recognizer in synchronous mode, add 1 ns for probe jitter; in asynchronous mode, add 20 ns for probe jitter.
Triggerable After Delay	
Accuracy	Both delays are within 70 ns to 10 times the A-SEC/DIV setting.
Superimposed Delta Time	LSD[d] + [0.01 × (B Time/Div)[e]] + [10 ppm × (A SEC/DIV)] + [10 ppm × (measured interval)] + 50 ps + TJE.[c] If CH 3 or CH 4 is one channel of a two-channel measurement, add 0.5 ns for channel-to-channel delay mismatch.
Nonsuperimposed Delta Time	LSD[d] + [absolute value[($t_{r_{REF}} - t_{r_{DELT}}$)][f] + TJE + [(0.0005 div) × ($1/SR_{REF} + 1/SR_{DELT}$)] + [10 ppm × (A SEC/DIV)] + [10 ppm × (measured interval)] + 50 ps. If A and B sweeps are triggered from different channels, add 0.5 ns for channel-to-channel mismatch + [0.5 div × ($1/SR_{REF}+1/SR_{DELT}$)] for trigger offset.
Display Update Rate	In Auto Resolution, twice per second or once for every four sweeps, whichever is slower.[c] In 1 ns, 100 ps, and 10 ps resolution modes, the update rate depends on the A SEC/DIV setting and the trigger repetition rate.

[c]Performance requirement not checked in manual.

[d]See Tables 3-4 and 3-5.

[e]B Time/Div includes SEC/DIV, X10 MAG, and VAR.

[f]This term assumes the trigger points are between the 10% and 90% points of the waveforms. Fall time is expressed as a negative risetime.

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Table 3-1 (cont)

Characteristics	Performance Requirements

DEFINITIONS

A Trigger Level Error = (A Trigger Level Readout Error)/SR_A.

B Trigger Level Error = (B Trigger Level Readout Error)/SR_B.

$t_{r_{REF}}$ = risetime, reference trigger signal.

$t_{r_{DELT}}$ = risetime, delta trigger signal.

SR_A = slew rate at trigger point, A sweep trigger signal in div/sec.

SR_B = slew rate at trigger point, B sweep trigger signal in div/sec.

SR_{REF} = slew rate at trigger point, reference trigger signal in div/sec.

SR_{DELT} = slew rate at trigger point, delta trigger signal in div/sec.

TJE = trigger jitter error.

= (Trigger Jitter)/$\sqrt{N}$.

For delay or delta time, disregarding noise in the signal, this term contributes <1 LSD if the slew rate is greater than 0.03 vertical div/ns or if the slew rate is greater than 30000 vertical div/horizontal div.

Trigger Jitter = $\sqrt{(\text{Reference Trigger Signal Jitter})^2 + (\text{Delta Trigger Signal Jitter})^2 + (\text{A Sweep Trigger Signal Jitter})^2}$.

Reference Trigger Signal Jitter = $(e_{n_S} + e_{n_{REF}})/SR_{REF}$.

= 0 for Frequency mode.

e_{n_S} = scope noise in div.

= 0.05 div for HF REJ trigger coupling.

= 0.1 div for DC trigger coupling, 5 mV to 5 V sensitivity.

= 0.15 div for DC trigger coupling, 2 mV sensitivity.

$e_{n_{REF}}$ = reference signal rms noise in div.

Delta Trigger Signal Jitter = $(e_{n_S} + e_{n_{DELT}})/SR_{DELT}$.

= 0 for Frequency or Delay mode.

$e_{n_{DELT}}$ = delta signal rms noise in div.

A Trigger Signal Sweep Jitter = $(e_{n_S} + e_{n_A})/SR_A$.

e_{n_A} = A sweep trigger signal rms noise in div.

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Table 3-1 (cont)

Characteristics	Performance Requirements
When the Word Recognizer supplies a trigger in synchronous mode, the trigger jitter of the associated trigger signal is <1 ns; in asynchronous mode, the associated trigger signal jitter is <20 ns.	
N = number of averages during measurement interval. = see Table 2-2 for Delay or Delta Time. = (measured frequency) X (Measurement Interval) for Frequency or Period. Measurement Interval = 0.5 s or two periods of measured signal, whichever is greater.	

[a]Performance Requirement not checked in manual (except Frequency—using CH 1).

[b]Least significant digit.

[c]Performance Requirement not checked in manual.

[d]See Table 2-2.

[e]B time/div includes SEC/DIV, X10 MAG, and VAR.

[f]This term assumes the trigger points are between the 10% and 90% points of the waveforms. Fall time is expressed as a negative risetime.

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Table 3-2
Word Recognizer Electrical Characteristics

Characteristics	Performance Requirements
SYNCHRONOUS MODE	
Data Setup Time D_0—D_{15} and Q	25 ns.
Data Hold Time D_0—D_{15} and Q	0 ns.
Minimum Clock Pulse Width	
High	20 ns.
Low	20 ns.
Minimum Clock Period	50 ns.[a]
Delay from Selected Clock Edge to Word Out from CTT	≤55 ns.
ASYNCHRONOUS MODE	
Minimum Coincidence Between Data Inputs (D_0—D_{15} & Q) Resulting in a Trigger	<85 ns.
Maximum Coincidence (D_0—D_{15} & Q) Between Data Inputs Without Producing a Trigger	>20 ns.
Delay from Input Word Coincidence to Word Out	≤140 ns.
INPUTS AND OUTPUTS	
Input Voltages	
Minimum Input Voltage	−0.5 V.[a]
Maximum Input Voltage	5.5 V.[a]
Maximum Input Low Voltage	0.6 V.[a]
Minimum Input High Voltage	2.0 V.[a]
WORD RECOG OUT	
High	>2.5 V LSTTL output.[a]
Low	<0.5 V LSTTL output.[a]
Input High Current	≤20 μA.[a]
Input Low Current	≥−0.6 mA source.[a]

[a]Performance Requirement not checked in manual.

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Table 3-3
Mechanical Characteristics

Characteristics	Performance Requirements
Weight	
With Power Cord, Cover, Pouch, Test Leads, Probes, Operators Manual, and Options, Including Word Recognizer Probe	<12.0 kg (26.4 lb).
Word Recognizer Probe	0.27 kg (0.6 lb).
Domestic Shipping Weight	<17.6 kg (38.8 lb).
P6407 Probe Dimensions	
Length	
Body	11.4 cm (4.5 in).
Cable	2 m (6.6 ft).
Width	5.6 cm (2.2 in).
Height	2.21 cm (0.87 in).

Table 3-4
Resolution Selections

A SEC/DIV	Selection	Least Digit	N for Average
10 ns to 500 ms	AUTO	See Table 3-5	See Table 3-5
10 ns to 5 μs	10 ps	10 ps	$> 10^6$
	100 ps	100 ps	$> 10^4$
	1 ns	1 ns	> 100
10 μs to 50 μs	10 ps or 100 ps	100 ps	$> 10^4$
	1 ns	1 ns	> 100
100 μs to 500 μs	10 ps to 1 ns	1 ns	> 100
1 ms to 5 ms	Any	10 ns	> 1
10 ms to 50 ms	Any	100 ns	> 1
100 ms to 500 ms	Any	1 μs	> 1

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Table 3-5
Auto Resolution

A SEC/DIV	Trigger Rate	Least Digit	N for Average
10 ns to 2 μs	> 20 kHz	100 ps	> 10^4
10 ns to 2 μs	200 Hz to 20 kHz	1 ns	> 100
5 μs to 200 μs	> 200 Hz	1 ns	> 100
10 ns to 200 μs	< 200 Hz	10 ns	> 1
500 μs to 5 ms	Any	10 ns	> 1
10 ms to 50 ms	Any	100 ns	> 1
100 ms to 500 ms	Any	1 μs	> 1

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PREPARATION FOR USE

OPERATING CONSIDERATIONS

A GATE OUT Termination

To prevent measurement errors, of as much as ±2.0 ns in Precision Delay and ±0.5 ns in Precision Delta Time, the A GATE OUT signal must not be terminated in less than 10 kΩ.

POWER-UP TESTS

Before initially turning on power to the instrument, read Section 2 in the oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, examine both the oscilloscope circuitry and the option circuitry. Tests that apply to the CTT Option are integrated into the power-up tests for the host oscilloscope; they include the CTT Kernel test and Confidence tests.

A power-up test failure will either flash the A SWP TRIG'D indicator or display a diagnostic message in the CRT readout. Pressing the A/B MENU button (A/B TRIG in the CRT readout) may place the instrument into a usable mode. Even if the instrument then functions adequately for your particular requirement, it should be referred to a qualified service technician for repair of the problem as soon as possible.

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THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 06 Counter/Timer/Trigger (CTT) and Option 09 Counter/Timer/Trigger with Word Recognizer (WR) circuitry for the 24X5A and 2467 Oscilloscopes. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified in the text, and the diagram number is shown (enclosed within a diamond symbol) on the tab of the appropriate foldout page. For the best understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

INTRODUCTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-6. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to the 24X5A and 2467 Oscilloscopes without option circuitry.

The activities of the options are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the options, monitors each option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable

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programmable read only memory (EPROM) contained in the Buffer and option circuit boards provide these storage locations.

BUFFER BOARD

The option circuit board connects to the standard oscilloscope through the Buffer circuit board. The Buffer board performs the following functions:

1. Buffers and modifies the timing of the microprocessor bus.
2. Distributes the microprocessor bus, power supplies, and analog signals from the standard oscilloscope to the options.
3. Provides additional ROM for interfacing options to the standard instrument.
4. Provides a mechanical interface.

The microprocessor control bus, address bus, and data bus are buffered by Buffer board circuitry. Microprocessor bus timing for the options is modified by buffers on the Buffer board to make bus timing compatible with the options. Address bus decoding allows individual circuits to be addressed.

These signal paths are used for communications between the options and the standard oscilloscope and involve both data and control signals. The standard oscilloscope circuitry uses them to control the options. The options use them to send information to the standard oscilloscope for display and to control the standard oscilloscope.

CTT BOARD

The CTT board utilizes signals from the standard instrument and the Word Recognizer to produce accurate measurements for display. Functionally the CTT circuitry is divided into four blocks:

1. Microprocessor interface.
2. Time base.
3. Counters and gating.
4. Word Recognizer interface and control.

The microprocessor interface contains the bus buffers, memory, registers, and address decoding that allows the microprocessor in the standard oscilloscope to control the option.

The time base contains the Oscillator and Phase-Locked Loop circuitry which provide the 131-MHz reference clock for the counters and the 5.24-MHz clock used by the counter-reloading state machine for the Delay-By-Events functions.

The Complex Counter integrated circuit (IC) is configured as three counters. The least significant bits of each counter are contained in the gate array.

For the counting and timing functions, the microprocessor initializes the circuitry by writing to registers. The contents of the registers, in turn, cause the proper input signals to be selected and applied to the counters through level shifting and multiplexing circuitry. Once the system is initialized, the microprocessor allows the counters to start when they see the proper edge of the selected start signal. When the selected edge of the stop signal is detected, the counters stop and the microprocessor reads the counters, calculates, and then displays the measurement. The process is then repeated.

The procedure just described is different in Totalize mode. In Totalize, the count is read and displayed by the microprocessor while counting is actively occurring. The count is reset from the front panel.

Logic Trigger functions use the Gate Array to perform logic functions on the A and B triggers. The result of the logical combination is used to trigger the standard instrument.

WORD RECOGNIZER

The Word Recognizer provides an external 17-bit combinational trigger input to the CTT. Input data matching states are individually selectable via the oscilloscope front

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panel to match either a logic 0, 1, or don't care (X). Either a rising or falling clock edge may be selected as the active edge in synchronous mode.

Control Register

The Control Register is a serial input, parallel output register controlled by the microprocessor that in turn controls the circuitry in the Word Recognizer probe. Desired input match bits (WDATA) are clocked into the Control Register by WCLOCK. Forty clocks after a data bit is shifted into the Control Register, it appears on the DATA RTRN output. This output is used to:

1. Detect if the WR is plugged into the oscilloscope.
2. Detect if the shift register was clocked extra times by static or other transients.
3. Perform diagnostic tests of WR circuitry.

Seventeen control register bits (don't cares) determine if the input gating will allow the 17 input signals to reach the Comparator. Seventeen other control register bits determine whether the Comparator will look for a matching HI or LO on the corresponding input from the input gating. When all data inputs from the input gating match the control register bits, the Comparator sends a LO to the Synchronizer and the Output Multiplexer.

Synchronizer and Output Multiplexer

The Synchronizer synchronizes the Comparator's output with the external clock input (C). A control bit selects the active edge of the Synchronizer's clock input.

The Output Multiplexer selects either the Synchronizer's output or the Comparator's output to pass on to the CTT. One bit of the Control Register selects either synchronous or asynchronous mode. If asynchronous mode is selected, the Output Multiplexer transfers the Comparator's output via the $\overline{\text{WORD}}$ signal to the CTT. If synchronous mode is selected, the Output Multiplexer selects the Synchronizer's output instead of the Comparator's output to pass on to the CTT. In the CTT, the $\overline{\text{WORD}}$ signal is sent to the WORD RECOG OUT connector and also to the Level Shifting and Multiplexing circuitry where it can be selected as one of the trigger events.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the Buffer Board, the Counter/Timer/Trigger, and the Word Recognizer circuitry in the 24X5A and 2467 Oscilloscopes. Unique circuitry is described in detail, while circuits common to the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-15) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

BUFFER BOARD DIGITAL DISTRIBUTION

The Buffer Board Digital Distribution circuitry (see Diagram 20) interconnects the standard oscilloscope and the CTT board. Most of the microprocessor signals are buffered and have their timing modified. In addition, some of the memory used for option functions is included on the Buffer board. The calibration constants and power-down settings of the option are stored in the nonvolatile RAM of the base instrument.

Address Decoding

Gates U4240A and U4240C partially decode the address bus. Enable BVMA (U4240C, pin 8) is HI for addresses from 1000-7FFF, the address space used by the options including the Buffer board. (This and all other address references are in hexadecimal.)

Enable $\overline{\text{BUFEN}}$ (U4250C, pin 8) is LO for the address space of 1000-1FFF. Address strobe $\overline{\text{LOWAD}}$ is active LO for the address space of XFFC-XFFF (where X is a don't care). These decoded address signals are used in selecting ROM U4260 on the Buffer board and disabling data bus buffer U4255.

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Buffer Board ROM

Buffer board ROM U4260 is used to interface the option to the standard oscilloscope. Its output enable (at pin 20) is $\overline{\text{ROMEN}}$. The signals $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ are the same if P4256 is present. With $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ the same, the Buffer board ROM address space is 1000-1FFF. Whenever the Buffer board ROM is addressed, U4275 (the shift register that controls the data bus buffer) is reset by $\overline{\text{ROMEN}}$. This prevents the Buffer board data bus buffer and the Buffer board ROM from driving the microprocessor side of the data bus at the same time.

Bus Buffers

The 10-MHz clock signal of the standard oscilloscope is buffered by U4265D. The buffered clock (B10MHZ) clocks shift register U4275 and is also sent to the options.

The $\overline{\text{E}}$ clock, $\overline{\text{RESET}}$, VMA, and R/$\overline{\text{W}}$ are buffered by latch U4225. The pull-up on pin 12 of U4225 allows $\overline{\text{RESET}}$ and $\overline{\text{E}}$ to pass through the latch unmodified. The buffered E clock is delayed more than 30 ns by R4265, C4265, and U4265C. This delayed BE clock latches $\overline{\text{VMA}}$, R/$\overline{\text{W}}$ (U4225) and the address bus (U4235 and U4245), providing extra hold time on these signals for the options.

Data Bus Buffer

Data bus buffer U4255 is a bidirectional bus driver that is controlled by the signals on pin 1 and pin 19. Pin 1 controls the direction of data flow through the buffer, and pin 19 turns the drivers on and off. When pin 1 is HI, the buffer is configured to drive data from the microprocessor to the options. Conversely, when pin 1 is LO, the buffer is configured to drive data from an option to the microprocessor. Pin 1 is always HI, except when the microprocessor is reading data from an option. U4255 is inactive when pin 19 is HI.

Signals on pin 1 and pin 19 coordinate the states of U4255 so that data bus contention never occurs. Buffer U4255 drives two buses: the bus between U4255 and the Control board of the standard oscilloscope, and the bus between U4255 and the options. Both of these must be kept free of contentions (i.e., it is not allowed for more than one device to drive the bus at the same time). These two buses will be examined individually.

The bus between the Control board and U4255 is driven by the Control board during a write bus cycle, is driven by the Control board during a read cycle from non-option space (0000-0FFF and 8000-FFFF), is driven by U4255 during a read cycle from option space (2000-7FFF), and is driven by U4260 during a read from Buffer board ROM (1000-1FFF). The Control board changes its drivers from output to input on the rising edge of E (this is the HI-true E and not the LO-true $\overline{\text{E}}$ used by the option) when going from a write to a read cycle. It changes from input to output on the falling edge of R/$\overline{\text{W}}$ when going from a read to a write cycle. Data buffer U4255 drives the Control board data bus only when BVMA and BR/$\overline{\text{W}}$ are both true, i.e., a read cycle from the option is being performed. This is done by driving U4255 pin 1 from BVMA NANDed with BR/$\overline{\text{W}}$ (after passing through a delay consisting of two cycles of the 10-MHz clock). Pin 19 of IC U4255 is driven by $\overline{\text{E}}$ delayed for two cycles of the 10-MHz clock. This two-cycle delay ensures that U4255 will be driving the Control board data bus only in a read cycle from option address space, during a time interval starting after the rising edge of E and ending after the falling edge of E. A delay of two cycles of the 10-MHz clock is necessary to guarantee that the Control board data bus drivers have turned off before U4255 starts driving the bus. This is a period of time when the Control board never drives the data bus during a read cycle. Shift register stages in U4275 are cleared by $\overline{\text{ROMEN}}$, forcing U4255 pin 19 HI while Buffer board ROM is being read.

The bus between U4255 and the options must be driven by U4255 during a write cycle to the options (2000-7FFF) and may be driven by an option only during a read cycle from the option (2000-7FFF). Bus driver U4255 actually drives the bus to the option during all cycles except read cycles from 1000-7FFF. The bus is driven by an option only while E is true during an option read cycle. Address bus driver U4255 drives the bus during an option write cycle while U4255 pin 19 is LO, but in this case pin 19 is delayed from $\overline{\text{E}}$ only by one cycle of the 10-MHz clock, driving the data to the options as soon as it is available from the microprocessor.

CTT CIRCUITRY

Counter/Timer/Trigger circuitry is divided functionally into the microprocessor interface, time base, counters and gating, and the Word Recognizer interface and control. The circuitry is shown on Diagram 25.

Microprocessor Interface

The microprocessor interface contains the circuitry that allows the microprocessor in the standard oscilloscope to control the option.

DATA BUS BUFFER. Bi-directional buffer U5940 buffers the data bus and has two control inputs. Direction control

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(pin 1) is provided by the microprocessor's buffered read/write signal BR/$\overline{W}$. The buffer is enabled at pin 19 whenever the CTT is selected and an address in the 4000-7FFF range is generated.

OPTION SELECT REGISTER. Whenever there is a write to an address in the 7FC0 to 7FFF range, data bus line BBD7 is latched by the Option Select flip-flop (U6252A). When the Option Select flip-flop is set, the CTT circuitry responds to addresses in the 4000-7FFF range. When the flip-flop is reset, the CTT only responds to microprocessor bus signals in the range of 7FC0-7FFF (the Option Select flip-flop).

MEMORY AND I/O DECODERS. The upper 128 bytes of CTT address space is decoded by U5942. The upper half of these locations enable the Option Select flip-flop. The lower 64 addresses are further decoded by address decoder U5950 to allow addressing of individual CTT I/O devices. While U5942 allows selection of CTT I/O devices, it also prevents (through U6150A) EPROM U5930 from appearing on the bus at these locations.

Address decoder U5950 decodes the option I/O space. Address space for CTT I/O devices extends from 7F80 to 7FBF. Due to incomplete address bus decoding, each output of this decoder appears 8 times in the address space. A memory map of the CTT Option is shown in Table 3-6.

HARDWARE REGISTER 1. Hardware Register 1 (U5952) is written to by the microprocessor. Four of its outputs control multiplexing of signals to the Gate Array. The other four outputs are control data inputs to the Gate Array.

STATUS REGISTER. Register U6250 is a 3-state bus driver. This register is read by the microprocessor to determine the status of the WR and the Gate Array. The Gate Array status (O0, O1, O2) is first converted to TTL by U6290 before being sent to U6250.

PAGED EPROM. A 64k-byte EPROM (U5930) provides storage for CTT firmware. Since the option is allowed only 16k-bytes of address space, a 4 X 16k X 8 paged EPROM is used. The EPROM is enabled (pin 20) when the Option Select flip-flop is set and addresses from 4000-7FFF appear on the address bus. Except for the top 128 bytes of CTT address space (the address space used by the Option Select Register), the EPROM outputs are enabled over the same address range (4000-7F7F).

Table 3-6
CTT And WR Memory Map

ADDRESS	DEVICE DESCRIPTION
4000-7F7F	ROM
7F80-7F83	Gate Array register 2 (MCA-2), write only
7F84-7F87	Gate Array register 1 (MCA-1), write only
7F88-7F8B	Gate Array register 3 (MCA-3), write only
7F8C-7F8F	CTT Page Register
7F90-7F91	Complex Counter data register (AM-RD), read only
7F92-7F93	Complex Counter status register (AM-RS), read only
7F94-7F95	Complex Counter data register (AM-WD), write only
7F96-7F97	Complex Counter command register (AM-WC), write only
7F98-7F9B	Gate Array status, read only
7F9C-7F9F	Hardware Control register 1 (HW-1), write only
7FA0-7FBF	Images of the above registers
7FC0-7FFF	Option Select register

Time Base

The Time Base consists of an oscillator, divider, and phase-locked loop. It generates the clocks used by the rest of the circuitry.

OSCILLATOR. The TTL-compatible 13.10669-MHz oscillator (Q5921 and Q5920) performs two functions:

1. It provides a clock for the Delay-By-Events End-Of-Sweep Counter-Reloading state machine in the Gate Array.

2. It provides a 1.310669-MHz reference to the Phase-Locked Loop through divider U5910.

DIVIDER. Divider U5910 divides the 13.10669-MHz clock by 2.5, 5, and 10. Complex Counter U6140 uses the 2.62134-MHz (U5910, pin 8), while the Phase-Locked Loop uses the 1.310669-MHz output (U5910, pin 12) as a reference. The 5.24267-MHz output goes to the Gate Array as the state machine clock.

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PHASE-LOCKED LOOP. The Phase-Locked Loop consists of phase comparator U6010, loop filter U6230, voltage controlled oscillator (VCO) U6120, and divider U6130.

Phase comparator U6010 has two 1.310669-MHz inputs. The first (pin 1) is the divided output of the 13.10669-MHz oscillator, while the second (pin 3) is the divided output of the VCO. The output of the phase comparator (pins 5 and 10) goes to the loop filter. A voltage reference (pin 8) is also supplied by the phase comparator to the loop filter. The phase comparator adjusts the frequency of the VCO so that the falling edges of the reference and feedback inputs of the phase comparator are coincident.

Loop filter U6230 is an active filter. Resistor R6232 and capacitor C6232 make up the filter's feedback path. Buffered address bit 0, through R6222, injects about one cycle of phase jitter into the loop to reduce aliasing effects.

Voltage-controlled oscillator U6120 provides a 131.0669-MHz reference to the Gate Array for frequency and time measurements. The output is also divided by 100 by U6130 and fed back to the phase comparator. Voltage-variable-capacitor CR6210 and inductor L6210 are the external tank circuit for the oscillator, with CR6210 also being the oscillator's tuning element.

Counters and Gating

The Counters and Gating Circuitry contains the level shifting, signal selection (multiplexing), counters (Gate Array and the Complex Counter), and trigger driver circuitry of the option. The circuitry is discussed as it applies to each input signal; then the counters are discussed.

The A Trigger Status ($\overline{\text{TSA}}$) comes from the standard oscilloscope (P6221, pin 2) as an active LO signal driven from a current sink. The standard oscilloscope either sinks 10 mA or presents an open circuit on the line. The signal path to the CTT is approximately 75 Ω. Termination on the line is controlled by register HW-1 (U5952, pin 16). If pin 16 of U5952 is HI, the termination is 75 Ω to +2.3 V. If pin 16 is LO, the termination is 22 kΩ to +5 V.

The 75-Ω termination results in $\overline{\text{TSA}}$ being converted to ECL levels (with ECL powered between +5 V and ground) and sent to the Gate Array. For 75 Ω, pin 16 of U5952 is HI and holds off Q5980. Diode CR5970 is reverse biased putting +3 V on the base of Q5981. With +3 V on its base, Q5981 is allowed to conduct. Resistor R5970 and the emitter resistance of Q5981 combine to provide the 75 Ω termination to +2.3 volts. The drive from $\overline{\text{TSA}}$ makes the base of Q5982 swing between +4 V and +5 V. Emitter follower Q5982 provides the ECL drive to the Gate Array (U6180, pin 36) and to the multiplexer (U6070, pin 13). The output of U5990A is also kept HI by the HI at pin 16 of U5952. This blocks the return path to the standard instrument for $\overline{\text{TSA}}$ (P4221, pin 2 to pin 3). The 22 kΩ termination results in $\overline{\text{TSA}}$ being looped through the CTT and sent back to the standard oscilloscope (P4221, pin 3). As far as the standard oscilloscope is concerned, the CTT does not affect the $\overline{\text{TSA}}$ signal.

For 22 kΩ termination, pin 16 of U5952 is LO. This turns on Q5980, terminating $\overline{\text{TSA}}$ through 22 kΩ. Diode CR5970 is now on, keeping Q5981 off (the 470 kΩ resistor on its emitter prevents Q5981 from turning completely off), preventing $\overline{\text{TSA}}$ from reaching the Gate Array and multiplexer. With a LO on pin 16 of U5952, U5990A allows $\overline{\text{TSA}}$ to return to the standard oscilloscope.

The B Trigger Status ($\overline{\text{TSB}}$) also comes from the standard oscilloscope (P4221, pin 8). This signal is treated basically the same as $\overline{\text{TSA}}$ except:

1. It doesn't go to multiplexer U6070.

2. It has its own multiplexer consisting of Q6091 and Q6092 which selects either $\overline{\text{TSB}}$ or $\overline{\text{WORD}}$ from the WR, and sends one of them to the Gate Array.

3. There is a 10-kΩ pull-up to +15 V on the collector of Q5983 to compensate for the drop through Q6092.

The A Sweep Gate ($\overline{\text{SGA}}$) is an active LO TTL signal from the standard oscilloscope (P4221, pin 14). A voltage divider converts it to ECL before it reaches the Gate Array (U6180, pin 33).

The B Sweep Gate ($\overline{\text{SGB}}$) is also an active LO TTL signal from the standard oscilloscope (P4221, pin 11). It is also converted to ECL by a voltage divider before it reaches the Gate Array (U6180, pin 8).

The A Hold Off (AHO) and the B Hold Off (BHO) come to the CTT (P4221, pin 20 and pin 24) as ECL signals requiring no level shifting. However, AHO is pulled up and clamped to +5 V to compensate for the loading of U6070. Both AHO and BHO go to multiplexer U6070. The AHO signal also goes to the multiplexer through an RC delay (C5961 and R6060). The multiplexer sends the selected

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hold off signal to the hold off (HO) input of the Gate Array (U6180, pin 2). The HO input of the Gate Array can be forced HI by the microprocessor through pin 40 of U6140 and Q6292 to reset the Gate Array trigger hardware.

Delay Select ($\overline{DS}$) is an active LO TTL signal from the standard oscilloscope (P4221, pin 17). Resistors R6172, R6050, and R6277 convert $\overline{DS}$ to ECL and balance currents through CR6170. Balancing the currents reduces cross talk from $\overline{DS}$ on the Gate Array inputs, improving the accuracy of delta-time measurements.

Because gate array U6180 uses emitter coupled logic (ECL), most signals that leave the Gate Array are converted to TTL, and signals entering the Gate Array are converted to ECL. The Gate Array has 9 ECL inputs controlled by the microprocessor: D0, D1, D2, D3, D4, D5, G1, G2, and G3. Each input signal is shifted to ECL by a resistive divider.

Complex counter U6140 has 5 outputs. Three of the outputs (O3, O4, and O5) are controlled by the microprocessor independently of the rest of the IC. The outputs control hold off selection, enabling of the B trigger status, and the WR clock respectively. Output O1 is used in Delay-By-Events modes to tell the Gate Array that the terminal count (TC) has been reached. To make certain TC is seen by the Gate Array, TC is latched by U6252B until HO arrives.

GATE ARRAY AND COMPLEX COUNTER. Both the Gate Array (U6180) and the Complex Counter (U6140) are complex multi-function microprocessor-controlled devices. The discussion that follows will describe the basic interconnection of the Gate Array and the Complex Counter. Specific setups for each CTT mode are located in accompanying tables.

The circuitry is connected to form three counters. Counter A contains a total of 38 bits, Counter B 37 bits, and Counter C 17 bits. Counter use for each mode is shown in Table 3-7. The least significant bit of each counter is in the Gate Array. The emitter coupled pair (Q6290 and Q6291 for counter A) between the ICs connects the least significant bits of the counters in the Gate Array to the most significant bits of the counters in the Complex Counter. The emitter coupled pair also converts the Gate Array's ECL signals to TTL for the Complex Counter.

Both the Gate Array and the Complex Counter contain registers which the microprocessor uses to set up the desired operating mode. Hardware Register 1 (HW-1) and two of the Gate Array registers (MCA-1 and MCA-2) are used to select the desired input signals and function. In all modes the microprocessor will initialize the hardware before the function starts. For each function, the content of each register is shown in Table 3-8. The values are hexadecimal except for register MCA-1 where only bits 3 and 2 are shown. Bit 3 enables A AUX TRIG and bit 2 enables B AUX TRIG.

Table 3-7
Counter Use

MODE	A	B	C	START	STOP
Frequency	131-MHz clock	Frequency being counted		A and B start on selected edge of B	A and B stop on selected edge of B
Totalize		Frequency being counted		MODE button	Count is reset by pressing of any front-panel button
Delay Time	131-MHz clock		Sweeps	A starts with the A sweep gate	A stops with the B sweep gate
Delta Time	131-MHz clock during delay 0	131-MHz clock during delay 1	Sweeps	A and B start with the A sweep gate	A and B stop with the B sweep gate
Delay by-Events	Events			Hardware controlled	Hardware controlled

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Table 3-8
Control Register Setup

HW-1	MCA-1	MCA-2	CTT MODE
00	00	00	Inactive
C0	08	10	Boolean AND
C0	04	10	Boolean AND, free run
C0	08	00	Boolean OR
C0	04	00	Boolean OR, free run
01	08	08	Word Recognizer, A Sweep
01	04	08	Word Recognizer, A Sweep, free run
03	04	08	Word Recognizer, B Sweep
C0	08	05	A Delay-by-Events (ADBE), start= A, events= B
80	08	05	ADBE, start= A, events=WR
41	08	05	ADBE, start=WR, events= B
01	08	0D	ADBE, start=WR, events=WR
C2	04	04	B Delay-by-Events (BDBE), start= A, events= B
82	04	0C	BDBE, start= A, events=WR
40	00	00	Freq/Totalize A (actually B)
01	08	09	Freq/Totalize WR
00	00	02	Precision Delay
00	00	13	Precision 1/Delta Time
00	00	03	Precision 1/Delta Time with ALT SLOPE

The input signals selected and applied to the Gate Array for each function are shown in Table 3-9. (Irrelevant inputs for each mode are not shown.) If one of the clocks is used in a particular mode, an "x" appears in its column. After passing through an RC delay, AHO becomes AHOD.

Table 3-10 shows the signals used by and buffered by the CTT Option for each particular mode. Signals used or buffered by the CTT are shown in the "From WR" and "From Standard Instrument" columns. Those signals that are buffered by but not used by the CTT in a particular mode and affect the standard instrument are denoted by an *. Signals being produced by or buffered by the CTT for each particular mode are shown in the "To Standard Instrument" column.

In Delta Time all three counters are used. Counter A counts cycles of the 131 MHz clock during delay 0. Counter B counts cycles of the 131 MHz clock during delay 1. Counter C counts the number of sweeps that occur. All three counters start counting on the leading edge of the A Sweep Gate ($\overline{\text{SGA}}$). On the leading edge of the B Sweep Gate all counters stop counting. When the counters stop, the microprocessor reads the counters and calculates the Delta Time. The microprocessor can then reinitialize the hardware and restart the procedure.

Delay-By-Events mode differs from the other modes by having the Delay-By-Events Counter-Reloading State machine in the Gate Array reload and reenable counter A (the only counter used in Delay-By-Events) at the end of the A sweep. At the end of the delay, the Gate Array also generates $\overline{\text{A AUX TRG}}$ or $\overline{\text{B AUX TRG}}$ to trigger the selected sweep.

Frequency mode uses Counter A and Counter B. Counter A counts the 131 MHz clock while Counter B counts cycles of the unknown signal. Both counters are started and stopped on the selected edge of the unknown signal being measured.

Totalize mode only uses Counter B. The unknown signal is counted by Counter B. The count in B is displayed after being read while counting is actively occurring. When counting is started or restarted, the B Trigger level is run to both its minimum and maximum levels to force a clock edge to enable the count circuitry. This may generate an extra count. If an extra count occurs, it is removed by the microprocessor.

Boolean Trigger mode uses the Gate Array to perform the selected logic function on the A and B triggers. The result of the logical combination of the triggers is sent to the standard instrument as the signal $\overline{\text{A AUX TRG}}$.

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Table 3-9
Gate Array Inputs

131 MHz	5.24 MHz	$\overline{EXT}$	$\overline{ATS}$	$\overline{BTS}$	$\overline{ASG}$	$\overline{BSG}$	HO	$\overline{DS}$	C/T/T Mode
									Inactive
			$\overline{TSA}$	$\overline{TSB}$			AHOD		Boolean AND
			$\overline{TSA}$	$\overline{TSB}$			AHOD		Boolean OR
		$\overline{WORD}$					AHOD		Word trig, A Sweep
		$\overline{WORD}$					BHO		Word trig, B Sweep
	x	$\overline{TSA}$		$\overline{TSB}$			AHOD		ADBE, start=A, events=B
	x	$\overline{TSA}$		$\overline{WORD}$			AHOD		ADBE, start=A, events=WR
	x	$\overline{WORD}$		$\overline{TSB}$			AHOD		ADBE, start=WR, events=B
	x	$\overline{WORD}$					AHOD		ADBE, start=WR, events=WR
	x		$\overline{TSA}$	$\overline{TSB}$			AHO		BDBE, start=A, events=B
	x	$\overline{WORD}$	$\overline{TSA}$				AHO		BDBE, start=A, events=WR
x				$\overline{TSB}$					Frequency A (actually B)[a]
				$\overline{TSB}$					Totalize A (actually B)[a]
x		$\overline{WORD}$							Frequency WR
		$\overline{WORD}$							Totalize WR
x					$\overline{SGA}$	$\overline{SGB}$			Precision Delay Time
x					$\overline{SGA}$	$\overline{SGB}$		$\overline{DS}$	Precision Delta Time
x					$\overline{SGA}$	$\overline{SGB}$		$\overline{DS}$	Precision 1/Delta Time
x					$\overline{SGA}$	$\overline{SGB}$		$\overline{DS}$	Precision Delta Time, ALT SLP
x					$\overline{SGA}$	$\overline{SGB}$		$\overline{DS}$	Precision 1/Delta Time, ALT SLP

[a] B trigger is the same as A trigger and the B events are counted in this mode.

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Table 3-10
Signals To/From CTT for CTT Modes

From WR	From Standard Instrument							To Standard Instrument				C/T/T Mode
$\overline{\text{WORD}}$	$\overline{\text{TSA}}$	$\overline{\text{TSB}}$	$\overline{\text{SGA}}$	$\overline{\text{SGB}}$	AHO	BHO	$\overline{\text{DS}}$	$\overline{\text{AAT}}$[a]	$\overline{\text{BAT}}$[a]	$\overline{\text{TSA}}$	$\overline{\text{TSB}}$	
	*	*								x	x	Inactive
	x	x			x			x				Boolean AND
	x	x			x				x			Boolean AND, free run
	x	x			x			x				Boolean OR
	x	x			x				x			Boolean OR, free run
x	*	*			x			x		x	x	Word trig, A Sweep
x	*	*			x				x	x	x	Word trig, A Sweep, free run
x	*	*				x			x	x	x	Word trig, B Sweep
	x	x			x			x				ADBE, start=A, events=B
x	x	*			x			x			x	ADBE, start=A, events=WR
x	*	x			x			x		x		ADBE, start=WR, events=B
x	*	*			x			x		x	x	ADBE, start=WR, events=WR
	x	x			x				x			BDBE, start=A, events=B
x	x	*			x				x		x	BDBE, start=A, events=WR
	*	x								x		Freq/ Totalize A (actually B)[b]
x	*	*						X		x	x	Freq/ Totalize WR
	*	*	x	x						x	x	Precision Delay Time
	*	*	x	x			x			x	x	Precision Delta Time

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Table 3-10 (cont)
Signals To/From CTT for CTT Modes

From WR	From Standard Instrument							To Standard Instrument				C/T/T Mode
$\overline{\text{WORD}}$	$\overline{\text{TSA}}$	$\overline{\text{TSB}}$	$\overline{\text{SGA}}$	$\overline{\text{SGB}}$	AHO	BHO	$\overline{\text{DS}}$	$\overline{\text{AAT}}$[a]	$\overline{\text{BAT}}$[a]	$\overline{\text{TSA}}$	$\overline{\text{TSB}}$	
	*	*	x	x			x			x	x	Precision 1/Delta Time
	*	*	x	x			x			x	x	Precision Delta Time, ALT SLP
	*	*	x	x			x			x	x	Precision 1/Delta Time, ALT SLP

[a] $\overline{\text{AAT}}$ and $\overline{\text{BAT}}$ are actually $\overline{\text{A AUX TRG}}$ and $\overline{\text{B AUX TRG}}$.
[b] B trigger is the same as A trigger, and the B events are counted in this mode.

Table 3-11
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6330	3	Data input 8 match bit	0	H
			1	L
			X	H
U6330	4	Data input 9 match bit	0	H
			1	L
			X	H
U6330	5	Data input 10 match bit	0	H
			1	L
			X	H
U6330	6	Data input 11 match bit	0	H
			1	L
			X	H
U6330	10	Data input 12 match bit	0	H
			1	L
			X	H
U6330	11	Data input 13 match bit	0	H
			1	L
			X	H
U6330	12	Data input 14 match bit	0	H
			1	L
			X	H
U6330	13	Data input 15 match bit	0	H
			1	L
			X	H

[a] X = don't care, H = high, and L = low.

Table 3-11 (cont)
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6325	3	Data input 8 input enable	0	H
			1	H
			X	L
U6325	4	Data input 9 input enable	0	H
			1	H
			X	L
U6325	5	Data input 10 input enable	0	H
			1	H
			X	L
U6325	6	Data input 11 input enable	0	H
			1	H
			X	L
U6325	10	Data input 12 input enable	0	H
			1	H
			X	L
U6325	11	Data input 13 input enable	0	H
			1	H
			X	L
U6325	12	Data input 14 input enable	0	H
			1	H
			X	L
U6325	13	Data input 15 input enable	0	H
			1	H
			X	L

[a] X = don't care, H = high, and L = low.

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Table 3-11 (cont)
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6420	3	Data input 0	0	H
		input enable	1	H
			X	L
U6420	4	Data input 1	0	H
		input enable	1	H
			X	L
U6420	5	Data input 2	0	H
		input enable	1	H
			X	L
U6420	6	Data input 3	0	H
		input enable	1	H
			X	L
U6420	10	Data input 4	0	H
		input enable	1	H
			X	L
U6420	11	Data input 5	0	H
		input enable	1	H
			X	L
U6420	12	Data input 6	0	H
		input enable	1	H
			X	L
U6420	13	Data input 7	0	H
		input enable	1	H
			X	L
U6430	3	Data input 0	0	H
		match bit	1	L
			X	H
U6430	4	Data input 1	0	H
		match bit	1	L
			X	H
U6430	5	Data input 2	0	H
		match bit	1	L
			X	H

[a]X = don't care, H = high, and L = low.

Table 3-11 (cont)
Control Register Setup

IC	Pin	Function	Word Recognizer Status Display[a]	Control Register Bit[a]
U6430	6	Data input 3	0	H
		match bit	1	L
			X	H
U6430	10	Data input 4	0	H
		match bit	1	L
			X	H
U6430	11	Data input 5	0	H
		match bit	1	L
			X	H
U6430	12	Data input 6	0	H
		match bit	1	L
			X	H
U6430	13	Data input 7	0	H
		match bit	1	L
			X	H
U6425	3	Qualifier	0	L
		input enable	1	L
			X	H
U6425	4	Qualifier	0	L
		match bit	1	H
			X	H
U6425	5	Clock edge	↑	L
		set	↓	H
			X	X
U6425	6	Synchronous/	↑	H
		Asynchronous	↓	H
			X	L
U6425	10			L
U6425	11			L
U6425	12			L
U6425	13	(first bit sent by CTT)		H

[a]X = don't care, H = high, and L = low.

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WORD RECOGNIZER CIRCUITRY

Word Recognizer circuitry is divided into the following functional blocks: Control Register, Input Gating, Comparator, Output Multiplexer, and Synchronizer. The circuitry is located on Diagram 27. Connector P2732 connects the CTT and the WR probe.

Control Register

This 40-bit register consists of five cascaded eight bit serial input, parallel output shift registers (U6330, U6325, U6420, U6430, and U6425). Pin 2 of U6330 is the Word Recognizer serial data (WDATA) input. The WR clock (WCLOCK) connects to pin 8 of each IC making up the register. Pull-up resistor R6492 converts WCLOCK to CMOS input levels. The Control Register's first 36 bits are control bits. The last four control register bits are used to detect extra shifts. The last bit of the Control Register is always set HI, while the preceding three control register bits are set LO. If there are one, two, or three extra control clocks, DATA RTRN (U6425, pin 13) will be LO. A LO DATA RTRN signal indicates, to the microprocessor, an erroneous setup. Table 3-11 lists the function, setup states, and location of each bit of the Control Register.

Input Gating

The Input Gating circuitry determines whether or not an input reaches the Comparator.

When don't care is selected for an input, that input is prevented from reaching the Comparator by the Input Gating circuitry. Input gating is performed on data inputs D0-D15 by NAND gates U6310, U6315, U6405, and U6409. Input gating on the qualifier input is performed by OR gate U6335C. The resistors in series with the qualifier and data inputs provide over-voltage protection for the WR circuitry.

When a NAND gate's don't care input (from the Control Register) is HI, the NAND gate's output will be the inverse of its data input. When a NAND gate's don't care input is LO (don't care), its output is HI, preventing the input data from reacning the Comparator. When the don't care input bit (from the Control Register) for pin 10 of OR gate U6335C is LO, its output will equal the qualifier input (Q). When the OR gate's don't care input bit is HI (don't care) the OR gate output will be HI, preventing the qualifier input from reaching the Comparator.

Comparator

The comparison between the data inputs, the qualifier, and their match bits (from the Control Register) is done by the Comparator (U6320, U6415, U6435A, and U6335D). Each comparator input pair is connected to a data and match control line. Comparator U6320 compares data inputs D8-D15 with their control register match bits. Since U6320 pin 1 is tied LO, the IC is always enabled, and the output pin 19 will go LO when all of its input pairs match.

When the Q input equals its control register match bit, pin 3 of U6435 goes LO enabling U6415. Comparator U6415 compares inputs D0-D7 with their control register match bits. When the IC is enabled, its output will go LO when all its input pairs match. The output of both comparators is ORed together by U6335D. Its output (pin 11) will be LO when all comparator input pairs (data and match bit) are equal.

Output Multiplexer

Gating of either the synchronous output signal or the asynchronous comparator output signal to $\overline{\text{WORD}}$ is done by the Output Multiplexer (U6356).

The synchronous output signal is input to the multiplexer on pin 8 of U6356C. The asynchronous comparator output is input to the multiplexer on pin 11 of U6356D. The synchronous control line (Control Register bit 35) goes to pin 12 of U6356D and through resistor R6336 to the base of Q6334. The resistor, transistor, and R6340 form an inverter. When the synchronous control line is HI the transistor is on and saturated. When the synchronous control line is LO the transistor is cut off. When the synchronous control line is HI, U6356C is enabled and the synchronous output (U6350A, pin 5) is gated to the paralleled $\overline{\text{WORD}}$ driver U6356A and U6356B. When the synchronous control line is LO, the asynchronous gate U6356D is enabled, gating the asynchronous comparator output (U6335D, pin 11) to the paralleled $\overline{\text{WORD}}$ driver U6356A and U6356B. The filter between the output of U6356D (pin 13) and the inputs of the NOR gates U6356A (pin 3) and U6356B (pin 6) slows HI going edges by 35 to 60 ns. The LO going edge is transferred much faster.

Synchronizer

The Synchronizer synchronizes the Comparator's output with the external clock input (C). A bit of the Control Register selects the active edge of the Synchronizer's clock input.

Clock edge selection is performed by U6435B. When edge select is LO (U6435B, pin 4), the output clock (U6435B, pin 6) will equal the input clock (U6435B, pin 5). When edge select is HI, the output clock will be the inverse of the input clock. This insures that synchronizer flip-flop U6350A will always see a rising edge clock.

Synchronizer flip-flop U6350A produces a LO (true) output when input pin 2 is LO on the rising edge of the clock (pin 3). Pin 5 is set back HI when the flip-flop set input (pin 4) is pulsed LO (true). The set input is driven by U6335A. When pin 5 of U6350A is LO, the set input will go LO on the falling edge of the clock (U6335A, pin 1). Since this makes U6350A pin 5 HI, the set input will return HI (false) readying the synchronizer flip-flop for the next active clock edge.

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PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 06 (Counter/Timer/Trigger) and Option 09 (Counter/Timer/Trigger with Word Recognizer) portion of the instrument's performance check and adjustment procedures. The "Performance Check Procedure" is used to check the instrument's performance against the requirements listed in Table 3-1. The "Adjustment Procedure" is used to restore optimum performance or return the options to conformance with their "Performance Requirements" as listed in Table 3-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for readjustment.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in these procedures are valid for an instrument that has been previously calibrated in an ambient temperature between +20 °C and +30 °C and is operating in an ambient temperature between −15 °C and +55 °C. The instrument also must have had at least a 20 minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

All the test equipment items listed in Table 3-12 are required to perform both the "Performance Check Procedure" and the "Adjust Procedure." To assure accurate measurements, it is important that test equipment used for making these checks meets or exceeds the specifications described in Table 3-12. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will suffice.

The procedures in this section are written using the equipment listed in Table 3-12. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Since detailed operating instructions for the test equipment are not provided in this procedure, refer to the appropriate test-equipment instruction manual if additional information is required.

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Table 3-12
Test Equipment Required

Item Number and Description	Minimum Specification	Examples of Applicable Test Equipment
1. Pulse Generator (2 required)	Frequency: 10 MHz. Pulse width: 50 ns. Pulse width accurace: 5%. Positive trigger input, 1 V to 5 V into 50 Ω. Positive trigger output, 1 V into 50 Ω. Variable pulse duration.	TEKTRONXIX PG 502 Pulse Generator.[a]
2. Time-Mark Generator	Markers: 10 ns to 2 s in a 1-2-5 sequence. Accuracy: ±0.00005%.	TEKTRONIX TG 501A Option 01 Time Mark Generator.[a]
3. Leveled Sinewave Generator	Frequency: 250 kHz to 250 MHz. Accuracy: ±1 LSD of generator's indicated frequency.	TEKTRONIX SG 503 Leveled Sinewave Generator.
4. BNC Cable (4 required)	Impedance: 50 Ω. Length: 42 in.	Tektronix Part Number 012-0057-00.
5. T connector (2 required)	Connectors: BNC.	Tektronix Part Number 103-0030-00.
6. Adaptor	Connectors: BNC-male-to-subminiature-probe tip.	Tektronix Part Number 013-0195-00.
7. Adaptor (2 required)	Connectors: BNC-maile-to-dual-binding post.	Tektronix Part Number 103-0035-00.

[a]Requires a TM 5000-Series power-module mainframe.

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the options and may be used to determine the need for readjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cabinet is not necessary to perform this procedure. All checks are made using operator accessible controls and connectors.

Turn on the oscilloscope and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

COUNTER/TIMER/TRIGGER CHECKS

Initial Control Settings

Control settings not listed do not affect the procedure.

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NOTE

Select channels to set VOLTS/DIV.

VOLTS/DIV

CH 1 and CH 2	500 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4, ADD and INVERT	Off
CHOP/ALT	ALT
20 MHz BW LIMIT	Off

Input Coupling

CH 1 and CH 2	50 Ω DC

Horizontal

A SEC/DIV	10 ns (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
TRACE SEP	Fully CW

Delta

Δt and ΔV	Off (press and release until associated readout is off)
TRACKING	Off

Trigger

HOLDOFF	Fully CCW
A and B LEVEL	Midrange
SLOPE	+ (plus)
A MODE	AUTO LVL
B MODE	RUN AFT DLY
SOURCE	VERT
COUPLING	DC

MENU Functions Off

1. Check Maximum Input Frequency at Minimum Sensitivity

a. Connect the leveled sinewave generator's output via a 50-Ω cable to the CH 1 input connector.

b. Set generator to produce a 150-MHz, 4-division display.

c. Press the A/B MENU button to enter MENU mode.

d. Turn either Δ control to underline **"COUNT"**.

e. Press the upper Trigger MODE button.

f. If the instrument contains Option 09 (Word Recognizer), turn the Δ REF OR DLY POS control to underline **"MODE"**.

g. Turn the Δ control to underline **"FREQ"**.

h. If the instrument contains Option 09 (Word Recognizer), turn the Δ REF OR DLY POS control to underline **"EVT"**.

i. If the instrument contains Option 09 (Word Recognizer), turn the Δ control to underline event **"A"**.

j. Press the upper Trigger MODE button to enter Frequency mode.

k. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

l. CHECK—Reading is between 149 MHz and 151 MHz and is stable.

2. Check Minimum Sensitivity at 50 MHz

a. Set the generator to produce a 50.0-MHz, 1.3-division display.

b. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

c. CHECK—Reading is between 49.9 MHz and 50.1 MHz and is stable.

d. Disconnect the test equipment from the instrument.

3. Check Frequency Accuracy

a. Connect the time-mark generator output via a 50-Ω cable to the CH 1 input connector.

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b. Set the generator to produce 10-ns time markers four divisions in amplitude using CH 1 VOLTS/DIV and VAR VOLTS/DIV.

c. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

d. CHECK—Reading is between 99.9995 MHz and 100.0005 MHz.

4. Check Minimum Input Frequency

a. Set the time-mark generator to produce 2-s time markers.

b. Set:

CH 1 VOLTS/DIV	100 mV
A SEC/DIV	50 ms (knob in)
A TRIGGER MODE	NORM

c. Adjust the A Trigger LEVEL control for a stable trigger.

d. CHECK—Reading is between 499.9975 mHz and 500.0025 mHz.

e. Disconnect the test equipment from the instrument.

5. Check Delay Time

a. Set:

CH 1 VOLTS/DIV	500 mV
CH 1 Input Coupling	GND
A SEC/DIV	20 ns (knob in)
A TRIGGER MODE	AUTO

b. Connect the output of the time-mark generator via a 50-Ω cable to the positive trigger input of the pulse generator.

c. Connect the output of the pulse generator via a 50-Ω cable to the CH 1 input connector.

d. Set the time-mark generator to produce 20-ns time markers.

e. Set the pulse generator to produce a positive 5-ns pulse when externally triggered.

f. Adjust the CH 1 POSITION control to center the CH 1 display.

g. Set the CH 1 Input Coupling to 50 Ω DC.

h. Adjust the pulse generator to produce a 5-division peak-to-peak display, centered about ground.

I. Adjust the A Trigger LEVEL for a readout of 0.00 V.

j. Pull out the SEC/DIV knob.

k. Press the A/B MENU button.

l. Set the B Trigger:

SLOPE	+ (plus)
MODE	TRIG AFT DLY
SOURCE	VERT
COUPLING	DC

m. Adjust the B Trigger LEVEL for a readout of 0.00 V.

n. Turn the Δ REF OR DLY POS control counterclockwise until the intensified zone stops moving to the left.

o. CHECK—Reading is either 59.5 ns to 60.5 ns or 69.5 ns to 70.5 ns.

6. Check Delta Time Accuracy

a. Set the B Trigger MODE to MENU.

b. Turn either Δ control to underline **"RES"**.

c. Press the upper Trigger MODE button.

d. Turn either Δ control to underline **"10 ps"**.

e. Press the upper Trigger MODE button.

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f. Set the A and B SEC/DIV to 1 μs (knob out).

g. Press A/B MENU to access the B TRIGGER controls.

h. Press the lower Trigger MODE button to enter TRIG AFT DLY mode.

i. Set the time-mark generator to produce 1-μs time markers.

j. Set the pulse generator to produce a positive 0.5-μs pulse when externally triggered.

k. Press and release the Δt button until the Delta Time readout appears.

l. Turn the Δ control to intensify the rising edge of the second square wave.

m. Turn the Δ REF OR DLY POS control to intensify the rising edge of the second square wave.

n. CHECK—That the averaged Δt reading is between +0.00005 μs and −0.00005 μs.

o. Turn the Δ control to intensify the rising edge of the eleventh square wave.

p. CHECK—Averaged Δt reading is between 8.99990 μs and 9.00010μs.

q. Set the A and B SEC/DIV to 100 μs (knob out).

r. Set the time-mark generator to produce 0.1-ms time markers.

s. Set the pulse generator to produce a positive 50-μs pulse when externally triggered.

t. Turn the Δ control to intensify the rising edge of the eleventh square wave.

u. Turn the Δ REF OR DLY POS control to intensify the rising edge of the second square wave.

v. CHECK—Reading is between +899.996 μs and +900.004 μs.

w. Press the upper Trigger MODE button to access the MENU.

x. If **"RES"** is not underlined, use the Δ controls to underline **"RES"**.

y. Press the upper Trigger MODE button.

z. Use the Δ controls to underline **"AUTO"**.

aa. Press the upper Trigger MODE button.

7. Verify Delay-By-Events

a. Set the A SEC/DIV to 100 μs (knob in).

b. Set the A Trigger SLOPE to − (minus).

c. Press the Δt button until the Δt display disappears.

d. Press the A/B MENU button.

e. Use either Δ control to underline **"DLY/EVTS"**.

f. Press the upper Trigger MODE button.

g. Use the Δ REF OR DLY POS and Δ controls to select **"SWP B"**, **"START A"**, and **"DLY BY B"**.

h. Press the upper Trigger MODE button.

i. Pull out the SEC/DIV knob.

j. Use the Δ REF OR DLY POS and the Δ controls to set the number of delaying events to 1.

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k. VERIFY—that the intensified zone moves to each succeeding rising edge as the delaying event count is changed to 2, 3, 4, and 5.

8. Check Logic Trigger

a. Set the A and B SEC/DIV to 20 ns (knob out).

b. Set the time-mark generator to produce 0.1 μs time markers.

c. Set the pulse generator to produce a positive 5-ns pulse when externally triggered.

d. Set the B Trigger MODE to TRIG AFT DLY.

e. Set the B Trigger SOURCE to CH 1.

f. Set the B Trigger MODE to MENU.

g. Turn either Δ control clockwise to underline **"LOGIC-TRIG"**.

h. Press the upper Trigger MODE button.

i. If the instrument contains Option 09 (Word Recognizer), turn the Δ control to underline **"A:A·B"**. Otherwise, underline **"A·B"**.

j. Press the upper Trigger MODE button.

k. Push in the SEC/DIV knob.

l. Adjust the B Trigger LEVEL for a readout of 0.00 V.

m. Press the A/B MENU button to illuminate an A Trigger MODE indicator.

n. Adjust the A Trigger LEVEL for a readout of 1.00 V.

o. Set the CH 1 Input Coupling to GND.

p. Turn the CH 1 POSITION control to align the trace with the center horizontal graticule line; do not readjust the CH 1 POSITION control during the remainder of this step.

q. Set the CH 1 Input Coupling to 50 Ω DC.

r. Set X10 MAG on.

s. Turn the Horizontal POSITION control to align the rising edge of the first displayed signal with the intersection of the second vertical graticule and the center horizontal graticule lines.

t. Set the pulse generator to produce a 2-ns pulse when externally triggered.

u. Increase the duration of the pulse until a stable display is obtained.

v. CHECK—Width of the pulse measured at the center horizontal graticule line is less than 4 ns.

w. Set X10 MAG off.

x. Press the upper Trigger MODE button.

y. Press the lower Trigger MODE button.

z. Press the upper Trigger MODE button.

aa. Disconnect the test equipment from the instrument.

9. Verify Trigger Delta Delay

a. Connect the leveled sinewave generator's output via a 50-Ω cable to the CH 1 input connector. Set the A SEC/DIV to 10 μs. Set the Horizontal POSITION to midrange.

b. Set the generator for a 50-kHz, 6-division display.

c. Press the Trigger SLOPE button to illuminate the + SLOPE indicator.

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d. Press the A/B MENU button to enter MENU mode.

e. Turn either Δ control to underline **"COUNT"**.

f. Press the upper Trigger MODE button.

g. If the instrument contains Option 09 (Word Recognizer), turn the Δ REF OR DLY POS control to underline **"MODE"**.

h. Turn the Δ control to underline **"PERIOD"**.

i. If the instrument contains Option 09 (Word Recognizer), turn the Δ REF OR DLY POS control to underline **"EVT"**.

j. If the instrument contains Option 09 (Word Recognizer), turn the Δ REF OR DLY POS control to underline event **"A"**.

k. Press the upper Trigger MODE button to enter Period mode.

l. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

m. Turn the SEC/DIV to 5 μs.

n. Pull out the SEC/DIV knob.

o. Press the A/B MENU button for B Trigger MODE. Set B Trigger MODE to RUN AFTER DELAY.

p. Adjust the Δ REF OR DLY POS control for a delay of 5.00 μs.

q. Press the lower Trigger MODE button once.

r. Press the SLOPE button to select + SLOPE if necessary.

s. Press the lower Trigger MODE button twice to select TRIG Δ DLY.

t. Press the Trigger SLOPE button to illuminate the – SLOPE.

u. Adjust the Δ control for a Δt reading of approximately 0.00 μs. The word **"SET"** will appear while making the adjustment.

v. VERIFY—There are two intensified zones on the displayed waveform.

w. VERIFY—The intensified zone moves on the falling edge of the waveform while adjusting the Trigger LEVEL control.

x. Press the lower Trigger MODE button to select TRIG AFT DLY.

y. VERIFY—The intensified zone moves on the rising edge of the waveform while adjusting the Trigger LEVEL control.

z. Disconnect the test equipment from the instrument.

10. Verify Alternate Slope

a. Set the pulse generator to produce a positive 50-ns pulse every 0.1 μs.

b. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

c. Turn the SEC/DIV knob to 200 ns (knob in).

d. Pull out the SEC/DIV knob.

e. Press the A/B MENU button.

f. Set the B Trigger MODE to ALT SLP.

g. CHECK—-The B Trigger LEVEL readout is 0.00 V.

h. Press the Trigger SLOPE button to illuminate the – SLOPE indicator.

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i. Turn the Horizontal POSITION control to center the display.

j. VERIFY—That the reference cursor intensifies the falling edge of a pulse.

k. VERIFY—That the Δ cursor intensifies the rising edge of a pulse.

l. Disconnect the test equipment from the instrument.

WORD RECOGNIZER CHECKS

1. Initial Setup

a. Set:

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4	On

VOLTS/DIV

CH 1 and CH 2	2 V
CH 3	0.5 V
CH 4	0.1 V

Horizontal

A SEC/DIV	200 ns (knob in)

Delta

Δt and ΔV	Off (press and release until associated readout is off)

Trigger

SOURCE	CH 1
MODE	AUTO LVL

b. Connect the + trigger output of pulse generator # 1 via a 50-Ω cable to the + trigger input of pulse generator # 2.

c. Connect the output of pulse generator # 1 via a 50-Ω cable and T connector to the CH 1 input connector. Use the T connector at the CH 1 input.

d. Connect the output of pulse generator # 2 via a 50-Ω cable and T connector to the CH 2 input connector. Use the T connector at the CH 2 input.

e. Connect the Word Recognizer probe to the P6407 input connector at the rear of the instrument.

f. Connect a BNC-male-to-dual-binding post adaptor to the T connector on the CH 1 input, and connect another BNC-male-to-dual-binding post adaptor to the T connector on the CH 2 input.

g. Connect a 4-inch bare wire (suitable for connecting a scope probe) to the red binding post of the adaptor connected to the CH 1 input.

h. Connect a 4-inch bare wire (suitable for connecting a scope probe) to the red binding post of the adaptor connected to the CH 2 input.

i. Connect a 2-inch bare wire (suitable for connecting a scope probe) to the black binding post of the adaptor connected to the CH 2 input.

j. Connect both ground leads from the Word Recognizer probe to the bare wire on the black binding post on the CH 2 input.

k. Connect the CH 3 input to the WORD RECOG OUT connector using the instrument X10 probe and a BNC-male-to-probe-tip adaptor.

l. Set pulse generator # 1 to produce a positive 0.5-μs pulse every 1 μs.

m. Set pulse generator # 2 to produce a positive 400-ns pulse when it receives an external trigger.

NOTE

The lowest point of the HI must not be lower than 2.0 V.

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n. Set both pulse generators to produce pulses of +0.6 V LO and +2.0 V HI.

o. Press the A/B MENU button.

p. Use the Δ REF OR DLY POS control to underline **"LOGIC-TRIG"**.

q. Press the upper Trigger MODE button.

r. Turn either Δ control to underline **"B:WR"**.

s. Press the upper Trigger MODE button.

t. Turn the Δ REF OR DLY POSITION control to underline **"RADIX"**.

u. Turn the Δ control to underline **"HEX"**.

v. Press the upper Trigger MODE button.

w. Connect the clock (C) input of the Word Recognizer to the wire on the red binding post of the CH 1 input.

x. Connect the Q and W0-W15 inputs of the Word Recognizer to the wire on the red binding post of the CH 2 input.

y. Set the A SEC/DIV to 20 ns (knob in).

2. Check Data Setup Time

a. For each test setup described in Table 3-13:

1. Vary (increase) the pulse duration of pulse generator # 2 until the active edge of the CH 2 signal falls about 10 ns after the trigger edge of the CH 1 signal.

2. CHECK—CH 3 is not displaying a signal.

3. Vary (decrease) the pulse duration of pulse generator # 2, moving the active edge of the CH 2 signal to the left until CH 3 displays a stable signal.

4. Press the Δt button.

5. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the first edge of the CH 2 signal.

6. Turn the Δ control to align the delta cursor with the first edge of the CH 1 signal.

7. CHECK—Reading is ≤25 ns.

8. Press the Δt button.

Table 3-13
Data Setup Time Checks

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	Pulse Generator # 2		
+	+	↓—0-0000	−
+	−	↓—1-FFFF	−
−	−	↑—1-FFFF	+
−	+	↑—0-0000	+

3. Check Data Hold Time

a. For each test setup described in Table 3-14:

1. Vary the pulse duration of pulse generator # 2 until the first edge of the CH 2 signal falls about 10 ns after the trigger edge of the CH 1 signal.

2. CHECK—A stable signal is displayed on CH 3.

3. Vary the pulse duration of pulse generator # 2, moving the first edge of the CH 2 signal to the left until CH 3 no longer displays a stable signal.

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4. Press the Δt button.

5. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the first edge of the CH 2 signal.

6. Turn the Δ control to align the delta cursor with the first edge of the CH 1 signal.

7. CHECK—Reading is >4 ns.

Table 3-14
Data Hold Time Checks

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	# 2		
+	+	↓—1-FFFF	–
+	–	↓—0-0000	–
–	–	↑—0-0000	+
–	+	↑—1-FFFF	+

4. Check Minimum Clock Pulse Width

a. Set pulse generator # 1 to produce a 5-ns positive pulse every 1 μs.

b. Press the A/B MENU button to select A Trigger MODE.

c. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

d. Press the A/B MENU button.

e. For each test setup described in Table 3-15:

1. If there is not a stable signal displayed on CH 3, (<2.5 V amplitude), vary (increase) the pulse duration of pulse generator # 1 until CH 3 displays a stable signal.

2. Press the Δt button.

3. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the leading edge of the CH 1 pulse.

4. Turn the Δ control to align the delta cursor with the trailing edge of the CH 1 pulse.

5. CHECK—Reading is ⩽20 ns.

6. Press the Δt button.

Table 3-15
Minimum Clock Pulse Width Checks

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	# 2		
+	+	↑—X-XXXX	+
–	+	↓—X-XXXX	–

5. Check Delay From Selected Edge to WORD RECOG OUT

a. Set:

VERTICAL MODE

CH 3 and CH 4	On
CH 1, CH 2, ADD, and INVERT	Off

VOLTS/DIV

CH 3 VOLTS/DIV	0.1 V (1 V with X10 probe attached)

Horizontal

A SEC/DIV	20 ns (knob in)

b. Connect the instrument X10 probe to the CH 4 input connector and the probe tip to the wire on the red binding post of the CH 1 input.

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c. Set pulse generator # 1 to produce a 50-ns positive pulse every 10 μs.

d. Set the A Trigger SOURCE to CH 4.

e. For each test setup described in Table 3-16:

1. Press the Δt button.
2. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the active edge of the CH 4 signal.
3. Turn the Δ control to align the delta cursor with the rising edge of the CH 3 signal.
4. CHECK—Reading is ⩽55 ns.
5. Press the Δt button.

Table 3-16
Delay From Selected Edge to WORD RECOG OUT Checks

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	Pulse Generator # 2		
+	+	↑—X-XXXX	+
−	+	↓—X-XXXX	−

6. Check Word Recognition Delay

a. Set pulse generator # 1 to produce a positive 0.5-μs pulse every 1 μs.

b. Disconnect the C input of the Word Recognizer from the wire on the red binding post of the CH 1 input.

c. Connect the Q and W0-W15 inputs of the Word Recognizer to the wire on the red binding post of the CH 1 input.

d. For each test setup described in Table 3-17:

1. Press the Δt button. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the first edge of the CH 4 signal.
3. Turn the Δ control to align the delta cursor with the rising edge of the CH 3 signal.
4. CHECK—Reading is ⩽140 ns.
5. Press the Δt button.

e. Disconnect the probe on the CH 4 input.

Table 3-17
Word Recognition Delay

Polarity		Word Recognizer Word Definition	A TRIGGER SLOPE
Pulse Generator # 1	Pulse Generator # 2		
+	+	X—1-FFFF	+
−	+	X—0-0000	−

7. Check Data Input Coincidence

a. Set:

CH 2 and CH 3	On
CH 4	Off
A SEC/DIV	50 ns (knob in)
SOURCE	CH 2
SLOPE	− (minus)

b. Set pulse generator # 1 to produce a positive 0.5-μs pulse every 1 μs.

c. Set pulse generator # 2 to produce a negative 5-ns pulse when it receives an external trigger.

d. Set the A SEC/DIV to 20 ns (knob in).

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e. Set the Word Definition of the Word Recognizer probe to BX0 0000.

f. Connect the Q and W0-W15 inputs of the Word Recognizer to the wire on the red binding post of the CH 2 input.

g. Press the A/B MENU button to select A Trigger MODE.

h. Press the upper Trigger MODE button to reinitialize the auto-trigger level.

i. Vary (increase) the pulse duration of pulse generator # 2 until further increase makes the CH 3 display stable (>2.5 V amplitude).

j. Press the Δt button.

k. Turn the Δ REF OR DLY POS control to align the delta reference cursor with the falling edge of the CH 2 signal.

l. Turn the Δ control to align the delta cursor with the rising edge of the CH 2 signal.

m. CHECK—Reading is ⩾20 ns and ⩽85 ns.

n. Press the Δt button.

o. Disconnect the test setup.

p. Press the lower Trigger MODE button.

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ADJUSTMENT PROCEDURE

The "Adjustment Procedure" is used to restore optimum performance or return the options to conformance with their "Performance Requirements" as listed in Tables 3-1 and 3-2. The options should be adjusted only when the standard instrument is known to meet its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual. The instrument must have a 20-minute warmup period before making any adjustments. Performing this procedure while the instrument's temperature is drifting may cause erroneous calibration settings.

PREPARATION

Remove the wrap-around cabinet from the instrument as described in the "Maintenance" section of the standard instrument Service manual. Then set the CAL/NO CAL jumper P501 in the standard instrument to the CAL position (between pins 1 and 2).

Turn the oscilloscope on by pressing the POWER button. Check to see that it enters its normal operating mode and that no error message is displayed on the CRT. If an error message is present, have the instrument repaired or calibrated by a qualified service technician before performing this procedure.

COUNTER/TIMER/TRIGGER ADJUSTMENT PROCEDURE

Equipment Required (see Table 3-12)

Pulse Generator (Item 1)

Time-Mark Generator (Item 2)

BNC Cable (2 required) (Item 4)

Initial Oscilloscope Control Settings

Control settings not listed do not affect the procedure.

a. Set:

VOLTS/DIV

CH 1 and CH 2	200 mV
CH 1 and CH 2 VAR	In detent
CH 3 and CH 4	0.1 V

VERTICAL MODE

CH 1, CH 2, CH 3, CH 4, ADD, and INVERT	Off
CHOP/ALT	ALT
20 MHz BW LIMIT	Off

Input Coupling

CH 1 and CH 2	50 Ω DC

Horizontal

A SEC/DIV	10 ns (knob in)
SEC/DIV VAR	In detent
X10 MAG	Off
TRACE SEP	Fully CW

Delta

Δt and ΔV	Off (press and release until associated readout is off)
TRACKING	Off

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Trigger

HOLDOFF	Fully CCW
A and B LEVEL	Midrange
A and B SLOPE	+
A MODE	AUTO LVL
B MODE	RUN AFT DLY
SOURCE	VERT
COUPLING	DC

b. Connect the output of the time-mark generator via a 50-Ω cable to the positive trigger input of the pulse generator.

c. Connect the output of the pulse generator via a 50-Ω cable to the CH 1 input connector.

d. Set the pulse generator to produce a positive 0.5-μs pulse when externally triggered.

e. Set the time-mark generator to produce 1-μs time markers.

f. Adjust the pulse generator to produce a 5-division display centered about ground.

g. Press the Trigger SLOPE button while holding in both the ΔV and Δt buttons to access the Diagnostic Menu.

NOTE

If the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

h. Press the lower Trigger MODE button until the message **"BU CAL F1"** appears in the lower left corner of the CRT.

i. Press the upper Trigger COUPLING button.

j. After about 3 seconds, the **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** message should appear in the Diagnostic Menu of the CRT readout.

k. Press the lower Trigger MODE button until the message **"CT CAL 81"** appears in the lower left corner of the CRT.

l. Press the upper Trigger COUPLING button.

m. CHECK—The message **"1 MHZ CH1 1VOLT PEAK TO PEAK"** appears in the Diagnostic Menu of the CRT readout.

n. Press the upper Trigger COUPLING button to start the calibration routine.

NOTE

*If either the frequency of the signal generator or the frequency of the oscillator within the CTT is not within tolerance, the message **"FREQ OUT OF LIMITS"** will appear in the CRT readout.*

*If the calibration routine is unable to calculate a delay offset calibration constant that is within tolerance, the message **"OFFSET LIMIT"** will appear in the CRT readout.*

o. After about 10 seconds, the **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** message should appear in the Diagnostic Menu of the CRT readout.

p. Press the A/B MENU button to exit the Diagnostic Menu.

q. Disconnect the test equipment from the instrument.

r. Return the CAL/NO CAL jumper to its NO CAL position and reinstall the instrument cabinet.

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Section 4

DIGITAL MULTIMETER

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SPECIFICATION

INTRODUCTION

The DMM Option (Option 01) to the TEKTRONIX 24X5A Oscilloscopes is a 4 ½-digit, fully autoranging digital multimeter which measures dc and ac voltage and current, resistance, dBV, dBm, continuity, and temperature. Option 1B is the same as Option 01 except that the temperature probe is not included. The DMM is controlled by "soft" front-panel switches that are used by the operator to determine the function or operation to be performed. All the controls are contained in the extended front panel.

Measurement results and DMM messages are displayed on the top line of the oscilloscope CRT readout. The processor can turn off the DMM when a display conflict arises either between the DMM and the standard oscilloscope or between the DMM and an option.

When the GPIB (General Purpose Interface Bus) Option (Option 10) is installed in the oscilloscope, the DMM functions can be controlled and the measurement results read via the bus. All controls available from the DMM front panel are also available through the GPIB interface. GPIB control, which differs from front-panel control, explicitly turns functions on and off. The normal front-panel control buttons work as toggles (when pressed the function switches to the opposite state).

ACCESSORIES

Standard Accessories

In addition to the standard accessories listed in the oscilloscope manuals, the following DMM Option standard accessories are provided:

Probe Set
Accessories to Probe Set
P6602 Temperature Probe

Optional Accessories

The following optional accessories are also available:

24X5A/2467 Options Service Manual
Protective Waterproof Vinyl Cover

The optional accessories can be ordered from Tektronix, Inc. A local Tektronix Field Office, representative, or the Tektronix Product catalog can provide ordering and product information.

PERFORMANCE CONDITIONS

Except as noted in Tables 4-1 and 4-2 of this manual, the electrical, mechanical, and environmental characteristics of Option 01 instruments are identical to those specified in the respective 24X5A Oscilloscope Service manual.

Table 4-1
Option 01 Electrical Characteristics

Characteristics	Performance Requirements
DC VOLTS	
Accuracies by Range	
+18 °C to +28 °C	
200 mV to 200 V	±(0.03% of reading + 0.01% of full scale).
500 V	±(0.03% of reading + 0.04% of full scale).
−15 °C to +18 °C and +28 °C to +55 °C	
200 mV to 200 V	Add ±(0.003% of reading + 0.001% of full scale)/°C below 18°C or above 28°C.[a]
500 V	Add ±(0.003% of reading + 0.004% of full scale)/°C below 18°C or above 28°C.[a]

[a]Performance Requirement not checked in manual.

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Table 4-1 (cont)

Characteristics	Performance Requirements
Common Mode Rejection Ratio	>100 dB at dc: >80 dB at 50 and 60 Hz, with 1 kΩ imbalance.
Normal Mode Rejection Ratio	>60 dB at 50 and 60 Hz.
Resolution	1 part in 20,000 of full scale except 0.1 V on 500 V range.[a]
Step Response Time	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
Input Resistance	
200 mV and 2 V Ranges	>1 GΩ or 10 MΩ ±1%.[a]
20 V to 500 V Ranges	10 MΩ ±1%.[a]
Input Bias Current at 23°C Ambient Temperature	Less than 10 pA.[a]
Reading Rate	Approximately 3 per second.[a]
AC VOLTS	
NOTE *Before a signal and frequency combination listed below is input, make sure the combination does not exceed the Maximum V·Hz Product specified in this table under* ***ADDITIONAL CHARACTERISTICS****.*	
Accuracies by Range	Crest Factor ≤4.
+18 °C to +28°C	
200 mV to 200 V	Input signal between 5% and 100% of full scale.
40 Hz to 10 kHz	±(0.6% of reading + 0.1% of full scale).
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1% of reading + 0.1% of full scale).
20 kHz to 100 kHz	±(5% of reading + 0.1% of full scale).
500 V	Input signal between 100 V and 500 V.
40 Hz to 10 kHz	±(0.6% of reading + 0.2% of full scale).
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1% of reading + 0.2% of full scale).
20 kHz to 100 kHz	±(5% of reading + 0.2% of full scale).
−15°C to +18°C and +28°C to +55°C	
200 mV to 200 V	Input signal between 5% and 100% of full scale.
40 Hz to 10 kHz	±(0.8% of reading + 0.1% of full scale).[a]
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1.3% of reading + 0.1% of full scale).[a]
20 kHz to 100 kHz	±(6% of reading + 0.1% of full scale).[a]
500 V	Input signal between 100 V and 500 V.
40 Hz to 10 kHz	±(0.8% of reading + 0.3% of full scale).[a]
20 Hz to 40 Hz and 10 kHz to 20 kHz	±(1.3% of reading + 0.3% of full scale).[a]
20 kHz to 100 kHz	±(6% of reading + 0.3% of full scale).[a]

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Table 4-1 (cont)

Characteristics	Performance Requirements
Common Mode Rejection Ratio	>60 dB from dc to 60 Hz, with 1 kΩ imbalance.
Resolution	1 part in 20,000 of full scale except 0.1 V on 500 V range.[a]
Response Time	
Manual Range	Less than 2 seconds.[a]
Auto Range	Less than 3 seconds.[a]
Input Impedance	1 MΩ ±1% in parallel with less than 100 pF.[a]
dBV, dBm	
Accuracy	dB readings are calculated from AC VOLTS measurements.[a]
Resolution	0.01 dB.[a]
HI OHMS	
Accuracies by Range	
+18 °C to +28 °C	
2 kΩ to 2 MΩ	±(0.1% of reading + 0.01% of full scale).
20 MΩ	±(0.5% of reading + 0.01% of full scale).
−15°C to +18°C and +28°C to +55°C	
2 kΩ to 200 kΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C.[a]
2 MΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ±2% of reading per 10% relative humidity above 70% relative humidity.[a]
20 MΩ	Add ±(0.05% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ±2% of reading per 10% relative humidity above 70% relative humidity.[a]
Voltage at Full Scale	Approximately 2 V.[a]
Maximum Open Circuit Voltage	Less than 6 V.[a]
Resolution	One part in 20,000 of full scale.[a]
Measuring Current by Range	
2 kΩ	Approximately 1 mA.[a]
20 kΩ	Approximately 0.1 mA.[a]
200 kΩ	Approximately 10 μA.[a]
2 MΩ	Approximately 1 μA.[a]
20 MΩ	Approximately 0.1 μA.[a]

[a]Performance Requirement not checked in manual.

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Table 1-4 (cont)

Characteristics	Performance Requirements
Response Time	
2 kΩ to 2 MΩ	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
20 MΩ Range	Less than 5 seconds.[a]
Reading Rate by Range	
2 kΩ to 2 MΩ	Approximately 3 per second.[a]
20 MΩ	Approximately 1.5 per second.[a]
LO OHMS	
Accuracies by Range	
+18°C to +28°C	
200 Ω	±(0.1% of reading + 0.1% of full scale).
2 kΩ to 200 kΩ	±(0.1% of reading + 0.01% of full scale).
2 MΩ	±(0.25% of reading + 0.01% of full scale).
−15°C to +18°C and +28°C to +55°C.	
200 Ω to 20 kΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C.[a]
200 kΩ	Add ±(0.01% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ± 2% of reading per 10% relative humidity above 70% relative humidity.[a]
2 MΩ	Add ±(0.025% of reading + 0.001% of full scale)/°C above 28°C or below 18°C ±2% of reading per 10% relative humidity above 70% relative humidity.[a]
Voltage at Full Scale	Approximately 0.2 V.[a]
Maximum Open Circuit Voltage	Less than 6 V.[a]
Measuring Current by Range	
200 Ω	Approximately 1 mA.[a]
2 kΩ	Approximately 0.1 mA.[a]
20 kΩ	Approximately 10 μA.[a]
200 kΩ	Approximately 1 μA.[a]
2 MΩ	Approximately 0.1 μA.[a]
Resolution	1 part in 20,000 of full scale.[a]

[a]Performance Requirement not checked in manual.

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Table 4-1 (cont)

Characteristics	Performance Requirements
Response Time	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
Reading Rate	Approximately 3 per second.[a]
AMPS	
DC Accuracy	
+18°C to +28°C	±(0.6% of reading + 0.1% of full scale).
−15°C to +18°C and +28°C to +55°C	±(0.7% of reading + 0.15% of full scale).[a]
AC Accuracy	20 Hz to 10 kHz sinusoidal waveform.
+18°C to +28°C	±(0.6% of reading + 0.1% of full scale).
−15°C to +18°C and +28°C to +55°C	±(0.7% of reading + 0.15% of full scale).[a]
Response Time	
Manual Range	Less than 1 second.[a]
Auto Range	Less than 2 seconds.[a]
Input Resistance by Range	
100 μA	Approximately 1.0 kΩ.[a]
1 mA	Approximately 100.0 Ω.[a]
10 mA	Approximately 10.5 Ω.[a]
100 mA	Approximately 1.5 Ω.[a]
1 A (1000 mA)	Approximately 0.5 Ω.[a]
Maximum Input Current	1 A.[a]
Resolution	1 part in 10,000 full scale.[a]
CONTINUITY	
Response Time	Approximately 0.1 second.[a]
Threshold Resistance	10 Ω ±1 Ω.[a]
TEMPERATURE	
Accuracy	
+18°C to +28°C Ambient Temperature	±(2% of reading + 1.5°C).[a]
−15°C to +18°C and +28°C to +55°C Ambient Temperature	±(2% of reading + 2.0°C).[a]
Probe Tip Measurement Range	−62°C to +230°C in one range.[a]
Resolution	0.1°C or 0.1°F.[a]

[a]Performance Requirement not checked in manual.

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Table 4-1 (cont)

Characteristics	Performance Requirements
ADDITIONAL CHARACTERISTICS	
Warmup Time to Meet Electrical Specification	45 minutes.[a]
Maximum Voltage between Inputs from either Input to Ground	
DC to 20 kHz	500 V rms; 700 V peak.[a]
Above 20 kHz	10^7 V*Hz.[a]

[a]Performance Requirement not checked in manual.

NOTE

For AMPS modes, maximum voltage between inputs is limited by maximum input current.

Table 4-2
Option 01 Mechanical Characteristics

Characteristics	Description
Weight	
With Accessories and Accessories Pouch	13.1 kg (28.8 lb).
Without Accessories and Accessories Pouch	12.2 kg (26.9 lb).
Shipping Weight	
Domestic	19.2 kg (42.2 lb).
Height	
With Feet and Accessories Pouch	231 mm (9.1 in).
Without Accessories Pouch	202 mm (7.9 in).
Width	
With Handle	338 mm (13.3 in).
Depth	
With Front Cover	429 mm (16.9 in).
With Handle Extended	508 mm (20.0 in).
Cooling	Forced-air circulation.

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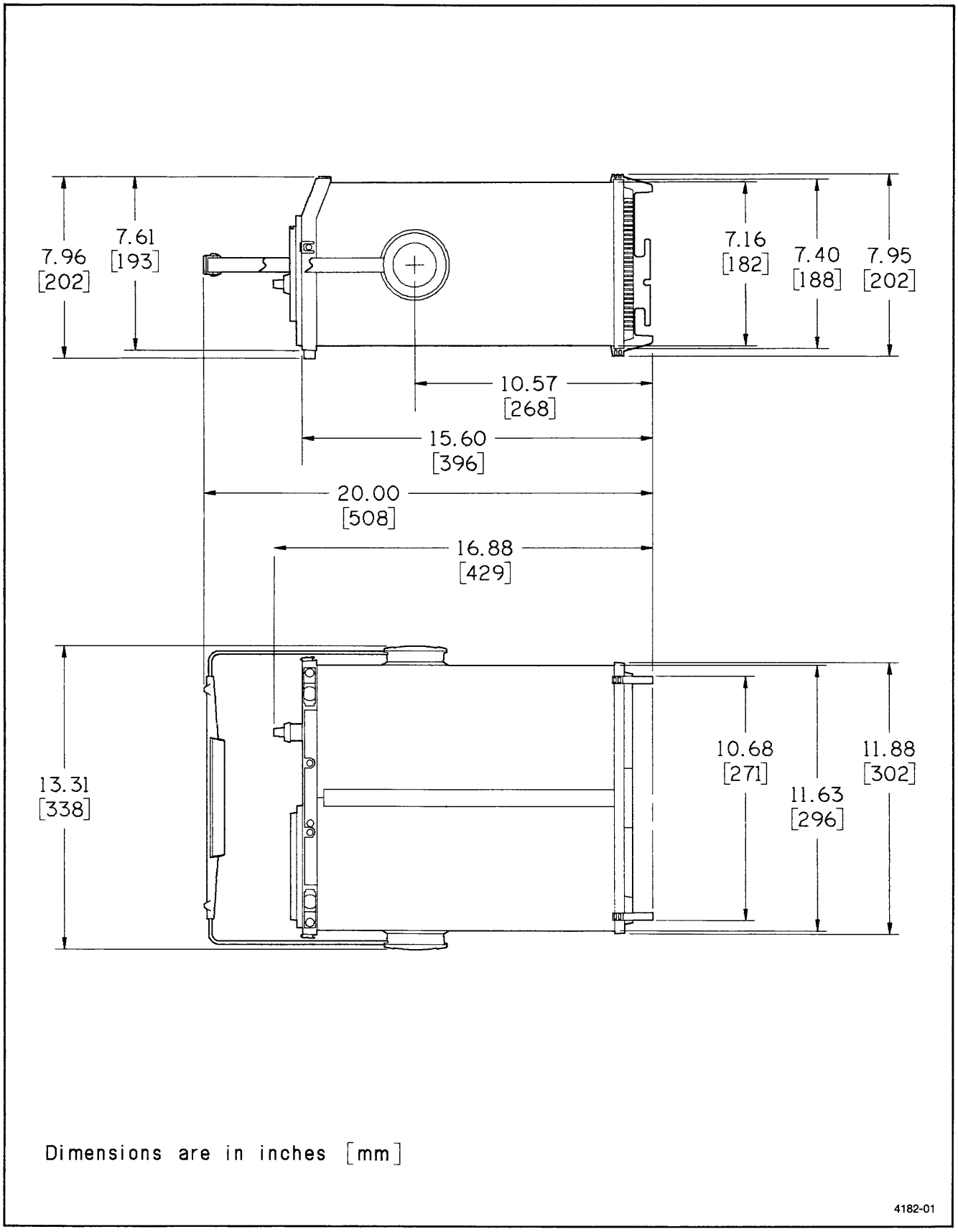


Figure 4-1. Dimensional drawing of the 24X5A Option 01 Oscilloscope.

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PREPARATION FOR USE

This section of the manual explains the power-up of the main instrument containing the DMM Option. The power-up sequence of the oscilloscope is described, along with explanations of option-related error messages that may occur if the instrument is not functioning properly.

POWER-UP SEQUENCE

Before turning on power to the instrument, read Section 2 in the standard oscilloscope Service manual and follow the safety and precautionary information described there.

The power-up tests, automatically performed each time the oscilloscope is turned on, test both the standard oscilloscope circuitry and the DMM Option circuitry. Tests that apply to the DMM Option are integrated into the power-up tests for the host oscilloscope; they include the DMM Kernel test and Confidence tests.

Kernel Test

Operation of the DMM Option memory (ROM) is checked by the standard instrument Kernel test. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labeled A/B MENU.

Even with a Kernel failure, pressing the A/B TRIG button may still place the instrument in an operating mode. However, if the operating mode is successfully entered, instrument operation may be unpredictable. If the instrument then functions adequately for your particular measurement, it can be used, but refer it to a qualified service technician for repair as soon as possible.

Confidence Tests

Failure of a DMM Confidence test during power-up is indicated in the bottom line of the CRT readout. The failure display has the following format:

"DM TEST 7X FAIL YY"

where 7X indicates the DMM Option and YY represents the code for the failed test segment.

A Confidence test failure may not render the DMM inoperable. Pressing the A/B TRIG button may still place the instrument into the normal operating mode; however, it may not meet all DMM specifications.

Successful Power-Up Sequencing

When the power-up routine is completed without a failure indication, the oscilloscope enters the normal operating state. The oscilloscope parameters are set to correspond with current front-panel settings and with functions that were established before instrument power was last turned off. The instrument is now ready to make measurements.

If the DMM was on when the oscilloscope was turned off, the DMM will return to the same operating condition when power is restored to the main instrument, with the exception of dc amps, ac amps, continuity, and the hold operator. With any one of these functions, the DMM will initialize upon power up to dc volts. For all DMM functions at power-up, the minimum and maximum values will be reset, but the reference in effect before the oscilloscope was turned off will be retained.

POWER-DOWN SEQUENCE

When the POWER switch is set to OFF, the instrument powers down and the instrument front-panel settings will be stored for use the next time power is applied to the instrument.

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DMM PARAMETER SELECTION

The following procedures are used to verify DMM push-button operation, to set the continuity function audible indicator frequency, and, if enabled, to set or determine the input impedance of the 0.2 V and 2 V DC DMM ranges.

Exercise procedure DM EXER 71, accessed via the oscilloscope Diagnostic Monitor, allows the operator to verify that the DMM front panel push buttons are functioning properly.

Exercise procedure DM EXER 72, also accessed via the Monitor, lets the operator set the continuity function audible-indicator frequency. Also, if enabled during the calibration of the DMM Option, the input impedance of the 0.2 V and 2 V DC ranges may be selected.

Perform the following procedure to access the functional selections described above:

1. Hold in both the ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The top row of the readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"**.

2. Press and hold the Trigger MODE button until the message **"DM EXER 71"** appears at the lower left corner of the CRT.

3. Press the upper Trigger COUPLING button, and the top of the display will contain all 1's grouped on the CRT to match the DMM push button layout.

4. When a DMM button is pressed, the corresponding 1 in the CRT readout should change to a 0. This will verify that the button is functioning. After checking each button, press the lower Trigger COUPLING button.

5. Press the upper Trigger MODE button. The message **"DM EXER 72"** will be displayed in the lower left corner of the CRT.

6. Press the upper Trigger COUPLING button, and the message **"MOVE SOURCE FOR CONTINUITY TONE"** will appear in the CRT readout.

7. Touch the test lead tips together and a tone will be heard. Press the upper Trigger SOURCE button to increase the frequency of the tone or press the lower Trigger SOURCE button to decrease the frequency of the tone.

8. Press the upper Trigger COUPLING button to get the message relating to the input impedance of the DMM in the 0.2 V and 2 V DC ranges. The message will be either:

   "INPUT Z ON 0.2VDC 2VDC = 10 MΩ"

   or

   "INPUT Z ON 0.2VDC 2VDC > 100 GΩ"

9. If the desired input impedance is not displayed, press the upper Trigger COUPLING button. The correct impedance should now be displayed.

10. Once the correct impedance is displayed, press the lower Trigger COUPLING button to store the impedance selection.

    NOTE

    On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labelled A/B MENU.

11. Press the A/B TRIG button to exit the Diagnostic Menu and resume normal operation.

DMM FUSES

The DMM has two fuses in series with the HI input connector to protect the DMM circuitry from current overload. One of the fuses is on the DMM front panel, and the other is inside the instrument cabinet. Only the front-panel fuse is operator replaceable; if the internal fuse opens, refer the instrument for fuse replacement or repair to a qualified service technician.

If the DMM does not make measurements after a potential current overload condition has occurred, turn off the instrument, remove the probes, and check the front-panel fuse. If it has opened, replace it with a fuse of the same type and rating. Otherwise replace the fuse in its holder and turn on the instrument. If the internal fuse has opened, the message **"DM TEST 76 FAIL 01"** will appear on the CRT readout during instrument power-up. In this case, refer the instrument to a qualified service technician for repair.

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THEORY OF OPERATION

INTRODUCTION

SECTION ORGANIZATION

This section contains a functional circuit description of the Option 01 Digital Multimeter (DMM) circuitry for the 24X5A Oscilloscopes. The discussion begins with an overview of option functions and continues with detailed explanations of each major circuit. Reference is made to supporting schematic and block diagrams, which aid in understanding the text. These diagrams show interconnections between parts of the circuitry, identify circuit components, list specific component values, and show interrelationships with the standard oscilloscope.

The block and schematic diagrams are located in the tabbed "Diagrams" section at the rear of this manual. The particular schematic diagram associated with each circuit description is identified by number in the text. The diagram number, enclosed within a diamond symbol, also appears on the tab of the appropriate foldout page. For the best understanding of the circuit being described, refer to both the applicable schematic and block diagrams.

DIGITAL LOGIC CONVENTIONS

Digital logic circuits perform many functions within the instrument. The operation of these circuits is represented by specific logic symbology and terminology. Logic-function descriptions contained in this manual use the positive-logic convention. The specific voltages which constitute a HI or a LO vary among individual devices. For specific device characteristics, refer to the manufacturer's data book.

GENERAL CIRCUIT DESCRIPTION

Before individual circuits are discussed in detail, a general block-level discussion is provided to aid in understanding overall operation of the option circuitry. A simplified block diagram of the option, showing basic interconnections, is shown in Figure 10-7. The diamond-enclosed numbers in the blocks refer to the schematic diagrams at the rear of this manual in which the corresponding circuitry is located. Throughout this discussion, standard oscilloscope refers to the 24X5A Oscilloscopes without option circuitry.

The activities of the options are directed by the microprocessor contained in the standard oscilloscope. The microprocessor, under the control of firmware present in the options, monitors each option's functions and sets up the operating modes according to instructions received.

While executing the control program, the microprocessor retrieves previously stored calibration constants and front-panel settings and, as necessary, places program-generated data in temporary storage for later use. The random access memory (RAM), and ultraviolet erasable programmable read only memory (EPROM) contained in the Buffer and option circuit boards and the nonvolatile RAM in the standard instrument provide these storage locations.

BUFFER BOARD

The DMM option connects to the standard oscilloscope through the Buffer circuit board. The Buffer board performs the following functions:

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1. Buffers and modifies the timing of the microprocessor bus.

2. Distributes the microprocessor bus, power supplies, and analog signals from the standard oscilloscope to the options.

3. Provides additional ROM for interfacing options to the standard instrument.

4. Provides a mechanical interface.

The microprocessor control bus, address bus, and data bus are buffered by Buffer board circuitry. Microprocessor bus timing for the options is modified by buffers on the Buffer board to make bus timing compatible with the options. These signal paths are used for communication between the DMM option and the standard oscilloscope.

DMM BOARD

The DMM option adds hardware and software to the standard oscilloscope that make it possible to measure ac and dc voltage and current, resistance, dBV, dBm, and temperature. The standard oscilloscope and the option are interconnected by the Buffer board. The DMM board circuitry is divided into 5 sections:

1. DMM Input Circuit.

2. V/F Converter and Digital Control.

3. Digital Counter and Processor Interface.

4. Extended Front Panel.

5. Power Distribution.

The option is under control of the microprocessor in the standard oscilloscope. The Processor Interface provides the interface to the microprocessor. After reading the switches in the Extended Front Panel, the microprocessor sets up the Digital Control circuitry for the desired operating mode. Range changing in the input circuitry is also controlled by the microprocessor through the Digital Control circuitry.

The DMM Input Circuit converts the input signal to a dc voltage for use by the V/F Converter. The voltage produced is proportional to the input signal. The V/F Converter generates a signal whose frequency is inversely proportional to the input voltage. The Digital Counter counts the frequency during the measurement interval. At the end of the measurement interval the microprocessor reads the Digital Counter, calculates and displays the input's value.

The Power Distribution circuitry contains the floating power supplies used by the DMM circuitry.

DETAILED CIRCUIT DESCRIPTION

INTRODUCTION

The following discussion provides detailed information concerning the electrical operation and circuit relationships of the 24X5A Buffer board and Digital Multimeter circuitry. Unique circuitry is described in detail, while circuits common in the electronics industry are not. The descriptions are supported by the associated detailed block diagram (Figure 10-18) and schematic diagrams located at the rear of this manual in the tabbed foldout pages.

BUFFER BOARD DIGITAL DISTRIBUTION

The Buffer Board Digital Distribution circuitry (see Diagram 20) interconnects the standard oscilloscope and the DMM board. Most of the microprocessor signals are buffered and have their timing modified. In addition, some of the memory used for option functions is included on the Buffer board.

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Address Decoding

Gates U4240A and U4240C partially decode the address bus. Enable BVMA (U4240C, pin 8) is HI for addresses from 1000-7FFF, the address space used by the options and the Buffer board. This and all other address references are in hexadecimal.

Enable $\overline{\text{BUFEN}}$ (U4250C, pin 8) is LO for the address space of 1000-1FFF. Address strobe $\overline{\text{LOWAD}}$ is active LO for the address space of XFFC-XFFF (where X is a don't care). These decoded address signals are used in selecting ROM U4260 on the Buffer board, disabling data bus buffer U4255, and selecting circuitry in the Extended Front Panel (1FFC-1FFF).

Buffer Board ROM

Buffer board ROM U4260 is used to interface the option to the standard oscilloscope. Its output enable (at pin 20) is $\overline{\text{ROMEN}}$. The signals $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ are the same if P4256 is present. With $\overline{\text{ROMEN}}$ and $\overline{\text{BUFEN}}$ the same, the Buffer board ROM address space is 1000-1FFF. Whenever the Buffer board ROM is addressed, U4275 (the shift register that controls the data bus buffer) is reset by $\overline{\text{ROMEN}}$. This prevents the Buffer board data bus buffer and the Buffer board ROM from driving the microprocessor side of the data bus at the same time.

With the DMM option installed, P4256 is not installed. In this case $\overline{\text{BUFEN}}$ is further decoded in the Extended Front Panel circuitry. The $\overline{\text{ROMEN}}$ signal produced makes the Buffer board ROM active over the address space of 1000-1FFB. The other decoded addresses are used by the DMM Extended Front Panel circuitry, as explained later.

Bus Buffers

The 10-MHz clock signal of the standard oscilloscope is buffered by U4265D. The buffered clock (B10MHZ) clocks shift register U4275 and is also sent to the options.

The $\overline{\text{E}}$ clock, pin 12 allows $\overline{\text{RESET}}$ and $\overline{\text{E}}$ to pass through the latch unmodified. The buffered E clock is delayed >30 ns by R4265, C4265, and U4265C. This delayed BE clock latches $\overline{\text{VMA}}$, R/$\overline{\text{W}}$ (U4225) and the address bus (U4235 and U4245), which provides extra hold time on these signals for the options.

Data Bus Buffer

Data bus buffer U4255 is a bidirectional bus driver that is controlled by the signals on pin 1 and pin 19. Pin 1 controls the direction of data flow through the buffer, and pin 19 turns the drivers on and off. When pin 1 is HI, the buffer is configured to drive data from the microprocessor to the options. Conversely, when pin 1 is LO, the buffer is configured to drive data from an option to the microprocessor. Pin 1 is always HI except when the microprocessor is reading data from an option. U4255 is inactive when pin 19 is HI.

Signals on pin 1 and pin 19 coordinate the states of U4255 so that data bus contention never occurs. Buffer U4255 drives two buses: the bus between U4255 and the Control board of the standard oscilloscope, and the bus between U4255 and the options. Both of these must be kept free of contentions (i.e., it is not allowed for more than one device to drive the bus at the same time). These two buses will be examined individually.

The bus between the Control board and U4255 is driven by the Control board during a write bus cycle, driven by the Control board during a read cycle from non-option space (0000-0FFF and 8000-FFFF), driven by U4255 during a read cycle from option space (2000-7FFF), and driven by U4260 during a read from Buffer board ROM (1000-1FFF). The Control board changes its drivers from output to input on the rising edge of E (this is the high-true E, not the low-true $\overline{\text{E}}$ used by the option) when going from a write to a read cycle. It changes from input to output on the falling edge of R/$\overline{\text{W}}$ when going from a read to a write cycle. Data buffer U4255 drives the Control board data bus only when BVMA and BR/$\overline{\text{W}}$ are both true, i.e., a read cycle from the option is being performed. This is done by driving pin 1 of U4255 from BVMA NANDed with BR/$\overline{\text{W}}$ (after passing through a delay consisting of two cycles of the 10-MHz clock). Pin 19 of U4255 is driven by $\overline{\text{E}}$ delayed for two cycles of the 10-MHz clock. This two-cycle delay ensures that U4255 will be driving the Control board data bus only in a read cycle from option address space, during a time interval starting after the rising edge of E and ending after the falling edge of E. A delay of two cycles of the 10-MHz clock is necessary to guarantee that the Control board data bus drivers have turned off before U4255 starts driving the bus. This is a period of time when the Control board never drives the data bus during a read cycle. Shift register stages in U4275 are cleared by $\overline{\text{ROMEN}}$, forcing pin 19 of U4255 HI while Buffer board ROM is being read.

The bus between U4255 and the options must be driven by U4255 during a write cycle to the options (2000-7FFF) and may be driven by an option only during a read cycle from the option (2000-7FFF). Bus driver U4255 actually drives the bus to the option during all cycles except read cycles from 1000-7FFF. The bus is driven by an option only while E is true during an option read cycle.

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Address bus driver U4255 drives the bus during an option write cycle while pin 19 of U4255 is LO, but in this case pin 19 is delayed from $\overline{E}$ only by one cycle of the 10-MHz clock, driving the data to the options as soon as it is available from the microprocessor.

DIGITAL MULTIMETER OPTION CIRCUIT BOARD

The DMM option adds hardware and software to allow measuring ac and dc voltage and current, resistance, dBV, dBm, and temperature. The DMM board is divided into 5 sections:

1. DMM Input Circuit.
2. V/F Converter and Digital Control.
3. Digital Counter and Processor Interface.
4. Extended Front Panel.
5. Power Distribution.

In general, the measurement procedure is the same for all measurements: the microprocessor sets up the Digital Control circuitry. The Digital Control circuitry sets up the input circuit for the desired operating mode. The input signal is attenuated by the Input Attenuators. Then the signal is buffered by one of the Volts Buffers. The V/F Input Multiplexer selects the buffer's output, sending it to the V/F Converter. The V/F Converter converts the input to a frequency. The signal is then counted, the reading calculated, and then displayed.

Interleaved between each measurement of the unknown input is the measurement of an offset or a reference. The measurement sequence is: unknown, offset, unknown, reference, unknown, offset, ...

DMM Input Circuit

The DMM Input Circuit (see Diagram 28) converts all inputs to a standard range of voltages. The circuitry contains Input Attenuators, an Ohms Current Source, a DC Volts Buffer, an AC Volts Buffer, and the V/F Input Multiplexer.

The gain path in DC Volts is maintained to keep the voltage to the V/F Converter at a full scale range of ±2 V, except in the 500 V range where the full scale range is ±0.5 V. Gain path selections used are shown in Table 4-3.

Table 4-3
DC Volts Selections

DC Volts Range	Input Atten	Reference	Buffer Gain	V/F Input Selected
.2 V	÷1	−0.2 V	X10	X1
2 V	÷1	−2 V	X1	X1
20 V	÷10	−2 V	X1	X1
200 V	÷100	−2 V	X1	X1
500 V	÷100	−2 V	X1	÷10

In the current ranges, the Input Attenuators convert the input current to a voltage (0.1 V at the top of the range) which is then sent to the 0.2 V input of one of the Volts buffers. The Volts buffer multiplies by 10, producing 1 V at the top of the range to the V/F Converter. The rest of the process is the same as for voltage readings.

In the Ohms ranges, the Ohms Current Source generates a current. This current is sent through the unknown resistance, producing a voltage proportional to the unknown resistance. The voltage produced is sent to the volts buffer, where the rest of the process is the same as for voltage readings.

In Continuity mode, the circuitry is set up as in the Ohms ranges. Before measurements start, a 10 Ω resistance in the Input Attenuators is measured and used as a reference. Measurements of 10 Ω or less sound the continuity tone; measurements greater than 10 Ω do not sound a tone.

For Temperature measurements, the circuitry is set up as for the 200 Ω range. The resistance of the Temperature Probe (a 100-Ω at 0°C thermistor) is measured. The resistance measured (which is proportional to temperature) is converted to temperature and displayed.

INPUT ATTENUATORS. The Input Attenuators contain the voltage dividers that attenuate the inputs to levels usable by the voltage buffers. Both the AC and the DC Volts Buffers have their own input attenuators. In addition, part of the attenuator for the DC Volts Buffer is used in

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the Amps ranges to convert the input current to a voltage. The setup for a given range is controlled by the Digital Control circuitry.

DC Volts Attenuator. Resistors R5081, R5080, R5082, R4960, and R4975 make up the voltage divider for the DC Volts Attenuator. Relays K4981 and K5091 determine which voltage tap will be used. Relay K5191 selects between >100-GΩ and the 10-MΩ input impedances. If the attenuator is to divide by 10 or 100, the 10-MΩ input impedance is selected.

AC Volts Attenuator. Resistors R5181 and R5177 make up the voltage divider for the AC Volts Attenuator. Relay K5180 determines which voltage tap will be used. Relay K5191 switches the input to the AC circuitry.

The attenuator is ac compensated by C5170. The effective capacitance of C5170 is changed by multiplier U5170 and the D-A Converter made up of R4970, R4971, R4972, R4973, R4974, and R5073. The effective capacitance required is determined during calibration and is the same for all ac voltage ranges.

Amps Attenuator. The Amps Attenuator converts the input current to a voltage. The resistances used are in R4960 and R4975. The resistance used in a given Amps range is selected by FETs Q4970, Q4971, Q4972, Q4973, and Q4980. Relay K4990 switches the input to the Amps circuitry. The attenuator is set to maintain ±0.10 V dc or ac rms full scale into the Volts Buffers. To give a ±1 V full scale signal to the V/F Converter, the buffers multiply by 10.

DC VOLTS BUFFER. The DC Volts Buffer buffers dc input voltages, sending the resultant signal to the V/F Input Multiplexer.

Input voltages first pass by U5060B, an active low pass filter. It removes both input noise and FET switching noise from the input signal. FET Switch Q5070A and Q5070B, selects either the unknown input voltage or the voltage reference (OFFSET or INPUT REF). Operational amplifier U5060A maintains proper bias on the FET switch, with varying input voltages. The B5 and $\overline{B5}$ Digital Control signals control the FET switch.

Operational amplifier U4970 amplifies the selected input signal. FET switches U4950C and U4950D control the feedback resistance and therefore the gain of the operational amplifier. The B6 Digital Control signal controls the FET switches. A LO on the control input (pin 16 or pin 9) of one of the FET switches closes the switch.

AC VOLTS BUFFER. The AC Volts Buffer buffers ac input voltages, converts the ac voltage to dc, and then sends the resultant signal to the V/F Input Multiplexer.

Operational amplifier U5151B buffers the ac input voltage. VR5160, VR5162, R5167, R5168, CR5163, and CR5164 protect the amplifier's input. The output of the operational amplifier is sent to operational amplifier U5151A. FET switches U5150C and U5150D control the operational amplifier's feedback resistance and therefore its gain. The C7 Digital Control signal controls the FET switches. A LO on the control input (pin 16 or pin 9) of one of the FET switches closes the switch. The output of the operational amplifier is converted to dc by rms-to-dc converter U5140.

V/F INPUT MULTIPLEXER. The V/F Input Multiplexer selects one signal from the DMM Input Circuit. The selected signal is sent to the V/F Converter. Signal selection is controlled by Digital Control signals B2, B3, and B4. The signal selected is either the output of the AC Volts Buffer (AC X1 or AC ÷10), the output of the DC Volts Buffer (DC X1 or DC ÷10), the −2 V REF, the Ground REF, or the AMPS ST signal.

OHMS CURRENT SOURCE. The Ohms Current Source generates the constant currents used to make resistance measurements. Also contained in the circuitry are the voltage references used by the current source and those used in all measurement sequences.

The voltage references are produced by U5050, R5049, R5054, R5055, and R5056. The Ohms Current Source uses the −6.95 V reference. The −2.0 V or −0.20 V reference is measured during reference measurement cycles. FET switch U4942B selects one of the references. The A6 Digital Control signal controls the FET switch. FET switch U4942A selects either the selected reference or the ground offset. The offset is measured during an offset measurement cycle. The A5 Digital Control signal controls the FET switch. For ac measurements, the −2.0 V reference is always used, and the V/F Input Multiplexer selects the −2.0 V reference and the offset directly.

The voltage drop across R4951 determines the current through Q4952. The voltage reference of −6.95 V is at one end of the resistor. FET switch U4942C, controlled by the A7 Digital Control signal, selects either −6.26 V or 0.0 V for the other end of the resistor. Voltage follower U5040 buffers the selected voltage.

The resulting current through Q4952 (either 1 mA or 0.1 mA) is divided by either 1 or 10 by R4957 and FET

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Table 4-4
Ohms Selections

Range	Low-Voltage Ranges			High-Voltage Ranges		
	Output Current	Current at Q4952	Output Voltage Full Scale	Output Current	Current at Q4952	Output Voltage Full Scale
200 Ω	1 mA	1 mA	0.2 V			
2 kΩ	100 μA	0.1 mA	0.2 V	1 mA	1 mA	2 V
20 kΩ	10 μA	0.1 mA	0.2 V	100 μA	0.1 mA	2 V
200 kΩ	1 μA	0.1 mA	0.2 V	10 μA	0.1 mA	2 V
2 MΩ	100 nA	0.1 mA	0.2 V	1 μA	0.1 mA	2 V
20 MΩ				100 nA	0.1 mA	2 V

switches U4950A and U4950B, the negative feedback loop for operational amplifier U4960. The positive feedback loop for U4960 drops the same voltage as its negative feedback loop. The B0 Digital Control signal controls the negative feedback; the B1 Digital Control signal controls the positive feedback. The selections for each Ohms range are shown in Table 4-4.

The Voltage Clamp, CR4980 and CR4981, keeps the output voltage between −0.7 V and 5.7 V and protects the current source from over-voltage inputs.

V/F Converter and Digital Control

The V/F Converter and Digital Control circuitry (see Diagram 29) generates a frequency that is inversely proportional to the voltage received from the input circuit. It also contains the registers which control the DMM Input Circuit hardware.

VOLTAGE-TO-CURRENT CONVERTER. The V/F Input Multiplexer (U5020, Diagram 28) selects the input to the Voltage-to-Current Converter. Selected input is converted to a current and inverted by operational amplifiers U5030A and U5030B. The current, which is inversely proportional to the input voltage, passes through Q4934 and charges integrating capacitor C4914 negatively.

INTEGRATING CAPACITOR. Integrating Capacitor C4914 is charged negatively by the Voltage-to-Current Converter. If the Current Source is turned on by the comparator, the Current Source charges the capacitor positively. The Comparator senses the charge on the capacitor; if the charge on the capacitor drops below zero volts, the comparator turns on the Current Source. Each time the Current Source is turned on it charges the capacitor for the same length of time. The voltage on the capacitor ramps down at a rate determined by the input signal. Once the capacitor's voltage goes below zero volts, the voltage on the capacitor ramps up at a rate determined by the input signal and the Current Source.

COMPARATOR. The Comparator senses the charge on the Integrating Capacitor, controls the Current Source, and sends a frequency, which is inversely proportional to the option's input, to the Digital Counter.

If the charge on the capacitor drops below zero volts, the collector of Q4932 goes HI. The HI enables the Current Source (U4932B, pin 12), and is inverted LO by U4920D. The LO is buffered by Q5130 and sent to the Digital Counter. This signal starts and stops all measurements and is counted to determine the measurement.

Whenever the microprocessor is loading the Digital Control circuitry with the hardware control information, ENL (U5130B, pin 3) stops the Comparator from sending the frequency signal to the Digital Counter. Whenever control information is being sent, ENL is LO. The LO is inverted HI by U5130B. The HI prevents the Comparator from sending frequency information to the Digital Control circuitry by holding the output of U4920D LO. The Digital Counter ignores its input during this time (see Delay Generator).

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CURRENT SOURCE. The Current Source charges the Integrating Capacitor in the positive direction whenever the Current Source is enabled by the Comparator.

Crystal Y4910 and U4920C make up a 3.58-MHz crystal oscillator. This clock is buffered and inverted by both U4920A and U4920B.

When the Comparator senses that the charge on the Integrating Capacitor is below zero volts, its output (collector of Q4932), going to pin 12 of U4932B, goes HI. The next time the clock goes HI (U4932B, pin 11), U4932B sets, making pin 8 LO. The LO at pin 8 causes counter U4930 to be loaded with zeros, making MAX/MIN (U4930, pin 12) LO. Flip-flop U4932A resets when the next rising edge of the clock arrives at pin 3 of U4932A. Resetting U4932A switches the current source for Q4920 from ground to the Integrating Capacitor and resets U4932B, removing the load signal from counter U4930.

The amount of current removed from the Integrating Capacitor is determined by Q5020. Counter U4930 controls the length of time the current is removed. The counter counts the oscillator clocks at pin 14. When the maximum count (15) is reached, MAX/MIN pin 12 goes HI. The next rising clock at pin 3 of U4932A sets U4932A, switching the current source for Q4920 back to ground.

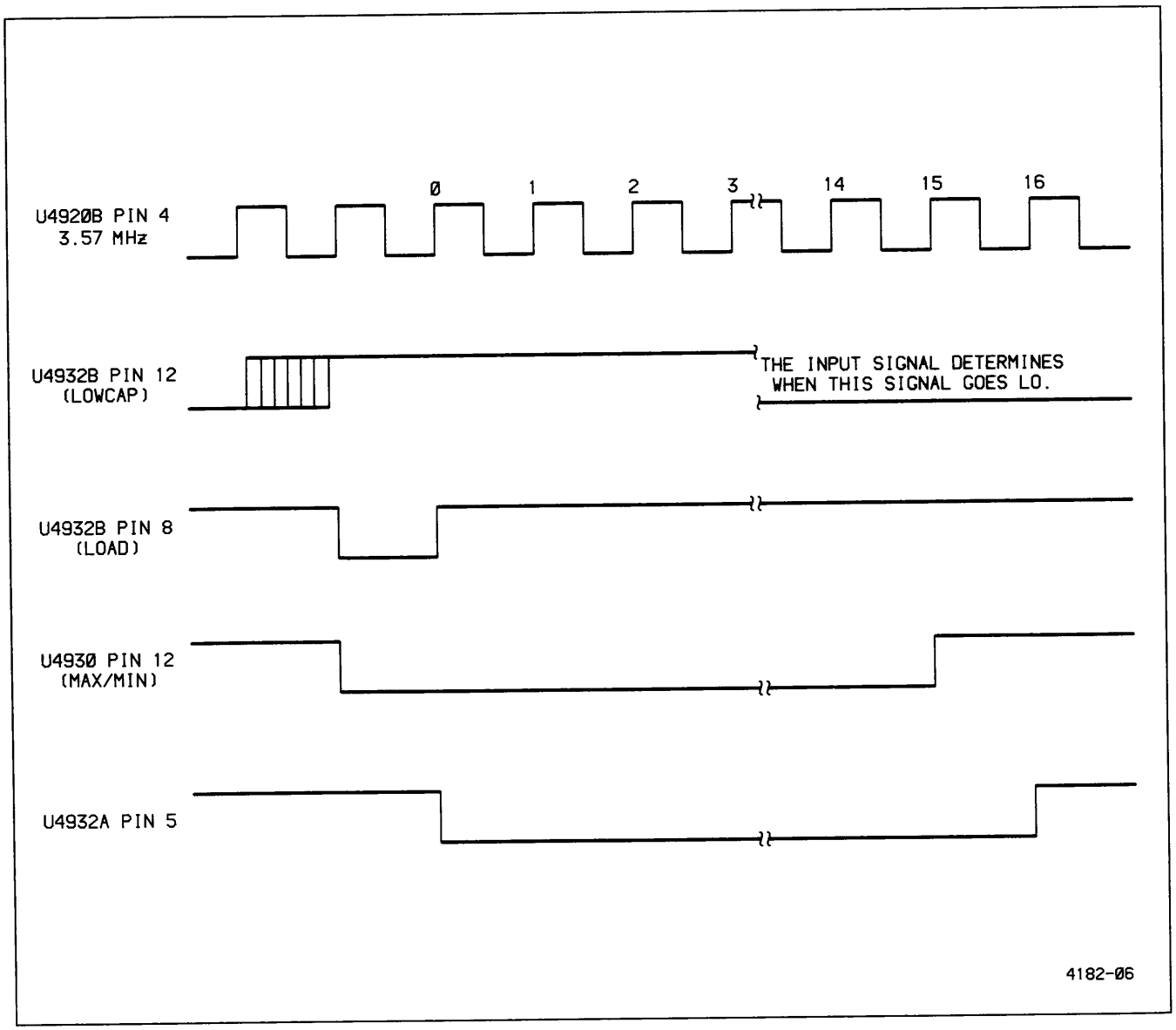


Figure 4-2. Current Source Timing Diagram.

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The current from the Current Source charges the Integrating Capacitor up past zero volts. The amount of charge and the time of charge is always the same: the constant current through Q5020 and Q4920 for 16 cycles of the crystal oscillator (see Figure 4-2). The frequency of these charge cycles (about 20 kHz at 2 V, 40 kHz at 0.0 V, and 70 kHz at −2 V) varies inversely with the DMM's input.

DIGITAL CONTROL. The Digital Control circuitry stores the hardware control words (relays and FET switches that determine the measurement path). As explained later, the Register Control circuitry serially shifts the hardware control words to the Digital Control circuitry. Due to transformer coupling in the Register Control circuitry, U5124 only sees the rising and falling edges of the CLK (pin 10) and DATA (pin 7) signals. The signals are reconstructed by line receiver U5124. The reconstructed data is clocked into the 24 bit register by the reconstructed clock signal (see Figure 4-3). Three serial-input parallel-output latches (U5122, U5120, and U4940) make up the 24 bit register. The control signals are buffered and inverted by U5132, U5130, U5010, and Q4950.

When digital control words are not being written, the V/F Converter (Comparator) uses the DATA line. Before the digital control words can be written, the V/F Converter's information must be stopped. Sending an initial series of CLK pulses stops the information. The pulses

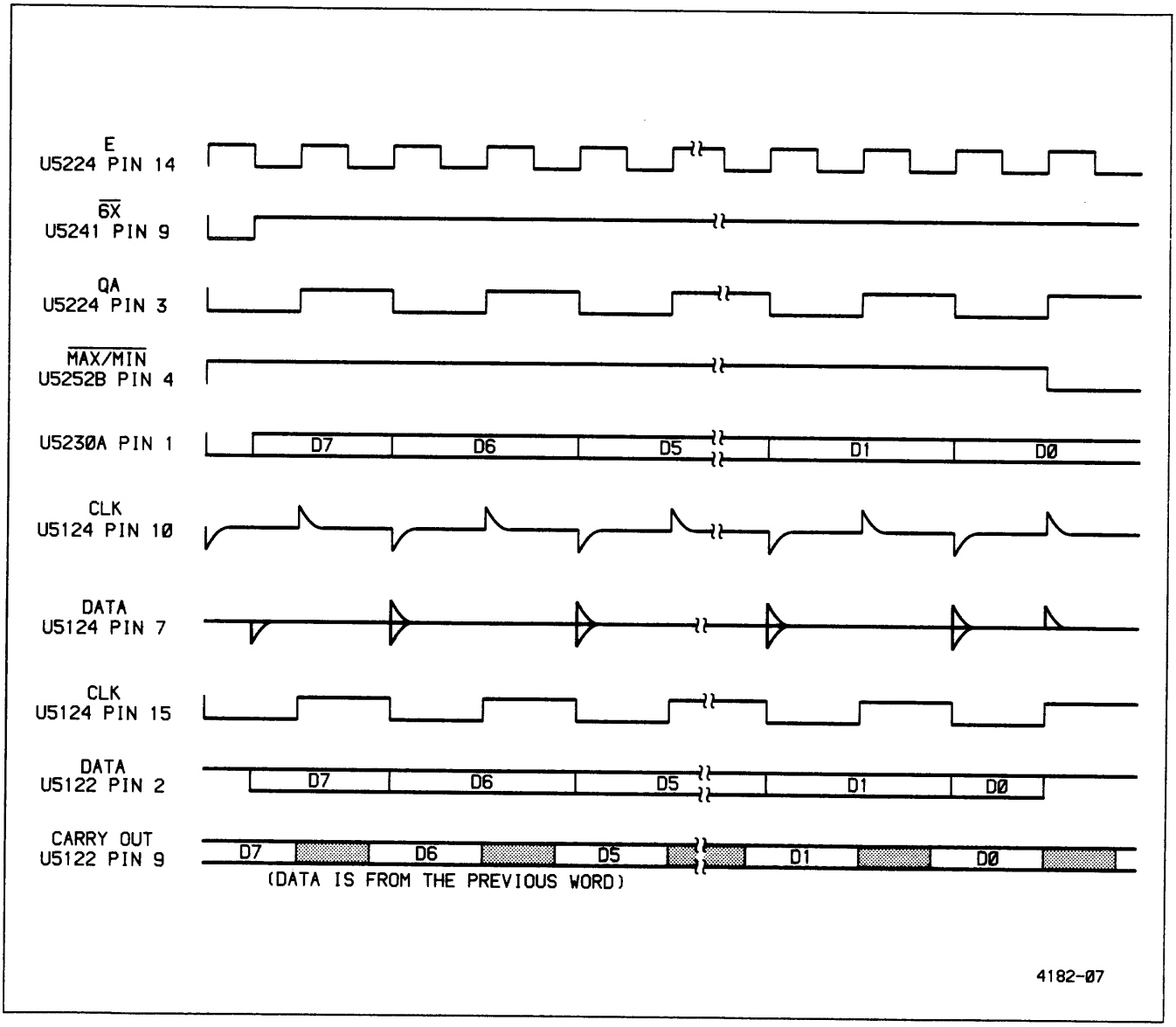


Figure 4-3. Digital Control timing diagram.

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discharge C5130. The LO on C5130 is inverted HI by U5130B. The HI on pin 11 of U4920D keeps its output LO, stopping the V/F Converter's information.

When the CONT button is pushed, the continuity function is calibrated by measuring the 10-Ω current shunt (the 10-Ω reference). The instrument then enters the 200-Ω unknown position and takes measurements. The state of the control signals, in hexadecimal, for each DMM operating mode is shown in Tables 4-5 through 4-13.

Digital Counter and Processor Interface

The Digital Counter and Processor Interface (see Diagram 30) contains the option's microprocessor interface, Counters, Delay Generator, and Register Control circuitry. Included in the microprocessor interface is the option's memory, buffers, registers, and latches that interface the option to the microprocessor. The counters count clocks used in calculating measurements. The Delay Generator delays each measurement's start until the hardware (relays and FET switches) settles. The Register Control circuitry loads the Digital Control registers and isolates instrument circuitry from the voltages possible at the DMM inputs.

Table 4-5
Continuity

	A	B	C
Calibration	E5	36	00
Measurement	E0	B6	22

Table 4-6
LO Ω Control Signals

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
200 Ω	E0	B6	22	C0	96	22	E0	96	22
2 kΩ	60	B6	22	40	96	22	60	96	22
20 kΩ	60	B7	22	40	97	22	60	97	22
200 kΩ	60	B4	22	40	94	22	60	94	22
2 MΩ	60	B5	22	40	95	22	60	95	22

Table 4-7
HI Ω Control Signals

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
2 kΩ	E0	F6	22	80	D6	22	E0	D6	22
20 kΩ	60	F6	22	00	D6	22	60	D6	22
200 kΩ	60	F7	22	00	D7	22	60	D7	22
2 k	60	F4	22	00	D4	22	60	D4	22
20 kΩ	60	F5	23	00	D5	22	60	D5	22

Table 4-8
DC Volts Control Signals

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
.2 V	60	B4	2X	40	94	2X	60	94	2X
2 V	60	F4	2X	00	D4	2X	60	D4	2X
20 V	60	74	04	00	54	04	60	54	04
200 V	60	74	24	00	54	24	60	54	24
500 V	60	64	24	00	44	24	60	44	24

X is 0 if input Z is > 1 GΩ, and X is 4 if input Z = 10 MΩ.

Table 4-9
AC Volts Control Signals

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
.2 V	6X	0C	88	6X	10	88	6X	00	88
2 V	6X	0C	08	6X	10	08	6X	00	08
20 V	6X	0C	98	6X	10	98	6X	00	98
200 V	6X	0C	18	6X	10	18	6X	00	18
500 V	6X	1C	18	6X	10	18	6X	00	18

The value of X is set during calibration; the value depends on the amount of frequency compensation required. Also, since X is a 5-bit word, the 6X could be a 7X.

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Table 4-10
DC Amps Control Signals

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
100 μA	71	34	40	51	14	40	71	14	40
1 mA	69	34	40	49	14	40	69	14	40
10 mA	65	34	40	45	14	40	65	14	40
100 mA	63	34	40	43	14	40	63	14	40
1 A	60	34	40	40	14	40	60	14	40

Table 4-11
AC Amps Control Signals

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
100 μA	71	4C	C0	71	50	C0	71	40	C0
1 mA	69	4C	C0	69	50	C0	69	40	C0
10 mA	65	4C	C0	65	50	C0	65	40	C0
100 mA	63	4C	C0	63	50	C0	63	40	C0
1 A	60	4C	C0	60	50	C0	60	40	C0

Table 4-12
Control Signals to Measure
AC Volts Offset at Calibration

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
.2 V	70	4C	81	70	50	81	70	40	81
2 V	70	4C	01	70	50	01	70	40	01
20 V	70	0C	11	70	10	11	70	00	11
200 V	70	4C	11	70	50	11	70	40	11
500 V	70	5C	11	70	50	11	70	40	11

Table 4-13
Control Signals to Measure
AC Amps Offset at Calibration

Range	Unknown			Reference			Offset		
	A	B	C	A	B	C	A	B	C
All	F1	4E	83	F1	52	83	F1	42	83

MEMORY AND I/O DECODERS. This circuitry generates enabling signals and strobes that allow the microprocessor to control the various circuit functions and devices as in the standard oscilloscope (see "Address Decode" description in the Service manual of the standard oscilloscope). The DMM option memory map is shown in Table 4-14.

Table 4-14
DMM Option Memory Map

Address	Device Description
1000-1FFB	Buffer board EPROM
1FFC-1FFF	Extended front panel switches
4000-7FFF	Data bus buffer
4000-7F7F	EPROM
7F80	Tone control register (set)
7F81	Tone control register (reset)
7F82	Flip-flop U5273B (set)
7F83	Flip-flop U5273B (reset)
7F84	Delay generator (set)
7F85	Status register
7F86	Register control (shift/load)
7F87	EPROM select register
7F88-7F8F	Timer U5272 registers
7F90-7F97	Address decoder image
7F98-7F9F	Timer image
7FA0-7FA7	Address decoder image
7FA8-7FAF	Timer image
7FB0-7FB7	Address decoder image
7FB8-7FBF	Timer image
7FC0-7FFE	Option select register images
7FFF	Option select register

OPTION SELECT REGISTER. The Option Select Register U5251B enables and disables access to DMM circuitry.

When there is a write to address 7FFF, data bus line BBD6 is latched by the register. If BBD6 is HI when latched, DMM circuitry is selected for memory and I/O accesses within the paged address space (4000-7FFF). If BBD6 is LO when latched, the DMM is deselected. While the DMM is deselected, the Option Select Register is the only DMM circuitry that can be accessed by the microprocessor.

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DATA BUS BUFFER. Bidirectional buffer U5282 buffers the data bus.

The buffer is enabled by BVMA, BA14, E, and the Option Select Register through U5232A and U5242A. BR/$\overline{W}$ through U5270A controls the direction of data flow through the buffer.

EPROM. The EPROM stores the option's control program.

The Option Select Register, through U5271A and U5271B, enables both EPROM U5280 and U5281. EPROM data is sent over the data bus when an EPROM address is decoded by U5242A and U5250 through U5270D, U5271D, and U5232A.

If both EPROMs are used, the EPROM Select Register (U5251A) allows only one EPROM to be enabled at a time. When the register's address is decoded by U5241, the register latches D0. If D0 was HI, U5281 is enabled; if D0 was LO, U5280 is enabled.

If only EPROM U5281 is used, jumper W5260 will connect U5271 pin 1 and pin 10. This enables the EPROM whenever the option is selected.

REGISTER CONTROL. The Register Control circuitry loads the hardware control word into the Digital Control register.

The DMM Input Circuit hardware (relays and FET switches that determine the measurement path) is controlled by writing three 8-bit words in succession (A, B, and C) to shift register U5240. The microprocessor writes the three words every 150 ms, once to set up each unknown, offset, and reference measurement. Each write loads shift register U5240 and resets counter U5242. The counter then outputs eight clock pulses at one-half the microprocessor clock (E) rate. The eight pulses shift the word through U5240.

The word (DATA) is sent to the Digital Control circuitry through U5242B, U5230A, and T5230. The DATA is only sent when the shift register is not being loaded and the counter is not at its maximum count. The same CLK used to shift the word out of the shift register is sent to the Digital Control circuitry through U5230B and T5220.

Before sending each group of three words, part of another word is sent. The sending of this word disables the V/F output clock which also uses the data path through T5230.

Transformers T5230A and T5230B isolate the Digital Counter, Processor Interface, and Extended Front Panel circuitry from the floating ground and high input potentials associated with the rest of the circuitry.

DELAY GENERATOR. The Delay Generator delays the start of a measurement. The delay starts after the Register Control circuitry has loaded the Digital Control registers. This delay allows the measurement path (relays and FET switches) to settle before a measurement is taken.

Whenever counter U5224 is not at its maximum count, reset, or counting, counter U5231 and flip-flop U5222A are reset. While the flip-flop is reset, counters U5272 and U5274 do not count. When the Digital Control register (see Diagram 29) has been loaded, U5224 will be at its maximum count. The MAX/MIN output (U5224, pin 2) goes HI, removing the reset hold it had on both U5231 and U5222A. This is the start of the delay. Counter U5231 then counts the 25-kHz clock (5.5 V ac) at U5231 pin 10.

About 50 ms after the start of the delay, pin 15 of U5231 goes HI. If DATA (C0) was HI, U5222A sets, ending the delay. If, however, the option is in its 20-MΩ range, DATA will be LO, keeping U5222A reset. In this case, the delay lasts about 400 ms. The delay ends when pin 3 of U5231 goes HI, stopping counter U5231 through CR5211, and setting U5222A through U5252A, U5232C, and U5252C. In both cases, counter U5272 starts counting V/F pulses once U5222A is set.

If the DMM mode is changed by pushing a front panel switch, the microprocessor does not wait for the delay to end. When the mode is changed, the microprocessor writes to 7F84, making U5241 pin 11 LO. This sets U5222A through U5252C and U5232C, ending the delay.

COUNTERS. Timer U5272 takes all measurements. The timer contains three programmable counters. Except for Continuity and some Diagnostics modes, the timer is programmed as follows:

Counter 1 counts V/F clock pulses. Counting starts when the counter's gate goes LO. When the gate goes HI, counting stops and the measurement-complete bit is set.

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Counter 2 counts the most-significant bits of the 10-MHz clock over the same interval as Counter 1.

Counter 3 counts the internal E clock. The counter produces the 0.1-s measurement interval, outputting a positive 0.1-s pulse when its gate goes LO.

Counting does not start until after the Delay Generator's delay has ended. When the delay ends, Counter 3 starts and its output goes HI. The first V/F clock after the output of Counter 3 goes HI starts Counters 1 and 2. The first V/F clock after Counter 3 goes LO (0.1-s measurement interval ends) stops Counters 1 and 2. When Counter 1 stops (its gate goes HI), Counters 1 and 2 are read and the measurement calculated (see Figure 4-4). Three of these measurements are required to display a reading; the unknown measurement measures the input signal, the offset measurement measures zero volts, and the reference measurement measures the −0.2 V or the −2 V reference. After all three measurements are made, the measurement to be displayed is calculated and then displayed.

At the start of the delay period, pin 2 of U5274A, pin 2 of U5272, and pin 5 of U5272 all go HI. This resets the least-significant bits, from the previous measurement, of the 10-MHz counter (U5274A) and prevents Counters 2 and 3 from counting. When Counter 3 is not counting, its output (U5272, pin 6) is LO.

When the delay ends (pin 6 of U5222A goes LO), DELAY goes LO enabling Counter 3. When Counter 3 is enabled, it starts counting and its output (U5272, pin 6)

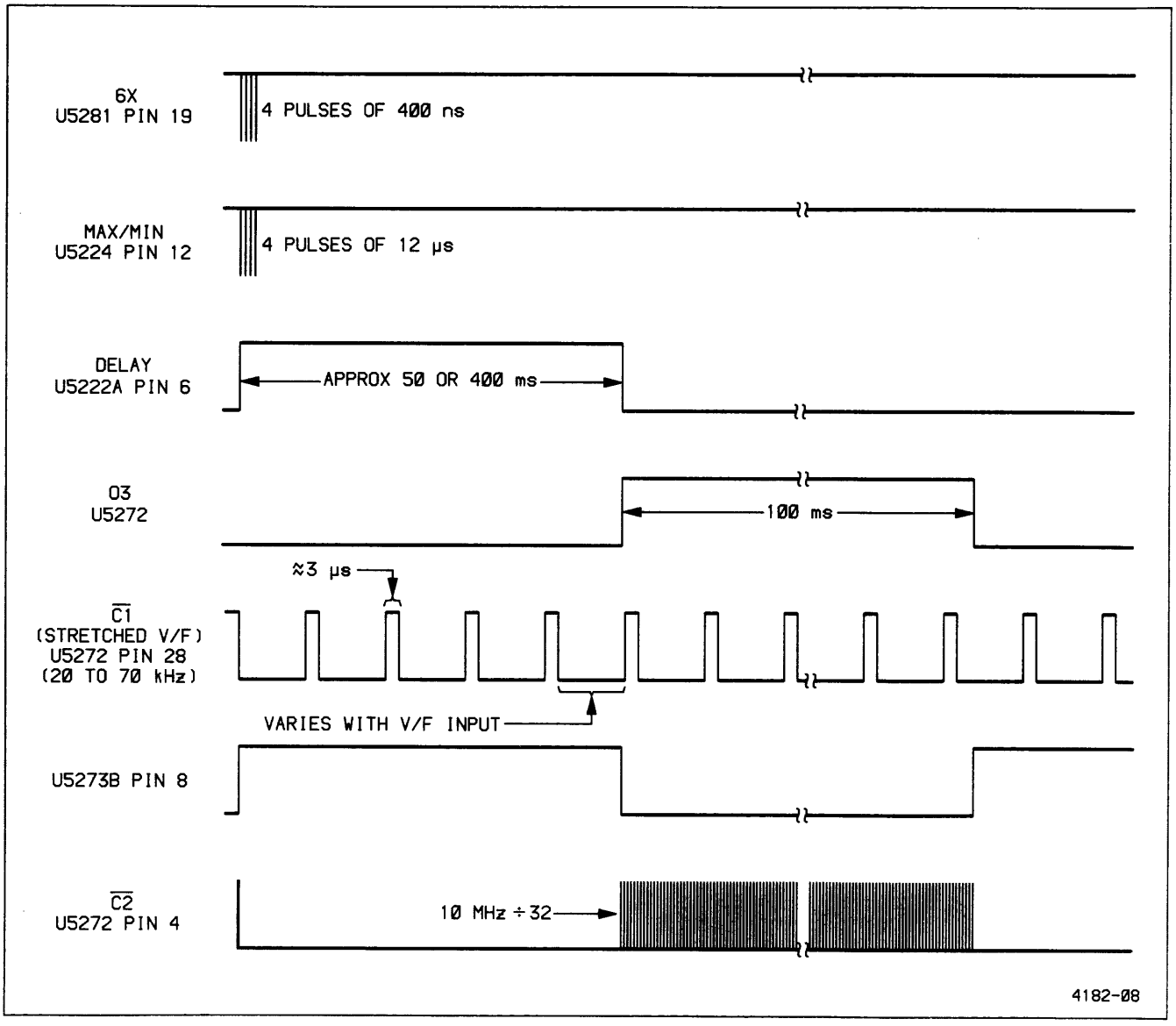


Figure 4-4. Digital Counter timing diagram.

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goes HI. This HI, at pin 12 of U5273B, allows U5273B to set when the next V/F clock arrives (at pin 11 of U5273B). When U5273B is set, Counter 1 and U5273A are both enabled. Counter 1 starts counting the V/F clocks, and the 10-MHz counter (U5273A, U5274A, and Counter 2) starts counting the B10MHZ clocks.

This counting continues until the measurement interval ends. At the end of the interval, the output of Counter 3 goes LO (U5272, pin 6). This LO allows U5273B to be reset when the next V/F clock arrives. The reset U5273B stops Counter 1 and sets U5273A, stopping the 10-MHz counter.

The V/F clock is stretched and inverted by Q5230, U5271B, U5274B, and U5252D. When the V/F clock goes LO, Q5230 turns on. This makes pin 12 of U5274B HI, resetting U5274B. This makes pin 9 of U5252 LO. This signal stays LO until four E clocks, through U5271B, are counted by U5274B. This stretched V/F clock is inverted by U5252D.

TONE CONTROL. The Tone Control circuitry generates a tone when the resistance measured in Continuity mode is less than 10 Ω. This circuitry is only used in Continuity mode.

At the start of Continuity mode, a 10-Ω resistance is measured. The count obtained in Counter 1 during the measurement is used for each initialization of Counter 1 for the duration of Continuity mode. Counter 2 is set up to produce the tone selected for continuity measurements. Counter 3 is set up to produce the measurement interval, which for Continuity mode is about 20 ms.

Counter 2 is always producing a tone signal in Continuity mode. Flip-flop U5222B determines whether or not the tone reaches the speaker. If the flip-flop is set, CR5212 is reverse biased, allowing the tone to reach Q5210. If the flip-flop is set, Q5210 inverts the tone signal and drives the speaker located in the Extended Front Panel circuitry. If the flip-flop is reset, CR5210 is forward biased, stopping the tone before it reaches Q5210.

Since Counter 1 is initialized to the count obtained for a 10-Ω resistance, if the resistance being measured is less than or equal to 10 Ω, the counter counts down to zero within the measurement interval. When the counter reaches zero, its output goes HI. If the resistance being measured is greater than 10 Ω, the counter will not reach zero, and its output will remain LO.

At the end of each measurement interval, the output of Counter 3 goes HI. This HI clocks the output of Counter 1 into flip-flop U5222B. If the output of Counter 1 is HI (resistance is 10 Ω or less), the flip-flop sets and the tone sounds. If the output of the counter is LO (resistance is greater than 10 Ω) the flip-flop resets and the tone does not sound.

STATUS REGISTER. The microprocessor reads the Status Register whenever the register's address is decoded by U5241 during a read operation. The register contains the least-significant bits of the 10-MHz counter (U5274A), the output of the Register Control's shift register (U5240), and the state of the Tone Control flip-flop.

Extended Front Panel

The Extended Front Panel circuitry (see Diagram 31) contains the Continuity Indicator, I/O Decoders, Extended Front Panel Switches, and the Switch Column Buffer.

CONTINUITY INDICATOR. The Continuity Indicator is a speaker driven by the Tone Control circuitry during Continuity measurements.

I/O DECODERS. The I/O Decoders decode addresses from the microprocessor, generating strobes for the Buffer Board ROM ($\overline{\text{ROMEN}}$ at U4310B, pin 11) and the Extended Front Panel Switches (U4310A and U4310B, pin 12). Decoder outputs are buffered by U4300.

EXTENDED FRONT PANEL SWITCHES. The Extended Front Panel Switches are pushed to select the desired DMM operating mode.

The switches are arranged in three rows and five columns. When the microprocessor wants to see if a switch has been pushed, it consecutively reads each row of switches. The row of switches being read is pulled LO by U4310A when the row's address is decoded. If the row being read has a switch pushed in, the column the switch is in is LO. Each read of a switch row returns the state of all five switch columns.

SWITCH COLUMN BUFFER. The Switch Column Buffer buffers the five switch columns, driving the data bus with switch column data whenever the switches are read.

Power Distribution

The Power Distribution circuitry (see Diagram 32) contains the floating power supplies used by the DMM circuitry and distributes both the floating supplies and the standard instrument's 5-V supply to the DMM circuitry.

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Fan Circuit

The fan motor used in this instrument is a brushless, dc motor that uses Hall-effect devices to control its rotation speed. The two Hall-effect devices sequentially drive the four field-control transistors (U1690A, B, C, and D) which in turn control field current to the fan motor windings. The fan's speed is determined by the amount of drive current supplied by Q1698 and varies with ambient temperature.

As the ambient temperature in the cabinet increases, the resistance of RT1696 decreases, and additional base drive is provided to Q1698. The transistor conducts harder, and the fan's motor speed is increased to provide more cooling capacity.

The back EMF produced by the motor field windings is also proportional to motor speed. This current opposes the normal bias current of the transistor and acts as a form of negative feedback to stabilize the motor speed from cycle to cycle.

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PERFORMANCE CHECK AND ADJUSTMENT PROCEDURES

INTRODUCTION

This section contains the Option 01 (DMM) portion of the instrument performance check and calibration procedures. The "Performance Check Procedure" is used to verify that the instrument meets the "Performance Requirements" listed in Table 4-1. The "Adjustment Procedure" is used to restore optimum performance or return the option to conformance with its "Performance Requirements" as listed in Table 4-1.

Instrument performance should be checked after every 2000 hours of operation or once each year if used infrequently. A more frequent interval may be necessary if the instrument is subjected to harsh environments or severe usage. The results of these periodic checks will determine the need for recalibration.

Before performing these procedures, ensure that the LINE VOLTAGE SELECTOR switch is set for the ac power source being used (see Section 2 of the standard instrument Service manual). Connect the instrument to be checked and the test equipment to an appropriate power source.

LIMITS AND TOLERANCES

The tolerances given in this procedure are valid for an instrument that has been previously calibrated in an ambient temperature between +20 °C and +30 °C and is operating in an ambient temperature between −15°C and +55°C. The instrument must also have had at least a 45-minute warm-up period. To assure instrument performance, perform all steps in the following procedures at the same ambient temperature. When performing these checks, it is assumed that the standard instrument meets all of its "Performance Requirements" as stated in Section 1 of the standard instrument Service manual.

TEST EQUIPMENT

All the test equipment items listed in Table 4-15 are required to accomplish both the "Performance Check Procedure" and the "Calibration Procedure". To assure accurate measurements, it is important that the test equipment used to calibrate the option meets or exceeds the specifications described in the table. When considering use of equipment other than that recommended, use the "Minimum Specification" column to determine whether available test equipment will be adequate.

The procedures in this section are written using the equipment listed in Table 4-15. When substitute equipment is used, control settings stated in the test setup and in the procedures may need to be altered.

Detailed operating instructions for the test equipment are not given in this procedure. If more operating information is needed, refer to the appropriate test-equipment instruction manual.

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Table 4-15
Test Equipment Required

Item and Description	Minimum Specification	Examples of Suitable Test Equipment
1. Calibrator	Dc voltage: 180 mV to 450 V. Voltage accuracy: 0.0075%. Resistance accuracy: 0.025%. Dc current: 10 μA to 900 mA. Current accuracy: 0.03%. Ac current: 10 μA to 900 mA. Current accuracy: 0.01%.	Fluke 5101B with Option 03.
2. Ac Calibration System	Ac voltage: 20 mV to 450 V. Voltage accuracy: 0.2%. Frequency: 50 Hz to 50 kHz.	Fluke 5101B and 5205A.
3. Cable	Impedance: 50 Ω.	Tektronix Part No. 012-0057-01.
4. Adaptor (2 required)	BNC-Female-to-Dual Banana.	Tektronix Part No. 103-0090-00.
5. Adaptor	Connectors: BNC-Male-to-Dual Binding Post.	Tektronix Part No. 103-0035-00.
6. Adaptor	BNC-Female-to-BNC-Female.	Tektronix Part No. 103-0028-00.
7. Patch Cord	Banana-Plug-to-Banana Plug.	Tektronix Part No. 012-0039-00.
8. Resistor	1 kΩ ¼ W.	

PERFORMANCE CHECK PROCEDURE

This procedure is used to verify proper operation of the option and may be used to determine the need for adjustment. This check may also be used as an acceptance test and as a preliminary troubleshooting aid. Perform all steps, both in the sequence presented and in their entirety, to ensure that control settings are correct for the following step.

PREPARATION

Removing the wrap-around cover is not necessary to perform this procedure. All checks are made using operator-accessible controls and connectors.

Turn on the instrument and ensure that no error message is displayed on the CRT. If the instrument displays **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"** at power on, one of the power-up tests has failed. If the error message on the bottom line of the CRT is **"TEST 04 FAIL XX"** where XX is X1, 1X, or 11, the stored calibration data is in error and the instrument should be recalibrated by a qualified service technician before performing the "Performance Check Procedure." If any other error messages occur, the failure is probably not related to calibration and the instrument should be repaired by a qualified service technician before performing either procedure.

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DMM OPTION CHECKS

1. Check Dc Volts Accuracy

a. Connect the calibrator via a BNC-female-to-dual banana adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Select the DC V function.

c. CHECK—Reading is within the limits shown in Table 4-16 for each dc calibrator output voltage.

Table 4-16
Dc Voltage Readout Checks

Calibrator Dc Voltage (V)	Display Readout Limits (V)
180 m	179.93 m to 180.07 m
−180 m	−179.93 m to −180.07 m
1.8	1.7993 to 1.8007
−1.8	−1.7993 to −1.8007
18	17.993 to 18.007
−18	−17.993 to −18.007
180	179.93 to 180.07
−180	−179.93 to −180.07
450	449.7 to 450.3
−450	−449.7 to −450.3

2. Check Ac Volts Accuracy

a. Select the AC V function.

b. CHECK—Reading is within the limits shown in Table 4-17 for each ac calibrator output voltage.

c. Disconnect the test equipment from the instrument.

Table 4-17
Ac Voltage Readout Checks

Calibrator Ac Voltage (V)	Frequency (Hz)	Display Readout Limits (V)
20 m	50	19.68 m to 20.32 m
180 m	50	178.72 m to 181.28 m
	10 k	178.72 m to 181.28 m
0.2	50	0.1968 to 0.2032
1.8	50	1.7872 to 1.8128
	10 k	1.7872 to 1.8128
2	50	1.968 to 2.003
18	50	17.872 to 18.128
	10 k	17.872 to 18.128
	20 k	17.800 to 18.200
	50 k	17.080 to 18.920
20	50	19.68 to 20.32
180	50	178.72 to 181.28
450	50	446.3 to 453.7

WARNING

Use extreme caution when performing the following ac voltage checks. Make sure that the signal connectors are correctly oriented so that ac voltage is not present on any exposed metal pieces.

d. Connect the ac power amplifier via a BNC-male-to-dual binding post adaptor, a BNC-female-to-BNC female adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

e. CHECK—Reading is within the limits shown in Table 4-18 for each ac calibrator output voltage.

f. Disconnect the test equipment from the instrument.

3. Check Resistance Accuracy

a. Connect the calibrator via a BNC-female-to-dual banana adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

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b. Select the LO Ω function.

c. CHECK—Reading is within the limits shown in Table 4-19 for each calibrator output resistance.

d. Select the HI Ω function.

e. CHECK—Reading is within the limits shown in Table 4-20 for each calibrator output resistance.

Table 4-18
Ac Voltage Readout Checks

Calibrator Ac Voltage (V)	Frequency (Hz)	Display Readout Limits (V)
180	10 k	178.72 to 181.28
	20 k	178.00 to 182.00
	50 k	170.80 to 189.20
450	10 k	446.3 to 453.7
	20 k	444.5 to 455.5

Table 4-19
LO Ω Readout Checks

Calibrator Resistance (Ω)	Display Readout Limits (Ω)
100	99.70 to 100.30
1 k	0.9988 k to 1.0012 k
10 k	9.988 k to 10.012 k
100 k	99.88 k to 100.12 k
1 M	0.9973 M to 1.0027 M

Table 4-20
HI ΩReadout Checks

Calibrator Resistance (Ω)	Display Readout Limits (Ω)
2 k	1.9978 k to 2.002 k
10 k	9.988 k to 10.012 k
100 k	99.88 k to 100.12 k
1 M	.9973 M to 1.0027 M
10 M	9.948 M to 10.052 M

4. Check Continuity Function

a. Set the calibrator to produce a 1-Ω output resistance.

b. Select the CONT function.

c. CHECK—The instrument produces an audible tone.

5. Check Dc Current Accuracy

a. Select the DC A function.

b. CHECK—Reading is within the limits shown in Table 4-21 for each dc calibrator output current.

6. Check Ac Current Accuracy

a. Select the AC A function.

b. CHECK—Reading is within the limits shown in Table 4-22 for each ac calibrator output current.

c. Disconnect the test equipment from the instrument.

Table 4-21
Dc Current Readout Checks

Calibrator Dc Current (A)	Display Readout Limits (A)
10 μ	9.97 μ to 10.03 μ
−10 μ	−9.97 μ to −10.03 μ
90 μ	89.89 μ to 90.11 μ
−90 μ	−89.89 μ to −90.11 μ
0.9 m	0.8989 m to 0.9011 m
−0.9 m	−0.8989 m to −0.9011 m
9 m	8.989 m to 9.011 m
−9 m	−8.989 m to −9.011 m
90 m	89.89 m to 90.11 m
−90 m	−89.89 m to −90.11 m
0.9	0.8989 m to 0.9011 m
−0.9	−0.8989 m to −0.9011 m

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Table 4-22
Ac Current Readout Checks

Calibrator Ac Current (A)	Frequency (Hz)	Display Readout Limits (A)
10 μ	50	9.84 μ to 10.16 μ
	1 k	9.84 μ to 10.16 μ
	5 k	9.84 μ to 10.16 μ
90 μ	50	89.36 μ to 90.64 μ
0.9 m	50	0.8936 m to 0.9064 m
9 m	50	8.936 m to 9.064 m
90 m	50	89.36 m to 90.64 m
900 m	50	893.6 m to 906.4 m

7. Check Normal and Common Mode Rejection Ratios

Connect the calibrator via a BNC-female-to-dual banana adaptor, a 50-Ω cable, and a BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Select the DC V function.

c. Set the calibrator to produce a 60-Hz, 1.0-V output.

d. CHECK—Reading is between −1.0000 mV and +1.0000 mV.

e. Disconnect the test equipment from the instrument.

f. Connect the test setup as shown in Figure 4-5.

g. Set the calibrator to produce a 10-V dc output.

h. CHECK—Reading is between −0.1000 mV and +0.1000 mV.

i. Set the calibrator to produce a 60-Hz, 10-V output.

j. CHECK—Reading is between −10.000 mV and +10.000 mV.

k. Select the AC V function.

l. Set the calibrator to produce a 60-Hz, 10.0-V output.

m. CHECK—Reading is less than 10.000 mV.

n. Disconnect the test equipment from the instrument.

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ADJUSTMENT PROCEDURE

INTRODUCTION

The "Adjustment Procedure" is used to restore optimum performance or to return the option to conformance with its "Performance Requirements" as listed in Table 4-1.

Calibration constants are generated for each of the functional ranges by the system microprocessor and are stored in nonvolatile memory. Although this procedure is designed to calibrate all DMM functions, an individual calibration routine may be performed separately if only one function is suspected of being out of calibration. For example, DM CAL 74 may be run alone if the LO Ω function is suspected of being out of calibration. See Table 4-23 for a listing of the calibration routines and the associated function that is calibrated.

PREPARATION

Remove the wrap-around cabinet from the instrument as described in the "Maintenance" section of the standard instrument Service manual. Then set the CAL/NO CAL jumper (P501) in the standard instrument to the CAL position (between pins 1 and 2).

Adjustment of the instrument must be done at an ambient temperature between +20 °C and +30 °C, and the instrument must have had a warm-up period of at least 45 minutes. Performing this procedure while the temperature is drifting may cause wrong calibration settings.

Table 4-23
Calibration Routines

Calibration Routine	Ranges Calibrated
DM CAL 71	DC V
DM CAL 72	AC V
DM CAL 73	HI Ω
DM CAL 74	LO Ω
DM CAL 75	DC A
DM CAL 76	AC A
DM CAL 77	DC V input impedance selection

DMM ADJUSTMENT

a. Connect the calibrator via a BNC-female-to-dual banana adaptor, a 50-Ω cable, and another BNC-female-to-dual banana adaptor to the HIGH and LOW DMM input connectors.

b. Press the Trigger SLOPE button while holding in both the ΔV and Δt buttons to access the Diagnostic Menu. The readout will display "**DIAGNSTIC. PUSH A/B TRIG TO EXIT**".

NOTE

If the calibration feature is disabled (the CAL/NO CAL jumper is in the NO CAL position), CAL messages will not appear in the Diagnostic Menu of the CRT readout.

c. Press the lower Trigger MODE button until the "**BU CAL F1**" message appears in the lower left corner of the CRT.

d. Press the upper Trigger COUPLING button.

e. After about 3 seconds, the "**DIAGNSTIC. PUSH A/B TO EXIT**" message should appear in the Diagnostic Menu of the CRT readout.

f. Press and hold the lower Trigger MODE button until the **DM CAL 71** message appears in the Diagnostic Menu of the CRT readout.

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g. Start the calibration routine by pressing the upper Trigger COUPLING button.

h. Set the calibrator to produce the signal called for in the Diagnostic Menu of the CRT readout.

i. Start the calibration constant calculation by pressing the upper Trigger COUPLING button. The top line of the CRT readout will display **"BUSY"**.

j. Wait for the microprocessor to finish calculating the calibration constant. When finished, the **"BUSY"** display is removed and the display is updated in preparation for the calculation of the next calibration constant.

NOTE

*If the calculation of the calibration constant fails, **"OUT OF LIMIT"** is displayed in the top line of the CRT readout and the display is updated in preparation for the calculation of the next calibration constant. This will happen if the applied signal is not within tolerance or if it is not applied soon enough. If desired, the calibration constant calculation may be reattempted by pressing the lower Trigger COUPLING button and then pressing the upper Trigger COUPLING button.*

k. Repeat steps h through j until **"COMPLETE"** is displayed in the bottom line of the CRT readout.

l. Press the upper Trigger COUPLING button to exit the current calibration routine.

m. Press the upper Trigger MODE button to select the next calibration routine.

n. Repeat steps d through j until **"DM CAL 77"** is displayed in the bottom line of the Diagnostic Menu.

o. Press the upper Trigger COUPLING button. One of the following messages will be displayed on the CRT readout:

"INPUT Z ON 0.2VDC 2VDC = 10MΩ"

"INPUT Z ON 0.2VDC 2VDC > 100GΩ"

p. If the desired input impedance is not displayed, press the upper Trigger COUPLING button. The desired impedance message should now be displayed.

q. Press the lower Trigger COUPLING button to store the selected impedance. The CRT readout will then display one of the following messages:

"INPUT Z IS NOT SELECTABLE"

"INPUT Z IS SELECTABLE"

NOTE

The ability to select the input impedance of the 0.2 V dc and 2 V dc ranges using DM EXER 72 is determined by this calibration setting.

r. If the desired input impedance selection is not displayed, press the upper Trigger COUPLING button. The desired input impedance selection message should now be displayed.

s. Press the lower Trigger COUPLING button to store the desired impedance selection.

NOTE

On instruments with the CTT installed (Option 06 or 09) the A/B TRIG button is labelled A/B MENU.

t. Press the A/B TRIG button to exit the Diagnostic Menu.

u. Disconnect the test equipment from the instrument.

v. Turn the instrument off and disconnect it from its ac power source.

w. Return the CAL/NO CAL jumper to its NO CAL position.

x. Reinstall the instrument cabinet using the reverse of the procedure outlined in the "Maintenance" section of this manual.

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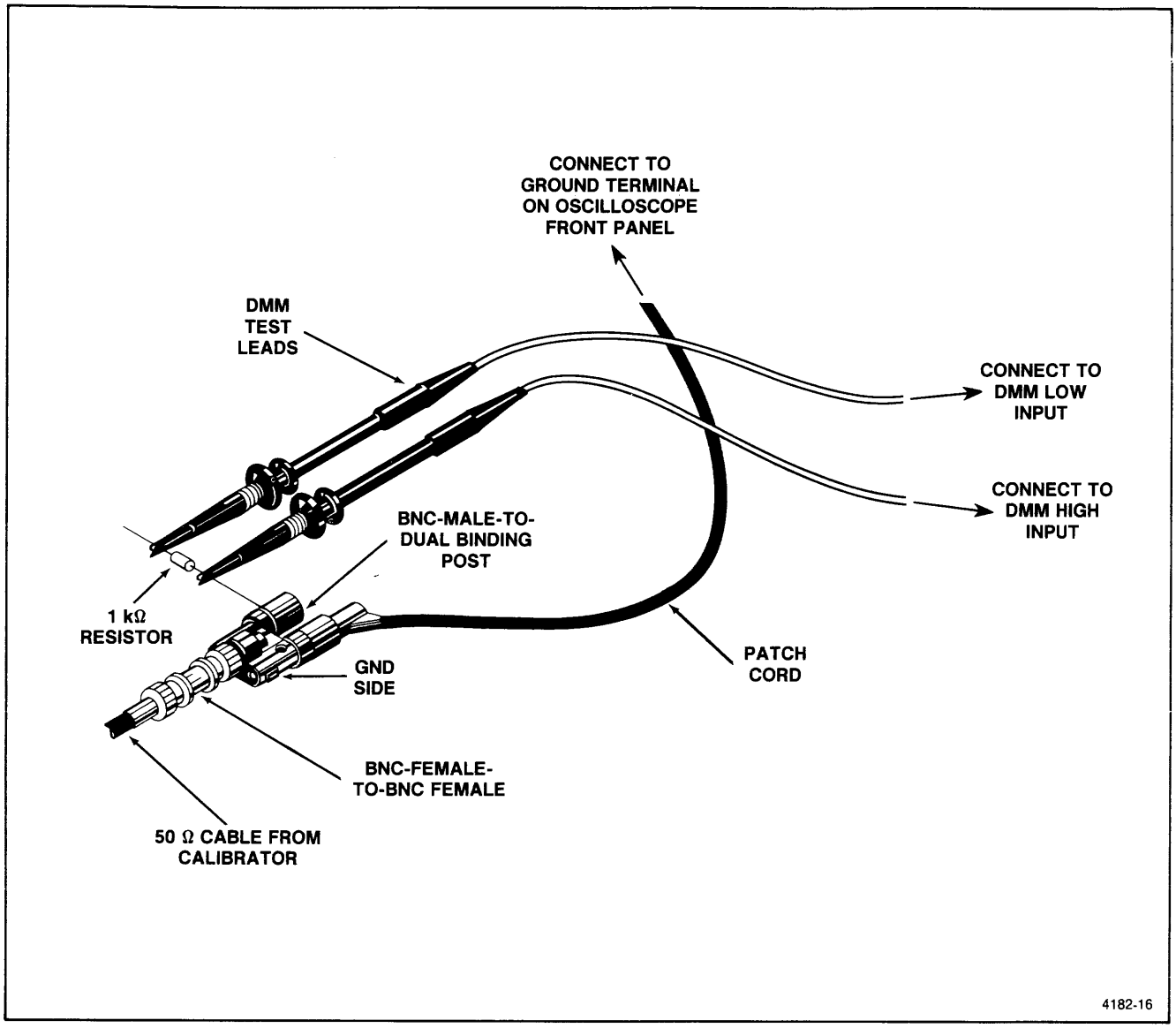


Figure 4-5. Test setup for DMM common mode check.

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Section 5

MAINTENANCE

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OPTIONS MAINTENANCE

This section contains information for troubleshooting the 24X5A/2467 Options. Maintenance information contained in the Service manual for the standard instrument still applies to maintenance of these options. To function properly, the option requires a working standard oscilloscope and Buffer board.

TROUBLESHOOTING

Preventive maintenance performed on a regular basis should reveal most potential problems before an instrument malfunctions. However, should troubleshooting be required, the following information is provided to facilitate location of a fault. In addition, the material presented in the "Theory of Operation" and "Diagrams" sections of this manual and the "Troubleshooting" portion of the "Maintenance" section in the standard instrument Service manual may be helpful while troubleshooting.

GENERAL TROUBLESHOOTING PROCEDURE

The information presented here is intended to complement the information contained in the "Troubleshooting" charts for the individual options. (These charts are among the "Diagrams" in Section 10.) Become familiar with the rest of the information in this section before proceeding with instrument troubleshooting. If the instrument will run the diagnostic routines as described in the "Diagnostic Routines" part of this section, use them to help localize the instrument problems.

Before troubleshooting the options, first make sure the standard instrument is functioning properly. In general, to check the standard instrument the option assembly must be removed; when troubleshooting the DMM, however, it is sufficient to verify that the instrument has a sweep and a properly functioning readout.

Next, verify the Buffer board: Disconnect all the option boards, remove the Buffer board from the option assembly, reconnect the Buffer board to the standard instrument, and run the Buffer board diagnostics. (To disconnect the DMM Option, it is sufficient to disconnect P4330 and P4241 and install zero-ohm jumper P4256.)

Finally, use the Buffer Test board to check the operation of each option one at a time. After all the options are working correctly, reassemble the instrument.

DIAGNOSTIC ROUTINES

Control of Diagnostic routines and their display format is the same as for the standard instrument.

Kernel Tests

The Kernel tests for the standard instrument include checks to determine if the Buffer board and any options are present. A ROM checksum test is performed on the Buffer board and each option ROM contained in the instrument.

A failure of a Kernel test is considered "fatal" to the operation of the microprocessor system. Kernel test failures will result in an attempt to flash the front-panel A SWP TRIG'D indicator and illuminate certain other front-panel indicators with an error code. The code points to the failure area as indicated in Table 5-1. Tables 5-2 and 5-3 are used to determine the option and device numbers used in Table 5-1.

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Table 5-1
Kernel Test Failure Codes

Failure Codes		
Option	Device	Failing Device
0	0	Control Board RAM U2496
0	1	Control Board ROM U2178
0	2	Control Board ROM U2378
0	3	Control Board ROM U2362
0	4	Control Board ROM U2162
1	1	GPIB Option ROM U4715
1	2	GPIB Option ROM U4710
1	4	GPIB Option RAM U4811
6	1	TV Option ROM U5565
7	1	DMM Option ROM U5280[a]
7	2	DMM Option ROM U5281[a]
8	1	CTT Option ROM U5930
F	1	Buffer Board ROM U4260

[a]When only one ROM is used, either device code indicates ROM U5281 is the failing device.

Even if a failure is reported, the A/B TRIG button (labeled A/B MENU when the CTT Option is installed) may be pressed (or the GPIB command NORM may be used) to try to resume normal instrument operation. However, because of the failure, operation of specific instrument functions is unpredictable.

Confidence Tests

Option-related Confidence tests, Exerciser routines, and their associated error codes are listed in Table 5-4. Except for the DMM, the Confidence tests are performed automatically at power-up if the Kernel tests are completed successfully. In the case of the DMM, only Confidence Test 76 is performed automatically; to run any of the others, the operator must disconnect the input leads and initiate the routine from the Diagnostics Monitor.

All the error codes are in hexadecimal. In the case of the CTT only, it is possible for any combination (through binary addition) of the listed error codes for a given test to occur.

To initiate these tests from the Diagnostics Monitor, the operator must:

1. Hold in both ΔV and Δt buttons and press the Trigger SLOPE button to enter the Diagnostic Menu. The readout will display **"DIAGNSTIC. PUSH A/B TRIG TO EXIT"**.

2. Press and hold the upper or lower Trigger MODE button to sequence through the TEST and EXER routine messages until the desired one appears at the lower left corner of the CRT.

3. Press the upper Trigger COUPLING button to start the test procedure.

4. Press the A/B TRIG button (or A/B MENU for the CTT Option) to exit the Diagnostic Menu and return to normal instrument operation.

If the Diagnostic Menu reports a failure, refer the instrument to a qualified service technician.

GPIB BOARD (GP TEST 11). This test checks the circuitry listed in Table 5-4 under GPIB Test 11.

The circuitry on the GPIB board is checked for proper operation, and error conditions are reported.

CALIBRATION CONSTANT TEST (CT TEST 81). Checks the CTT calibration constants to see if they are within set limits.

GATE ARRAY I/O PATH TEST (CT TEST 82). Checks the I/O paths into and out of the Gate Array. The tested circuitry includes Hardware Register 1 and the ECL-to-TTL level shifters and data buffers.

The Gate Array is written to six times; each time one data line is HI and the others are LO. After each write, the data is read back and checked.

COMPLEX COUNTER I/O PATH TEST (CT TEST 83). Checks the I/O paths to and from the Complex Counter. The test involves circuitry in the Gate Array, Complex Counter, and the CLK A-to-S1 and GATE A-to-G1 signal paths between the Gate Array and Complex Counter. The only IC not involved in earlier tests is U6140.

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Table 5-2
Front-Panel LED Option Codes

Option Code					
CH 1 TRIGGER SOURCE LED (bit 3)	CH 2 TRIGGER SOURCE LED (bit 2)	CH 3 TRIGGER SOURCE LED (bit 1)	CH 4 TRIGGER SOURCE LED (bit 0)	Option Number (in hex)	Option Name
OFF	OFF	OFF	OFF	0	Standard Instrument
OFF	OFF	OFF	ON	1	GPIB (Option 10)
OFF	ON	ON	OFF	6	TV (Option 05)
OFF	ON	ON	ON	7	DMM (Option 01)
ON	OFF	OFF	OFF	8	CTT (Option 06)
ON	OFF	OFF	OFF	8	WR (Option 09)
ON	ON	ON	ON	F	Buffer Board

Table 5-3
Front-Panel LED Device Codes

Device Codes			
Ready LED (bit 2)	+ SLOPE LED (bit 1)	− SLOPE LED (bit 0)	Device Number
OFF	OFF	OFF	0
OFF	OFF	ON	1
OFF	ON	OFF	2
OFF	ON	ON	3
ON	OFF	OFF	4
ON	OFF	ON	5
ON	ON	OFF	6
ON	ON	ON	7

Each data bit, starting with D0, is set HI and written to U6140. This data is read back in order while recording errors. The CLK A-to-S1 and the GATE A-to-G1 interfaces between U6180 and U6140 are then checked. Counters 1 and 2 of U6140 count CLK A and GATE A respectively. The Gate Array is initialized to cycle both GATE A and CLK A. Counters 1 and 2 of U6140 are then checked to see if they received the count.

GATE ARRAY TRIGGER PATH TEST (CT TEST 84). Checks the following signal paths: $\overline{\text{TSA}}$ to and from the Buffer board, $\overline{\text{TSB}}$ to and from the Buffer board, the three AHO paths to the Gate Array, the $\overline{\text{EXT}}$ inputs, and the $\overline{\text{A AUX TRG}}$ output. This test also checks to see if the AHO paths clear the $\overline{\text{A AUX TRG}}$ output between sweeps. Circuitry not involved in earlier tests includes U6070 and the circuitry in the $\overline{\text{TSA}}$ and $\overline{\text{TSB}}$ to U6180 signal paths.

This test is performed with the triggers set to fast compare. The trigger status inputs are manipulated by changing the A and B trigger levels. Both the A and B trigger status pass-through paths are checked in both the HI and LO states. With the trigger status inputs in ECL mode (status inputs to U6180), the $\overline{\text{ATS}}$ and $\overline{\text{BTS}}$ inputs, the $\overline{\text{EXT}}$ input, and the $\overline{\text{A AUX TRG}}$ output are checked with the CTT in LOGIC AND, LOGIC OR, and simulated external trigger modes. Then each AHO path is checked to see if it clears $\overline{\text{A AUX TRG}}$ between sweeps.

COUNTERS, PHASE LOCKED LOOP, AND OSCILLATOR TEST (CT TEST 85). Checks the time base by comparing the count in two of the counters after about 20 ms. One counter is counting the 131 MHz Phase Locked Loop clock; the other counter counts the 2.62 MHz clock. The count in the 131 MHz counter should contain 50 times the count contained in the 2.62 MHz counter. The count in the 2.62 MHz counter must be within 1000 parts per million of the correct value, referenced to the 6802 clock.

DELAY-BY-EVENTS CIRCUITRY TEST (CT TEST 86). Checks the Delay-By-Events circuitry, BHO input, $\overline{\text{B AUX TRG}}$ output, the HO output of the complex counter, and the $\overline{\text{TC}}$ input to the Gate Array.

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Table 5-4
Diagnostic and Exerciser Routines

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
GPIB Board Test	11	RAM	01	Error in RAM or associated circuitry.
		GPIB Controller	02	Malfunction of U4818, decoder U7408, or buffer U4701.
		Power Latch	03	Failure in latch U4801, gate U4735D, Q4745, or buffer U4701.
		Output Latches	04	Malfunction of latch U4625, gate U4731, buffer U4701, a GPIB STATUS indicator, or latch U4626.
		Wait State	05	Malfunction of U4831B, Generator U4735A, U4801, U4838A.
TV Board Tests	none			
CTT and WR	81	Calibration constant test	01	Delay Offset constant Board Tests out of limit. Recalibrate the CTT.
			02	Clock Frequency constant out of limit. Recalibrate the CTT.
	82	Gate Array (U6180)	01	Gate Array bit 0 I/O path test. Read/Write error. Check U6180, R6162, U6290C, U6250, and U5950.
			02	Gate Array bit 1 Read/Write error. Check U5952, U6180, U6290A, U6250, U5950, and R6160.
			04	Gate Array bit 2 Read/Write error. Check U5952, U6180, U6290B, U6250, U5950, and R6176.
			08	Gate Array bit 3 Read/Write error. Check U5952, U6180, U6290C, U6250, U5950, and R6260.
			10	Gate Array bit 4 Read/Write error. Check U5952, U6180, U6290A, U6250, U5950, and R6261.
			20	Gate Array bit 5 Read/Write error. Check U5952, U6180, U6290B, U6250, U5950, and R6161.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
CTT and WR (cont)	83	Complex Counter (U6140) I/0 path test.	08	Complex counter bit 0 Read/Write error. Check U6140, and for U5930 pin 22 stuck LO.
			09	Complex counter bit 1 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0B	Complex counter bit 2 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0C	Complex counter bit 3 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0D	Complex counter bit 4 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0E	Complex counter bit 5 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			0F	Complex counter bit 6 Read/Write error. Check U6140, U5950, and for U5930 pin 22 stuck LO.
			10	CLK A path error. Check U6140, U6180, Q6290, Q6291, and U5950.
			20	GATE A path error. Check U6140, U6180, Q6273, Q6271, and U5950.
	84	Gate Array (U6180) trigger path tests.	0C	Boolean OR trigger failed to generate a sweep on the rising edge of ATS. Check U6180, Q5981, Q5982, Q5983, Q6090, Q6092, Q6091, U5952, and U6070.
			0D	Boolean OR trigger generated multiple sweeps on rising edge of ATS. Check U6180, U6070, HO, and MT.
			0E	Boolean OR trigger generated sweep on falling edge of ATS. Check R5981 and look for glitch on ATS.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
CTT and WR (cont)			10	Boolean OR trigger failed to generate a sweep on rising edge of BTS. Check BTS into U6180.
			14	Boolean AND trigger failed. There were no sweeps but one was expected. Check U6180, and HO into U6180.
			15	Boolean AND trigger generated multiple sweeps. Check HO into U6180.
			16	Sweep occurred on rising edge of EXT when driven from ATS. Check for a glitch on EXT into U6180.
			17	Multiple sweeps occurred on rising edge of EXT when driven from ATS. Check HO into U6180 and look for a glitch on EXT into U6180.
			18	Expected sweep did not occur on EXT when driven from ATS. Check both HO and EXT into U6180.
			19	Multiple sweeps occurred, only one was expected, when EXT was driven from ATS. Check HO into U6180.
			40	Either the ATS to TSA or the BTS to TSB signal path is bad. Check the trigger status from and to the Main board, Q5981, Q5980, U5990A, Q5983, Q6093, U5990D, and U5952.
	85	Counters, Phase Locked Loop, and Oscillator test.	01	Top byte of 131 MHz counter too low. Check U6180 pin 40.
			02	Top byte of 2.65 MHz counter too low. Check Q5920, Q5921, U6140 pin 4, and U6140.
			04	Phase Locked Loop not locked. Check Phase Locked Loop.
			08	Wrong oscillator frequency. Check Y5910 and associated circuitry.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
CTT and WR (cont)	86	Delay-By-Events circuitry test.	01	In Trigger After Delay mode with the delay time set shorter than the delay, a sweep was produced. Check B AUX TRIG and HO at U6180.
			02	In Trigger After Delay mode with the delay time set longer than the delay, there was no sweep. Check B AUX TRG and HO at U6180 and output O1 at U6140.
			04	BHO path into Gate Array stuck low.
			08	Forced HO (U6140 pin 40) doesn't work. Check U6140 pin 40 and associated circuitry.
			10	Complex counter (U6140) reset sequence fails.
			20	AHO turn off too slow. Check R5962.
	87	Delta Time measurement test.	01	BSG to Gate Array bad.
			02	DS to Gate Array bad.
			04	Delay difference is bad. Check the stability of the 131.0669-MHz clock.
			08	Counter C contains a bad count.
			10	Counter B contains a bad count. Check CLKB path between U6180 and U6140.
			18	Counter A contains a bad count. Failure should be caught by earlier tests.
			20	Clock C or ASG path bad.
			40	Clock B path bad.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Tests	71	Digital	01	Malfunction of timer U5272 or associated microprocessor signals.
			02	Malfunction of timer U5272, flip-flop U5222, decoder U5241, or Status Register U5260.
			03	Malfunction of timer U5272 or flip-flop U5222.
			04	Malfunction of timer U5272, dividers U5273 and U5274, or the B10MHZ signal.
			05	Malfunction of timer U5272, transistor Q5230, gate U5271, counter U5274, or inverter U5252.
			06	Malfunction of shift register U5240, counter U5224, gate U5252E, or Status Register U5260.
			07	Malfunction of timer U5272.
			08	Malfunction of the Delay Generator, decoder U5241, or timer U5272.
	72	V/F Converter	01	Malfunction of floating power supplies, fuse F5220, or V/F Converter, with 0 V input.
			02	Malfunction of V/F Input Multiplexer, Voltage-to-Current Converter, or Current Source, with −2 V input.
			03	Malfunction of V/F Input Multiplexer, Voltage-to-Current Converter, or Current Source, with +5 V input.
			04	Frequency change between 0 V and + 5 V is low, but is OK between 0 V and −2 V. Malfunction of multiplexer U5020 or shift register U5120.
			05	Frequency change between −2 V, 0 V, and +5 V is very low. Malfunction of multiplexer U5020 or shift registers U5122, U5120, or U4940.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Test (cont)			06	Malfunction of precision reference U5050 or the Voltage-to-Current Converter.
			07	Frequency of V/F Converter is offset. Check frequency at U4920B pin 4 and zeners VR5020 and VR5031.
	73	DC Volts	01	Malfunction of the DC Volts Buffer.
			02	The 0 V reference through the DC Volts Buffer at X1 gain is incorrect, but ÷ 10 gain is OK.
			03	Previous reference measurements failed, but measurements from the input passed. Check the reference at FET Q5070A.
			04	Previous measurements failed. Output of the DC Volts Buffer is offset. Check amplifier U4970, FET switch U4950D, FET switch U4950C, amplifier U5060A, FET Q5070A, and FET Q5070B.
			05	The ÷ 10 output of the DC Volts Buffer is offset.
			06	The 0 V reference through the DC Volts Buffer X10 is offset.
			07	Voltage on input of DC Volts Buffer causing an offset. Check voltage to ground at R5080, and check resistance to ground at R5080.
			09	Malfunction of FET Q5070A, FET switch U4942B, or FET switch U4942A.
			0A	The −0.2 V reference through the DC Volts Buffer at X10 gain is incorrect, but the −2 V X1 gain is OK. Check resistor R5064 and FET switches U4942A, U4942B, U4950C, and U4950C.
			0B	The −2 V reference through the DC Volts Buffer at X1 gain is incorrect, but −0.2 V X10 gain is OK. Check resistor R5064 and FET switches U4942A, U4942B, U4950C, and U4950C.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Test (cont)	74	AMPS/OHMS	01	Measurement time-out. Unable to obtain a reading.
			02	Measured too high using test setup A. Malfunction of Ohms Current Source, 10MΩ resistor chain, relay K4980, FET switches U4942 and U4950, or operational amplifiers U5040 and U4960.
			03	Measurements using test setups A and B were not equal. Malfunction of FET switch U4950 or shift register U5120.
			04	Measurement using test setup C failed. Malfunction of relay K5191, resistor R5181, or resistor R5177. This will also cause DM TEST 75 to fail with error code 02.
			05	Measured too low using test setup A. Malfunction of Ohms Current Source, relay K5090, relay K5091, or the front panel fuse or the connections to it.
			06	Measurements using test setup D failed. Malfunction of fuse F4990, relay K4980, or FETs Q4972, Q4973, or Q4980.
			07	Measurement using test setup D with 0.1 mA failed. Malfunction of shift register U4940, or FETs Q4970 or Q4971.
			08	Measurement using test setup D with 1 mA failed. Malfunction of FET Q4971 or FET switch U4942C.
	75	AC Volts	01	Measurement time-out.
			02	Malfunction of the AC Volts Buffer or the V/F Input Multiplexer.
	76	Power-up	01	Malfunction of DMM, or if this is the only failure, V/F Input Multiplexer U5020 input pin 2.
			02	Malfunction of decoder U4310, buffer U4300, or cable W4330 to Buffer board.
			03	Malfunction of resistor R4320, buffer U4320, or cable W4330 to Buffer board.

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Table 5-4 (cont)

Routine Type	Test Number	Routine Name	Error Code	Error Code Meaning
DMM Board Test (cont)			04	Malfunction of front panel switch S4302, S4306, S4309, or S4318.
			05	Malfunction of front panel switch S4304, S4308, S4312, S4314, or S4316.
			06	Malfunction of front panel switch S4303, S4307, S4310, or S4317.
Buffer Exerciser	F1	Option Identification	None	
Buffer Exerciser	F2	Page Selection	None	
Exerciser	02	Calibration RAM Examine	None	
GPIB Exerciser	11	Address Selection	None	
GPIB Exerciser	12	Terminator and Talk/Listen Mode Selection	None	
GPIB Exerciser	13	Receive-Setups Mode	None	
GPIB Exerciser	14	Send-Setups Mode	None	
TV Exerciser	61	Line 1 Format Selection	None	
TV Exerciser	62	TV Protocol Selection	None	
TV Exerciser	63	TV Sync Selection	None	
Word Recognizer Exerciser	81	Word Recognizer Probe Exerciser	None	
DMM Exerciser	71	Extended Front Panel Switches	None	
DMM Exerciser	72	Tone and Input Impedance	None	

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the B-Sweep Triggerable-After-Delay mode with the B Delay set at half sweep. The delay-by-events time is set shorter than the B Delay; a Delay Sweep should not occur. The time is then set longer than the B Delay; a Delayed Sweep should occur. Checks are also made to see that Delay-By-Events mode resets and that $\overline{\text{B AUX TRG}}$ clears between sweeps. During one sweep, auto holdoff is exerted; a Delay Sweep should not occur. In a Delay-By-Events test, holdoff turn off time is checked.

DELTA TIME MEASUREMENT TEST (CT TEST 87). Makes a one sample (two sweep) Delta Time measurement. Checks $\overline{\text{ASG}}$, $\overline{\text{BSG}}$, $\overline{\text{DS}}$, and the three counters in the Gate Array and Complex Counter.

The sweeps are triggered by grounding the A-Trigger input and then changing the A-Trigger level. Each time the 3.3-ms interrupt occurs, the levels are changed. The reference delay is set to 800 ns ($\approx$ 105 clocks) and the delta delay is set to 400 ns ($\approx$ 52 clocks). When the sample is taken, the difference between the two counters must be within two counts of 52.

DIGITAL (DM TEST 71). The circuitry in the digital half of the DMM board is checked. Failure of analog tests that follow do not affect this test. A failure of this test will probably cause all other tests to fail.

V/F CONVERTER (DM TEST 72). This test checks the voltage-to-frequency conversion circuitry. A failure of this test will cause all tests that follow to fail.

DC VOLTS (DM TEST 73). DMM Test 73 checks the offsets and gain of the DC Volts Buffer.

Zero volts is first applied to the input of the buffer from the reference and then from the input (see Figure 5-1). Each time, the buffer's gain is changed from X1 to $\div$10 to X10 and the results compared to 0.0 V into multiplexer U5020. Then the $-$2 V reference is applied to the input of the buffer with X1 gain and compared to $-$2 V through the multiplexer. Finally, the $-$0.2 V reference is applied to the input of the buffer with X10 gain and compared to $-$2 V through the multiplexer.

AMPS/OHMS (DM TEST 74). This test checks the input relays, the Ohms Current Source, and the Amps range selection circuitry. The input leads must be disconnected for the test to pass.

The test setups used during this test are shown in Figure 5-2. Every setup results in 1 V on the output of the DC Volts Buffer; a voltage other than 0.0 V or 1 V is a failure.

AC VOLTS (DM TEST 75). This Confidence test checks the ac signal path between FET switch U5150A and multiplexer U5020. The input leads must be disconnected for the test to pass.

Software generates a 1-V ac signal to pin 2 of FET switch U5150 by switching 0.1 mA from the Ohms Current Source on and off (see Figure 5-3). The 0.1 mA is sent through FET Q4970 into the 1 kΩ of R4960 and R4975. This produces a 0.1-V square wave that the AC Volts Buffer multiplies by 10 to a 1-V square wave. The RMS Converter converts this to 0.5 V dc (1-V square wave = 0.5 V rms). Then, a measurement is made before RMS Converter U5140 has a chance to decay. This measurement is compared with a measurement identical to the measurement made during the AMPS/OHMS Test divided by two.

POWER-UP (DM TEST 76). This test makes a quick check of the circuitry on the DMM board and the Extended Front Panel. The input leads may be connected for this test.

Exerciser Routines

Operation of Exerciser routines is the same as for the standard instrument. The Exerciser routines allow the operator to set and examine various bytes of control data used in determining option function.

OPTION IDENTIFICATION (BU EXER F1). This routine displays across the top line of the CRT readout, the option designator for all installed options. Option designators are listed in Table 5-5.

Table 5-5
Option Designators

Option	Option Designator
Buffer Board	BU
GPIB	GP
TV	TV
DMM	DM
Counter/Timer/Trigger	CT

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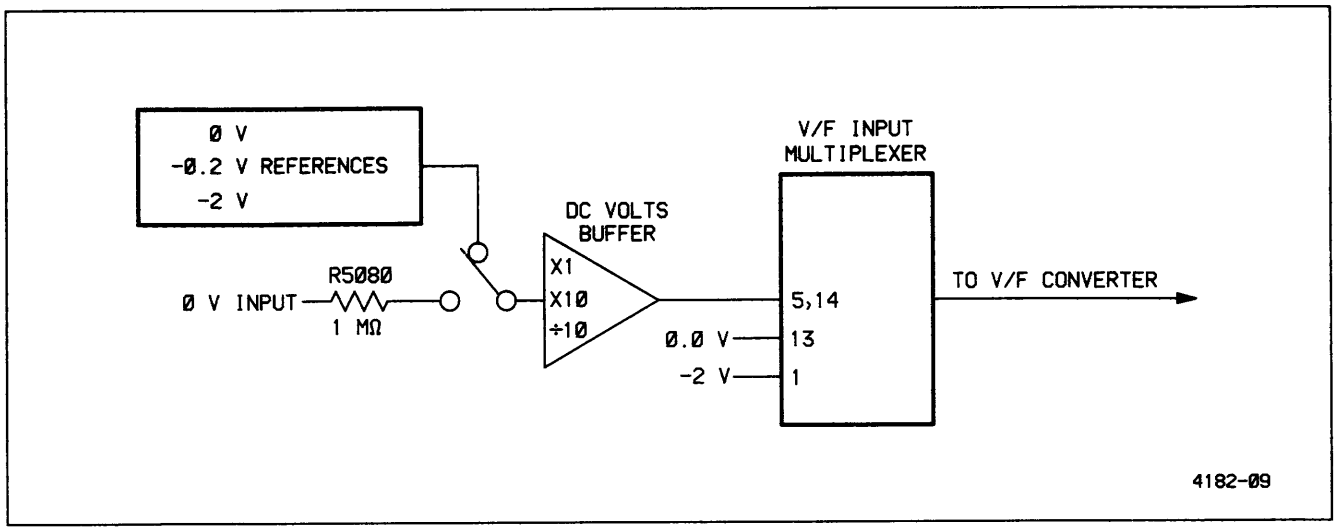


Figure 5-1. DC Volts test setup.

PAGE SELECTION (BU EXER F2). This routine continuously selects and deselects each of the option page registers.

CALIBRATION RAM EXAMINE (EXER 02). This is the standard instrument Calibration RAM Examine routine.

ADDRESS SELECTION (GP EXER 11). Used to select the instrument's GPIB address. For an explanation of its use, refer to the "Preparation" portion of the "Performance Check Procedure" in the GPIB Section of this manual.

TERMINATOR AND TALK/LISTEN MODE SELECTION (GP EXER 12). Used to select both the instrument's end-of-message terminator and the Talk/Listen mode of the instrument's GPIB interface. For an explanation of its use, refer to the "Preparation" portion of the "Performance Check Procedure" in the GPIB Section of this manual.

SEND-SETUPS MODE (GP EXER 14). Used to transfer SAVE/RECALL stored setups from instrument to instrument via the GPIB.

TV PROTOCOL SELECTION (TV EXER 61). This routine allows the starting position of Line 1 to be selected. The starting position may be either three lines prior to the field sync pulse (system-M) or coincident with the field sync pulse (nonsystem-M). Selecting the incorrect system for a given TV protocol will not affect the ability to trigger on a given TV waveform, but it will cause the line number displayed to be inaccurate. For an explanation of its use, refer to the "TV Protocol and Line-Numbering Format Selection" portion of "Preparation for Use" in the TV Section of this manual.

TV LINE 1 FORMAT SELECTION (TV EXER 62). This routine allows the selection of the TV line numbering format. Line numbering can be selected to reset on each field or on field 1 only. For an explanation of its use, refer to the "TV Protocol and Line-Numbering Format Selection" portion of "Preparation for Use" in the TV Section of this manual.

TV SYNC SLOPE SELECT (TV EXER 63). Used to select the default condition of the instrument trigger slope when a TV mode (FLD 1, FLD 2, or LINES) is selected. For an explanation of its use, refer to the "Automatic Sync Selection" portion of "Preparation for Use" in the TV Section of this manual.

WORD RECOGNIZER EXERCISER (CT EXER 81). This routine continuously exercises the Word Recognizer Data line by repeatedly sending a HI followed by 39 LOs over the WDATA signal line, to the Word Recognizer probe.

EXTENDED FRONT PANEL SWITCHES (DM EXER 71). This routine displays, across the top line of the CRT readout, a one for each switch in the Extended Front Panel. When a DMM switch is pushed, the one representing the depressed switch is replaced by a zero and all other switches are represented by a one. For an explanation of its use, refer to "DMM Parameter Selection" in the "Preparation for Use" portion of the

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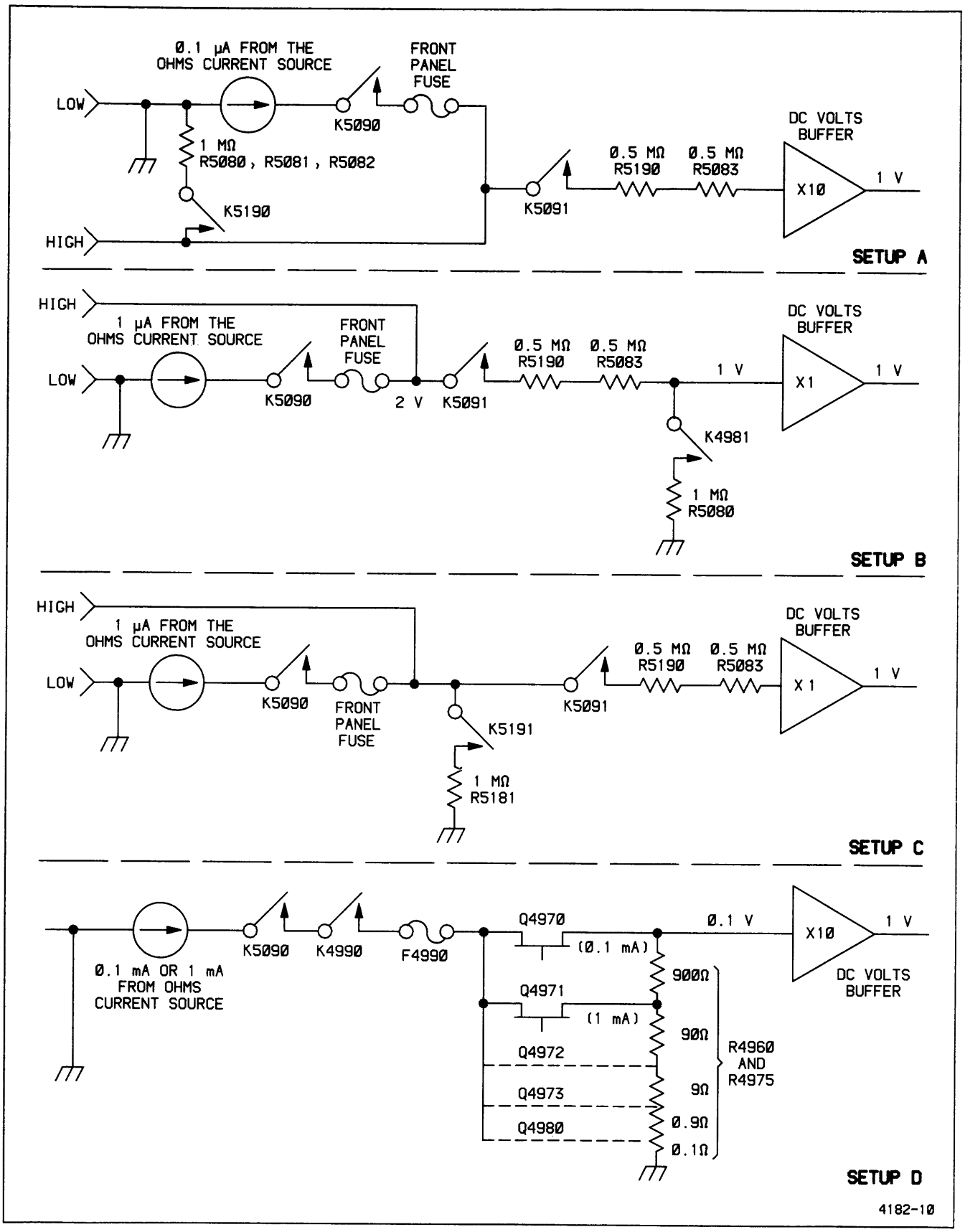


Figure 5-2. AMPS/OHMS test setups.

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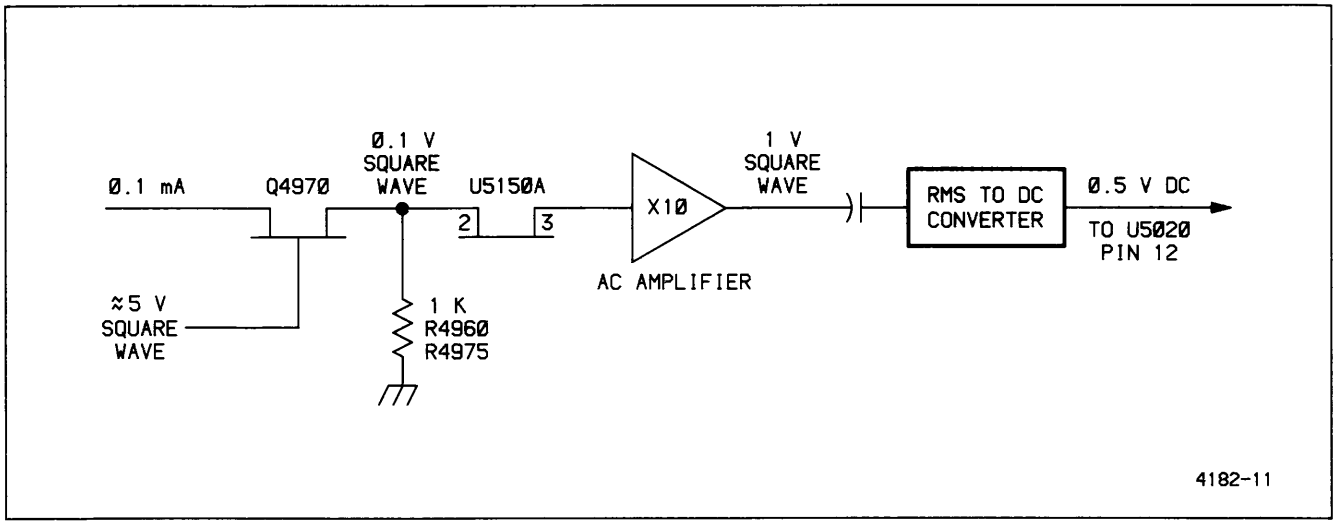


Figure 5-3. AC Volts test setup.

DMM Section of this manual. The following is the display when the ACV/ACA switch is pushed in or shorted:

111 10111 11 111

TONE AND INPUT IMPEDANCE (DM EXER 72). This routine changes the tone of the continuity indicator and changes the input impedance of the 0.2-Vdc and 2-Vdc ranges. For an explanation of it use, refer to "DMM Parameter Selection" in the "Preparation for Use" portion of the DMM Section of this manual.

BUFFER TEST KIT

Description

The Buffer Test Kit, which can be ordered from Tektronix, Inc. (Part Number 020-1500-00), makes it easier to troubleshoot the TV (Option 05), CTT and WR (Option 06/09), and GPIB (Option 10) boards. Table 5-6 lists the contents of the Buffer Test Kit.

Before troubleshooting the options, remove the option assembly and make sure the standard instrument and Buffer board are functioning properly. For detailed instructions on option assembly removal, refer to the "Removal and Replacement Instructions" under "Corrective Maintenance" in this manual.

Table 5-6
Buffer Test Kit (020-1500-00)

Item	Qty	Description	Part Number
1	1	Buffer Test Board	670-9882-00
2	1	20 Conductor Ribbon Cable	175-4544-00
3	2	2 X 20 Interconnect Pin Set	131-2238-00
4	1	Zero Ohm Jumper	131-0566-00
5	4	Zero Ohm Connector	131-0993-00

Instrument Troubleshooting Without Options

To troubleshoot the standard instrument after removing the option assembly, it may be necessary (depending on which options were included in the instrument) to perform one or both of the following steps in order to complete signal paths required for operation of the standard instrument circuitry.

NOTE

J101 and J102 are located on the Main board in the standard instrument.

1. If the instrument contained the TV or CTT Option, disconnect ribbon cable "C" from J102 on the Main board. Using the zero ohm connectors from the Buffer Test Kit, join pin 3 to pin 4 and pin 7 to pin 8 of J102.

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2. If the instrument contained the CTT Option, disconnect ribbon cable "E" from J101 on the Main board. Using the zero ohm connectors from the Buffer Test Kit, join pin 1 to pin 3 and pin 6 to pin 8 of J101.

Buffer Board Troubleshooting Without Options

To troubleshoot the Buffer board without options, the instrument must be configured as described in "Instrument Troubleshooting Without Options" and the Buffer board must be removed from the option assembly and installed in the instrument. For detailed instructions on Buffer board removal, refer to the "Removal and Replacement Instructions" under "Corrective Maintenance" in this manual.

NOTE

Jumper P4256 must be in place on the Buffer board whenever cable P4330 from the DMM Option (Option 01) is not connected. The jumper permits the Buffer board and all options except the DMM to work.

To prepare the Buffer board for troubleshooting:

1. Verify that P4256 is in place.

2. Connect the Control board cable (P4210) to the right side of the Buffer board, making sure it is correctly indexed.

3. Install the Buffer board in the instrument, making sure that P203 and P303 are correctly seated in their connectors.

Instrument Troubleshooting With Options

After verifying that the standard instrument and the Buffer board are functioning properly, troubleshoot the options one at a time.

NOTE

Refer to the CAUTION and WARNING statements under "Corrective Maintenance" before working on the DMM. Jumper P4256 must be installed on the Buffer board when cable P4330 from the DMM is disconnected. The jumper permits the Buffer board and all options except the DMM to work. The jumper also permits DMM diagnostics to run (except that DM TEST 76 will fail with an 02 error code). While the DMM diagnostics will run, the switches in the Extended Front Panel will not work and the DMM will not operate under the control of the switches in the Extended Front Panel. If the instrument also contains the GPIB Option, the DMM will operate under the control of GPIB commands.

Troubleshooting of the DMM board can be done with the board rotated out on its hinge. Troubleshooting of the other options requires use of the Buffer Test Kit.

NOTE

As shipped, the Buffer Test circuit board is configured to operate with 2445 and 2465 instruments only. For use with the 24X5A and 2467 instruments, the Buffer Test board must have these modifications:

a. Remove R4201.

b. Remove R4210 and replace it with the zero ohm jumper (131-0566-00) provided in the Buffer Test Kit.

To use the Buffer Test Kit:

1. Verify that the Buffer Test board has been modified for use with 24X5A/2467 instruments (see NOTE).

2. Remove the Buffer board from the instrument.

3. If troubleshooting the TV (Option 05) board, remove the zero ohm connectors from J102 on the instrument Main board and connect P102 (cable "C").

4. If troubleshooting the CTT and WR (Option 06/09) board, remove the zero ohm connectors from J101 and J102 on the instrument Main board and connect P101 (cable "E") and P102 (cable "C").

CAUTION

The next step requires the use of static-prevention techniques to avoid damaging the memory IC (U4260).

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5. Remove the memory IC (U4260) from the instrument Buffer board and install it in the Buffer Test board. (Use static prevention techniques and insure proper indexing.)

6. Connect the Control board cable (P4210) to the Buffer Test board.

7. Install the Buffer Test board in the instrument, making sure that P203 and P303 are correctly seated in their connectors.

8. To the left edge of the Buffer Test board, connect all of the cables "A" through "E" that were disconnected when the option assembly was removed.

9. Install the option board to be tested on the Buffer Test board, taking care to correctly align the pins and connectors.

10. If necessary, connect the cables for the GPIB port or the Word Recognizer probe.

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CORRECTIVE MAINTENANCE

Corrective maintenance for the options is the same as for the standard instrument unless stated otherwise in this section.

REMOVAL AND REPLACEMENT INSTRUCTIONS

The various option boards and the Buffer board may be removed for repair or replacement using the following procedures. Before beginning any procedure, read the information at the beginning of the "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual.

Option Assembly Removal

The following instructions describe how to remove the option assembly from a fully optioned instrument. For instruments with fewer options, some of the steps may not be necessary.

1. If the GPIB cable from the controller is connected to the instrument, disconnect it from the oscilloscope rear panel.

NOTE

The "Cabinet Removal" procedure and the "Vertical Bracket (Top-Cover Plate) Removal" procedure are at the beginning of "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual.

2. Perform the "Cabinet Removal" procedure as outlined in the standard instrument Service manual. If the instrument has the DMM Option, make these changes to the procedure:

   a. In step 5, remove six screws in the rear feet.

   b. In step 6, the top-center screw is about 2.5 inches from the top of the rear panel.

NOTE

The next five steps (steps 3 through 7) apply only to instruments that have the DMM Option.

WARNING

The input potential to the DMM is present on the five screws mounting the DMM board shields. To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

3. Disconnect the two-conductor cable (P5210) from the left rear corner of the DMM board.

4. Remove the two board-securing screws located at the left edge of the DMM board.

5. Lift and rotate the DMM board about its hinge on the right edge until its top is about level; support the extended edge of the board.

6. Disconnect the cable (P4330) at the front edge of the Vertical Bracket.

7. Disconnect the cable (P4241) at the center of the Vertical Bracket.

8. If the instrument has the TV Option (Option 05), disconnect cables "A" (P4228), "B" (P4230), and "C" (P4232) from the left edge of the Buffer board.

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9. If the instrument has the CTT Option (Option 06), disconnect cables "C" (P4232), "D" (P4234), and "E" (P4236) from the left edge of the Buffer board.

10. Perform steps 3 through 7 of the "Vertical Bracket (Top-Cover Plate) Removal" procedure as outlined in the standard instrument Service manual.

11. Lift the vertical bracket and the attached Buffer board and option assembly straight up about two inches.

12. If the instrument has the GPIB Option (Option 01), disconnect the LED cable (P4540) from the lower front of the GPIB board.

13. If the instrument has GPIB, disconnect the GPIB cable (P4800) from the left-rear of the GPIB board.

14. If the instrument has the Word Recognizer Option (Option 09), disconnect the Word Recognizer cable (P5990) and the Word RECOG OUT cable (P5991) from the upper rear of the CTT board.

15. Disconnect the Control board cable (P4210) from the right side of the Buffer board.

16. Lift the entire assembly clear of the instrument and place it top side down on a flat surface.

CAUTION

When securing the option assembly back into the main instrument, be sure that the connector cables are indexed correctly. Also check that the cables are not crimped and that P203 and P303 are seated correctly in their connectors. Make sure that the two black grommets located along the right edge of the Vertical Bracket securely engage the Readout board and the two black plastic pins on the power supply assembly align with their mating holes before installing and tightening the screws.

To reinstall the option assembly into the standard instrument, perform the reverse of the preceding steps.

Option Board and Buffer Board Removal

To remove the Option boards and the Buffer board for troubleshooting, repair, or replacement:

1. Perform the preceding "Option Assembly Removal" procedure.

NOTE

To remove the TV and CTT Option boards, the bracket spacer between the front and rear guides must first be removed.

2. Remove the option boards from the option assembly by lifting them straight out from the Buffer board.

3. Remove the five securing screws that attach the Buffer board to the Vertical Bracket.

4. Remove the Buffer board from the Vertical Bracket and option assembly.

To reinstall the Buffer board and the option boards into the option assembly, perform the reverse of the preceding steps.

GPIB LED Board Removal

To remove the LED board for repair or replacement:

1. Perform all applicable steps through step 12 of the "Option Assembly Removal" procedure.

2. Remove the two screws securing the LED Mounting plate.

3. Remove the LED Mounting plate and the LED board, being careful not to damage the clear LED light lens.

To reinstall the LED board, perform the reverse of the preceding steps.

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Word Recognizer Probe Disassembly

To disassemble the Word Recognizer Probe for repair or replacement:

1. If the cable from the Word Recognizer probe is connected to the instrument, disconnect it from the oscilloscope rear panel.
2. If the 10-wide combs are connected to the probe, disconnect them from the probe by pulling them straight out of the probe body.
3. Remove the four screws securing the probe covers.
4. Remove the probe covers.
5. Remove the two Word Recognizer boards by holding the board that contains J6300 and pulling the other board straight to the front toward J6300.
6. Remove P6370 by pulling it straight back between J6380 and J6385.

To reassemble the Word Recognizer probe, perform the reverse of the preceding steps, making sure that the probe cover with D8 to D15 markings covers the board containing J6300.

DMM Extended Front Panel Board Removal

To remove the Extended Front Panel board for repair or replacement:

NOTE

Instruments with the DMM Option installed have five screws on the top edge of the front decorative trim ring (rather than four). They also have one screw on each side of the front decorative trim ring.

1. Perform the first six steps of the "A6—Front Panel Circuit Board Assembly Removal," which is under "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service manual. Three additional screws must be removed to complete this procedure (see NOTE).
2. Perform steps 3-6 of the Option Assembly Removal procedure, which is in this manual at the beginning of Corrective Maintenance.
3. Remove three screws along the middle of the Extended Front Panel.
4. Remove the Extended Front Panel board from the Extended Front Panel.

To reinstall the Extended Front Panel board into the Extended Front Panel, perform the reverse of the preceding steps.

Probe Connector and Fuse Assembly Removal

To remove the Probe Connector and Fuse Assembly for repair or replacement:

WARNING

To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

1. Perform the first five steps of the "Option Assembly Removal" procedure.
2. Remove the screw that retains P4990 at the right front corner of the DMM board.
3. Disconnect the two wires from the top probe connector and the fuse assembly by pulling the white plastic receptacles away from the tabs. (These connectors mate very tightly. It may be necessary to use pliers to pull them apart.)

NOTE

Instruments with the DMM Option installed have five screws on the top edge of the front decorative trim ring (rather than four). They also have one screw on each side of the front decorative trim ring.

4. Perform the first six steps of the "A6—Front-Panel Circuit Board Assembly Removal," which is under "Removal and Replacement Instruc-

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tions" in the Maintenance section of the standard instrument Service manual. Three additional screws must be removed to complete this procedure (see NOTE).

5. Remove the two screws from the right front of the Extended Front Panel.

6. Remove the Probe Connector and Fuse Assembly.

To reinstall the Probe Connector and Fuse Assembly into the Extended Front Panel, perform the reverse of the preceding steps.

DMM Board Removal

To remove the DMM board for repair or replacement:

WARNING

To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

1. Perform the first three steps of the "Probe Connector and Fuse Assembly Removal" procedure.

2. Disconnect the cable (P5290) from the right rear of the DMM board.

3. Disconnect the cable (P5220) from the left rear of the DMM board.

4. Rotate the DMM board back to its normal position.

5. Remove the two board-mounting screws at the right edge of the DMM board.

6. Remove the DMM board.

CAUTION

To avoid increased leakage, avoid touching the circuit board and the components located under the shields.

WARNING

The input potential to the DMM is present on the five screws mounting the DMM board shields. To avoid electric shock, remove inputs to the DMM HIGH and LOW input connectors.

7. Remove five screws from the DMM board shields.

8. Remove shields.

To reinstall the DMM board, perform the reverse of the preceding steps.

Fan Board Removal

To remove the Fan board, it is necessary first to remove the Power Supply assembly. Perform the "A2, A3, and A12—Power Supply Assembly Removal" procedure under "Removal and Replacement Instructions" in the Maintenance section of the standard instrument Service Manual, replacing steps 3 and 4 with the following two steps:

3. Loosen, but do not remove, the nut securing the fan blade to the fan motor shaft (a ¼-inch nut driver is required).

4. Grasp the fan blade and, using firm pressure, pull the fan blade and mounting collar from the motor shaft.

Remove the Fan board and motor from the Power Supply assembly as follows:

1. Loosen the four screws on the plastic motor mount and remove the top cover.

2. Disconnect P301 from the fan board.

3. Remove the Fan board and motor from the motor mount.

To reinstall the Fan board and motor, perform the reverse of the preceding steps.

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REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

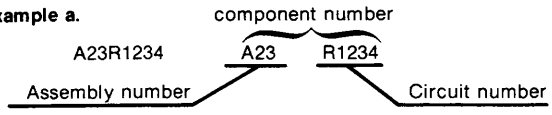
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

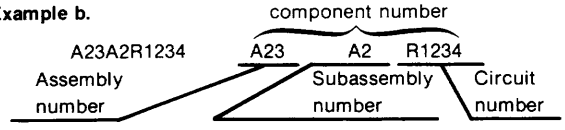
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00213	NYTRONICS COMPONENTS GROUP INC SUBSIDIARY OF NYTRONICS INC	ORANGE ST	DARLINGTON SC 29532
00779	AMP INC	P O BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPRESSWAY P O BOX 225012 M/S 49	DALLAS TX 75265
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
03888	KDI PYROFILM CORP	60 S JEFFERSON RD	WHIPPANY NJ 07981
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR GROUP	5005 E MCDOWELL RD	PHOENIX AZ 85008
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
07263	FAIRCHILD CAMERA AND INSTRUMENT CORP SEMICONDUCTOR DIV	464 ELLIS ST	MOUNTAIN VIEW CA 94042
07716	TRW INC TRW ELECTRONICS COMPONENTS TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
08261	SPECTRA-STRIP AN ELTRA CO	7100 LAMPSON AVE	GARDEN GROVE CA 92642
12954	MICROSEMI CORP	8700 E THOMAS RD P O BOX 1390	SCOTTSDALE AZ 85252
13409	SENSITRON SEMICONDUCTOR DIV OF RSM ELECTRON POWER INC	221 W INDUSTRY COURT	DEER PARK NY 11729
14433	ITT SEMICONDUCTORS DIV		WEST PALM BEACH FL
14552	MICRO/SEMICONDUCTOR CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776
15454	AMETEK INC RODAN DIV	2905 BLUE STAR ST	ANAHEIM CA 92806
15513	DATA DISPLAY PRODUCTS	303 N OAK ST	LOS ANGELES CA 90302
15636	ELEC-TROL INC	26477 N GOLDEN VALLEY RD	SAUGUS CA 91350
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054
18324	SIGNETICS CORP	811 E ARQUES	SUNNYVALE CA 94086
19647	CADDOCK ELECTRONICS INC	3127 CHICAGO AVE	RIVERSIDE CA 92507
19701	MEPCO/ELECTRA INC A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067
20932	KYOCERA INC	11620 SORRENTO VALLEY RD	SAN DIEGO CA 92121
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS	30 HUNTER LANE	CAMP HILL PA 17011
24355	ANALOG DEVICES INC	RT 1 INDUSTRIAL PK P O BOX 280	NORWOOD MA 02062
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051
27264	MOLEX INC CORPORATE HQ	2222 WELLINGTON COURT	LISLE IL 60532
31433	UNION CARBIDE CORP ELECTRONICS DIV	PO BOX 5928	GREENVILLE SC 29606
32293	INTERSIL INC	10900 N TANTAU AVE	CUPERTINO CA 95014
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086
50157	MIDWEST COMPONENTS INC	1981 PORT CITY BLVD P O BOX 787	MUSKEGON MI 49443
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	640 PAGE MILL RD	PALO ALTO CA 94304
52648	PLESSEY INC PLESSEY OPTOELECTRONICS AND MICROWAVE	1641 KAISER AVE	IRVINE CA 92714
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195
57668	ROHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
58361	GENERAL INSTRUMENT CORP OPTOELECTRONICS DIV	3400 HILLVIEW AVE	PALO ALTO CA 94304

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
59821	CENTRALAB INC SUB NORTH AMERICAN PHILIPS CORP	7158 MERCHANT AVE	EL PASO TX 79915
61529	AROMAT CORP	250 SHEFFIELD ST	MOUNTAINSIDE NJ 07092
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
75042	INTERNATIONAL RESISTIVE CO INC	401 N BROAD ST	PHILADELPHIA PA 19108
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES IL 60016
76493	BELL INDUSTRIES INC MILLER J W DIV	19070 REYES AVE P O BOX 5825	COMPTON CA 90224
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
91637	DALE ELECTRONICS INC	P O BOX 609	COLUMBUS NE 68601
92194	ALPHA WIRE CORP	711 LIDGERWOOD AVE	ELIZABETH NJ 07207
TK1015	MUSASHI WORKS OF HITACHI LTD	1450 JOSUIHON-CHO KODAIRA-SHI	TOKYO JAPAN
TK1345	ZMAN AND ASSOCIATES	7633 S 180TH	KENT WA 98032
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1601	PULSE ENGINEERING INC	1680 THE ALAMEDA	SAN JOSE CA 95126
TK1650	AMP INC	19200 STEVENS CREEK BLVD	CUPERTINO CA 95014
TK2042	ZMAN & ASSOCIATES	7633 SO. 180TH	KENT, WA 98032

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-07			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672-0076-07
A10	670-7390-01			CIRCUIT BD ASSY:FAN MOTOR (OPTION 01 ONLY)	80009	670-7390-01
A20	670-7830-12	B010100	B011480	CIRCUIT BD ASSY:BUFFER (OPTION 01/06/09 ONLY)	80009	670-7830-12
A20	670-7830-13	B010100	B011480	CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 01/06/09/10 ONLY)	80009	670-7830-13
A20	670-7830-13	B011481	B012643	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
A20	670-7830-15	B012644		CIRCUIT BD ASSY:BUFFER (FOR ALL OPTIONS AND COMBINATIONS) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-15
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A27	670-7997-07	B010100	B012556	CIRCUIT BD ASSY:COUNTER TIMER TRIGGER	80009	670-7997-07
A27	670-7997-09	B012557		CIRCUIT BD ASSY:COUNTER/TIMER/TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-09
A29	670-7835-07			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670-7835-07
A30	670-7894-01			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670-7894-01
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A2	672-0076-07			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672-0076-07
A10	670-7390-01			CIRCUIT BD ASSY:FAN MOTOR (OPTION 01 ONLY)	80009	670-7390-01
A10B1690	147-0035-00			MOTOR,DC:BRUSHLESS,3000 RPM,10-15V	25088	1AD3001-0A
A10C1698	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A10CR1691	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1692	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1694	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1696	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1699	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10Q1698	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A10R1691	308-0142-00			RES,FXD,WW:30 OHM,5%,3W	00213	1240S-30-5
A10R1692	321-0062-00			RES,FXD,FILM:43.2 OHM,0.5%,0.125W,TC=T0	57668	CRB14 FXE 43.2
A10R1693	323-0155-00			RES,FXD,FILM:402 OHM,1%,0.5W,TC=T0	75042	CECT0-4020F
A10R1694	323-0155-00			RES,FXD,FILM:402 OHM,1%,0.5W,TC=T0	75042	CECT0-4020F
A10R1695	321-0222-00			RES,FXD,FILM:2.00K OHM,1%,0.125W,TC=T0	19701	5033ED2K00F
A10R1697	321-0190-00			RES,FXD,FILM:931 OHM,1%,0.125W,TC=T2	19701	5043ED931R0F
A10RT1696	307-0124-00			RES,THERMAL:5K OHM,10%,NTC	15454	1DC502K-220-EC
A10U1690	156-0281-00			MICROCKT,LINEAR:4-XSTR,HIGH CUR ARRAY	02735	89164
A20	670-7830-12	B010100	B011480	CIRCUIT BD ASSY:BUFFER	80009	670-7830-12

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
				(OPTION 01/06/09 ONLY)		
A20	670-7830-13	B010100	B011480	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
				(OPTION 05 WITH 01/06/09/10 ONLY)		
A20	670-7830-13	B011481	B012643	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
A20	670-7830-15	B012644		CIRCUIT BD ASSY:BUFFER	80009	670-7830-15
				(FOR ALL OPTIONS AND COMBINATIONS)		
				(DOES NOT INCLUDE U4260, ORDER SEPARATELY)		
A20C4215	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4224	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4240	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4241	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4255	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4260	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4265	281-0764-00			CAP,FXD,CER DI:82PF,5%,100V	04222	MA101A820JAA
A20C4270	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)		
A20C4280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
				(OPTION 01, 01/05)O)		
A20J4210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
				(QUANTITY OF 34)		
A20J4220	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
				(QUANTITY OF 14)		
A20J4221	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
				(QUANTITY OF 24)		
A20J4228	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4230	131-2920-00	B010100	B012643	CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4230	131-3766-00	B012644		CONN,RCPT,ELEC:HEADER,1 X 2,0.10 SPACING	TK1650	87232-2
A20J4232	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4234	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4236	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4240	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS	22526	48283-086
				(QUANTITY OF 40, LOCATION A)		
A20J4240	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
				(QUANTITY OF 4, LOCATION B)		
A20J4242	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
				(QUANTITY OF 44)		
A20J4243	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
				(QUANTITY OF 44)		
A20J4256	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
				(QUANTITY OF 14)		
A20J4256	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS	22526	48283-086
				(QUANTITY OF 2)		
A20J4330	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
				(QUANTITY OF 16)		
A20P203	131-2924-00			CONN,RCPT,ELEC:HEADER,1 X 6,0.2 SPACING	27264	10-51-1061
A20P303	131-2923-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.2 SPACING	27264	10-51-1021
A20R4202	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4203	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4207	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4208	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4224	315-0102-00	B010100	B012643	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A20R4224	313-1102-00	B012644		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A20R4265	315-0681-00	B010100	B012643	RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A20R4265	313-1681-00	B012644		RES,FXD,FILM:680 OHM,5%,0.2W	57668	TR20JE 680E

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A20U4225	156-1318-00			MICROCKT,DGTL:LSTTL,4-BIT BISTABLE LATCH,SC RN	01295	SN74LS375NP3
A20U4235	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4240	156-0718-03			MICROCKT,DGTL:TRIPLE 3-INP NOR GATE,SCRN	01295	SN74LS27NP3
A20U4245	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4250	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A20U4255	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A20U4260	160-3676-01	B010100	B012234	MICROCKT,DGTL:4096 X 8 EPROM,PRGM	80009	160-3676-01
A20U4260	160-3676-02	B012235		MICROCKT,DGTL:4096 X 8 EPROM,PRGM (NOT PART OF A20, ORDER SEPARATELY)	80009	160-3676-02
A20U4265	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A20U4275	156-0392-03			MICROCKT,DGTL:QUAD LATCH W/CLEAR,SCRN,	07263	74LS175PCQR
A20U4280	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A20W4210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A22DS4540	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4542	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4545	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-10%,10V	55680	TLB1A470MAA
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23J4540	131-1614-00			CONN,RCPT,ELEC:CKT BD,1 X 36,0.1 SPACING	08261	800-380-000
A23J4800	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 24)	22526	48283-036
A23P4243	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0736-00
A23R4513	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4515	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4543	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4544	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4545	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4732	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A23R4734	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A23R4735	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
A23R4740	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A23R4743	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A23U4501	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4505	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4601	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4605	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4606	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A23U4608	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A23U4625	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4626	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR,SCRN	27014	DM81LS95ANA+
A23U4705	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A23U4706	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4708	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A23U4710	160-3674-01	B010100	B010124	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3674-01
A23U4710	160-3674-02	B010125		MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3674-02
A23U4715	160-3675-01	B010100	B010124	MICROCKT,DGTL:16K X 8 EPROM,PRGM	80009	160-3675-01
A23U4715	160-3675-02	B010125		MICROCKT,DGTL:16K X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3675-02
A23U4730	156-0467-02			MICROCKT,DGTL:QUAD 2-INP NAND BFR W/OC OUT	01295	SN74LS38NP3
A23U4735	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4738	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A23U4801	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A23U4805	156-1415-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR MGT BUS	01295	SN75161A N
A23U4808	156-1414-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR DATA BUS	01295	SN75160 (N OR J)
A23U4811	156-1594-00			MICROCKT,DGTL:NMOS,2048 X 8 SRAM	TK1015	HM6116P-3(DP-24)
A23U4818	156-1444-01			MICROCKT,DGTL:NMOS,GPIB INTFC CONTROLLER	01295	TMS9914A (NL
A23U4831	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A23U4838	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A25C5331	290-0808-00			CAP,FXD,ELCTLT:2.7UF,10%,20V	05397	T322B275K020AS
A25C5374	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5419	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5433	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5458	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5465	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5490	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5540	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5543	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5545	281-0826-00			CAP,FXD,CER DI:2200PF,5%,100V	20932	401EM100AD222K
A25C5612	283-0024-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	SR215C104MAA
A25C5613	281-0792-00			CAP,FXD,CER DI:82PF,10%,100V	04222	MA101A820KAA
A25C5625	281-0788-00			CAP,FXD,CER DI:470PF,10%,100V	04222	MA101C471KAA
A25C5627	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5630	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5631	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5633	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5639	290-0246-00			CAP,FXD,ELCTLT:3.3UF,10%,15V	12954	D3R3EA15K1
A25C5640	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5651	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5690	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5720	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5724	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5726	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A25C5726	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5728	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A25C5731	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5734	281-0863-00			CAP,FXD,CER DI:240PF,5%,100V	04222	MA101A241JAA
A25C5740	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5755	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5757	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5770	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5773	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5775	281-0813-00			CAP,FXD,CER DI:0.047UF,20%,50V	05397	C412C473M5V2CA
A25C5810	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5830	281-0820-00			CAP,FXD,CER DI:680 PF,10%,50V	04222	MA105C651KAA
A25C5848	281-0861-00			CAP,FXD,CER DI:270PF,5%,50V	54583	MA12C0G1H271J
A25C5850	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5853	283-0486-00			CAP,FXD,CER DI:1.0UF,10%,50V	04222	SR405105K
A25C5865	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A25CR5333	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5336	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5522	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5526	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5623	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5641	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5653	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5655	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5721	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5735	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5751	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5772	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5774	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5776	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5823	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5825	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5831	152-0322-00			SEMICOND DVC,DI:SCHOTTKY BARR,SI,15V,DO-35	50434	5082-2672
A25CR5867	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25P4220	131-2889-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 7,0.1 SP	22526	65000-103
A25P4242	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A25Q5370	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A25Q5442	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5512	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5515	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5518	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5528	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5530	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5625	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5735	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5736	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5860	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25R5319	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5322	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5329	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5330	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5334	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5335	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5370	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5371	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5421	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5422	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5423	315-0564-00	B010100	B011315	RES,FXD,FILM:560K OHM,5%,0.25W	19701	5043CX560K0J
A25R5423	315-0154-00	B011316		RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
A25R5424	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A25R5429	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5432	321-0251-00			RES,FXD,FILM:4.02K OHM,1%,0.125W,TC=T0	19701	5033ED4K020F
A25R5433	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5434	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5436	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5443	315-0204-00			RES,FXD,FILM:200K OHM,5%,0.25W	19701	5043CX200K0J
A25R5444	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A25R5445	315-0163-00			RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
A25R5519	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A25R5523	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A25R5524	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5525	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A25R5540	315-0303-00			RES,FXD,FILM:30K OHM,5%,0.25W	19701	5043CX30K00J
A25R5541	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5542	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5544	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5556	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5557	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5610	315-0112-00			RES,FXD,FILM:1.1K OHM,5%,0.25W	19701	5043CX1K100J
A25R5611	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A25R5612	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A25R5622	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5623	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
A25R5624	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5626	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
A25R5627	315-0162-00			RES,FXD,FILM:1.6K OHM,5%,0.25W	19701	5043CX1K600J
A25R5628	321-0226-00			RES,FXD,FILM:2.21K OHM,1%,0.125W,TC=T0	01121	RNK2211F
A25R5629	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5632	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5652	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5656	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5657	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5720	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
A25R5722	315-0911-00			RES,FXD,FILM:910 OHM,5%,0.25W	57668	NTR25J-E910E
A25R5723	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5725	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A25R5729	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A25R5730	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5732	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5733	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5735	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5736	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5737	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5738	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5739	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
A25R5750	315-0154-00			RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
A25R5752	315-0751-00			RES,FXD,FILM:750 OHM,5%,0.25W	57668	NTR25J-E750E
A25R5754	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A25R5755	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A25R5756	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5760	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5771	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
A25R5810	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
A25R5811	307-0104-00			RES,FXD,CMPSN:3.3 OHM,5%,0.25W	01121	CB33G5
A25R5812	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5813	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5820	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5822	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A25R5823	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5824	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5825	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5826	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5827	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5829	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5830	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5831	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5832	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5833	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A25R5834	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A25R5847	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5850	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5851	315-0514-00			RES,FXD,FILM:510K OHM,5%,0.25W	19701	5043CX510K0J
A25R5852	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5853	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A25R5854	315-0824-00			RES,FXD,FILM:820K OHM,5%,0.25W	19701	5043CX820K0J
A25R5858	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5864	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A25R5868	315-0683-00			RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
A25R5891	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25U5310	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5315	156-0991-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L05ACP
A25U5380	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A25U5390	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A25U5410	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5427	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A25U5436	156-1349-00			MICROCKT,LINEAR:DUAL INDEP DIFF AMPL	02735	CA3054-98
A25U5456	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5459	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A25U5565	160-3677-02	B010100	B012303	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3677-02
A25U5565	160-3677-03	B012304		MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A25, ORDER SEPARATELY)	80009	160-3677-03
A25U5575	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A25U5580	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5590	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25U5636	156-1200-01			MICROCKT,LINEAR:OPERATIONAL AMPL,QUAD BIFET	80009	156-1200-01
A25U5645	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5680	156-0481-02			MICROCKT,DGTL:TRIPLE 3-INP & GATE,SCRN	01295	SN74LS11NP3
A25U5712	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5728	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5755	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5756	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5764	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A25U5770	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5775	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5790	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5835	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5838	156-0575-03			MICROCKT,DGTL:3 INPUT NOR GATE,SELECTED	02735	CD4025BFX
A25U5845	156-0704-00			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046CP
A25U5855	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5880	156-1981-00			MICROCKT,DGTL:QUAD J-K FLIP-FLOP,SCRN	01295	SN54276J4
A25U5890	156-0381-02			MICROCKT,DGTL:QUAD 2-INP EXCL OR GATE	07263	74LS86PCQR
A25VR5420	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A25VR5866	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205
A27	670-7997-07	B010100	B012556	CIRCUIT BD ASSY:COUNTER TIMER TRIGGER	80009	670-7997-07

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27	670-7997-09	B012557		CIRCUIT BD ASSY:COUNTER/TIMER/TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-09
A27C5920	281-0757-00			CAP,FXD,CER DI:10PF,20%,100V	04222	MA101A100MAA
A27C5921	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5921	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5922	281-0759-00			CAP,FXD,CER DI:22PF,10%,100V	04222	MA101A220KAA
A27C5923	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5924	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5940	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5940	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5960	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5961	281-0765-00			CAP,FXD,CER DI:100PF,5%,100V	04222	MA101A101JAA
A27C5980	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5981	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5990	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5991	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5991	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6020	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6021	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6030	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6033	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A27C6040	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6040	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6110	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6111	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6112	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A27C6113	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6113	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6120	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6121	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6121	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6130	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6170	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6192	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6192	281-0909-00	B012557		CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27C6230	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6231	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6232	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A27C6260	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6260	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-01	B012557		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0775-00	B010100	B012556	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0909-00	B012557		CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27CR5960	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5961	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5970	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5990	152-0141-02	B012557		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6010	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)

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A27CR6020	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6162	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6170	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6180	152-0141-02	B012557		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6181	152-0951-00	B012557		SEMICOND DVC DI:SI,SCHOTTKY,60V,2.2F	50434	IN6263
A27CR6182	152-0141-02	B012557		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6190	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF,DO-7	04713	SMV1263
A27CR6211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6273	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27J5990	131-3058-00	B010100	B012556	CONN,RCPT,ELEC:HEADER,RTANG,2 X 3,0.1 CTR	00779	1-86479-5
A27J5990	131-3851-00	B012556		CONN,RCPT,ELEC:HEADER,2 X 4,0.1 SPACING	TK1650	1-02123-5
A27J5991	131-2921-00	B010100	B012556	CONN,RCPT,ELEC:HEADER,1 X 2,0.1 SPACING	00779	1-86479-3
A27J6135	175-2054-00			WIRE,ELECTRICAL:SOLID,30 AWG,BLACK,KYNAR	92194	5951
A27L5990	108-0245-00	B010100	B012556	CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A27L5990	108-1251-00	B012557		COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6030	108-0245-00	B010100	B012556	CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A27L6030	108-1251-00	B012557		COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6210	108-0892-00	B010100	B012556	COIL,RF:FIXED,44NH	TK2042	ORDER BY DESCR
A27L6210	108-1382-00	B012557		COIL,RF:FIXED,42NH,10%	TK1345	ORDER BY DESCR
A27P4221	131-2890-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 12,0.1 SP	22526	65000-010
A27P4240	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A27Q5920	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5921	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5961	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5970	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5980	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q5981	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q5982	151-0427-00	B010100	B012556	TRANSISTOR:NPN,SI,TO-92	07263	S39287
A27Q5982	151-0427-03	B012557		TRANSISTOR:NPN,SI	07263	S39287
A27Q5983	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q6090	151-0427-00	B010100	B012556	TRANSISTOR:NPN,SI,TO-92	07263	S39287
A27Q6090	151-0427-03	B012557		TRANSISTOR:NPN,SI	07263	S39287
A27Q6091	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6092	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6093	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6180	151-0190-00	B012557		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q6181	151-0190-00	B012557		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q6190	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6191	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6270	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6271	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6272	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6273	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6274	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6290	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6291	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6292	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27R5920	315-0512-00	B010100	B012556	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R5920	313-1512-00	B012557		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R5921	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5921	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R5950	315-0113-00	B010100	B012556	RES,FXD,FILM:11K OHM,5%,0.25W	19701	5043CX11K00J
A27R5950	313-1113-00	B012557		RES,FXD,FILM:11K OHM,5%,0.2W	57668	TR20JE11K0
A27R5951	315-0222-00	B010100	B012556	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R5951	313-1222-00	B012557		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R5952	315-0103-00	B010100	B012556	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5952	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0

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A27R5960	315-0201-00	B010100	B012556	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R5960	313-1201-00	B012557		RES,FXD,FILM:200 OHM,5%,0.2W	57668	TR20JE200E
A27R5961	315-0131-00	B010100	B012556	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R5961	313-1131-00	B012557		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R5962	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5962	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R5963	315-0202-00	B010100	B012556	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5963	313-1202-00	B012557		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5964	315-0474-00	B010100	B012556	RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5964	313-1474-00	B012557		RES,FXD,FILM:470K OHM,5%,0.2W	80009	313-1474-00
A27R5970	315-0680-00	B010100	B012556	RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5970	313-1680-00	B012557		RES,FXD,FILM:68 OHM,0.2W,5%	57668	TR20JT68 68E
A27R5971	315-0223-00	B010100	B012556	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5971	313-1223-00	B012557		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R5972	315-0202-00	B010100	B012556	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5972	313-1202-00	B012557		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5973	315-0103-00	B010100	B012556	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5973	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R5980	315-0223-00	B010100	B012556	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5980	313-1223-00	B012557		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R5981	315-0202-00	B010100	B012556	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5981	313-1202-00	B012557		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5982	315-0302-00	B010100	B012556	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R5982	313-1302-00	B012557		RES,FXD,FILM:3K OHM,5%,0.2W	57668	TR20JE 03K0
A27R5983	315-0680-00	B010100	B012556	RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5983	313-1680-00	B012557		RES,FXD,FILM:68 OHM,0.2W,5%	57668	TR20JT68 68E
A27R5984	315-0101-00	B010100	B012556	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R5984	313-1101-00	B012557		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R5985	315-0474-00	B010100	B012556	RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5985	313-1474-00	B012557		RES,FXD,FILM:470K OHM,5%,0.2W	80009	313-1474-00
A27R5990	315-0681-00	B010100	B012556	RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A27R5991	315-0330-00	B010100	B012556	RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R00J
A27R5991	313-1330-00	B012557		RES,FXD,FILM:33 OHM,5%,0.2W	91637	CCF501G33R0J
A27R5992	315-0301-00	B010100	B012556	RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A27R5992	313-1301-00	B012557		RES,FXD,FILM:300 OHM,5%,0.2W,MI	57668	TR20JT68-300E
A27R5993	315-0750-00	B010100	B012556	RES,FXD,FILM:75 OHM,5%,0.25W	57668	NTR25J-E75E0
A27R5993	313-1750-00	B012557		RES,FXD,FILM:75 OHM,5%,0.2W	57668	TR20JE 75E
A27R6020	315-0223-00	B010100	B012556	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R6020	313-1223-00	B012557		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R6021	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6021	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6022	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6022	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6042	315-0103-00	B010100	B012556	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6042	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6050	315-0122-00	B010100	B012556	RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A27R6050	313-1122-00	B012557		RES,FXD,FILM:1.2K OHM,5%,0.2W	57668	TR20JE01K2
A27R6060	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6060	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6062	315-0131-00	B010100	B012556	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6062	313-1131-00	B012557		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R6063	315-0201-00	B010100	B012556	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R6063	313-1201-00	B012557		RES,FXD,FILM:200 OHM,5%,0.2W	57668	TR20JE200E
A27R6064	315-0222-00	B010100	B012556	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6064	313-1222-00	B012557		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R6081	315-0222-00	B010100	B012556	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6081	313-1222-00	B012557		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R6082	315-0221-00	B010100	B012556	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E

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A27R6082	313-1221-00	B012557		RES,FXD,FILM:220 OHM,5%,0.2W	57668	TR20JE220E
A27R6083	315-0101-00	B010100	B012556	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6083	313-1101-00	B012557		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6090	315-0131-00	B010100	B012556	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6090	313-1131-00	B012557		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R6091	315-0181-00	B010100	B012556	RES,FXD,FILM:180 OHM,5%,0.25W	57668	NTR25J-E180E
A27R6091	313-1181-00	B012557		RES,FXD,FILM:180 OHM,5%0.2W	57668	TR20JE180E
A27R6092	315-0202-00	B010100	B012556	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6092	313-1202-00	B012557		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R6093	315-0103-00	B010100	B012556	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6093	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6094	315-0101-00	B010100	B012556	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6094	313-1101-00	B012557		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6104	315-0202-00	B010100	B012556	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6104	313-1202-00	B012557		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R6121	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6121	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6160	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6160	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6161	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6161	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6162	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6162	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6163	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6163	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6164	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6164	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6165	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6165	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6166	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6166	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6170	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6170	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6172	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6172	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6173	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6173	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6175	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6175	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6176	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6176	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6177	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6178	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6180	313-1510-00	B012557		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6181	313-1511-00	B012557		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6182	313-1510-00	B012557		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6183	313-1510-00	B012557		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6184	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6191	315-0471-00	B010100	B012556	RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A27R6191	313-1471-00	B012557		RES,FXD,FILM:470 OHM,5%,0.2W	57668	TR20JE 470E
A27R6192	315-0221-00	B010100	B012556	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A27R6192	313-1221-00	B012557		RES,FXD,FILM:220 OHM,5%,0.2W	57668	TR20JE220E
A27R6193	315-0302-00	B010100	B012556	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R6193	313-1302-00	B012557		RES,FXD,FILM:3K OHM,5%,0.2W	57668	TR20JE 03K0
A27R6194	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6195	315-0101-00	B010100	B012556	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6195	313-1101-00	B012557		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6197	315-0512-00	B010100	B012556	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1

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A27R6197	313-1512-00	B012557		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R6198	315-0103-00	B010100	B012556	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6198	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6199	315-0512-00	B010100	B012556	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6199	313-1512-00	B012557		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R6221	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6221	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6222	315-0823-00	B010100	B012556	RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A27R6222	313-1823-00	B012557		RES,FXD,FILM:82K OHM,5%,0.2W	57668	TR20JE 82K
A27R6230	315-0103-00	B010100	B012556	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6230	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6231	315-0910-00			RES,FXD,FILM:91 OHM,5%,0.25W	19701	5043CX91R00J
A27R6232	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6232	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6233	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6233	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6245	315-0101-00	B010100	B012556	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6245	313-1101-00	B012557		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6250	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A103OR706A103
A27R6251	315-0102-00	B010100	B012556	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6251	313-1102-00	B012557		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6252	313-1103-00	B012557		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6260	315-0152-00	B010100	B102556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6260	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6261	315-0152-00	B010100	B012556	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6261	313-1152-00	B012557		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6262	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6263	315-0621-00	B010100	B012556	RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A27R6263	313-1621-00	B012557		RES,FXD,FILM:620 OHM,5%,0.2W	57668	TR20JE 620E
A27R6264	315-0101-00	B010100	B012556	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6264	313-1101-00	B012557		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6266	315-0510-00	B010100	B012556	RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6266	313-1510-00	B012557		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6267	315-0511-00	B010100	B012556	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6267	313-1511-00	B012557		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6270	315-0391-00	B010100	B012556	RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A27R6270	313-1391-00	B012557		RES,FXD,FILM:390 OHM,5%,0.2W	57668	TR20JE 390E
A27R6271	315-0511-00	B010100	B012556	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6271	313-1511-00	B012557		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6273	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6274	315-0511-00	B010100	B012556	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6274	313-1511-00	B012557		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6275	315-0511-00	B010100	B012556	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6275	313-1511-00	B012557		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6276	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6277	315-0752-00	B010100	B012556	RES,FXD,FILM:7.5K OHM,5%,0.25W	57668	NTR25J-E07K5
A27R6277	313-1752-00	B012557		RES,FXD,FILM:7.5K OHM,5%,0.2W	57668	TR20JE 07K5
A27R6290	321-0157-00			RES,FXD,FILM:422 OHM,1%,0.125W,TC=T0	07716	CEAD422R0F
A27R6291	321-0066-00			RES,FXD,FILM:47.5 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G47R50F
A27R6292	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6293	315-0510-00	B010100	B012556	RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6293	313-1510-00	B012557		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6294	315-0511-00	B010100	B012556	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6294	313-1511-00	B012557		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27U5910	156-0656-02			MICROCKT,DGTL:DECADE COUNTER,SCRN	01295	SN74LS90NP3
A27U5930	160-3678-03	B010100	B010124	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-03
A27U5930	160-3678-04	B010125	B012556	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-04
A27U5930	160-3678-05	B012557		MICROCKT,DGTL:32678 X 8 EPROM,PRGM (NOT PART OF A27, ORDER SEPARATELY)	80009	160-3678-05

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27U5940	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A27U5942	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A27U5950	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A27U5952	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A27U5990	156-1340-01			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCREENED	02735	CD4071BFX
A27U6010	156-0124-02			MICROCKT,DGTL:SCRN	04713	MC4044LDS
A27U6070	156-1795-00			MICROCKT,DGTL:DUAL 4 TO 1 MUX	04713	MC10H174PD
A27U6120	156-0266-01			MICROCKT,DGTL:EMITTER COUPLED OSCILLATOR	04713	MC1648PD/LD
A27U6130	156-1248-00			MICROCKT,DGTL:ECL,PRESCALER/DIVIDE BY 100	52648	SP8629
A27U6140	156-1550-00			MICROCKT,DGTL:NMOS,SYS TIMING CONT,SCRN	34335	AM9513APCTB
A27U6150	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A27U6152	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A27U6180	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY,PRGM	04713	SC32205-001
A27U6230	156-1134-00			MICROCKT,LINEAR:OP AMPL,MOS/FET INPUT	02735	CA3140EX
A27U6250	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A27U6252	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A27U6290	156-0411-02			MICROCKT,LINEAR:QUAD COMPARATOR,SCREENED	04713	LM339JDS
A27W6042	131-0566-00	B012557		BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6084	131-0566-00	B010100	B012556	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6174	131-0566-00	B010100	B012556	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ	33096	CCAT101801
A29	670-7835-07			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670-7835-07
A29C4910	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4911	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C4912	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C4913	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4914	285-0558-00			CAP,FXD,PLASTIC:0.05 UF 2%,50V	80009	285-0558-00
A29C4915	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4932	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4960	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A29C4961	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4962	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4963	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5015	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A29C5020	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5031	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C5050	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5052	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5070	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	80009	285-0753-00
A29C5071	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	80009	285-0753-00
A29C5110	290-0532-00			CAP,FXD,ELCTLT:150UF,20%,6V	05397	T354J157M006AS 2
A29C5111	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5112	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5122	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR302E105ZAATR
A29C5124	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR302E105ZAATR
A29C5130	281-0772-00			CAP,FXD,CER DI:4700PF,10%,100V	04222	MA201C472KAA
A29C5140	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
A29C5142	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5150	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5151	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5152	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
A29C5153	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5155	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
A29C5170	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29C5171	285-1106-00			CAP,FXD,PLASTIC:0.022UF,20%,600V	14752	230B1F223
A29C5220	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5222	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
A29C5224	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A29C5230	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5231	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5232	281-0791-00			CAP,FXD,CER DI:270PF,10%,100V	04222	MA101C271KAA
A29C5250	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5251	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5281	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29CR4952	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR4970	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A,DO-41	13409	1N4947
A29CR4971	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A,DO-41	13409	1N4947
A29CR4980	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR4981	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR4982	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5030	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5031	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5110	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5111	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5112	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5113	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5114	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5115	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5130	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5163	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR5164	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR5170	152-0307-00			SEMICOND DVC,DI:SW,SI,100V,0.13A,DO-92	04713	SSD1150
A29CR5210	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5212	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5221	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29DS5201	150-1014-00			LT EMITTING DIO:RED,695NM,100MA MAX	58361	Q6444/MV5054-1
A29F4990	159-0224-01			FUSE,CARTRIDGE:5AG,3A,600V,FAST	71400	BBS-3
A29F5220	159-0159-00			FUSE,WIRE LEAD:1.5A,125V,5 SEC	75915	25501.5
A29J5210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 2)	22526	48283-036
A29J5220	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 3)	22526	48283-036
A29J5290	131-3323-00			CONN,RCPT,ELEC:HEADER,2 X 20,0.1 SPACING	22526	66506-025
A29J5291	131-3323-00			CONN,RCPT,ELEC:HEADER,2 X 20,0.1 SPACING	22526	66506-025
A29K4980	148-0146-00			RELAY,REED:1 FORM A,500VDC,COIL 5VDC	15636	ORDER BY DESCR
A29K4981	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K4990	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5080	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5090	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5091	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5190	148-0141-00			RELAY,REED:1 FORM A,0.5A,100VDC,COIL 15VDC	15636	R7620-2
A29K5191	148-0141-00			RELAY,REED:1 FORM A,0.5A,100VDC,COIL 15VDC	15636	R7620-2
A29Q4920	151-0354-00			TRANSISTOR:PNP,SI,TO-78	32293	ITS-1200-A
A29Q4922	151-1054-00			TRANSISTOR:FET,N-CHAN,SI,TO-71	80009	151-1054-00
A29Q4930	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A29Q4932	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29Q4934	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4936	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A29Q4950	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29Q4952	151-1078-00			TRANSISTOR:FET,N-CHAN,SI,TO-92	04713	SPF3040
A29Q4960	151-0254-00			TRANSISTOR:DARLINGTON,NPN,SI	03508	X38L3118
A29Q4970	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4971	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4972	151-1063-00			TRANSISTOR:MOS FET,N-CHANNEL,SI	80009	151-1063-00
A29Q4973	151-1063-00			TRANSISTOR:MOS FET,N-CHANNEL,SI	80009	151-1063-00
A29Q4980	151-1136-00			TRANSISTOR:MOSFE,N-CHANNEL,SI,TO-220AB	04713	IRF530
A29Q5020	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
A29Q5070	151-1077-01			TRANSISTOR:FET,N-CHAN,SI	80009	151-1077-01
A29Q5124	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A29Q5130	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29Q5210	151-0254-00			TRANSISTOR:DARLINGTON,NPN,SI	03508	X38L3118
A29Q5230	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29R4910	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
A29R4910	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A29R4911	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A29R4913	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A29R4914	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4915	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4916	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4917	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A29R4920	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A29R4921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4922	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A29R4923	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R4924	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4925	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4926	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4927	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A29R4930	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A29R4932	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4934	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R4950	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A29R4951	325-0252-00			RES,FXD,FILM:6.95K OHM,0.1%,0.1W	03888	PME55 6.95 K OHM
A29R4952	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R4953	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4954	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4955	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4957	307-0765-00			RES NTWK,FXD,FI:1K/9K OHM,5%,0.1W	07716	4168
A29R4958	307-0765-00			RES NTWK,FXD,FI:1K/9K OHM,5%,0.1W	07716	4168
A29R4960	307-0934-00			RES NTWK,FXD,FI:SINGLE INLINE,0.25%	19647	1787-31
A29R4971	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A29R4972	315-0164-00			RES,FXD,FILM:160K OHM,5%,0.25W	57668	NTR25J-E160K
A29R4973	321-0924-02			RES,FXD,FILM:40K OHM,0.5%,0.125W,TC=T2	19701	5033RC40K00D
A29R4974	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	19701	5033ED20K00F
A29R4975	307-0346-02			RES,FXD,FILM:1 OHM,0.1%	80009	307-0346-02
A29R4976	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R4977	322-0481-07			RES,FXD,FILM:1M OHM,0.1%,0.25W,TC=T9	19701	5043RE1M000B
A29R4978	323-0385-00			RES,FXD,FILM:100K OHM,1%,0.5W,TC=T0	75042	CECT0-1003F
A29R4979	317-0101-00			RES,FXD,CMPSN:100 OHM,5%,0.125W	01121	BB1015
A29R4980	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29R4980	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5010	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5011	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5012	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5013	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5014	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5015	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29R5016	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5017	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5020	321-0225-00			RES,FXD,FILM:2.15K OHM,1%,0.125W,TC=T0	19701	5033ED2K15F
A29R5021	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5030	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A29R5032	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5033	321-0325-00			RES,FXD,FILM:23.7K OHM,1%,0.125W,TC=T0	07716	CEAD23701F
A29R5034	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	19701	5033ED20K00F
A29R5035	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A29R5036	321-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.125W,TC=T0	19701	5043ED3K010F
A29R5039	321-0296-00			RES,FXD,FILM:11.8K OHM,1%,0.125W,TC=T0	07716	CEAD11801F
A29R5041	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R5042	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R5043	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5044	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5045	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5047	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	24546	NA55D7501F
A29R5048	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A29R5049	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5054	325-0394-00			RES,FXD,FILM:4.95K OHM,1%,0.1W,T-13	19701	5023ZB 4K950F
A29R5055	325-0079-00			RES,FXD,FILM:1.8K OHM,1%,0.1W,TC-13	19701	5023ZB1K800F
A29R5056	325-0393-00			RES,FXD,FILM:200 OHM,1%,0.1W,T-13	19701	5023 ZB 200R0F
A29R5057	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5058	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5063	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5064	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
A29R5066	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5070	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5071	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	19701	5043CX1M500J
A29R5072	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5073	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A29R5075	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5080	325-0034-00			RES SET,MATCHED:1 EA,9M,900K,99K OHM,1%	03888	ORDER BY DESCR
A29R5081	----- -----			(PART OF A29R5080)		
A29R5082	----- -----			(PART OF A29R5080)		
A29R5083	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	75042	CCAT2-5003C
A29R5090	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5122	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R5124	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R5130	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5131	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5132	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5133	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5134	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5150	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5151	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5167	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5168	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5170	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A29R5171	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5172	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5173	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A29R5174	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
A29R5176	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
A29R5177	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R5180	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29R5181	324-0620-09			RES,FXD,FILM:990K OHM,1%,1W,TC=T9	80009	324-0620-09
A29R5182	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0

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A29R5190	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	75042	CCAT2-5003C
A29R5191	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5210	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5211	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
A29R5212	307-0103-00			RES,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A29R5220	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5222	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A29R5223	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5224	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
A29R5230	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A29R5231	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A29R5232	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5251	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5252	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5270	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A29T5210	120-1494-00			TRANSFORMER,PWR:ISOLATION HF,POT CORE	80009	120-1494-00
A29T5230	120-1533-00			XFMR,ISOLATION:2KV,1:1 RATIO,DUAL SIGNAL	TK1601	63820
A29TP4910	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP4960	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP4980	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5140	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5270	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5271	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5290	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29U4920	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A29U4930	156-0422-02			MICROCKT,DGTL:UP/DOWN SYN BINARY CNTR,SCRN	18324	N74LS191NB
A29U4932	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A29U4940	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U4942	156-0515-02			MICROCKT,DGTL:TRIPLE 3-CHAN MUX,SEL	80009	156-0515-02
A29U4944	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A29U4950	156-1850-00			MICROCKT,LINEAR:CMOS,QUAD SPST ANALOG SW	17856	SDG21107
A29U4960	156-1978-01			MICROCKT,LINEAR:OP AMP,L BIAS CUR/OFFSET V	80009	156-1978-01
A29U4970	156-1838-01			MICROCKT,LINEAR:OPERATIONAL AMPLIFIER	80009	156-1838-01
A29U5010	156-1225-00			MICROCKT,LINEAR:DUAL COMPARATOR	01295	LM393P
A29U5020	156-0513-00			MICROCKT,DGTL:CMOS,8-CHANNEL MUX	04713	MC14051BCL
A29U5030	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5040	156-0854-00			MICROCKT,LINEAR:OPNL AMPL	27014	LM308AN
A29U5050	156-0783-00			MICROCKT,LINEAR:PRECISION VOLTAGE REFERENCE	27014	LM399
A29U5060	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5110	156-1207-00			MICROCKT,LINEAR:VOLTAGE REGULATOR,-12 V	04713	MC79L12ACG
A29U5112	156-1160-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L12ACG
A29U5120	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U5122	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U5124	156-0934-00			MICROCKT,DGTL:DUAL LINE RCVR	01295	SN75152
A29U5130	156-0745-01			MICROCKT,DGTL:HEX INVERTER,BURN-IN	02735	CD4069UBFX
A29U5132	156-1245-00			MICROCKT,LINEAR:7 XSTR,SI,HV/HIGH CURRENT	01295	ULN2003AN-P3
A29U5140	156-1457-01			MICROCKT,LINEAR:TRUE RMS TO DC CONVERTER,	24355	AD41134
A29U5150	156-1850-00			MICROCKT,LINEAR:CMOS,QUAD SPST ANALOG SW	17856	SDG21107
A29U5151	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5170	156-0130-00			MICROCKT,LINEAR:MODULATOR/DEMODULATOR	80009	156-0130-00
A29U5222	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5224	156-0844-02			MICROCKT,DGTL:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A(NP3)
A29U5230	156-0302-02			MICROCKT,DGTL:DUAL 2-INP NAND DRVR,SCRN	01295	SN75452PP3
A29U5231	156-0895-01			MICROCKT,DGTL:14 BIT BINARY COUNTER,BURN-IN	02735	CD4020BFX
A29U5232	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29U5240	156-0789-02			MICROCKT,DGTL:8 BIT SR,PRL LOAD,SCREENED	04713	SN74LS165JDS
A29U5241	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A29U5242	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A29U5250	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A29U5251	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5252	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A29U5260	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A29U5270	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A29U5271	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A29U5272	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A29U5273	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5274	156-1172-01			MICROCKT,DGTL:DUAL 4 BIT BIN CNTR,SCRN	01295	SN74LS393NP3
A29U5281	160-3679-01			MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A29, ORDER SEPARATELY)	80009	160-3679-01
A29U5282	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A29VR5010	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A29VR5020	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205
A29VR5031	152-0662-00			SEMICOND DVC,DI:ZEN,SI,5V,1%,400MW,DO-7	04713	SZG195RL
A29VR5160	152-0217-00			SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
A29VR5162	152-0217-00			SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
A29VR5210	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29W4980	195-0964-00			LEAD,ELECTRICAL:26 AWG,2.0 L,9-1	80009	195-0964-00
A29W5070	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A29W5075	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195-1259-00
A29W5260	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A29Y4910	158-0261-00			XTAL UNIT,QTZ:3.579MHZ,01%	33096	CCAT101773HC18
A30	670-7894-01			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670-7894-01
A30C4310	283-0421-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAA
A30LS4330	119-1427-01			XDCR,AUDIO:1-4.2KHZ,30MA,6V	TK1066	QMB-06
A30P4300	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 2)	22526	48283-029
A30R4320	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A1030R706A103
A30S4302	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	80009	260-2171-00
A30S4303	260-2170-00			SWITCH,PUSH:5 BUTTON,1 POLE,INPUT SEL	80009	260-2170-00
A30S4304	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	59821	2LL199NB021068
A30S4305	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	59821	2LL199NB021068
A30S4306	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	80009	260-2171-00
A30U4300	156-1080-01			MICROCKT,DGTL:HEX BUFFERS W/OC HV OUT,SCRN	01295	SN7407NP3
A30U4310	156-0541-02			MICROCKT,DGTL:DUAL 2-TO 4-LINE DCDR/DEMUX	04713	SN74LS139NDS
A30U4320	156-1220-01			MICROCKT,DGTL:HEX BUS DRIVER,SCREENED	01295	SN74LS365NP3
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A32CR6330	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32J6300	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A32J6370	131-1425-00			CONN,RCPT,ELEC:RTANG HEADER,1 X 36,0.1 SP (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,RCPT,ELEC:RTANGLE HEADER,1 X 36 (LOCATION B)	22526	65524-136
A32J6380	131-3045-00			CONN,RCPT,ELEC:CKT BD,RTANG,1 X 5,0.1 SP	80009	131-3045-00

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A32Q6334	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A32U6310	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6315	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6320	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A32U6325	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6330	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6335	156-1724-00			MICROCKT,DGTL:QUAD 2 INPUT OR GATE	04713	MC74F32ND
A32U6350	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A32U6356	156-1743-00			MICROCKT,DGTL:ASTTL,QUAD 2-INPUT NOR GATE	18324	74F02 NB OR FB
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33J6400	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A33P6380	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33P6385	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A33U6405	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6409	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6415	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A33U6420	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6425	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6430	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6435	156-1800-00			MICROCKT,DGTL:ASTTL,QUAD 2 INP EXCL OR GATE	18324	N74F86(NB OR JB)
F4991	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW (OPTION 01)	71400	AGC-CW-1 1/2

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REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

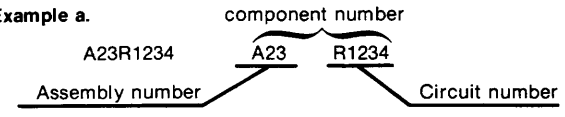
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

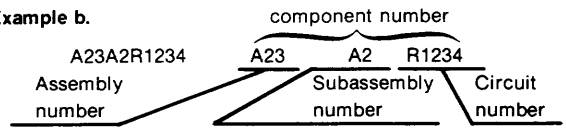
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00213	NYTRONICS COMPONENTS GROUP INC SUBSIDIARY OF NYTRONICS INC	ORANGE ST	DARLINGTON SC 29532
00779	AMP INC	P O BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPRESSWAY P O BOX 225012 M/S 49	DALLAS TX 75265
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
03888	KDI PYROFILM CORP	60 S JEFFERSON RD	WHIPPANY NJ 07981
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR GROUP	5005 E MCDOWELL RD	PHOENIX AZ 85008
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
07263	FAIRCHILD CAMERA AND INSTRUMENT CORP SEMICONDUCTOR DIV	464 ELLIS ST	MOUNTAIN VIEW CA 94042
07716	TRW INC TRW ELECTRONICS COMPONENTS TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
08261	SPECTRA-STRIP AN ELTRA CO	7100 LAMPSON AVE	GARDEN GROVE CA 92642
12954	MICROSEMI CORP	8700 E THOMAS RD P O BOX 1390	SCOTTSDALE AZ 85252
13409	SENSITRON SEMICONDUCTOR DIV OF RSM ELECTRON POWER INC	221 W INDUSTRY COURT	DEER PARK NY 11729
14433	ITT SEMICONDUCTORS DIV		WEST PALM BEACH FL
14552	MICRO/SEMICONDUCTOR CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776
15454	AMETEK INC RODAN DIV	2905 BLUE STAR ST	ANAHEIM CA 92806
15513	DATA DISPLAY PRODUCTS	303 N OAK ST	LOS ANGELES CA 90302
15636	ELEC-TROL INC	26477 N GOLDEN VALLEY RD	SAUGUS CA 91350
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054
18324	SIGNETICS CORP	811 E ARQUES	SUNNYVALE CA 94086
19647	CADDOCK ELECTRONICS INC	3127 CHICAGO AVE	RIVERSIDE CA 92507
19701	MEPCO/ELECTRA INC A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067
20932	KYOCERA INC	11620 SORRENTO VALLEY RD	SAN DIEGO CA 92121
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS	30 HUNTER LANE	CAMP HILL PA 17011
24355	ANALOG DEVICES INC	RT 1 INDUSTRIAL PK P O BOX 280	NORWOOD MA 02062
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051
27264	MOLEX INC CORPORATE HQ	2222 WELLINGTON COURT	LISLE IL 60532
31433	UNION CARBIDE CORP ELECTRONICS DIV	PO BOX 5928	GREENVILLE SC 29606
32293	INTERSIL INC	10900 N TANTAU AVE	CUPERTINO CA 95014
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086
50157	MIDWEST COMPONENTS INC	1981 PORT CITY BLVD P O BOX 787	MUSKEGON MI 49443
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	640 PAGE MILL RD	PALO ALTO CA 94304
52648	PLESSEY INC PLESSEY OPTOELECTRONICS AND MICROWAVE	1641 KAISER AVE	IRVINE CA 92714
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195
57668	ROHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
58361	GENERAL INSTRUMENT CORP OPTOELECTRONICS DIV	3400 HILLVIEW AVE	PALO ALTO CA 94304

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
59821	CENTRALAB INC SUB NORTH AMERICAN PHILIPS CORP	7158 MERCHANT AVE	EL PASO TX 79915
61529	AROMAT CORP	250 SHEFFIELD ST	MOUNTAINSIDE NJ 07092
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
75042	INTERNATIONAL RESISTIVE CO INC	401 N BROAD ST	PHILADELPHIA PA 19108
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES IL 60016
76493	BELL INDUSTRIES INC MILLER J W DIV	19070 REYES AVE P O BOX 5825	COMPTON CA 90224
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
91637	DALE ELECTRONICS INC	P O BOX 609	COLUMBUS NE 68601
92194	ALPHA WIRE CORP	711 LIDGERWOOD AVE	ELIZABETH NJ 07207
TK1015	MUSASHI WORKS OF HITACHI LTD	1450 JOSUIHON-CHO KODAIRA-SHI	TOKYO JAPAN
TK1345	ZMAN AND ASSOCIATES	7633 S 180TH	KENT WA 98032
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1601	PULSE ENGINEERING INC	1680 THE ALAMEDA	SAN JOSE CA 95126
TK1650	AMP INC	19200 STEVENS CREEK BLVD	CUPERTINO CA 95014

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-07			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672-0076-07
A10	670-7390-01			CIRCUIT BD ASSY:FAN MOTOR (OPTION 01 ONLY)	80009	670-7390-01
A20	670-7830-12			CIRCUIT BD ASSY:BUFFER (OPTION 01/06/09 ONLY)	80009	670-7830-12
A20	670-7830-13			CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 01/06/09/10 ONLY) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-13
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A27	670-7997-07			CIRCUIT BD ASSY:COUNTER TIMER TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-07
A29	670-7835-07			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670-7835-07
A30	670-7894-01			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670-7894-01
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A2	672-0076-07			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672-0076-07
A10	670-7390-01			CIRCUIT BD ASSY:FAN MOTOR (OPTION 01 ONLY)	80009	670-7390-01
A10B1690	147-0035-00			MOTOR,DC:BRUSHLESS,3000 RPM,10-15V	25088	1AD3001-0A
A10C1698	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A10CR1691	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1692	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1694	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1696	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1699	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10Q1698	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A10R1691	308-0142-00			RES,FXD,WW:30 OHM,5%,3W	00213	1240S-30-5
A10R1692	321-0062-00			RES,FXD,FILM:43.2 OHM,0.5%,0.125W,TC=T0	57668	CRB14 FXE 43.2
A10R1693	323-0155-00			RES,FXD,FILM:402 OHM,1%,0.5W,TC=T0	75042	CECT0-4020F
A10R1694	323-0155-00			RES,FXD,FILM:402 OHM,1%,0.5W,TC=T0	75042	CECT0-4020F
A10R1695	321-0222-00			RES,FXD,FILM:2.00K OHM,1%,0.125W,TC=T0	19701	5033ED2K00F
A10R1697	321-0190-00			RES,FXD,FILM:931 OHM,1%,0.125W,TC=T2	19701	5043ED931R0F
A10RT1696	307-0124-00			RES,THERMAL:5K OHM,10%,NTC	15454	1DC502K-220-EC
A10U1690	156-0281-00			MICROCKT,LINEAR:4-XSTR,HIGH CUR ARRAY	02735	89164
A20	670-7830-12			CIRCUIT BD ASSY:BUFFER (OPTION 01/06/09 ONLY)	80009	670-7830-12
A20	670-7830-13			CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 01/06/09/10 ONLY) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-13
A20C4215	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
				(OPTION 01, 01/05)		
A20C4224	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4240	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4241	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4255	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4260	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4265	281-0764-00			CAP,FXD,CER DI:82PF,5%,100V	04222	MA101A820JAA
A20C4270	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)0)	54583	MA12X7R1H223M-T
A20J4210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 34)	22526	48283-036
A20J4220	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 14)	22526	48283-029
A20J4221	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 24)	22526	48283-029
A20J4228	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4230	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4232	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4234	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4236	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4240	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS (QUANTITY OF 40, LOCATION A)	22526	48283-086
A20J4240	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 4, LOCATION B)	22526	48283-029
A20J4242	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 44)	22526	48283-029
A20J4243	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 44)	22526	48283-029
A20J4256	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 14)	22526	48283-036
A20J4256	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS (QUANTITY OF 2)	22526	48283-086
A20J4330	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 16)	22526	48283-036
A20P203	131-2924-00			CONN,RCPT,ELEC:HEADER,1 X 6,0.2 SPACING	27264	10-51-1061
A20P303	131-2923-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.2 SPACING	27264	10-51-1021
A20R4202	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4203	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4207	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4208	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4224	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A20R4265	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A20U4225	156-1318-00			MICROCKT,DGTL:LSTTL,4-BIT BISTABLE LATCH,SCRN	01295	SN74LS375NP3
A20U4235	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4240	156-0718-03			MICROCKT,DGTL:TRIPLE 3-INP NOR GATE,SCRN	01295	SN74LS27NP3
A20U4245	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4250	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A20U4255	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A20U4260	160-3676-01			MICROCKT,DGTL:4096 X 8 EPROM,PRGM (NOT PART OF A20, ORDER SEPARATELY)	80009	160-3676-01
A20U4265	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A20U4275	156-0392-03			MICROCKT,DGTL:QUAD LATCH W/CLEAR,SCRN,	07263	74LS175PCQR
A20U4280	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A20W4210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A22DS4540	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4542	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4545	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-10%,10V	55680	TLB1A470MAA
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23J4540	131-1614-00			CONN,RCPT,ELEC:CKT BD,1 X 36,0.1 SPACING	08261	800-380-000
A23J4800	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 24)	22526	48283-036
A23P4243	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0736-00
A23R4513	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4515	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4543	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4544	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4545	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4732	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A23R4734	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A23R4735	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
A23R4740	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A23R4743	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A23U4501	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4505	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4601	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4605	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4606	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A23U4608	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A23U4625	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4626	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR,SCRN	27014	DM81LS95ANA+
A23U4705	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A23U4706	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4708	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A23U4710	160-3674-02			MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3674-02

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A23U4715	160-3675-02			MICROCKT,DGTL:16K X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3675-02
A23U4730	156-0467-02			MICROCKT,DGTL:QUAD 2-INP NAND BFR W/OC OUT	01295	SN74LS38NP3
A23U4735	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4738	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A23U4801	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A23U4805	156-1415-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR MGT BUS	01295	SN75161A N
A23U4808	156-1414-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR DATA BUS	01295	SN75160 (N OR J)
A23U4811	156-1594-00			MICROCKT,DGTL:NMOS,2048 X 8 SRAM	TK1015	HM6116P-3(DP-24)
A23U4818	156-1444-01			MICROCKT,DGTL:NMOS,GPIB INTFC CONTROLLER	01295	TMS9914A (NL
A23U4831	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A23U4838	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A25C5331	290-0808-00			CAP,FXD,ELCTLT:2.7UF,10%,20V	05397	T322B275K020AS
A25C5374	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5419	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5433	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5458	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5465	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5490	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5540	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5543	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5545	281-0826-00			CAP,FXD,CER DI:2200PF,5%,100V	20932	401EM100AD222K
A25C5612	283-0024-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	SR215C104MAA
A25C5613	281-0792-00			CAP,FXD,CER DI:82PF,10%,100V	04222	MA101A820KAA
A25C5625	281-0788-00			CAP,FXD,CER DI:470PF,10%,100V	04222	MA101C471KAA
A25C5627	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5630	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5631	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5633	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5639	290-0246-00			CAP,FXD,ELCTLT:3.3UF,10%,15V	12954	D3R3EA15K1
A25C5640	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5651	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5690	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5720	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5724	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5726	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A25C5726	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5728	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5731	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5734	281-0863-00			CAP,FXD,CER DI:240PF,5%,100V	04222	MA101A241JAA
A25C5740	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5755	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5757	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5770	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5773	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5775	281-0813-00			CAP,FXD,CER DI:0.047UF,20%,50V	05397	C412C473M5V2CA
A25C5810	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5830	281-0820-00			CAP,FXD,CER DI:680 PF,10%,50V	04222	MA105C651KAA
A25C5848	281-0861-00			CAP,FXD,CER DI:270PF,5%,50V	54583	MA12C0G1H271J
A25C5850	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5853	283-0486-00			CAP,FXD,CER DI:1.0UF,10%,50V	04222	SR405105K
A25C5865	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A25CR5333	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5336	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A25CR5522	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5526	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5623	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5641	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5653	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5655	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5721	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5735	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5751	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5772	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5774	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5776	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5823	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5825	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5831	152-0322-00			SEMICOND DVC,DI:SCHOTTKY BARR,SI,15V,DO-35	50434	5082-2672
A25CR5867	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25P4220	131-2889-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 7,0.1 SP	22526	65000-103
A25P4242	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A25Q5370	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A25Q5442	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5512	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5515	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5518	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5528	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5530	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5625	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5735	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5736	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5860	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25R5319	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5322	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5329	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5330	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5334	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5335	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5370	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5371	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5421	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5422	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5424	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5429	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5432	321-0251-00			RES,FXD,FILM:4.02K OHM,1%,0.125W,TC=T0	19701	5033ED4K020F
A25R5433	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5434	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5436	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5443	315-0204-00			RES,FXD,FILM:200K OHM,5%,0.25W	19701	5043CX200K0J
A25R5444	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A25R5445	315-0163-00			RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
A25R5519	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A25R5523	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A25R5524	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5525	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A25R5540	315-0303-00			RES,FXD,FILM:30K OHM,5%,0.25W	19701	5043CX30K00J
A25R5541	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5542	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5544	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5556	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5557	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K

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A25R5610	315-0112-00			RES,FXD,FILM:1.1K OHM,5%,0.25W	19701	5043CX1K100J
A25R5611	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A25R5612	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A25R5622	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5623	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
A25R5624	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5626	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
A25R5627	315-0162-00			RES,FXD,FILM:1.6K OHM,5%,0.25W	19701	5043CX1K600J
A25R5628	321-0226-00			RES,FXD,FILM:2.21K OHM,1%,0.125W,TC=T0	01121	RNK2211F
A25R5629	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5632	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5652	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5656	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5657	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5720	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
A25R5722	315-0911-00			RES,FXD,FILM:910 OHM,5%,0.25W	57668	NTR25J-E910E
A25R5723	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5725	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A25R5729	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A25R5730	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5732	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5733	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5735	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5736	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5737	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5738	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5739	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
A25R5750	315-0154-00			RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
A25R5752	315-0751-00			RES,FXD,FILM:750 OHM,5%,0.25W	57668	NTR25J-E750E
A25R5754	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A25R5755	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A25R5756	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5760	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5771	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
A25R5810	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
A25R5811	307-0104-00			RES,FXD,CMPSN:3.3 OHM,5%,0.25W	01121	CB33G5
A25R5812	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5813	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5820	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5822	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5823	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5824	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5825	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5826	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5827	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5829	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5830	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5831	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5832	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5833	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A25R5834	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A25R5847	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5850	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5851	315-0514-00			RES,FXD,FILM:510K OHM,5%,0.25W	19701	5043CX510K0J
A25R5852	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5853	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A25R5854	315-0824-00			RES,FXD,FILM:820K OHM,5%,0.25W	19701	5043CX820K0J
A25R5858	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9

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A25R5864	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A25R5868	315-0683-00			RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
A25R5891	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25U5310	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5315	156-0991-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L05ACP
A25U5380	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A25U5390	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A25U5410	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5427	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A25U5436	156-1349-00			MICROCKT,LINEAR:DUAL INDEP DIFF AMPL	02735	CA3054-98
A25U5456	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5459	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A25U5565	160-3677-02			MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A25, ORDER SEPARATELY)	80009	160-3677-02
A25U5575	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A25U5580	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5590	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25U5636	156-1200-01			MICROCKT,LINEAR:OPERATIONAL AMPL,QUAD BIFET	80009	156-1200-01
A25U5645	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5680	156-0481-02			MICROCKT,DGTL:TRIPLE 3-INP & GATE,SCRN	01295	SN74LS11NP3
A25U5712	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5728	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5755	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5756	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5764	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A25U5770	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5775	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5790	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5835	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5838	156-0575-03			MICROCKT,DGTL:3 INPUT NOR GATE,SELECTED	02735	CD4025BFX
A25U5845	156-0704-00			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046CP
A25U5855	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5880	156-1981-00			MICROCKT,DGTL:QUAD J-K FLIP-FLOP,SCRN	01295	SN54276J4
A25U5890	156-0381-02			MICROCKT,DGTL:QUAD 2-INP EXCL OR GATE	07263	74LS86PCQR
A25VR5420	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A25VR5866	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205
A27	670-7997-07			CIRCUIT BD ASSY:COUNTER TIMER TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-07
A27C5920	281-0757-00			CAP,FXD,CER DI:10PF,20%,100V	04222	MA101A100MAA
A27C5921	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5922	281-0759-00			CAP,FXD,CER DI:22PF,10%,100V	04222	MA101A220KAA
A27C5923	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5924	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5940	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5960	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5961	281-0765-00			CAP,FXD,CER DI:100PF,5%,100V	04222	MA101A101JAA
A27C5980	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5981	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5990	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5991	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6020	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6021	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6030	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6033	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA

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A27C6040	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6110	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6111	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6112	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A27C6113	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6120	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6121	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6130	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6170	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6192	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27C6230	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6231	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6232	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A27C6260	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27CR5960	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5961	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5970	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6010	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6020	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6162	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6170	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6181	152-0951-00			SEMICOND DVC DI:SI,SCHOTTKY,60V,2.2F	50434	IN6263
A27CR6190	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF,DO-7	04713	SMV1263
A27CR6211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6273	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27J5990	131-3851-00			CONN,RCPT,ELEC:HEADER,2 X 4,0.1 SPACING	TK1650	1-02123-5
A27J5991	131-2921-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.1 SPACING	00779	1-86479-3
A27J6135	175-2054-00			WIRE,ELECTRICAL:SOLID,30 AWG,BLACK,KYNAR	92194	5951
A27L5990	108-1251-00			COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6030	108-1251-00			COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6210	108-1382-00			COIL,RF:FIXED,42NH,10%	TK1345	ORDER BY DESCR
A27P4221	131-2890-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 12,0.1 SP	22526	65000-010
A27P4240	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A27Q5920	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5921	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5961	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5970	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5980	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q5981	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q5982	151-0427-03			TRANSISTOR:NPN,SI	07263	S39287
A27Q5983	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q6090	151-0427-03			TRANSISTOR:NPN,SI	07263	S39287
A27Q6091	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6092	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6093	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6190	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6191	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6270	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6271	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6272	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6273	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6274	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6290	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27Q6291	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6292	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27R5921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5950	315-0113-00			RES,FXD,FILM:11K OHM,5%,0.25W	19701	5043CX11K00J
A27R5951	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R5952	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5960	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R5961	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R5962	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5963	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5964	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5970	315-0680-00			RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5971	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5972	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5973	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5980	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5981	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5982	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R5983	315-0680-00			RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5984	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R5985	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5990	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A27R5991	315-0330-00			RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R00J
A27R5992	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A27R5993	315-0750-00			RES,FXD,FILM:75 OHM,5%,0.25W	57668	NTR25J-E75E0
A27R6020	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R6021	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6022	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6042	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6050	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A27R6060	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6062	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6063	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R6064	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6081	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6083	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6090	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6091	315-0181-00			RES,FXD,FILM:180 OHM,5%,0.25W	57668	NTR25J-E180E
A27R6092	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6093	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6094	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6121	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6160	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6161	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6162	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6163	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6164	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6165	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6166	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6170	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6172	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6173	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6175	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6176	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6177	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6178	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6191	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A27R6192	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27R6193	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R6194	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6195	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6197	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6198	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6199	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6222	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A27R6230	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6231	315-0910-00			RES,FXD,FILM:91 OHM,5%,0.25W	19701	5043CX91R00J
A27R6232	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6245	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6250	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A1030R706A103
A27R6251	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6252	313-1103-00			RES,FXD,FILM:10K OHM,5%,0.2W	80009	313-1103-00
A27R6260	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6261	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6262	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6263	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A27R6264	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6266	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6267	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6270	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A27R6271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6273	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6274	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6275	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6276	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6277	315-0752-00			RES,FXD,FILM:7.5K OHM,5%,0.25W	57668	NTR25J-E07K5
A27R6290	321-0157-00			RES,FXD,FILM:422 OHM,1%,0.125W,TC=T0	07716	CEAD422R0F
A27R6291	321-0066-00			RES,FXD,FILM:47.5 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G47R50F
A27R6292	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6293	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6294	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27U5910	156-0656-02			MICROCKT,DGTL:DECADE COUNTER,SCRN	01295	SN74LS90NP3
A27U5930	160-3678-04			MICROCKT,DGTL:32678 X 8 EPROM,PRGM (NOT PART OF A27, ORDER SEPARATELY)	80009	160-3678-04
A27U5940	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A27U5942	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A27U5950	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A27U5952	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A27U5990	156-1340-01			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCREENED	02735	CD4071BFX
A27U6010	156-0124-02			MICROCKT,DGTL:SCRN	04713	MC4044LDS
A27U6070	156-1795-00			MICROCKT,DGTL:DUAL 4 TO 1 MUX	04713	MC10H174PD
A27U6120	156-0266-01			MICROCKT,DGTL:EMITTER COUPLED OSCILLATOR	04713	MC1648PD/LD
A27U6130	156-1248-00			MICROCKT,DGTL:ECL,PRESCALER/DIVIDE BY 100	52648	SP8629
A27U6140	156-1550-00			MICROCKT,DGTL:NMOS,SYS TIMING CONT,SCRN	34335	AM9513APCTB
A27U6150	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A27U6152	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A27U6180	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY,PRGM	04713	SC32205-001
A27U6230	156-1134-00			MICROCKT,LINEAR:OP AMPL,MOS/FET INPUT	02735	CA3140EX
A27U6250	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A27U6252	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A27U6290	156-0411-02			MICROCKT,LINEAR:QUAD COMPARATOR,SCREENED	04713	LM339JDS
A27W6084	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6174	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ	33096	CCAT101801

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29	670-7835-07			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670-7835-07
A29C4910	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4911	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C4912	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C4913	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4914	285-0558-00			CAP,FXD,PLASTIC:0.05 UF 2%,50V	80009	285-0558-00
A29C4915	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4932	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4960	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A29C4961	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4962	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4963	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5015	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A29C5020	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5031	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C5050	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5052	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5070	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	80009	285-0753-00
A29C5071	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	80009	285-0753-00
A29C5110	290-0532-00			CAP,FXD,ELCTLT:150UF,20%,6V	05397	T354J157M006AS 2
A29C5111	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5112	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5122	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR302E105ZAATR
A29C5124	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR302E105ZAATR
A29C5130	281-0772-00			CAP,FXD,CER DI:4700PF,10%,100V	04222	MA201C472KAA
A29C5140	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
A29C5142	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5150	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5151	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5152	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
A29C5153	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5155	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
A29C5170	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C5171	285-1106-00			CAP,FXD,PLASTIC:0.022UF,20%,600V	14752	230B1F223
A29C5220	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5222	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
A29C5224	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A29C5230	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5231	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5232	281-0791-00			CAP,FXD,CER DI:270PF,10%,100V	04222	MA101C271KAA
A29C5250	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5251	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5281	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29CR4952	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR4970	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A,DO-41	13409	1N4947
A29CR4971	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A,DO-41	13409	1N4947
A29CR4980	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR4981	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR4982	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5030	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5031	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5110	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5111	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012

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A29CR5112	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5113	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5114	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5115	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5130	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5163	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR5164	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR5170	152-0307-00			SEMICOND DVC,DI:SW,SI,100V,0.13A,DO-92	04713	SSD1150
A29CR5210	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5212	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5221	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29DS5201	150-1014-00			LT EMITTING DIO:RED,695NM,100MA MAX	58361	Q6444/MV5054-1
A29F4990	159-0224-01			FUSE,CARTRIDGE:5AG,3A,600V,FAST	71400	BBS-3
A29F5220	159-0159-00			FUSE,WIRE LEAD:1.5A,125V,5 SEC	75915	25501.5
A29J5210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 2)	22526	48283-036
A29J5220	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 3)	22526	48283-036
A29J5290	131-3323-00			CONN,RCPT,ELEC:HEADER,2 X 20,0.1 SPACING	22526	66506-025
A29J5291	131-3323-00			CONN,RCPT,ELEC:HEADER,2 X 20,0.1 SPACING	22526	66506-025
A29K4980	148-0146-00			RELAY,REED:1 FORM A,500VDC,COIL 5VDC	15636	ORDER BY DESCR
A29K4981	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K4990	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5080	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5090	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5091	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5190	148-0141-00			RELAY,REED:1 FORM A,0.5A,100VDC,COIL 15VDC	15636	R7620-2
A29K5191	148-0141-00			RELAY,REED:1 FORM A,0.5A,100VDC,COIL 15VDC	15636	R7620-2
A29Q4920	151-0354-00			TRANSISTOR:PNP,SI,TO-78	32293	ITS-1200-A
A29Q4922	151-1054-00			TRANSISTOR:FET,N-CHAN,SI,TO-71	80009	151-1054-00
A29Q4930	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A29Q4932	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29Q4934	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4936	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A29Q4950	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A29Q4952	151-1078-00			TRANSISTOR:FET,N-CHAN,SI,TO-92	04713	SPF3040
A29Q4960	151-0254-00			TRANSISTOR:DARLINGTON,NPN,SI	03508	X38L3118
A29Q4970	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4971	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4972	151-1063-00			TRANSISTOR:MOS FET,N-CHANNEL,SI	80009	151-1063-00
A29Q4973	151-1063-00			TRANSISTOR:MOS FET,N-CHANNEL,SI	80009	151-1063-00
A29Q4980	151-1136-00			TRANSISTOR:MOSFE,N-CHANNEL,SI,TO-220AB	04713	IRF530
A29Q5020	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
A29Q5070	151-1077-01			TRANSISTOR:FET,N-CHAN,SI	80009	151-1077-01
A29Q5124	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A29Q5130	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29Q5210	151-0254-00			TRANSISTOR:DARLINGTON,NPN,SI	03508	X38L3118
A29Q5230	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29R4910	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
A29R4910	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A29R4911	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A29R4913	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A29R4914	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4915	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4916	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4917	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A29R4920	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E

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A29R4921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4922	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A29R4923	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R4924	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4925	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4926	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4927	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A29R4930	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A29R4932	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4934	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R4950	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A29R4951	325-0252-00			RES,FXD,FILM:6.95K OHM,0.1%,0.1W	03888	PME55 6.95 K OHM
A29R4952	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R4953	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4954	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4955	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4957	307-0765-00			RES NTWK,FXD,FI:1K/9K OHM,5%,0.1W	07716	4168
A29R4958	307-0765-00			RES NTWK,FXD,FI:1K/9K OHM,5%,0.1W	07716	4168
A29R4960	307-0934-00			RES NTWK,FXD,FI:SINGLE INLINE,0.25%	19647	1787-31
A29R4971	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A29R4972	315-0164-00			RES,FXD,FILM:160K OHM,5%,0.25W	57668	NTR25J-E160K
A29R4973	321-0924-02			RES,FXD,FILM:40K OHM,0.5%,0.125W,TC=T2	19701	5033RC40K00D
A29R4974	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	19701	5033ED20K00F
A29R4975	307-0346-02			RES,FXD,FILM:1 OHM,0.1%	80009	307-0346-02
A29R4976	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R4977	322-0481-07			RES,FXD,FILM:1M OHM,0.1%,0.25W,TC=T9	19701	5043RE1M000B
A29R4978	323-0385-00			RES,FXD,FILM:100K OHM,1%,0.5W,TC=T0	75042	CECT0-1003F
A29R4979	317-0101-00			RES,FXD,CMPSN:100 OHM,5%,0.125W	01121	BB1015
A29R4980	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29R4980	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5010	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5011	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5012	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5013	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5014	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5015	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5016	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5017	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5020	321-0225-00			RES,FXD,FILM:2.15K OHM,1%,0.125W,TC=T0	19701	5033ED2K15F
A29R5021	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5030	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A29R5032	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5033	321-0325-00			RES,FXD,FILM:23.7K OHM,1%,0.125W,TC=T0	07716	CEAD23701F
A29R5034	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	19701	5033ED20K00F
A29R5035	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A29R5036	321-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.125W,TC=T0	19701	5043ED3K010F
A29R5039	321-0296-00			RES,FXD,FILM:11.8K OHM,1%,0.125W,TC=T0	07716	CEAD11801F
A29R5041	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R5042	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R5043	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5044	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5045	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5047	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	24546	NA55D7501F
A29R5048	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A29R5049	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5054	325-0394-00			RES,FXD,FILM:4.95K OHM,1%,0.1W,T-13	19701	5023ZB 4K950F
A29R5055	325-0079-00			RES,FXD,FILM:1.8K OHM,1%,0.1W,TC-13	19701	5023ZB1K800F
A29R5056	325-0393-00			RES,FXD,FILM:200 OHM,1%,0.1W,T-13	19701	5023 ZB 200R0F

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A29R5057	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5058	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5063	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5064	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
A29R5066	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5070	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5071	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	19701	5043CX1M500J
A29R5072	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5073	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A29R5075	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5080	325-0034-00			RES SET,MATCHED:1 EA,9M,900K,99K OHM,1%	03888	ORDER BY DESCR
A29R5081	----- -----			(PART OF A29R5080)		
A29R5082	----- -----			(PART OF A29R5080)		
A29R5083	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	75042	CCAT2-5003C
A29R5090	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5122	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R5124	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R5130	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5131	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5132	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5133	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5134	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5150	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5151	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5167	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5168	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5170	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A29R5171	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5172	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5173	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A29R5174	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
A29R5176	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
A29R5177	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R5180	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29R5181	324-0620-09			RES,FXD,FILM:990K OHM,1%,1W,TC=T9	80009	324-0620-09
A29R5182	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5190	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	75042	CCAT2-5003C
A29R5191	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5210	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5211	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
A29R5212	307-0103-00			RES,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A29R5220	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5222	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A29R5223	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5224	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
A29R5230	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A29R5231	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A29R5232	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5251	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5252	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5270	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A29T5210	120-1494-00			TRANSFORMER,PWR:ISOLATION HF,POT CORE	80009	120-1494-00
A29T5230	120-1533-00			XFMR,ISOLATION:2KV,1:1 RATIO,DUAL SIGNAL	TK1601	63820
A29TP4910	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP4960	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP4980	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29TP5140	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5270	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5271	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5290	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29U4920	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A29U4930	156-0422-02			MICROCKT,DGTL:UP/DOWN SYN BINARY CNTR,SCRN	18324	N74LS191NB
A29U4932	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A29U4940	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U4942	156-0515-02			MICROCKT,DGTL:TRIPLE 3-CHAN MUX,SEL	80009	156-0515-02
A29U4944	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A29U4950	156-1850-00			MICROCKT,LINEAR:CMOS,QUAD SPST ANALOG SW	17856	SDG21107
A29U4960	156-1978-01			MICROCKT,LINEAR:OP AMP,L BIAS CUR/OFFSET V	80009	156-1978-01
A29U4970	156-1838-01			MICROCKT,LINEAR:OPERATIONAL AMPLIFIER	80009	156-1838-01
A29U5010	156-1225-00			MICROCKT,LINEAR:DUAL COMPARATOR	01295	LM393P
A29U5020	156-0513-00			MICROCKT,DGTL:CMOS,8-CHANNEL MUX	04713	MC14051BCL
A29U5030	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5040	156-0854-00			MICROCKT,LINEAR:OPNL AMPL	27014	LM308AN
A29U5050	156-0783-00			MICROCKT,LINEAR:PRECISION VOLTAGE REFERENCE	27014	LM399
A29U5060	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5110	156-1207-00			MICROCKT,LINEAR:VOLTAGE REGULATOR,-12 V	04713	MC79L12ACG
A29U5112	156-1160-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L12ACG
A29U5120	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U5122	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U5124	156-0934-00			MICROCKT,DGTL:DUAL LINE RCVR	01295	SN75152
A29U5130	156-0745-01			MICROCKT,DGTL:HEX INVERTER,BURN-IN	02735	CD4069UBFX
A29U5132	156-1245-00			MICROCKT,LINEAR:7 XSTR,SI,HV/HIGH CURRENT	01295	ULN2003AN-P3
A29U5140	156-1457-01			MICROCKT,LINEAR:TRUE RMS TO DC CONVERTER,	24355	AD41134
A29U5150	156-1850-00			MICROCKT,LINEAR:CMOS,QUAD SPST ANALOG SW	17856	SDG21107
A29U5151	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5170	156-0130-00			MICROCKT,LINEAR:MODULATOR/DEMODULATOR	80009	156-0130-00
A29U5222	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5224	156-0844-02			MICROCKT,DGTL:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A(NP3)
A29U5230	156-0302-02			MICROCKT,DGTL:DUAL 2-INP NAND DRVR,SCRN	01295	SN75452PP3
A29U5231	156-0895-01			MICROCKT,DGTL:14 BIT BINARY COUNTER,BURN-IN	02735	CD4020BFX
A29U5232	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A29U5240	156-0789-02			MICROCKT,DGTL:8 BIT SR,PRL LOAD,SCREENED	04713	SN74LS165JDS
A29U5241	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A29U5242	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A29U5250	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A29U5251	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5252	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A29U5260	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A29U5270	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A29U5271	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A29U5272	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A29U5273	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5274	156-1172-01			MICROCKT,DGTL:DUAL 4 BIT BIN CNTR,SCRN	01295	SN74LS393NP3
A29U5281	160-3679-01			MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A29, ORDER SEPARATELY)	80009	160-3679-01
A29U5282	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A29VR5010	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A29VR5020	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205
A29VR5031	152-0662-00			SEMICOND DVC,DI:ZEN,SI,5V,1%,400MW,DO-7	04713	SZG195RL
A29VR5160	152-0217-00			SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
A29VR5162	152-0217-00			SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
A29VR5210	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29W4980	195-0964-00			LEAD,ELECTRICAL:26 AWG,2.0 L,9-1	80009	195-0964-00

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A29W5070	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A29W5075	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195-1259-00
A29W5260	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A29Y4910	158-0261-00			XTAL UNIT,QTZ:3.579MHZ,01%	33096	CCAT101773HC18
A30	670-7894-01			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670-7894-01
A30C4310	283-0421-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAA
A30LS4330	119-1427-01			XDCR,AUDIO:1-4.2KHZ,30MA,6V	TK1066	QMB-06
A30P4300	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 2)	22526	48283-029
A30R4320	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A103OR706A103
A30S4302	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	80009	260-2171-00
A30S4303	260-2170-00			SWITCH,PUSH:5 BUTTON,I POLE,INPUT SEL	80009	260-2170-00
A30S4304	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	59821	2LL199NB021068
A30S4305	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	59821	2LL199NB021068
A30S4306	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	80009	260-2171-00
A30U4300	156-1080-01			MICROCKT,DGTL:HEX BUFFERS W/OC HV OUT,SCRN	01295	SN7407NP3
A30U4310	156-0541-02			MICROCKT,DGTL:DUAL 2-TO 4-LINE DCDR/DEMUX	04713	SN74LS139NDS
A30U4320	156-1220-01			MICROCKT,DGTL:HEX BUS DRIVER,SCREENED	01295	SN74LS365NP3
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A32CR6330	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32J6300	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A32J6370	131-1425-00			CONN,RCPT,ELEC:RTANG HEADER,1 X 36,0.1 SP (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,RCPT,ELEC:RTANGLE HEADER,1 X 36 (LOCATION B)	22526	65524-136
A32J6380	131-3045-00			CONN,RCPT,ELEC:CKT BD,RTANG,1 X 5,0.1 SP	80009	131-3045-00
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A32Q6334	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A32U6310	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6315	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6320	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A32U6325	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6330	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6335	156-1724-00			MICROCKT,DGTL:QUAD 2 INPUT OR GATE	04713	MC74F32ND

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A32U6350	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A32U6356	156-1743-00			MICROCKT,DGTL:ASTTL,QUAD 2-INPUT NOR GATE	18324	74F02 NB OR FB
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33J6400	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A33P6380	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33P6385	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A33U6405	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6409	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6415	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A33U6420	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6425	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6430	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6435	156-1800-00			MICROCKT,DGTL:ASTTL,QUAD 2 INP EXCL OR GATE	18324	N74F86(NB OR JB)
F4991	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW (OPTION 01)	71400	AGC-CW-1 1/2

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REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

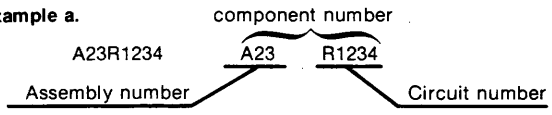
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

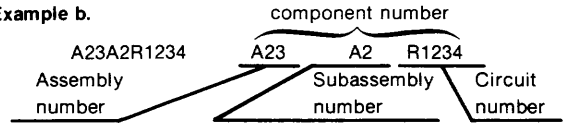
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00213	NYTRONICS COMPONENTS GROUP INC SUBSIDIARY OF NYTRONICS INC	ORANGE ST	DARLINGTON SC 29532
00779	AMP INC	P O BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPRESSWAY P O BOX 225012 M/S 49	DALLAS TX 75265
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
03888	KDI PYROFILM CORP	60 S JEFFERSON RD	WHIPPANY NJ 07981
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR GROUP	5005 E MCDOWELL RD	PHOENIX AZ 85008
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
07263	FAIRCHILD CAMERA AND INSTRUMENT CORP SEMICONDUCTOR DIV	464 ELLIS ST	MOUNTAIN VIEW CA 94042
07716	TRW INC TRW ELECTRONICS COMPONENTS TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
08261	SPECTRA-STRIP AN ELTRA CO	7100 LAMPSON AVE	GARDEN GROVE CA 92642
12954	MICROSEMI CORP	8700 E THOMAS RD P O BOX 1390	SCOTTSDALE AZ 85252
13409	SENSITRON SEMICONDUCTOR DIV OF RSM ELECTRON POWER INC	221 W INDUSTRY COURT	DEER PARK NY 11729
14433	ITT SEMICONDUCTORS DIV		WEST PALM BEACH FL
14552	MICRO/SEMICONDUCTOR CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704
14752	ELECTRO CUBE INC	1710 S DEL MAR AVE	SAN GABRIEL CA 91776
15454	AMETEK INC RODAN DIV	2905 BLUE STAR ST	ANAHEIM CA 92806
15513	DATA DISPLAY PRODUCTS	303 N OAK ST	LOS ANGELES CA 90302
15636	ELEC-TROL INC	26477 N GOLDEN VALLEY RD	SAUGUS CA 91350
17856	SILICONIX INC	2201 LAURELWOOD RD	SANTA CLARA CA 95054
18324	SIGNETICS CORP	811 E ARQUES	SUNNYVALE CA 94086
19647	CADDOCK ELECTRONICS INC	3127 CHICAGO AVE	RIVERSIDE CA 92507
19701	MEPCO/ELECTRA INC A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067
20932	KYOCERA INC	11620 SORRENTO VALLEY RD	SAN DIEGO CA 92121
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS	30 HUNTER LANE	CAMP HILL PA 17011
24355	ANALOG DEVICES INC	RT 1 INDUSTRIAL PK P O BOX 280	NORWOOD MA 02062
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051
27264	MOLEX INC CORPORATE HQ	2222 WELLINGTON COURT	LISLE IL 60532
31433	UNION CARBIDE CORP ELECTRONICS DIV	PO BOX 5928	GREENVILLE SC 29606
32293	INTERSIL INC	10900 N TANTAU AVE	CUPERTINO CA 95014
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086
50157	MIDWEST COMPONENTS INC	1981 PORT CITY BLVD P O BOX 787	MUSKEGON MI 49443
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	640 PAGE MILL RD	PALO ALTO CA 94304
52648	PLESSEY INC PLESSEY OPTOELECTRONICS AND MICROWAVE	1641 KAISER AVE	IRVINE CA 92714
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195
57668	ROHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
58361	GENERAL INSTRUMENT CORP OPTOELECTRONICS DIV	3400 HILLVIEW AVE	PALO ALTO CA 94304

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
59821	CENTRALAB INC SUB NORTH AMERICAN PHILIPS CORP	7158 MERCHANT AVE	EL PASO TX 79915
61529	AROMAT CORP	250 SHEFFIELD ST	MOUNTAINSIDE NJ 07092
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
75042	INTERNATIONAL RESISTIVE CO INC	401 N BROAD ST	PHILADELPHIA PA 19108
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES IL 60016
76493	BELL INDUSTRIES INC MILLER J W DIV	19070 REYES AVE P O BOX 5825	COMPTON CA 90224
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
91637	DALE ELECTRONICS INC	P O BOX 609	COLUMBUS NE 68601
92194	ALPHA WIRE CORP	711 LIDGERWOOD AVE	ELIZABETH NJ 07207
TK1015	MUSASHI WORKS OF HITACHI LTD	1450 JOSUIHON-CHO KODAIRA-SHI	TOKYO JAPAN
TK1345	ZMAN AND ASSOCIATES	7633 S 180TH	KENT WA 98032
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1601	PULSE ENGINEERING INC	1680 THE ALAMEDA	SAN JOSE CA 95126
TK1650	AMP INC	19200 STEVENS CREEK BLVD	CUPERTINO CA 95014
TK2042	ZMAN & ASSOCIATES	7633 SO. 180TH	KENT, WA 98032

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A2	672-0076-07			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672-0076-07
A10	670-7390-01			CIRCUIT BD ASSY:FAN MOTOR (OPTION 01 ONLY)	80009	670-7390-01
A20	670-7830-12	B010100	B013647	CIRCUIT BD ASSY:BUFFER (OPTION 01/06/09 ONLY)	80009	670-7830-12
A20	670-7830-13	B010100	B013647	CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 01/06/09/10 ONLY)	80009	670-7830-13
A20	670-7830-13	B013648	B015896	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
A20	670-7830-15	B015897		CIRCUIT BD ASSY:BUFFER (FOR ALL OPTIONS AND COMBINATIONS) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-15
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A27	670-7997-07	B010100	B015745	CIRCUIT BD ASSY:COUNTER TIMER TRIGGER	80009	670-7997-07
A27	670-7997-09	B015746		CIRCUIT BD ASSY:COUNTER/TIMER/TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-09
A29	670-7835-07			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670-7835-07
A30	670-7894-01			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670-7894-01
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A2	672-0076-07			CIRCUIT BD ASSY:LV PWR SPLY MODULE (OPTION 01 ONLY)	80009	672-0076-07
A10	670-7390-01			CIRCUIT BD ASSY:FAN MOTOR (OPTION 01 ONLY)	80009	670-7390-01
A10B1690	147-0035-00			MOTOR,DC:BRUSHLESS,3000 RPM,10-15V	25088	1AD3001-0A
A10C1698	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A10CR1691	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1692	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1694	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1696	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10CR1699	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A10J301	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 3)	22526	48283-036
A10Q1698	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A10R1691	308-0142-00			RES,FXD,WW:30 OHM,5%,3W	00213	1240S-30-5
A10R1692	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A10R1693	323-0155-00			RES,FXD,FILM:402 OHM,1%,0.5W,TC=T0	75042	CECT0-4020F
A10R1694	323-0155-00			RES,FXD,FILM:402 OHM,1%,0.5W,TC=T0	75042	CECT0-4020F
A10R1695	321-0222-00			RES,FXD,FILM:2.00K OHM,1%,0.125W,TC=T0	19701	5033ED2K00F
A10R1697	321-0190-00			RES,FXD,FILM:931 OHM,1%,0.125W,TC=T2	19701	5043ED931R0F
A10RT1696	307-0124-00			RES,THERMAL:5K OHM,10%,NTC	15454	1DC502K-220-EC
A10U1690	156-0281-00			MICROCKT,LINEAR:4-XSTR,HIGH CUR ARRAY	02735	89164

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A20	670-7830-12	B010100	B013647	CIRCUIT BD ASSY:BUFFER (OPTION 01/06/09 ONLY)	80009	670-7830-12
A20	670-7830-13	B010100	B013647	CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 01/06/09/10 ONLY)	80009	670-7830-13
A20	670-7830-13	B013648	B015896	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
A20	670-7830-15	B015897		CIRCUIT BD ASSY:BUFFER (FOR ALL OPTIONS AND COMBINATIONS) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-15
A20C4215	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4224	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4240	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4241	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4255	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4260	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4265	281-0764-00			CAP,FXD,CER DI:82PF,5%,100V	04222	MA101A820JAA
A20C4270	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)O)	54583	MA12X7R1H223M-T
A20J4210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 34)	22526	48283-036
A20J4220	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 14)	22526	48283-029
A20J4221	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 24)	22526	48283-029
A20J4228	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4230	131-2920-00	B010100	B015896	CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4230	131-3766-00	B015897		CONN,RCPT,ELEC:HEADER,1 X 2,0.10 SPACING	TK1650	87232-2
A20J4232	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4234	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4236	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4240	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS (QUANTITY OF 40, LOCATION A)	22526	48283-086
A20J4240	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 4, LOCATION B)	22526	48283-029
A20J4242	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 44)	22526	48283-029
A20J4243	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 44)	22526	48283-029
A20J4256	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 14)	22526	48283-036
A20J4256	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS (QUANTITY OF 2)	22526	48283-086
A20J4330	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 16)	22526	48283-036
A20P203	131-2924-00			CONN,RCPT,ELEC:HEADER,1 X 6,0.2 SPACING	27264	10-51-1061
A20P303	131-2923-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.2 SPACING	27264	10-51-1021
A20R4202	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4203	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4207	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4208	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4224	315-0102-00	B010100	B015896	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A20R4224	313-1102-00	B015897		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A20R4265	315-0681-00	B010100	B015896	RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A20R4265	313-1681-00	B015897		RES,FXD,FILM:680 OHM,5%,0.2W	57668	TR20JE 680E
A20U4225	156-1318-00			MICROCKT,DGTL:LSTTL,4-BIT BISTABLE LATCH,SCRN	01295	SN74LS375NP3
A20U4235	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4240	156-0718-03			MICROCKT,DGTL:TRIPLE 3-INP NOR GATE,SCRN	01295	SN74LS27NP3
A20U4245	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4250	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A20U4255	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A20U4260	160-3676-01	B010100	B014958	MICROCKT,DGTL:4096 X 8 EPROM,PRGM	80009	160-3676-01
A20U4260	160-3676-02	B014959		MICROCKT,DGTL:4096 X 8 EPROM,PRGM (NOT PART OF A20, ORDER SEPARATELY)	80009	160-3676-02
A20U4265	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A20U4275	156-0392-03			MICROCKT,DGTL:QUAD LATCH W/CLEAR,SCRN,	07263	74LS175PCQR
A20U4280	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A20W4210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A22DS4540	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4542	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4545	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22W4540	175-7185-00			CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON	80009	175-7185-00
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-10%,10V	55680	TLB1A470MAA
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23J4540	131-1614-00			CONN,RCPT,ELEC:CKT BD,1 X 36,0.1 SPACING	08261	800-380-000
A23J4800	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 24)	22526	48283-036
A23P4243	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0736-00
A23R4513	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4515	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4543	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4544	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4545	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4732	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A23R4734	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A23R4735	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
A23R4740	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5

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A23R4743	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A23U4501	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4505	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4601	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4605	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A23U4606	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A23U4608	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A23U4625	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4626	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR,SCRN	27014	DM81LS95ANA+
A23U4705	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A23U4706	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4708	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A23U4710	160-3674-01	B010100	B010528	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3674-01
A23U4710	160-3674-02	B010529		MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3674-02
A23U4715	160-3675-01	B010100	B010528	MICROCKT,DGTL:16K X 8 EPROM,PRGM	80009	160-3675-01
A23U4715	160-3675-02	B010529		MICROCKT,DGTL:16K X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3675-02
A23U4730	156-0467-02			MICROCKT,DGTL:QUAD 2-INP NAND BFR W/OC OUT	01295	SN74LS38NP3
A23U4735	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4738	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A23U4801	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A23U4805	156-1415-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR MGT BUS	01295	SN75161A N
A23U4808	156-1414-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR DATA BUS	01295	SN75160 (N OR J)
A23U4811	156-1594-00			MICROCKT,DGTL:NMOS,2048 X 8 SRAM	TK1015	HM6116P-3(DP-24)
A23U4818	156-1444-01			MICROCKT,DGTL:NMOS,GPIB INTFC CONTROLLER	01295	TMS9914A (NL
A23U4831	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A23U4838	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A25C5331	290-0808-00			CAP,FXD,ELCTLT:2.7UF,10%,20V	05397	T322B275K020AS
A25C5374	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5419	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5433	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5458	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5465	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5490	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5540	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5543	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5545	281-0826-00			CAP,FXD,CER DI:2200PF,5%,100V	20932	401EM100AD222K
A25C5612	283-0024-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	SR215C104MAA
A25C5613	281-0792-00			CAP,FXD,CER DI:82PF,10%,100V	04222	MA101A820KAA
A25C5625	281-0788-00			CAP,FXD,CER DI:470PF,10%,100V	04222	MA101C471KAA
A25C5627	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5630	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5631	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5633	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5639	290-0246-00			CAP,FXD,ELCTLT:3.3UF,10%,15V	12954	D3R3EA15K1
A25C5640	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5651	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5690	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5720	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5724	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5726	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A25C5726	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA

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A25C5728	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5731	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5734	281-0863-00			CAP,FXD,CER DI:240PF,5%,100V	04222	MA101A241JAA
A25C5740	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5755	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5757	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5770	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5773	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5775	281-0813-00			CAP,FXD,CER DI:0.047UF,20%,50V	05397	C412C473M5V2CA
A25C5810	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5830	281-0820-00			CAP,FXD,CER DI:680 PF,10%,50V	04222	MA105C651KAA
A25C5848	281-0861-00			CAP,FXD,CER DI:270PF,5%,50V	54583	MA12COG1H271J
A25C5850	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5853	283-0486-00			CAP,FXD,CER DI:1.0UF,10%,50V	04222	SR405105K
A25C5865	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A25CR5333	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5336	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5522	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5526	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5623	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5641	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5653	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5655	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5721	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5735	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5751	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5772	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5774	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5776	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5823	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5825	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5831	152-0322-00			SEMICOND DVC,DI:SCHOTTKY BARR,SI,15V,DO-35	50434	5082-2672
A25CR5867	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25P4220	131-2889-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 7,0.1 SP	22526	65000-103
A25P4242	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A25Q5370	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A25Q5442	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5512	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5515	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5518	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5528	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5530	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5625	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5735	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5736	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5860	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25R5319	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5322	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5329	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5330	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5334	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5335	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5370	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5371	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5421	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5422	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5423	315-0564-00	B010100	B013301	RES,FXD,FILM:560K OHM,5%,0.25W	19701	5043CX560K0J
A25R5423	315-0154-00	B013302		RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K

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A25R5424	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5429	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5432	321-0251-00			RES,FXD,FILM:4.02K OHM,1%,0.125W,TC=T0	19701	5033ED4K020F
A25R5433	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5434	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5436	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5443	315-0204-00			RES,FXD,FILM:200K OHM,5%,0.25W	19701	5043CX200K0J
A25R5444	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A25R5445	315-0163-00			RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
A25R5519	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A25R5523	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A25R5524	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5525	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A25R5540	315-0303-00			RES,FXD,FILM:30K OHM,5%,0.25W	19701	5043CX30K00J
A25R5541	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5542	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5544	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5556	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5557	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5610	315-0112-00			RES,FXD,FILM:1.1K OHM,5%,0.25W	19701	5043CX1K100J
A25R5611	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A25R5612	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A25R5622	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5623	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
A25R5624	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5626	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
A25R5627	315-0162-00			RES,FXD,FILM:1.6K OHM,5%,0.25W	19701	5043CX1K600J
A25R5628	321-0226-00			RES,FXD,FILM:2.21K OHM,1%,0.125W,TC=T0	01121	RNK2211F
A25R5629	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5632	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5652	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5656	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5657	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5720	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
A25R5722	315-0911-00			RES,FXD,FILM:910 OHM,5%,0.25W	57668	NTR25J-E910E
A25R5723	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5725	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A25R5729	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A25R5730	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5732	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5733	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5735	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5736	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5737	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5738	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5739	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
A25R5750	315-0154-00			RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
A25R5752	315-0751-00			RES,FXD,FILM:750 OHM,5%,0.25W	57668	NTR25J-E750E
A25R5754	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A25R5755	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A25R5756	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5760	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5771	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
A25R5810	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
A25R5811	307-0104-00			RES,FXD,CMPSN:3.3 OHM,5%,0.25W	01121	CB33G5
A25R5812	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5813	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5820	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A25R5822	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5823	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5824	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5825	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5826	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5827	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5829	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5830	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5831	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5832	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5833	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A25R5834	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A25R5847	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5850	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5851	315-0514-00			RES,FXD,FILM:510K OHM,5%,0.25W	19701	5043CX510K0J
A25R5852	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5853	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A25R5854	315-0824-00			RES,FXD,FILM:820K OHM,5%,0.25W	19701	5043CX820K0J
A25R5858	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5864	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A25R5868	315-0683-00			RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
A25R5891	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25U5310	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5315	156-0991-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L05ACP
A25U5380	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A25U5390	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A25U5410	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5427	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A25U5436	156-1349-00			MICROCKT,LINEAR:DUAL INDEP DIFF AMPL	02735	CA3054-98
A25U5456	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5459	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A25U5565	160-3677-02	B010100	B015155	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3677-02
A25U5565	160-3677-03	B015156		MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A25, ORDER SEPARATELY)	80009	160-3677-03
A25U5575	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A25U5580	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5590	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25U5636	156-1200-01			MICROCKT,LINEAR:OPERATIONAL AMPL,QUAD BIFET	80009	156-1200-01
A25U5645	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5680	156-0481-02			MICROCKT,DGTL:TRIPLE 3-INP & GATE,SCRN	01295	SN74LS11NP3
A25U5712	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5728	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5755	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5756	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5764	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A25U5770	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5775	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5790	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5835	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5838	156-0575-03			MICROCKT,DGTL:3 INPUT NOR GATE,SELECTED	02735	CD4025BFX
A25U5845	156-0704-00			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046CP
A25U5855	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5880	156-1981-00			MICROCKT,DGTL:QUAD J-K FLIP-FLOP,SCRN	01295	SN54276J4
A25U5890	156-0381-02			MICROCKT,DGTL:QUAD 2-INP EXCL OR GATE	07263	74LS86PCQR
A25VR5420	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A25VR5866	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27	670-7997-07	B010100	B015745	CIRCUIT BD ASSY:COUNTER TIMER TRIGGER	80009	670-7997-07
A27	670-7997-09	B015746		CIRCUIT BD ASSY:COUNTER/TIMER/TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-09
A27C5920	281-0757-00			CAP,FXD,CER DI:10PF,20%,100V	04222	MA101A100MAA
A27C5921	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5921	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5922	281-0759-00			CAP,FXD,CER DI:22PF,10%,100V	04222	MA101A220KAA
A27C5923	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5924	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5940	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5940	281-0775-01	B015745		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-01	B015745		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5960	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5961	281-0765-00			CAP,FXD,CER DI:100PF,5%,100V	04222	MA101A101JAA
A27C5980	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5981	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5990	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5991	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5991	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6020	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6021	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6030	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6033	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A27C6040	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6040	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6110	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6111	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6112	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A27C6113	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6113	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6120	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6121	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6121	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6130	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6170	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6192	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6192	281-0909-00	B015746		CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27C6230	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6231	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6232	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A27C6260	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6260	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-01	B015746		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0775-00	B010100	B015745	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0909-00	B015746		CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27CR5960	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5961	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5970	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5990	152-0141-02	B015746		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)

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A27CR6010	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6020	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6162	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6170	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6180	152-0141-02	B015746		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6181	152-0951-00	B015746		SEMICOND DVC DI:SI,SCHOTTKY,60V,2.2F	50434	IN6263
A27CR6182	152-0141-02	B015746		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6190	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF,DO-7	04713	SMV1263
A27CR6211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6273	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27J5990	131-3058-00	B010100	B015745	CONN,RCPT,ELEC:HEADER,RTANG,2 X 3,0.1 CTR	00779	1-86479-5
A27J5990	131-3851-00	B015746		CONN,RCPT,ELEC:HEADER,2 X 4,0.1 SPACING	TK1650	1-02123-5
A27J5991	131-2921-00	B010100	B015745	CONN,RCPT,ELEC:HEADER,1 X 2,0.1 SPACING	00779	1-86479-3
A27J6135	175-2054-00			WIRE,ELECTRICAL:SOLID,30 AWG,BLACK,KYNAR	92194	5951
A27L5990	108-0245-00	B010100	B015745	CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A27L5990	108-1251-00	B015746		COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6030	108-0245-00	B010100	B015745	CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A27L6030	108-1251-00	B015746		COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6210	108-0892-00	B010100	B015745	COIL,RF:FIXED,44NH	TK2042	ORDER BY DESCR
A27L6210	108-1382-00	B015746		COIL,RF:FIXED,42NH,10%	TK1345	ORDER BY DESCR
A27P4221	131-2890-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 12,0.1 SP	22526	65000-010
A27P4240	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A27Q5920	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5921	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5980	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q5981	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q5982	151-0427-00	B010100	B015745	TRANSISTOR:NPN,SI,TO-92	07263	S39287
A27Q5982	151-0427-03	B015745		TRANSISTOR:NPN,SI	07263	S39287
A27Q5983	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q6090	151-0427-00	B010100	B015745	TRANSISTOR:NPN,SI,TO-92	07263	S39287
A27Q6090	151-0427-03	B015746		TRANSISTOR:NPN,SI	07263	S39287
A27Q6091	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6092	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6093	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6180	151-0190-00	B015746		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q6181	151-0190-00	B015746		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q6190	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6191	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6270	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6271	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6272	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6273	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6274	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6290	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6291	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6292	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27R5920	315-0512-00	B010100	B015745	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R5920	313-1512-00	B015746		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R5921	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5921	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R5950	315-0113-00	B010100	B015745	RES,FXD,FILM:11K OHM,5%,0.25W	19701	5043CX11K00J
A27R5950	313-1113-00	B015746		RES,FXD,FILM:11K OHM,5%,0.2W	57668	TR20JE11K0
A27R5951	315-0222-00	B010100	B015745	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R5951	313-1222-00	B015746		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R5952	315-0103-00	B010100	B015745	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5952	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R5960	315-0201-00	B010100	B015745	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27R5960	313-1201-00	B015746		RES,FXD,FILM:200 OHM,5%,0.2W	57668	TR20JE200E
A27R5961	315-0131-00	B010100	B015745	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R5961	313-1131-00	B015746		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R5962	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5962	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R5963	315-0202-00	B010100	B015745	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5963	313-1202-00	B015746		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5964	315-0474-00	B010100	B015745	RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5964	313-1474-00	B015746		RES,FXD,FILM:470K OHM,5%,0.2W	80009	313-1474-00
A27R5970	315-0680-00	B010100	B015745	RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5970	313-1680-00	B015746		RES,FXD,FILM:68 OHM,0.2W,5%	57668	TR20JT68 68E
A27R5971	315-0223-00	B010100	B015745	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5971	313-1223-00	B015746		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R5972	315-0202-00	B010100	B015745	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5972	313-1202-00	B015746		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5973	315-0103-00	B010100	B015745	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5973	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R5980	315-0223-00	B010100	B015745	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5980	313-1223-00	B015746		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R5981	315-0202-00	B010100	B015745	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5981	313-1202-00	B015746		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5982	315-0302-00	B010100	B015745	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R5982	313-1302-00	B015746		RES,FXD,FILM:3K OHM,5%,0.2W	57668	TR20JE 03K0
A27R5983	315-0680-00	B010100	B015745	RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5983	313-1680-00	B015746		RES,FXD,FILM:68 OHM,0.2W,5%	57668	TR20JT68 68E
A27R5984	315-0101-00	B010100	B015745	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R5984	313-1101-00	B015746		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R5985	315-0474-00	B010100	B015745	RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5985	313-1474-00	B015746		RES,FXD,FILM:470K OHM,5%,0.2W	80009	313-1474-00
A27R5990	315-0681-00	B010100	B015745	RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A27R5991	315-0330-00	B010100	B015745	RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R00J
A27R5991	313-1330-00	B015746		RES,FXD,FILM:33 OHM,5%,0.2W	91637	CCF501G33R0J
A27R5992	315-0301-00	B010100	B015745	RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A27R5992	313-1301-00	B015746		RES,FXD,FILM:300 OHM,5%,0.2W,MI	57668	TR20JT68-300E
A27R5993	315-0750-00	B010100	B015745	RES,FXD,FILM:75 OHM,5%,0.25W	57668	NTR25J-E75E0
A27R5993	313-1750-00	B015746		RES,FXD,FILM:75 OHM,5%,0.2W	57668	TR20JE 75E
A27R6020	315-0223-00	B010100	B015745	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R6020	313-1223-00	B015746		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R6021	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6021	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6022	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6022	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6042	315-0103-00	B010100	B015745	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6042	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6050	315-0122-00	B010100	B015745	RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A27R6050	313-1122-00	B015746		RES,FXD,FILM:1.2K OHM,5%,0.2W	57668	TR20JE01K2
A27R6060	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6060	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6062	315-0131-00	B010100	B015745	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6062	313-1131-00	B015746		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R6063	315-0201-00	B010100	B015745	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R6063	313-1201-00	B015746		RES,FXD,FILM:200 OHM,5%,0.2W	57668	TR20JE200E
A27R6064	315-0222-00	B010100	B015745	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6064	313-1222-00	B015746		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R6081	315-0222-00	B010100	B015745	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6081	313-1222-00	B015746		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R6082	315-0221-00	B010100	B015745	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A27R6082	313-1221-00	B015746		RES,FXD,FILM:220 OHM,5%,0.2W	57668	TR20JE220E

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A27R6083	315-0101-00	B010100	B015745	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6083	313-1101-00	B015746		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6090	315-0131-00	B010100	B015745	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6090	313-1131-00	B015746		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R6091	315-0181-00	B010100	B015745	RES,FXD,FILM:180 OHM,5%,0.25W	57668	NTR25J-E180E
A27R6091	313-1181-00	B015746		RES,FXD,FILM:180 OHM,5%0.2W	57668	TR20JE180E
A27R6092	315-0202-00	B010100	B015745	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6092	313-1202-00	B015746		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R6093	315-0103-00	B010100	B015745	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6093	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6094	315-0101-00	B010100	B015745	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6094	313-1101-00	B015746		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6104	315-0202-00	B010100	B015745	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6104	313-1202-00	B015746		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R6121	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6121	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6160	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6160	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6161	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6161	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6162	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6162	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6163	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6163	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6164	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6164	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6165	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6165	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6166	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6166	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6170	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6170	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6172	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6172	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6173	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6173	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6175	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6175	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6176	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6176	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6177	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6178	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6180	313-1510-00	B015746		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6181	313-1511-00	B015746		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6182	313-1510-00	B015746		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6183	313-1510-00	B015746		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6184	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6191	315-0471-00	B010100	B015745	RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A27R6191	313-1471-00	B015746		RES,FXD,FILM:470 OHM,5%,0.2W	57668	TR20JE 470E
A27R6192	315-0221-00	B010100	B015745	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A27R6192	313-1221-00	B015746		RES,FXD,FILM:220 OHM,5%,0.2W	57668	TR20JE220E
A27R6193	315-0302-00	B010100	B015745	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R6193	313-1302-00	B015746		RES,FXD,FILM:3K OHM,5%,0.2W	57668	TR20JE 03K0
A27R6194	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6195	315-0101-00	B010100	B015745	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6195	313-1101-00	B015746		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6197	315-0512-00	B010100	B015745	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6197	313-1512-00	B015746		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1

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A27R6198	315-0103-00	B010100	B015745	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6198	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6199	315-0512-00	B010100	B015745	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6199	313-1512-00	B015746		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R6221	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6221	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6222	315-0823-00	B010100	B015745	RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A27R6222	313-1823-00	B015746		RES,FXD,FILM:82K OHM,5%,0.2W	57668	TR20JE 82K
A27R6230	315-0103-00	B010100	B015745	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6230	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6231	315-0910-00			RES,FXD,FILM:91 OHM,5%,0.25W	19701	5043CX91R00J
A27R6232	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6232	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6233	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6233	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6245	315-0101-00	B010100	B015745	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6245	313-1101-00	B015746		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6250	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A1030R706A103
A27R6251	315-0102-00	B010100	B015745	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6251	313-1102-00	B015746		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6252	313-1103-00	B015746		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6260	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6260	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6261	315-0152-00	B010100	B015745	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6261	313-1152-00	B015746		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6262	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6263	315-0621-00	B010100	B015745	RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A27R6263	313-1621-00	B015746		RES,FXD,FILM:620 OHM,5%,0.2W	57668	TR20JE 620E
A27R6264	315-0101-00	B010100	B015745	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6264	313-1101-00	B015746		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6266	315-0510-00	B010100	B015745	RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6266	313-1510-00	B015746		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6267	315-0511-00	B010100	B015745	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6267	313-1511-00	B015746		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6270	315-0391-00	B010100	B015745	RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A27R6270	313-1391-00	B015746		RES,FXD,FILM:390 OHM,5%,0.2W	57668	TR20JE 390E
A27R6271	315-0511-00	B010100	B015745	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6271	313-1511-00	B015746		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6273	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6274	315-0511-00	B010100	B015745	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6274	313-1511-00	B015746		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6275	315-0511-00	B010100	B015745	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6275	313-1511-00	B015746		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6276	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6277	315-0752-00	B010100	B015745	RES,FXD,FILM:7.5K OHM,5%,0.25W	57668	NTR25J-E07K5
A27R6277	313-1752-00	B015746		RES,FXD,FILM:7.5K OHM,5%,0.2W	57668	TR20JE 07K5
A27R6290	321-0157-00			RES,FXD,FILM:422 OHM,1%,0.125W,TC=T0	07716	CEAD422R0F
A27R6291	321-0066-00			RES,FXD,FILM:47.5 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G47R50F
A27R6293	315-0510-00	B010100	B015745	RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6293	313-1510-00	B015746		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6294	315-0511-00	B010100	B015745	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6294	313-1511-00	B015746		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27U5910	156-0656-02			MICROCKT,DGTL:DECADE COUNTER,SCRN	01295	SN74LS90NP3
A27U5930	160-3678-03	B010100	B010528	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-03
A27U5930	160-3678-04	B010529	B015745	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-04
A27U5930	160-3678-05	B015746		MICROCKT,DGTL:32678 X 8 EPROM,PRGM (NOT PART OF A27, ORDER SEPARATELY)	80009	160-3678-05

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27U5940	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A27U5942	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A27U5950	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A27U5952	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A27U5990	156-1340-01			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCREENED	02735	CD4071BFX
A27U6010	156-0124-02			MICROCKT,DGTL:SCRN	04713	MC4044LDS
A27U6070	156-1795-00			MICROCKT,DGTL:DUAL 4 TO 1 MUX	04713	MC10H174PD
A27U6120	156-0266-01			MICROCKT,DGTL:EMITTER COUPLED OSCILLATOR	04713	MC1648PD/LD
A27U6130	156-1248-00			MICROCKT,DGTL:ECL,PRESCALER/DIVIDE BY 100	52648	SP8629
A27U6140	156-1550-00			MICROCKT,DGTL:NMOS,SYS TIMING CONT,SCRN	34335	AM9513APCTB
A27U6150	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A27U6152	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A27U6180	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY,PRGM	04713	SC32205-001
A27U6230	156-1134-00			MICROCKT,LINEAR:OP AMPL,MOS/FET INPUT	02735	CA3140EX
A27U6250	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A27U6252	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A27U6290	156-0411-02			MICROCKT,LINEAR:QUAD COMPARATOR,SCREENED	04713	LM339JDS
A27W6042	131-0566-00	B015746		BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6084	131-0566-00	B010100	B015745	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6174	131-0566-00	B010100	B015745	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ	33096	CCAT101801
A29	670-7835-07			CIRCUIT BD ASSY:DMM (OPTION 01 ONLY)	80009	670-7835-07
A29C4910	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4911	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C4912	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C4913	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4914	285-0558-00			CAP,FXD,PLASTIC:0.05 UF 2%,50V	80009	285-0558-00
A29C4915	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4932	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C4960	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A29C4961	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4962	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C4963	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5015	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A29C5020	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5031	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A29C5050	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5051	281-0762-00			CAP,FXD,CER DI:27PF,20%,100V	04222	MA101A270MAA
A29C5052	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5070	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	80009	285-0753-00
A29C5071	285-0753-00			CAP,FXD,PLASTIC:0.01UF,3.5%,100V	80009	285-0753-00
A29C5110	290-0532-00			CAP,FXD,ELCTLT:150UF,20%,6V	05397	T354J157M006AS 2
A29C5111	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5112	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5122	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR302E105ZAATR
A29C5124	283-0177-00			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR302E105ZAATR
A29C5130	281-0772-00			CAP,FXD,CER DI:4700PF,10%,100V	04222	MA201C472KAA
A29C5140	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
A29C5142	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5150	290-0876-00			CAP,FXD,ELCTLT:15UF,20%,25 WVDC	05397	T330C156M025AS
A29C5151	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5152	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
A29C5153	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5155	290-0523-00			CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
A29C5160	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA

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A29C5170	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A29C5171	285-1106-00			CAP,FXD,PLASTIC:0.022UF,20%,600V	14752	230B1F223
A29C5220	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5222	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
A29C5224	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A29C5230	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5231	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5232	281-0791-00			CAP,FXD,CER DI:270PF,10%,100V	04222	MA101C271KAA
A29C5250	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5251	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5281	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29C5290	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A29CR4952	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR4970	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A,DO-41	13409	1N4947
A29CR4971	152-0674-00			SEMICOND DVC,DI:RECT,SI,800V,1.0A,DO-41	13409	1N4947
A29CR4980	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR4981	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR4982	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5030	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5031	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5110	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5111	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5112	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5113	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5114	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5115	152-0333-00			SEMICOND DVC,DI:SW,SI,55V,200MA,DO-35	07263	FDH-6012
A29CR5130	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5163	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR5164	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29CR5170	152-0307-00			SEMICOND DVC,DI:SW,SI,100V,0.13A,DO-92	04713	SSD1150
A29CR5210	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5212	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29CR5221	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A29DS5210	150-1014-00			LT EMITTING DIO:RED,695NM,100MA MAX	58361	Q6444/MV5054-1
A29F4990	159-0224-01			FUSE,CARTRIDGE:5AG,3A,600V,FAST	71400	BBS-3
A29F5220	159-0159-00			FUSE,WIRE LEAD:1.5A,125V,5 SEC	75915	25501.5
A29J5210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 2)	22526	48283-036
A29J5220	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 3)	22526	48283-036
A29J5290	131-3323-00			CONN,RCPT,ELEC:HEADER,2 X 20,0.1 SPACING	22526	66506-025
A29J5291	131-3323-00			CONN,RCPT,ELEC:HEADER,2 X 20,0.1 SPACING	22526	66506-025
A29K4980	148-0146-00			RELAY,REED:1 FORM A,500VDC,COIL 5VDC	15636	ORDER BY DESCR
A29K4981	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K4990	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5090	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5091	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5180	148-0149-00			RELAY,ARMATURE:1 EA FORM A/B,8A,250 VAC	61529	ST1E-DC12V
A29K5190	148-0141-00			RELAY,REED:1 FORM A,0.5A,100VDC,COIL 15VDC	15636	R7620-2
A29K5191	148-0141-00			RELAY,REED:1 FORM A,0.5A,100VDC,COIL 15VDC	15636	R7620-2
A29Q4920	151-0354-00			TRANSISTOR:PNP,SI,TO-78	32293	ITS-1200-A
A29Q4922	151-1054-00			TRANSISTOR:FET,N-CHAN,SI,TO-71	80009	151-1054-00
A29Q4930	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A29Q4932	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29Q4934	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4936	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00

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A29Q4950	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A29Q4952	151-1078-00			TRANSISTOR:FET,N-CHAN,SI,TO-92	04713	SPF3040
A29Q4960	151-0254-00			TRANSISTOR:DARLINGTON,NPN,SI	03508	X38L3118
A29Q4970	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4971	151-1103-00			TRANSISTOR:FET,N CHANNEL,SI,TO-72	17856	DM1001
A29Q4972	151-1063-00			TRANSISTOR:MOS FET,N-CHANNEL,SI	80009	151-1063-00
A29Q4973	151-1063-00			TRANSISTOR:MOS FET,N-CHANNEL,SI	80009	151-1063-00
A29Q4980	151-1136-00			TRANSISTOR:MOSFE,N-CHANNEL,SI,TO-220AB	04713	IRF530
A29Q5020	151-0342-00			TRANSISTOR:PNP,SI,TO-92	07263	S035928
A29Q5070	151-1077-01			TRANSISTOR:FET,N-CHAN,SI	80009	151-1077-01
A29Q5124	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A29Q5130	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29Q5210	151-0254-00			TRANSISTOR:DARLINGTON,NPN,SI	03508	X38L3118
A29Q5230	151-0221-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0221-00
A29R4910	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
A29R4911	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A29R4913	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A29R4914	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4915	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4916	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4917	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A29R4920	315-0221-00			RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A29R4921	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4922	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A29R4923	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R4924	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4925	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4926	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4927	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A29R4930	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A29R4932	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R4934	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R4950	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A29R4951	325-0252-00			RES,FXD,FILM:6.95K OHM,0.1%,0.1W	03888	PME55 6.95 K OHM
A29R4952	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R4953	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4954	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4955	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R4957	307-0765-00			RES NTWK,FXD,FI:1K/9K OHM,5%,0.1W	07716	4168
A29R4958	307-0765-00			RES NTWK,FXD,FI:1K/9K OHM,5%,0.1W	07716	4168
A29R4960	307-0934-00			RES NTWK,FXD,FI:SINGLE INLINE,0.25%	19647	1787-31
A29R4970	315-0823-00			RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A29R4971	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A29R4972	315-0164-00			RES,FXD,FILM:160K OHM,5%,0.25W	57668	NTR25J-E160K
A29R4973	321-0924-02			RES,FXD,FILM:40K OHM,0.5%,0.125W,TC=T2	19701	5033RC40K00D
A29R4974	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	19701	5033ED20K00F
A29R4975	307-0346-02			RES,FXD,FILM:1 OHM,0.1%	80009	307-0346-02
A29R4976	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R4977	322-0481-07			RES,FXD,FILM:1M OHM,0.1%,0.25W,TC=T9	19701	5043RE1M000B
A29R4978	323-0385-00			RES,FXD,FILM:100K OHM,1%,0.5W,TC=T0	75042	CECT0-1003F
A29R4979	317-0101-00			RES,FXD,CMPSN:100 OHM,5%,0.125W	01121	BB1015
A29R4980	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5010	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5011	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5012	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5013	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5014	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5015	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J

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A29R5016	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5017	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5020	321-0225-00			RES,FXD,FILM:2.15K OHM,1%,0.125W,TC=T0	19701	5033ED2K15F
A29R5021	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5030	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A29R5032	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5033	321-0325-00			RES,FXD,FILM:23.7K OHM,1%,0.125W,TC=T0	07716	CEAD23701F
A29R5034	321-0318-00			RES,FXD,FILM:20.0K OHM,1%,0.125W,TC=T0	19701	5033ED20K00F
A29R5035	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A29R5036	321-0239-00			RES,FXD,FILM:3.01K OHM,1%,0.125W,TC=T0	19701	5043ED3K010F
A29R5039	321-0296-00			RES,FXD,FILM:11.8K OHM,1%,0.125W,TC=T0	07716	CEAD11801F
A29R5041	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R5042	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A29R5043	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5044	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5045	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5047	321-0277-00			RES,FXD,FILM:7.50K OHM,1%,0.125W,TC=T0	24546	NA55D7501F
A29R5048	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A29R5049	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A29R5054	325-0394-00			RES,FXD,FILM:4.95K OHM,1%,0.1W,T-13	19701	5023ZB 4K950F
A29R5055	325-0079-00			RES,FXD,FILM:1.8K OHM,1%,0.1W,TC-13	19701	5023ZB1K800F
A29R5056	325-0393-00			RES,FXD,FILM:200 OHM,1%,0.1W,T-13	19701	5023 ZB 200R0F
A29R5057	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5058	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5063	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5064	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
A29R5066	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5070	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5071	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	19701	5043CX1M500J
A29R5072	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5073	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A29R5075	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5080	325-0034-00			RES SET,MATCHED:1 EA,9M,900K,99K OHM,1%	03888	ORDER BY DESCR
A29R5081	----- -----			(PART OF A29R5080)		
A29R5082	----- -----			(PART OF A29R5080)		
A29R5083	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	75042	CCAT2-5003C
A29R5090	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5094	321-0193-00			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	19701	5033ED1K00F
A29R5122	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R5124	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A29R5130	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5131	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5132	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5133	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5134	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5150	321-0753-06			RES,FXD,FILM:9K OHM,0.25%,0.125W,TC=T2	07716	CEAE90000C
A29R5151	321-0193-07			RES,FXD,FILM:1K OHM,0.1%,0.125W,TC=T9	19701	5033RE1K000B
A29R5167	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5168	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5170	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A29R5171	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5172	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A29R5173	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A29R5174	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
A29R5176	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
A29R5177	321-0289-09			RES,FXD,FILM:10.0K OHM,1%,0.125W,TC=T9	19701	5033RE10K00F
A29R5181	324-0620-09			RES,FXD,FILM:990K OHM,1%,1W,TC=T9	80009	324-0620-09
A29R5182	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0

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A29R5190	322-0673-03			RES,FXD,FILM:500K OHM,0.25%,0.25W,TC=T2	75042	CCAT2-5003C
A29R5191	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5210	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5211	315-0331-00			RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
A29R5212	307-0103-00			RES,FXD,CMPSN:2.7 OHM,5%,0.25W	01121	CB27G5
A29R5220	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5221	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5222	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A29R5224	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
A29R5230	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A29R5231	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A29R5232	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A29R5233	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A29R5251	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5252	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5270	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A29R5271	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A29RT4980	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29RT5180	307-0662-00			RES,THERMAL:1K OHM,40%	50157	180Q10216
A29T5210	120-1494-00			TRANSFORMER,PWR:ISOLATION HF,POT CORE	80009	120-1494-00
A29T5230	120-1533-00			XFMR,ISOLATION:2KV,1:1 RATIO,DUAL SIGNAL	TK1601	63820
A29TP4910	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP4960	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP4980	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5140	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5270	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5271	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29TP5290	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
A29U4920	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A29U4930	156-0422-02			MICROCKT,DGTL:UP/DOWN SYN BINARY CNTR,SCRN	18324	N74LS191NB
A29U4932	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A29U4940	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U4942	156-0515-02			MICROCKT,DGTL:TRIPLE 3-CHAN MUX,SEL	80009	156-0515-02
A29U4944	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A29U4950	156-1850-00			MICROCKT,LINEAR:CMOS,QUAD SPST ANALOG SW	17856	SDG21107
A29U4960	156-1978-01			MICROCKT,LINEAR:OP AMP,L BIAS CUR/OFFSET V	80009	156-1978-01
A29U4970	156-1838-01			MICROCKT,LINEAR:OPERATIONAL AMPLIFIER	80009	156-1838-01
A29U5010	156-1225-00			MICROCKT,LINEAR:DUAL COMPARATOR	01295	LM393P
A29U5020	156-0513-00			MICROCKT,DGTL:CMOS,8-CHANNEL MUX	04713	MC14051BCL
A29U5030	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5040	156-0854-00			MICROCKT,LINEAR:OPNL AMPL	27014	LM308AN
A29U5050	156-0783-00			MICROCKT,LINEAR:PRECISION VOLTAGE REFERENCE	27014	LM399
A29U5060	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5110	156-1207-00			MICROCKT,LINEAR:VOLTAGE REGULATOR,-12 V	04713	MC79L12ACG
A29U5112	156-1160-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L12ACG
A29U5120	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U5122	156-0796-00			MICROCKT,DGTL:8 STG SHF & STORE BUS RGTR	02735	CD4094BF
A29U5124	156-0934-00			MICROCKT,DGTL:DUAL LINE RCVR	01295	SN75152
A29U5130	156-0745-01			MICROCKT,DGTL:HEX INVERTER,BURN-IN	02735	CD4069UBFX
A29U5132	156-1245-00			MICROCKT,LINEAR:7 XSTR,SI,HV/HIGH CURRENT	01295	ULN2003AN-P3
A29U5140	156-1457-01			MICROCKT,LINEAR:TRUE RMS TO DC CONVERTER,	24355	AD41134
A29U5150	156-1850-00			MICROCKT,LINEAR:CMOS,QUAD SPST ANALOG SW	17856	SDG21107
A29U5151	156-1191-01			MICROCKT,LINEAR:DUAL BI-FET OP-AMP,8 DIP	80009	156-1191-01
A29U5170	156-0130-00			MICROCKT,LINEAR:MODULATOR/DEMODULATOR	80009	156-0130-00
A29U5222	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5224	156-0844-02			MICROCKT,DGTL:SYN 4 BIT CNTR,SCRN	01295	SN74LS161A(NP3)
A29U5230	156-0302-02			MICROCKT,DGTL:DUAL 2-INP NAND DRVR,SCRN	01295	SN75452PP3

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A29U5231	156-0895-01			MICROCKT,DGTL:14 BIT BINARY COUNTER,BURN-IN	02735	CD4020BFX
A29U5232	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A29U5240	156-0789-02			MICROCKT,DGTL:8 BIT SR,PRL LOAD,SCREENED	04713	SN74LS165JDS
A29U5241	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A29U5242	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A29U5250	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A29U5251	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5252	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A29U5260	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A29U5270	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A29U5271	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A29U5272	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A29U5273	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A29U5274	156-1172-01			MICROCKT,DGTL:DUAL 4 BIT BIN CNTR,SCRN	01295	SN74LS393NP3
A29U5281	160-3679-01			MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A29, ORDER SEPARATELY)	80009	160-3679-01
A29U5282	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A29VR5010	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A29VR5020	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205
A29VR5031	152-0662-00			SEMICOND DVC,DI:ZEN,SI,5V,1%,400MW,DO-7	04713	SZG195RL
A29VR5160	152-0217-00			SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
A29VR5162	152-0217-00			SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
A29VR5210	152-0246-00			SEMICOND DVC,DI:SW,SI,40V,200MA,DO-7	14433	WG1537TK
A29W4980	195-0964-00			LEAD,ELECTRICAL:26 AWG,2.0 L,9-1	80009	195-0964-00
A29W5070	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A29W5075	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195-1259-00
A29W5080	195-1259-00			LEAD,ELECTRICAL:26 AWG,1.5 L,9-4	80009	195-1259-00
A29W5260	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A29Y4910	158-0261-00			XTAL UNIT,QTZ:3.579MHZ,01%	33096	CCAT101773HC18
A30	670-7894-01			CIRCUIT BD ASSY:FRONT PANEL (OPTION 01 ONLY)	80009	670-7894-01
A30C4310	283-0421-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	MD015C104MAA
A30LS4330	119-1427-01			XDCR,AUDIO:1-4.2KHZ,30MA,6V	TK1066	QMB-06
A30P4300	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 2)	22526	48283-029
A30R4320	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A103OR706A103
A30S4302	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	80009	260-2171-00
A30S4303	260-2170-00			SWITCH,PUSH:5 BUTTON,1 POLE,INPUT SEL	80009	260-2170-00
A30S4304	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	59821	2LL199NB021068
A30S4305	260-2088-00			SWITCH,PUSH:1 BTN,1 POLE,TRIGGER	59821	2LL199NB021068
A30S4306	260-2171-00			SWITCH,PUSH:3 BUTTON,1 POLE,RANGE	80009	260-2171-00
A30U4300	156-1080-01			MICROCKT,DGTL:HEX BUFFERS W/OC HV OUT,SCRN	01295	SN7407NP3
A30U4310	156-0541-02			MICROCKT,DGTL:DUAL 2-TO 4-LINE DCDR/DEMUX	04713	SN74LS139NDS
A30U4320	156-1220-01			MICROCKT,DGTL:HEX BUS DRIVER,SCREENED	01295	SN74LS365NP3
A30W4330	175-8325-00			CA ASSY,SP,ELEC:20,36 AWG,4.0 L,RIBBON	80009	175-8325-00
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A32CR6330	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32J6300	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A32J6370	131-1425-00			CONN,RCPT,ELEC:RTANG HEADER,1 X 36,0.1 SP	22526	65521-136

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
				(LOCATION A)		
A32J6370	131-1426-00			CONN,RCPT,ELEC:RTANGLE HEADER,1 X 36	22526	65524-136
				(LOCATION B)		
A32J6380	131-3045-00			CONN,RCPT,ELEC:CKT BD,RTANG,1 X 5,0.1 SP	80009	131-3045-00
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A32Q6334	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A32U6310	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6315	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6320	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A32U6325	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6330	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6335	156-1724-00			MICROCKT,DGTL:QUAD 2 INPUT OR GATE	04713	MC74F32ND
A32U6350	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A32U6356	156-1743-00			MICROCKT,DGTL:ASTTL,QUAD 2-INPUT NOR GATE	18324	74F02 NB OR FB
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33J6400	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A33P6380	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33P6385	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A33U6405	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6409	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6415	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A33U6420	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6425	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6430	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6435	156-1800-00			MICROCKT,DGTL:ASTTL,QUAD 2 INP EXCL OR GATE	18324	N74F86(NB OR JB)
F4991	159-0016-00			FUSE,CARTRIDGE:3AG,1.5,250V,FAST BLOW (OPTION 01)	71400	AGC-CW-1 1/2

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REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

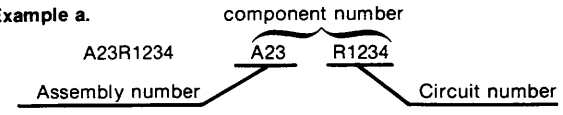
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

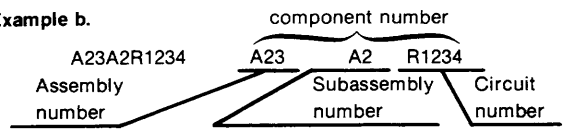
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	P O BOX 3608	HARRISBURG PA 17105
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPRESSWAY P O BOX 225012 M/S 49	DALLAS TX 75265
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR GROUP	5005 E MCDOWELL RD	PHOENIX AZ 85008
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
07263	FAIRCHILD CAMERA AND INSTRUMENT CORP SEMICONDUCTOR DIV	464 ELLIS ST	MOUNTAIN VIEW CA 94042
07716	TRW INC TRW ELECTRONICS COMPONENTS TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
08261	SPECTRA-STRIP AN ELTRA CO	7100 LAMPSON AVE	GARDEN GROVE CA 92642
12954	MICROSEMI CORP	8700 E THOMAS RD P O BOX 1390	SCOTTSDALE AZ 85252
14552	MICRO/SEMICONDUCTOR CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704
15513	DATA DISPLAY PRODUCTS	303 N OAK ST	LOS ANGELES CA 90302
18324	SIGNETICS CORP	811 E ARQUES	SUNNYVALE CA 94086
19701	MEPCO/ELECTRA INC A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067
20932	KYOCERA INC	11620 SORRENTO VALLEY RD	SAN DIEGO CA 92121
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS	30 HUNTER LANE	CAMP HILL PA 17011
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051
27264	MOLEX INC CORPORATE HQ	2222 WELLINGTON COURT	LISLE IL 60532
31433	UNION CARBIDE CORP ELECTRONICS DIV	PO BOX 5928	GREENVILLE SC 29606
33096	COLORADO CRYSTAL CORP	2303 W 8TH ST	LOVELAND CO 80537
34335	ADVANCED MICRO DEVICES	901 THOMPSON PL	SUNNYVALE CA 94086
50434	HEWLETT-PACKARD CO OPTOELECTRONICS DIV	640 PAGE MILL RD	PALO ALTO CA 94304
52648	PLESSEY INC PLESSEY OPTOELECTRONICS AND MICROWAVE	1641 KAISER AVE	IRVINE CA 92714
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195
57668	ROHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
76493	BELL INDUSTRIES INC MILLER J W DIV	19070 REYES AVE P O BOX 5825	COMPTON CA 90224
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
91637	DALE ELECTRONICS INC	P O BOX 609	COLUMBUS NE 68601
92194	ALPHA WIRE CORP	711 LIDGERWOOD AVE	ELIZABETH NJ 07207
TK1015	MUSASHI WORKS OF HITACHI LTD	1450 JOSUIHON-CHO KODAIRA-SHI	TOKYO JAPAN
TK1345	ZMAN AND ASSOCIATES	7633 S 180TH	KENT WA 98032
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1650	AMP INC	19200 STEVENS CREEK BLVD	CUPERTINO CA 95014
TK2042	ZMAN & ASSOCIATES	7633 SO. 180TH	KENT, WA 98032

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A20	670-7830-12	B010100	B010926	CIRCUIT BD ASSY:BUFFER (OPTION 06/09 ONLY)	80009	670-7830-12
A20	670-7830-13	B010100	B010926	CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 06/09/10 ONLY)	80009	670-7830-13
A20	670-7830-13	B010927	B011207	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
A20	670-7830-15	B011208		CIRCUIT BD ASSY:BUFFER (ALL OPTIONS AND COMBINATIONS) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-15
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A27	670-7997-07	B010100	B011185	CIRCUIT BD ASSY:COUNTER TIMER TRIGGER	80009	670-7997-07
A27	670-7997-09	B011186		CIRCUIT BD ASSY:COUNTER/TIMER/TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-09
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A20	670-7830-12	B010100	B010926	CIRCUIT BD ASSY:BUFFER (OPTION 06/09 ONLY)	80009	670-7830-12
A20	670-7830-13	B010100	B010926	CIRCUIT BD ASSY:BUFFER (OPTION 05 WITH 06/09/10 ONLY)	80009	670-7830-13
A20	670-7830-13	B010927	B011207	CIRCUIT BD ASSY:BUFFER	80009	670-7830-13
A20	670-7830-15	B011208		CIRCUIT BD ASSY:BUFFER (ALL OPTIONS AND COMBINATIONS) (DOES NOT INCLUDE U4260, ORDER SEPARATELY)	80009	670-7830-15
A20C4215	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4224	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4240	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4241	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4255	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4260	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4265	281-0764-00			CAP,FXD,CER DI:82PF,5%,100V	04222	MA101A820JAA
A20C4270	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)	54583	MA12X7R1H223M-T
A20C4280	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V (OPTION 01, 01/05)0)	54583	MA12X7R1H223M-T
A20J4210	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 34)	22526	48283-036
A20J4220	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 14)	22526	48283-029
A20J4221	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 24)	22526	48283-029
A20J4228	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00
A20J4230	131-2920-00	B010100	B011207	CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4230	131-3766-00	B011208		CONN,RCPT,ELEC:HEADER,1 X 2,0.10 SPACING	TK1650	87232-2
A20J4232	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4234	131-2919-00			CONN,RCPT,ELEC:HEADER,1 X 4,0.1 SPACING	80009	131-2919-00

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A20J4236	131-2920-00			CONN,RCPT,ELEC:HEADER,2 X 5,0.1 SPACING	00779	86479-3
A20J4240	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS (QUANTITY OF 40, LOCATION A)	22526	48283-086
A20J4240	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 4, LOCATION B)	22526	48283-029
A20J4242	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 44)	22526	48283-029
A20J4243	131-0589-00			TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ (QUANTITY OF 44)	22526	48283-029
A20J4256	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 14)	22526	48283-036
A20J4256	131-1742-00			TERMINAL,PIN:0.662 L X 0.025 SQ PH BRS (QUANTITY OF 2)	22526	48283-086
A20J4330	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 16)	22526	48283-036
A20P203	131-2924-00			CONN,RCPT,ELEC:HEADER,1 X 6,0.2 SPACING	27264	10-51-1061
A20P303	131-2923-00			CONN,RCPT,ELEC:HEADER,1 X 2,0.2 SPACING	27264	10-51-1021
A20R4202	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4203	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4207	321-0101-00			RES,FXD,FILM:110 OHM,1%,0.125W,TC=T0	07716	CEAD110R0F
A20R4208	321-0132-00			RES,FXD,FILM:232 OHM,1%,0.125W,TC=T0	19701	5043ED232R0F
A20R4224	315-0102-00	B010100	B011207	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A20R4224	313-1102-00	B011208		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A20R4265	315-0681-00	B010100	B011207	RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A20R4265	313-1681-00	B011208		RES,FXD,FILM:680 OHM,5%,0.2W	57668	TR20JE 680E
A20U4225	156-1318-00			MICROCKT,DGTL:LSTTL,4-BIT BISTABLE LATCH,SCRN	01295	SN74LS375NP3
A20U4235	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4240	156-0718-03			MICROCKT,DGTL:TRIPLE 3-INP NOR GATE,SCRN	01295	SN74LS27NP3
A20U4245	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A20U4250	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A20U4255	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A20U4260	160-3676-01	B010100	B011094	MICROCKT,DGTL:4096 X 8 EPROM,PRGM	80009	160-3676-01
A20U4260	160-3676-02	B011095		MICROCKT,DGTL:4096 X 8 EPROM,PRGM (NOT PART OF A20, ORDER SEPARATELY)	80009	160-3676-02
A20U4265	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A20U4275	156-0392-03			MICROCKT,DGTL:QUAD LATCH W/CLEAR,SCRN,	07263	74LS175PCQR
A20U4280	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A20W4210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A22	670-8159-00			CIRCUIT BD ASSY:LED (OPTION 10 ONLY)	80009	670-8159-00
A22DS4540	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4542	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A22DS4545	150-1064-00			LT EMITTING DIO:YELLOW,585NM,40 MA MAX	15513	SP840113
A23	670-7558-08			CIRCUIT BD ASSY:GPIB OPT 10 (OPTION 10 ONLY) (DOES NOT INCLUDE U4710, U4715, ORDER SEPARATELY)	80009	670-7558-08
A23C4625	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4626	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4705	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4706	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4708	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4730	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4735	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4738	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4745	283-0203-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SR305SC474MAA

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A23C4747	290-0847-00			CAP,FXD,ELCTLT:47UF,+50-10%,10V	55680	TLB1A470MAA
A23C4801	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4805	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4808	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4831	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23C4838	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A23J4540	131-1614-00			CONN,RCPT,ELEC:CKT BD,1 X 36,0.1 SPACING	08261	800-380-000
A23J4800	131-0608-00			TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL (QUANTITY OF 24)	22526	48283-036
A23P4243	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A23Q4743	151-0622-00			TRANSISTOR:PNP,SI,TO-226/237	04713	SPS8956(MPSW51A)
A23Q4745	151-0736-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0736-00
A23R4513	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4515	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A23R4543	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4544	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4545	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A23R4732	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A23R4734	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A23R4735	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
A23R4740	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A23R4743	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A23U4501	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4505	156-0956-02			MICROCKT,DGTL:OCTAL BFR W/3 STATE OUT,SCRN	01295	SN74LS244NP3
A23U4601	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4605	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A23U4606	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A23U4608	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A23U4625	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4626	156-1221-00			MICROCKT,DGTL:LSTTL,HEX D-TYPE FF,SCRN	01295	SN74LS378N3
A23U4701	156-1277-00			MICROCKT,DGTL:LSTTL,3-STATE OCTAL BFR,SCRN	27014	DM81LS95ANA+
A23U4705	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A23U4706	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4708	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A23U4710	160-3674-00	B010100	B010369	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3674-00
A23U4710	160-3674-01	B010370	B010427	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3674-01
A23U4710	160-3674-02	B010428		MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3674-02
A23U4715	160-3675-00	B010100	B010369	MICROCKT,DGTL:16K X 8 EPROM,PRGM	80009	160-3675-00
A23U4715	160-3675-01	B010370	B010427	MICROCKT,DGTL:16K X 8 EPROM,PRGM	80009	160-3675-01
A23U4715	160-3675-02	B010428		MICROCKT,DGTL:16K X 8 EPROM,PRGM (NOT PART OF A23, ORDER SEPARATELY)	80009	160-3675-02
A23U4730	156-0467-02			MICROCKT,DGTL:QUAD 2-INP NAND BFR W/OC OUT	01295	SN74LS38NP3
A23U4735	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A23U4738	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A23U4801	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A23U4805	156-1415-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR MGT BUS	01295	SN75161A N
A23U4808	156-1414-00			MICROCKT,DGTL:TTL,OCTAL GPIB XCVR DATA BUS	01295	SN75160 (N OR J)
A23U4811	156-1594-00			MICROCKT,DGTL:NMOS,2048 X 8 SRAM	TK1015	HM6116P-3(DP-24)
A23U4818	156-1444-01			MICROCKT,DGTL:NMOS,GPIB INTFC CONTROLLER	01295	TMS9914A (NL
A23U4831	156-0479-02			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCRN	01295	SN74LS32NP3
A23U4838	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25	670-7784-09			CIRCUIT BD ASSY:TV OPTION (OPTION 05 ONLY) (DOES NOT INCLUDE U5565, ORDER SEPARATELY)	80009	670-7784-09
A25C5331	290-0808-00			CAP,FXD,ELCTLT:2.7UF,10%,20V	05397	T322B275K020AS
A25C5374	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A25C5419	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5433	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5458	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5465	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5490	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5540	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5543	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5545	281-0826-00			CAP,FXD,CER DI:2200PF,5%,100V	20932	401EM100AD222K
A25C5612	283-0024-00			CAP,FXD,CER DI:0.1UF,+80-20%,50V	04222	SR215C104MAA
A25C5613	281-0792-00			CAP,FXD,CER DI:82PF,10%,100V	04222	MA101A820KAA
A25C5625	281-0788-00			CAP,FXD,CER DI:470PF,10%,100V	04222	MA101C471KAA
A25C5627	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5630	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5631	283-0167-00			CAP,FXD,CER DI:0.1UF,10%,100V	04222	3430-100C-104K
A25C5633	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5639	290-0246-00			CAP,FXD,ELCTLT:3.3UF,10%,15V	12954	D3R3EA15K1
A25C5640	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5651	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5690	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5720	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5724	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5726	281-0785-00			CAP,FXD,CER DI:68PF,10%,100V	04222	MA101A680KAA
A25C5726	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5728	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5731	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5734	281-0863-00			CAP,FXD,CER DI:240PF,5%,100V	04222	MA101A241JAA
A25C5740	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5755	281-0786-00			CAP,FXD,CER DI:150PF,10%,100V	04222	MA101A151KAA
A25C5757	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A25C5770	281-0909-00			CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A25C5773	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	MA101A101KAA
A25C5775	281-0813-00			CAP,FXD,CER DI:0.047UF,20%,50V	05397	C412C473M5V2CA
A25C5810	283-0059-00			CAP,FXD,CER DI:1UF,+80-20%,50V	31433	C330C105M5R5CA
A25C5830	281-0820-00			CAP,FXD,CER DI:680 PF,10%,50V	04222	MA105C651KAA
A25C5848	281-0861-00			CAP,FXD,CER DI:270PF,5%,50V	54583	MA12COG1H271J
A25C5850	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A25C5853	283-0486-00			CAP,FXD,CER DI:1.0UF,10%,50V	04222	SR405105K
A25C5865	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A25CR5333	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5336	152-0460-00			SEMICOND DVC,DI:FE,SI,25V,1MA,TO-7	04713	SCL072
A25CR5522	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5526	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5623	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5641	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5653	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5655	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5721	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5735	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5751	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5772	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5774	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5776	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5823	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5825	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25CR5831	152-0322-00			SEMICOND DVC,DI:SCHOTTKY BARR,SI,15V,DO-35	50434	5082-2672
A25CR5867	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A25P4220	131-2889-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 7,0.1 SP	22526	65000-103
A25P4242	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8

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A25Q5370	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A25Q5442	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5512	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5515	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5518	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5528	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5530	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5625	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5735	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25Q5736	151-1059-00			TRANSISTOR:FET,N-CHAN,TO-106	04713	ORDER BY DESCR
A25Q5860	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A25R5319	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5322	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5329	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5330	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5334	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5335	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5370	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5371	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5421	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5422	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5423	315-0564-00	B010100	B010875	RES,FXD,FILM:560K OHM,5%,0.25W	19701	5043CX560K0J
A25R5423	315-0154-00	B010876		RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
A25R5424	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5429	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5432	321-0251-00			RES,FXD,FILM:4.02K OHM,1%,0.125W,TC=T0	19701	5033ED4K020F
A25R5433	315-0394-00			RES,FXD,FILM:390K OHM,5%,0.25W	57668	NTR25J-E390K
A25R5434	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5436	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5443	315-0204-00			RES,FXD,FILM:200K OHM,5%,0.25W	19701	5043CX200K0J
A25R5444	315-0334-00			RES,FXD,FILM:330K OHM,5%,0.25W	57668	NTR25J-E 330K
A25R5445	315-0163-00			RES,FXD,FILM:16K OHM,5%,0.25W	57668	NTR25J-E 16K
A25R5519	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A25R5523	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A25R5524	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5525	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A25R5540	315-0303-00			RES,FXD,FILM:30K OHM,5%,0.25W	19701	5043CX30K00J
A25R5541	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5542	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5544	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
A25R5556	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5557	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5610	315-0112-00			RES,FXD,FILM:1.1K OHM,5%,0.25W	19701	5043CX1K100J
A25R5611	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A25R5612	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
A25R5622	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5623	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
A25R5624	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5626	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
A25R5627	315-0162-00			RES,FXD,FILM:1.6K OHM,5%,0.25W	19701	5043CX1K600J
A25R5628	321-0226-00			RES,FXD,FILM:2.21K OHM,1%,0.125W,TC=T0	01121	RNK2211F
A25R5629	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5632	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5652	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5656	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5657	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5720	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
A25R5722	315-0911-00			RES,FXD,FILM:910 OHM,5%,0.25W	57668	NTR25J-E910E

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A25R5723	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A25R5725	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
A25R5729	315-0474-00			RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A25R5730	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
A25R5732	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5733	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5735	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5736	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5737	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5738	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5739	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
A25R5750	315-0154-00			RES,FXD,FILM:150K OHM,5%,0.25W	57668	NTR25J-E150K
A25R5752	315-0751-00			RES,FXD,FILM:750 OHM,5%,0.25W	57668	NTR25J-E750E
A25R5754	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A25R5755	315-0563-00			RES,FXD,FILM:56K OHM,5%,0.25W	19701	5043CX56K00J
A25R5756	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A25R5760	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5771	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
A25R5810	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
A25R5811	307-0104-00			RES,FXD,CMPSN:3.3 OHM,5%,0.25W	01121	CB33G5
A25R5812	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5813	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5820	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
A25R5822	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5823	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5824	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5825	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5826	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
A25R5827	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
A25R5829	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25R5830	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5831	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A25R5832	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5833	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A25R5834	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A25R5847	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A25R5850	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A25R5851	315-0514-00			RES,FXD,FILM:510K OHM,5%,0.25W	19701	5043CX510K0J
A25R5852	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
A25R5853	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A25R5854	315-0824-00			RES,FXD,FILM:820K OHM,5%,0.25W	19701	5043CX820K0J
A25R5858	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
A25R5864	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A25R5868	315-0683-00			RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
A25R5891	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A25U5310	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5315	156-0991-00			MICROCKT,LINEAR:VOLTAGE REGULATOR	04713	MC78L05ACP
A25U5380	156-0465-02			MICROCKT,DGTL:8-INP NAND GATE,SCRN	01295	SN74LS30NP3
A25U5390	156-0480-02			MICROCKT,DGTL:QUAD 2-INP & GATE,SCRN,	01295	SN74LS08NP3
A25U5410	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5427	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
A25U5436	156-1349-00			MICROCKT,LINEAR:DUAL INDEP DIFF AMPL	02735	CA3054-98
A25U5456	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5459	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A25U5565	160-3677-01	B010100	B010369	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3677-01
A25U5565	160-3677-02	B010370	B011137	MICROCKT,DGTL:8192 X 8 EPROM,PRGM	80009	160-3677-02
A25U5565	160-3677-03	B011138		MICROCKT,DGTL:8192 X 8 EPROM,PRGM (NOT PART OF A25, ORDER SEPARATELY)	80009	160-3677-03

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A25U5575	156-1426-00			MICROCKT,DGTL:NMOS,PROGRAMMABLE TIMER MDL	04713	MC68B40 (L OR P)
A25U5580	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5590	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A25U5636	156-1200-01			MICROCKT,LINEAR:OPERATIONAL AMPL,QUAD BIFET	80009	156-1200-01
A25U5645	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5680	156-0481-02			MICROCKT,DGTL:TRIPLE 3-INP & GATE,SCRN	01295	SN74LS11NP3
A25U5712	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5728	156-1381-00			MICROCKT,LINEAR:3 NPN,2 PNP,XSTR ARRAY	02735	CA3096AE-17
A25U5755	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5756	156-0366-02			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCREENED	02735	CD4013BFX
A25U5764	156-1065-01			MICROCKT,DGTL:OCTAL D TYPE TRANS LATCHES	04713	SN74LS373 ND/JD
A25U5770	156-0385-02			MICROCKT,DGTL:HEX INVERTER,SCRN	07263	74LS04PCQR
A25U5775	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5790	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5835	156-0382-02			MICROCKT,DGTL:QUAD 2 INP NAND GATE BURN	18324	N74LS00NB
A25U5838	156-0575-03			MICROCKT,DGTL:3 INPUT NOR GATE,SELECTED	02735	CD4025BFX
A25U5845	156-0704-00			MICROCKT,LINEAR:CMOS,PHASE LOCK LOOP	04713	MC14046CP
A25U5855	156-0912-02			MICROCKT,LINEAR:OPNL AMPL,SCREENED	80009	156-0912-02
A25U5880	156-1981-00			MICROCKT,DGTL:QUAD J-K FLIP-FLOP,SCRN	01295	SN54276J4
A25U5890	156-0381-02			MICROCKT,DGTL:QUAD 2-INP EXCL OR GATE	07263	74LS86PCQR
A25VR5420	152-0175-00			SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.4W,DO-7	14552	TD3810976
A25VR5866	152-0760-00			SEMICOND DVC,DI:ZEN,SI,6.2V,2%,400MW,DO-35	04713	SZG30205
A27	670-7997-07	B010100	B011185	CIRCUIT BD ASSY:COUNTER TIMER TRIGGER	80009	670-7997-07
A27	670-7997-09	B011186		CIRCUIT BD ASSY:COUNTER/TIMER/TRIGGER (OPTION 06/09 ONLY) (DOES NOT INCLUDE U5930, ORDER SEPARATELY)	80009	670-7997-09
A27C5920	281-0757-00			CAP,FXD,CER DI:10PF,20%,100V	04222	MA101A100MAA
A27C5921	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5921	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5922	281-0759-00			CAP,FXD,CER DI:22PF,10%,100V	04222	MA101A220KAA
A27C5923	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5924	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A27C5940	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5940	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5950	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5960	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5961	281-0765-00			CAP,FXD,CER DI:100PF,5%,100V	04222	MA101A101JAA
A27C5980	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5981	281-0811-00			CAP,FXD,CER DI:10PF,10%,100V	04222	MA101A100KAA
A27C5990	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C5991	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C5991	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6010	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6020	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6021	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6030	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6033	281-0809-00			CAP,FXD,CER DI:200 PF,5%,100V	04222	MA101A201JAA
A27C6040	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6040	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6070	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6081	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6110	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6111	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA

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A27C6112	281-0812-00			CAP,FXD,CER DI:1000PF,10%,100V	04222	MA101C102KAA
A27C6113	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6113	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6120	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6121	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6121	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6130	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6170	290-0804-00			CAP,FXD,ELCTLT:10UF,+50-10%,25V	55680	ULB1E100TAAANA
A27C6192	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6192	281-0909-00	B011186		CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27C6230	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6231	281-0773-00			CAP,FXD,CER DI:0.01UF,10%,100V	04222	MA201C103KAA
A27C6232	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	MA201E223MAA
A27C6260	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6260	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6270	281-0775-01	B011186		CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0775-00	B010100	B011185	CAP,FXD,CER DI:0.1UF,20%,50V	04222	MA205E104MAA
A27C6290	281-0909-00	B011186		CAP,FXD,CER DI:0.022UF,20%,50V	54583	MA12X7R1H223M-T
A27CR5960	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5961	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5970	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR5990	152-0141-02	B011186		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6010	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6020	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6162	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6170	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6180	152-0141-02	B011186		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6181	152-0951-00	B011186		SEMICOND DVC DI:SI,SCHOTTKY,60V,2.2F	50434	IN6263
A27CR6182	152-0141-02	B011186		SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6190	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6210	152-0269-00			SEMICOND DVC,DI:VVC,SI,35V,33PF,DO-7	04713	SMV1263
A27CR6211	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27CR6273	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A27J5990	131-3058-00	B010100	B011185	CONN,RCPT,ELEC:HEADER,RTANG,2 X 3,0.1 CTR	00779	1-86479-5
A27J5990	131-3851-00	B011186		CONN,RCPT,ELEC:HEADER,2 X 4,0.1 SPACING	TK1650	1-02123-5
A27J5991	131-2921-00	B010100	B011585	CONN,RCPT,ELEC:HEADER,1 X 2,0.1 SPACING	00779	1-86479-3
A27J6135	175-2054-00			WIRE,ELECTRICAL:SOLID,30 AWG,BLACK,KYNAR	92194	5951
A27L5990	108-0245-00	B010100	B011185	CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A27L5990	108-1251-00	B011186		COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6030	108-0245-00	B010100	B011185	CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A27L6030	108-1251-00	B011186		COIL,RF:FXD,2.7UH,10%	54583	SPT 0406-2R7K-6
A27L6210	108-0892-00	B010100	B011185	COIL,RF:FIXED,44NH	TK2042	ORDER BY DESCR
A27L6210	108-1382-00	B011186		COIL,RF:FIXED,42NH,10%	TK1345	ORDER BY DESCR
A27P4221	131-2890-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 12,0.1 SP	22526	65000-010
A27P4240	131-2887-00			CONN,RCPT,ELEC:CKT BD,HORIZ,2 X 22,0.1,SP	00779	1-86063-8
A27Q5920	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5921	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5961	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5970	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q5980	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q5981	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q5982	151-0427-00	B010100	B011185	TRANSISTOR:NPN,SI,TO-92	07263	S39287
A27Q5982	151-0427-03	B011186		TRANSISTOR:NPN,SI	07263	S39287
A27Q5983	151-0424-00			TRANSISTOR:NPN,SI,TO-92	04713	SPS8246
A27Q6090	151-0427-00	B010100	B011185	TRANSISTOR:NPN,SI,TO-92	07263	S39287
A27Q6090	151-0427-03	B011186		TRANSISTOR:NPN,SI	07263	S39287
A27Q6091	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00

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A27Q6092	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6093	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6180	151-0190-00	B011186		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q6181	151-0190-00	B011186		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27Q6190	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6191	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6270	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6271	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6272	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6273	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6274	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6290	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6291	151-0188-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0188-00
A27Q6292	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A27R5920	315-0512-00	B010100	B011185	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R5920	313-1512-00	B011186		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R5921	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5921	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R5950	315-0113-00	B010100	B011185	RES,FXD,FILM:11K OHM,5%,0.25W	19701	5043CX11K00J
A27R5950	313-1113-00	B011186		RES,FXD,FILM:11K OHM,5%,0.2W	57668	TR20JE11K0
A27R5951	315-0222-00	B010100	B011185	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R5951	313-1222-00	B011186		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R5952	315-0103-00	B010100	B011185	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5952	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R5960	315-0201-00	B010100	B011185	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R5960	313-1201-00	B011186		RES,FXD,FILM:200 OHM,5%,0.2W	57668	TR20JE200E
A27R5961	315-0131-00	B010100	B011185	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R5961	313-1131-00	B011186		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R5962	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R5962	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R5963	315-0202-00	B010100	B011185	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5963	313-1202-00	B011186		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5964	315-0474-00	B010100	B011185	RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5964	313-1474-00	B011186		RES,FXD,FILM:470K OHM,5%,0.2W	80009	313-1474-00
A27R5970	315-0680-00	B010100	B011185	RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5970	313-1680-00	B011186		RES,FXD,FILM:68 OHM,0.2W,5%	57668	TR20JT68 68E
A27R5971	315-0223-00	B010100	B011185	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5971	313-1223-00	B011186		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R5972	315-0202-00	B010100	B011185	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5972	313-1202-00	B011186		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5973	315-0103-00	B010100	B011185	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R5973	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R5980	315-0223-00	B010100	B011185	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R5980	313-1223-00	B011186		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R5981	315-0202-00	B010100	B011185	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R5981	313-1202-00	B011186		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R5982	315-0302-00	B010100	B011185	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R5982	313-1302-00	B011186		RES,FXD,FILM:3K OHM,5%,0.2W	57668	TR20JE 03K0
A27R5983	315-0680-00	B010100	B011185	RES,FXD,FILM:68 OHM,5%,0.25W	57668	NTR25J-E68E0
A27R5983	313-1680-00	B011186		RES,FXD,FILM:68 OHM,0.2W,5%	57668	TR20JT68 68E
A27R5984	315-0101-00	B010100	B011185	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R5984	313-1101-00	B011186		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R5985	315-0474-00	B010100	B011185	RES,FXD,FILM:470K OHM,5%,0.25W	19701	5043CX470K0J92U
A27R5985	313-1474-00	B011186		RES,FXD,FILM:470K OHM,5%,0.2W	80009	313-1474-00
A27R5990	315-0681-00	B010100	B011185	RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
A27R5991	315-0330-00	B010100	B011185	RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R00J
A27R5991	313-1330-00	B011186		RES,FXD,FILM:33 OHM,5%,0.2W	91637	CCF501G33R0J
A27R5992	315-0301-00	B010100	B011185	RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E

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A27R5992	313-1301-00	B011186		RES,FXD,FILM:300 OHM,5%,0.2W,MI	57668	TR20JT68-300E
A27R5993	315-0750-00	B010100	B011185	RES,FXD,FILM:75 OHM,5%,0.25W	57668	NTR25J-E75E0
A27R5993	313-1750-00	B011186		RES,FXD,FILM:75 OHM,5%,0.2W	57668	TR20JE 75E
A27R6020	315-0223-00	B010100	B011185	RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
A27R6020	313-1223-00	B011186		RES,FXD,FILM:22K,OHM,5%,0.2W	57668	TR20JE 22K
A27R6021	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6021	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6022	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6022	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6042	315-0103-00	B010100	B011185	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6042	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6050	315-0122-00	B010100	B011185	RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
A27R6050	313-1122-00	B011186		RES,FXD,FILM:1.2K OHM,5%,0.2W	57668	TR20JE01K2
A27R6060	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6060	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6062	315-0131-00	B010100	B011185	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6062	313-1131-00	B011186		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R6063	315-0201-00	B010100	B011185	RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
A27R6063	313-1201-00	B011186		RES,FXD,FILM:200 OHM,5%,0.2W	57668	TR20JE200E
A27R6064	315-0222-00	B010100	B011185	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6064	313-1222-00	B011186		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R6081	315-0222-00	B010100	B011185	RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A27R6081	313-1222-00	B011186		RES,FXD,FILM:2.2K OHM,5%,0.2W	57668	TR20JE 02K2
A27R6082	315-0221-00	B010100	B011185	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A27R6082	313-1221-00	B011186		RES,FXD,FILM:220 OHM,5%,0.2W	57668	TR20JE220E
A27R6083	315-0101-00	B010100	B011185	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6083	313-1101-00	B011186		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6090	315-0131-00	B010100	B011185	RES,FXD,FILM:130 OHM,5%,0.25W	19701	5043CX130R0J
A27R6090	313-1131-00	B011186		RES,FXD,FILM:130 OHM,5%,0.26	57668	TR20JT68 130E
A27R6091	315-0181-00	B010100	B011185	RES,FXD,FILM:180 OHM,5%,0.25W	57668	NTR25J-E180E
A27R6091	313-1181-00	B011186		RES,FXD,FILM:180 OHM,5%0.2W	57668	TR20JE180E
A27R6092	315-0202-00	B010100	B011185	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6092	313-1202-00	B011186		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R6093	315-0103-00	B010100	B011185	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6093	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6094	315-0101-00	B010100	B011185	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6094	313-1101-00	B011186		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6104	315-0202-00	B010100	B011185	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6104	313-1202-00	B011186		RES,FXD,FILM:2K OHM,5%,0.2W	57668	TR20JE02K0
A27R6121	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6121	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6160	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6160	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6161	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6161	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6162	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6162	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6163	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6163	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6164	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6164	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6165	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6165	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6166	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6166	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6170	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6170	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6172	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%.0.25W	57668	NTR25J-E01K5

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27R6172	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6173	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6173	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6175	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6175	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6176	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6176	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6177	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6178	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6180	313-1510-00	B011186		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6181	313-1511-00	B011186		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6182	313-1510-00	B011186		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6183	313-1510-00	B011186		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6184	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6191	315-0471-00	B010100	B011185	RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A27R6191	313-1471-00	B011186		RES,FXD,FILM:470 OHM,5%,0.2W	57668	TR20JE 470E
A27R6192	315-0221-00	B010100	B011185	RES,FXD,FILM:220 OHM,5%,0.25W	57668	NTR25J-E220E
A27R6192	313-1221-00	B011186		RES,FXD,FILM:220 OHM,5%,0.2W	57668	TR20JE220E
A27R6193	315-0302-00	B010100	B011185	RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
A27R6193	313-1302-00	B011186		RES,FXD,FILM:3K OHM,5%,0.2W	57668	TR20JE 03K0
A27R6194	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A27R6195	315-0101-00	B010100	B011185	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6195	313-1101-00	B011186		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6197	315-0512-00	B010100	B011185	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6197	313-1512-00	B011186		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R6198	315-0103-00	B010100	B011185	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6198	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6199	315-0512-00	B010100	B011185	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6199	313-1512-00	B011186		RES,FXD,CMPSN:5.1K OHM,5%,0.2W	57668	TR20JE 5K1
A27R6221	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6221	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6222	315-0823-00	B010100	B011185	RES,FXD,FILM:82K OHM,5%,0.25W	57668	NTR25J-E82K
A27R6222	313-1823-00	B011186		RES,FXD,FILM:82K OHM,5%,0.2W	57668	TR20JE 82K
A27R6230	315-0103-00	B010100	B011185	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
A27R6230	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6231	315-0910-00			RES,FXD,FILM:91 OHM,5%,0.25W	19701	5043CX91R00J
A27R6232	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6232	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6233	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6233	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6245	315-0101-00	B010100	B011185	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6245	313-1101-00	B011186		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6250	307-0542-00			RES NTWK,FXD,FI:(5)10K OHM,5%,0.125W	01121	106A103OR706A103
A27R6251	315-0102-00	B010100	B011185	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
A27R6251	313-1102-00	B011186		RES,FXD,FILM:1K OHM,5%,0.2W	57668	TR20JE01K0
A27R6252	313-1103-00	B011186		RES,FXD,FILM:10K OHM,5%,0.2W	57668	TR20JE10K0
A27R6260	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6260	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6261	315-0152-00	B010100	B011185	RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A27R6261	313-1152-00	B011186		RES,FXD,FILM:1.5K OHM,5%,0.2W	57668	TR20JE01K5
A27R6262	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6263	315-0621-00	B010100	B011185	RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
A27R6263	313-1621-00	B011186		RES,FXD,FILM:620 OHM,5%,0.2W	57668	TR20JE 620E
A27R6264	315-0101-00	B010100	B011185	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A27R6264	313-1101-00	B011186		RES,FXD,FILM:100 OHM,5%,0.2W	57668	TR20JE100E
A27R6266	315-0510-00	B010100	B011185	RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6266	313-1510-00	B011186		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6267	315-0511-00	B010100	B011185	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6267	313-1511-00	B011186		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E

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Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A27R6270	315-0391-00	B010100	B011185	RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
A27R6270	313-1391-00	B011186		RES,FXD,FILM:390 OHM,5%,0.2W	57668	TR20JE 390E
A27R6271	315-0511-00	B010100	B011185	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6271	313-1511-00	B011186		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6273	321-0068-00			RES,FXD,FILM:49.9 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G49R90F
A27R6274	315-0511-00	B010100	B011185	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6274	313-1511-00	B011186		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6275	315-0511-00	B010100	B011185	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6275	313-1511-00	B011186		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27R6276	307-0541-00			RES NTWK,FXD,FI:(7)1K OHM,10%,1W	01121	108A102
A27R6277	315-0752-00	B010100	B011185	RES,FXD,FILM:7.5K OHM,5%,0.25W	57668	NTR25J-E07K5
A27R6277	313-1752-00	B011186		RES,FXD,FILM:7.5K OHM,5%,0.2W	57668	TR20JE 07K5
A27R6290	321-0157-00			RES,FXD,FILM:422 OHM,1%,0.125W,TC=T0	07716	CEAD422R0F
A27R6291	321-0066-00			RES,FXD,FILM:47.5 OHM,0.5%,0.125W,TC=T0	91637	CMF55116G47R50F
A27R6292	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
A27R6293	315-0510-00	B010100	B011185	RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
A27R6293	313-1510-00	B011186		RES,FXD,FILM:51 OHM,5%,0.2W	80009	313-1510-00
A27R6294	315-0511-00	B010100	B011185	RES,FXD,FILM:510 OHM,5%,0.25W	19701	5043CX510R0J
A27R6294	313-1511-00	B011186		RES,FXD,FILM:510 OHM,5%,0.2W	57668	TR20JT68 510E
A27U5910	156-0656-02			MICROCKT,DGTL:DECADE COUNTER,SCRN	01295	SN74LS90NP3
A27U5930	160-3678-00	B010100	B010179	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-00
A27U5930	160-3678-02	B010180	B010369	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-02
A27U5930	160-3678-03	B010370	B010427	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-03
A27U5930	160-3678-04	B010428	B011185	MICROCKT,DGTL:32678 X 8 EPROM,PRGM	80009	160-3678-04
A27U5930	160-3678-05	B011186		MICROCKT,DGTL:32678 X 8 EPROM,PRGM (NOT PART OF A27, ORDER SEPARATELY)	80009	160-3678-05
A27U5940	156-1111-02			MICROCKT,DGTL:OCTAL BUS XCVR W/3 STATE OUT	01295	SN74LS245N3
A27U5942	156-0866-02			MICROCKT,DGTL:13 INP NAND GATES,SCRN	04713	SN74LS133(NDS)
A27U5950	156-0469-02			MICROCKT,DGTL:3/8 LINE DCDR,SCRN	01295	SN74LS138NP3
A27U5952	156-0865-02			MICROCKT,DGTL:OCTAL D FF W/CLEAR,SCRN	01295	SN74LS273NP3
A27U5990	156-1340-01			MICROCKT,DGTL:QUAD 2-INP OR GATE,SCREENED	02735	CD4071BFX
A27U6010	156-0124-02			MICROCKT,DGTL:SCRN	04713	MC4044LDS
A27U6070	156-1795-00			MICROCKT,DGTL:DUAL 4 TO 1 MUX	04713	MC10H174PD
A27U6120	156-0266-01			MICROCKT,DGTL:EMITTER COUPLED OSCILLATOR	04713	MC1648PD/LD
A27U6130	156-1248-00			MICROCKT,DGTL:ECL,PRESCALER/DIVIDE BY 100	52648	SP8629
A27U6140	156-1550-00			MICROCKT,DGTL:NMOS,SYS TIMING CONT,SCRN	34335	AM9513APCTB
A27U6150	156-0386-02			MICROCKT,DGTL:TRIPLE 3-INP NAND GATE,SCRN	07263	74LS10PCQR
A27U6152	156-0383-02			MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN,	18324	N74LS02NB
A27U6180	160-1748-00			MICROCKT,DGTL:MACROCELL GATE ARRAY,PRGM	04713	SC32205-001
A27U6230	156-1134-00			MICROCKT,LINEAR:OP AMPL,MOS/FET INPUT	02735	CA3140EX
A27U6250	156-0852-02			MICROCKT,DGTL:LSTTL,HEX BUS DRIVER	01295	SN74LS367NP3
A27U6252	156-0388-03			MICROCKT,DGTL:DUAL D FLIP-FLOP,SCRN	01295	SN74LS74ANP3
A27U6290	156-0411-02			MICROCKT,LINEAR:QUAD COMPARATOR,SCREENED	04713	LM339JDS
A27W6042	131-0566-00	B011186		BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6084	131-0566-00	B010100	B011185	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6174	131-0566-00	B010100	B011185	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27W6210	131-0566-00			BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
A27Y5910	158-0269-00			XTAL UNIT,QTZ:13.10669MHZ	33096	CCAT101801
A32	670-7999-00			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (OPTION 09 ONLY)	80009	670-7999-00
A32C6303	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6334	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A32C6338	281-0767-00			CAP,FXD,CER DI:330PF,20%,100V	04222	MA106C331MAA
A32CR6330	152-0141-02			SEMICOND DVC,DI:SW,SI,30V,150MA,30V,DO-35	03508	DA2527 (1N4152)
A32CR6335	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32CR6340	152-0664-00			SEMICOND DVC,DI:SCHOTTKY,SW,SI,70V,DO-35	80009	152-0664-00
A32J6300	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR

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A32J6370	131-1425-00			CONN,RCPT,ELEC:RTANG HEADER,1 X 36,0.1 SP (LOCATION A)	22526	65521-136
A32J6370	131-1426-00			CONN,RCPT,ELEC:RTANGLE HEADER,1 X 36 (LOCATION B)	22526	65524-136
A32J6380	131-3045-00			CONN,RCPT,ELEC:CKT BD,RTANG,1 X 5,0.1 SP	80009	131-3045-00
A32J6385	136-0547-00			CONN,RCPT,ELEC:CKT BOARD,6 CONTACT	00779	1-380949-6
A32L6354	108-0245-00			CHOKE,RF:FIXED,3.9UH	76493	B6310-1
A32Q6334	151-0190-00			TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
A32R6301	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6302	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6303	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6304	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6305	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6306	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6307	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6308	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6325	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A32R6330	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A32R6336	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
A32R6340	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
A32R6350	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
A32U6310	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6315	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A32U6320	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A32U6325	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6330	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A32U6335	156-1724-00			MICROCKT,DGTL:QUAD 2 INPUT OR GATE	04713	MC74F32ND
A32U6350	156-1611-00			MICROCKT,DGTL:ASTTL,DUAL D TYPE EDGE-TRIG	80009	156-1611-00
A32U6356	156-1743-00			MICROCKT,DGTL:ASTTL,QUAD 2-INPUT NOR GATE	18324	74F02 NB OR FB
A33	670-7998-01			CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (OPTION 09 ONLY)	80009	670-7998-01
A33C6410	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33C6440	283-0423-00			CAP,FXD,CER DI:0.22UF,+80-20%,50V	04222	MD015E224ZAA
A33J6400	131-3046-00			TERM SET,PIN:1 X 10,0.15 SP,RTANG	22526	ORDER BY DESCR
A33P6380	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33P6385	131-3153-00			TERM SET,PIN:(36)0.025 SQ,RTANG,0.22 L	TK1483	082-3643-RS20
A33R6400	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6401	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6402	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6403	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6404	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6405	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6406	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6407	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6408	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25W	57668	NTR25J-E300E
A33R6432	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
A33R6443	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
A33U6405	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6409	156-1707-00			MICROCKT,DGTL:QUAD 2-INPUT NAND GATE,SCRN	04713	MC7400(NDORJD)
A33U6415	156-0441-00			MICROCKT,DGTL:TTL,8 BIT IDENT COMPTR,SCRN	07263	74F521(PC OR DC)
A33U6420	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6425	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6430	156-0572-02			MICROCKT,DGTL:8 BIT SERIAL IN/PRL OUT,SEL	27014	MM74C164JA+
A33U6435	156-1800-00			MICROCKT,DGTL:ASTTL,QUAD 2 INP EXCL OR GATE	18324	N74F86(NB OR JB)

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DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966	Drafting Practices.
Y14.2, 1973	Line Conventions and Lettering.
Y10.5, 1968	Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

American National Standard Institute
1430 Broadway
New York, New York 10018

Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

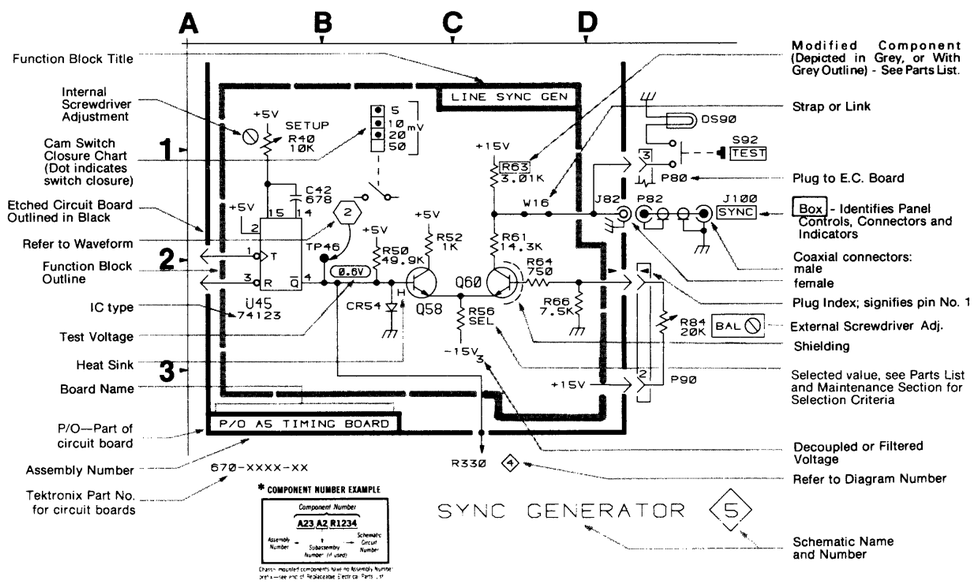
Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

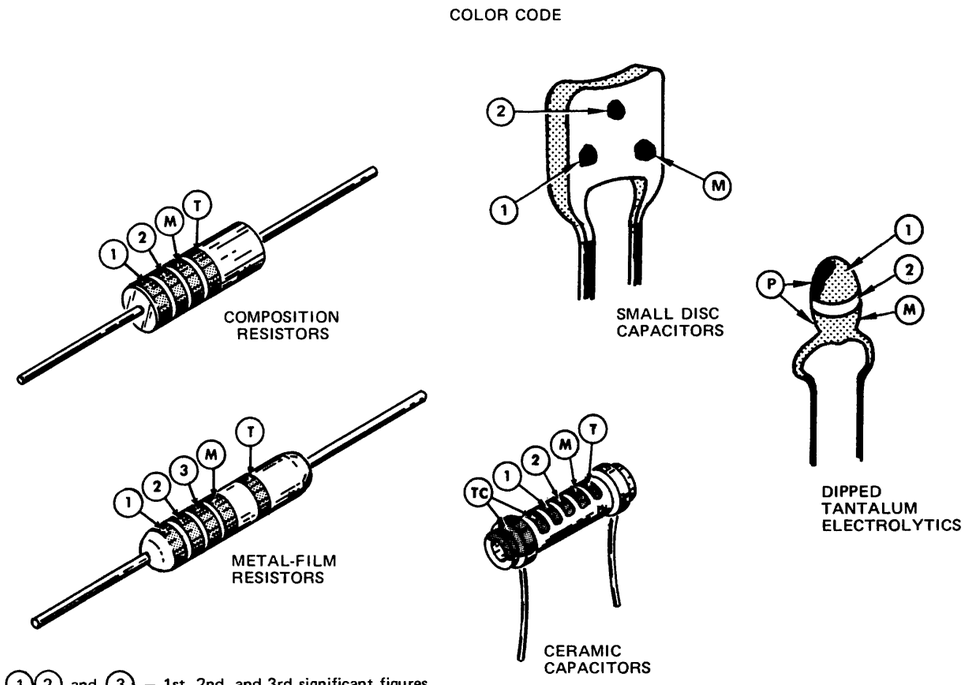
The information and special symbols below may appear in this manual.

Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number *(see following illustration for constructing a component number).

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.





COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER	TOLERANCE	MULTIPLIER	TOLERANCE over 10 pF	TOLERANCE under 10 pF	
BLACK	0	1	———	1	±20%	±2 pF	4 VDC
BROWN	1	10	±1%	10	±1%	±0.1 pF	6 VDC
RED	2	10^2 or 100	±2%	10^2 or 100	±2%	———	10 VDC
ORANGE	3	10^3 or 1 K	±3%	10^3 or 1000	±3%	———	15 VDC
YELLOW	4	10^4 or 10 K	±4%	10^4 or 10,000	+100% −9%	———	20 VDC
GREEN	5	10^5 or 100 K	±½%	10^5 or 100,000	±5%	±0.5 pF	25 VDC
BLUE	6	10^6 or 1 M	±¼%	10^6 or 1,000,000	———	———	35 VDC
VIOLET	7	———	±1/10%	———	———	———	50 VDC
GRAY	8	———	———	10^{-2} or 0.01	+80% −20%	±0.25 pF	———
WHITE	9	———	———	10^{-1} or 0.1	±10%	±1 pF	3 VDC
GOLD	—	10^{-1} or 0.1	±5%	———	———	———	———
SILVER	—	10^{-2} or 0.01	±10%	———	———	———	———
NONE	—	———	±20%	———	±10%	±1 pF	———

(1861-20A) 5857-52

Figure 10-1. Color code for resistors and capacitors.

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ATIONS

and Lettering.
or Quantities Used in
ice and Electrical

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0018

on the diagrams are in
therwise:

are in picofarads (pF).
e are in microfarads

manual.

cuit board component
lookup table with the
ease of locating the
illustrated on the facing
able. When more than
lustrate the circuitry on
illustration may only
n on which it was il-
the diagram number of
of the circuit board

Modified Component (Depicted in Grey, or With Grey Outline) - See Parts List.

Strap or Link

Plug to E.C. Board

Box - Identifies Panel Controls, Connectors and Indicators

Coaxial connectors:
male
female

Plug Index; signifies pin No. 1

External Screwdriver Adj.

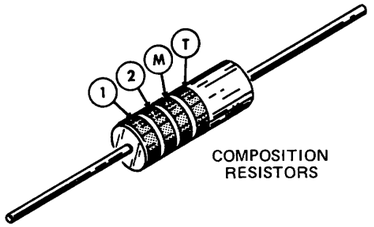
Shielding

Selected value, see Parts List and Maintenance Section for Selection Criteria

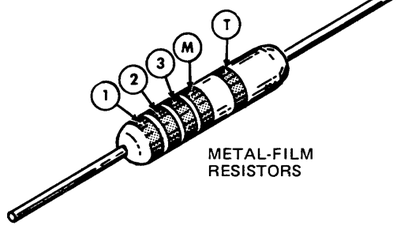
Decoupled or Filtered Voltage

Refer to Diagram Number

Schematic Name and Number

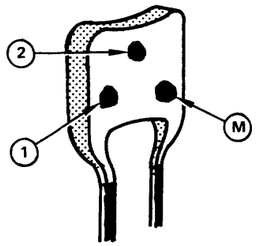


COMPOSITION RESISTORS

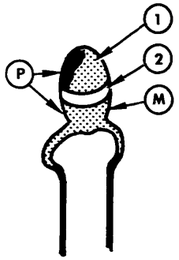


METAL-FILM RESISTORS

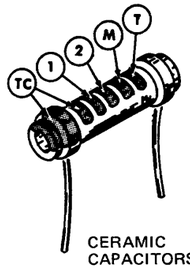
COLOR CODE



SMALL DISC CAPACITORS



DIPPED TANTALUM ELECTROLYTICS



CERAMIC CAPACITORS

(1) (2) and (3) – 1st, 2nd, and 3rd significant figures

(M) –multiplier (T) –tolerance

(TC) –temperature coefficient

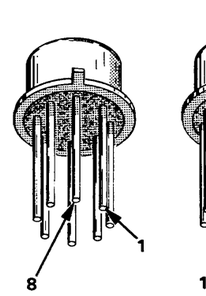
(P) –polarity and voltage rating

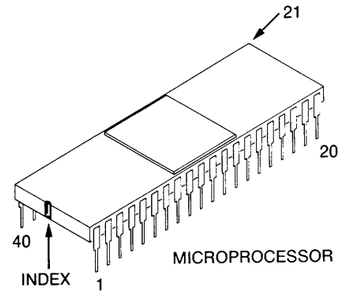
(T) and/or (TC) color code may not be present on some capacitors

COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER	TOLERANCE	MULTIPLIER	TOLERANCE over 10 pF	TOLERANCE under 10 pF	
BLACK	0	1	–––	1	±20%	±2 pF	4 VDC
BROWN	1	10	±1%	10	±1%	±0.1 pF	6 VDC
RED	2	10^2 or 100	±2%	10^2 or 100	±2%	–––	10 VDC
ORANGE	3	10^3 or 1 K	±3%	10^3 or 1000	±3%	–––	15 VDC
YELLOW	4	10^4 or 10 K	±4%	10^4 or 10,000	+100% –9%	–––	20 VDC
GREEN	5	10^5 or 100 K	±½%	10^5 or 100,000	±5%	±0.5 pF	25 VDC
BLUE	6	10^6 or 1 M	±¼%	10^6 or 1,000,000	–––	–––	35 VDC
VIOLET	7	–––	±1/10%	–––	–––	–––	50 VDC
GRAY	8	–––	–––	10^{-2} or 0.01	+80% –20%	±0.25 pF	–––
WHITE	9	–––	–––	10^{-1} or 0.1	±10%	±1 pF	3 VDC
GOLD	–	10^{-1} or 0.1	±5%	–––	–––	–––	–––
SILVER	–	10^{-2} or 0.01	±10%	–––	–––	–––	–––
NONE	–	–––	±20%	–––	±10%	±1 pF	–––

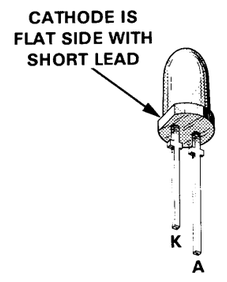
(1861-20A) 5857-52

Figure 10-1. Color code for resistors and capacitors.

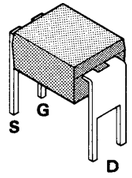


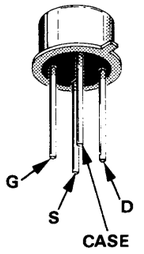


INTEGRATED CIRCUITS



LED



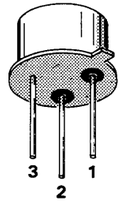






FETS

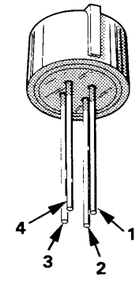
PLASTIC CASE TRANSISTORS



POSITIVE
78L00 SERIES
1 – INPUT
2 – OUTPUT
3 – GROUND

NEGATIVE
79L00 SERIES
1 – GROUND
2 – OUTPUT
3 – INPUT

VOLTAGE REGULATOR



PRECISION VOLTAGE REFERENCE

LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

5857-53

Figure 10-2. Semiconductor lead configurations.

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24X5A/2467 Options Service

To identify any component mounted on a circuit board and to locate that component in the appropriate schematic diagram

1. Locate the Circuit Board Illustration

a. In the instrument identify the Assembly Number of the circuit board in question. The Assembly Number is usually printed on the upper left corner of the circuit board on the component side.

b. In the manual locate and pull out tabbed page whose title corresponds with the Assembly Number of the circuit board. Circuit board assembly numbers and board nomenclature are printed on the back side of the tabs (facing the rear of the manual).

2. Determine the Circuit Number

a. Compare the circuit board with its illustration and locate the desired component by area and shape on the illustration.

b. Scan the table adjacent to the Circuit Board Illustration and find the Circuit Number of the desired component.

c. Determine the Schematic Diagram Number in which the component is located.

3. Locate the Component

a. Locate and pull out correspond with th determined in the ta and numbers are p (facing the front of t

b. Scan the Compone schematic diagram desired component.

A6 CRT BOARD

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 10

C602	C632	Q668	R625
C603	C641		R626
C609	C643	R604	R627
C671	C651	R605	R630
C615		R608	R632
C616	Q606	R609	
C617	Q610	R610	
C618	Q615	R614	
C619	Q645	R616	
C624	Q656	R623	
C626	Q665	R624	

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 11

C670	Q670	R677	
C671	Q672	R679	
C673	Q673	R680	
C680			
C681	R671	U617	
P503	R673	U618	
P607	R674	U619	
Q669	R675		

COMPONENT LOCATION TABLE

CRT CIRCUIT DIAGRAM 10

A6 CRT BOARD

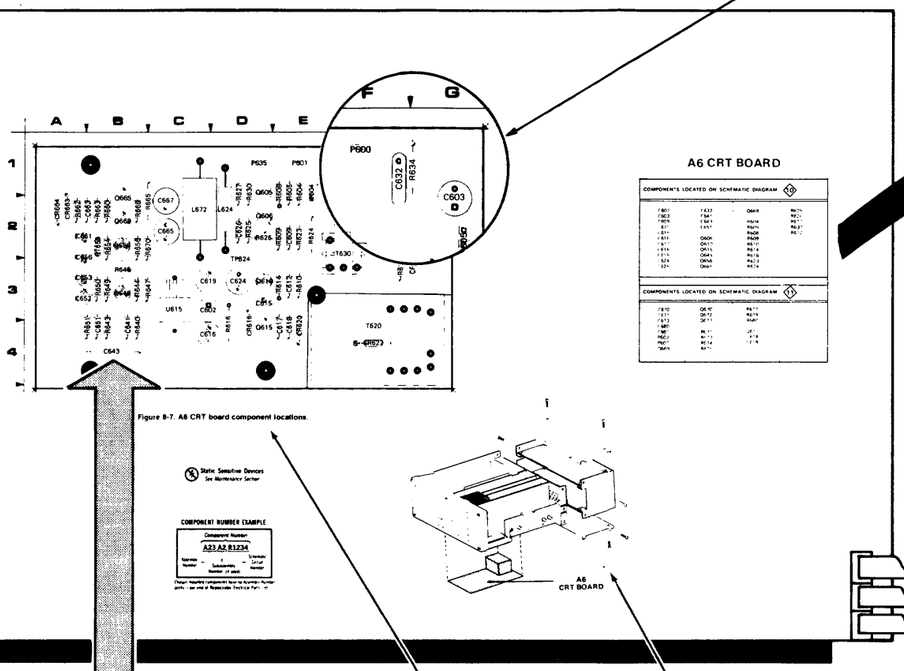


Figure 8-7. A6 CRT board component locations.



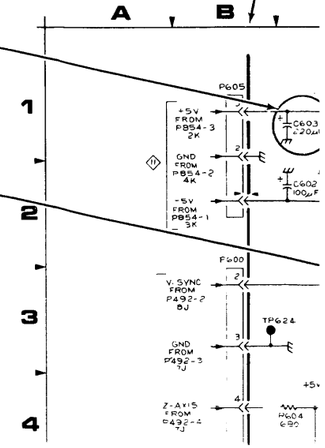
CRT CIRCUIT DIAGRAM 10

A6 ASSEMBLY

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C602	2C	3C	Q656	2F	2B
C603	1C	1G	Q665	1G	1B
C609	4E	2E	Q668	2G	2B
C612	7C	3E			
C615	7C	3D	R604	4C	1E
C616	2C	3C	R605	5D	1E
C617	7D	3D	R608	4E	1D
C618	7E	3E	R609	4E	2D
C619	6E	3C	R610	7B	3E
C624	4F	3D	R614	7C	3D
C626	7G	2D	R616	1C	3D
C632	8G	1F	R623	4D	2E
C643	3D	4B	R625	7F	2D
C651	3E	3B	R626	7F	2D
		3B	R627	7G	1D
			R630	4F	1D
Q606	4E	2D			
Q610	7C	3D	TP624	3B	2D
Q615	7D	3D			
Q645	3E	3B	U615	1D	3C

CHASSIS MOUNTED PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
L635	51	CHASSIS	V635	6J	CHASSIS



MANUAL BINDER

MANUAL BINDER

PULL OUT PAGE TABS FOR CIRCUIT BOARD ILLUSTRATION

ASSEMBLY NUMBER AND CIRCUIT BOARD NAME

ILLUSTRATION FOR INSTRUMENT CIRCUIT BOARD LOCATION

4. Determine the Circuit Board Illustration and Component Location

a. From the schematic diagram, determine the Assembly Number of the circuit board on which the component is mounted. This information is boxed and located in a corner of the heavy line that distinguishes the board outline.

b. Scan the Component Location Table for the Assembly Number just determined and find the Circuit Number of the desired component.

c. Under the BOARD LOCATION column, read the grid coordinates for the desired component.

5. Locate the Component on the Circuit Board

a. In the manual, locate and pull out the tabbed page whose title and Assembly Number correspond with the desired circuit board. This information is on the back side of the tabs.

b. Using the Circuit Number and grid coordinates, locate the component on the Circuit Board Illustration.

c. In the circuit board location illustration, determine the location of the circuit board in the instrument.

d. Find the circuit board in the instrument and compare it with its illustration in the manual to locate the desired component on the board.

Figure 10-3. Locating components on schematic diagrams and circuit board illustrations.

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2. Determine the Circuit Number

a. Compare the circuit board with its illustration and locate the desired component by area and shape on the illustration.

b. Scan the table adjacent to the Circuit Board Illustration and find the Circuit Number of the desired component.

c. Determine the Schematic Diagram Number in which the component is located.

3. Locate the Component on the Schematic Diagram

a. Locate and pull out tabbed page whose number and title correspond with the Schematic Diagram Number just determined in the table. Schematic diagram nomenclature and numbers are printed on the front side of the tabs (facing the front of the manual).

b. Scan the Component Location Table adjacent to the schematic diagram and find the Circuit Number of the desired component.

c. Under the SCHEM LOCATION column, read the grid coordinates for the desired component.

d. Using the Circuit Number and grid coordinates, locate the component on the schematic diagram.

A6 CRT BOARD

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 10

C602	C632	Q668	R625
C603	C641		R626
C609	C643	R604	R627
C671	C651	R605	R630
C615		R608	R632
C616	Q606	R609	
C617	Q610	R610	
C618	Q615	R614	
C619	Q645	R616	
C624	Q656	R623	
C626	Q665	R624	

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 11

C670	Q670	R677	
C671	Q672	R679	
C673	Q673	R680	
C680			
C681	R671	U617	
P603	R673	U618	
P607	R674	U619	
Q669	R675		

CRT CIRCUIT DIAGRAM 10

COMPONENT LOCATION TABLE

CRT CIRCUIT DIAGRAM 10

A6 ASSEMBLY

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C602	2C	3C	Q656	2F	2B
C603	1C	1G	Q665	1G	1B
C609	4E	2E	Q668	2G	2B
C612	7C	3E			
C615	7C	3D	R604	4C	1E
C616	2C	3C	R605	5D	1E
C617	7D	3D	R608	4E	1D
C618	7E	3E	R609	4E	2D
C619	6E	3C	R610	7B	3E
C624	4F	3D	R614	7C	3D
C626	7G	2D	R616	1C	3D
C632	8G	1E	R623	4D	2E
C643	3D	4B	R625	7F	2D
C651	3E	3B	R626	7F	2D
		3B	R627	7G	1D
			R630	4E	1D
Q606	4E	2D			
Q610	7C	3D	TP624	3B	2D
Q615	7D	3D			
Q645	3E	3B	U615	1D	3C

CHASSIS MOUNTED PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
L635	51	CHASSIS	V635	6J	CHASSIS

PULL OUT PAGE TABS FOR SCHEMATIC DIAGRAMS

CRT CIRCUIT 10

PARTIAL A6 CRT CIRCUIT BOARD

CRT CIRCUIT 10

SCHEMATIC DIAGRAM NAME AND NUMBER

MANUAL BINDER

MANUAL BINDER

ILLUSTRATION FOR INSTRUMENT CIRCUIT BOARD LOCATION

A6 CRT BOARD

Board Illustration and Component

ic diagram, determine the Assembly uit board on which the component is mation is boxed and located in a corner at distinguishes the board outline.

ent Location Table for the Assembly ined and find the Circuit Number of the .

LOCATION column, read the grid desired component.

To identify any component in a schematic diagram and to locate that component on its respective circuit board.

Locating components on schematic diagrams and circuit board illustrations.

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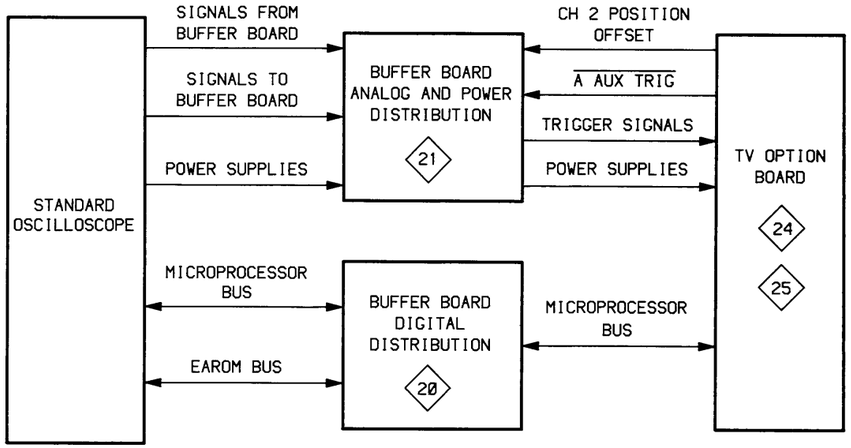
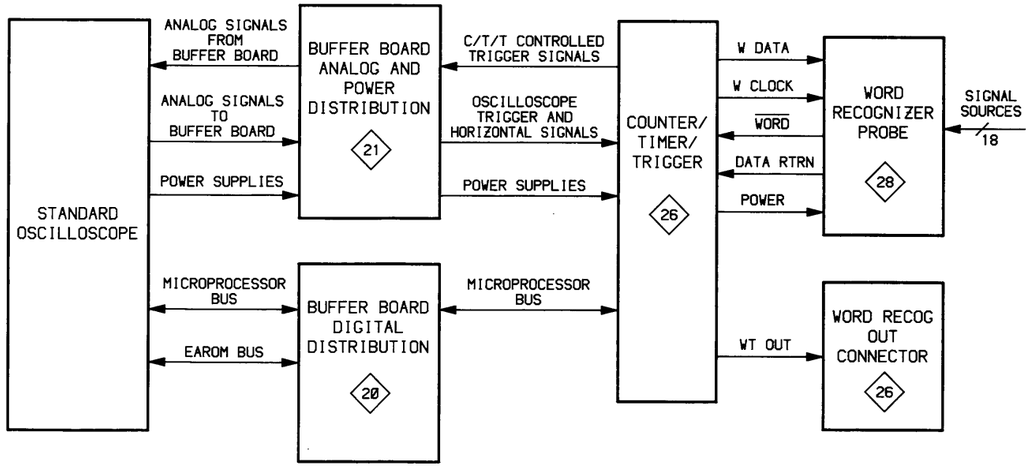


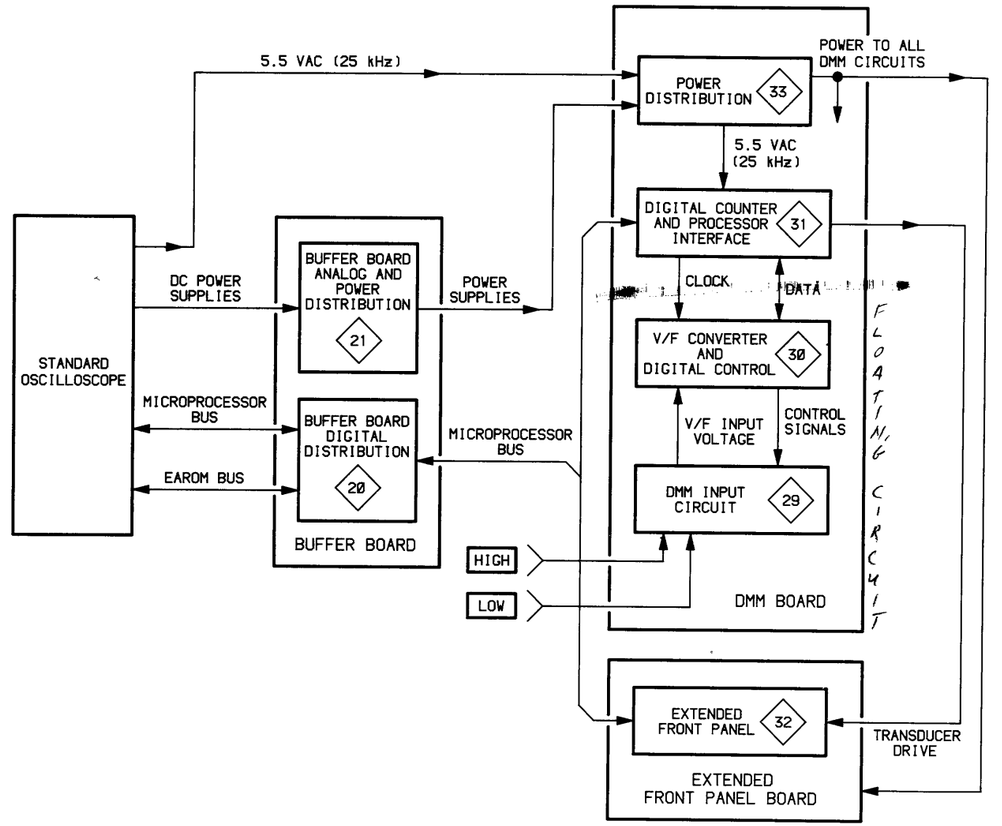
Figure 10-5. TV (option 05) simplified block diagram.

4630-51



4632-11

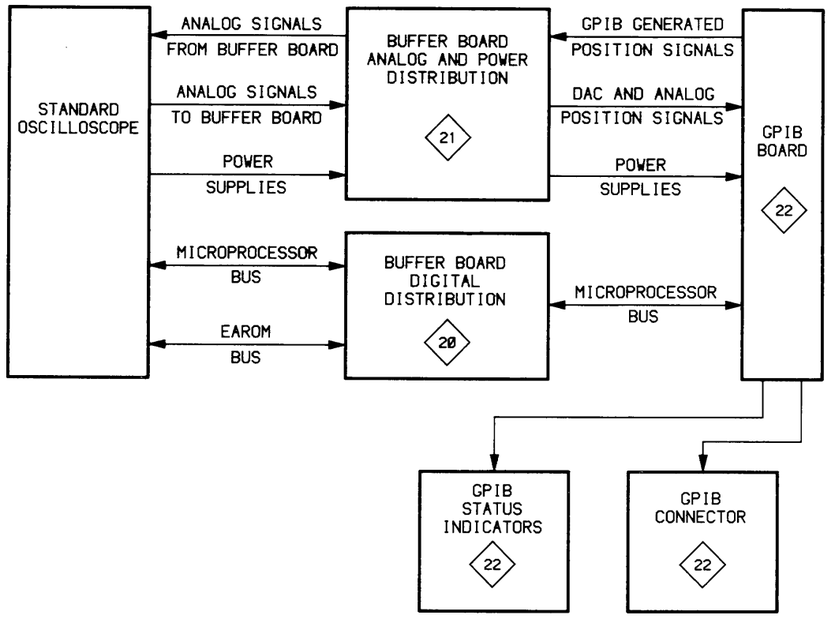
Figure 10-6. CTT and WR (Option 06/09) simplified block diagram.



4182-05

Figure 10-7. DMM (Option 01) simplified block diagram.

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4640-11

Figure 10-4. GPIB (Option 10) simplified block diagram.

IF ANY OPTION WORKS BUFFER IS GOOD

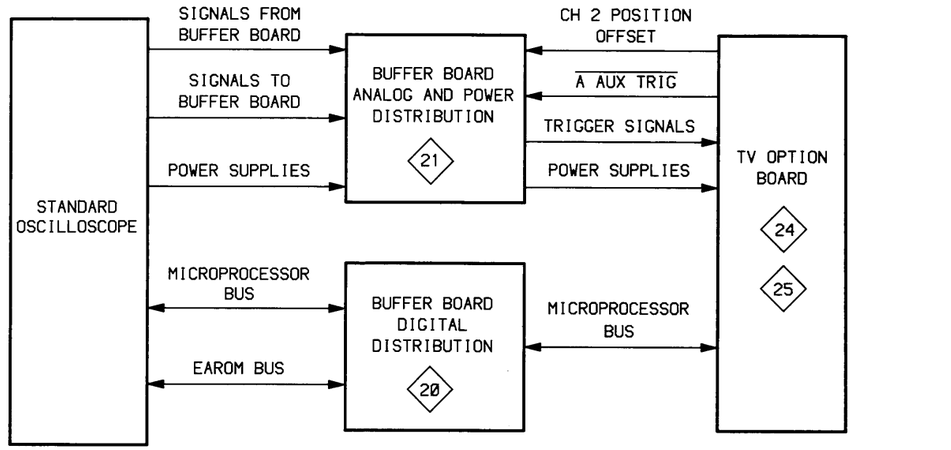
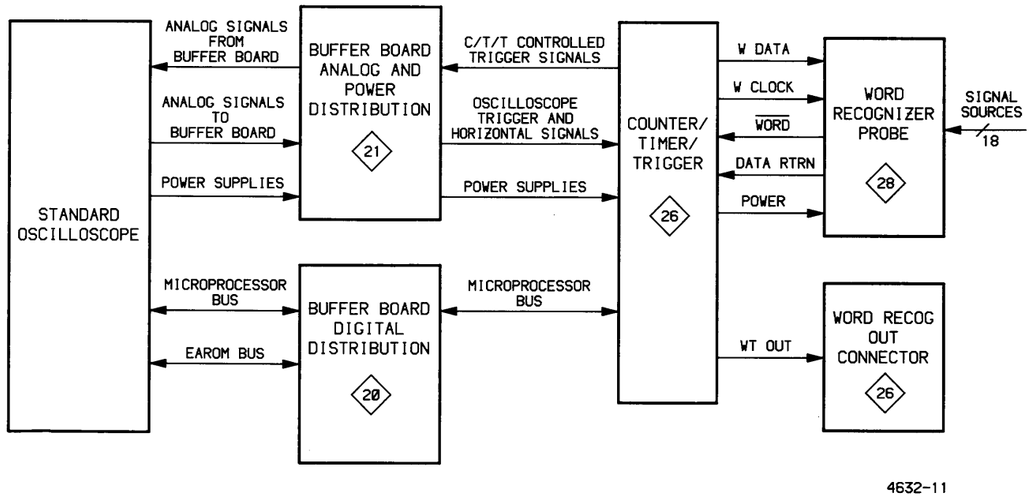


Figure 10-5. TV (option 05) simplified block diagram.

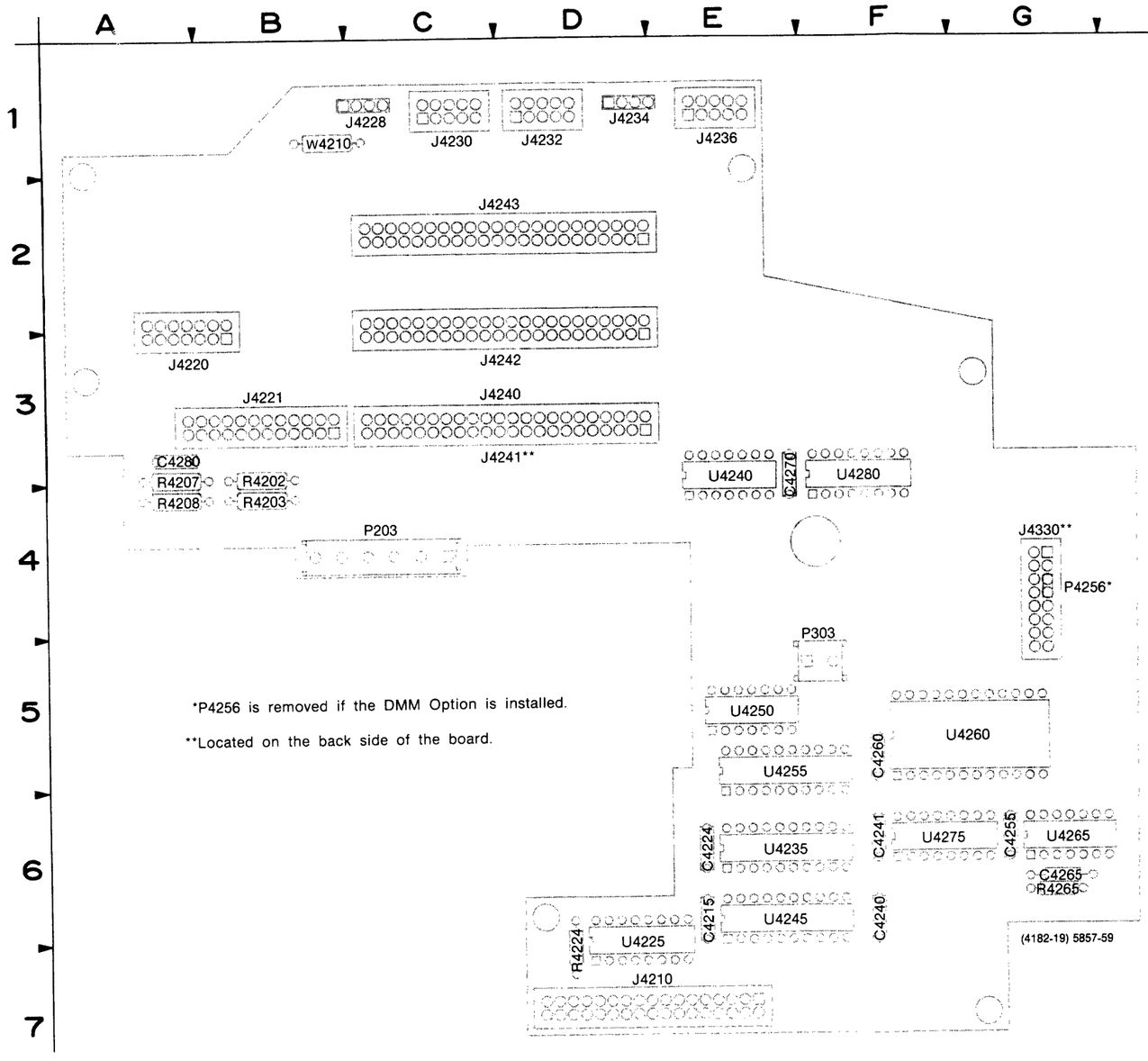
4630-51



4632-11

Figure 10-6. CTT and WR (Option 06/09) simplified block diagram.

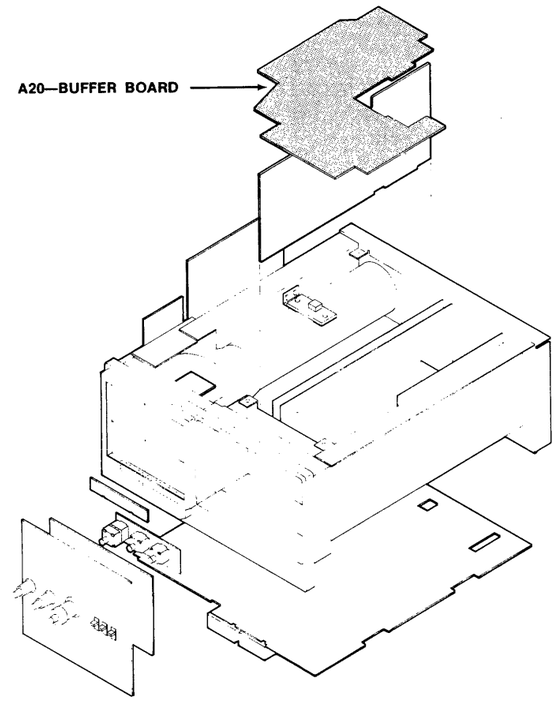
ManualsPlus.com



*P4256 is removed if the DMM Option is installed.

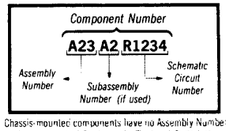
**Located on the back side of the board.

Figure 10-8. A20—Buffer board.



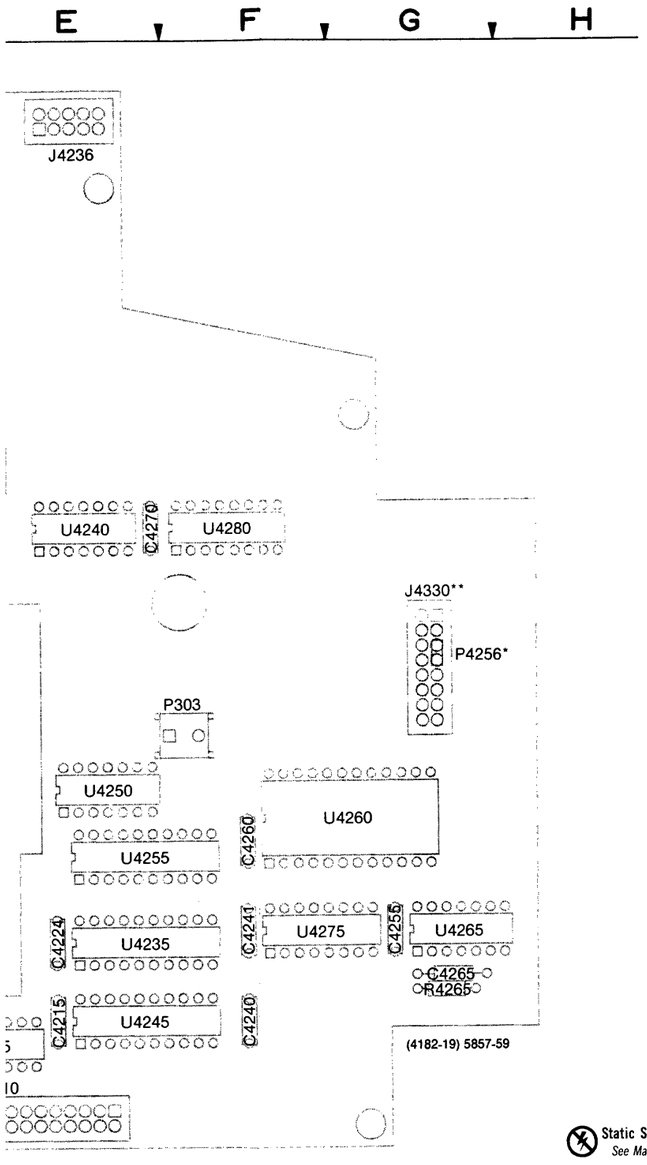
Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

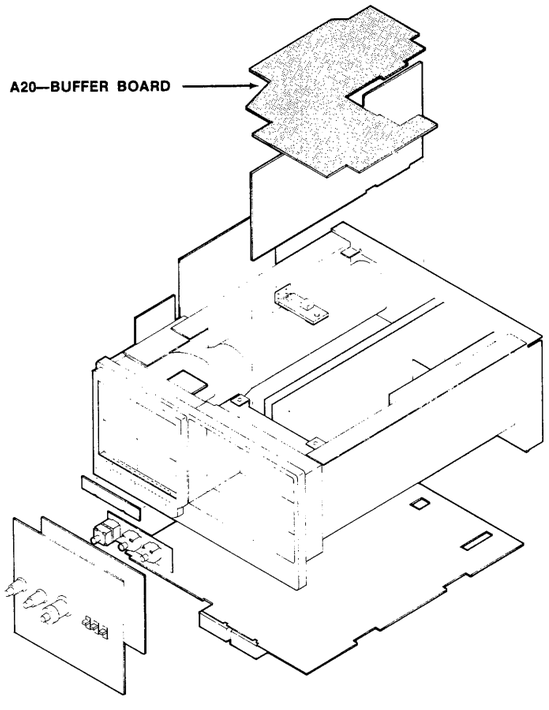


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

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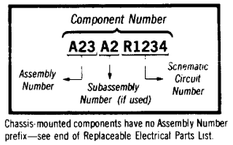


ffer board.



Static Sensitive Devices
See Maintenance Section

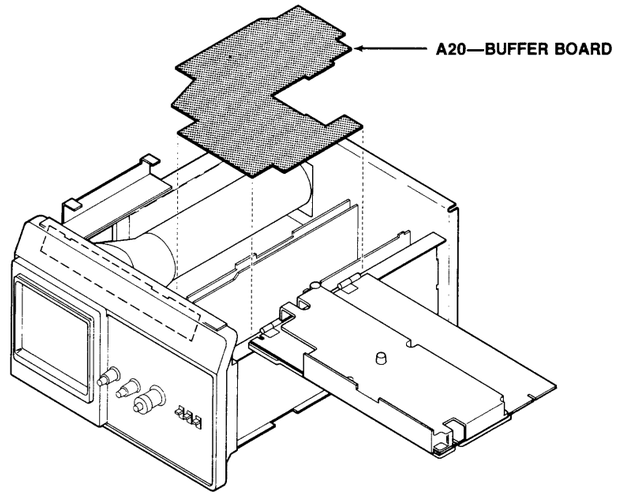
COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

A20—BUFFER BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4215	21	J4230	21	J4330	21	U4235	20
C4224	21	J4232	21			U4240	20
C4240	21	J4234	21	P203	21	U4245	20
C4241	21	J4236	21	P303	21	U4250	20
C4255	21	J4240	20	P4256	20	U4255	20
C4260	21	J4240	21			U4260	20
C4265	20	J4241	20	R4202	21	U4265	20
C4270	21	J4241	21	R4203	21	U4275	20
C4280	21	J4242	20	R4207	21	U4280	20
		J4242	21	R4208	21		
J4210	20	J4243	20	R4224	20	W4210	21
J4220	21	J4243	21	R4265	20		
J4221	21	J4256	20				
J4228	21	J4330	20	U4225	20		



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BUFFER BOARD DIGITAL DISTRIBUTION DIAGRAM 20

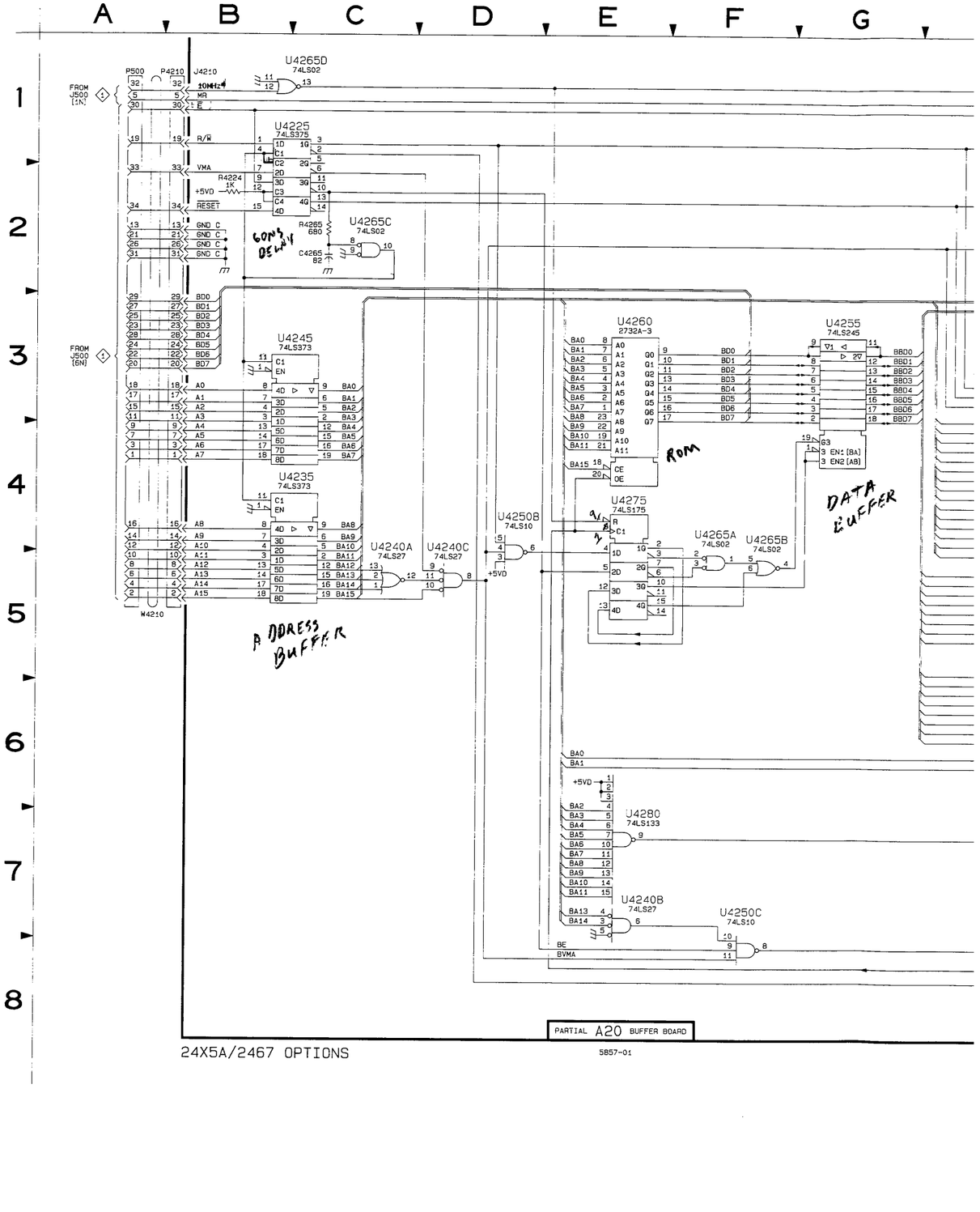
ASSEMBLY A20

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4265	2C	6G	J4330	5H	4G	U4235	4B	6E	U4260	3E	5G
						U4240A	5C	3E	U4265A	5F	6G
J4210	1A	7D	P4256	8J	4G	U4240B	7E	3E	U4265B	5F	6G
J4240	3K	3D				U4240C	5D	3E	U4265C	2C	6G
J4241	3H	3D	R4224	2B	7D	U4245	3B	6E	U4265D	1B	6G
J4242	3M	3D	R4265	2C	6G	U4250B	4D	5E	U4275	4E	6F
J4243	1N	2D				U4250C	7F	5E	U4280	7E	3F
J4256	7J	4G	U4225	1B	7D	U4255	3G	5E			

Partial A20 also shown on diagram 21.

OTHER PARTS

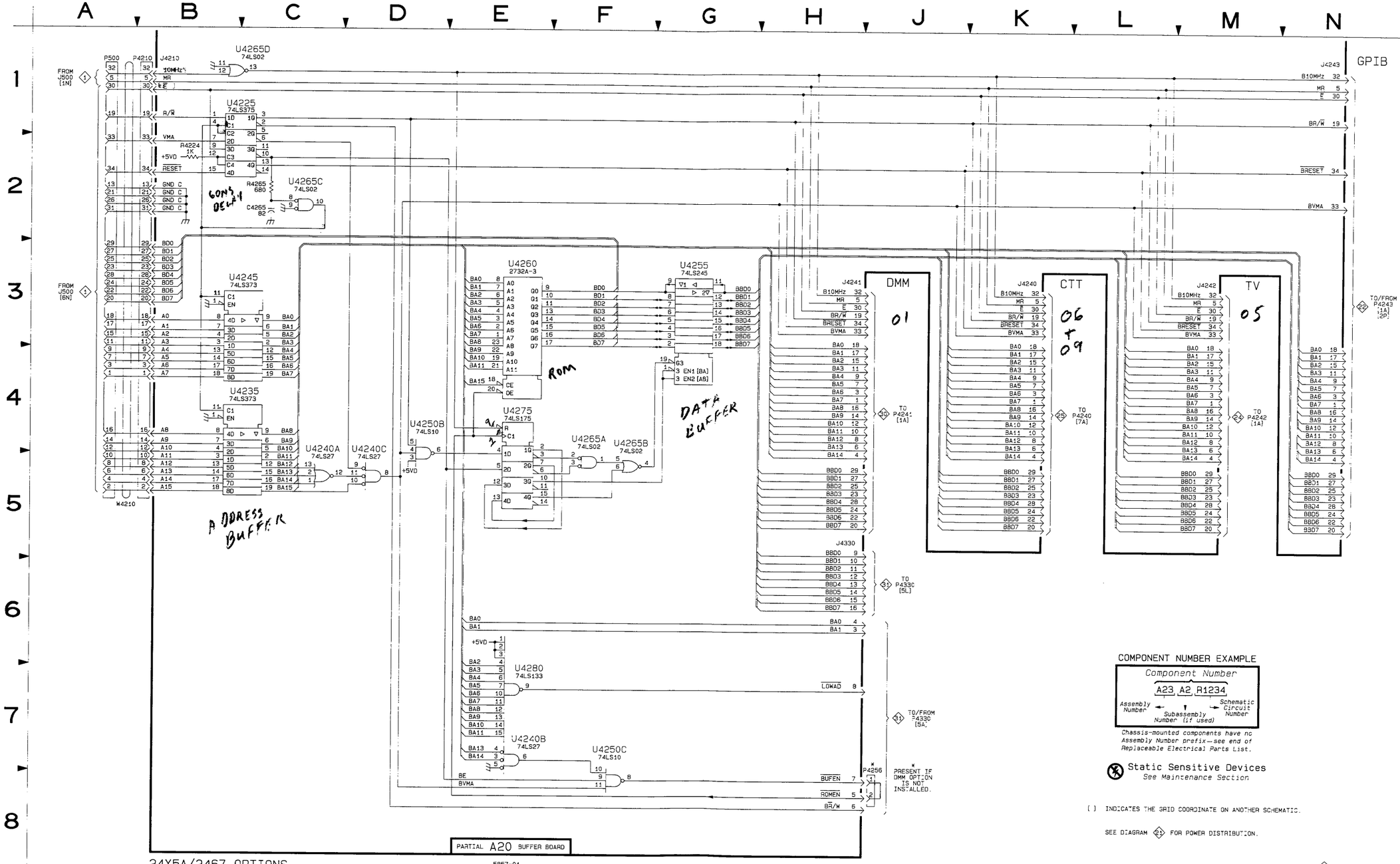
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P500	1A	CHASSIS	P4330	8B	CHASSIS	W4210	5A	CHASSIS			
P4210	1B	CHASSIS									



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CHEM CATION	BOARD LOCATION
3E	5G
5F	6G
5F	6G
2C	6G
1B	6G
4E	6F
7E	3F

CHEM CATION	BOARD LOCATION



COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234

Assembly Number ← Subassembly Number (if used) → Schematic Circuit Number

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.

SEE DIAGRAM <20> FOR POWER DISTRIBUTION.

BUFFER BOARD DIGITAL DISTRIBUTION <20>

DIGITAL DISTRIBUTION

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OTHER PARTS

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
B1690	32	P4241	30	P6310	27	U4280	21
		P4241	32	P6370	27		
F4991	28	P4300	30	P6400	27	W301	32
		P4330	20	P6401	27	W4210	20
J59	25	P4491	28	P6402	27	W4228	21
J2732	27	P4800	22	P6403	27	W4230	21
		P5090	28	P6404	27	W4232	21
P100	21	P5210	30	P6405	27	W4234	21
P101	21	P5220	32	P6406	27	W4236	21
P102	21	P5290	30	P6407	27	W4241	30
P103	21	P5290	32	P6408	27	W4241	32
P104	21	P5990	27	P6409	27	W4491	28
P109	21	P5991	25	P6410	27	W4800	22
P301	32	P6300	27			W4990	28
P302	32	P6301	27	U4225	21	W5090	28
P500	20	P6302	27	U4235	21	W5210	30
P2732	27	P6303	27	U4240	21	W5220	32
P4210	20	P6304	27	U4245	21	W5990	27
P4228	21	P6305	27	U4250	21	W6300	27
P4230	21	P6306	27	U4255	21	W6370	27
P4232	21	P6307	27	U4260	21		
P4234	21	P6308	27	U4265	21		
P4236	21	P6309	27	U4275	21		

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BUFFER BOARD ANALOG AND POWER DISTRIBUTIONS DIAGRAM 21

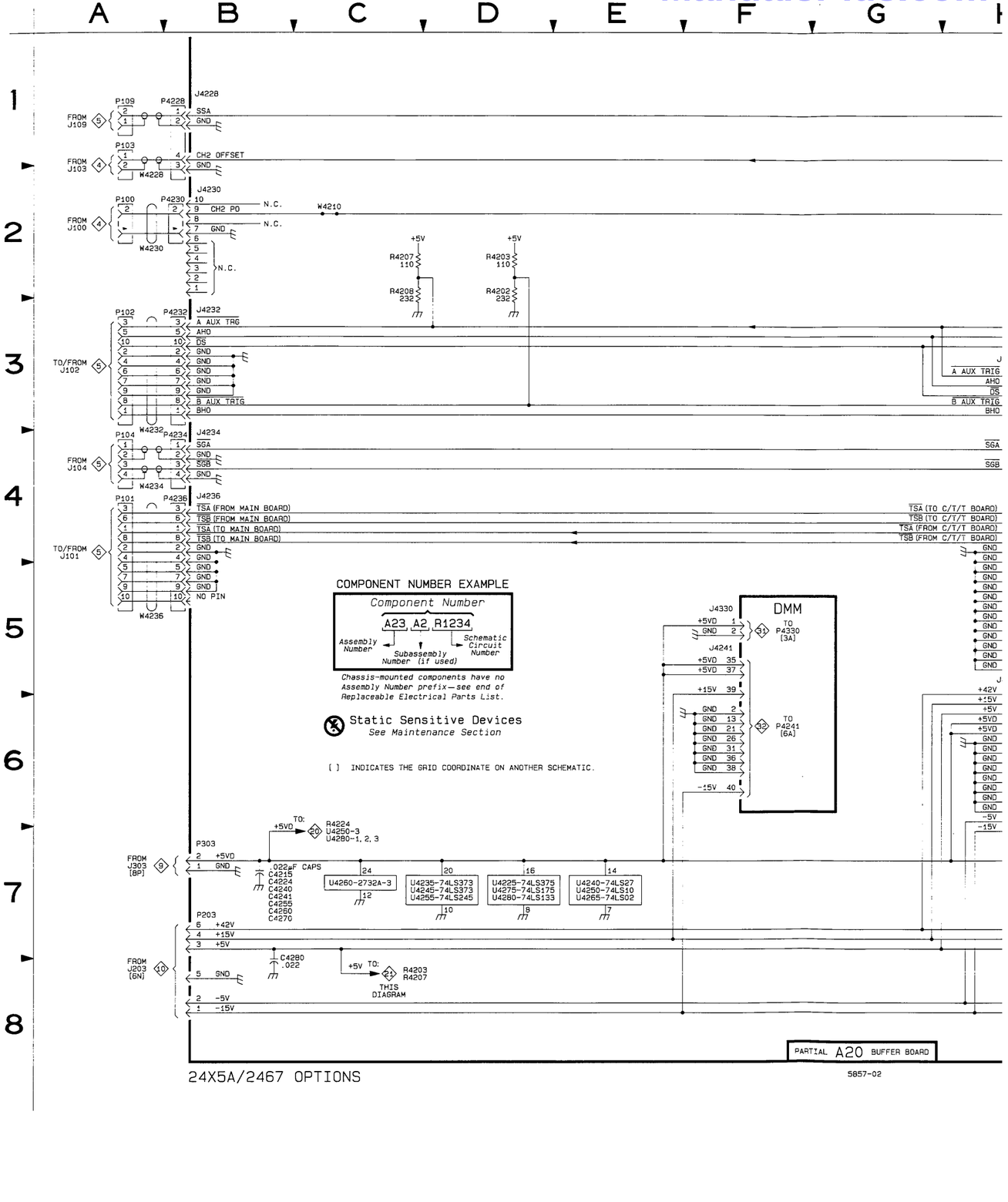
ASSEMBLY A20

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4215	7B	6E	J4220	1K	2B	J4241	5F	3D	R4202	2D	3B
C4224	7B	6E	J4221	3H	3B	J4242	4K	3D	R4203	2D	4B
C4240	7B	6F	J4228	1B	1C	J4243	6M	2D	R4207	2C	3A
C4241	7B	6F	J4230	2B	1C	J4330	5F	4G	R4208	2C	4A
C4255	7B	6G	J4232	3B	1D						
C4260	7B	5F	J4234	4B	1D	P203	7B	4C	W4210	2C	1B
C4270	7B	3E	J4236	4B	1E	P303	7B	5F			
C4280	7B	3A	J4240	5H	3D						

Partial A20 also shown on diagram 20.

OTHER PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P100	2A	CHASSIS	P4230	2B	CHASSIS	U4240	7E	CHASSIS	U4280	7D	CHASSIS
P101	4A	CHASSIS	P4232	3B	CHASSIS	U4245	7D	CHASSIS			
P102	3A	CHASSIS	P4234	4B	CHASSIS	U4250	7E	CHASSIS	W4228	2A	CHASSIS
P103	1A	CHASSIS	P4236	4B	CHASSIS	U4255	7D	CHASSIS	W4230	2A	CHASSIS
P104	4A	CHASSIS				U4260	7C	CHASSIS	W4232	3A	CHASSIS
P109	1A	CHASSIS	U4225	7D	CHASSIS	U4265	7E	CHASSIS	W4234	4A	CHASSIS
P4228	1B	CHASSIS	U4235	7D	CHASSIS	U4275	7D	CHASSIS	W4236	5A	CHASSIS

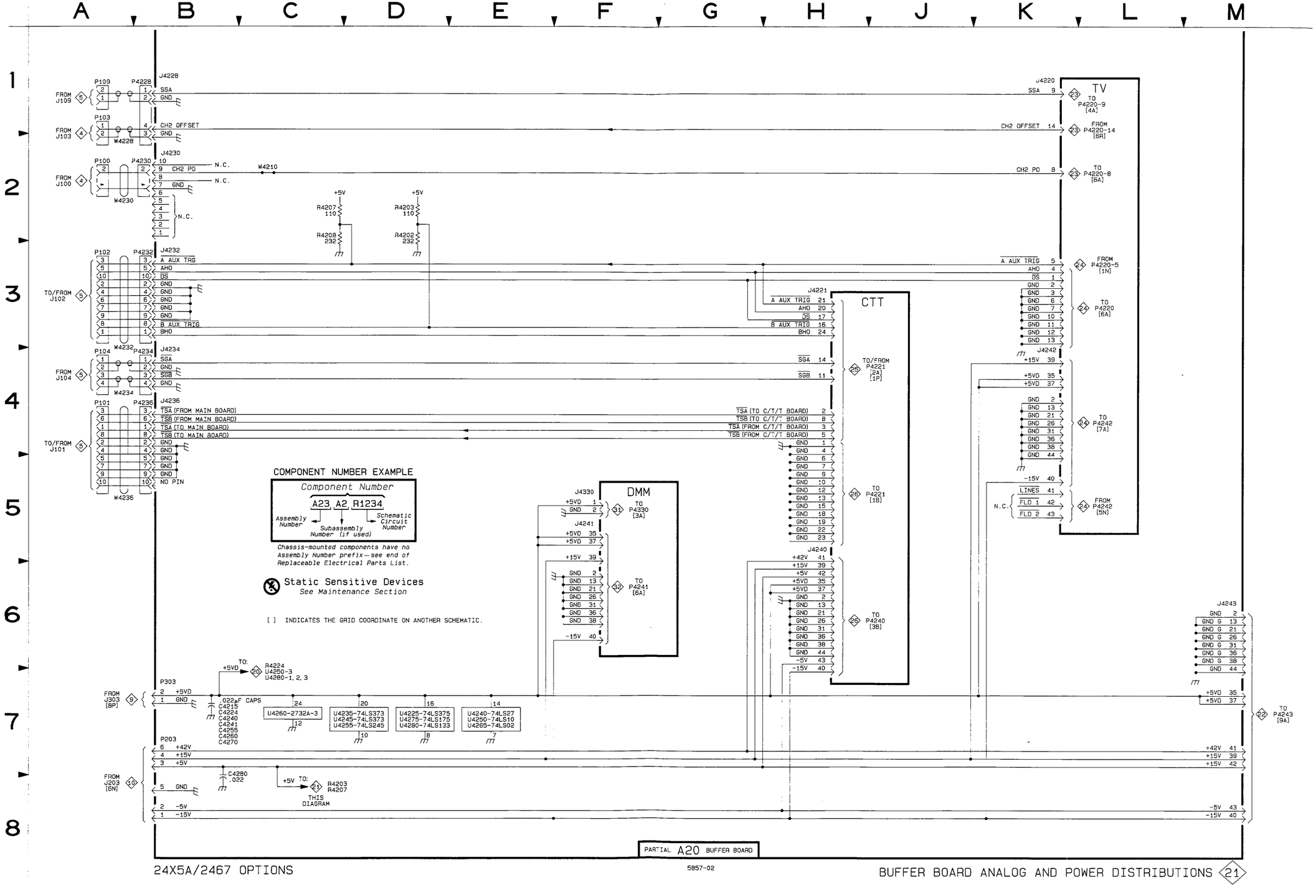


24X5A/2467 OPTIONS

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SCHEM LOCATION	BOARD LOCATION
2D	3B
2D	4B
2C	3A
2C	4A
2C	1B

SCHEM LOCATION	BOARD LOCATION
7D	CHASSIS
2A	CHASSIS
2A	CHASSIS
3A	CHASSIS
4A	CHASSIS
5A	CHASSIS

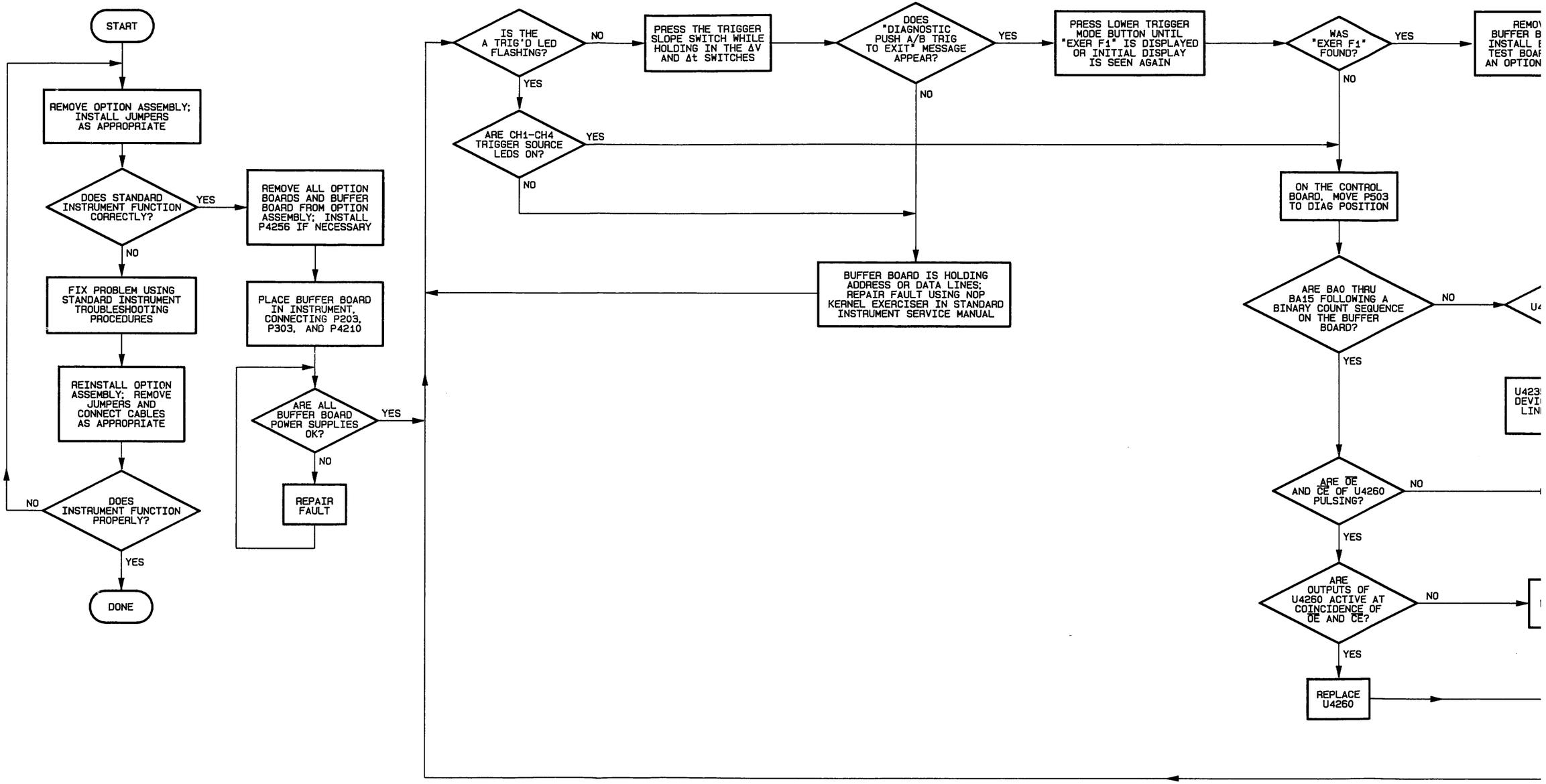


24X5A/2467 OPTIONS

5857-02

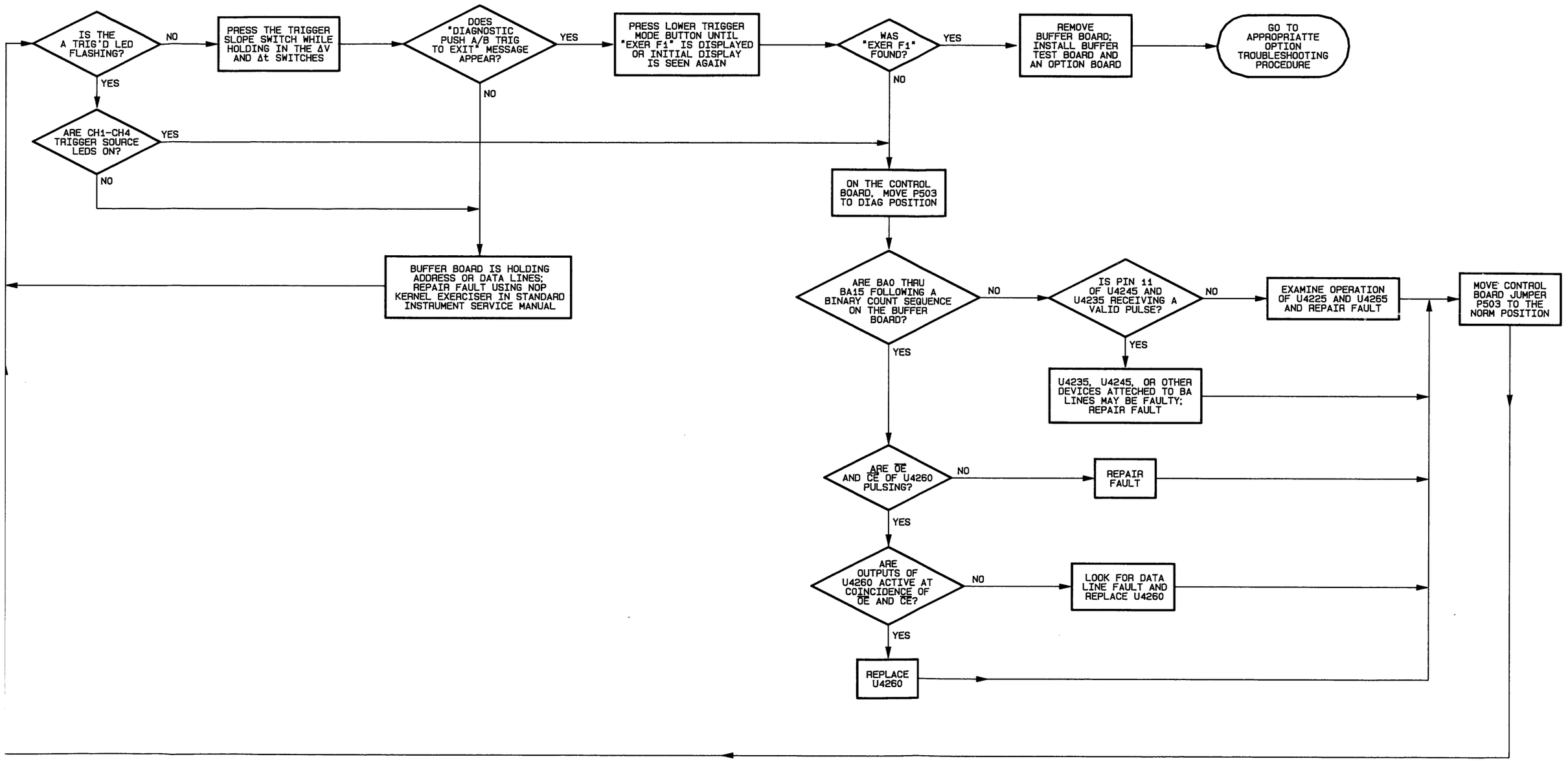
BUFFER BOARD ANALOG AND POWER DISTRIBUTIONS 21

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BUFFER BOARD TROUBLESHOOTING PROCEDURE

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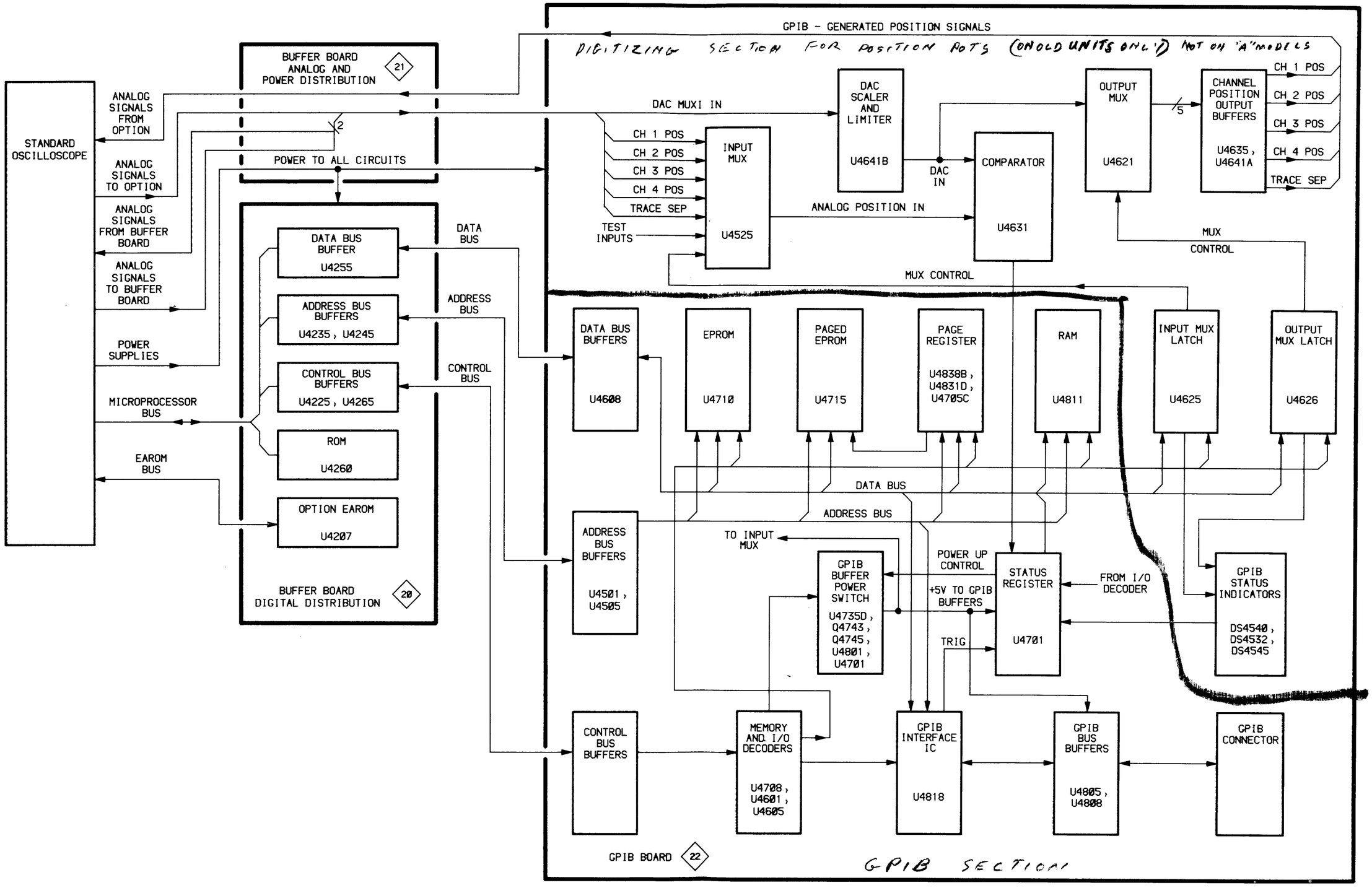


Figure 10-9. GPIB (Option 10) detailed block diagram.

4640-12

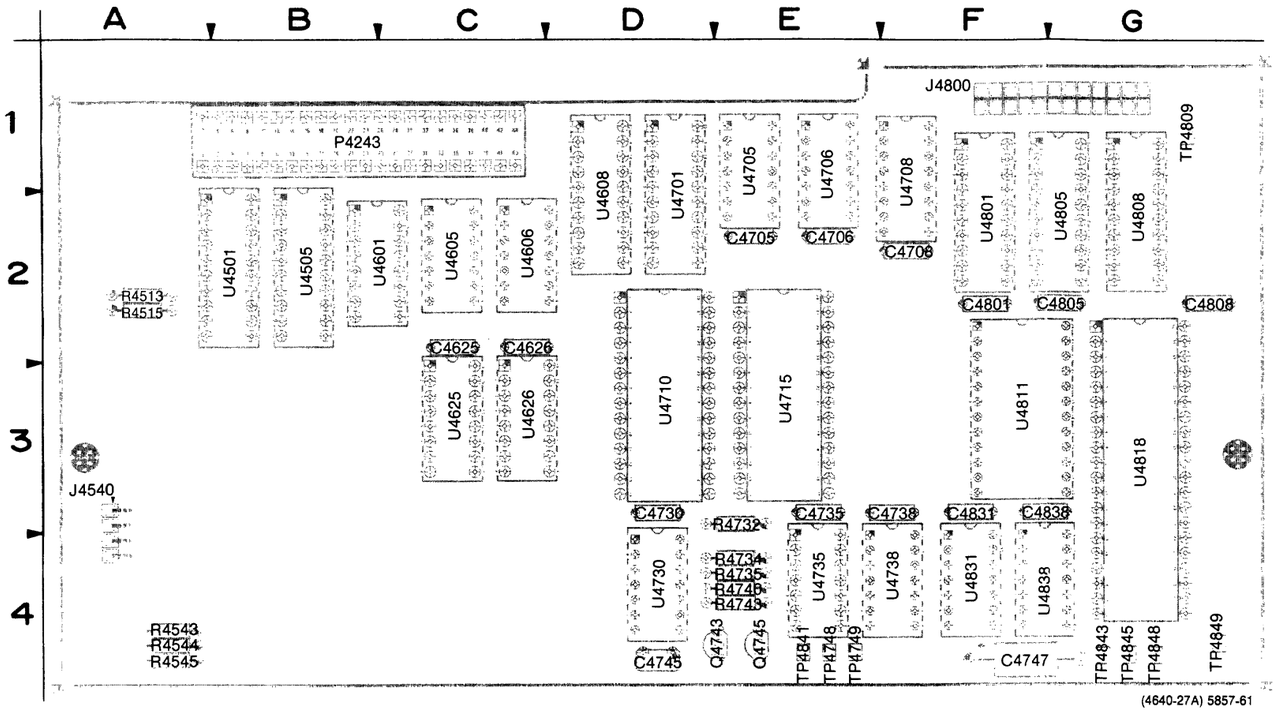


Figure 10-10. A23—GPIB board.

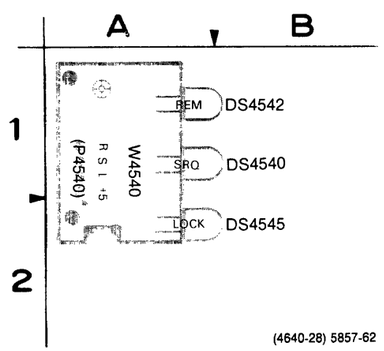


Figure 10-11. A22—LED board.

Static Sensitive Devices
See Maintenance Section

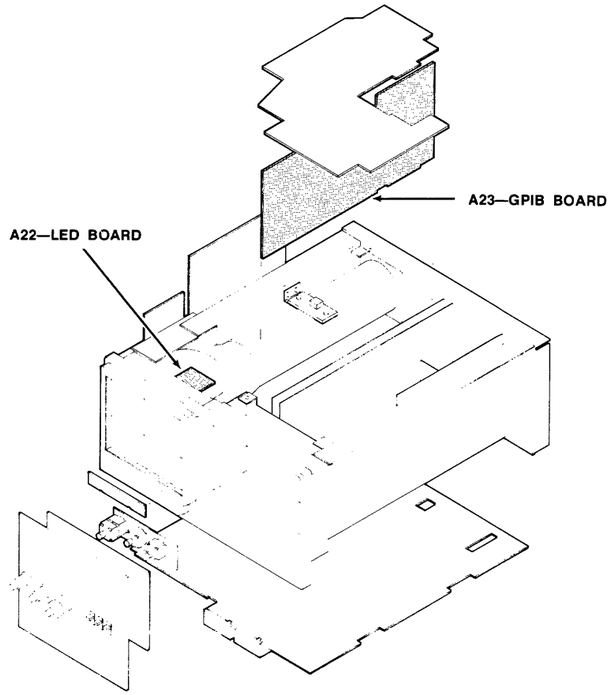
COMPONENT NUMBER EXAMPLE

Component Number

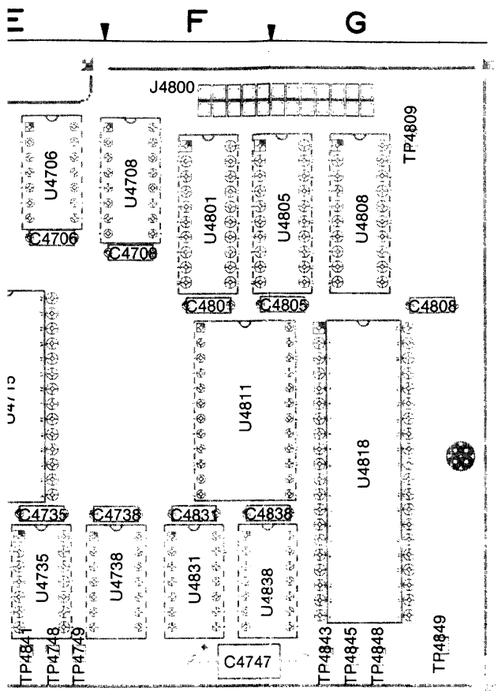
A23 A2 R1234

Assembly Number — *Subassembly Number (if used)* — *Schematic Circuit Number*

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List



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(4640-27A) 5857-61

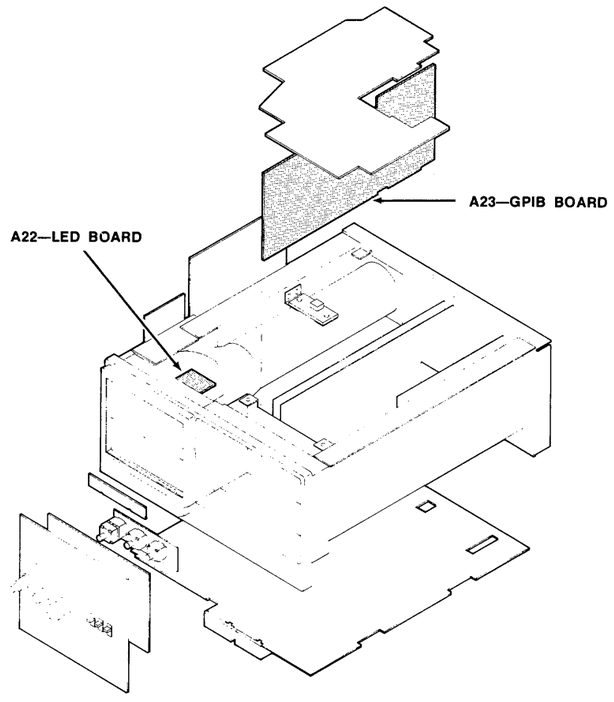
I.

) Static Sensitive Devices
See Maintenance Section

PONENT NUMBER EXAMPLE

Component Number
A23 A2 R1234
ly er — *Subassembly Number (if used)*; *Schematic Circuit Number*

unted components have no Assembly Number
e end of Replaceable Electrical Parts List.



A23—GPIB BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4625	22	J4800	22			U4626	22
C4626	22			TP4748	22	U4701	22
C4705	22	P4243	22	TP4749	22	U4705	22
C4706	22			TP4809	22	U4706	22
C4708	22	Q4743	22	TP4841	22	U4708	22
C4730	22	Q4745	22	TP4843	22	U4710	22
C4735	22			TP4845	22	U4715	22
C4738	22	R4513	22	TP4848	22	U4730	22
C4745	22	R4515	22	TP4849	22	U4735	22
C4747	22	R4543	22			U4738	22
C4801	22	R4544	22	U4501	22	U4801	22
C4805	22	R4545	22	U4505	22	U4805	22
C4808	22	R4732	22	U4601	22	U4808	22
C4831	22	R4734	22	U4605	22	U4811	22
C4838	22	R4735	22	U4606	22	U4818	22
		R4740	22	U4608	22	U4831	22
J4540	22	R4743	22	U4625	22	U4838	22

A22—LED BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
DS4540	22	P4540	22
DS4542	22		
DS4545	22	W4540	22

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GPIB BOARD AND POWER DISTRIBUTIONS DIAGRAM 22

ASSEMBLY A22

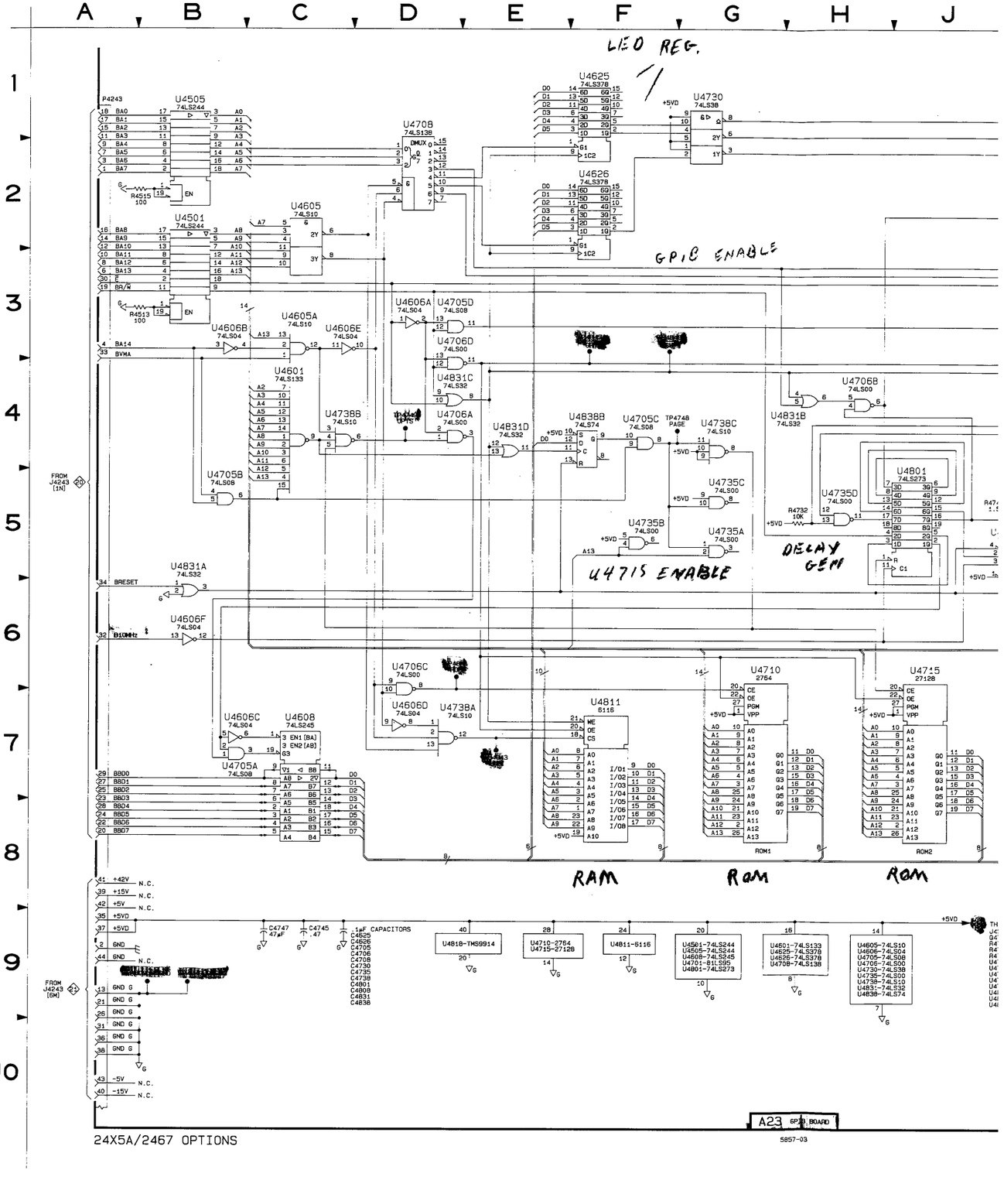
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
DS04540	1M	1A	DS4545	1N	2A	P4540	1M	1A	W4540	2M	1A
DS4542	1N	1A									

ASSEMBLY A23

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4625	9D	2C	R4545	2L	4A	U4606E	3C	2C	U4730	9H	4D
C4626	9D	2C	R4732	5H	3E	U4606F	6B	2C	U4735A	5G	4E
C4705	9D	2E	R4734	5K	4E	U4606	9H	2C	U4735B	5F	4E
C4706	9D	2E	R4735	4K	4E	U4608	7C	2D	U4735C	5G	4E
C4708	9D	2F	R4740	5K	4E	U4608	9G	2D	U4735D	5H	4E
C4730	9D	3D	R4743	5K	4E	U4625	1F	3C	U4735	9H	4E
C4735	9D	3E				U4625	9H	3C	U4738A	7D	4F
C4738	9D	3F	TP4748	4F	4E	U4626	2F	3C	U4738B	4C	4F
C4745	9C	4D	TP4749	4D	4E	U4626	9H	3C	U4738C	4G	4F
C4747	9C	4F	TP4809	9B	1G	U4701	4L	2D	U4738	9H	4F
C4801	9D	2F	TP4841	6D	4E	U4701	9G	2D	U4801	5J	2F
C4805	5K	2G	TP4843	7E	4G	U4705A	7B	1E	U4801	9G	2F
C4808	9D	2G	TP4845	3F	4G	U4705B	5B	1E	U4805	3N	2G
C4831	9D	3F	TP4848	3F	4G	U4705C	4F	1E	U4805	4N	2G
C4838	9D	3F	TP4849	9B	4G	U4705D	3D	1E	U4808	3N	2G
						U4705	9H	1E	U4808	6N	2G
J4540	1M	3A	U4501	2B	2B	U4706A	4D	1E	U4811	7F	3F
J4800	4P	1F	U4501	9G	2B	U4706B	4H	1E	U4811	9F	3F
			U4505	1B	2B	U4706C	6D	1E	U4818	3M	3G
P4243	1A	1B	U4505	9G	2B	U4706D	3D	1E	U4818	9E	3G
P4243	2P	1B	U4601	4C	2C	U4706	9H	1E	U4831A	6B	4F
			U4601	9H	2C	U4708	1D	1F	U4831B	4H	4F
Q4743	4K	4E	U4605A	3C	2C	U4708	9H	1F	U4831C	4D	4F
Q4745	5K	4E	U4605	2C	2C	U4710	6G	3D	U4831D	4E	4F
			U4605	9H	2C	U4710	9E	3D	U4831	9H	4F
R4513	3B	2A	U4606A	3D	2C	U4715	6J	3E	U4838A	5K	4F
R4515	2B	2A	U4606B	3B	2C	U4715	9E	3E	U4838B	4F	4F
R4543	1L	4A	U4606C	7B	2C	U4730D	2M	4D	U4838	9H	4F
R4544	1L	4A	U4606D	7D	2C	U4730	1G	4D			

OTHER PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P4800	4P	CHASSIS	W4800	8P	CHASSIS						

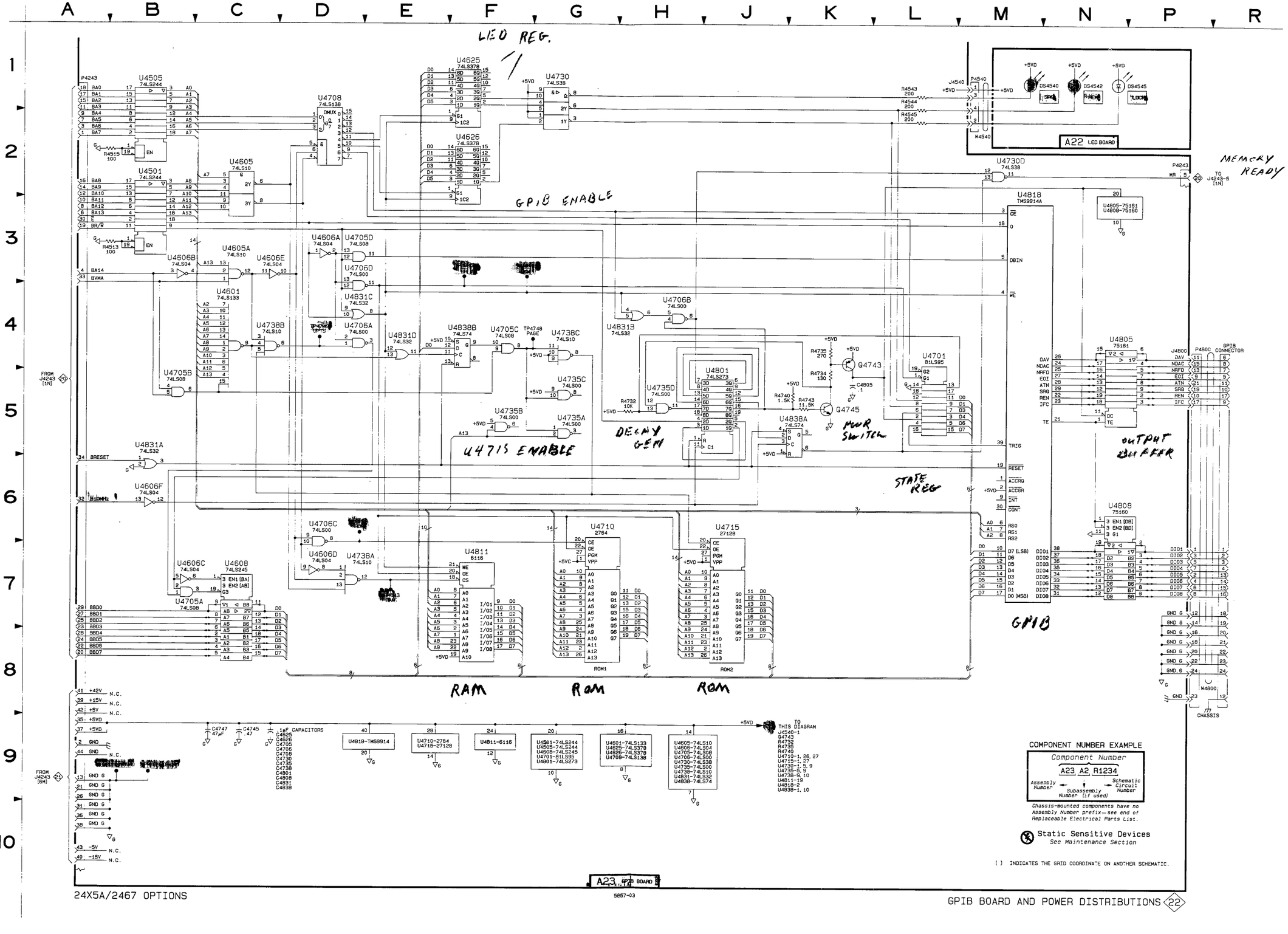


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CHEM CATION	BOARD LOCATION
2M	1A

CHEM CATION	BOARD LOCATION
9H	4D
5G	4E
5F	4E
5G	4E
5H	4E
9H	4E
7D	4F
4C	4F
4G	4F
9H	4F
5J	2F
9G	2F
3N	2G
4N	2G
3N	2G
6N	2G
7F	3F
9F	3F
3M	3G
9E	3G
6B	4F
4H	4F
4D	4F
4E	4F
9H	4F
5K	4F
4F	4F
9H	4F

CHEM ATION	BOARD LOCATION



24X5A/2467 OPTIONS

GPIB BOARD AND POWER DISTRIBUTIONS 22

COMPONENT NUMBER EXAMPLE

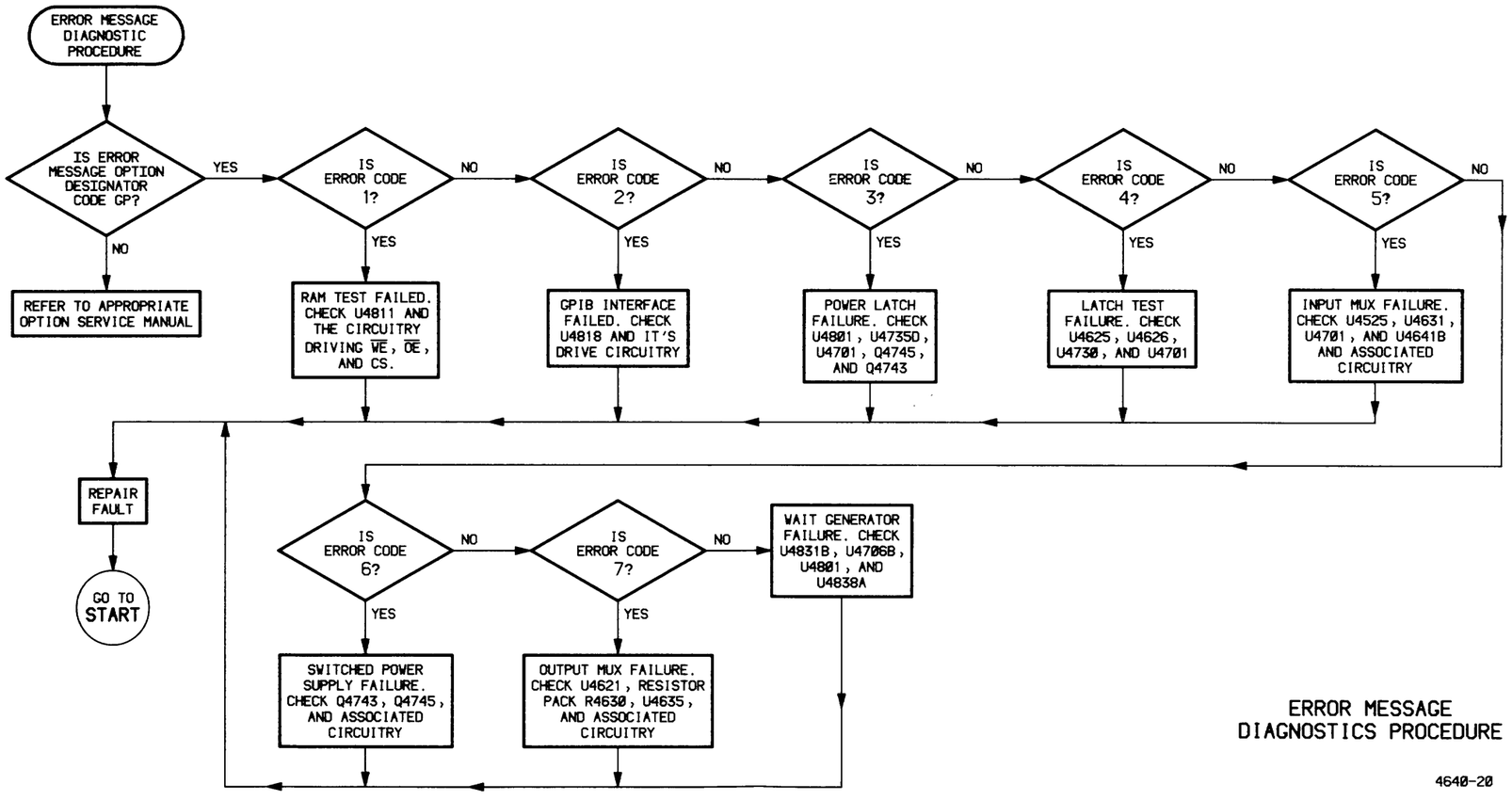
Component Number: A23 A2 R1234
(Assembly Number; Subassembly Number (if used); Schematic Circuit Number)

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.

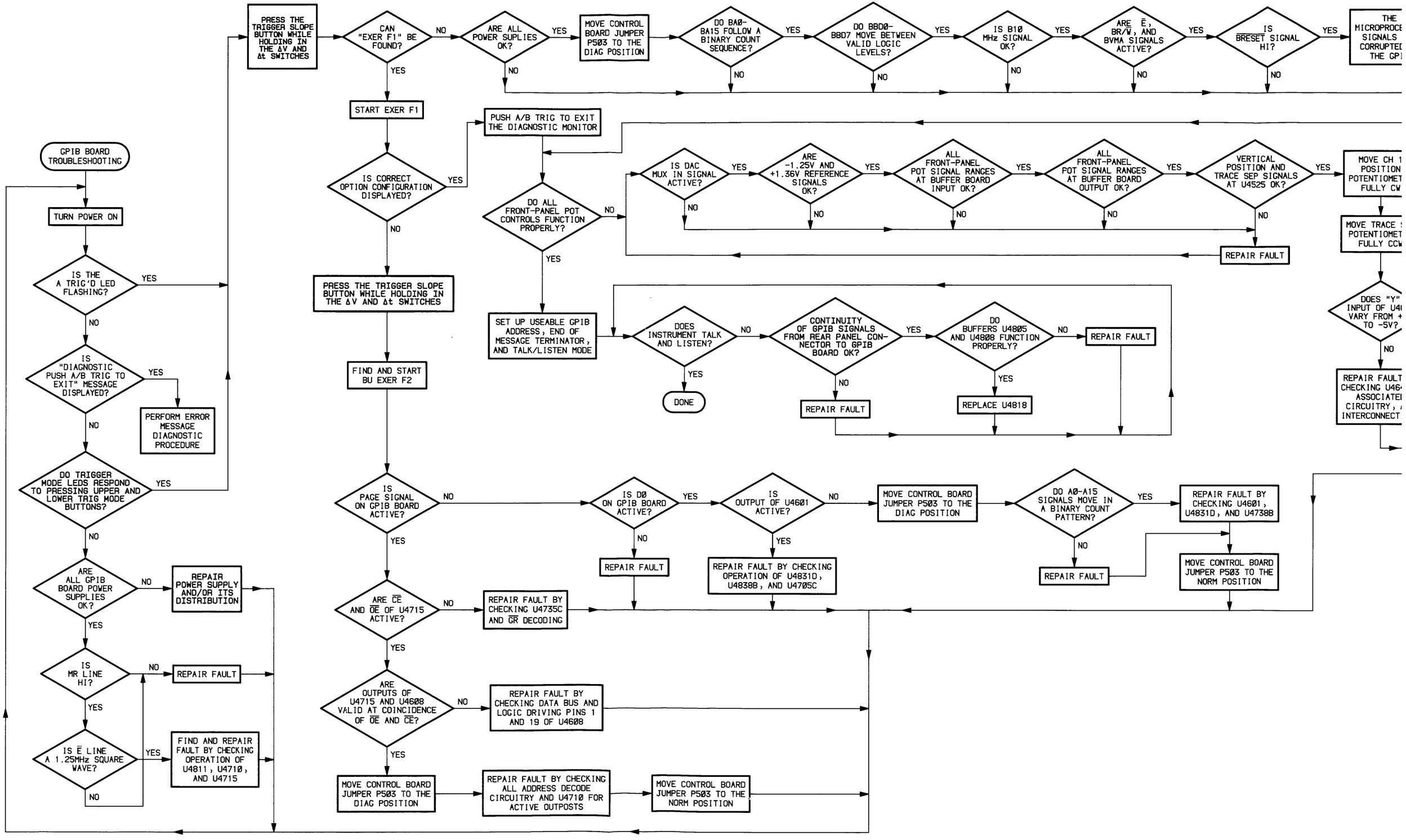
ManualsPlus.com



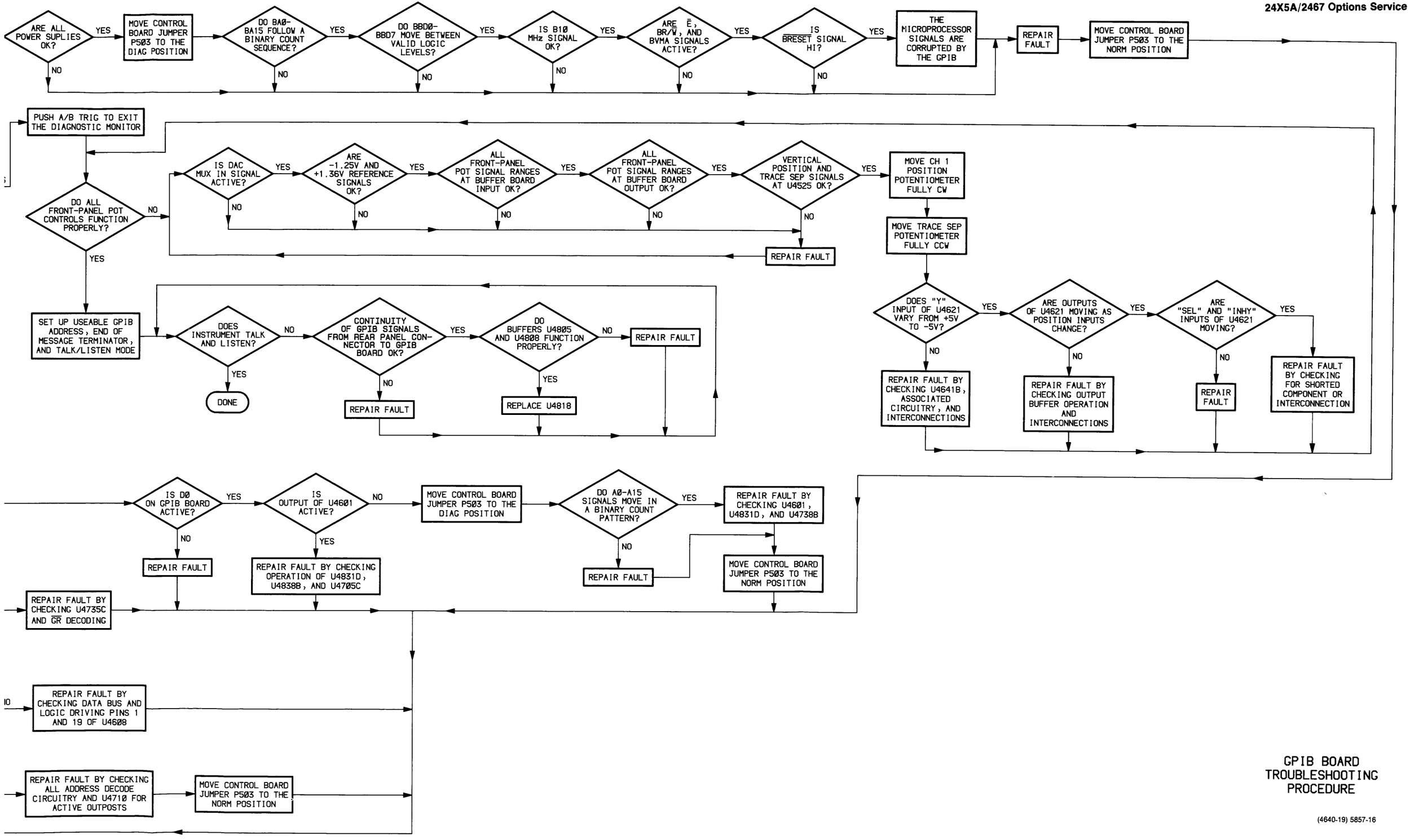
ERROR MESSAGE
DIAGNOSTICS PROCEDURE

4640-20

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GPIB BOARD TROUBLESHOOTING PROCEDURE

(4640-19) 5857-16

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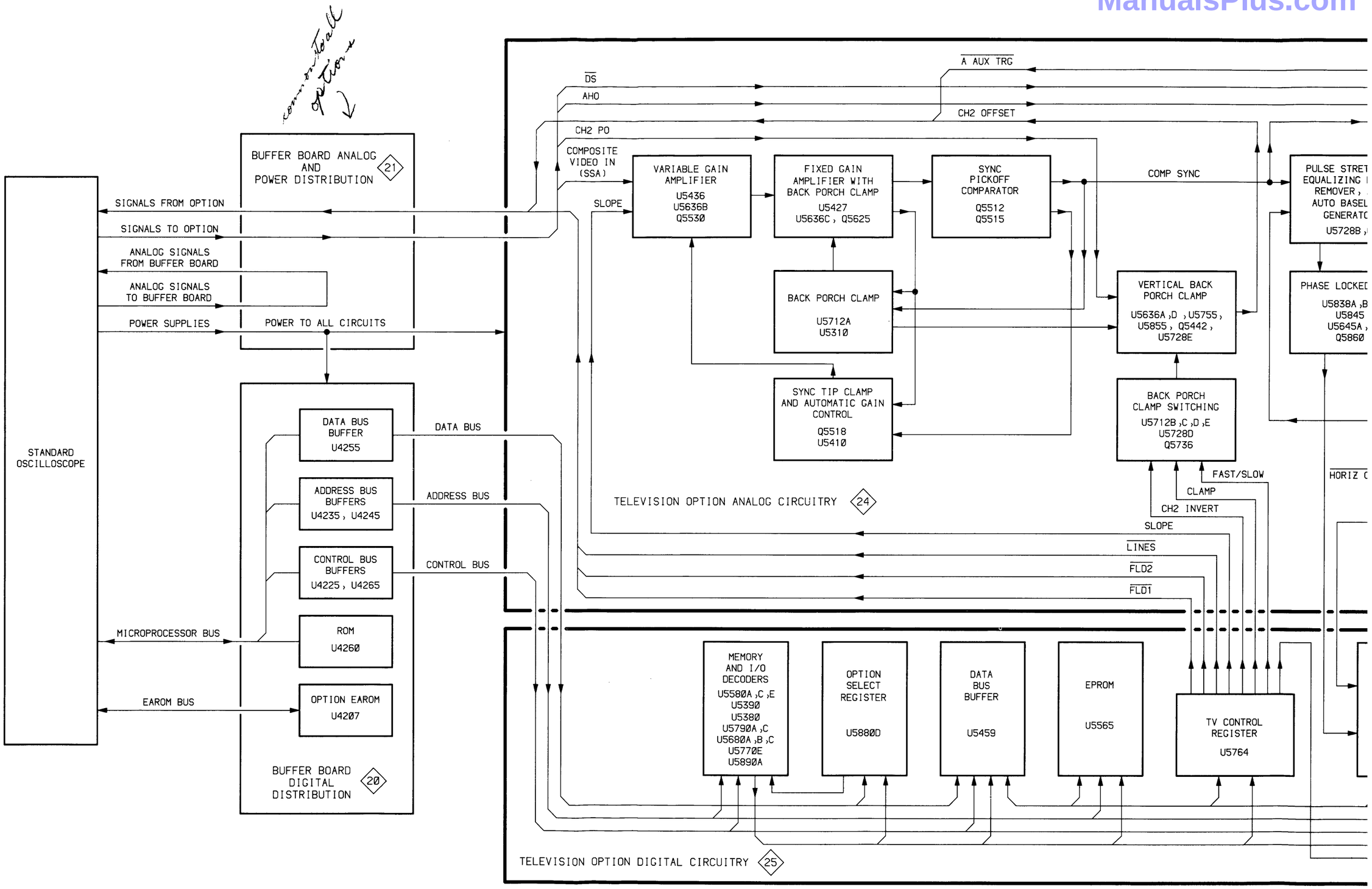


Figure 10-12. TV (Option 05) detailed block diagram.

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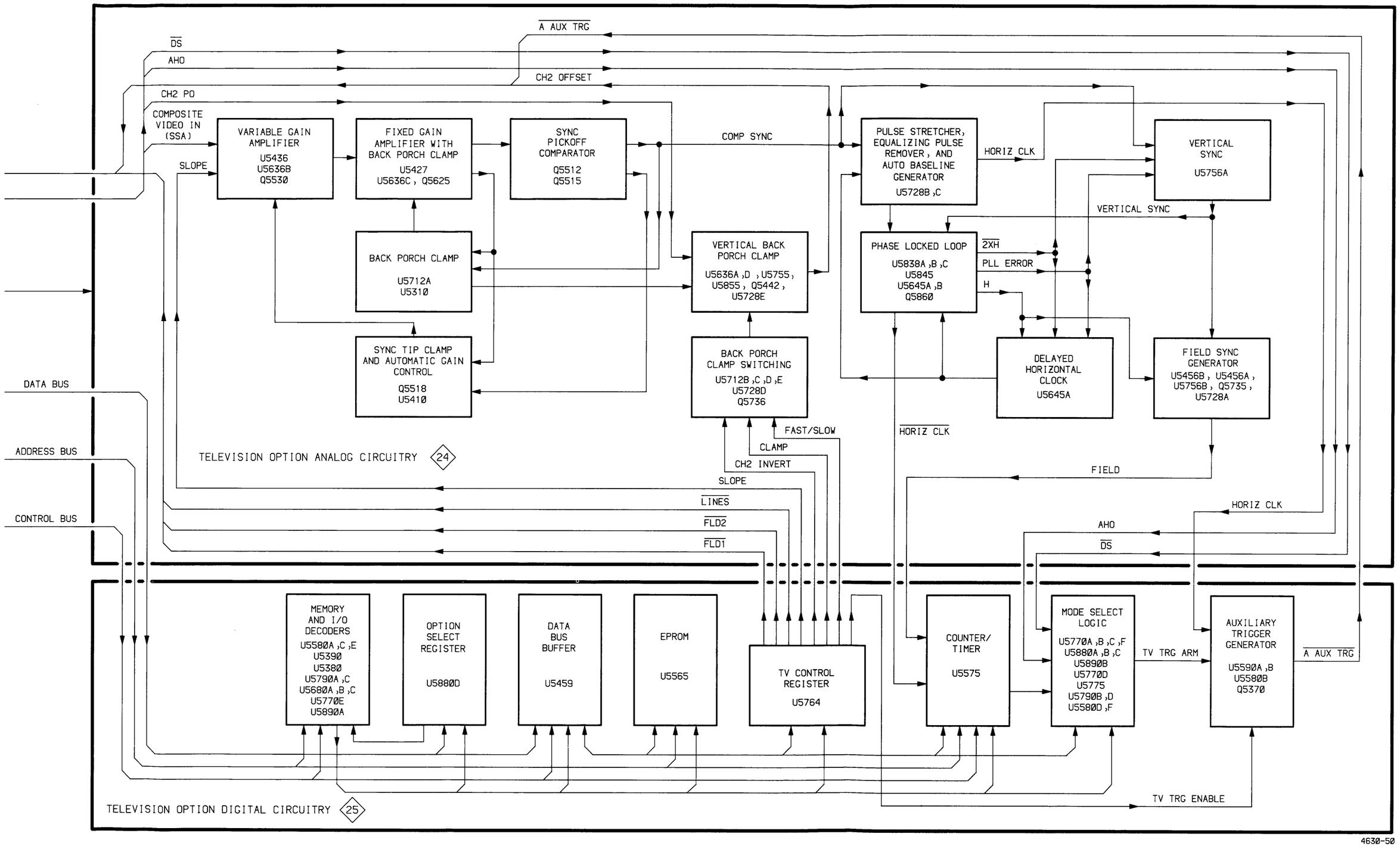
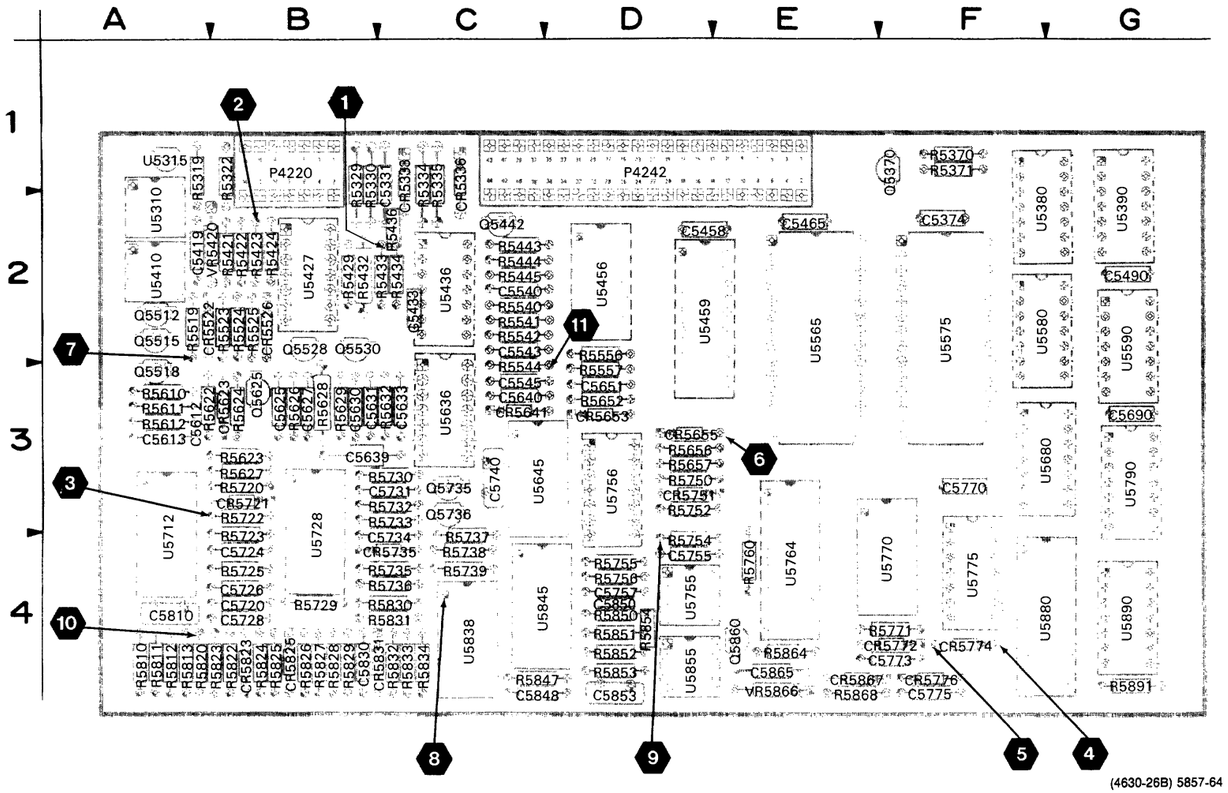


Figure 10-12. TV (Option 05) detailed block diagram.

ManualsPlus.com

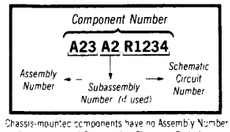


(4630-26B) 5857-64

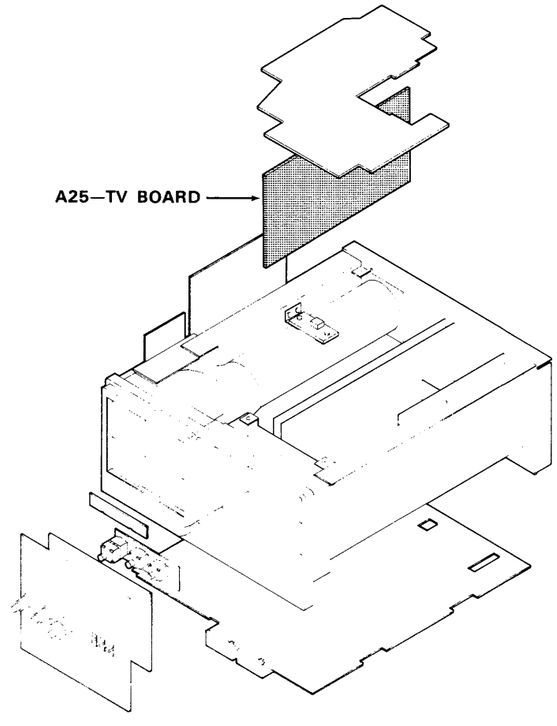
Figure 10-13. A25—TV board.

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

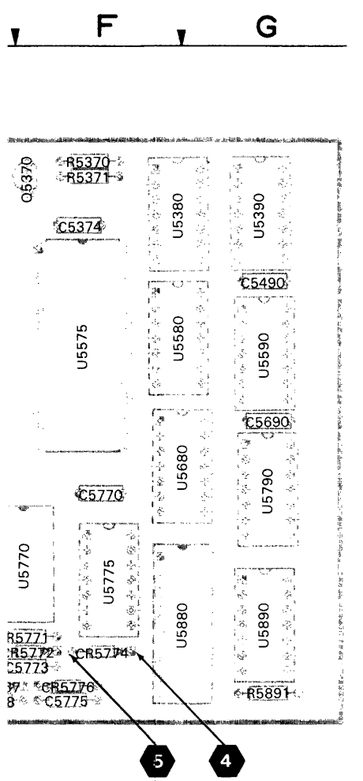


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

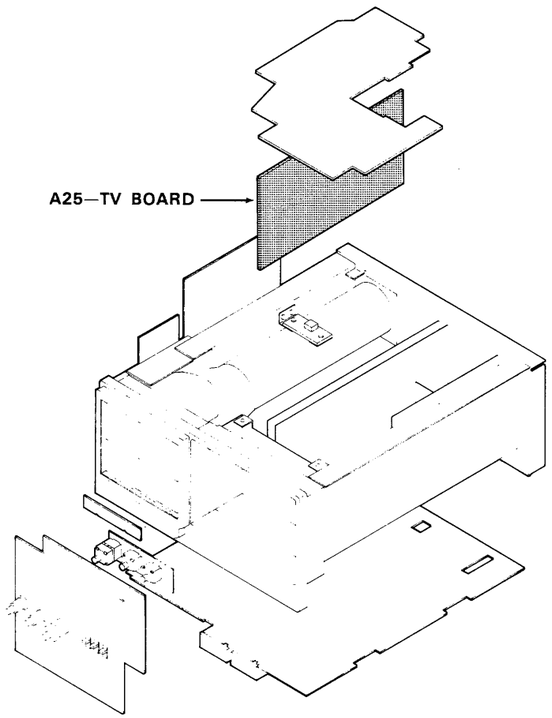


CIRCUIT NUMBER	SC NU
C5331	
C5374	
C5419	
C5433	
C5458	
C5465	
C5490	
C5540	
C5543	
C5545	
C5612	
C5613	
C5625	
C5627	
C5630	
C5631	
C5633	
C5639	
C5640	
C5651	
C5690	
C5720	
C5724	
C5726	
C5728	
C5731	
C5734	
C5740	
C5755	
C5757	
C5770	
C5773	
C5775	
C5810	
C5830	
C5848	
C5850	
C5853	
C5865	
CR5333	
CR5336	
CR5522	

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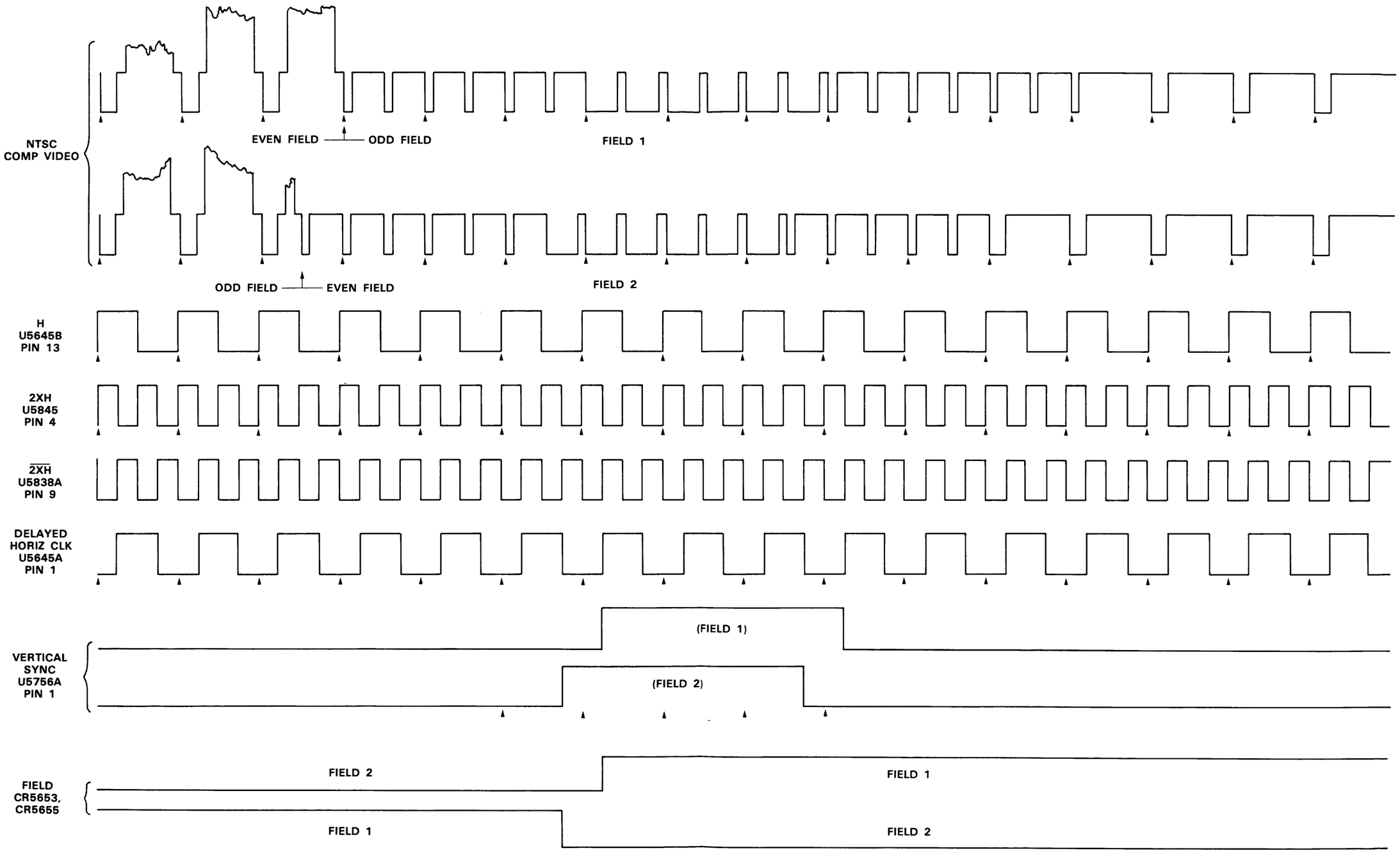
(4630-26B) 5857-64



A25—TV BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5331	23	CR5526	23	R5424	23	R5737	23	U5410	23
C5374	24	CR5623	23	R5429	23	R5738	23	U5410	24
C5419	23	CR5641	23	R5432	23	R5739	23	U5427	23
C5433	23	CR5653	23	R5433	23	R5750	23	U5436	23
C5458	24	CR5655	23	R5434	23	R5752	23	U5456	23
C5465	24	CR5721	23	R5436	23	R5754	23	U5456	24
C5490	24	CR5735	23	R5443	23	R5755	23	U5459	24
C5540	23	CR5751	23	R5444	23	R5756	24	U5565	24
C5543	23	CR5772	23	R5445	23	R5760	24	U5575	24
C5545	23	CR5774	23	R5519	23	R5771	23	U5580	24
C5612	23	CR5776	23	R5523	23	R5810	23	U5590	24
C5613	23	CR5823	23	R5524	23	R5811	23	U5636	23
C5625	23	CR5825	23	R5525	23	R5812	23	U5636	24
C5627	23	CR5831	23	R5540	23	R5813	23	U5645	23
C5630	23	CR5867	23	R5541	23	R5820	23	U5645	24
C5631	23			R5542	23	R5822	23	U5680	24
C5633	24	P4220	23	R5544	23	R5823	23	U5712	23
C5639	23	P4220	24	R5556	23	R5824	23	U5712	24
C5640	23	P4242	24	R5557	23	R5825	23	U5728	23
C5651	23			R5610	23	R5826	23	U5728	24
C5690	24	Q5370	24	R5611	23	R5827	23	U5755	23
C5720	23	Q5442	23	R5612	23	R5828	23	U5755	24
C5724	23	Q5512	23	R5622	23	R5829	23	U5756	23
C5726	23	Q5515	23	R5623	23	R5830	23	U5756	24
C5728	23	Q5518	23	R5624	23	R5831	23	U5764	24
C5731	24	Q5528	23	R5626	23	R5832	23	U5770	24
C5734	23	Q5530	23	R5627	23	R5833	23	U5775	24
C5740	23	Q5625	23	R5628	23	R5834	23	U5790	24
C5755	23	Q5735	23	R5629	23	R5847	23	U5838	23
C5757	24	Q5736	23	R5632	24	R5850	23	U5838	24
C5770	24	Q5860	23	R5652	23	R5851	23	U5845	23
C5773	23			R5656	23	R5852	23	U5845	24
C5775	23	R5319	23	R5657	23	R5853	23	U5855	23
C5810	24	R5322	23	R5720	23	R5854	23	U5855	24
C5830	23	R5329	23	R5722	23	R5864	23	U5880	24
C5848	23	R5330	23	R5723	23	R5868	23	U5890	24
C5850	23	R5334	23	R5725	23	R5891	24		
C5853	23	R5335	23	R5729	23			VR5420	23
C5865	23	R5370	24	R5730	24	U5310	23	VR5866	23
		R5371	24	R5732	23	U5310	24		
CR5333	23	R5421	23	R5733	23	U5315	24		
CR5336	23	R5422	23	R5735	23	U5380	24		
CR5522	23	R5423	23	R5736	23	U5390	24		

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4630-03

Figure 10-14. TV Option timing diagram.

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TEST WAVEFORM SETUP INFORMATION

The numbered waveforms below were obtained at the test points indicated on the schematic diagram. The waveforms are representative of signals that may be expected at the associated points when the following setup conditions are observed. Any changes from the given setup conditions required to produce a given waveform are noted with that waveform illustration.

24X5A/2467 TV OPTION SETUP

Connect a 100 IRE unit composite video signal (NTSC or PAL) to the CH 2 input using a 75-Ω bnc cable and a 75-Ω terminator. Set initial front-panel controls as follows:

CH 2 POSITION	Midrange

VERTICAL MODE

CH 1, CH 3, and CH 4	Off
CH 2	On

VOLTS/DIV

CH 2	200 mV
CH 2 VAR	In detent

Input Coupling

CH 2	1 MΩ DC

Horizontal

POSITION	Midrange
A SEC/DIV	10 μs
SEC/DIV VAR	In detent
X10 MAG	Off
ΔV and Δt	Displays off

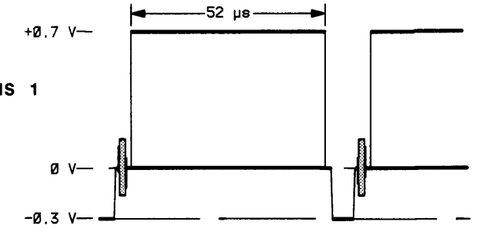
Trigger

HOLDOFF	MIN (fully CCW)
SLOPE	—
MODE	AUTO
SOURCE	CH 2
COUPLING	LINES

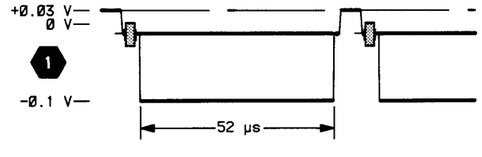
TEST OSCILLOSCOPE SETUP

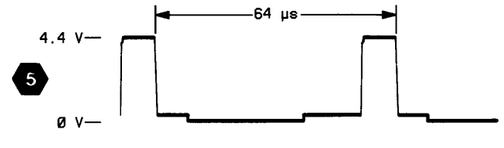
Using a X10 probe with the test oscilloscope, set its Trigger Slope, Trigger Level, Volts/Div, and Time/Div ranges as required to obtain the indicated displays.

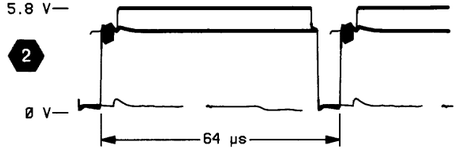
INPUT SIGNAL WHILE OBSERVING WAVEFORMS 1 THROUGH 8.

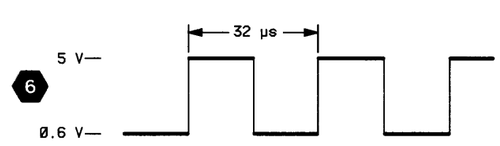


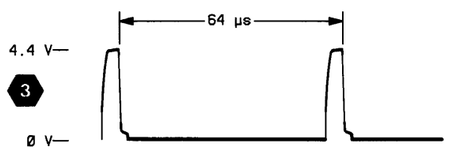
**INPUT SIGNA
THROUGH 11.
TV GENERATC
COUPLING TO**

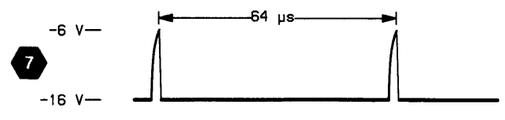


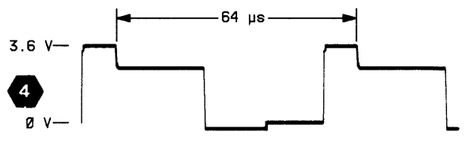


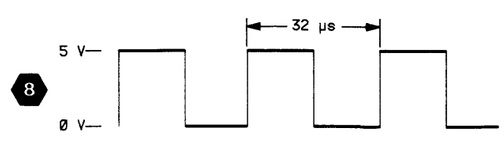












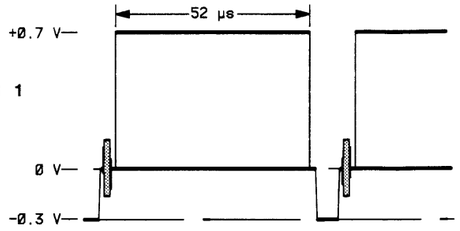
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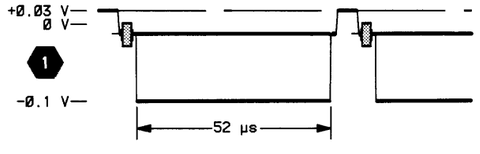
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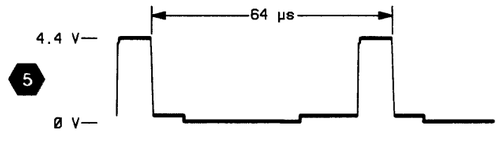
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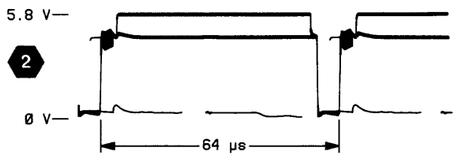
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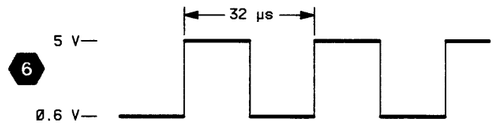
INPUT SIGNAL WHILE OBSERVING WAVEFORMS 1 THROUGH 8.

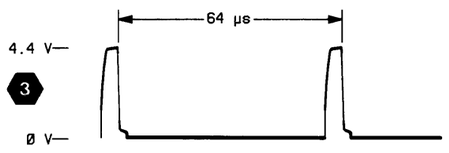


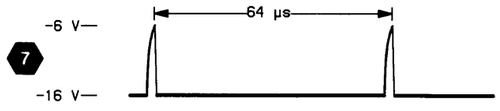


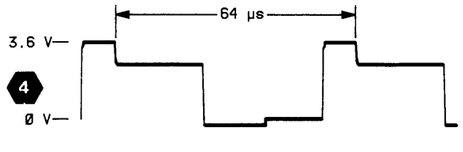


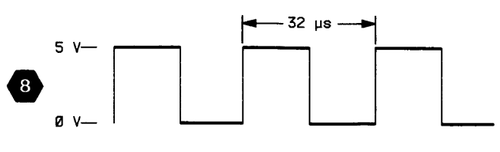




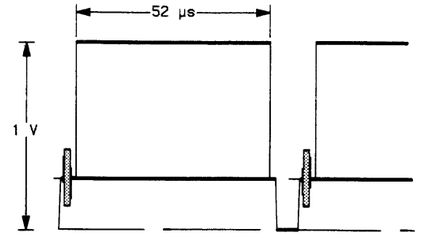


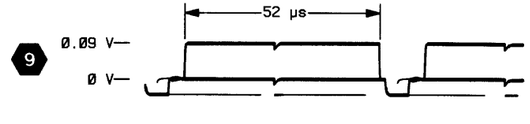


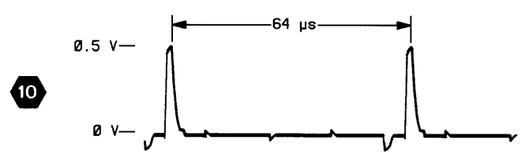


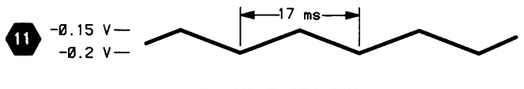


INPUT SIGNAL WHILE OBSERVING WAVEFORMS 9 THROUGH 11. CONNECT A FIELD SQUARE WAVE FROM A TV GENERATOR TO THE CH 2 INPUT. SET CH 2 INPUT COUPLING TO TV CLAMP.









A AND B SEC/DIV 5 ms.

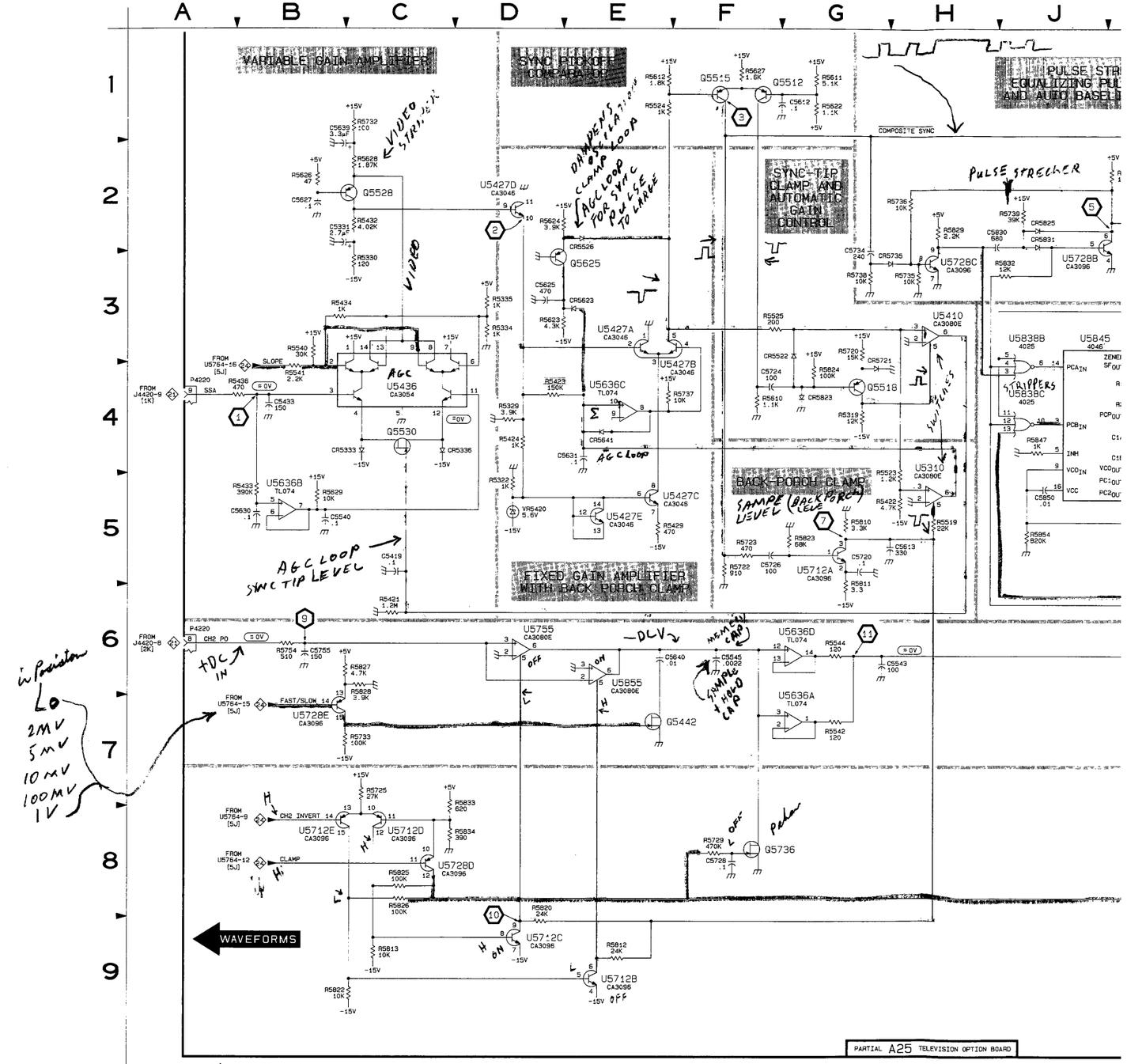
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TV OPTION ANALOG CIRCUITRY DIAGRAM 23

ASSEMBLY A25

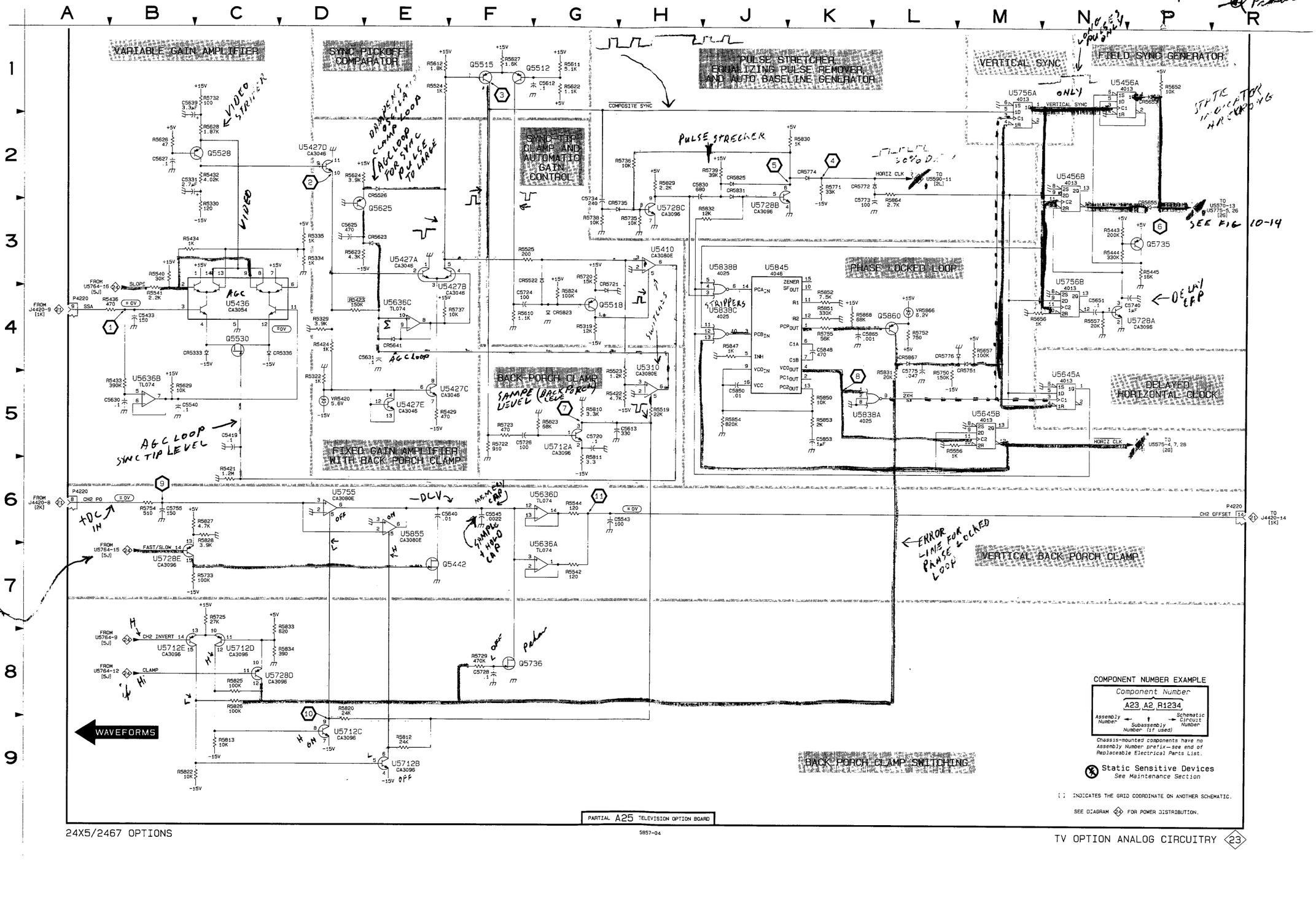
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5331	2B	1C	P4220	4A	1B	R5622	1G	3A	R5851	4K	4D
C5419	5C	2A	P4220	6A	1B	R5623	3E	3B	R5852	4K	4D
C5433	4B	2C	P4220	6R	1B	R5624	2D	3B	R5853	5K	4D
C5540	5B	2C				R5626	2B	3B	R5854	5J	4D
C5543	6G	2C	Q5442	7E	2C	R5627	1F	3B	R5864	2L	4E
C5545	6F	3C	Q5512	1F	2A	R5628	2C	3B	R5868	4K	4E
C5612	1G	3A	Q5515	1F	2A	R5629	4B	3B			
C5613	5H	3A	Q5518	4G	3A	R5629	5B	3B	U5310	5H	2A
C5625	3D	3B	Q5528	2C	2B	R5652	1P	3D	U5410	3H	2A
C5627	2B	3B	Q5530	4C	2B	R5656	4M	3D	U5427A	3E	2B
C5630	5B	3B	Q5625	3E	3B	R5657	4M	3D	U5427B	3F	2B
C5631	4E	3B	Q5735	3P	3C	R5720	3G	3B	U5427C	5E	2B
C5639	2B	3B	Q5736	9F	3C	R5722	5F	3B	U5427D	2D	2B
C5640	6E	3C	Q5860	4L	4E	R5723	5F	4B	U5427E	5E	2B
C5651	4N	3D				R5725	7C	4B	U5436	4C	2C
C5720	5G	4B	R5319	4G	1A	R5729	8F	4B	U5456A	1N	2D
C5724	4F	4B	R5322	5D	1B	R5732	1C	3C	U5456B	2N	2D
C5726	5F	4B	R5329	4D	1B	R5733	7C	3C	U5636A	7G	3C
C5728	8F	4B	R5330	3C	1B	R5735	3H	4C	U5636B	5B	3C
C5734	2G	4C	R5334	3D	1C	R5736	2H	4C	U5636C	4E	3C
C5740	4P	3C	R5334	3D	1C	R5737	4E	4C	U5636D	6G	3C
C5755	6B	4D	R5335	3D	1C	R5738	3G	4C	U5645A	5N	3C
C5773	2L	4F	R5421	6C	2B	R5739	2J	4C	U5645B	5M	3C
C5775	4L	4F	R5422	5H	2B	R5750	4L	3D	U5712A	5G	4A
C5830	2H	4B	R5423	4D	2B	R5752	4L	3D	U5712A	5G	4A
C5848	4K	4C	R5424	4D	2B	R5754	6B	4D	U5712B	9E	4A
C5850	5J	4D	R5429	5E	2B	R5755	4K	4D	U5712C	9D	4A
C5853	5K	4D	R5432	2C	2B	R5771	2K	4F	U5712D	8C	4A
C5865	4K	4E	R5433	5B	2C	R5810	5G	4A	U5712E	8B	4A
			R5434	3B	2C	R5811	5G	4A	U5728A	4N	4B
CR5333	4C	1C	R5436	4B	2C	R5812	9E	4A	U5728B	2J	4B
CR5336	4C	1C	R5443	3N	2C	R5813	9C	4A	U5728C	3H	4B
CR5522	3G	2A	R5444	3N	2C	R5820	8D	4A	U5728D	8C	4B
CR5526	2E	2B	R5445	3P	2C	R5822	9C	4B	U5728E	7B	4B
CR5623	3E	3B	R5519	5H	2A	R5823	5G	4B	U5755	6D	4D
CR5641	4E	3C	R5523	4H	2B	R5824	4G	4B	U5756A	1M	3D
CR5653	1P	3D	R5523	5H	2B	R5825	8C	4B	U5756B	4N	3D
CR5655	3P	3D	R5524	1E	2B	R5826	8C	4B	U5838A	5K	4C
CR5721	4G	3B	R5525	3F	2B	R5827	6C	4B	U5838B	3J	4C
CR5735	3G	4C	R5540	3B	2C	R5828	6C	4B	U5838C	4J	4C
CR5751	4M	3D	R5541	4B	2C	R5829	2H	4B	U5845	3J	4C
CR5772	2L	4F	R5542	7G	2C	R5830	2K	4C	U5855	6E	4D
CR5774	2K	4F	R5544	6G	3C	R5831	4L	4C			
CR5776	4M	4F	R5556	5M	2D	R5832	3J	4C	VR5420	5D	2B
CR5823	4G	4B	R5557	4N	3D	R5833	7C	4C	VR5866	4L	4E
CR5825	2J	4B	R5610	4F	3A	R5834	8C	4C			
CR5831	2J	4C	R5611	1G	3A	R5847	4J	4C			
CR5867	4L	4E	R5612	1E	3A	R5850	5K	4D			

Partial A25 also shown on diagram 24.



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SCHEM LOCATION	BOARD LOCATION
4K	4D
4K	4D
5K	4D
5J	4D
2L	4E
4K	4E
5H	2A
3H	2A
3E	2B
3F	2B
5E	2B
2D	2B
5E	2B
4C	2C
1N	2D
2N	2D
7G	3C
5B	3C
4E	3C
6G	3C
5N	3C
5M	3C
5G	4A
5G	4A
9E	4A
9D	4A
8C	4A
8B	4A
4N	4B
2J	4B
3H	4B
8C	4B
7B	4B
6D	4D
1M	3D
4N	3D
5K	4C
3J	4C
4J	4C
3J	4C
6E	4D
5D	2B
4L	4E



COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234

Assembly Number — Subassembly Number (if used) — Schematic Circuit Number

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.

SEE DIAGRAM 24 FOR POWER DISTRIBUTION.

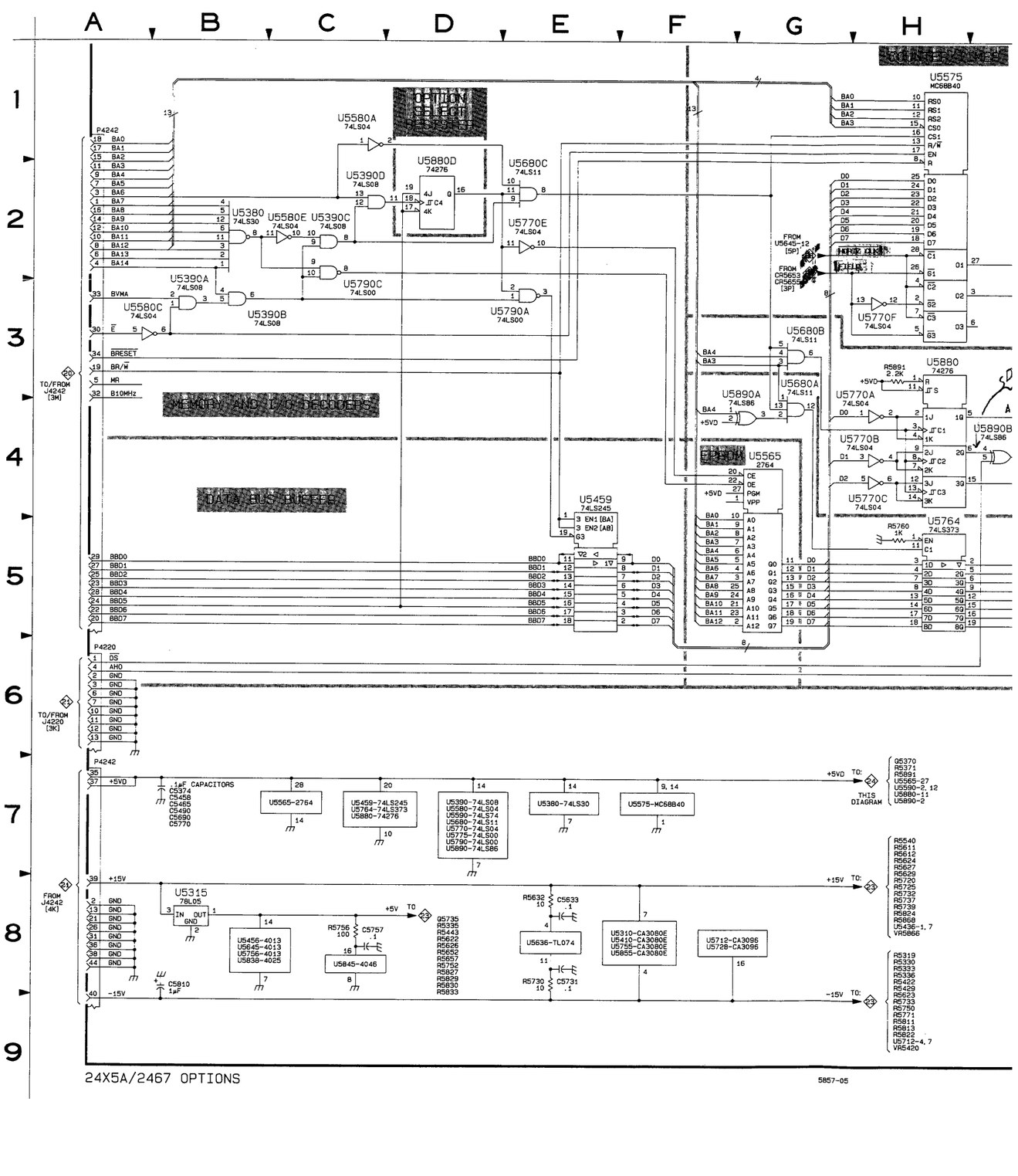
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TV OPTION DIGITAL CIRCUITRY AND POWER DISTRIBUTION DIAGRAM 24

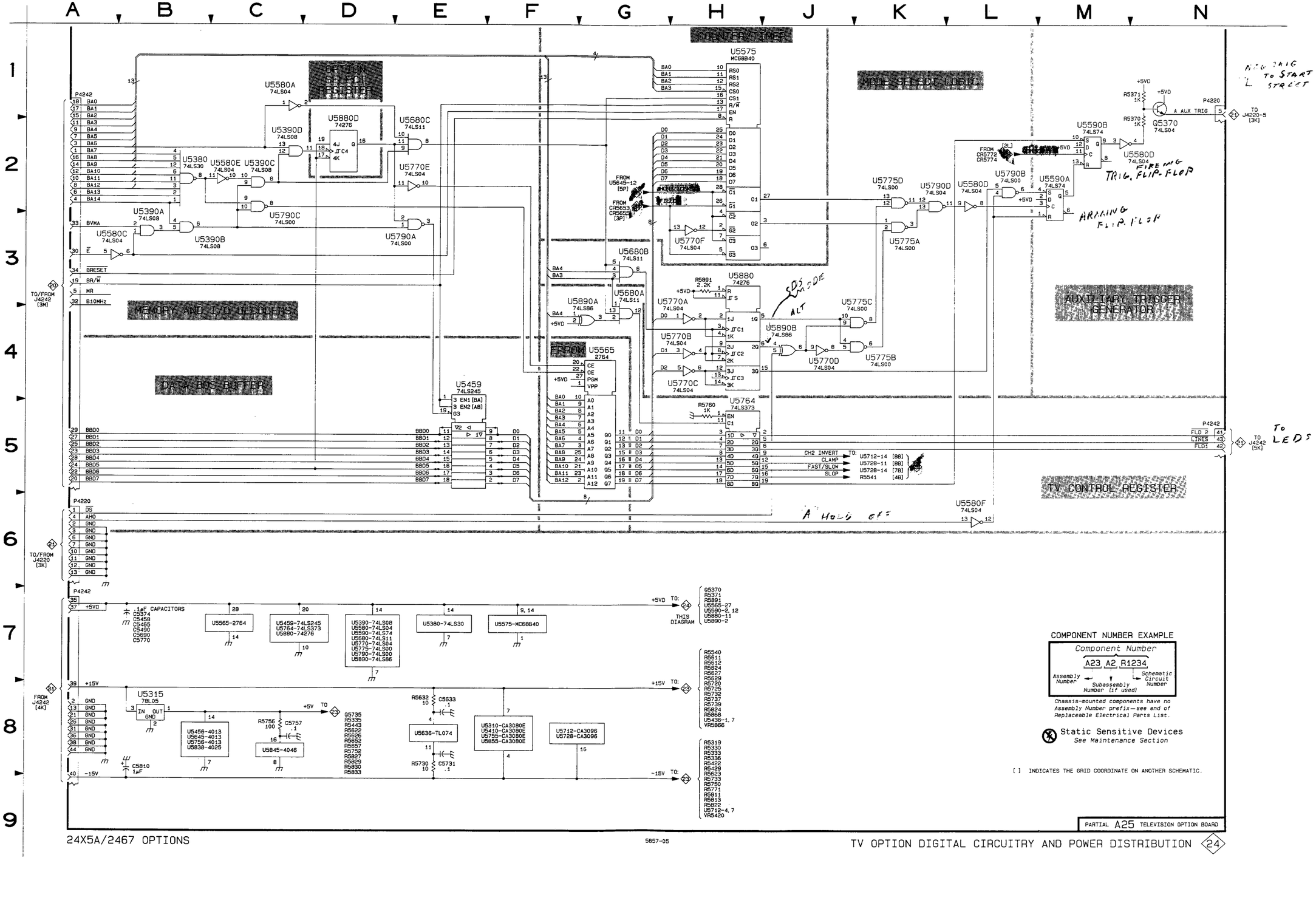
ASSEMBLY A25

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5374	7B	2F	U5380	7E	2F	U5755	8F	4D
C5458	7B	2D	U5390A	3B	2G	U5756	8B	3D
C5465	7B	2E	U5390B	3B	2G	U5764	5H	4E
C5490	7B	2G	U5390C	2C	2G	U5764	7C	4E
C5633	8E	3C	U5390	7D	2G	U5770A	4H	4F
C5690	7B	3G	U5410	8F	2A	U5770B	4H	4F
C5731	8E	3C	U5456	8B	2D	U5770C	4H	4F
C5757	8C	4D	U5459	4E	2D	U5770D	4J	4F
C5770	7B	3F	U5459	7C	2D	U5770E	2E	4F
C5810	8B	4A	U5565	4G	2E	U5770F	3H	4F
			U5565	7C	2E	U5770	7D	4F
P4220	1N	1B	U5575	1H	2F	U5775A	3K	4F
P4220	6A	1B	U5575	7F	2F	U5775B	4K	4F
P4242	1A	1D	U5580A	1C	2F	U5775C	4K	4F
P4242	5N	1D	U5580C	3A	2F	U5775D	2K	4F
P4242	7A	1D	U5580D	2L	2F	U5775	7D	4F
			U5580D	2M	2F	U5790A	3E	3G
Q5370	1N	1F	U5580E	2C	2F	U5790B	2L	3G
			U5580F	6L	2F	U5790C	2C	3G
R5370	1N	1F	U5580	7D	2F	U5790D	2K	3G
R5371	1N	1F	U5590A	2M	2G	U5790	7D	3G
R5632	8E	3C	U5590B	2M	2G	U5838	8B	4C
R5730	8E	3C	U5590	7D	2G	U5845	8C	4C
R5756	8C	4D	U5636	8E	3C	U5855	8F	4D
R5760	5H	4E	U5645	8B	3C	U5880D	2D	4F
R5891	3H	4G	U5680B	3G	3F	U5880	3H	4F
			U5680C	2E	3F	U5880	7C	4F
U5310	8F	2A	U5680	7D	3F	U5890B	4J	4G
U5315	8B	1A	U5712	8F	4A	U5890	7D	4G
U5380	2B	2F	U5728	8F	4B			

Partial A25 also shown on diagram 23.



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COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234
- A23: Assembly Number
- A2: Subassembly Number (if used)
- R1234: Schematic Circuit Number

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.

PARTIAL A25 TELEVISION OPTION BOARD

24X5A/2467 OPTIONS

5857-05

TV OPTION DIGITAL CIRCUITRY AND POWER DISTRIBUTION 24

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INITIAL TROUBLESHOOTING SETUP

The input signal during the troubleshooting that follows is a composite video signal. Set initial front-panel controls as follows:

CH 2 POSITION	Midrange

VERTICAL MODE

CH 1, CH 3, and CH 4	Off
CH 2	On

VOLTS/DIV

CH 2	500 mV
CH 2 VAR	In detent

Input Coupling

CH 2	1 MΩ DC

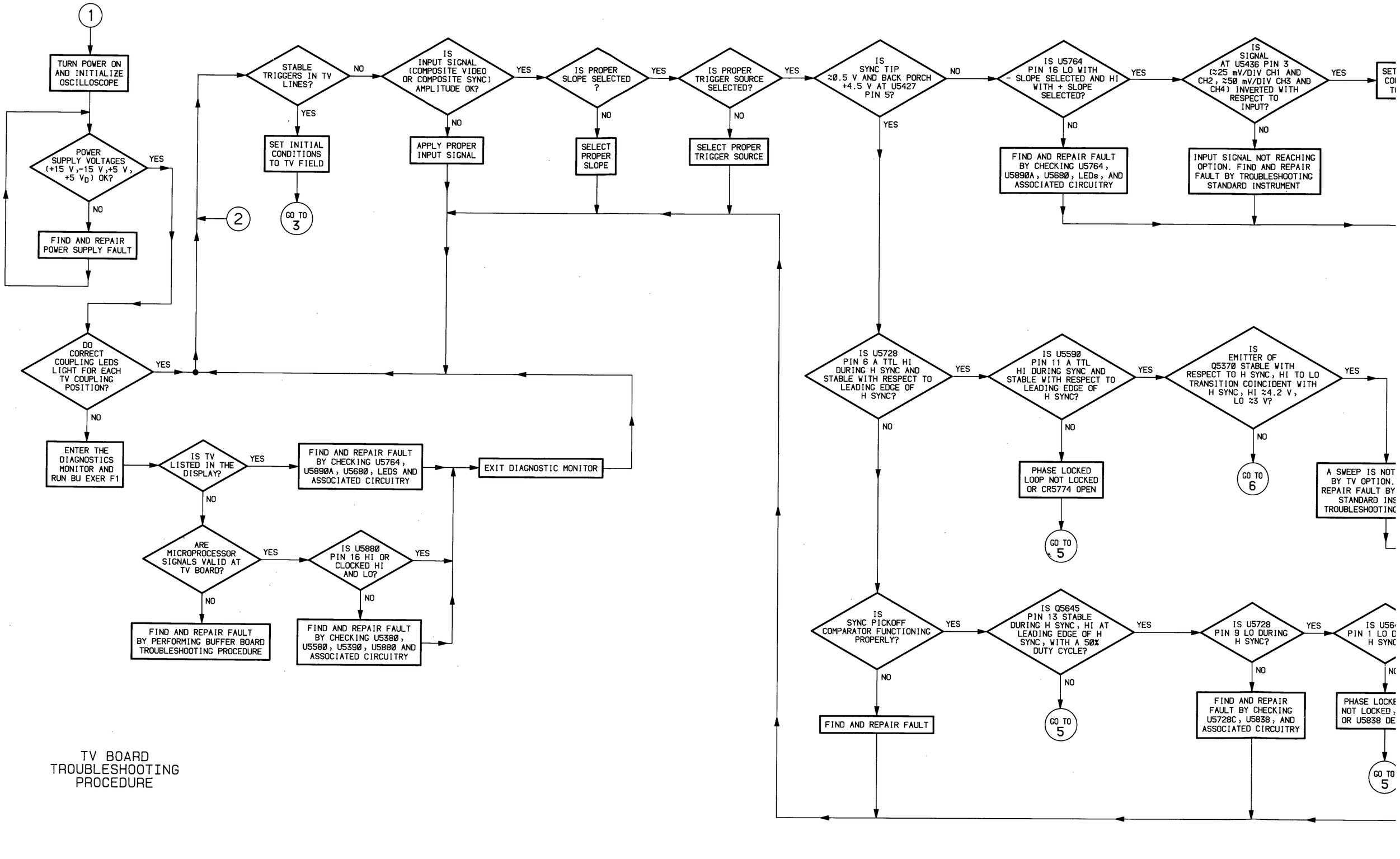
Horizontal

POSITION	Midrange
SEC/DIV VAR	In detent
ΔV and Δt	Displays off
X10 MAG	Off
ΔV and Δt	Displays off

Trigger

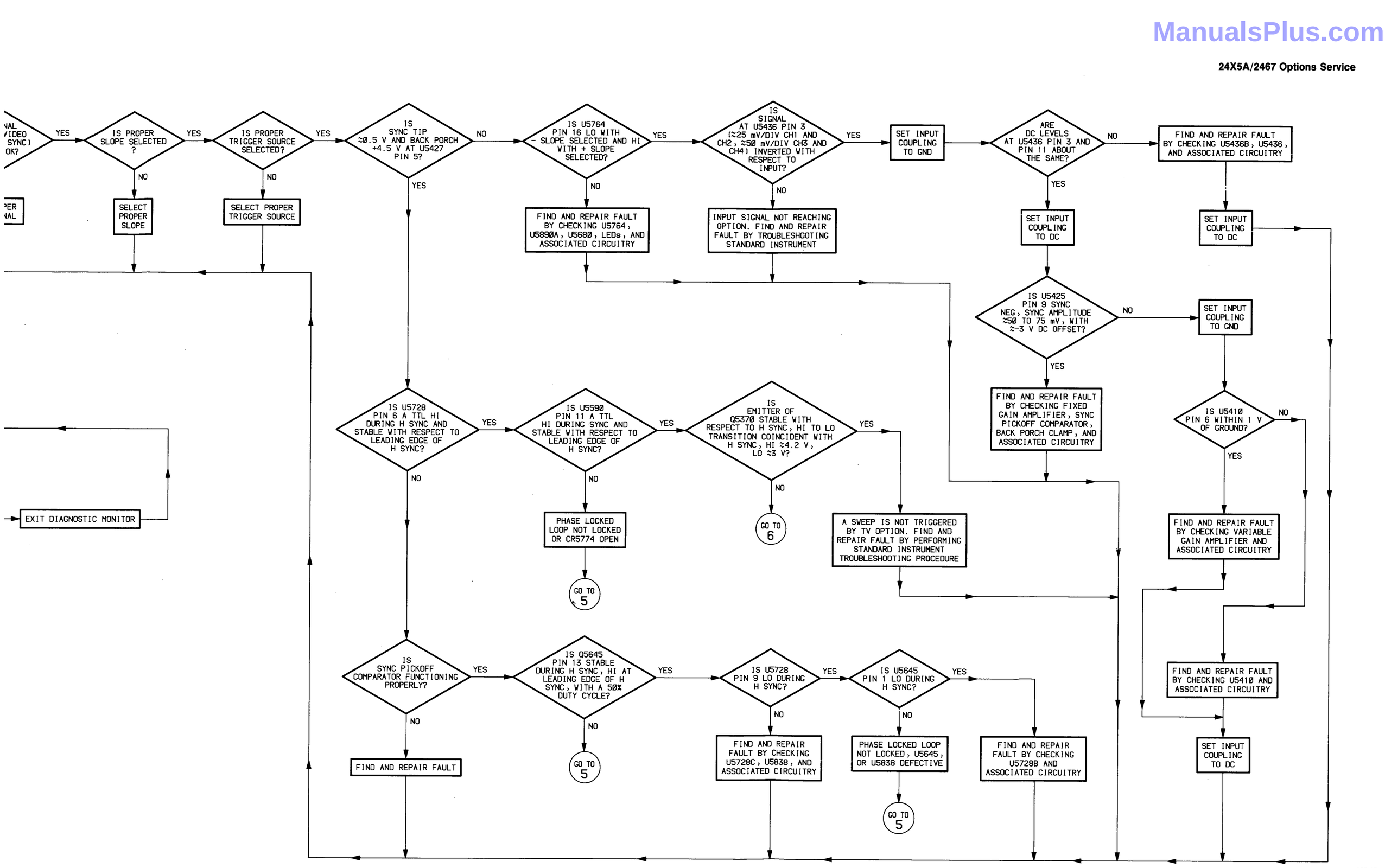
HOLDOFF	MIN (fully CCW)
SLOPE	+ for + sync −for −sync
MODE	AUTO
SOURCE	CH 2
COUPLING	LINES for lines troubleshooting, FLD1 line 1 for field troubleshooting

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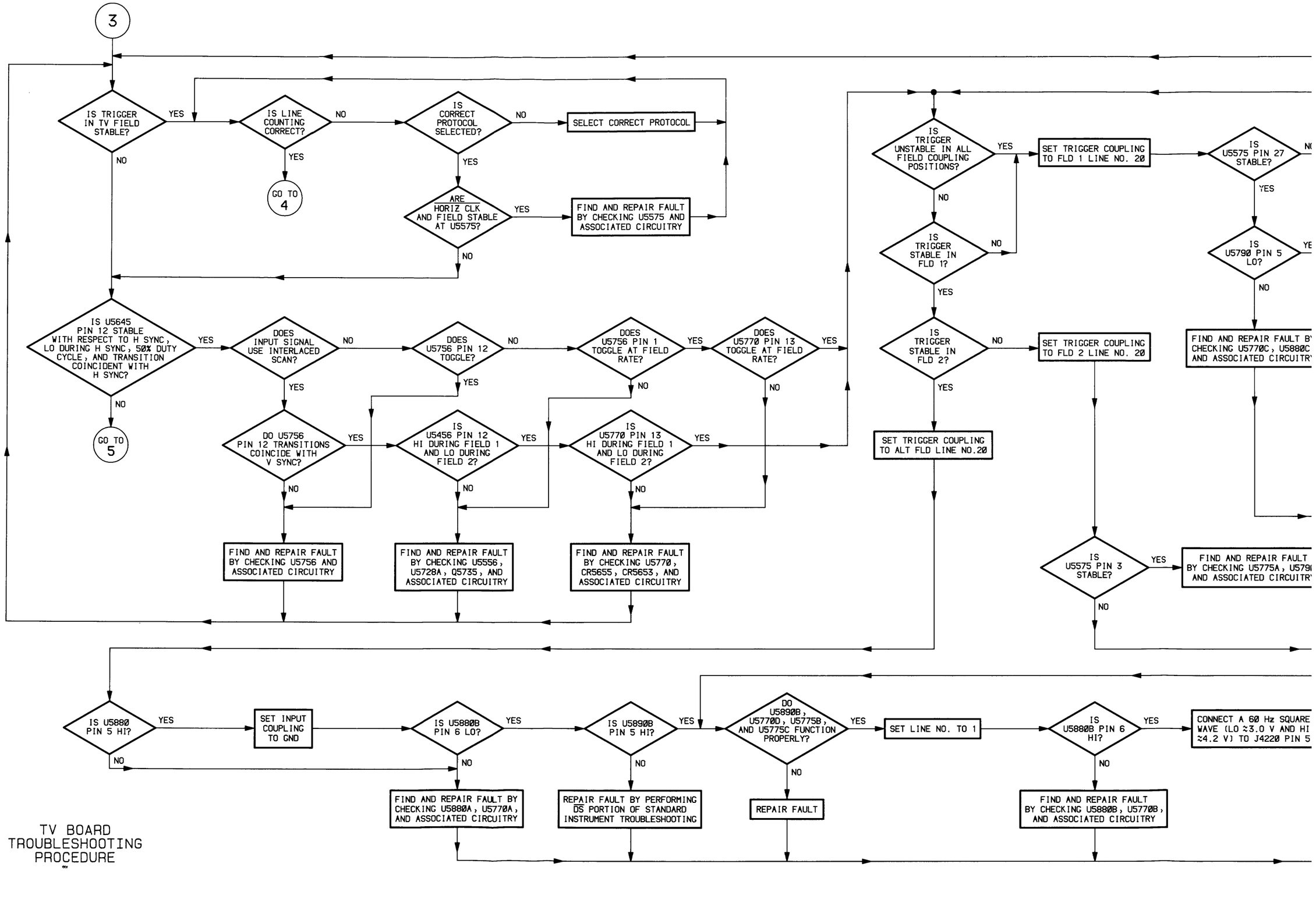
TV BOARD TROUBLESHOOTING PROCEDURE

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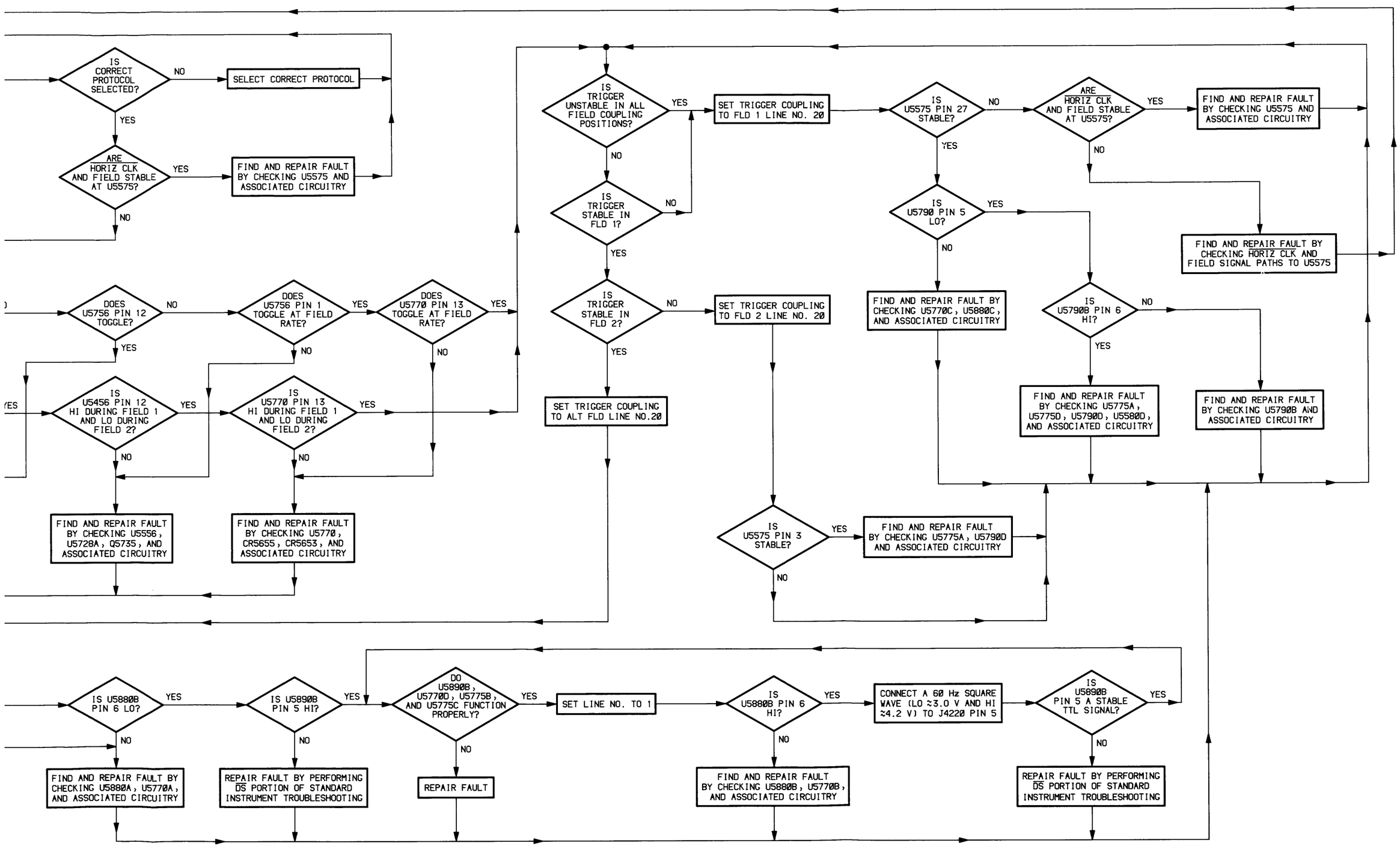
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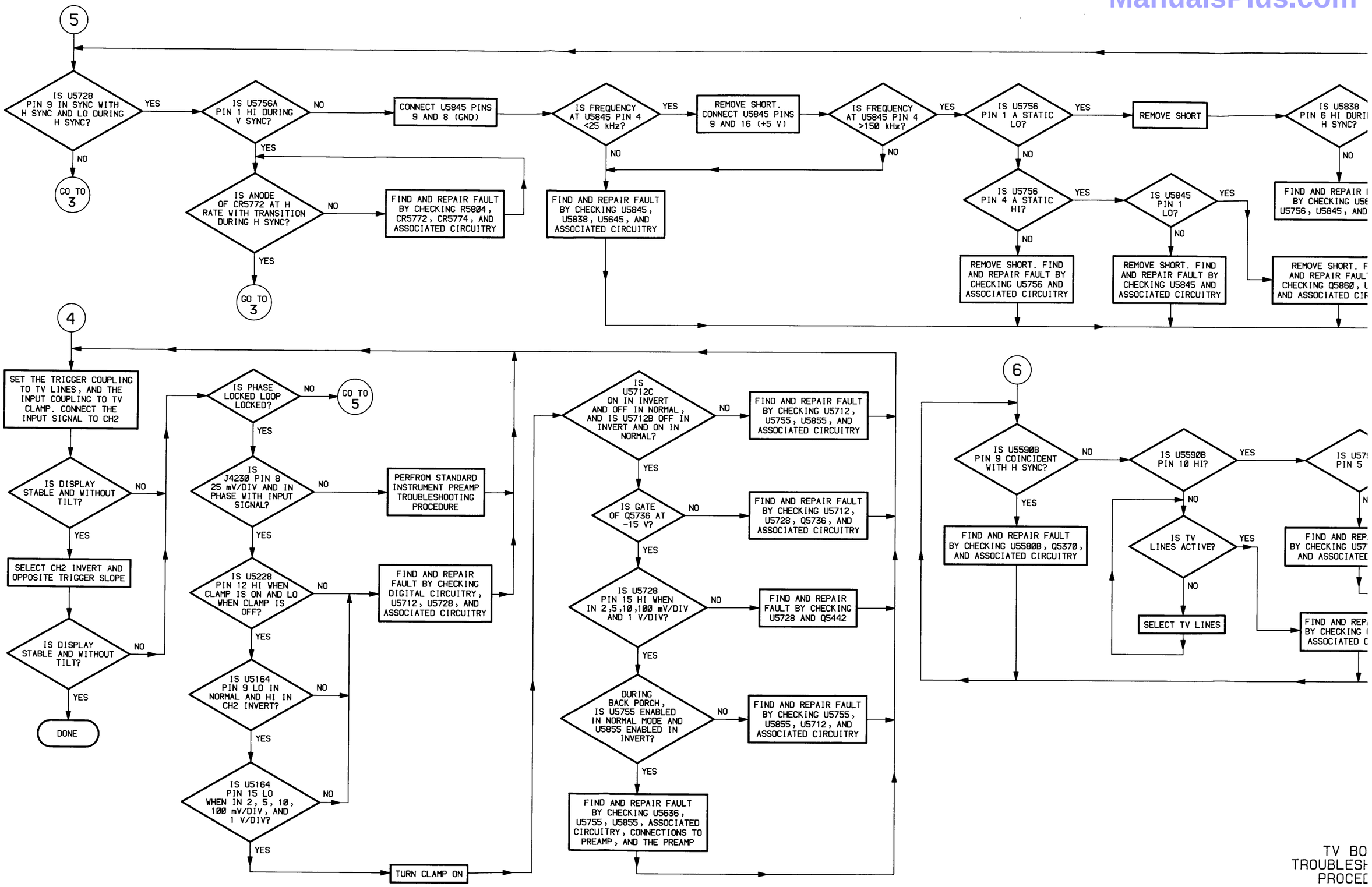
TV BOARD TROUBLESHOOTING PROCEDURE

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TV BO
TROUBLESH
PROCE

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CONNECT U5845 PINS 9 AND 8 (GND)

IS FREQUENCY AT U5845 PIN 4 <25 kHz?

YES

REMOVE SHORT. CONNECT U5845 PINS 9 AND 16 (+5 V)

IS FREQUENCY AT U5845 PIN 4 >150 kHz?

YES

NO

IS U5756 PIN 1 A STATIC LO?

YES

REMOVE SHORT

IS U5838 PIN 6 HI DURING H SYNC?

YES

FIND AND REPAIR FAULT BY CHECKING U5645, U5756, Q5860, U5838D, U5845 AND ASSOCIATED CIRCUITRY

NO

IND AND REPAIR FAULT BY CHECKING R5804, CR5772, CR5774, AND SSOCIATED CIRCUITRY

FIND AND REPAIR FAULT BY CHECKING U5845, U5838, U5645, AND ASSOCIATED CIRCUITRY

NO

IS U5756 PIN 4 A STATIC HI?

YES

IS U5845 PIN 1 LO?

YES

FIND AND REPAIR FAULT BY CHECKING U5645, U5756, U5845, AND U5838

NO

REMOVE SHORT. FIND AND REPAIR FAULT BY CHECKING U5756 AND ASSOCIATED CIRCUITRY

NO

REMOVE SHORT. FIND AND REPAIR FAULT BY CHECKING U5845 AND ASSOCIATED CIRCUITRY

REMOVE SHORT. FIND AND REPAIR FAULT BY CHECKING Q5860, U5756, AND ASSOCIATED CIRCUITRY

ERFROM STANDARD NSTRUMENT PREAMP TROUBLESHOOTING PROCEDURE

FIND AND REPAIR AULT BY CHECKING GITAL CIRCUITRY, 5712, U5728, AND OCIATED CIRCUITRY

TURN CLAMP ON

IS U5712C ON IN INVERT AND OFF IN NORMAL, AND IS U5712B OFF IN INVERT AND ON IN NORMAL?

NO

FIND AND REPAIR FAULT BY CHECKING U5712, U5755, U5855, AND ASSOCIATED CIRCUITRY

YES

IS GATE OF Q5736 AT -15 V?

NO

FIND AND REPAIR FAULT BY CHECKING U5712, U5728, Q5736, AND ASSOCIATED CIRCUITRY

YES

IS U5728 PIN 15 HI WHEN IN 2,5,10,100 mV/DIV AND 1 V/DIV?

NO

FIND AND REPAIR FAULT BY CHECKING U5728 AND Q5442

YES

DURING BACK PORCH, IS U5755 ENABLED IN NORMAL MODE AND U5855 ENABLED IN INVERT?

NO

FIND AND REPAIR FAULT BY CHECKING U5755, U5855, U5712, AND ASSOCIATED CIRCUITRY

YES

FIND AND REPAIR FAULT BY CHECKING U5636, U5755, U5855, ASSOCIATED CIRCUITRY, CONNECTIONS TO PREAMP, AND THE PREAMP

6

IS U5590B PIN 9 COINCIDENT WITH H SYNC?

NO

YES

FIND AND REPAIR FAULT BY CHECKING U5580B, Q5370, AND ASSOCIATED CIRCUITRY

IS U5590B PIN 10 HI?

YES

NO

IS TV LINES ACTIVE?

YES

NO

SELECT TV LINES

IS U5790B PIN 5 HI?

YES

NO

FIND AND REPAIR FAULT BY CHECKING U5770C, U5880C, AND ASSOCIATED CIRCUITRY

FIND AND REPAIR FAULT BY CHECKING U5764 AND ASSOCIATED CIRCUITRY

IS U5580F PIN 13 HI ONLY DURING HOLDOFF?

NO

FIND AND REPAIR FAULT BY PERFORMING STANDARD INSTRUMENT TROUBLESHOOTING PROCEDURE

YES

IS U5590 PIN 13 SYNCHRONIZED WITH AHO?

NO

FIND AND REPAIR FAULT BY CHECKING U5590A, U5580F, U5790B, AND ASSOCIATED CIRCUITRY

YES

FIND AND REPAIR FAULT BY CHECKING U5590B AND ASSOCIATED CIRCUITRY

GO TO 2

TV BOARD TROUBLESHOOTING PROCEDURE

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option 06

BUFFER BOARD ANALOG AND POWER DISTRIBUTION 21

STANDARD OSCILLOSCOPE

ANALOG SIGNALS FROM OPTION

ANALOG SIGNALS TO OPTION

ANALOG SIGNALS FROM BUFFER BOARD

ANALOG SIGNALS TO BUFFER BOARD

POWER SUPPLIES

MICROPROCESSOR BUS

EAROM BUS

2

POWER TO ALL CIRCUITS

DATA BUS BUFFERS U4255

DATA BUS

ADDRESS BUS BUFFERS U4235, U4245

ADDRESS BUS

CONTROL BUS BUFFERS U4225, U4265

ROM U4260

OPTION EAROM U4207

BUFFER BOARD DIGITAL DISTRIBUTION 20

CONTROL BUS

WORD

A AUX TRIG

B AUX TRIG

WORD RECOG OUT CONNECTOR

2.62MHz

OSCILLATOR Q5920 Q5921

13.1MHz

5.24MHz

DIVIDER U5910

1.31MHz

PHASE LOCKED LOOP U6010A U6010B U6230 U6120 U6130

131MHz

GATE ARRAY

DT

MT

DATA RTRN

W CLOCK

W DATA

O0

O1

O2

HI REF

CLK C

CLK B

CLK A

GATE A

TC

LEVEL SHIFTING U6290 Q6190 Q6191 Q6270 Q6271 Q6272 Q6273 Q6290 Q6291

STATUS REGISTER U6250

S5 S4 S3 S1 G1

COMPLEX COUNTER

O1 O5

M.S.B.

U6140

O2 O3 O4

TERMINAL COUNT

PAGE

PAGED EPROM U5930

WORD

TSA

TSB

DS

SCB

SCA

AHO

BHO

LEVEL SHIFTING AND MULTIPLEXING U6070, U5990A U5990D, Q5981 Q5980, Q5982 Q5983, Q6093 Q6090, Q6092 Q6091

ATS

BTS

DS

ASG

BSG

EXT

D0-1

D2-5

HO

L.S.B.

U6180

G1-3

BTS EN

1/2

1/7

DATA BUS BUFFER U5940

MEMORY AND I/O DECODERS U5950 U5942 U6150A U6152A U6150C U6150B U6152

SELECT

OPTION SELECT REGISTER U6252A

HARDWARE REGISTER 1 U5952

HO

BTS EN

W DATA TO WORD RECOGNIZER

COUNTER/TIMER/TRIGGER 26

Figure 10-15. CTT and WR (Option 06/09) detailed block diagram.

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option 06

option 09

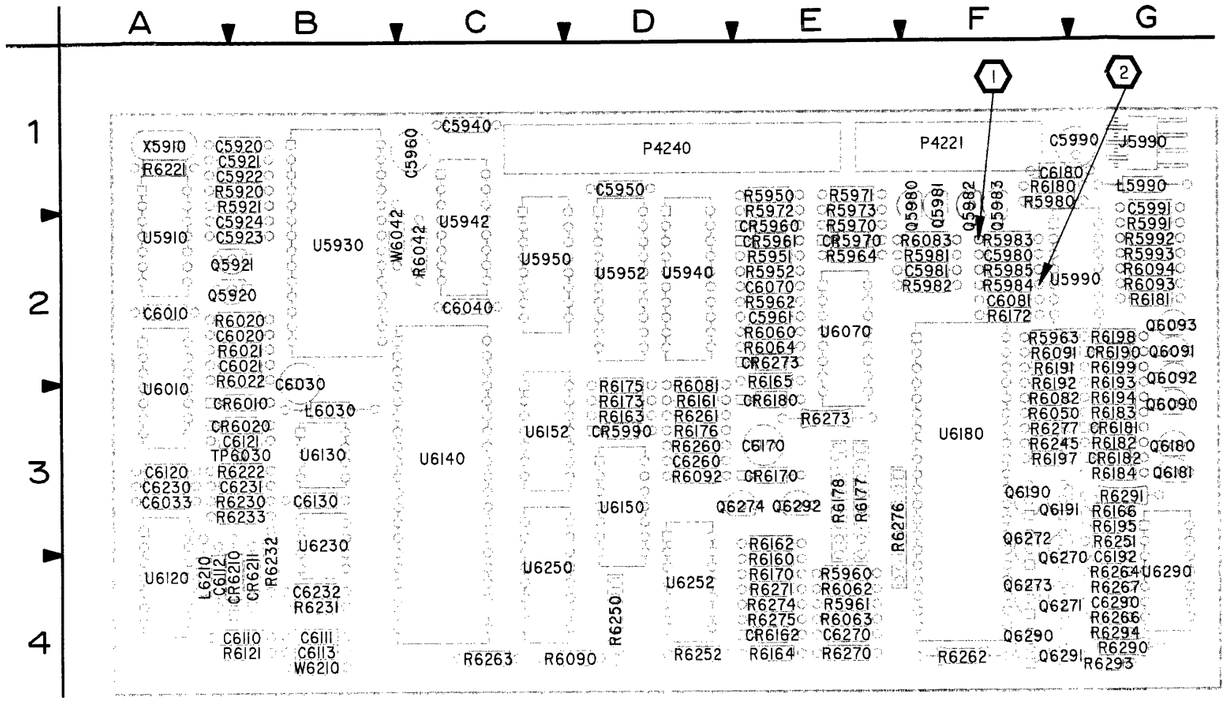
WORD
A AUX TRIG
B AUX TRIG
2.62MHz
OSCILLATOR Q5920 Q5921
13.1MHz
5.24MHz
DIVIDER U5910
1.31MHz
PHASE LOCKED LOOP U6010A U6010B U6230 U6120 U6130
131MHz
GATE ARRAY
DT
MT
Q0
Q1
Q2
HI REF
CLK C
CLK B
CLK A
GATE A
TC
ATS
BTS
DS
ASC
BSC
EXT
D0-1
D2-5
HO
L.S.B.
U6180
G1-3
WORD RECOG OUT CONNECTOR
DATA RTRN
W CLOCK
W DATA
LEVEL SHIFTING U6290 Q6190 Q6191 Q6270 Q6271 Q6272 Q6273 Q6290 Q6291
STATUS REGISTER U6250
S5
S3
S1
G1
S4
COMPLEX COUNTER
O1
O5
M.S.B.
U6140
O2
O3 O4
TERMINAL COUNT
PAGE
PAGED EPROM U5930
WORD
TSA
TSB
DS
SCB
SCA
AHO
BHO
LEVEL SHIFTING AND MULTIPLEXING U6070, U5990A U5990D, Q5981 Q5980, Q5982 Q5983, Q6093 Q6090, Q6092 Q6091
DATA BUS
ADDRESS BUS
CONTROL BUS
MEMORY AND I/O DECODERS U5950 U5942 U6150A U6152A U6150C U6150B U6152
SELECT
DATA BUS BUFFER U5940
OPTION SELECT REGISTER U6252A
HARDWARE REGISTER 1 U5952
2
7
BTS EN
HO
BTS EN
W DATA TO WORD RECOGNIZER
CONTROL REGISTER U6330, U6325, U6420 U6425, U6430
SYNCHRONOUS
EDGE SELECT
17 INPUT ENABLES
17 INPUT MATCH BITS
INPUT GATING U6315 U6310 U6405 U6409 U6335C
COMPARATOR U6320 U6415 U6335D
17
OUTPUT MULTIPLEXER U6356, Q6334
SYNCHRONIZER U6435A U6435B U6350
C
16
D0-15
Q
WORD RECOGNIZER 28
COUNTER/TIMER/TRIGGER 26

4632-12

Figure 10-15. CTT and WR (Option 06/09) detailed block diagram.

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2465A:B015746 & above;
2445A:B012557 & above)

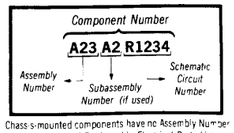


5857-27

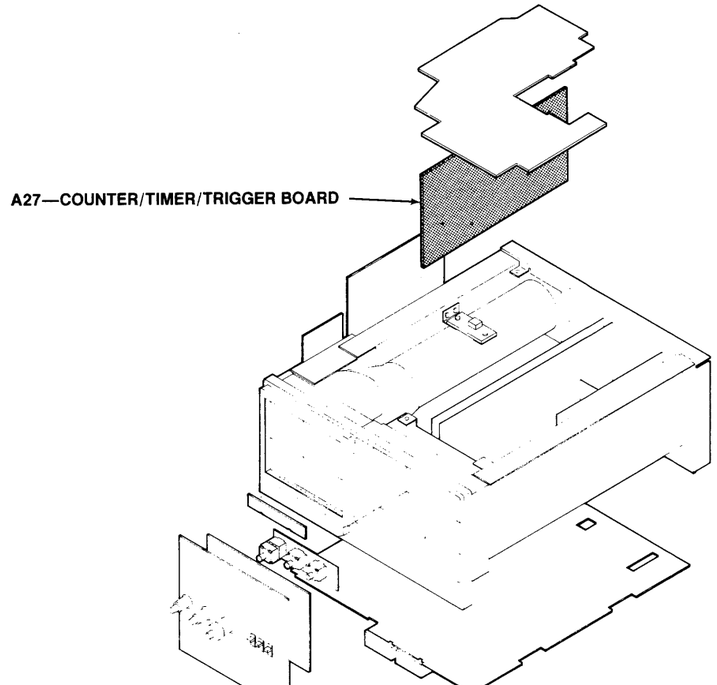
Figure 10-16. A27—Counter/Timer/Trigger Board. (For instruments with serial numbers: 2467: B011186 & above; 2465A: B015746 & above; 2445A: B012557 & above.)

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List



A27—CTT BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5920	25	CR5961	25	Q6190	25	R6050	25	R6198	25	U5942	25
C5921	26	CR5970	25	Q6191	25	R6060	25	R6199	25	U5942	26
C5922	25	CR5990	25	Q6270	25	R6062	25	R6221	25	U5950	25
C5923	25	CR6010	25	Q6271	25	R6063	25	R6222	25	U5950	26
C5924	25	CR6020	25	Q6272	25	R6064	25	R6230	25	U5952	25
C5940	26	CR6162	25	Q6273	25	R6081	25	R6231	25	U5952	26
C5950	26	CR6170	26	Q6274	25	R6082	25	R6232	25	U5990	25
C5960	26	CR6180	25	Q6290	25	R6083	25	R6233	25	U5990	26
C5961	25	CR6181	25	Q6291	25	R6090	25	R6245	25	U6010	25
C5980	25	CR6182	25	Q6292	25	R6091	25	R6250	25	U6010	26
C5981	25	CR6190	25			R6092	25	R6251	25	U6070	25
C5990	26	CR6210	25	R5920	25	R6093	25	R6252	25	U6070	26
C5991	26	CR6211	25	R5921	25	R6094	25	R6260	25	U6120	25
C6010	26	CR6273	25	R5950	25	R6121	25	R6261	25	U6120	26
C6020	26			R5951	25	R6160	25	R6262	25	U6130	25
C6021	25	J5990	25	R5952	25	R6161	25	R6263	25	U6130	26
C6030	26	J5991	25	R5960	25	R6162	25	R6264	25	U6140	25
C6033	25			R5961	25	R6163	25	R6266	25	U6140	26
C6040	26	L5990	26	R5962	25	R6164	25	R6267	25	U6150	25
C6070	26	L6030	26	R5963	25	R6165	25	R6270	25	U6150	26
C6081	26	L6210	25	R5964	25	R6166	25	R6271	25	U6152	25
C6110	25			R5970	25	R6170	25	R6273	25	U6152	26
C6111	25	P4221	25	R5971	25	R6172	25	R6274	25	U6180	25
C6112	25	P4221	26	R5972	25	R6173	25	R6275	25	U6180	26
C6113	26	P4240	25	R5973	25	R6175	25	R6276	25	U6230	25
C6120	25	P4240	26	R5980	25	R6176	25	R6277	25	U6230	26
C6121	26			R5981	25	R6177	25	R6290	25	U6250	25
C6130	25	Q5920	25	R5982	25	R6178	25	R6291	25	U6250	26
C6170	26	Q5921	25	R5983	25	R6180	25	R6293	25	U6252	25
C6180	25	Q5980	25	R5984	25	R6181	25	R6294	25	U6252	26
C6192	26	Q5981	25	R5985	25	R6182	25			U6290	25
C6230	25	Q5982	25	R5990	25	R6183	25	TP6030	25	U6290	26
C6231	26	Q5983	25	R5991	25	R6184	25				
C6232	25	Q6090	25	R5992	25	R6191	25	U5910	25	W6042	25
C6260	26	Q6091	25	R5993	25	R6192	25	U5910	26	W6084	25
C6270	26	Q6092	25	R6020	25	R6193	25	U5930	25	W6174	25
C6290	25	Q6093	25	R6021	25	R6194	25	U5930	26	W6210	26
		Q6180	25	R6022	25	R6195	25	U5940	25		
CR5960	25	Q6181	25	R6042	25	R6197	25	U5940	26	Y5910	25

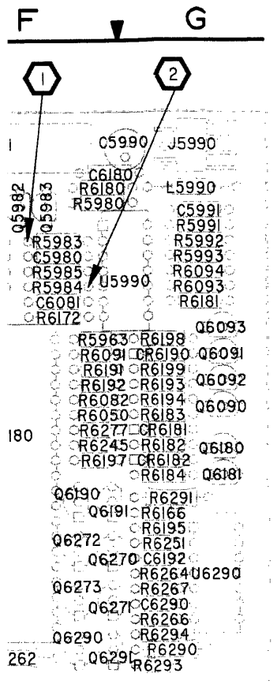
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The numbered wavefor
are representative of sig
observed. Any changes
waveform illustration.

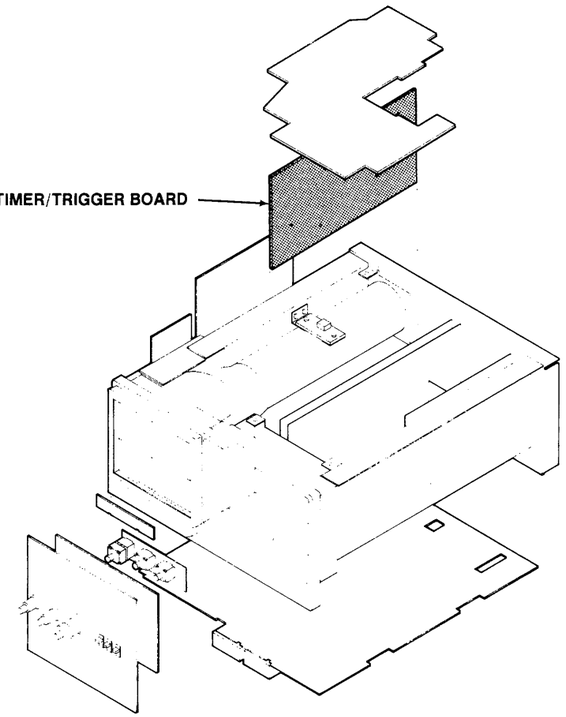
Connect a 6-division, 1
Trigger event. Set initial fr

Using a X10 probe wit
required to obtain the indic

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5857-27



7: B011186 & above;

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Number
List

A27—CTT BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C5920	25	CR5961	25	Q6190	25	R6050	25	R6198	25	U5942	25
C5921	26	CR5970	25	Q6191	25	R6060	25	R6199	25	U5942	26
C5922	25	CR5990	25	Q6270	25	R6062	25	R6221	25	U5950	25
C5923	25	CR6010	25	Q6271	25	R6063	25	R6222	25	U5950	26
C5924	25	CR6020	25	Q6272	25	R6064	25	R6230	25	U5952	25
C5940	26	CR6162	25	Q6273	25	R6081	25	R6231	25	U5952	26
C5950	26	CR6170	26	Q6274	25	R6082	25	R6232	25	U5990	25
C5960	26	CR6180	25	Q6290	25	R6083	25	R6233	25	U5990	26
C5961	25	CR6181	25	Q6291	25	R6090	25	R6245	25	U6010	25
C5980	25	CR6182	25	Q6292	25	R6091	25	R6250	25	U6010	26
C5981	25	CR6190	25			R6092	25	R6251	25	U6070	25
C5990	26	CR6210	25	R5920	25	R6093	25	R6252	25	U6070	26
C5991	26	CR6211	25	R5921	25	R6094	25	R6260	25	U6120	25
C6010	26	CR6273	25	R5950	25	R6121	25	R6261	25	U6120	26
C6020	26			R5951	25	R6160	25	R6262	25	U6130	25
C6021	25	J5990	25	R5952	25	R6161	25	R6263	25	U6130	26
C6030	26	J5991	25	R5960	25	R6162	25	R6264	25	U6140	25
C6033	25			R5961	25	R6163	25	R6266	25	U6140	26
C6040	26	L5990	26	R5962	25	R6164	25	R6267	25	U6150	25
C6070	26	L6030	26	R5963	25	R6165	25	R6270	25	U6150	26
C6081	26	L6210	25	R5964	25	R6166	25	R6271	25	U6152	25
C6110	25			R5970	25	R6170	25	R6273	25	U6152	26
C6111	25	P4221	25	R5971	25	R6172	25	R6274	25	U6180	25
C6112	25	P4221	26	R5972	25	R6173	25	R6275	25	U6180	26
C6113	26	P4240	25	R5973	25	R6175	25	R6276	25	U6230	25
C6120	25	P4240	26	R5980	25	R6176	25	R6277	25	U6230	26
C6121	26			R5981	25	R6177	25	R6290	25	U6250	25
C6130	25	Q5920	25	R5982	25	R6178	25	R6291	25	U6250	26
C6170	26	Q5921	25	R5983	25	R6180	25	R6293	25	U6252	25
C6180	25	Q5980	25	R5984	25	R6181	25	R6294	25	U6252	26
C6192	26	Q5981	25	R5985	25	R6182	25			U6290	25
C6230	25	Q5982	25	R5990	25	R6183	25	TP6030	25	U6290	26
C6231	26	Q5983	25	R5991	25	R6184	25				
C6232	25	Q6090	25	R5992	25	R6191	25	U5910	25	W6042	25
C6260	26	Q6091	25	R5993	25	R6192	25	U5910	26	W6084	25
C6270	26	Q6092	25	R6020	25	R6193	25	U5930	25	W6174	25
C6290	25	Q6093	25	R6021	25	R6194	25	U5930	26	W6210	26
		Q6180	25	R6022	25	R6195	25	U5940	25		
CR5960	25	Q6181	25	R6042	25	R6197	25	U5940	26	Y5910	25

TEST WAVEFORM SETUP INFORMATION

The numbered waveforms below were obtained at the test points indicated on the schematic diagram. The waveforms are representative of signals that may be expected at the associated points when the following setup conditions are observed. Any changes from the given setup conditions required to produce a given waveform are noted with that waveform illustration.

24X5A/2467 CTT OPTION SETUP

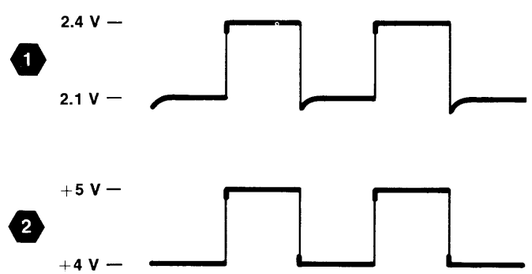
Connect a 6-division, 1-MHz square wave to the CH 2 input. Set the CTT Menu mode to count the frequency of the A Trigger event. Set initial front-panel controls as follows:

Trigger

MODE	AUTO LVL
SOURCE	CH 1
COUPLING	DC
HOLDOFF	MIN (Fully CCW)
SLOPE	+

TEST OSCILLOSCOPE SETUP

Using a X10 probe with the test oscilloscope, set its Trigger Slope, Trigger Level, Volts/Div, and Time/Div ranges as required to obtain the indicated displays.



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COUNTER/TIMER/TRIGGER DIAGRAM 25

2467:B011186 & above 2465A:B015746 & above 2445A:B012557 & above

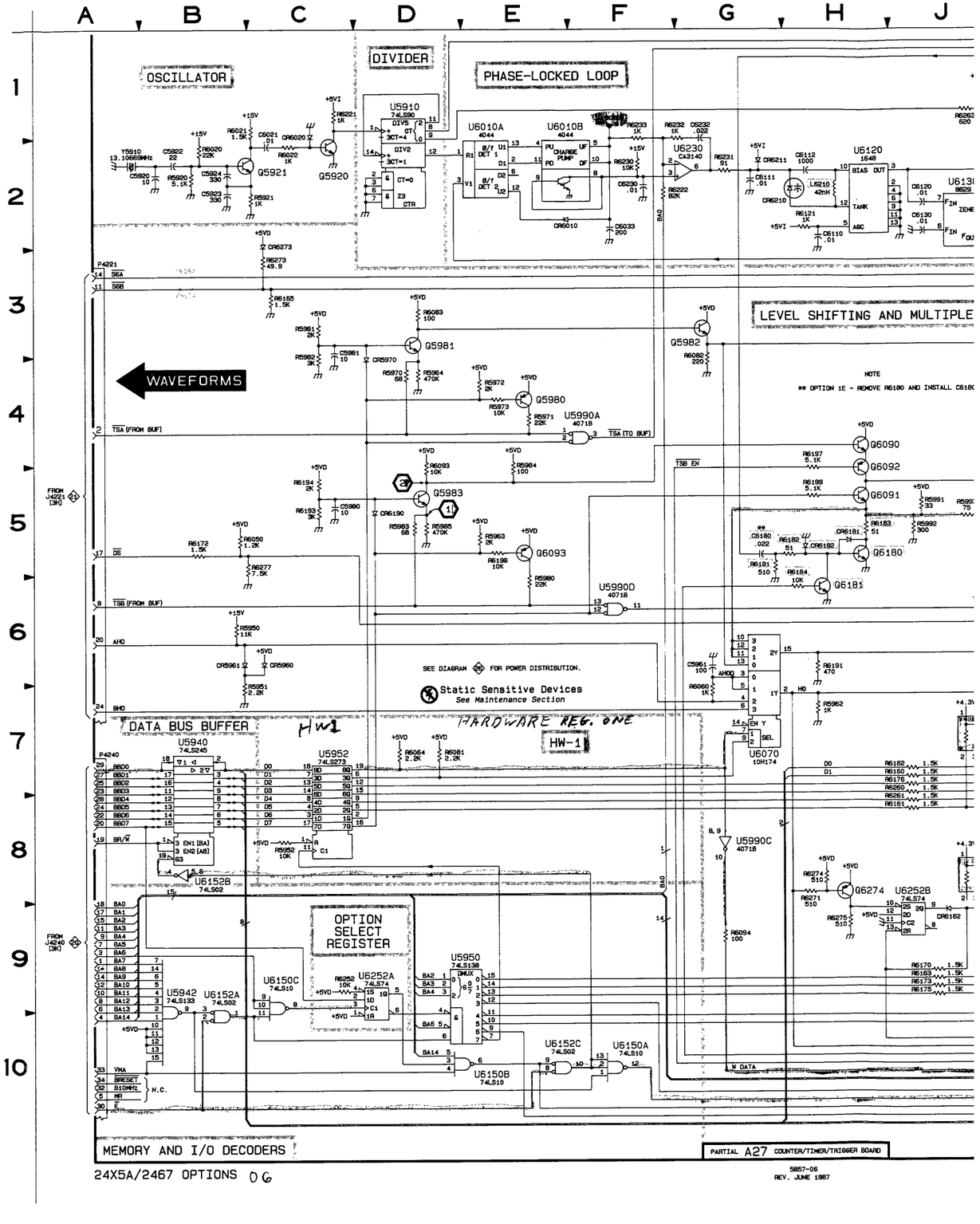
ASSEMBLY A27

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5920	2B	1B	Q6092	5H	2G	R6091	2K	2F	R6274	8H	4E
C5922	2B	1B	Q6093	5E	2G	R6092	7P	3D	R6275	9H	4E
C5923	2B	2B	Q6180*	5H	3G	R6093	4D	2G	R6276A	6L	3F
C5924	2B	2B	Q6181*	6H	3G	R6094	9G	2G	R6276B	6L	3F
C5961	6G	2E	Q6190	6L	3F	R6121	2H	4B	R6276C	8L	3F
C5980	5C	2F	Q6191	6M	3F	R6160	7J	4E	R6276D	5M	3F
C5981	3C	2F	Q6270	6M	4F	R6161	8J	3D	R6276E	7L	3F
C6021	2C	2B	Q6271	8M	4F	R6162	7J	3E	R6276F	4M	3F
C6033	2F	3A	Q6272	6L	4F	R6163	9J	3D	R6276G	4M	3F
C6110	2H	4B	Q6273	8L	4F	R6164	4P	4E	R6277	5B	3F
C6111	2G	4B	Q6274	8H	3E	R6165	3C	2E	R6290	4M	4G
C6112	2H	4A	Q6290	7L	4F	R6166	6M	3G	R6291	3M	3G
C6120	2J	3A	Q6291	7M	4F	R6170	9J	4E	R6293	7M	4G
C6130	2J	3B	Q6292	8N	3E	R6172	5B	2F	R6294	7M	4G
C6180*	5G	1F				R6173	9J	3D			
C6230	2F	3A	R5920	2B	1B	R6175	9J	3D	TP6030	1F	3C
C6232	1G	4B	R5921	2C	1B	R6176	7J	3D			
C6290	4M	4G	R5950	6B	1E	R6177	8K	3E	U5910	1D	1A
			R5951	7B	2E	R6178	7K	3E	U5930	9R	1B
CR5960	6C	2E	R5952	8C	2E	R6180*	2N	1F	U5940	7B	2D
CR5961	6B	2E	R5960	2L	4E	R6181*	5G	3D	U5942	9B	1C
CR5970	4D	2E	R5961	2L	4E	R6182*	5H	3G	U5950	9D	2C
CR5990*	2N	3D	R5962	7H	2E	R6183*	5H	3G	U5952	7C	2D
CR6010	2E	3B	R5963	5E	2F	R6184*	6H	3G	U5990A	4F	2G
CR6020	1C	3B	R5964	4D	2E	R6191	6H	2F	U5990C	8G	2G
CR6162	9J	4E	R5970	4D	2E	R6192	6J	2F	U5990D	6F	2G
CR6180*	2N	3E	R5971	4E	1E	R6193	5C	2G	U6010A	1E	2A
CR6181*	5H	3G	R5972	4E	1E	R6194	5C	3G	U6010B	1E	2A
CR6182*	5H	3G	R5973	4E	1E	R6195	5M	3G	U6070	7G	2E
CR6190	5D	2G	R5980	6E	1F	R6197	4H	3F	U6120	2H	3A
CR6210	2H	4B	R5981	3C	2F	R6198	5E	2G	U6130	2J	3B
CR6211	2G	4B	R5982	3C	2F	R6199	5H	2G	U6140	6N	2C
CR6273	2C	2E	R5983	5D	2F	R6221	1C	1A	U6150A	10F	3D
			R5984	4E	2F	R6222	2F	3B	U6150B	10E	3D
J5990A	2P	1G	R5985	5D	2F	R6230	2F	3B	U6150C	9C	3D
J5990B	2P	1G	R5990*	2M	2G	R6231	2G	4B	U6152A	9B	3C
J5991*	2P	1G	R5991	6J	2G	R6232	1F	4B	U6152B	8B	3C
			R5992	6J	2G	R6233	1F	3B	U6152C	10E	3C
L6210	2H	4A	R5993	6J	2G	R6245	7N	3F	U6152D	2M	3C
			R6020	2B	2B	R6250	3N	4D	U6180	1K	2F
P4221	1P	1F	R6021	1C	2B	R6251	7M	3G	U6230	2G	3B
P4221	3A	1F	R6022	2C	2B	R6252	9C	4D	U6250	4R	3C
P4240	7A	1D	R6042	9N	2C	R6260	7J	3D	U6252A	9D	3D
			R6050	5B	3F	R6261	8J	3D	U6252B	8J	3D
Q5920	2C	2B	R6060	7G	2E	R6262	3M	4F	U6290A	4M	3G
Q5921	2C	2B	R6062	2L	4E	R6263	1J	4C	U6290B	5M	3G
Q5980	4E	1F	R6063	3L	4E	R6264	6M	4G	U6290C	4M	3G
Q5981	3D	1F	R6064	7D	2E	R6266	8M	4G			
Q5982	3G	1F	R6081	7D	2G	R6267	8M	4G	W6042*	10N	2B
Q5983	5D	1F	R6082	3G	3F	R6270	1J	4E	W6084*	3B	2F
Q6090	4H	3G	R6083	3D	2F	R6271	8H	4E	W6174*	3B	3E
Q6091	5H	2G	R6090	2K	4D	R6273	3C	3E	Y5910	2A	1A

OTHER PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J59	2R	CHASSIS	P5991	2R	CHASSIS						

***See Parts List for serial number ranges.**



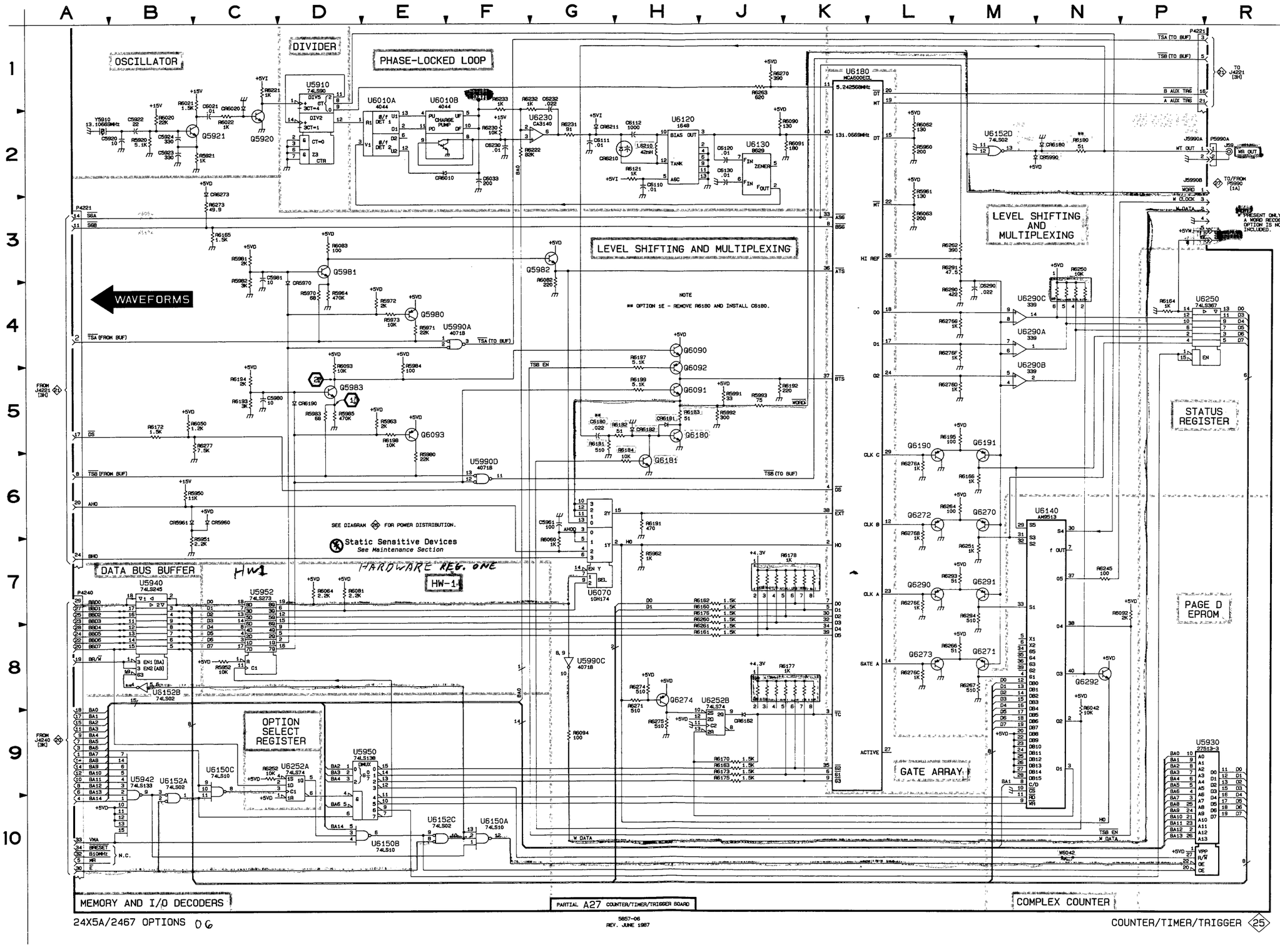
24X5A/2467 OPTIONS 06

SEE TABLE 3-7 / TABLE 3-9 + 3-10
PAGE 3-21 / PAGE 3-23 + 3-24

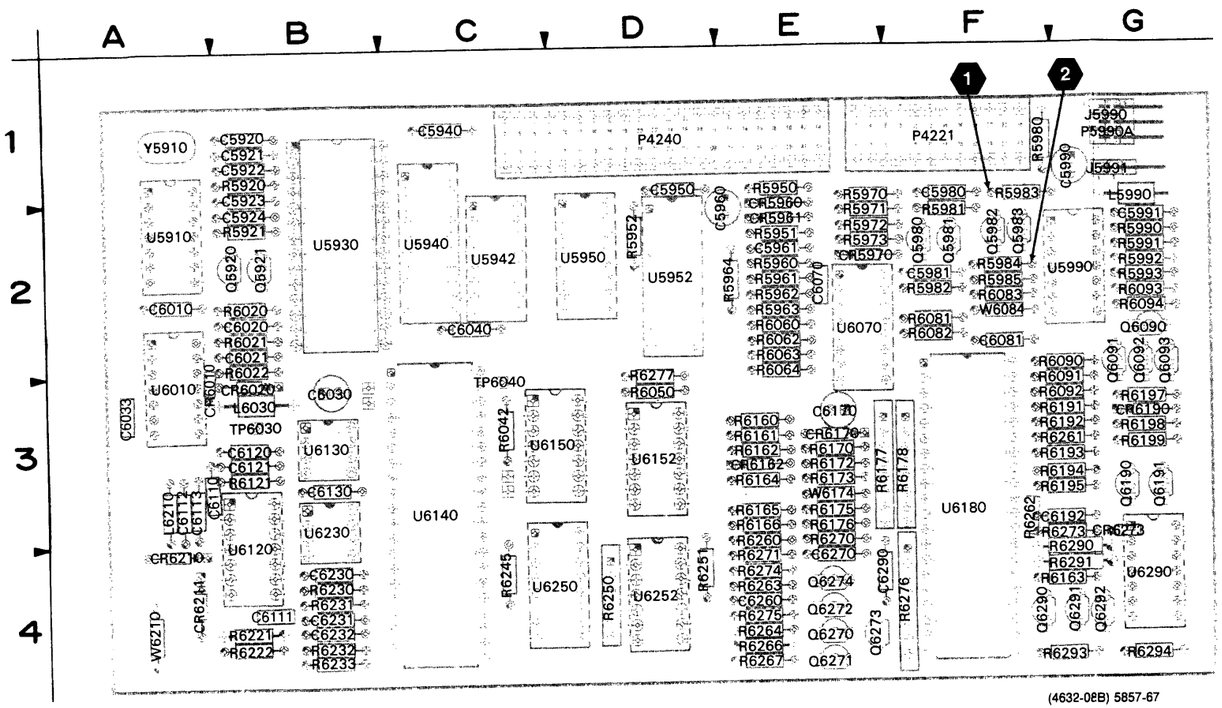
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EM TION	BOARD LOCATION
	4E
	4E
	3F
	3F
	3F
M	3F
M	3F
M	3F
M	3F
M	3F
M	4G
M	3G
M	4G
M	4G
	3C
)	1A
	1B
	2D
	1C
	2C
	2D
	2G
	2G
	2G
	2G
	2A
	2A
	2E
	3A
	3B
	2C
IF	3D
IE	3D
	3D
	3C
	3C
IE	3C
M	3C
	2F
	3B
	3C
	3D
	3D
M	3G
M	3G
M	3G
IN	2B
	2F
	3E
	1A

CHEM CATION	BOARD LOCATION



ManualsPlus.com



2465A:B015745 & below;
2445A:B012556 & below)

Figure 10-16. A27—Counter/Timer/Trigger Board. (For instruments with serial numbers: 2467: B011185 & below; 2465A: B015745 & below; 2445A: B012556 & below.)

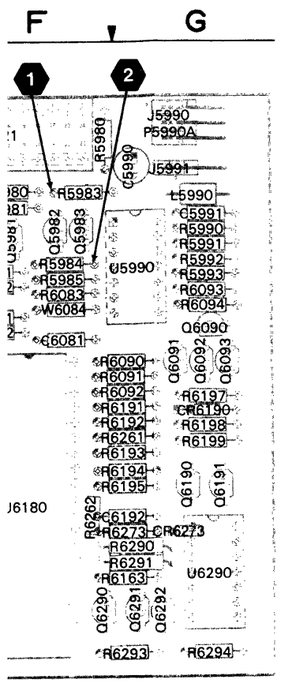
2467:

ASSEMBLY A27

CIRCUIT NUMBER	SCHEM LOCATION	LO
C5920	2B	
C5922	2B	
C5923	2B	
C5924	2B	
C5961	6G	
C5980	5C	
C5981	3C	
C6021	2C	
C6033	2F	
C6110	2H	
C6111	2G	
C6112	2H	
C6120	2J	
C6130	2J	
C6230	2F	
C6232	1G	
C6290	4M	
CR5960	6C	
CR5961	6B	
CR5970	4D	
CR6010	2E	
CR6020	1C	
CR6162	9J	
CR6190	5D	
CR6210	2G	
CR6211	2G	
CR6273	2C	
J5990	2P	
J5991	2P	
L6210	2H	
P4221	1P	
P4221	3A	
P4240	7A	
P5990A	1R	
Q5920	2C	
Q5921	2C	
Q5980	4E	
Q5981	3D	
Q5982	3G	
Q5983	5D	
Q6090	5G	
Q6091	5G	
Q6092	5G	
Q6093	5E	

Partial A27 also shown on

ManualsPlus.com



(4632-08B) 5857-67

467: B011185 & below;

COUNTER/TIMER/TRIGGER DIAGRAM 25

2467: B011185 & below 2465A: B015745 & below 2445A: B012556 & below

ASSEMBLY A27

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5920	2B	1B
C5922	2B	1B
C5923	2B	1B
C5924	2B	2B
C5961	6G	2E
C5980	5C	1F
C5981	3C	2F
C6021	2C	2B
C6033	2F	3A
C6110	2H	3A
C6111	2G	4B
C6112	2H	3A
C6120	2J	3B
C6130	2J	3B
C6230	2F	4B
C6232	1G	4B
C6290	4M	4E
CR5960	6C	2E
CR5961	6B	2E
CR5970	4D	2E
CR6010	2E	3A
CR6020	1C	3B
CR6162	9J	3E
CR6190	5D	3G
CR6210	2G	4A
CR6211	2G	4A
CR6273	2C	3G
J5990	2P	1G
J5991	2P	1G
L6210	2H	3A
P4221	1P	1F
P4221	3A	1F
P4240	7A	1D
P5990A	1R	1G
Q5920	2C	2B
Q5921	2C	2B
Q5980	4E	2F
Q5981	3D	2F
Q5982	3G	2F
Q5983	5D	2F
Q6090	5G	2G
Q6091	5G	2G
Q6092	5G	2G
Q6093	5E	2G
Q6190	5L	3G
Q6191	5M	3G
Q6270	6M	4E
Q6271	8M	4E
Q6272	6L	4E
Q6273	8L	4E
Q6274	8H	4E
Q6290	7L	4F
Q6291	7M	4G
Q6292	8N	4G
R5920	2B	1B
R5921	2C	2B
R5950	6B	1E
R5951	7C	2E
R5952	8C	1D
R5960	2L	2E
R5961	2L	2E
R5962	7H	2E
R5963	5E	2E
R5964	4D	2E
R5970	4D	1E
R5971	4E	2E
R5972	4E	2E
R5973	4E	2E
R5980	6E	1F
R5981	3C	2F
R5982	3C	2F
R5983	5D	1F
R5984	4E	2F
R5985	5D	2F
R5990	2P	2G
R5991	5H	2G
R5992	6G	2G
R5993	5H	2G
R6020	2B	2B
R6021	1C	2B
R6022	2C	2B
R6042	9N	3C
R6050	5B	3D
R6060	7G	2E
R6062	2L	2E
R6063	3L	2E
R6064	7D	2E
R6081	7D	2F
R6082	3G	2F
R6083	3D	2F
R6090	2J	2G
R6091	2J	3G
R6092	7P	3G
R6093	4D	2G
R6094	9G	2G
R6121	2H	3B
R6160	7J	3E
R6161	8J	3E
R6162	7J	3E
R6163	9J	4G
R6164	4P	3E
R6165	3C	3E
R6166	6M	3E
R6170	9J	3E
R6172	5B	3E
R6173	9J	3E
R6175	9J	3E
R6176	7J	3E
R6177	8K	3E
R6178	7K	3F
R6191	6H	3G
R6192	5J	3G
R6193	5C	3G
R6194	5C	3G
R6195	5M	3G
R6197	5G	3G
R6198	5E	3G
R6199	5F	3G
R6221	1C	4B
R6222	2F	4B
R6230	2F	4B
R6231	2G	4B
R6232	1F	4B
R6233	1F	4B
R6245	7N	4C
R6250	3N	4D
R6250	9C	4D
R6251	7M	4D
R6260	7J	3E
R6261	8J	3G
R6262	3M	3F
R6263	1J	4E
R6264	6M	4E
R6266	8M	4E
R6267	8M	4E
R6270	1J	3E
R6271	8H	4E
R6273	3C	3G
R6274	8H	4E
R6275	9H	4E
R6276A	5M	4F
R6276B	6L	4F
R6276C	6L	4F
R6276D	7L	4F
R6276E	4M	4F
R6276F	4M	4F
R6276G	8L	4F
R6277	5B	3D
R6290	4M	4G
R6291	3M	4G
R6293	7M	4G
R6294	7M	4G
TP6030	1F	3B
U5910	1D	2A
U5930	9R	2B
U5940	7B	2C
U5942	9B	2C
U5950	9D	1D
U5952	7C	1D
U5990A	4F	2G
U5990C	8G	2G
U5990D	6F	2G
U6010A	1E	3A
U6010B	1E	3A
U6070	7G	2E
U6120	2H	3B
U6130	2J	3B
U6140	6N	3C
U6150A	10F	3D
U6150B	10E	3D
U6150C	9C	3D
U6152A	9B	3D
U6152B	8E	3D
U6152C	10E	3D
U6152D	2P	3D
U6180	1K	3F
U6230	2G	3B
U6250	4R	4D
U6252A	9D	4D
U6252B	8J	4D
U6290A	4M	4G
U6290B	5M	4G
U6290C	4M	4G
W6084	3B	2F
W6174	3B	3E
Y5910	2A	1A

Partial A27 also shown on diagram 26.

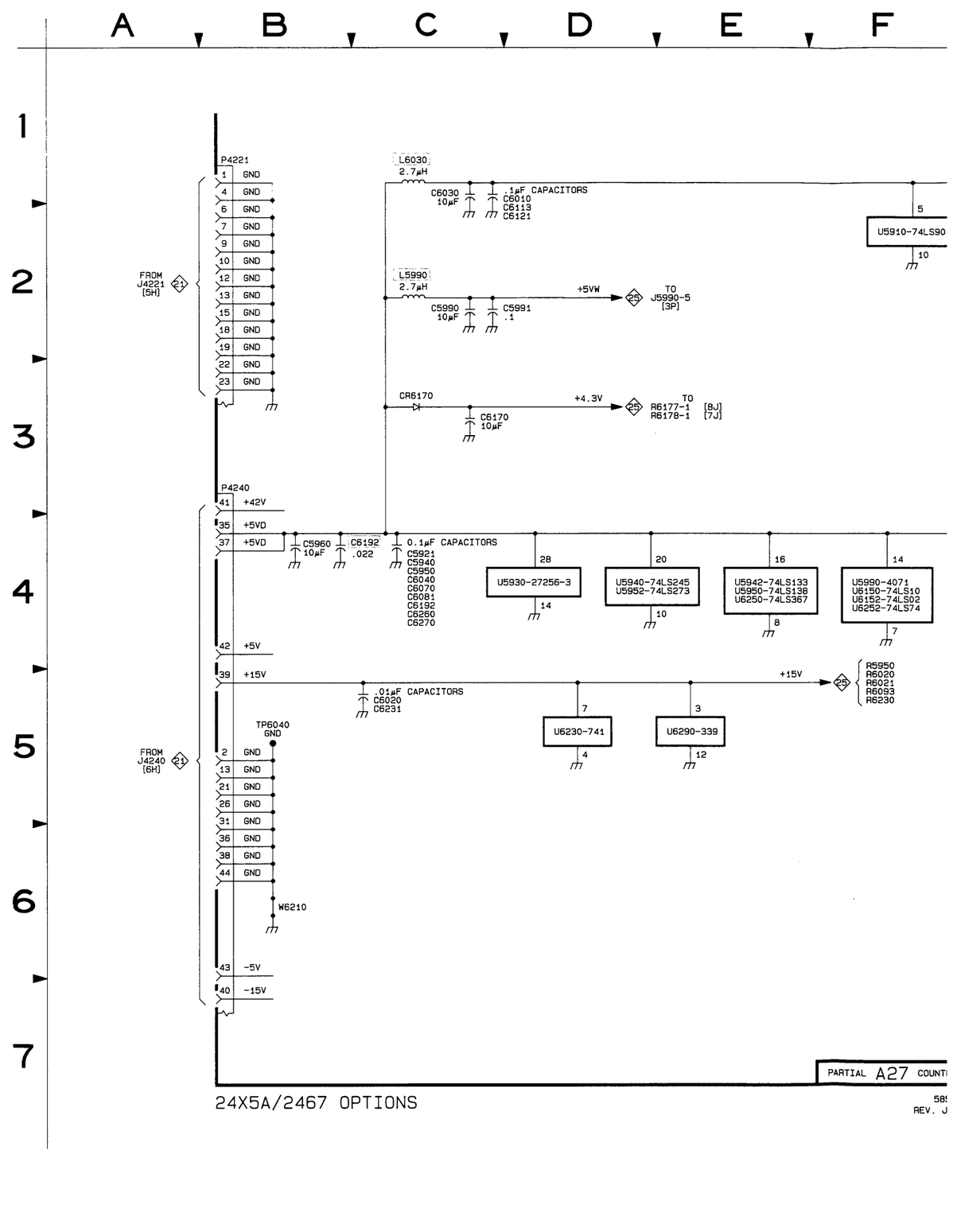
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COUNTER/TIMER/TRIGGER POWER DISTRIBUTION DIAGRAM 26

ASSEMBLY A27

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5921	4C	1B	C6121	1C	3B	P4240	3B	1D	U6120	2H	3B
C5940	4C	1C	C6170	3C	3E				U6130	2H	3B
C5950	4C	1D	C6192	4C	3G	TP6040	5B	3C	U6140	4G	3C
C5960	4B	2E	C6231	5C	4B				U6150	4F	3D
C5990	2C	1G	C6260	4C	4E	U5910	2F	2A	U6152	4F	3D
C5991	2C	2G	C6270	4C	4E	U5930	4D	2B	U6180	4H	3F
C6010	1C	2A				U5940	4D	2C	U6230	5D	3B
C6020	5C	2B	CR6170	3C	3E	U5942	4E	2C	U6250	4E	4D
C6030	1C	3B				U5950	4E	1D	U6252	4F	4D
C6040	4C	2C	L5990	2C	2G	U5952	4D	1D	U6290	5E	4G
C6070	4C	2E	L6030	1C	3B	U5990	4F	2G			
C6081	4C	2F				U6010	2G	3A	W6210	5C	4A
C6113	1C	3A	P4221	1B	1F	U6070	4G	2E			

Partial A27 also shown on diagram 25.

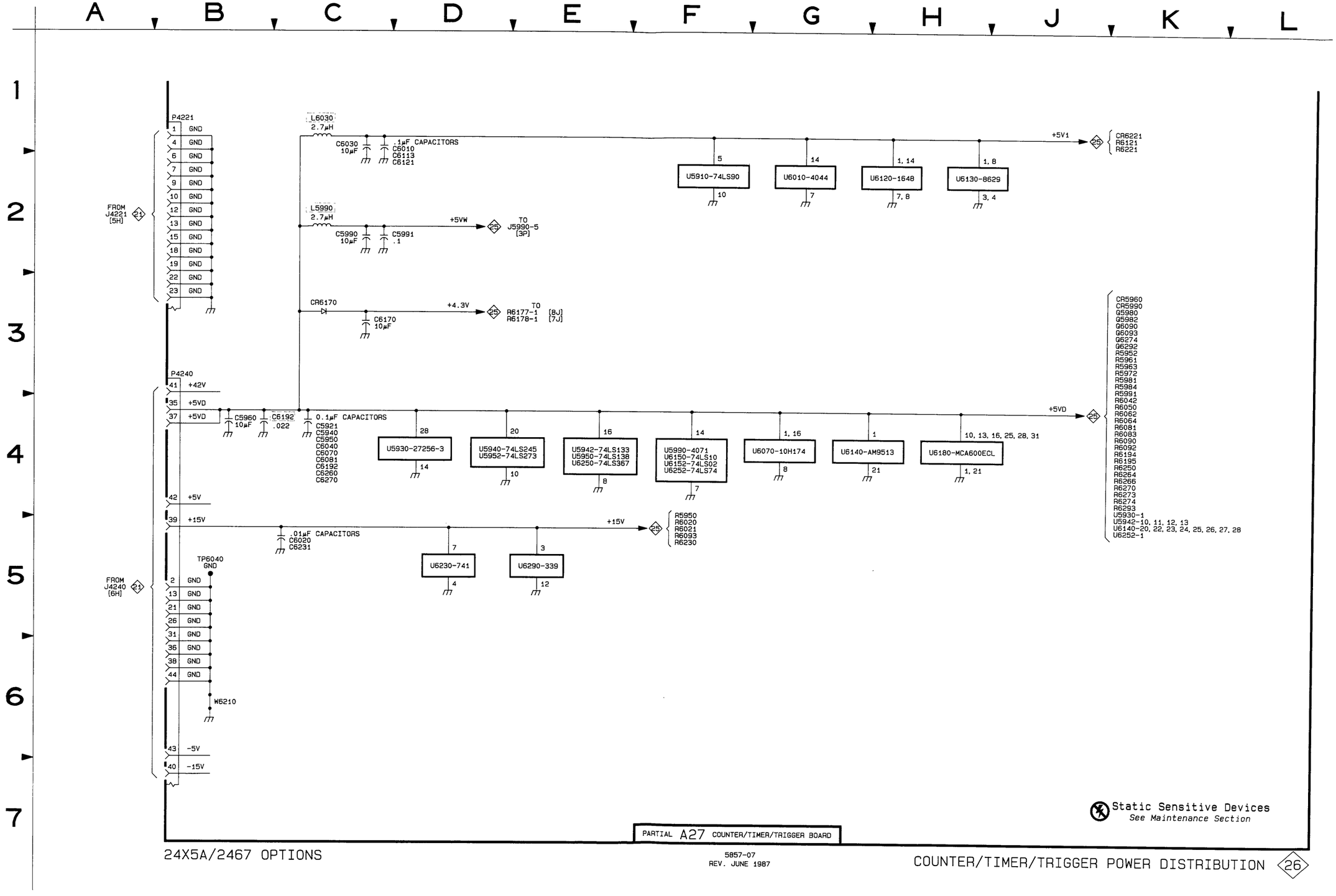


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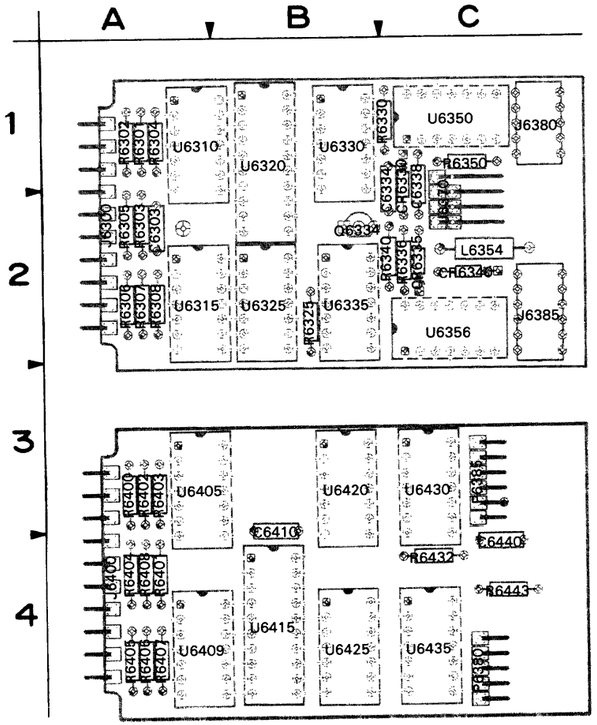
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6

SCHEM LOCATION	BOARD LOCATION
2H	3B
2H	3B
4G	3C
4F	3D
4F	3D
4H	3F
5D	3B
4E	4D
4F	4D
5E	4G
5C	4A

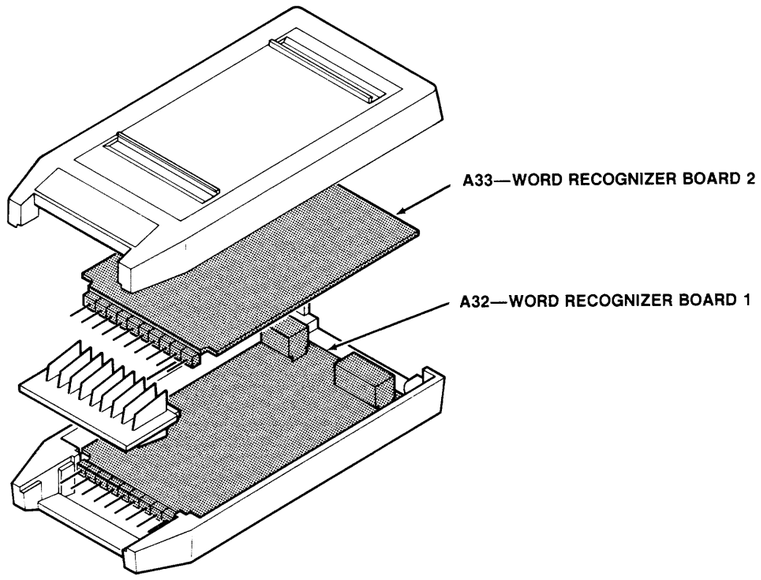


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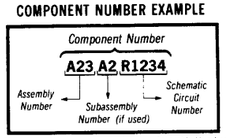
(4632-09) 5857-68

Figure 10-17. A32—Word Recognizer board 1 (top), and A33—Word Recognizer board 2 (bottom).



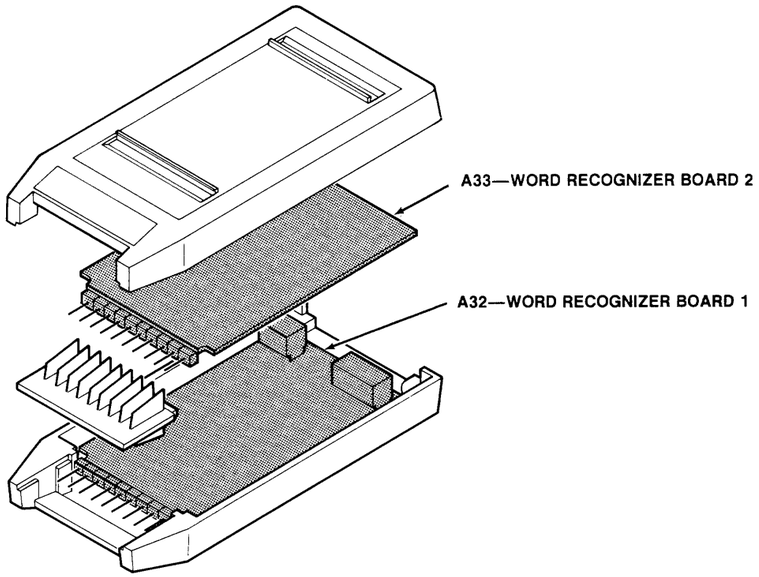
Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

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A32—WORD RECOGNIZER BOARD 1

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C6303	27	J6380	27	R6304	27		
C6334	27	J6385	27	R6305	27	U6310	27
C6338	27			R6306	27	U6315	27
		L6354	27	R6307	27	U6320	27
CR6330	27			R6308	27	U6325	27
CR6335	27	Q6334	27	R6325	27	U6330	27
CR6340	27			R6330	27	U6335	27
		R6301	27	R6336	27	U6350	27
J6300	27	R6302	27	R6340	27	U6356	27
J6370	27	R6303	27	R6350	27		

A33—WORD RECOGNIZER BOARD 2

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C6410	27			R6406	27	U6409	27
C6440	27	R6400	27	R6407	27	U6415	27
		R6401	27	R6408	27	U6420	27
J6400	27	R6402	27	R6432	27	U6425	27
		R6403	27	R6443	27	U6430	27
P6380	27	R6404	27			U6435	27
P6385	27	R6405	27	U6405	27		

WORD RECOGNIZER DIAGRAM 27

ASSEMBLY A32

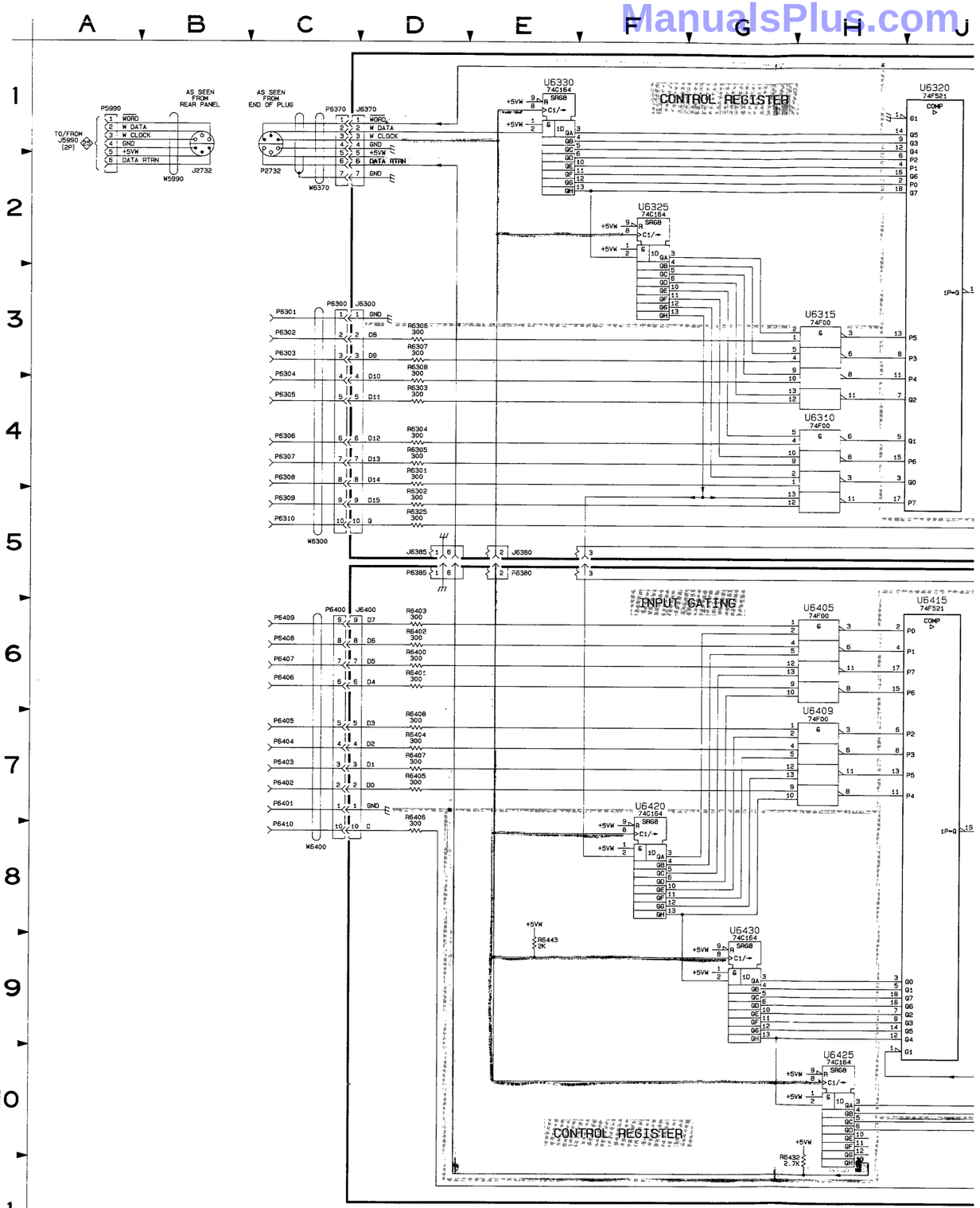
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C6303	4M	2A	L6354	1M	2C	R6336	2M	2C	U6335A	3L	2B
C6334	4M	1C				R6340	2M	2C	U6335C	5K	2B
C6338	2N	1C	Q6334	2M	2B	R6350	1M	1C	U6335D	3J	2B
									U6335	4N	2B
CR6330	1N	1C	R6301	4D	1A	U6310	4H	1A	U6350A	3M	1C
CR6335	2M	2C	R6302	5D	1A	U6310	4N	1A	U6350	5N	1C
CR6340	1M	2C	R6303	4D	2A	U6315	3H	2A	U6356A	1N	2C
			R6304	4D	1A	U6315	4N	2A	U6356B	2N	2C
J6300	3D	2A	R6305	4D	2A	U6320	1J	1B	U6356C	2N	2C
J6370	1D	2C	R6306	3D	2A	U6320	4M	1B	U6356D	1L	2C
J6380	5E	1C	R6307	3D	2A	U6325	2F	2B	U6356	5N	2C
J6380	5L	1C	R6308	3D	2A	U6325	4N	2B			
J6385	5D	2C	R6325	5D	2B	U6330	1E	1B			
J6385	5K	2C	R6330	1N	1C	U6330	4N	1B			

ASSEMBLY A33

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C6410	6M	3B	R6400	6D	3A	R6443	9E	4C	U6425	10H	4B
C6440	6M	4C	R6401	6D	4A				U6425	6N	4B
			R6402	6D	3A	U6405	6H	3A	U6430	6N	3C
J6400	6D	4A	R6403	6D	3A	U6405	6N	3A	U6430	9G	3C
			R6404	7D	4A	U6409	6N	4A	U6435A	10K	4C
P6380	5E	4C	R6405	7D	4A	U6409	7H	4A	U6435B	11L	4C
P6380	5L	4C	R6406	8D	4A	U6415	6J	4B	U6435	6N	4C
P6385	5D	3C	R6407	7D	4A	U6415	6M	4B			
P6385	5K	3C	R6408	7D	4A	U6420	6N	3B			
			R6432	10H	4C	U6420	7F	3B			

OTHER PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J2732	2B	CHASSIS	P6304	4C	CHASSIS	P6400	6C	CHASSIS	P6408	6C	CHASSIS
			P6305	4C	CHASSIS	P6401	7C	CHASSIS	P6409	6C	CHASSIS
P2732	2C	CHASSIS	P6306	4C	CHASSIS	P6402	7C	CHASSIS	P6410	8C	CHASSIS
P5990	1A	CHASSIS	P6307	4C	CHASSIS	P6403	7C	CHASSIS			
P6300	3C	CHASSIS	P6308	4C	CHASSIS	P6404	7C	CHASSIS	W5990	2B	CHASSIS
P6301	3C	CHASSIS	P6309	5C	CHASSIS	P6405	7C	CHASSIS	W6300	5C	CHASSIS
P6302	3C	CHASSIS	P6310	5C	CHASSIS	P6406	6C	CHASSIS	W6370	2C	CHASSIS
P6303	3C	CHASSIS	P6370	1C	CHASSIS	P6407	6C	CHASSIS			



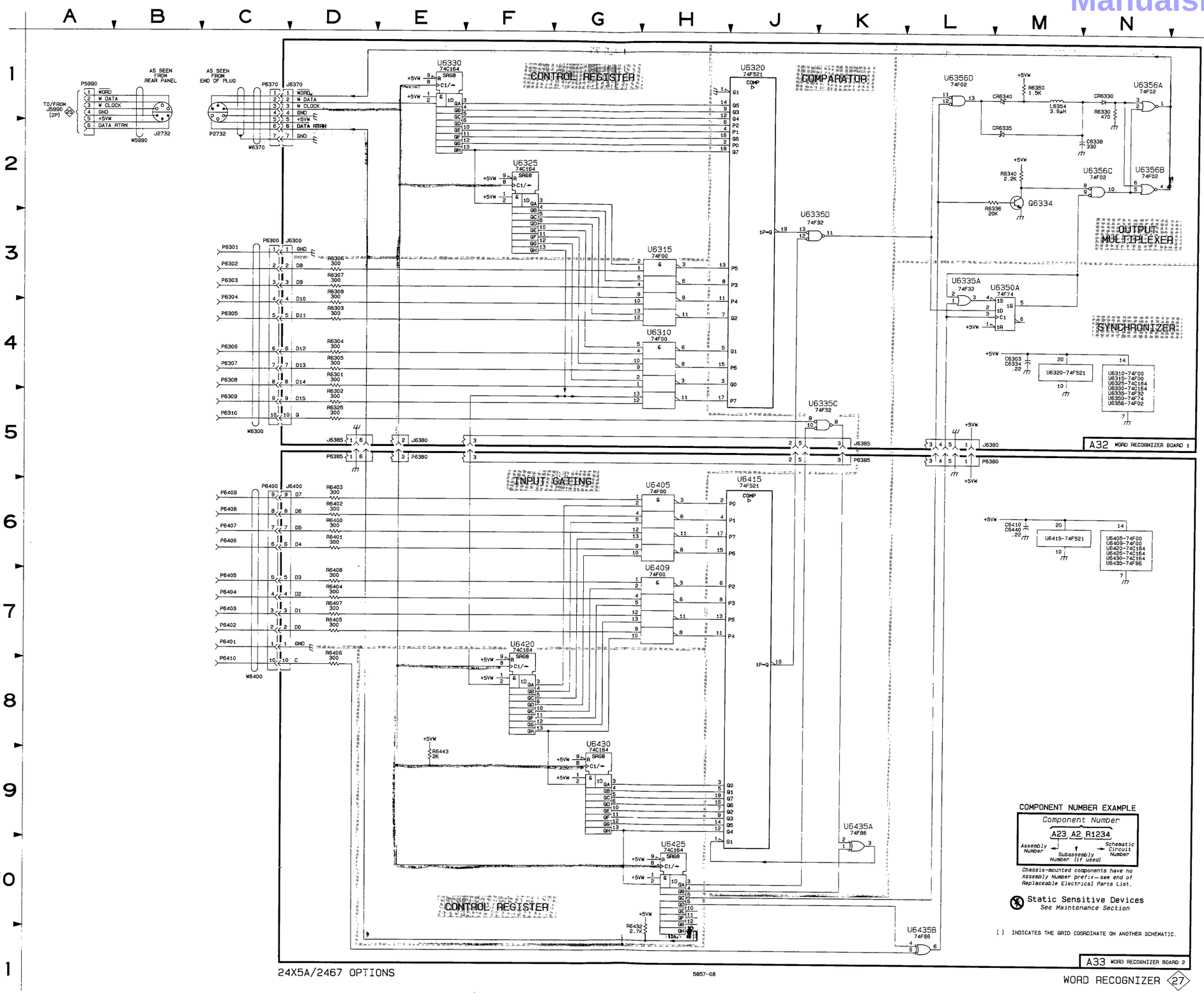
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SCHEM OCATION	BOARD LOCATION
3L	2B
5K	2B
3J	2B
4N	2B
3M	1C
5N	1C
1N	2C
2N	2C
2N	2C
1L	2C
5N	2C

SCHEM OCATION	BOARD LOCATION
10H	4B
6N	4B
6N	3C
9G	3C
10K	4C
11L	4C
6N	4C

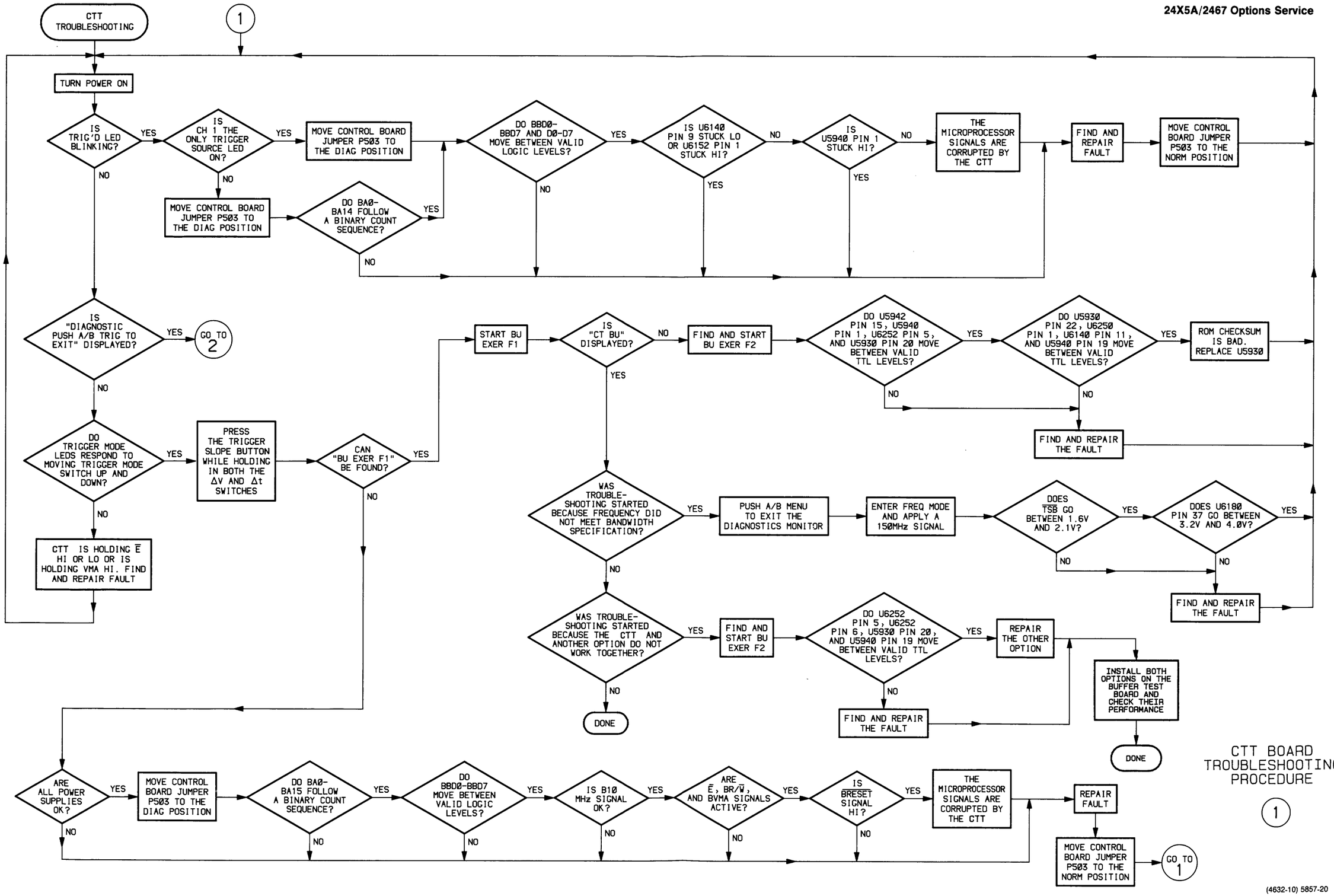
SCHEM OCATION	BOARD LOCATION
6C	CHASSIS
6C	CHASSIS
8C	CHASSIS
2B	CHASSIS
5C	CHASSIS
2C	CHASSIS



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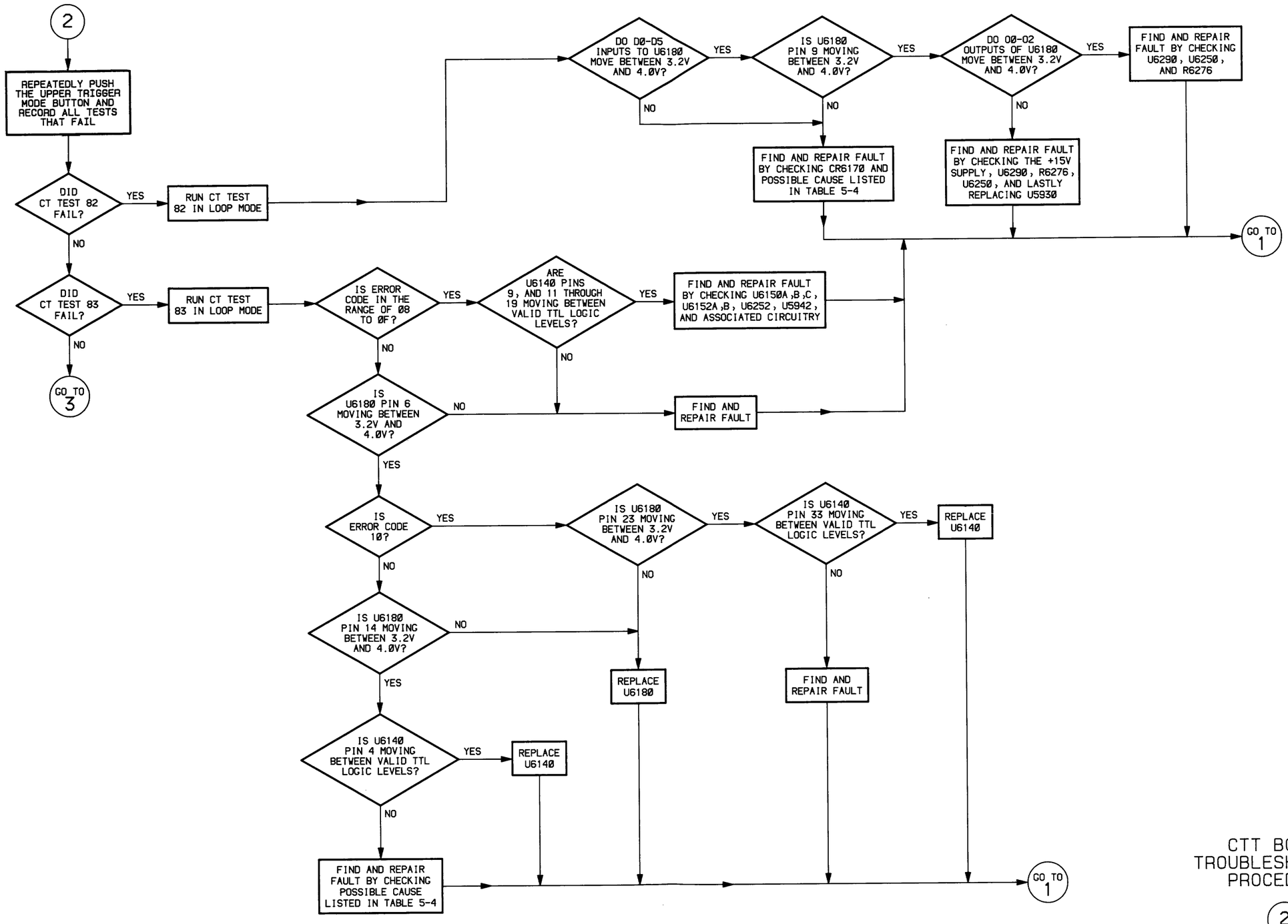


CTT BOARD TROUBLESHOOTING PROCEDURE

1

(4632-10) 5857-20

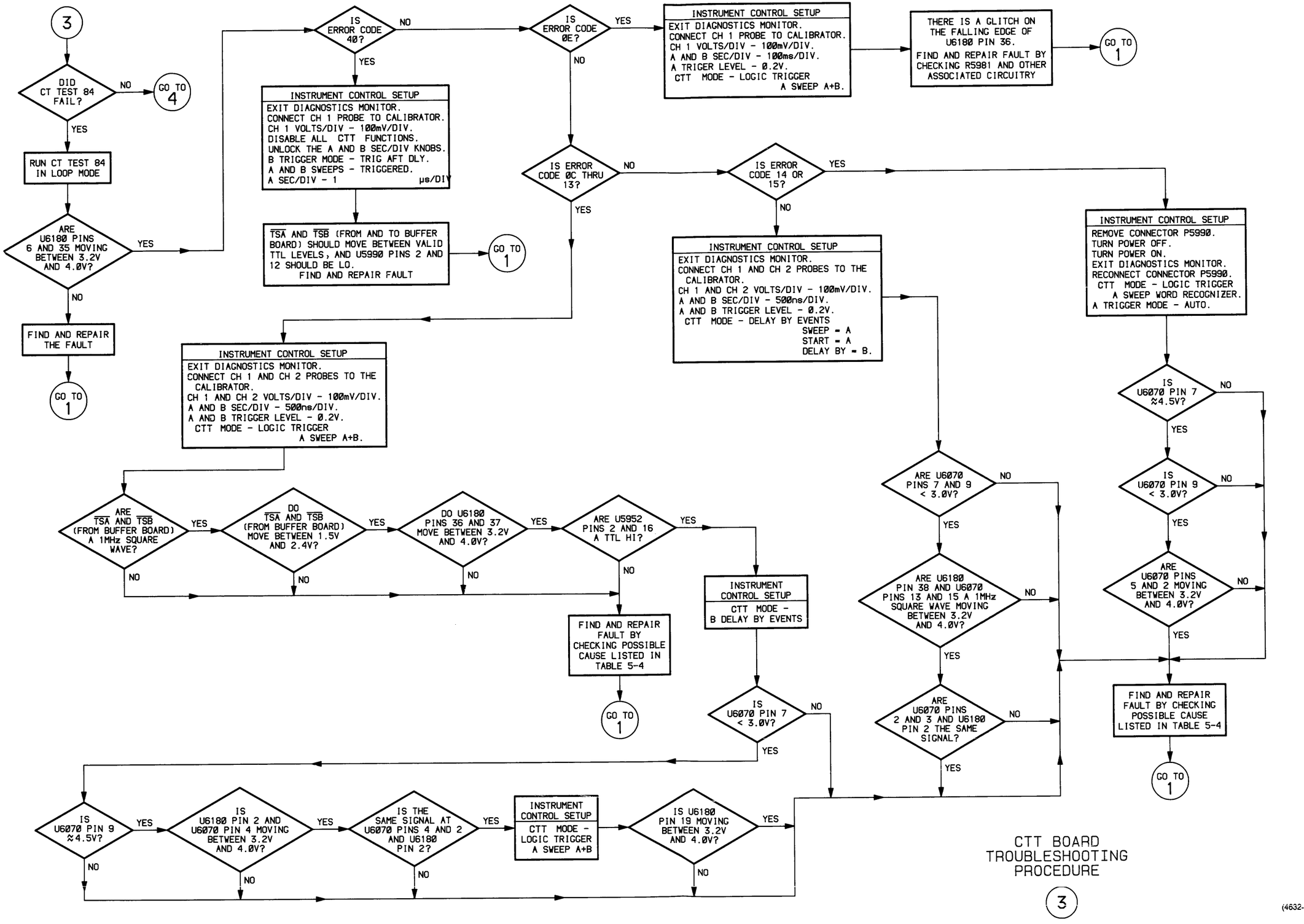
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CTT BOARD TROUBLESHOOTING PROCEDURE

2

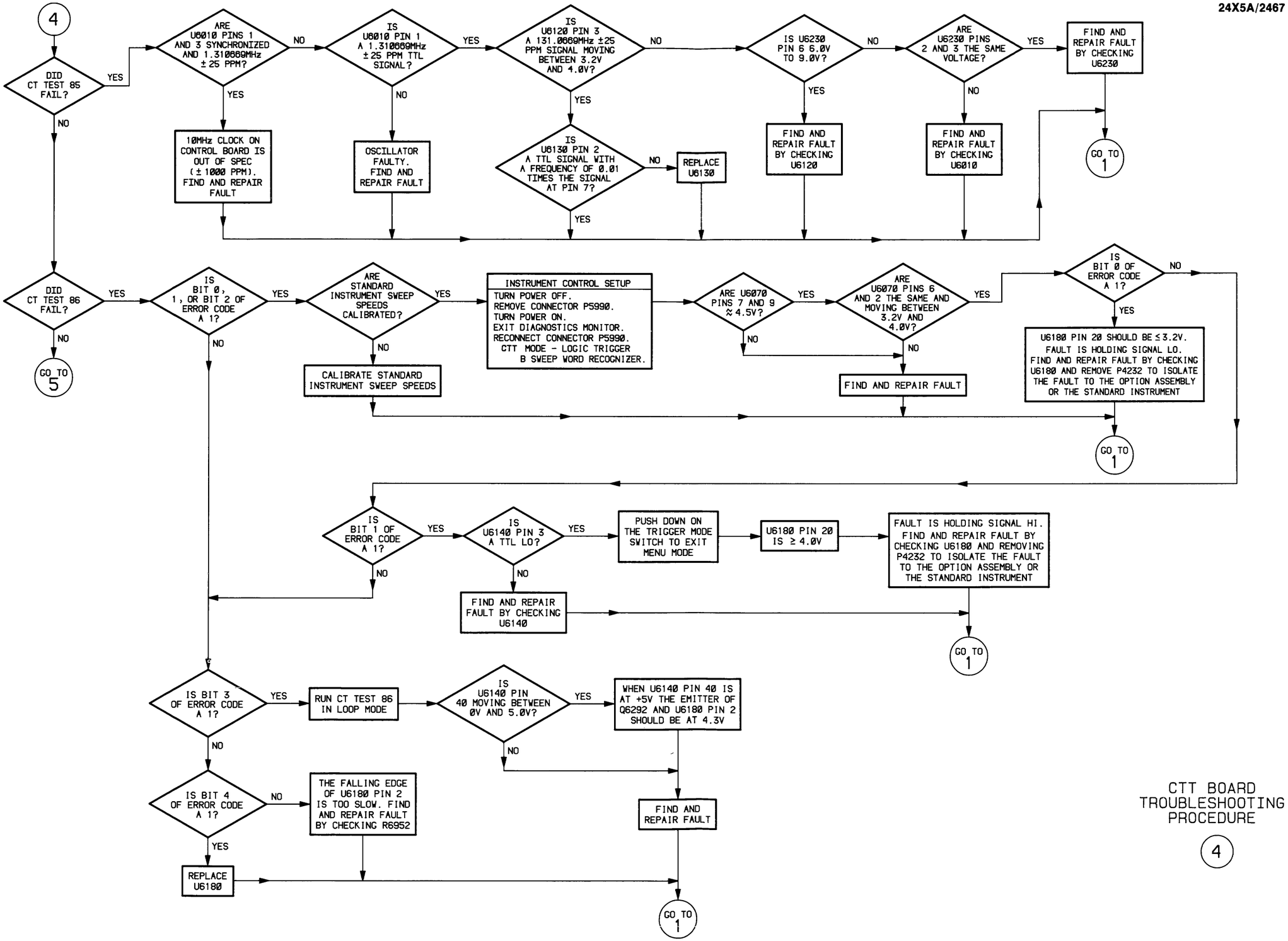
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CTT BOARD TROUBLESHOOTING PROCEDURE

3

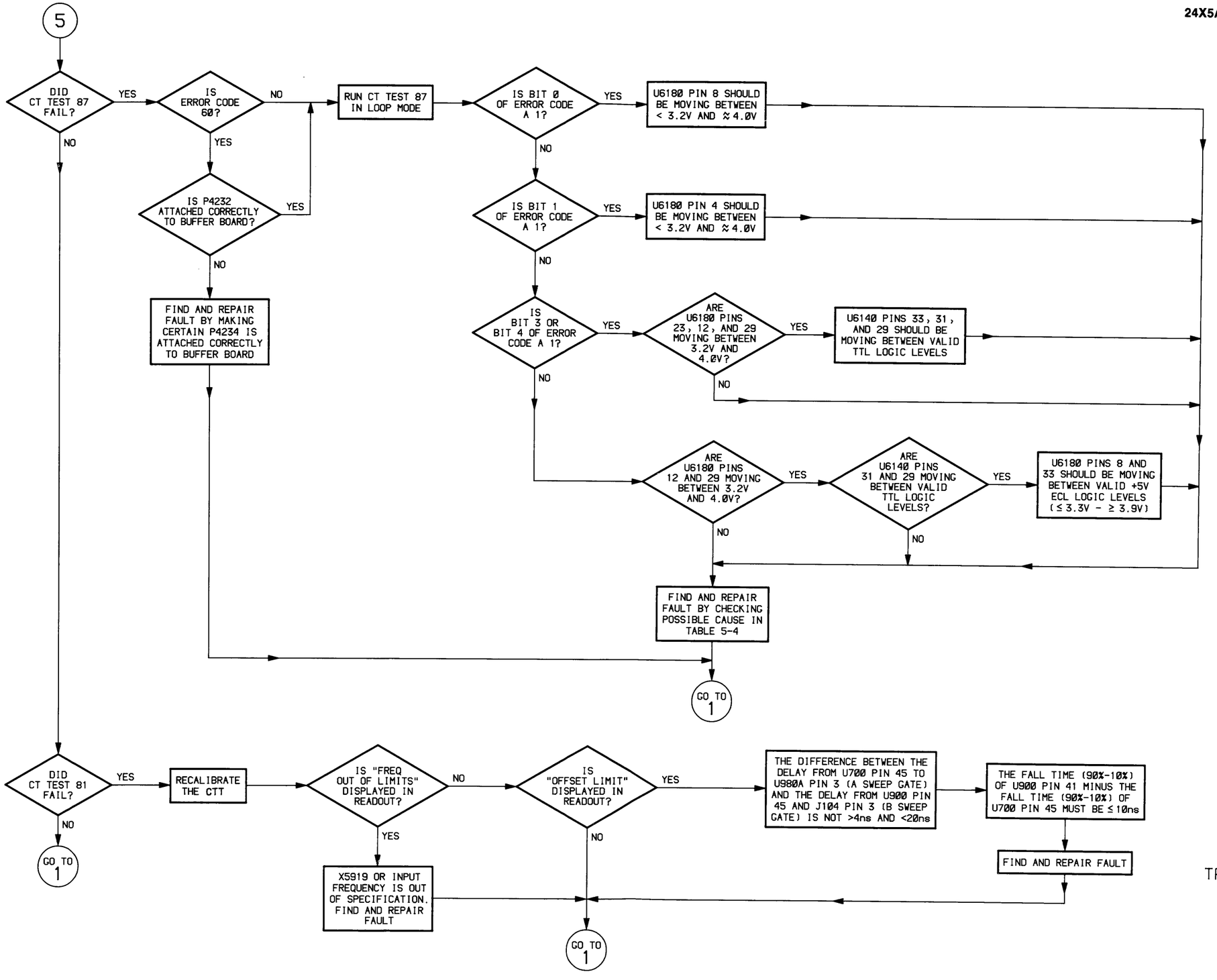
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CTT BOARD TROUBLESHOOTING PROCEDURE

4

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CTT BOARD TROUBLESHOOTING PROCEDURE

5

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COMMON TO ALL

STANDARD OSCILLOSCOPE

MICROPROCESSOR BUS

EAROM BUS

DC POWER SUPPLIES

5.5 VAC (25 kHz)

DATA BUS BUFFER U4255

ADDRESS BUS BUFFERS U4235, U4245

CONTROL BUS BUFFERS U4225, U4265

ROM U4260

OPTION EAROM U4207

ADDRESS DECODING U4250C, U4240B, U4280

BUFFER BOARD DIGITAL DISTRIBUTION 20

BUFFER BOARD ANALOG AND POWER DISTRIBUTION 21

ROMEN

FRONT PANEL SELECTS

DATA BUS

ADDRESS BUS

CONTROL BUS

SELECT

TCS

10 MC

DELAY

V/F

TC

TRANSDUCER DRIVE

DC POWER SUPPLIES

5.5 VAC (25 kHz)

FLOATING DC POWER TO DMM CIRCUITRY

DATA

CLK

HIGH

LOW

DIGITAL COUNTER AND PROCESSOR INTERFACE 31

- OPTION SELECT REGISTER U5251B
- MEMORY AND I/O DECODERS U5241, U5271D U5232A,B U5242A,C,D U5270B,D,E U5250
- DATA BUS BUFFER U5282 U5270A
- EPROM U5280 U5281 U5251A U5271A,B
- COUNTERS U5272 U5274A,B U5273A,B U5252D U5271B Q5230
- STATUS REGISTER U5260

EXTENDED FRONT PANEL 32

- I/O DECODERS U4310A,B U4300A,B,C, D,E,F
- ROW SELECT
- EXTENDED FRONT PANEL SWITCHES S4302, S4303, S4304, S4305, S4306
- SWITCH COLUMN BUFFER U4320
- CONTINUITY INDICATOR LS4330

COLUMN DATA

REGISTER SELECT

V/F CONVERTER AND DIGITAL INTERFACE 30

- VOLTAGE TO CURRENT CONVERTER U5030A,B Q4934
- INTEGRATING CAPACITOR C4914
- CURRENT SOURCE Q5020, Q4920 U4920A,B,C U4932A,B U4930
- COMPARATOR Q4922, Q4930 Q4936, Q4944 Q4932, U4920D Q5130, U5130B
- DIGITAL CONTROL U5122, U5124 U5132, U5120 U5130A,C,F U4940, Q4950 U5010A,B

V/F INPUT

CAP

LOCAP

ENL

DMM INPUT CIRCUIT 29

- INPUT ATTENUATORS Q4970, Q4971 Q4972, Q4973 Q4980
- OHMS CURRENT SOURCE U5040, U4960 U4942 U4950A,B U5050, Q4960
- DC VOLTS BUFFER U4970 U4950C,D U5060A,D Q5070A,B
- AC VOLTS BUFFER U5151A,B U5140, U5170 U5150C,D
- V/F INPUT MULTIPLEXER U5020

ACI

DC1

OHMS SOURCE

REFERENCES

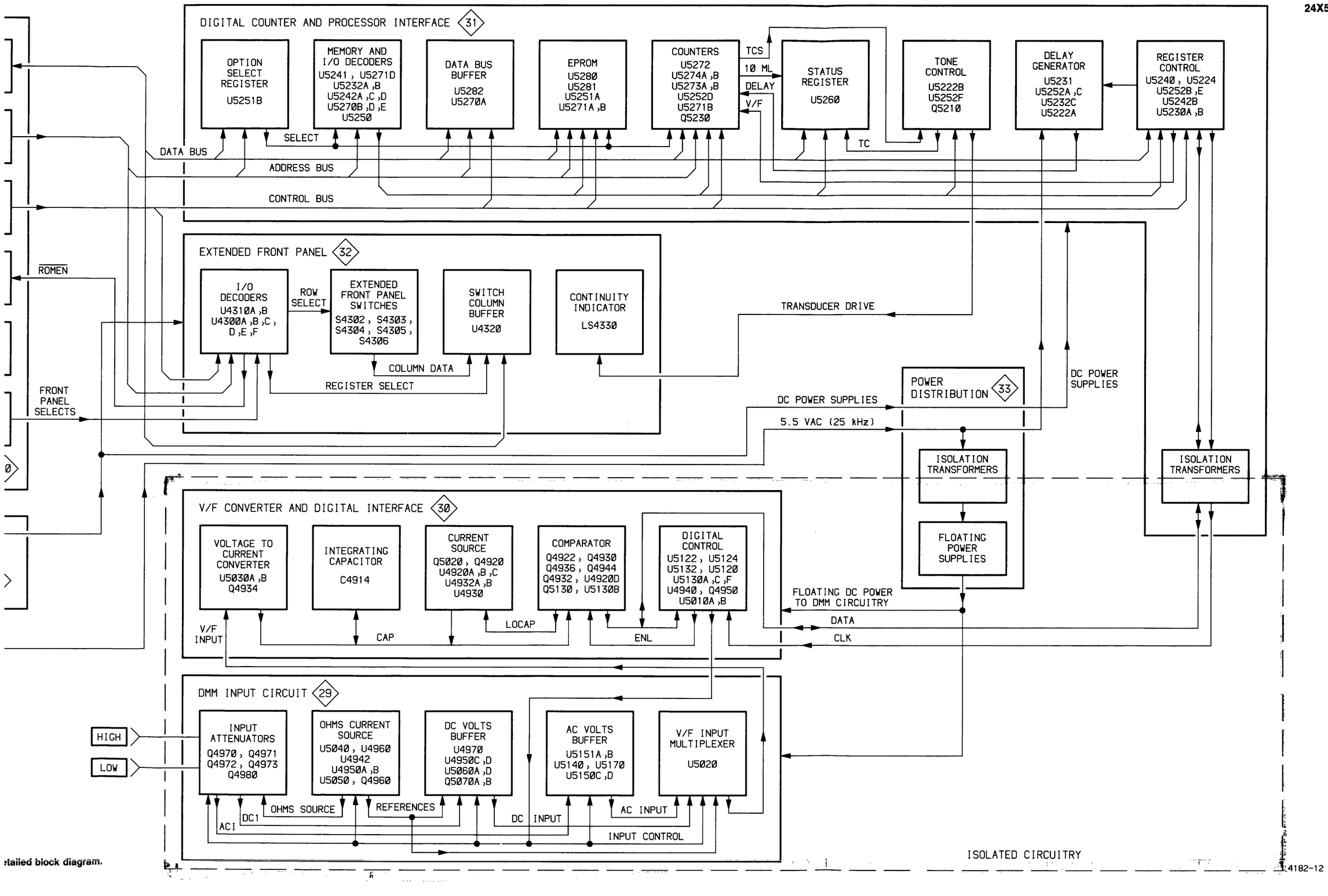
DC INPUT

AC INPUT

INPUT CONTROL

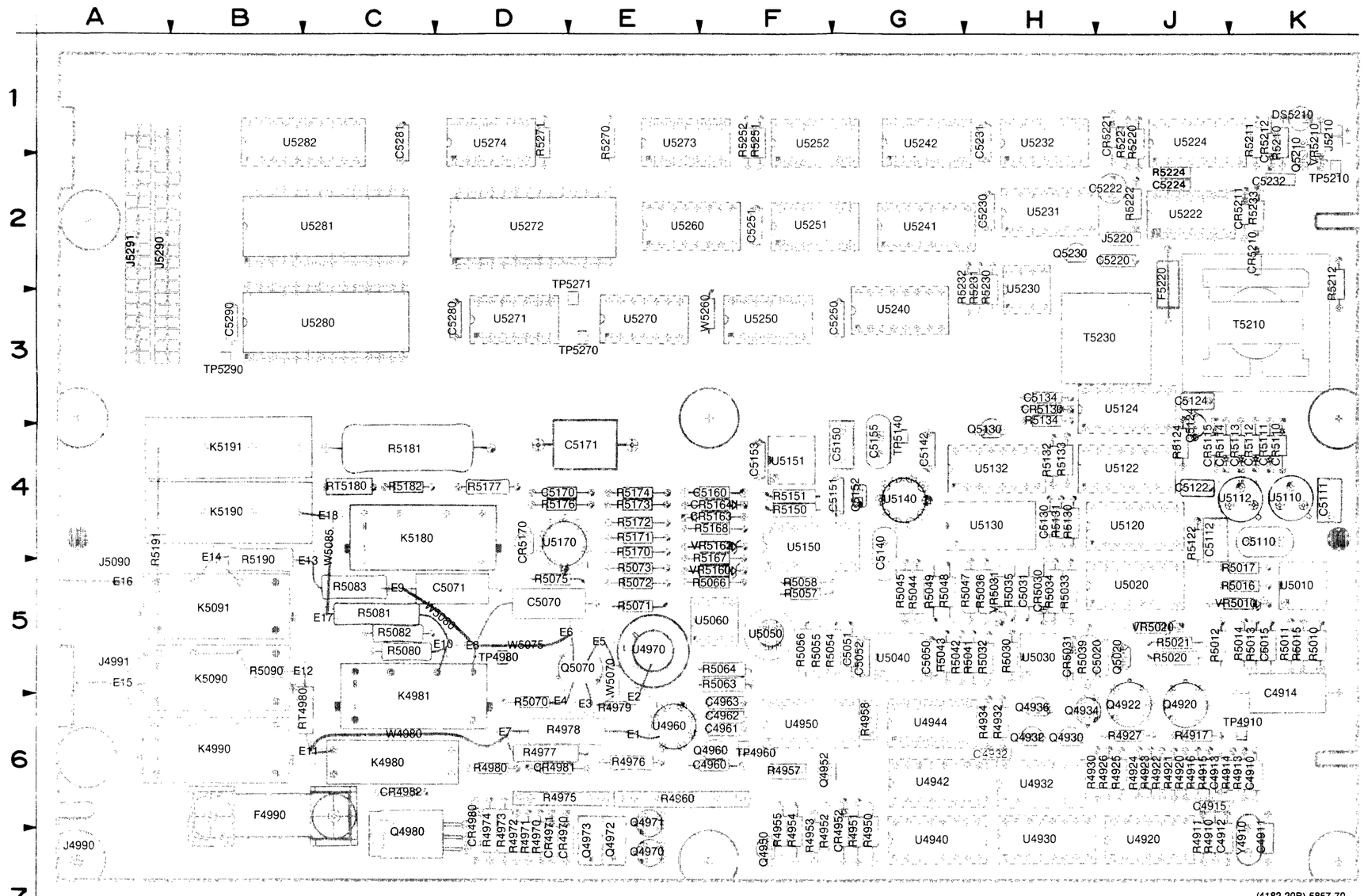
Figure 10-18. DMM (Option 01) detailed block diagram.

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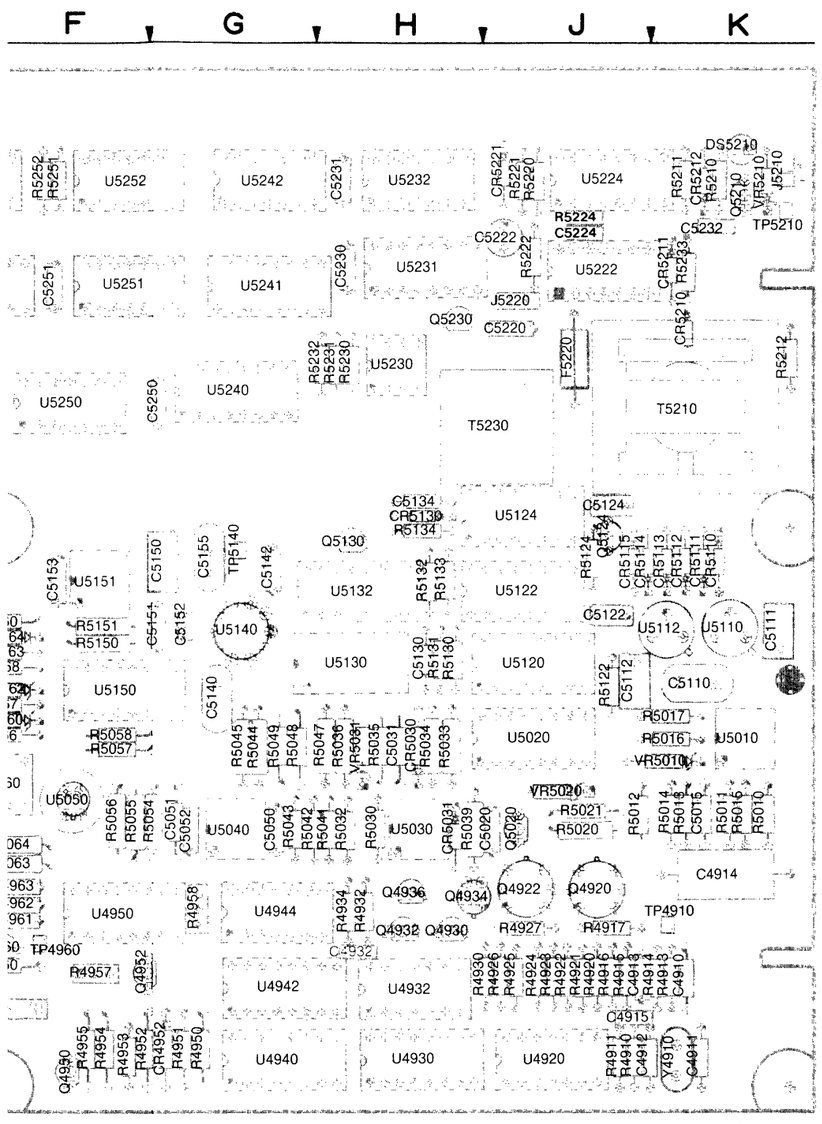


tailed block diagram.

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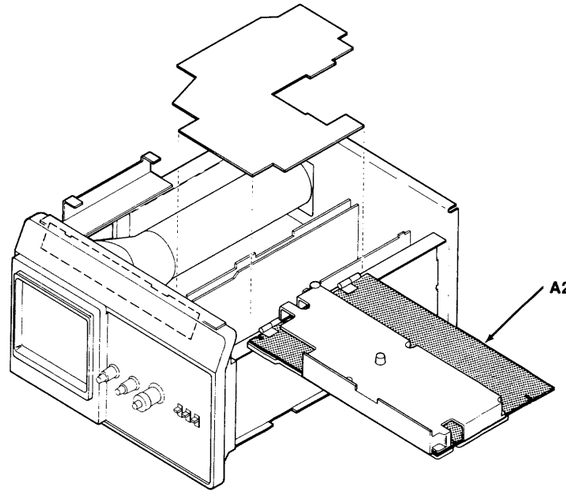

A
B
C
D
E
F
G
H
J
K
1
2
3
4
5
6
7
U5282
U5281
U5280
U5274
U5272
U5271
U5273
U5260
U5270
U5252
U5251
U5250
U5242
U5241
U5240
U5232
U5231
U5230
U5224
U5222
U5124
U5132
U5130
U5122
U5120
U5112
U5110
U5020
U5010
U5140
U5150
U5151
U5170
U5060
U5050
U5040
U5030
U4970
U4960
U4950
U4944
U4942
U4940
U4932
U4930
U4920
K5191
K5190
K5180
K5091
K5090
K4981
K4980
K4990
R5181
C5171
RT5180
R5182
R5177
C5170
R5176
R5174
R5173
R5172
R5171
R5170
R5073
R5072
R5071
R5075
C5070
R5083
C5071
R5081
R5082
R5080
TP4980
W5085
W5080
W5075
W5070
W4980
R5090
R5191
R5190
J5090
J4991
J4990
E18
E14
E13
E16
E9
E17
E10
E8
E6
E5
E12
E15
E7
E11
E4
E3
E2
E1
RT4980
R5070
Q5070
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R4977
R4980
CR4981
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CR4982
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R4971
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CR4970
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Q4972
Q4971
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C5160
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R5168
VR5165
R5167
VR5160
R5066
C5153
C5150
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CR5030
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R5033
R5056
R5055
R5054
C5051
C5052
C5050
R5043
R5042
R5041
R5032
R5030
CR5031
R5039
C5020
Q5020
R5021
R5020
VR5020
R5012
R5014
R5013
C5015
R5011
R5015
R5010
R5064
R5063
C4963
C4962
C4961
TP4960
C4960
R4957
Q4952
R4958
R4934
R4932
Q4936
Q4934
Q4922
Q4920
Q4932
Q4930
R4927
R4917
TP4910
C4914
C4932
R4930
R4926
R4925
R4924
R4923
R4922
R4921
R4920
R4916
R4915
C4913
R4914
R4913
C4910
C4915
R4911
R4910
C4912
Y4910
C4911
C5230
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CR5114
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R5112
R5111
R5110
C5122
R5132
R5133
R5131
R5130
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C5112
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R5016
VR5010
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CR5212
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VR5210
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R5233
CR5210
R5232
R5231
R5230
C5280
C5290
C5281
C5291
J5291
J5290
TP5271
TP5270
TP5290
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C5250
C5251
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R5252
R5251
R5271
R5270
C5231
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R5261
R5262
R5263
R5264
R5265
R5266
R5267
R5268
R5269
R5270
R5271
R5272
R5273
R5274
R5275
R5276
R5277
R5278
R5279
R5280
R5281
R5282
R5283
R5284
R5285
R5286
R5287
R5288
R5289
R5290
R5291
R5292

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(4182-20B) 5857-70

-19. A29—DMM board.



A29—DMM BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4910	32	CR5130	29	Q4971	28	R5034	29	R5233	30	U5150	28
C4911	29	CR5163	28	Q4972	28	R5035	29	R5251	30	U5150	32
C4912	29	CR5164	28	Q4973	28	R5036	29	R5252	30	U5151	28
C4913	29	CR5170	28	Q4980	28	R5039	29	R5270	30	U5151	32
C4914	29	CR5210	30	Q5020	29	R5041	29	R5271	30	U5170	28
C4915	32	CR5211	30	Q5070	28	R5042	29			U5222	30
C4932	32	CR5212	30	Q5124	29	R5043	29	RT4980	28	U5222	32
C4960	28	CR5221	30	Q5130	29	R5044	28	RT5180	28	U5224	30
C4961	32			Q5210	30	R5045	28			U5224	32
C4962	32	DS5210	30	Q5230	30	R5047	29	T5210	32	U5230	30
C4963	32					R5048	28	T5230	30	U5230	32
C5015	29	E1	28	R4910	29	R5049	28			U5231	30
C5020	29	E2	28	R4911	29	R5054	28	TP4910	32	U5231	32
C5031	29	E3	28	R4913	29	R5055	28	TP4960	28	U5232	30
C5050	32	E4	28	R4914	29	R5056	28	TP4980	28	U5232	32
C5051	28	E5	28	R4915	29	R5057	28	TP5140	28	U5240	30
C5052	32	E6	28	R4916	29	R5058	28	TP5210	32	U5240	32
C5070	28	E7	28	R4917	29	R5063	28	TP5270	30	U5241	30
C5071	28	E8	28	R4920	29	R5064	28	TP5271	32	U5241	32
C5110	32	E9	28	R4921	29	R5066	28	TP5290	30	U5242	30
C5111	32	E10	28	R4922	29	R5070	28			U5242	32
C5112	32	E11	28	R4923	29	R5071	28	U4920	29	U5250	30
C5122	29	E12	28	R4924	29	R5072	28	U4920	32	U5250	32
C5124	29	E13	28	R4925	29	R5073	28	U4930	29	U5251	30
C5130	29	E14	28	R4926	29	R5075	28	U4930	32	U5251	32
C5134	29	E15	28	R4927	29	R5080	28	U4932	29	U5252	30
C5140	28	E16	28	R4930	29	R5081	28	U4932	32	U5252	32
C5142	32	E17	28	R4932	29	R5082	28	U4940	29	U5260	30
C5150	28	E18	28	R4934	29	R5083	28	U4940	32	U5260	32
C5151	32			R4950	29	R5090	28	U4942	28	U5270	30
C5152	28	F4990	28	R4951	28	R5122	29	U4942	32	U5270	32
C5153	32	F5220	32	R4952	28	R5124	29	U4944	29	U5271	30
C5155	28			R4953	29	R5130	29	U4950	28	U5271	32
C5160	28	J4990	28	R4954	29	R5131	28	U4950	32	U5272	30
C5170	28	J4991	28	R4955	29	R5132	29	U4960	28	U5272	32
C5171	28	J5090	28	R4957	28	R5133	29	U4960	32	U5273	30
C5220	32	J5210	30	R4958	28	R5134	29	U4970	28	U5273	32
C5222	30	J5220	32	R4960	28	R5150	28	U4970	32	U5274	30
C5224	30	J5290	30	R4970	28	R5151	28	U5010	29	U5274	32
C5230	32	J5290	32	R4971	28	R5167	28	U5010	32	U5280	30
C5231	32	J5291	30	R4972	28	R5168	28	U5020	28	U5280	32
C5232	30	J5291	32	R4973	28	R5170	28	U5020	32	U5281	30
C5250	32			R4974	28	R5171	28	U5030	29	U5281	32
C5251	32	K4980	28	R4975	28	R5172	28	U5030	32	U5282	30
C5280	32	K4981	28	R4976	28	R5173	28	U5040	28	U5282	32
C5281	32	K4990	28	R4977	28	R5174	28	U5040	32		
C5290	32	K5090	28	R4978	28	R5176	28	U5050	28	VR5010	32
		K5091	28	R4979	28	R5177	28	U5060	28	VR5020	29
CR4952	28	K5180	28	R4980	28	R5181	28	U5060	32	VR5031	29
CR4970	28	K5190	28	R5010	29	R5182	28	U5110	32	VR5160	28
CR4971	28	K5191	28	R5011	29	R5190	28	U5112	32	VR5162	28
CR4980	28			R5012	32	R5191	28	U5120	29	VR5210	30
CR4981	28	Q4920	29	R5013	28	R5210	30	U5120	32		
CR4982	28	Q4922	29	R5014	28	R5211	30	U5122	29	W4980	28
CR5030	29	Q4930	29	R5015	29	R5212	32	U5122	32	W5070	28
CR5031	29	Q4932	29	R5016	29	R5220	30	U5124	29	W5075	28
CR5110	32	Q4934	29	R5017	29	R5221	30	U5124	32	W5080	28
CR5111	32	Q4936	29	R5020	29	R5222	30	U5130	29	W5085	28
CR5112	32	Q4950	29	R5021	29	R5224	30	U5130	32	W5260	30
CR5113	32	Q4952	28	R5030	29	R5230	30	U5132	29		
CR5114	32	Q4960	28	R5032	29	R5231	30	U5140	28	Y4910	29
CR5115	32	Q4970	28	R5033	29	R5232	30	U5140	32		

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DMM INPUT CIRCUIT DIAGRAM 28

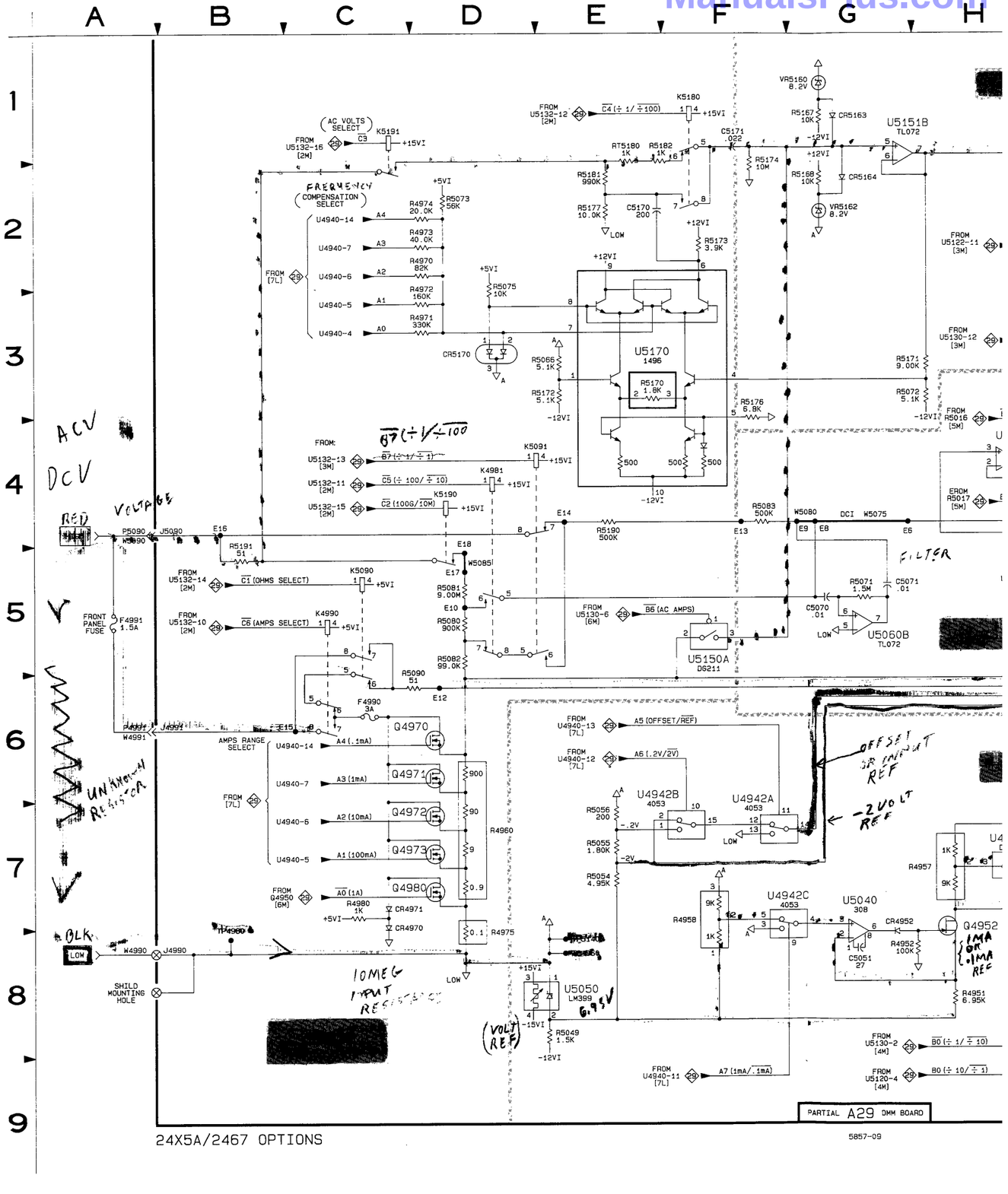
ASSEMBLY A29

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4960	7J	6F	F4990	6C	6B	R4980	7C	6D	R5191	4B	4A
C5051	8G	5G				R5013	1M	5K			
C5070	5G	5D	J4990	8B	7A	R5014	4K	5K			
C5071	5G	5D	J4991	6B	5A	R5044	1L	5G	RT4980	8L	6C
C5140	1L	4G	J5090	4B	5A	R5045	2L	5G	RT5180	1E	4C
C5150	1K	4G				R5048	1K	5G			
C5152	1K	4G	K4980	8L	6C	R5049	8E	5G			
C5155	2K	4G	K4981	4B	6C	R5054	7E	5F	TP4960	8E	6F
C5160	3K	4F	K4990	5C	6B	R5055	7E	5F	TP4980	8B	5D
C5170	2E	4D	K5090	5C	5B	R5056	7E	5F	TP5140	8E	4G
C5171	1F	4E	K5091	4B	5B	R5057	4J	5F			
			K5180	1F	4C	R5058	4J	5F			
CR4952	7G	7G	K5190	4B	4B	R5063	5K	5F	U4942A	7F	6G
CR4970	7C	7D	K5191	1C	4B	R5064	5K	5F	U4942B	7F	6G
CR4971	7C	7D				R5066	3E	5F	U4942C	7F	6G
CR4980	7K	7D	Q4952	7H	6F	R5070	4J	6D	U4950A	7H	6F
CR4981	7K	6D	Q4960	8L	6F	R5071	5G	5E	U4950B	7J	6F
CR4982	8L	6C	Q4970	6D	7E	R5072	3H	5E	U4950C	5K	6F
CR5163	1G	4F	Q4971	6D	6E	R5073	2D	5E	U4950D	4K	6F
CR5164	2G	4F	Q4972	7D	7E	R5075	2D	5D	U4960	7J	6E
CR5170	3D	4D	Q4973	7D	7E	R5080	5D	5C	U4970	4K	5E
			Q4980	7D	7C	R5081	5D	5C	U5020	3M	5J
E1	8J	6E	Q5070A	3J	5E	R5082	5D	5C	U5040	7G	5G
E2	4K	6E	Q5070B	4J	5E	R5083	4F	5C	U5050	8E	5F
E3	4J	6E				R5090	6C	5B	U5060A	4H	5F
E4	3J	6D	R4951	8H	7G	R5131	8L	4H	U5060B	5G	5F
E5	4J	5E	R4952	8H	7F	R5150	3K	4F	U5140	1K	4G
E6	4G	5E	R4957	7H	6F	R5151	3K	4F	U5150A	5F	4F
E7	8K	6D	R4958	7F	6G	R5167	1G	4F	U5150C	3J	4F
E8	4G	5D	R4960	7D	6E	R5168	2G	4F	U5150D	2J	4F
E9	4G	5C	R4970	2D	7D	R5170	3E	4E	U5151A	1J	4F
E10	5D	5D	R4971	3D	7D	R5171	3H	4E	U5151B	1G	4F
E11	8K	6C	R4972	3D	7D	R5172	3E	4E	U5170	3E	4D
E12	6D	5C	R4973	2D	7D	R5173	2F	4E			
E13	4F	5C	R4974	2D	7D	R5174	1F	4E	VR5160	1G	5F
E14	4E	4B	R4975	8D	6D	R5176	3F	4D	VR5162	2G	4F
E15	6C	5A	R4976	7K	6E	R5177	2E	4D			
E16	4B	5A	R4977	8K	6D	R5181	2E	4C	W4980	8K	6C
E17	5D	5C	R4978	8J	6D	R5182	1E	4C	W5070	4J	5E
E18	5D	4C	R4979	4J	6E	R5190	4E	4B	W5075	4G	5D
									W5080	4G	5D
									W5085	5D	4C

Partial A29 also shown on diagrams 29, 30 and 32.

OTHER PARTS

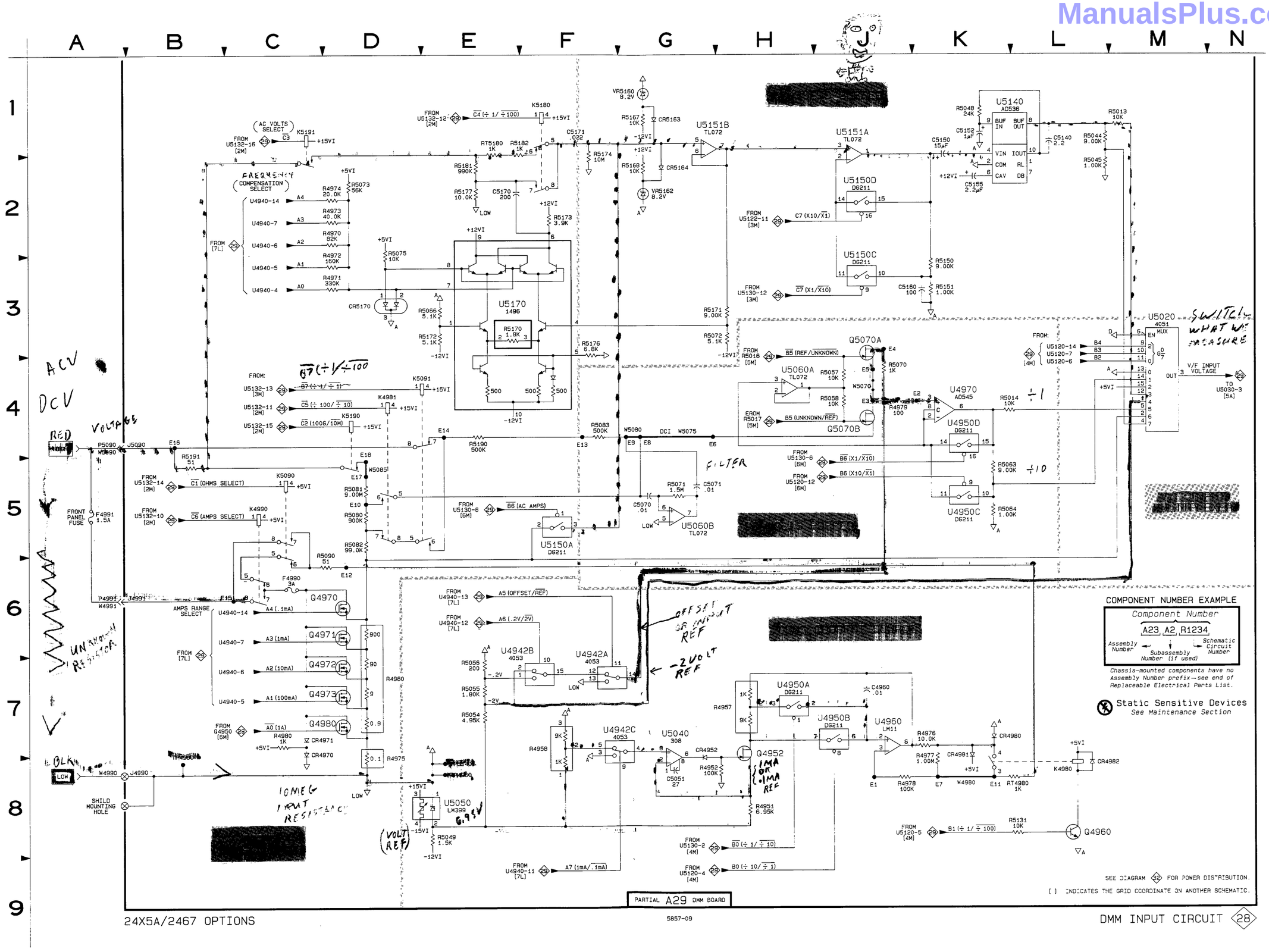
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
F4991	5A	CHASSIS	P4991	6A	CHASSIS	W4991	6A	CHASSIS	W5090	4A	CHASSIS
			P5090	4A	CHASSIS	W4990	8A	CHASSIS			



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SCHEM LOCATION	BOARD LOCATION
4B	4A
8L	6C
1E	4C
8E	6F
8B	5D
8E	4G
7F	6G
7F	6G
7F	6G
7H	6F
7J	6F
5K	6F
4K	6F
7J	6E
4K	5E
3M	5J
7G	5G
8E	5F
4H	5F
5G	5F
1K	4G
5F	4F
3J	4F
2J	4F
1J	4F
1G	4F
3E	4D
1G	5F
2G	4F
8K	6C
4J	5E
4G	5D
4G	5D
5D	4C

SCHEM LOCATION	BOARD LOCATION
4A	CHASSIS



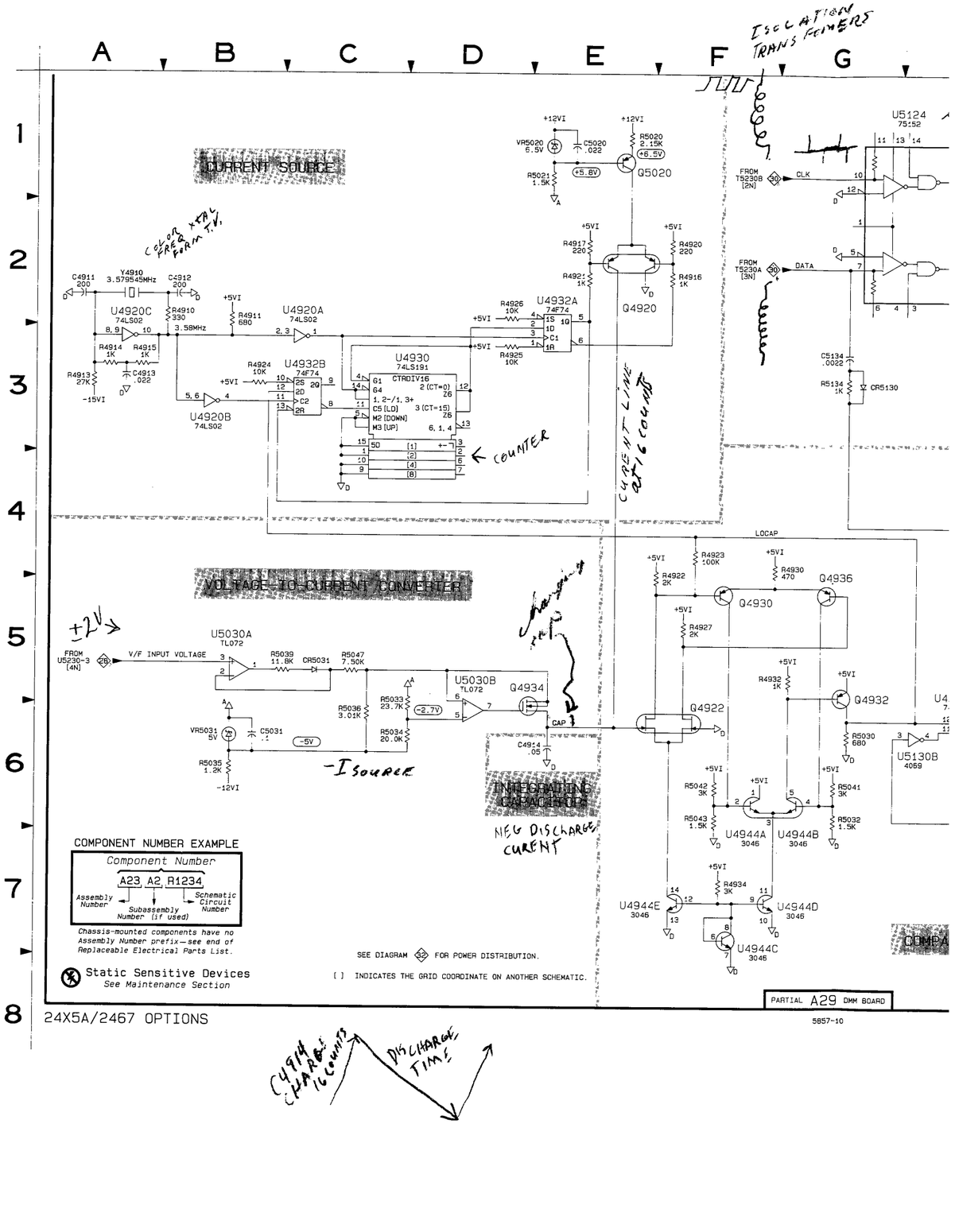
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DMM V/F CONVERTER AND DIGITAL CONTROL DIAGRAM 29

ASSEMBLY A29

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4911	2A	7K	R4910	2B	7J	R5017	5L	5K	U4932B	3C	6H
C4912	2B	7J	R4911	2B	7J	R5020	1E	5J	U4940	6K	7G
C4913	3A	6J	R4913	3A	6K	R5021	1E	5J	U4944A	6F	6G
C4914	6E	5K	R4914	3A	6J	R5030	6G	5H	U4944B	6G	6G
C5015	5L	5K	R4915	3A	6J	R5032	6G	5H	U4944C	7F	6G
C5020	1E	5J	R4916	2F	6J	R5033	5D	5H	U4944D	7F	6G
C5031	6B	5H	R4917	2E	6J	R5034	6D	5H	U4944E	7F	6G
C5122	2J	4J	R4920	2F	6J	R5035	6B	5H	U5010A	5L	5K
C5124	2H	3J	R4921	2E	6J	R5036	6C	5H	U5010B	4L	5K
C5130	2J	4H	R4922	4F	6J	R5039	5B	5H	U5030A	5B	5H
C5134	3G	3H	R4923	4F	6J	R5041	6G	5H	U5030B	5D	5H
			R4924	3B	6J	R5042	6F	5G	U5120	3K	4J
CR5030	2H	5H	R4925	3D	6J	R5043	6F	5G	U5122	1K	4J
CR5031	5C	5H	R4926	2D	6J	R5047	5C	5H	U5124	1G	3J
CR5130	3G	3H	R4927	5F	6J	R5122	1J	4J	U5130A	4L	4H
			R4930	4F	6J	R5124	2H	4J	U5130B	6H	4H
Q4920	2E	6J	R4932	5G	6H	R5130	2H	4H	U5130C	6L	4H
Q4922	6F	6J	R4934	7F	6H	R5132	4H	4H	U5130F	3L	4H
Q4930	5F	6H	R4950	1H	7G	R5133	4J	4H	U5132	2L	4H
Q4932	5G	6H	R4953	6J	7F	R5134	3G	3H			
Q4934	5D	6H	R4954	6L	7F				VR5020	1E	5J
Q4936	5G	6H	R4955	6L	7F	U4920B	3B	7J	VR5031	6B	5H
Q4950	6L	7F	R5010	5L	5K	U4920C	3A	7J			
Q5020	1E	5J	R5011	5L	5K	U4920D	6H	7J	Y4910	2A	7K
Q5124	2H	4J	R5015	4L	5K	U4930	3C	7H			
Q5130	6H	4H	R5016	5L	5K	U4932A	2E	6H			

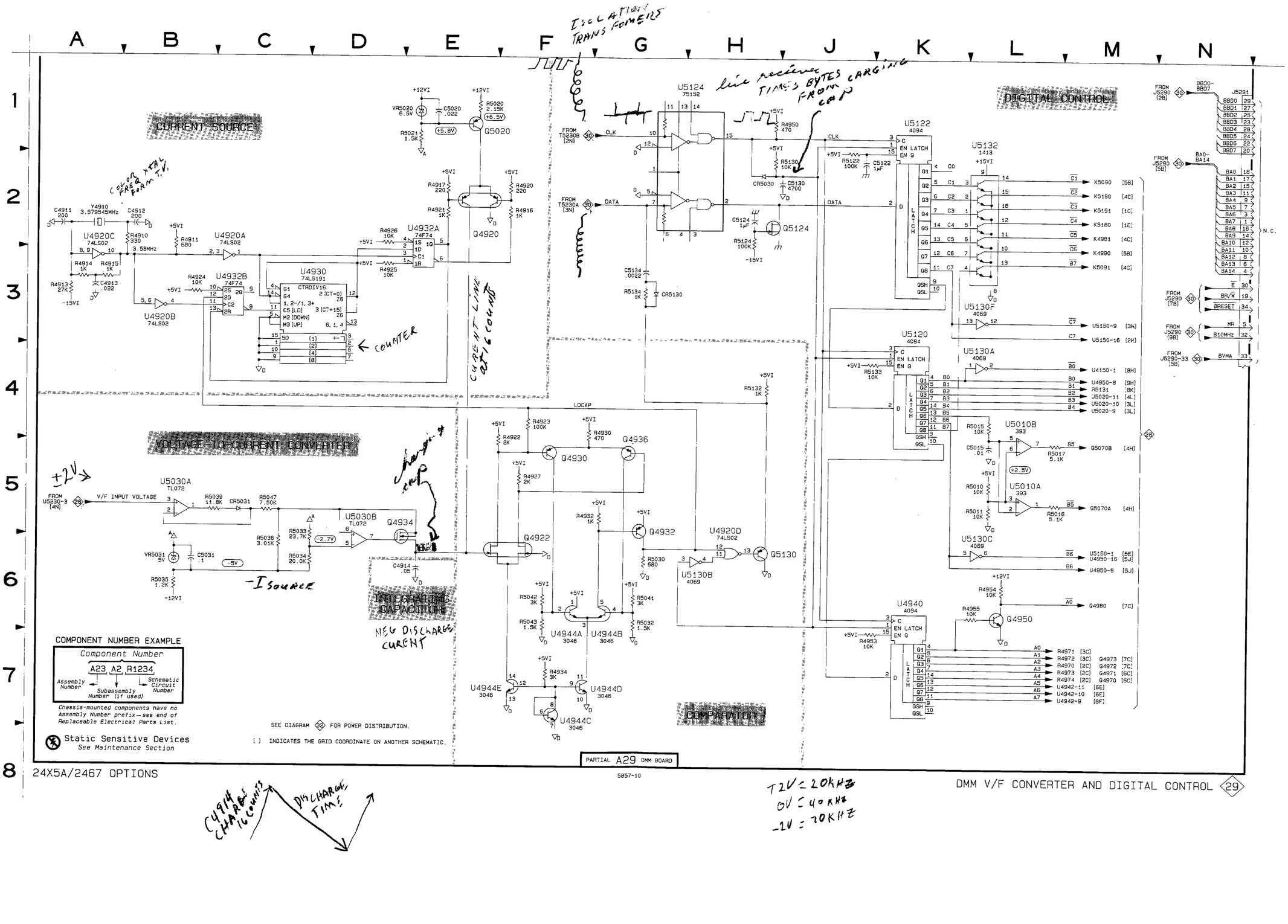
Partial A29 also shown on diagrams 28, 30 and 32.



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29

IT ER	SCHEM LOCATION	BOARD LOCATION
B	3C	6H
	6K	7G
A	6F	6G
B	6G	6G
C	7F	6G
D	7F	6G
E	7F	6G
A	5L	5K
B	4L	5K
A	5B	5H
B	5D	5H
	3K	4J
	1K	4J
	1G	3J
A	4L	4H
B	6H	4H
C	6L	4H
E	3L	4H
	2L	4H
D	1E	5J
1	6B	5H
	2A	7K



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DMM DIGITAL COUNTER AND PROCESSOR INTERFACE DIAGRAM 30

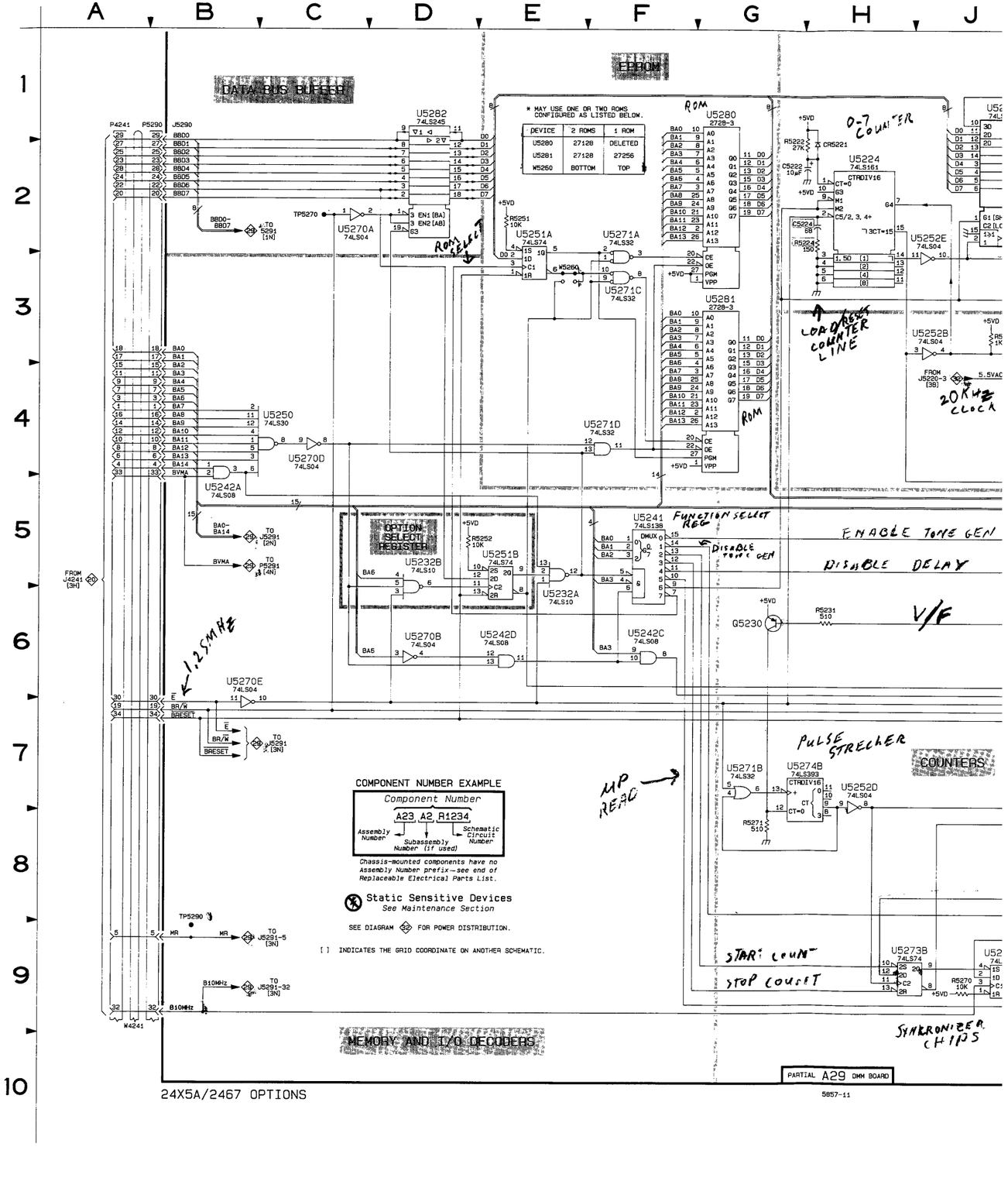
ASSEMBLY A29

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C5222	2H	2J	R5222	1H	2J	U5231	3K	2H	U5270B	6D	3E
C5224	2H	2J	R5224	2H	2J	U5232A	5E	1H	U5270D	4C	3E
C5232	4K	2K	R5230	3M	2H	U5232B	5D	1H	U5270E	6B	3E
			R5231	6H	2H	U5232C	4L	1H	U5271A	2F	3D
CR5210	3K	2K	R5232	3M	2H	U5240	1J	3G	U5271B	7G	3D
CR5211	4K	2K	R5233	4K	2K	U5241	5F	2G	U5271C	3F	3D
CR5212	8M	1K	R5251	2E	1F	U5242A	5B	1G	U5271D	4F	3D
CR5221	2H	1J	R5252	5D	1F	U5242B	3K	1G	U5272	6L	2D
			R5270	9J	1E	U5242C	6F	1G	U5273B	9H	1E
DS5210	3N	1K	R5271	8G	1D	U5242D	6E	1G	U5274A	9J	1D
						U5250	4C	3F	U5274B	7G	1D
J5210	7P	1K	T5230A	3N	3J	U5251A	2E	2F	U5274B	9K	1D
J5290	1B	2A	T5230B	2N	3J	U5251B	5E	2F	U5280	1G	3C
J5291	1B	2A				U5252A	4L	1F	U5281	3F	2C
			TP5270	2C	3E	U5252B	3J	1F	U5282	1D	1B
Q5210	8M	1K	TP5290	9B	3B	U5252C	4M	1F			
Q5230	6G	2H				U5252D	7H	1F	VR5210	8N	1K
			U5222A	4M	2J	U5252E	2J	1F			
R5210	8M	1K	U5222B	8M	2J	U5252F	8L	1F	W5260	3E	3F
R5211	4N	1K	U5224	2H	1J	U5260A	9M	2E			
R5220	4K	1J	U5230A	3K	2H	U5260B	8M	2E			
R5221	3J	1J	U5230B	3L	2H	U5270A	2C	3E			

Partial A29 also shown on diagrams 28, 29 and 32.

OTHER PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P4241	1A	CHASSIS	P5210	7P	CHASSIS	W4241	9A	CHASSIS			
P4300	7P	CHASSIS	P5290	1B	CHASSIS	W5210	8P	CHASSIS			

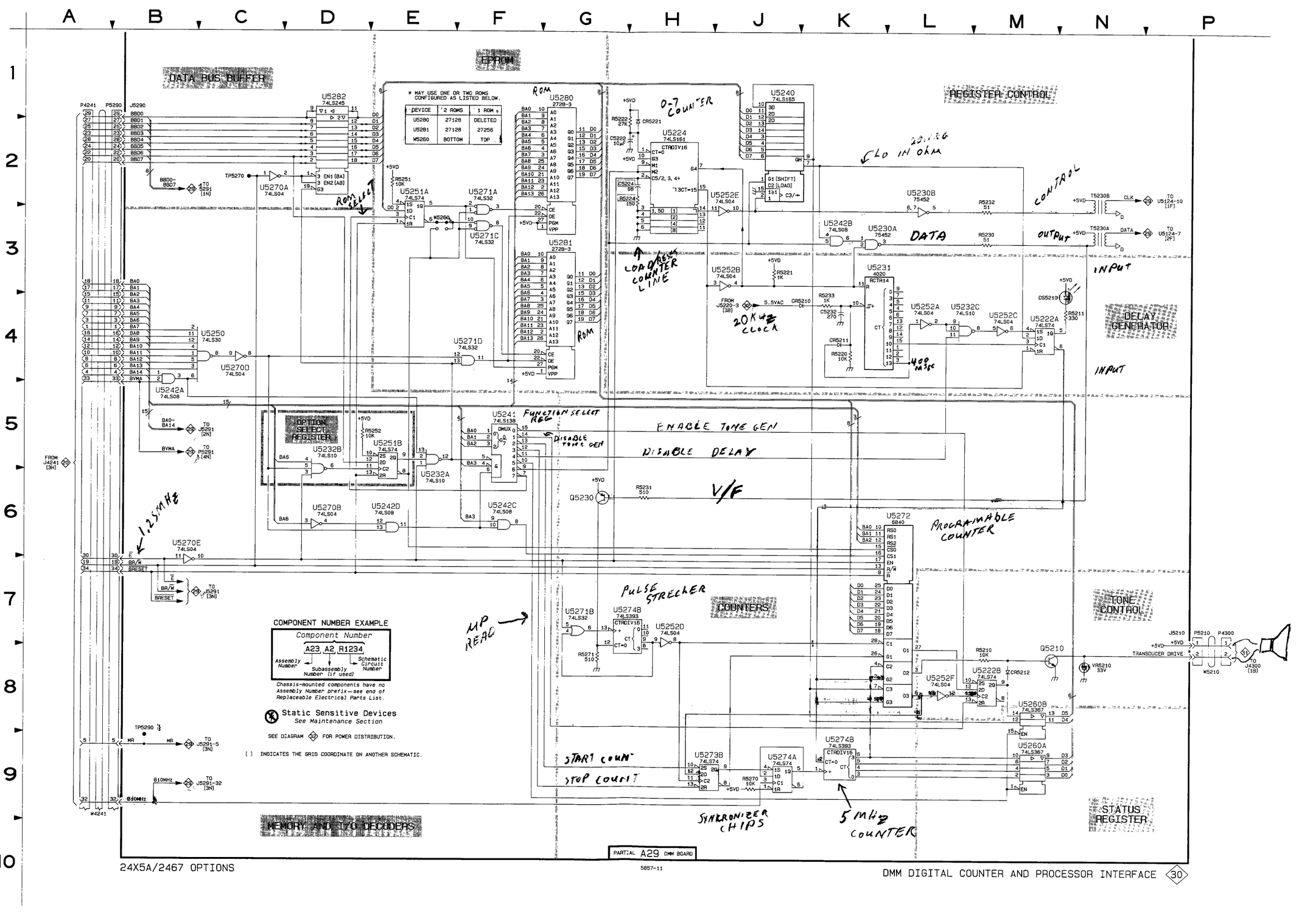


24X5A/2467 OPTIONS

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SCHEM LOCATION	BOARD LOCATION
6D	3E
4C	3E
6B	3E
2F	3D
7G	3D
3F	3D
4F	3D
6L	2D
9H	1E
9J	1D
7G	1D
9K	1D
1G	3C
3F	2C
1D	1B
8N	1K
3E	3F

SCHEM LOCATION	BOARD LOCATION



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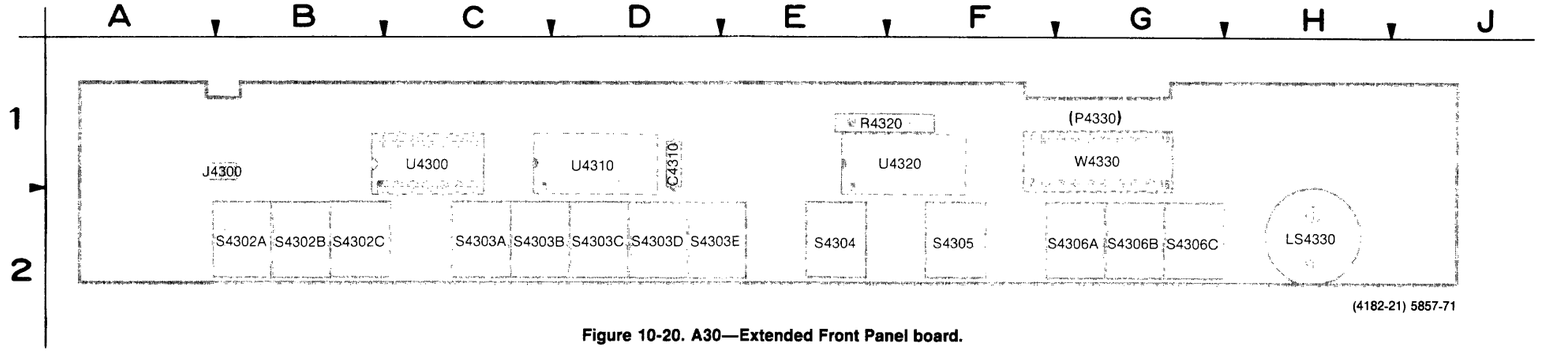
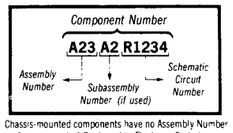


Figure 10-20. A30—Extended Front Panel board.

CIRCUIT NUMBER	SCHEM NUMBER
C4310	31
J4300	31

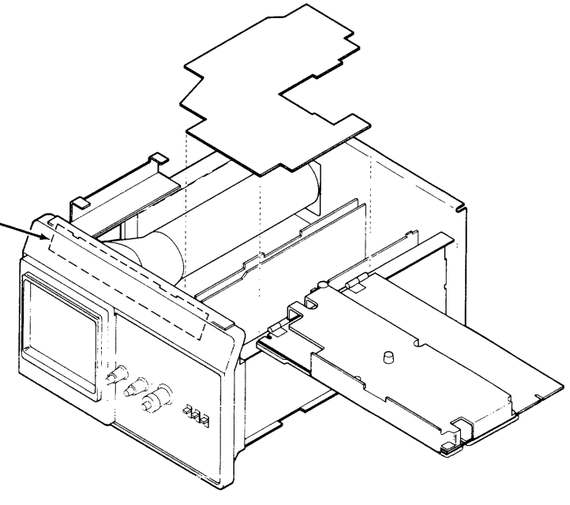
Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

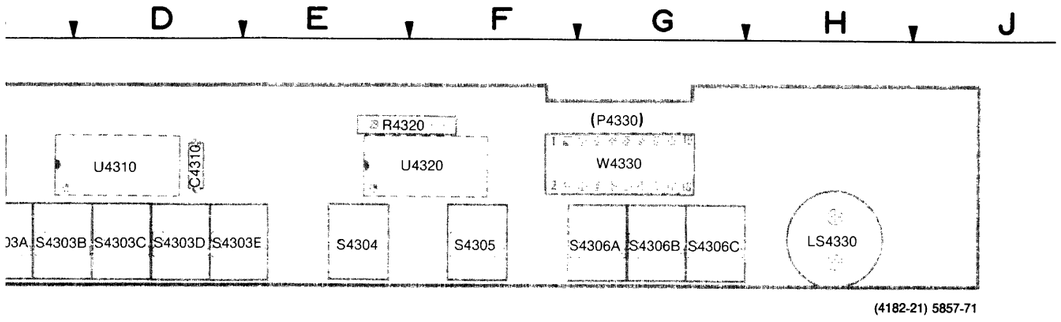


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List

A30—EXTENDED FRONT PANEL BOARD

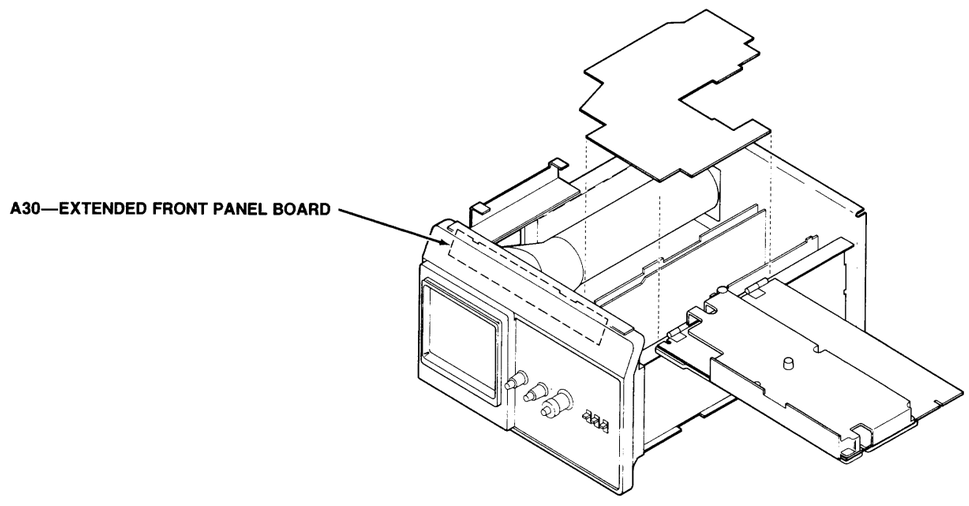


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Figure 10-20. A30—Extended Front Panel board.



A30—EXTENDED FRONT PANEL BOARD

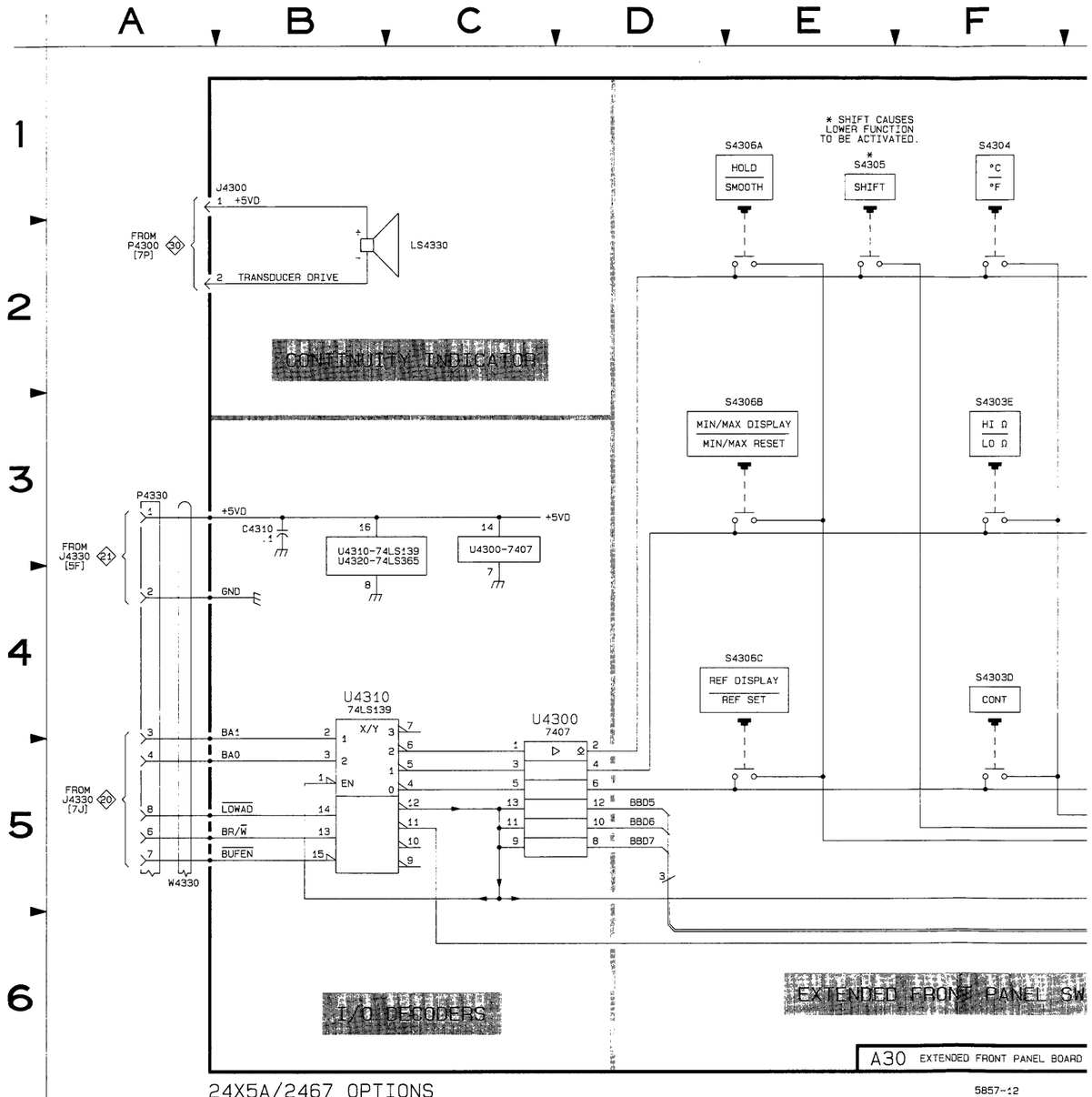
CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C4310	31	LS4330	31	R4320	31	S4304	31	U4300	31	W4330	31
J4300	31	P4330	31	S4302	31	S4305	31	U4310	31		
				S4303	31	S4306	31	U4320	31		

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DMM EXTENDED FRONT PANEL DIAGRAM 31

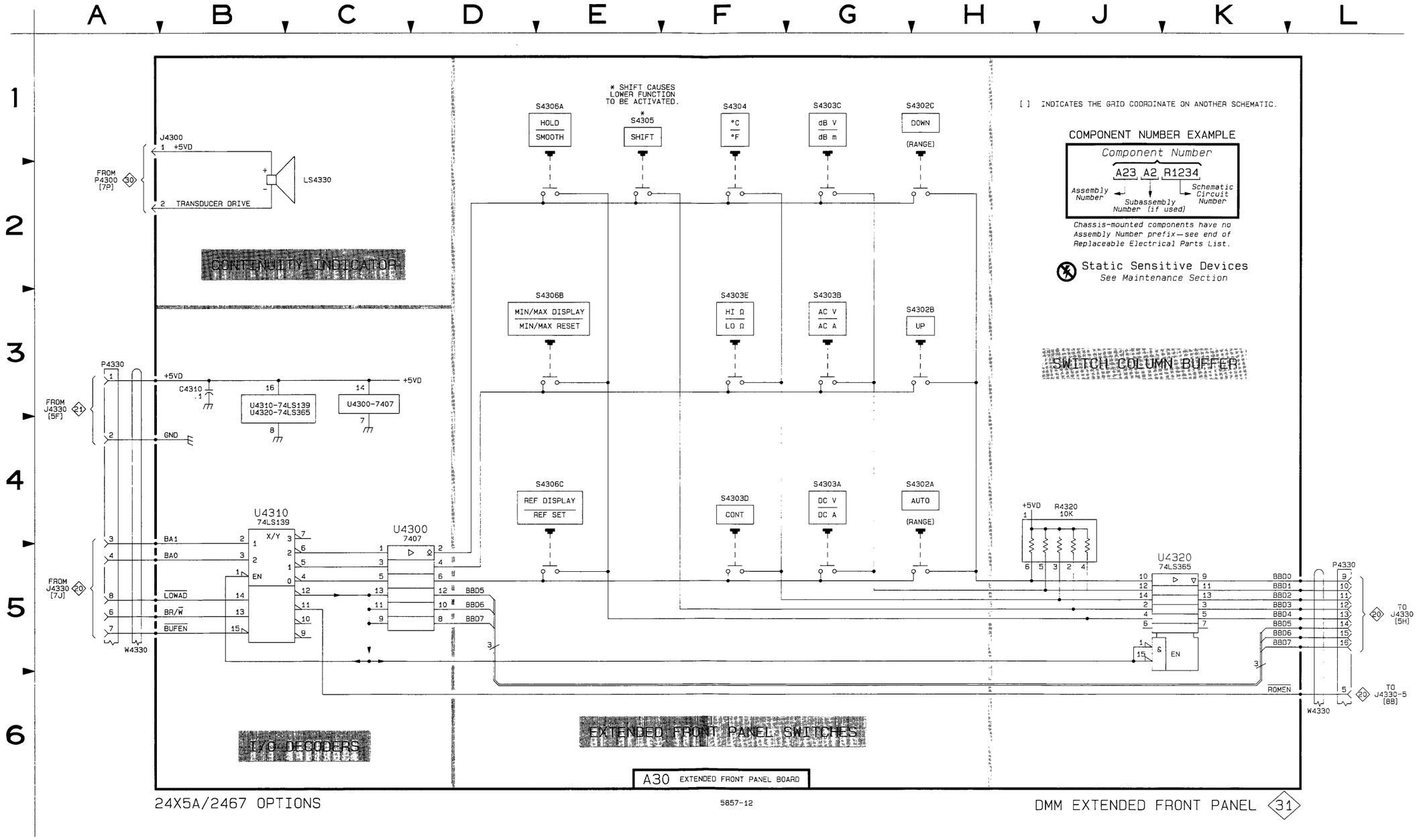
ASSEMBLY A30

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4310	3B	1D	R4320	4J	1E	S4303E	1H	2D	U4300	4C	1C
						S4303E	3F	2D	U4310	3B	1D
J4300	1B	1B	S4302A	4H	2B	S4304	1F	2E	U4310	4B	1D
			S4302B	3H	2B	S4305	1E	2F	U4320	3B	1F
LS4330	2C	2H	S4302C	2H	2B	S4306A	1E	2G	U4320	5K	1F
			S4303A	4G	2C	S4306B	3E	2G			
P4330	3A	1G	S4303B	3G	2C	S4306C	4E	2G	W4330	5A	1G
P4330	5L	1G	S4303C	1G	2D				W4330	6L	1G
			S4303D	4F	2D	U4300	3C	1C			



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CHEM CATION	BOARD LOCATION
4C	1C
3B	1D
4B	1D
3B	1F
5K	1F
5A	1G
6L	1G



[ ] INDICATES THE GRID COORDINATE ON ANOTHER SCHEMATIC.

COMPONENT NUMBER EXAMPLE

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

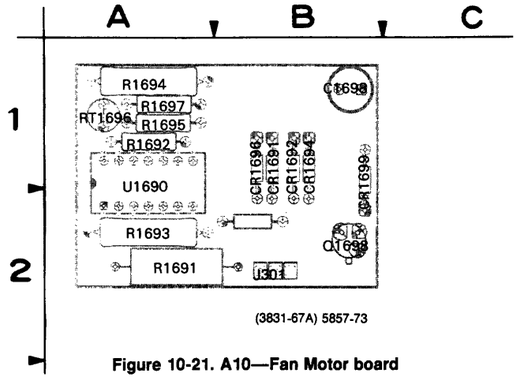
SWITCH COLUMN BUFFER

24X5A/2467 OPTIONS

5857-12

DMM EXTENDED FRONT PANEL 31

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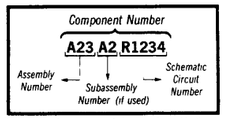


(3831-67A) 5857-73

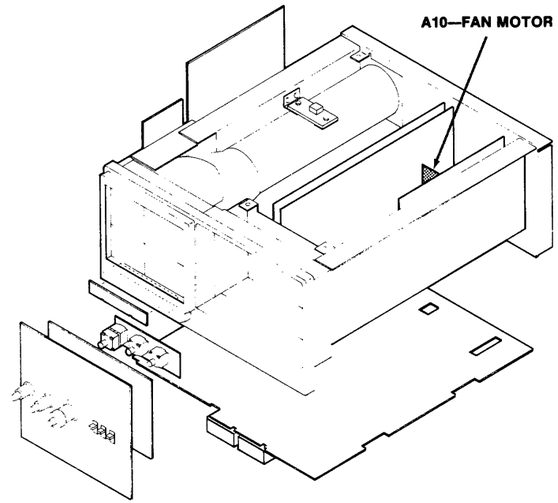
Figure 10-21. A10—Fan Motor board for Option 01 instruments.

Static Sensitive Devices
See Maintenance Section

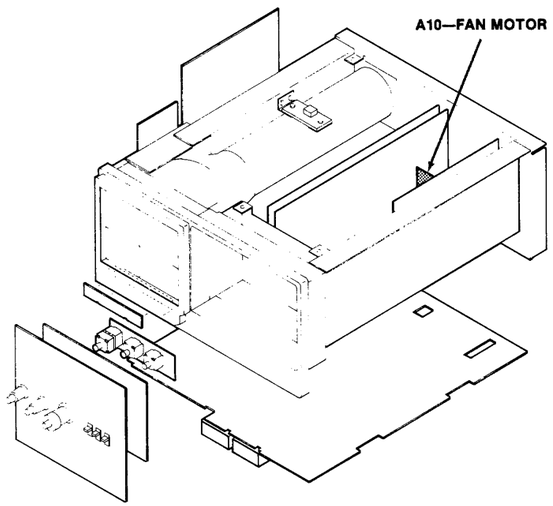
COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

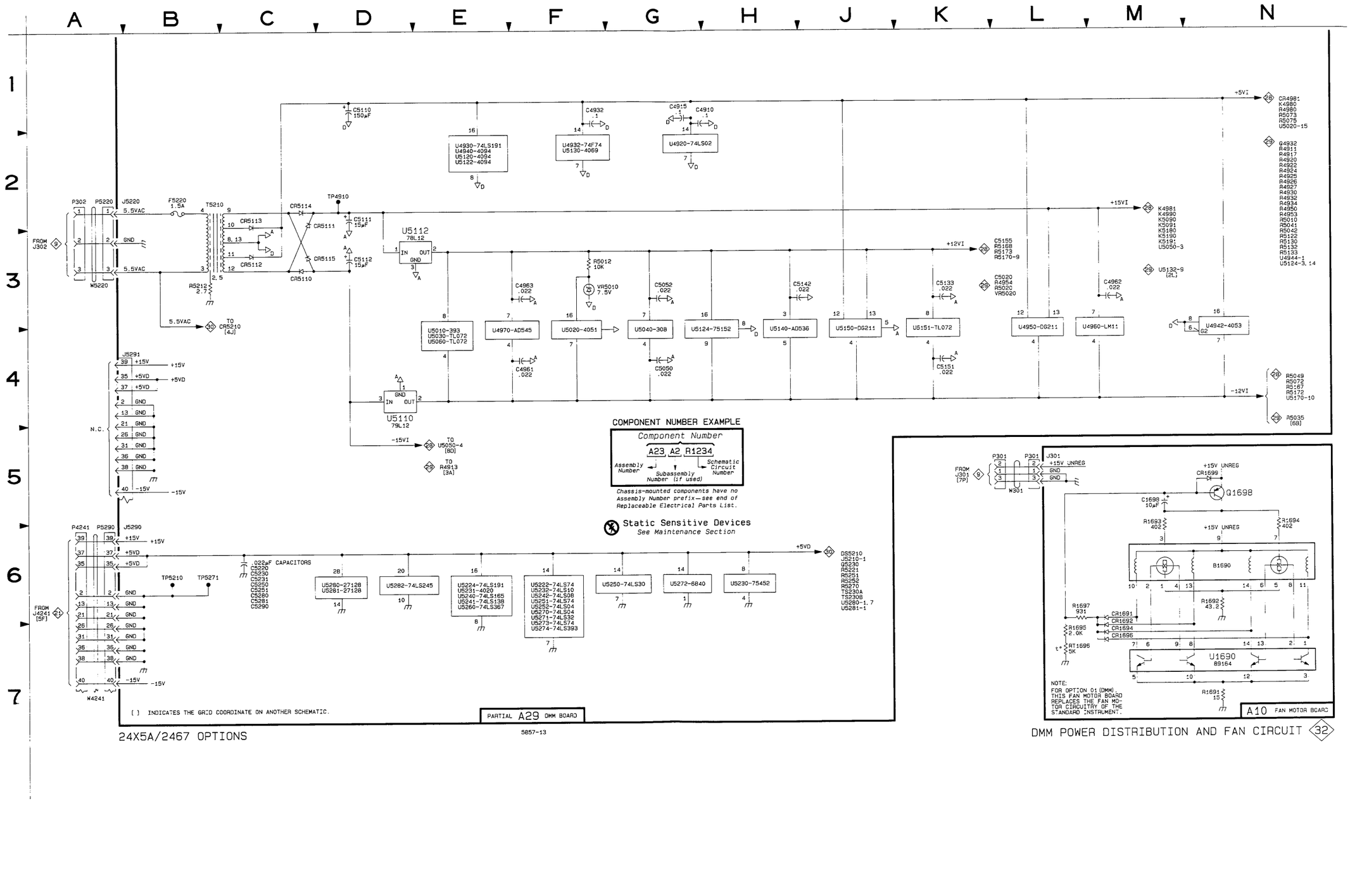


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A10—FAN MOTOR BOARD							
CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C1698	32	CR1699	32	R1691	32		
				R1692	32	RT1696	32
CR1691	32	J301	32	R1693	32		
CR1692	32			R1694	32	U1690	32
CR1694	32	Q1698	32	R1695	32		
CR1696	32			R1697	32		

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24X5A/2467 OPTIONS

DMM POWER DISTRIBUTION AND FAN CIRCUIT (32)

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DMM POWER DISTRIUBTION DIAGRAM 32

ASSEMBLY A10

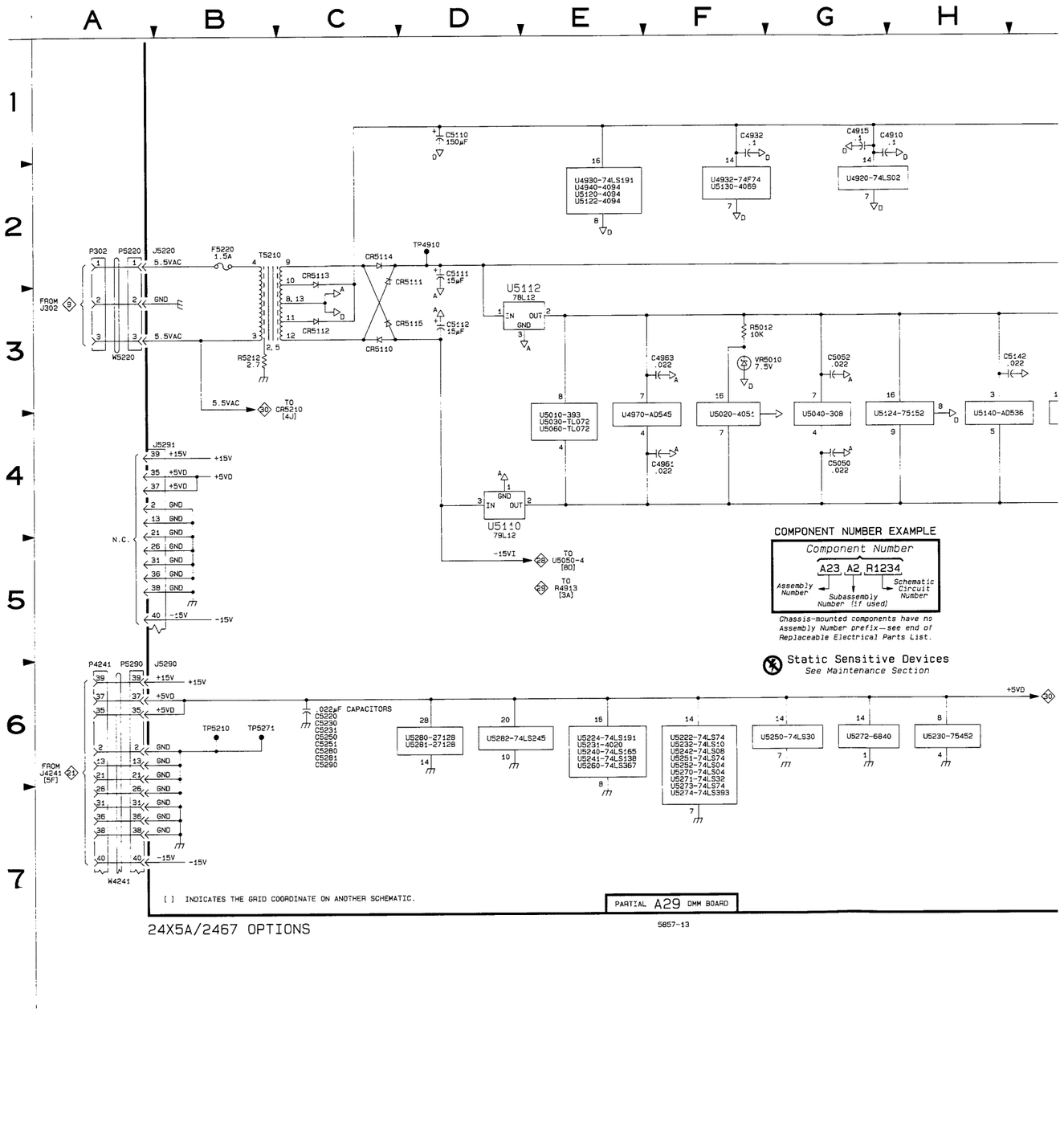
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C1698	5M	2B	J301	5L	2B	R1695	7L	1A
						R1697	6L	1A
CR1691	6M	2B	Q1698	5N	2B			
CR1692	7M	2B				RT1696	7L	1A
CR1694	7M	2B	R1691	7N	2A			
CR1696	7M	2B	R1692	6N	1A	U1690	7N	1A
CR1699	5N	2B	R1693	6M	2A			
			R1694	6N	1A			

ASSEMBLY A29

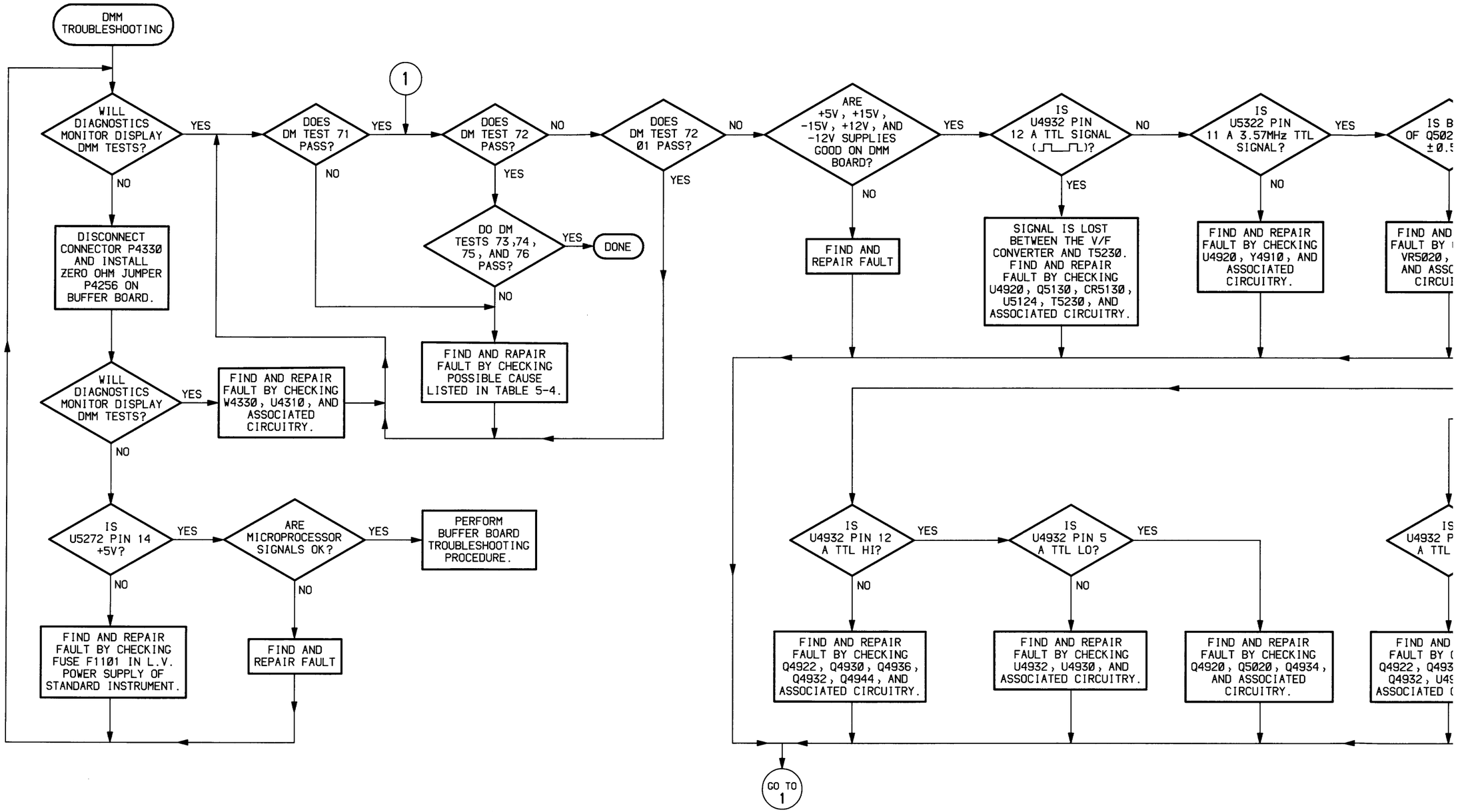
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C4910	1G	6K	J5220	2B	2J	U5130	2F	4H
C4915	1G	6J	J5290	6B	2A	U5140	4H	4G
C4932	1F	6H	J5291	5B	2A	U5150	4J	4F
C4961	4F	6F				U5151	4K	4F
C4962	3M	6F	R5012	3F	5J	U5222	6F	2J
C4963	3F	6F	R5212	3B	2K	U5224	6E	1J
C5050	4G	5G				U5230	6H	2H
C5052	3G	5G	T5210	2B	3K	U5231	6E	2H
C5142	3H	4G				U5232	6F	1H
C5151	4K	4G	TP5210	6B	2K	U5240	6E	3G
C5153	3K	4F	TP5271	6B	3E	U5241	6E	2G
C5220	6C	2J				U5242	6F	1G
C5230	6C	2H	U4920	2G	7J	U5250	6G	3F
C5231	6C	1H	U4930	2E	7H	U5251	6F	2F
C5250	6C	3G	U4932	2F	6H	U5252	6F	1F
C5251	6C	2F	U4940	2E	7G	U5260	6E	2E
C5280	6C	3D	U4942	4N	6G	U5270	6F	3E
C5281	6C	1C	U4950	4L	6F	U5271	6F	3D
C5290	6C	3B	U4960	4M	6E	U5272	6G	2D
			U4970	4E	5E	U5273	7F	1E
CR5110	3C	4K	U5010	4E	5K	U5274	7F	1D
CR5111	2C	4K	U5020	4F	5J			
CR5112	3C	4K	U5030	4E	5H	VR5010	3F	5K
CR5113	2C	4K	U5040	4G	5G			
CR5114	2C	4J	U5060	4E	5F			
CR5115	3C	4J	U5120	2E	4J			
			U5122	2E	4J			
F5220	2B	2J	U5124	4G	3J			

OTHER PARTS

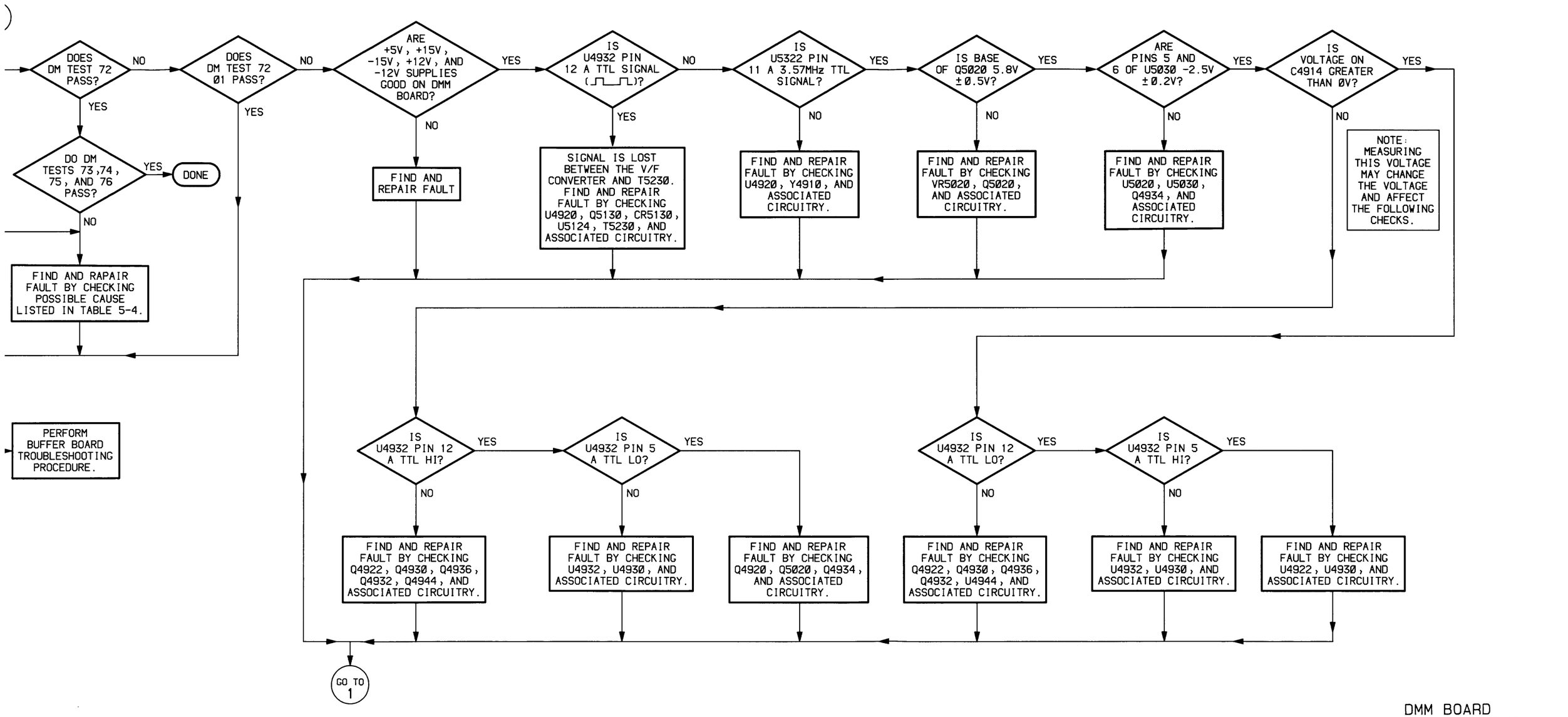
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
B1690	6N	CHASSIS	P4241	6A	CHASSIS	W301	5L	CHASSIS
			P5220	2A	CHASSIS	W4241	7A	CHASSIS
P301	5L	CHASSIS	P5290	6A	CHASSIS	W5220	3A	CHASSIS
P302	2A	CHASSIS						



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DMM BOARD TROUBLESHOOTING PROCEDURE

4682-13

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J/P100		A1 TO A20
Pin	Line Name	Schem
1	GND	4,21
2	CH2 PO	4,21

J/P101		A1 TO A20
Pin	Line Name	Schem
1	TSA	5,21
2	GND	5,21
3	TSA	5,21
4	GND	5,21
5	GND	5,21
6	TSB	5,21
7	GND	5,21
8	TSB	5,21
9	GND	5,21
10	NO PIN	5,21

J/P102		A1 TO A20
Pin	Line Name	Schem
1	BHO	5,21
2	GND	5,21
3	A AUX TRG	5,21
4	GND	5,21
5	AHO	5,21
6	NO PIN	5,21
7	GND	5,21
8	B AUX TRG	5,21
9	GND	5,21
10	DS	5,21

J/P/W301 (DMM Option only)		A3 TO A10
Pin	Line Name	Schem
1	GND	32
2	+15V UNREG	32
3	GND	32

J/P500		A5 TO A20
Pin	Line Name	Schem
1	A7	1,20
2	A15	1,20
3	A6	1,20
4	A14	1,20
5	MR	1,20
6	A13	1,20
7	A5	1,20
8	A12	1,20
9	A4	1,20
10	A11	1,20
11	A3	1,20
12	A10	1,20
13	GND C	1,20
14	A9	1,20
15	A2	1,20
16	A8	1,20
17	A1	1,20
18	A0	1,20
19	R/W	1,20
20	BD7	1,20
21	GND C	1,20
22	BD6	1,20
23	BD3	1,20
24	BD5	1,20
25	BD2	1,20
26	GND C	1,20
27	BD1	1,20
28	BD4	1,20
29	BD0	1,20
30	E	1,20
31	GND C	1,20
32	10MHZ	1,20
33	VMA	1,20
34	RESET	1,20

J/P/W4210		A5 TO A20
Pin	Line Name	Schem
1	A7	20
2	A15	20
3	A6	20
4	A14	20
5	MR	20
6	A13	20
7	A5	20
8	A12	20
9	A4	20
10	A11	20
11	A3	20
12	A10	20
13	GND C	20
14	A9	20
15	A2	20
16	A8	20
17	A1	20
18	A0	20
19	R/W	20
20	BD7	20
21	GND C	20
22	BD6	20
23	BD3	20
24	BD5	20
25	BD2	20
26	GND C	20
27	BD1	20
28	BD4	20
29	BD0	20
30	E	20
31	GND C	20
32	10MHZ	20
33	VMA	20
34	RESET	20

J/P4220		A20 TO A25
Pin	Line Name	Schem
1	DS	21,24
2	GND	21,24
3	GND	21,24
4	AHO	21,24
5	A AUX TRG	21,24
6	GND	21,24
7	GND	21,24
8	CH2 PO	21,23
9	SSA	21,23
10	GND	21,24
11	GND	21,24
12	GND	21,24
13	GND	21,24
14	CH2 OFFSET	21,23

J/P4221		A20 TO A27
Pin	Line Name	Schem
1	GND	21,26
2	TSA	21,25
3	TSA	21,25
4	GND	21,26
5	TSB	21,25
6	GND	21,26
7	GND	21,26
8	TSB	21,25
9	GND	21,26
10	GND	21,26
11	SGB	21,25
12	GND	21,26
13	GND	21,26
14	SGA	21,25
15	GND	21,26
16	B AUX TRG	21,25
17	DS	21,25
18	GN	21,26
19	GND	21,26
20	AHO	21,25
21	A AUX TRG	21,25
22	GND	21,26
23	GND	21,26
24	BHO	21,25

J4230	
Pin	Line N
1	NC
2	NC
3	NC
4	NC
5	NC
6	NC
7	GND
8	NC
9	CH2 PO
10	NC

P4230	
Pin	Line N
1	GND
2	CH2 PO

J/P/W4232	
Pin	Line N
1	BHO
2	GND
3	A AUX
4	GND
5	AHO
6	GND
7	GND
8	B AUX
9	GND
10	DS

J/P/W4236	
Pin	Line N
1	TSA
2	GND
3	TSA
4	GND
5	GND
6	TSB
7	GND
8	TSB
9	GND
10	NO PIN

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J/P/W4210		A5 TO A20
Pin	Line Name	Schem
1	A7	20
2	A15	20
3	A6	20
4	A14	20
5	MR	20
6	A13	20
7	A5	20
8	A12	20
9	A4	20
10	A11	20
11	A3	20
12	A10	20
13	GND C	20
14	A9	20
15	A2	20
16	A8	20
17	A1	20
18	A0	20
19	R/W	20
20	BD7	20
21	GND C	20
22	BD6	20
23	BD3	20
24	BD5	20
25	BD2	20
26	GND C	20
27	BD1	20
28	BD4	20
29	BD0	20
30	E	20
31	GND C	20
32	10MHZ	20
33	VMA	20
34	RESET	20

J/P4220		A20 TO A25
Pin	Line Name	Schem
1	DS	21,24
2	GND	21,24
3	GND	21,24
4	AHO	21,24
5	A AUX TRG	21,24
6	GND	21,24
7	GND	21,24
8	CH2 PO	21,23
9	SSA	21,23
10	GND	21,24
11	GND	21,24
12	GND	21,24
13	GND	21,24
14	CH2 OFFSET	21,23

J/P4221		A20 TO A27
Pin	Line Name	Schem
1	GND	21,26
2	TSA	21,25
3	TSA	21,25
4	GND	21,26
5	TSB	21,25
6	GND	21,26
7	GND	21,26
8	TSB	21,25
9	GND	21,26
10	GND	21,26
11	SGB	21,25
12	GND	21,26
13	GND	21,26
14	SGA	21,25
15	GND	21,26
16	B AUX TRG	21,25
17	DS	21,25
18	GN	21,26
19	GND	21,26
20	AHO	21,25
21	A AUX TRG	21,25
22	GND	21,26
23	GND	21,26
24	BHO	21,25

J4230		A1 TO A20
Pin	Line Name	Schem
1	NC	21
2	NC	21
3	NC	21
4	NC	21
5	NC	21
6	NC	21
7	GND	21
8	NC	21
9	CH2 PO	21
10	NC	21

P4230		A1 TO A20
Pin	Line Name	Schem
1	GND	21
2	CH2 PO	21

J/P/W4232		A20 TO A1
Pin	Line Name	Schem
1	BHO	21
2	GND	21
3	A AUX TRG	21
4	GND	21
5	AHO	21
6	GND	21
7	GND	21
8	B AUX TRG	21
9	GND	21
10	DS	21

J/P/W4236		A1 TO A20
Pin	Line Name	Schem
1	TSA	21
2	GND	21
3	TSA	21
4	GND	21
5	GND	21
6	TSB	21
7	GND	21
8	TSB	21
9	GND	21
10	NO PIN	21

J/P4240		A20 TO A27
Pin	Line Name	Schem
1	BA7	20,25
2	GND	21,26
3	BA6	20,25
4	BA14	20,25
5	MR	20,25
6	BA13	20,25
7	BA5	20,25
8	BA12	20,25
9	BA4	20,25
10	BA11	20,25
11	BA3	20,25
12	BA10	20,25
13	GND	21,26
14	BA9	20,25
15	BA2	20,25
16	BA8	20,25
17	BA1	20,25
18	BA0	20,25
19	BR/W	20,25
20	BBD7	20,25
21	GND	21,26
22	BBD6	20,25
23	BBD3	20,25
24	BBD5	20,25
25	BBD2	20,25
26	GND	21,26
27	BBD1	20,25
28	BBD4	20,25
29	BBD0	20,25
30	E	20,25
31	GND	21,26
32	B10MHZ	20,25
33	BVMA	20,25
34	BRESET	20,25
35	$+5V_D$	21,26
36	GND	21,26
37	$+5V_D$	21,26
38	GND	21,26
39	+15V	21,26
40	−15V	21,26
41	+42V	21,26
42	+5V	21,26
43	−5V	21,26
44	GND	21,26

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J/P/W4241 A20 TO A29

Pin	Line Name	Schem
1	BA7	20,30
2	GND	21,32
3	BA6	20,30
4	BA14	20,30
5	MR	20,30
6	BA13	20,30
7	BA5	20,30
8	BA12	20,30
9	BA4	20,30
10	BA11	20,30
11	BA3	20,30
12	BA10	20,30
13	GND	21,32
14	BA9	20,30
15	BA2	20,30
16	BA8	20,30
17	BA1	20,30
18	BA0	20,30
19	BR/W	20,30
20	BBD7	20,30
21	GND	21,32
22	BBD6	20,30
23	BBD3	20,30
24	BBD5	20,30
25	BBD2	20,30
26	GND	21,32
27	BBD1	20,30
28	BBD4	20,30
29	BBD0	20,30
30	E	20,30
31	GND	21,32
32	B10MHZ	21,30
33	BVMA	21,30
34	BRESET	21,30
35	$+5V_D$	21,32
36	GND	21,32
37	$+5V_D$	21,32
38	GND	21,32
39	+15V	21,32
40	−15V	21,32

J/P4242 A20 TO A25

Pin	Line Name	Schem
1	BA7	20,24
2	GND	21,24
3	BA6	20,24
4	BA14	20,24
5	MR	20,24
6	BA13	20,24
7	BA5	20,24
8	BA12	20,24
9	BA4	20,24
10	BA11	20,24
11	BA3	20,24
12	BA10	20,24
13	GND	21,24
14	BA9	20,24
15	BA2	20,24
16	BA8	20,24
17	BA1	20,24
18	BA0	20,24
19	BR/W	20,24
20	BBD7	20,24
21	GND	21,24
22	BBD6	20,24
23	BBD3	20,24
24	BBD5	20,24
25	BBD2	20,24
26	GND	21,24
27	BBD1	20,24
28	BBD4	20,24
29	BBD0	20,24
30	E	20,24
31	GND	21,24
32	B10MHZ	20,24
33	BVMA	20,24
34	BRESET	20,24
35	$+5V_D$	21,24
36	GND	21,24
37	$+5V_D$	21,24
38	GND	21,24
39	+15V	21,24
40	−15V	21,24
41	FLD2	21,24
42	FLD1	21,24
43	LINES	21,24
44	GND	21,24

J/P4243 A20 TO A23

Pin	Line Name	Schem
1	BA7	20,22
2	GND	21,22
3	BA6	20,22
4	BA14	20,22
5	MR	20,22
6	BA13	20,22
7	BA5	20,22
8	BA12	20,22
9	BA4	20,22
10	BA11	20,25
11	BA3	20,22
12	BA10	20,22
13	GND G	21,22
14	BA9	20,22
15	BA2	20,22
16	BA8	20,22
17	BA1	20,22
18	BA0	20,22
19	BR/W	20,22
20	BBD7	20,22
21	GND G	21,22
22	BBD6	20,22
23	BBD3	20,22
24	BBD5	20,22
25	BBD2	20,22
26	GND G	21,22
27	BBD1	20,22
28	BBD4	20,22
29	BBD0	20,22
30	E	20,22
31	GND G	21,22
32	B10MHZ	20,22
33	BVMA	20,22
34	BRESET	20,22
35	$+5V_D$	21,22
36	GND G	21,22
37	$+5V_D$	21,22
38	GND G	21,22
39	+15V	21,22
40	−15V	21,22
41	+42V	21,22
42	+5V	21,22
43	−5V	21,22
44	GND	21,22

J/P4330 A20 TO A30

Pin	Line Name	Schem
1	$+5V_D$	21,31
2	GND	21,31
3	BA1	20,31
4	BA0	20,31
5	ROMEN	20,31
6	BR/W	20,31
7	BUFEN	20,31
8	LOWAD	20,31
9	BBD0	20,31
10	BBD1	20,31
11	BBD2	20,31
12	BBD3	20,31
13	BBD4	20,31
14	BBD5	20,31
15	BBD6	20,31
16	BBD7	20,31

J/P4800 A23 TO GPIB CONNECTOR

Pin	Line Name	Schem
1	DIO1	22
2	DIO5	22
3	DIO2	22
4	DIO6	22
5	DIO3	22
6	DIO7	22
7	DIO4	22
8	DIO8	22
9	EOI	22
10	REN	22
11	DAV	22
12	GND G	22
13	NRFD	22
14	GND G	22
15	NDAC	22
16	GND G	22
17	IFC	22
18	GND G	22
19	SRQ	22
20	GND G	22
21	ATN	22
22	GND G	22
23	GND	22
24	GND G	22

J/P5290

Pin	Line
1	BA7
2	GND
3	BA6
4	BA14
5	MR
6	BA13
7	BA5
8	BA12
9	BA4
10	BA11
11	BA3
12	BA10
13	GND
14	BA9
15	BA2
16	BA8
17	BA1
18	BA0
19	BR/W
20	BBD7
21	GND
22	BBD6
23	BBD3
24	BBD5
25	BBD2
26	GND
27	BBD1
28	BBD4
29	BBD0
30	E
31	GND
32	B10MH
33	BVMA
34	BRESE
35	$+5V_D$
36	GND
37	$+5V_D$
38	GND
39	+15V
40	−15V

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	A20 TO A25
	Schem
	20,24
	21,24
	20,24
	20,24
	20,24
	20,24
	20,24
	20,24
	20,24
	20,24
	20,24
	20,24
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	21,24
	21,24
	21,24

J/P4243		A20 TO A23
Pin	Line Name	Schem
1	BA7	20,22
2	GND	21,22
3	BA6	20,22
4	BA14	20,22
5	MR	20,22
6	BA13	20,22
7	BA5	20,22
8	BA12	20,22
9	BA4	20,22
10	BA11	20,25
11	BA3	20,22
12	BA10	20,22
13	GND G	21,22
14	BA9	20,22
15	BA2	20,22
16	BA8	20,22
17	BA1	20,22
18	BA0	20,22
19	BR/W	20,22
20	BBD7	20,22
21	GND G	21,22
22	BBD6	20,22
23	BBD3	20,22
24	BBD5	20,22
25	BBD2	20,22
26	GND G	21,22
27	BBD1	20,22
28	BBD4	20,22
29	BBD0	20,22
30	E	20,22
31	GND G	21,22
32	B10MHZ	20,22
33	BVMA	20,22
34	BRESET	20,22
35	$+5V_D$	21,22
36	GND G	21,22
37	$+5V_D$	21,22
38	GND G	21,22
39	+15V	21,22
40	−15V	21,22
41	+42V	21,22
42	+5V	21,22
43	−5V	21,22
44	GND	21,22

J/P4330		A20 TO A30
Pin	Line Name	Schem
1	$+5V_D$	21,31
2	GND	21,31
3	BA1	20,31
4	BA0	20,31
5	ROMEN	20,31
6	BR/W	20,31
7	BUFEN	20,31
8	LOWAD	20,31
9	BBD0	20,31
10	BBD1	20,31
11	BBD2	20,31
12	BBD3	20,31
13	BBD4	20,31
14	BBD5	20,31
15	BBD6	20,31
16	BBD7	20,31

J/P4800	A23 TO GPIB CONNECTOR	
Pin	Line Name	Schem
1	DIO1	22
2	DIO5	22
3	DIO2	22
4	DIO6	22
5	DIO3	22
6	DIO7	22
7	DIO4	22
8	DIO8	22
9	EOI	22
10	REN	22
11	DAV	22
12	GND G	22
13	NRFD	22
14	GND G	22
15	NDAC	22
16	GND G	22
17	IFC	22
18	GND G	22
19	SRQ	22
20	GND G	22
21	ATN	22
22	GND G	22
23	GND	22
24	GND G	22

J/P5290		A20 TO A29
Pin	Line Name	Schem
1	BA7	30
2	GND	32
3	BA6	30
4	BA14	30
5	MR	30
6	BA13	30
7	BA5	30
8	BA12	30
9	BA4	30
10	BA11	30
11	BA3	30
12	BA10	30
13	GND	32
14	BA9	30
15	BA2	30
16	BA8	30
17	BA1	30
18	BA0	30
19	BR/W	30
20	BBD7	30
21	GND	32
22	BBD6	30
23	BBD3	30
24	BBD5	30
25	BBD2	30
26	GND	32
27	BBD1	30
28	BBD4	30
29	BBD0	30
30	E	30
31	GND	32
32	B10MHZ	30
33	BVMA	30
34	BRESET	30
35	$+5V_D$	32
36	GND	32
37	$+5V_D$	32
38	GND	32
39	+15V	32
40	−15V	32

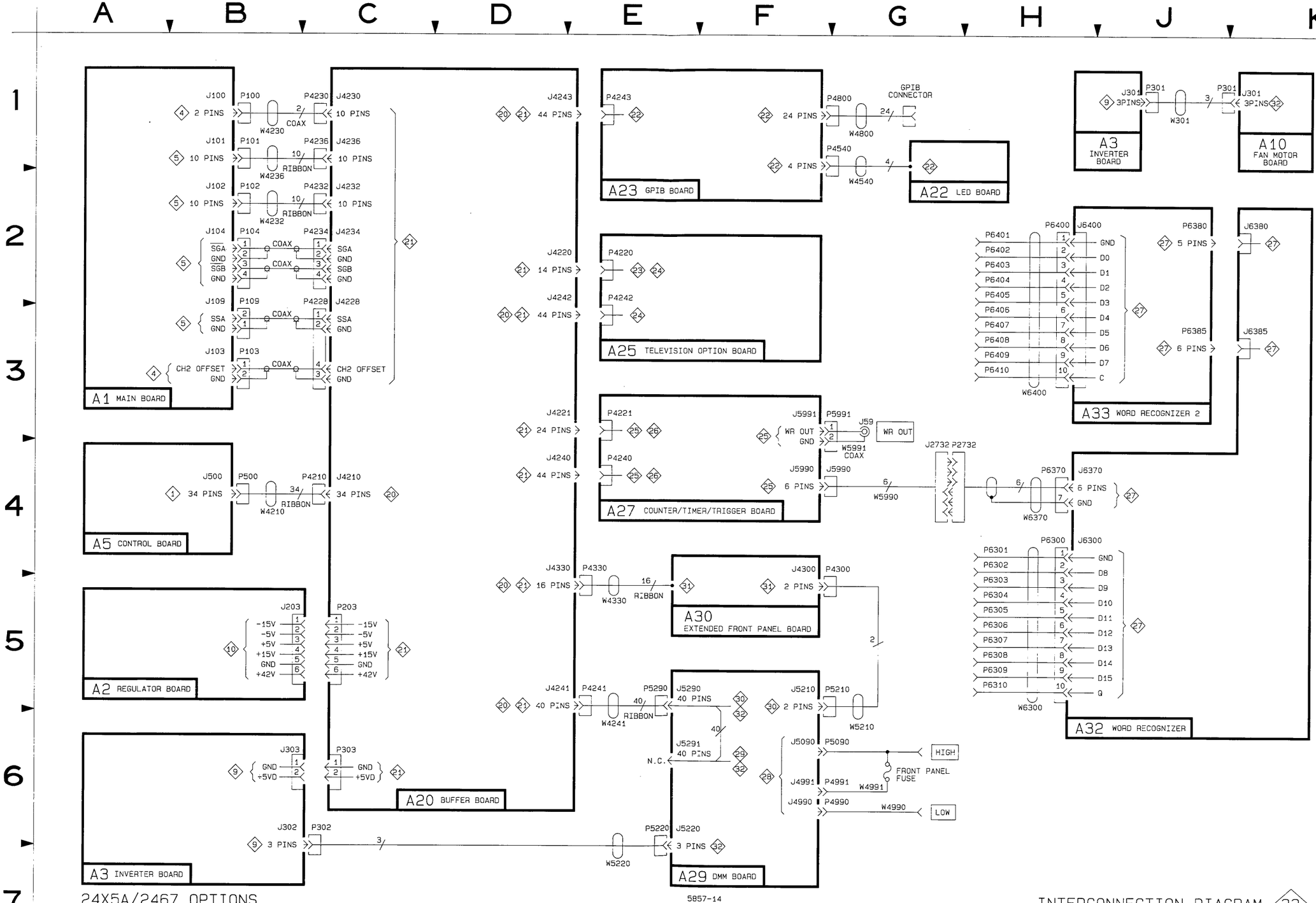
J/P/W5990	A27 TO WORD RECOGNIZER CONNECTOR	
Pin	Line Name	Schem
1	WORD	25,27
2	WDATA	25,27
3	WCLOCK	25,27
4	GND	25,27
5	$+5V_W$	25,27
6	DATA RETURN	25,27

J/P/W6370	WORD RECOGNIZER CONNECTOR TO A32	
Pin	Line Name	Schem
1	WORD	27
2	WDATA	27
3	WCLOCK	27
4	GND	27
5	$+5V_W$	27
6	DATA RETURN	27
7	GND	27

J/P6380	A32 TO A33	
Pin	Line Name	Schem
1	$+5V_W$	27
2	WCLOCK	27
3	SYNCH	27
4	GATED CLOCK	27
5	GND	27

J/P6385	A32 TO A33	
Pin	Line Name	Schem
1	GND	27
2	LOWBYTEEQUAL	27
3	SERIAL DATA	27
4	GATED Q	27
5	Q DONT CARE	27
6	DATA RETURN	27

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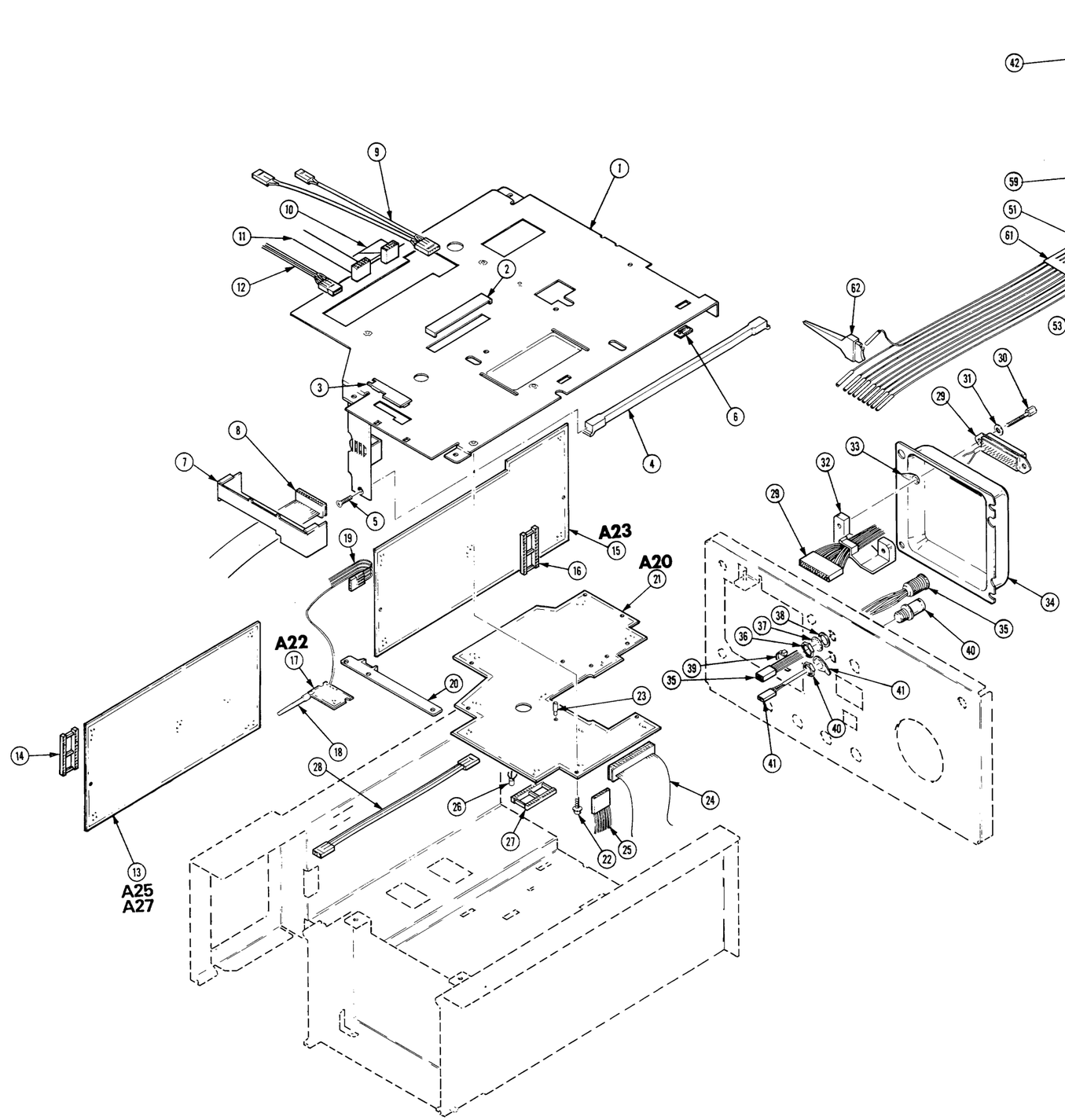


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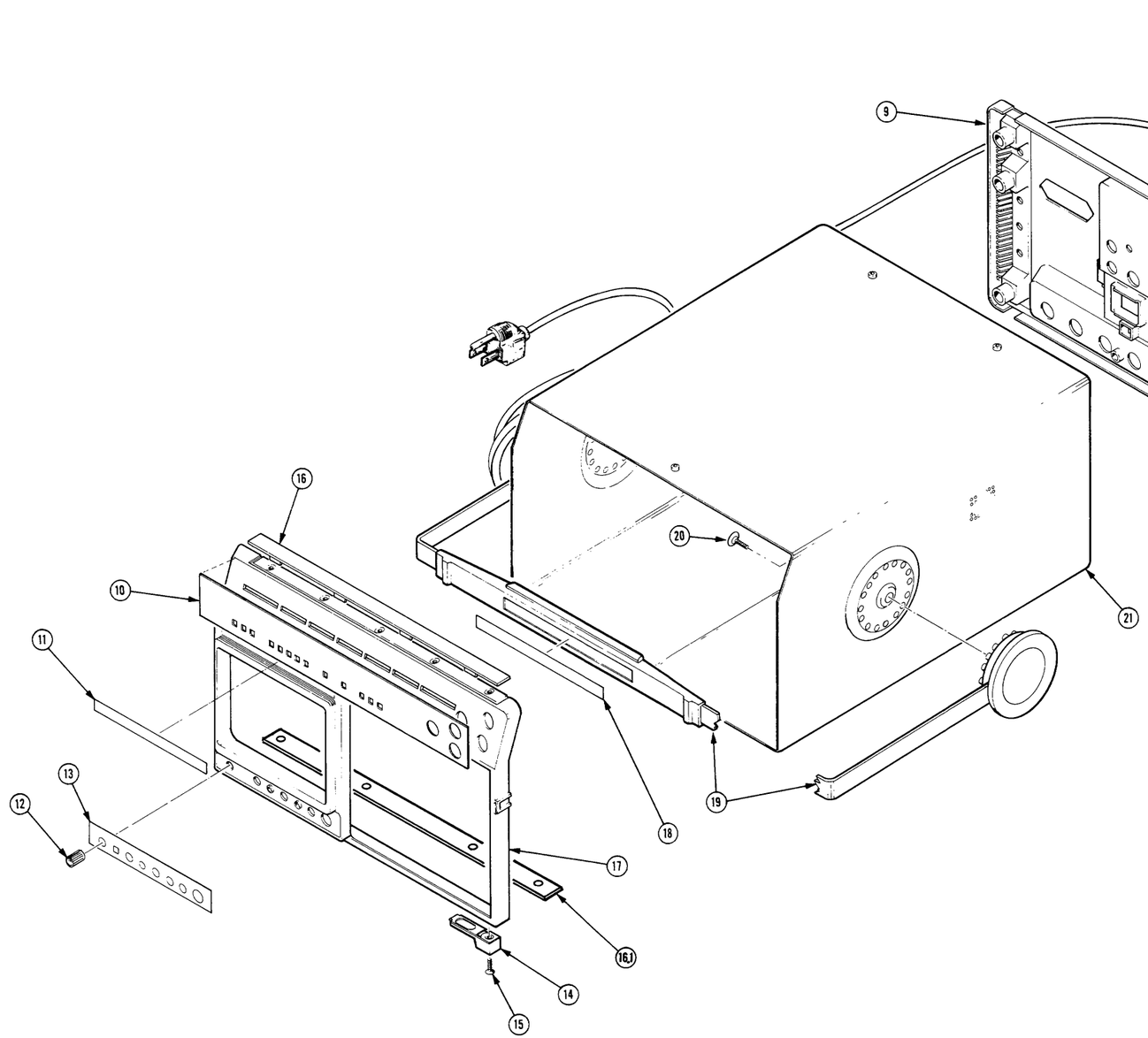
INTERCONNECTION DIAGRAM 33

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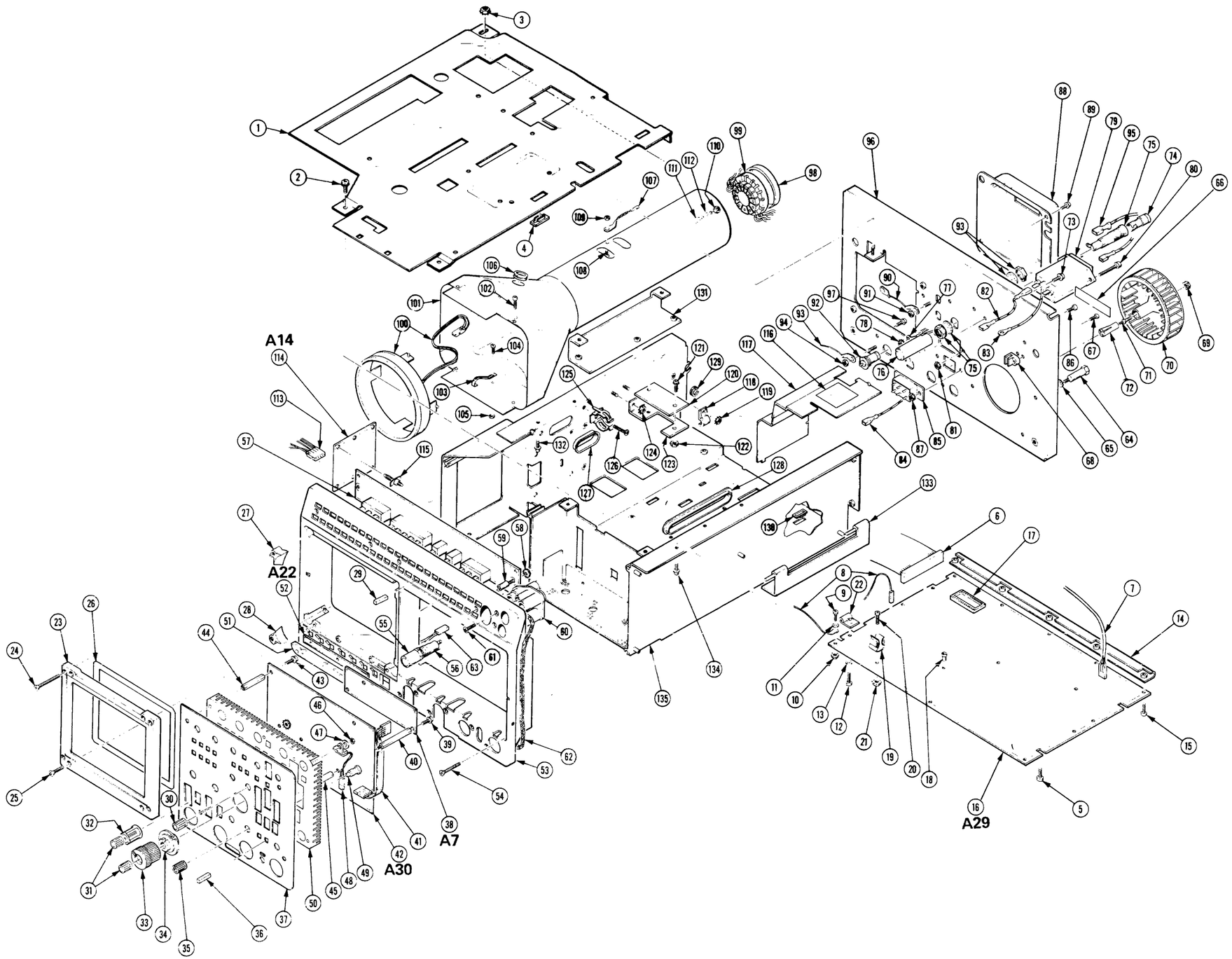
2445A ILLUSTRATION
24X5A/2467 OPTIONS SERVICE

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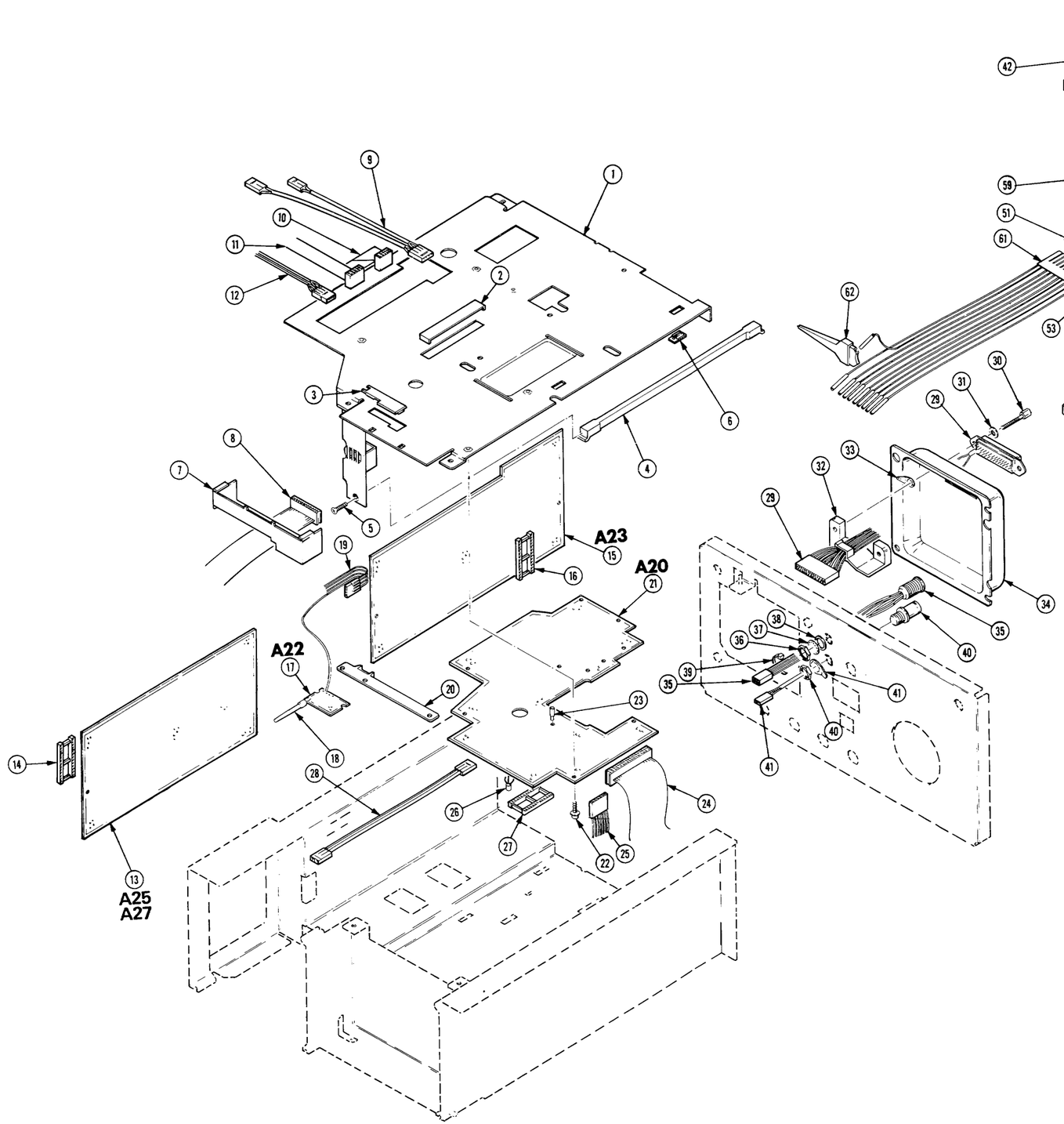
2455A ILLUSTRATION
24X5A/2467 OPTIONS SERVICE

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REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```
1 2 3 4 5                    Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
                **** END ATTACHING PARTS ****
  Detail Part of Assembly and/or Component
  Attaching parts for Detail Part
                **** END ATTACHING PARTS ****
    Parts of Detail Part
    Attaching parts for Parts of Detail Part
                **** END ATTACHING PARTS ****
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

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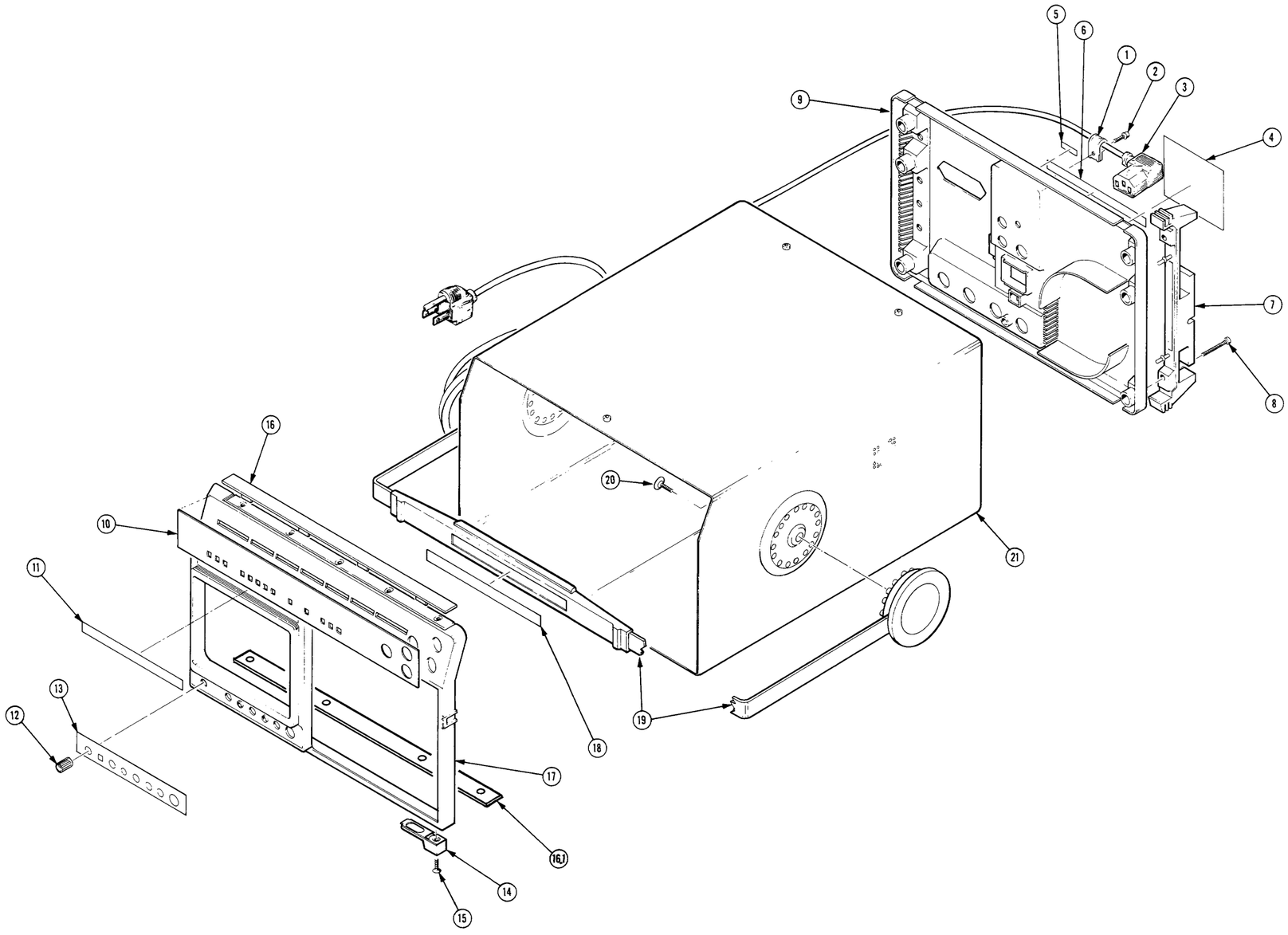
CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
04811	PRECISION COIL SPRING CO	10107 ROSE ST P O BOX 5450	EL MONTE CA 91734
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 60477
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039
09772	WEST COAST LOCKWASHER CO INC	16730 E JOHNSON DRIVE P O BOX 3588	CITY OF INDUSTRY CA 91744
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125
16428	BELDEN CORP ELECTRONIC DIV	2200 US HWY 27 SOUTH P O BOX 1980	RICHMOND IN 47374
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119
24931	SPECIALTY CONNECTOR CO INC	2620 ENDRESS PLACE P O BOX D	GREENWOOD IN 46142
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
73743	FISCHER SPECIAL MFG CO	446 MORGAN ST	CINCINNATI OH 45206
77900	SHAKEPROOF DIV OF ILLINOIS TOOL WORKS	SAINT CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIVISION	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
85480	BRADY W H CO	727 W GLENDALE AVE	MILWAUKEE WI 53209
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201
88245	LITTON SYSTEMS INC USECO DIV	13536 SATICOY ST	VAN NUYS CA 91409
91836	KINGS ELECTRONICS CO INC	40 MARBLEDALE ROAD	TUCKAHOE NY 10707
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61101
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0433	PORTLAND SCREW CO	6520 N BASIN	PORTLAND OR 97217
TK0435	LEWIS SCREW CO	4114 S PEORIA	CHICAGO IL 60609
TK0588	UNIVERSAL PRECISION PRODUCTS	1775 NW 216TH	HILLSBORO OR 97123
TK0861	H SCHURTER AG DIST PANEL COMPONENTS	2015 SECOND STREET	BERKELEY CA 94170
TK1165	STEN MFG INC	9702 85TH AVENUE N	MINNEAPOLIS MN 55369
TK1169	DIEMAKERS	801 SECOND ST	MONROE CITY MO 63456
TK1285	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
TK1319	MORELLIS Q & D PLASTICS	1812 16-TH AVE	FOREST GROVE OR 97116
TK1326	NORTHWEST FOURSLIDE INC	5858 WILLOW LANE	LAKE OSWEGO OR 97034
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK2092	DEMPSEY INDUSTRIES INC	802 N FOURTH ST	MIAMISBURG OH 45342-1812

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	343-0003-00			1	CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
					ATTACHING PARTS		
-2	211-0691-00			1	SCREW,MACHINE:6-32 X 0.625,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-3	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L,W/RTANG CONN	16428	CH8352, FH-8352
					SAFETY CONTROLLED		
-4	334-4377-04			1	MARKER,IDENT:MKD CAUTION	80009	334-4377-04
-5	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	80009	334-4378-01
-6	334-6341-00			1	MARKER,IDENT:MKD REAR BNC	80009	334-6341-00
-7	348-0780-00			2	FOOT,CABINET:W/CORD WRAP,REAR,BLACK	80009	348-0780-00
					POLYYURETHANE		
					ATTACHING PARTS		
-8	212-0154-00			4	SCREW,MACHINE:8-32 X 1.125,PNH,STL	83385	ORDER BY DESCR
					END ATTACHING PARTS		
-9	200-2275-03			1	COVER,REAR:	80009	200-2275-03
					(BNC HOLE PUNCHED OUT WHEN OPT 10 PRESENT)		
-10	333-2995-00			1	PANEL,FRONT:	80009	333-2995-00
-11	334-6338-00			1	MARKER,IDENT:MKD TEKTRONIX 2445A	22670	ORDER BY DESCR
	334-6337-00			1	MARKER,IDENT:MKD TEKTRONIX 2445A GPIB	22670	ORDER BY DESCR
-12	366-2041-03			4	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	80009	366-2041-03
	366-2036-00			1	PUSH BUTTON:GY,0.206 SQ,1.445 H	80009	366-2036-00
-13	333-2877-00			1	PANEL,FRONT:CRT	80009	333-2877-00
-14	348-0740-00			2	FOOT,CABINET:BOTTOM FRONT,PLASTIC	80009	348-0740-00
					ATTACHING PARTS		
-15	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-16	200-2779-00			1	COVER,TOP:TRIM	80009	200-2779-00
-17	101-0095-01			1	TRIM,DECORATIVE:FRONT	80009	101-0095-01
					ATTACHING PARTS		
	211-0718-00			10	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	83486	ORDER BY DESCR
					END ATTACHING PARTS		
-18	334-6339-00			1	MARKER,IDENT:MKD 2445A	07416	ORDER BY DESCR
-19	367-0303-04			1	.HANDLE,CARRYING:12.86 L,GRIP & INDEX	80009	367-0303-04
					ATTACHING PARTS		
-20	212-0144-00			2	.SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE,	93907	225-38131-012
					.SPCL HD		
					END ATTACHING PARTS		
-21	437-0309-00			1	.CABINET,SCOPE:	80009	437-0309-00
	348-0764-04			1	.SHLD GSKT,ELEK:0.125 X 0.188,WIRE MESH,2	80009	348-0764-04
					.LAYERS,37.0 L		

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2445A ILLUSTRATION
24X5A/2467 OPTIONS SERVICE

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
					ATTACHING PARTS		
-2	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-3	210-0457-00			4	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-4	343-1012-00			1	RETAINER,CKT BD:POLYCARBONATE	80009	343-1012-00
-5	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-6	175-8324-00			1	CA ASSY,SP,ELEC:40,36 AWG,4.0 L,RIBBON	80009	175-8324-00
-7	175-8323-00			1	CA ASSY,SP,ELEC:3,26 AWG,13.0 L,9-N	80009	175-8323-00
-8	196-2924-00			1	LEAD ASSY,ELEC:2,24 AWG,5.5 L,9-1/9-2	80009	196-2924-00
					(DMM BD TO HVPS TO FRONT PANEL FUSE HOLDER)		
					ATTACHING PARTS		
-9	211-0304-00			1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-10	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-11	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-12	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-13	----- -----			2	(CALLED OUT IN ERROR-PART OF 211-0711-00)		
-14	407-2842-00			1	BRACKET,CKT BD:ALUMINUM	80009	407-2842-00
					ATTACHING PARTS		
-15	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-16	----- -----			1	CKT BD ASSY:DGTL MULTIMETER(SEE A29 REPL)		
-17	136-0755-00			1	SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP	09922	DILB28P-108
-18	358-0136-00			18	.INSULATOR,BSHG:0.075 ID X 0.203 OD X 0.075	88245	420971
-19	344-0356-00			2	.CLIP,ELECTRICAL:FUSE,BRONZE,ALBALOY PL	71400	5960-63
					ATTACHING PARTS		
-20	211-0722-00			2	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
-21	210-0457-00			2	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
	361-1270-00			5	.SPACER,RELAY:PLASTIC	80009	361-1270-00
-22	214-3492-00			2	HINGE HALF:DMM,ALUMINUM	TK1165	80630-000
-23	426-1864-01			1	FRAME,CRT:	TK1169	ORDER BY DESCR
					ATTACHING PARTS		
-24	211-0713-00			4	SCREW,MACHINE:6-32 X 1.25,FLH,100 DEG,STL	83385	ORDER BY DESCR
-25	213-0194-00			4	THUMBSCREW:0.25-36 X 0.203,0.312 OD HD,BRS	80009	213-0194-00
-26	348-0731-01			1	GASKET:CRT,POLYETHYLENE	80009	348-0731-01
	337-2926-03			1	SHLD,IMPLOSION:4.44 X 3.67 X 0.06,CLEAR	80009	337-2926-03
-27	343-0993-00			2	RETAINER,CRT:BLACK,PLASTIC	80009	343-0993-00
					(UPPER LEFT/LOWER RT/BLACK)		
-28	343-0992-00			2	RETAINER,CRT:CLEAR,PLASTIC	80009	343-0992-00
					(UPPER RT/LOWER LEFT/NATURAL)		
-29	366-2013-02			13	PUSH BUTTON:IVORY GRAY,0.186 SQ X 0.48 H	80009	366-2013-02
-30	366-1833-00			3	KNOB:GRAY,0.25 ID X 0.392 OD X 0.466 H	80009	366-1833-00
-31	366-2145-01			3	KNOB:DOVE GRAY,TIME/DIV,0.08 ID X0.392 OD X	80009	366-2145-01
					0.466 H		
-32	366-2038-00			2	KNOB:GY,0.25 ID X 0.706 OD X 0.6H	80009	366-2038-00
-33	366-2039-02			1	KNOB:GX,B SWEEP	80009	366-2039-02
-34	366-2040-00			1	KNOB:CLEAR,A SWEEP,0.252 ID X 1.12 OD	80009	366-2040-00
-35	366-2041-03			7	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	80009	366-2041-03
-36	366-2017-00			16	PUSH BUTTON:0.18 SQ X 0.644 H,IVORY GY	80009	366-2017-00
-37	333-3274-00			1	PANEL,FRONT:	22670	ORDER BY DESCR
-38	----- -----			1	CKT BD ASSY:FRONT PANEL VAR(SEE A7 REPL)		
					(STANDARD MANUAL)		
					ATTACHING PARTS		
-39	211-0304-00			3	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-40	129-0941-00			2	SPCR,POST:1.86 L,4-40 INT/EXT,STL,0.188 HEX	80009	129-0941-00
-41	175-4597-00			1	CA ASSY,SP,ELEC:5,26 AWG,4.0 L,RIBBON	80009	175-4597-00
-42	----- -----			1	CKT BD ASSY:FRONT PANEL(SEE A6 REPL)		
					(STANDARD MANUAL)		
					ATTACHING PARTS		
-43	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-44	129-0938-00			5	SPCR POST:1.102 L,4-40 EA END,AL,0.188 HEX	80009	129-0938-00
-45	129-0978-00			2	SPACER,POST:0.375-32,AL,0.5 HEX	80009	129-0978-00
-46	220-0495-00			2	NUT,PLAIN,HEX:0.375-32 X 0.438 HEX,BRS	73743	ORDER BY DESCR
-47	210-0012-00			3	WASHER,LOCK:0.384 ID,INTL,0.022 THK,STL	09772	ORDER BY DESCR

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-48	----- -----			1	SWITCH,PUSH:SPST,0.1A,125VAC (SEE CHASSIS S3185 REPL)(STANDARD INST)		
-49	377-0550-01			10	INSERT,KNOB:0.178 ID X 0.37 OD X 0.64	80009	377-0550-01
-50	354-0632-01			1	RING,MOUNTING:5.41 X 4.18,BRASS	80009	354-0632-01
-51	378-0204-00			1	REFLECTOR,LIGHT:INT SCALE ILLUMINATION	80009	378-0204-00
-52	----- -----			1	CKT BD ASSY:LED (SEE A22 REPL)		
	361-1317-00			3	.SPACER,SLEEVE:0.375 L X 0.085 ID,PVC BLK	80009	361-1317-00
-54	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL END ATTACHING PARTS	83385	ORDER BY DESCR
-56	352-0765-01			1	FUSEHOLDER:3AG,PNL MT	80009	352-0765-01
-57	----- -----			1	CKT BD ASSY:FRONT PANEL(EXTENDED) (SEE A30 REPL)		
-59	361-1273-01			3	SPACER,CKT BD:W/POST SPACER	80009	361-1273-01
-60	352-0691-01			1	HOLDER,CONN:POLYCARBONATE ATTACHING PARTS	80009	352-0691-01
-61	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL END ATTACHING PARTS	83385	ORDER BY DESCR
	136-0765-00			2	JACK,TIP:BANANA	80009	136-0765-00
	196-1577-01			1	LEAD,ELECTRICAL:24 AWG,3.0 L,9-1 (FROM DMM BD)	80009	196-1577-01
-62	348-0792-02			1	GASKET:ELECTRICAL SHIELD,37.0 L	80009	348-0792-02
-63	175-8730-00			1	CA ASSY,SP,ELEC:2,26 AWG,7.5 L	80009	175-8730-00
-64	361-1188-00			1	SPACER,POST:1.15 L,4-40 THD ONE END,STL, 0.312 HEX	80009	361-1188-00
-65	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-66	334-4865-00			1	MARKER,IDENT:MKD FAN,CAUTION	80009	334-4865-00
-67	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-68	386-4863-00			1	SUPPORT,CKT BD:	80009	386-4863-00
-69	220-0555-00			1	NUT,PLAIN,HEX:8-32 X 0.25 HEX,STL CD PL	TK0433	ORDER BY DESCR
-70	369-0043-01			1	IMPLR,FAN ASSY:2.8 DIA,0.25 DIA SHAFT, POLYAMIDE	80009	369-0043-01
	343-1190-00			1	COLLAR,IMPELLER:0.464 X 0.25,ALUMINUM	80009	343-1190-00
-71	355-0192-00			1	STUD,SHLDR&STEP:4-40/8-32 ENDS,0.5 L,SST	TK0588	ORDER BY DESCR
-72	343-1040-01			1	COLLAR,FAN MT:POLYMIDE	80009	343-1040-01
-73	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-74	200-2264-00			1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-75	204-0833-00			1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	TK0861	031 1653 (FEU)
-76	200-2265-00			1	CAP,FUSEHOLDER:5 X 20MM FUSES	TK0861	FEK 031.1663
-77	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01 ATTACHING PARTS	80009	195-3984-00
-78	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL END ATTACHING PARTS	78189	511-061800-00
-79	119-1536-00			1	FILTER,RFI:3A,250VAC,50/60HZ ATTACHING PARTS	54583	ZUB2203-00
-80	211-0332-00			2	SCR,ASSEM WSHR:4-40 X 0.5,PNH,STL CD PL, TORX T9	01536	ORDER BY DESCR
-81	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-82	195-3989-00			1	LEAD,ELECTRICAL:18 AWG,4.0 L,8-9	80009	195-3989-00
-83	195-3990-00			1	LEAD,ELECTRICAL:18 AWG,4.5 L,5-4	80009	195-3990-00
-84	195-3987-00			1	LEAD,ELECTRICAL:22 AWG,2.6 L,8-19	80009	195-3987-00
	195-3988-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-29	80009	195-3988-00
-85	----- -----			1	SWITCH,SLIDE:DPDT: (SEE CHASSIS S90 REPL)(STANDARD MANUAL) ATTACHING PARTS		
-86	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-87	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-88	200-2686-00			1	COVER,REAR:CRT ATTACHING PARTS	80009	200-2686-00
-89	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL END ATTACHING PARTS	83486	ORDER BY DESCR
-90	195-8410-00			1	LEAD,ELECTRICAL:22 AWG,1.65 L (GROUND FROM REAR PLATE TO CRT SHEILD) ATTACHING PARTS	80009	195-8410-00
-91	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL END ATTACHING PARTS	TK0435	ORDER BY DESCR
-92	131-1910-01			4	CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR284-1

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-93	195-9513-00			1	LEAD,ELECTRICAL:22 AWG,1.4 L,	80009	195-9513-00
					ATTACHING PARTS		
-94	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-95	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	80009	195-3984-00
-96	386-5048-01			1	PLATE,REAR:PWR SPLY	80009	386-5048-01
-97	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-98	200-0917-01			1	COVER,CRT SKT:2.052 OD X 0.291 H,PLASTIC	80009	200-0917-01
-99	198-4603-01			1	WIRE SET,ELEC:W/CRT SOCKET	80009	198-4603-01
-100	119-1478-01			1	COIL,TUBE DEFL:FXD,TRACE ROTATION	80009	119-1478-01
-101	337-2931-01			1	SHIELD,CRT:	TK1285	337-2931-01
					ATTACHING PARTS		
-102	211-0337-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,SST	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-103	214-0291-00			1	CONTACT,ELEC:CRT CONNECTOR,CU BE SIL PL	04811	ORDER BY DESCR
					ATTACHING PARTS		
-104	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-105	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
					END ATTACHING PARTS		
-106	348-0762-00			1	GROMMET,PLASTIC:BLACK,ROUND,0.54 ID	80009	348-0762-00
-107	195-6851-01			1	LEAD,ELECTRICAL:BRAIDED,1.65 L	80009	195-6851-01
					ATTACHING PARTS		
-108	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-109	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-110	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
-111	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-112	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-113	175-8010-01			1	CA ASSY,SP,ELEC:5,22 AWG,10.5 L,RIBBON	80009	175-8010-01
-114	----- -----			1	CKT BD ASSY:DYNAMIC CENTERING		
					(SEE A14 REPL)(STANDARD MANUAL)		
					ATTACHING PARTS		
-115	361-0067-00			3	SPACER,CKT BD:0.187,NYLON	06915	LCBS3M
					END ATTACHING PARTS		
-116	334-4759-00			1	MARKER,IDENT:MKD SHIELDS INVERTER	80009	334-4759-00
-117	337-3120-00			1	SHIELD,ELEC:DMM,TOP	80009	337-3120-00
-118	343-0081-00			1	STRAP,RETAINING:0.125 DIA,NYLON	85480	CPNY-172BK
					ATTACHING PARTS		
-119	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-120	307-1154-00			1	PASSIVE NETWORK:CRT TERMINATOR	80009	307-1154-00
					ATTACHING PARTS		
-121	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-122	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-123	407-2809-00			1	BRACKET,ANGLE:RESISTOR,AL	80009	407-2809-00
					ATTACHING PARTS		
-124	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-125	343-1099-01			1	RTNR,POWER SPLY:LOW VOLTAGE,FRONT,PC	80009	343-1099-01
					ATTACHING PARTS		
-126	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-127	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	80009	348-0763-00
-128	348-0751-00			1	GROMMET,PLASTIC:NATURAL,3.11 X 0.645 OBLONG	80009	348-0751-00
-129	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	80009	348-0757-00
-130	343-1012-00			1	RETAINER,CKT BD:POLYCARBONATE	80009	343-1012-00
-131	407-3092-00			1	BRKT,CMPNT MTG:DMM	80009	407-3092-00
					ATTACHING PARTS		
-132	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
	211-0730-00			1	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	80009	211-0730-00
	210-0858-00			1	WASHER,FLAT:0.172 ID X 0.5 OD X 0.062,BRS	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-133	407-3124-00			1	BRKT ASSY,HINGE:ALUMINUM	80009	407-3124-00
					ATTACHING PARTS		
-134	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
2-135	441-1618-02			1		CHASSIS,SCOPE:	80009	441-1618-02

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
-2	200-2871-00			1	COVER,ELEC CONN: (OPTION 05,10 ONLY)	TK1319	ORDER BY DESCR
-3	200-2277-00			1	COVER,ELEC CONN: (OPTION 10 ONLY)	TK1319	56411-000
-4	361-1286-00			1	SPACER,BRACKET:7.5 L,POLYCARBONATE,BLACK (OPTION 06,09,10 ONLY) ATTACHING PARTS	80009	361-1286-00
-5	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL (OPTION 06,09,10 ONLY) END ATTACHING PARTS	80009	211-0722-00
-6	343-1012-00			2	RETAINER,CKT BD:POLYCARBONATE (OPTION 10 ONLY)	80009	343-1012-00
-7	337-3141-00			1	SHIELD,ELEC:BULKHEAD (OPTION 10 ONLY)	80009	337-3141-00
-8	175-7180-00			1	CA ASSY,SP,ELEC:20,28 AWG,9.50 L,RIBBON (OPTION 10 ONLY)	80009	175-7180-00
	200-3436-00			2	SHIELD,CAP:0.093 X 0.25 X 0.19,PLSTC,BLK (OPTIONS 05,06,09)	TK2092	200-3436-00
-9	175-7925-01			1	CABLE ASSY,RF:50 OHM COAX,21.25 L (OPTION 05 ONLY)	80009	175-7925-01
-10	175-7927-00	B010100	B010704	1	CA ASSY,SP,ELEC:10,28 AWG,11.00 L,RIBBON	80009	175-7927-00
	175-7927-01	B010705		1	CA ASSY,SP,ELEC:10,36 AWG,11.75 L,RIBBON (OPTION 05,06,09 ONLY)	80009	175-7927-01
-11	175-9478-00			1	CABLE ASSY,RF:75 OHM COAX,12.0 L,O-N (OPTION 05 ONLY)	80009	175-9478-00
	175-7929-00			1	CA ASSY,SP,ELEC:4,26 AWG,18.0 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7929-00
-12	175-7928-00			1	CA ASSY,SP,ELEC:10,28 AWG,!8.75 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7928-00
-13	----- -----			1	CIRCUIT BD ASSY:TV OPTION (SEE A25 REPL) (OPTION 05 ONLY)		
	----- -----			1	CIRCUIT BD ASSY:COUNTER/TRIGGER/TIMER (SEE A27 REPL) (OPTION 06,09 ONLY)		
-14	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 05,06,09 ONLY)	09922	DILB28P-108
	129-1056-00			1	.SPCR,POST:0.4 L,6-32 INT/EXT,STL,0.312 HEX	80009	129-1056-00
	131-0933-00			1	.TERMINAL,STUD:0.5 L,BRASS ALBALOY PL	80009	131-0933-00
	210-0006-00			1	.WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
	211-0722-00			1	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
	214-3799-00			1	.HEAT SINK,ELEC:ALUMINUM .(OPTION 06,09 ONLY)	TK1680	214-3799-00
	343-0005-00			1	.CLAMP,LOOP:0.437 ID,PLASTIC	06915	E7 CLEAR ROUND
-15	----- -----			1	CIRCUIT BD ASSY:GPIB OPTION (SEE A23 REPL) (OPTION 10 ONLY)		
-16	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 10 ONLY)	09922	DILB28P-108
-17	----- -----			1	CIRCUIT BD ASSY:LED (SEE A22 REPL) (OPTION 10 ONLY) ATTACHING PARTS		
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL END ATTACHING PARTS	80009	211-0378-00
-18	378-0896-01			1	.LENS,LIGHT:CLEAR LED .(OPTION 10 ONLY)	80009	378-0896-01
-19	175-7185-00			1	.CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON .(OPTION 10 ONLY)	80009	175-7185-00
-20	386-0867-00			1	PLATE,MOUNTING:LED (OPTION 10 ONLY) ATTACHING PARTS	80009	386-0867-00
	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	01536	ORDER BY DESCR
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL END ATTACHING PARTS	80009	211-0378-00
-21	----- -----			1	CIRCUIT BD ASSY:BUFFER (SEE A20 REPL) ATTACHING PARTS		
-22	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX END ATTACHING PARTS	01536	ORDER BY DESCR
-23	361-1252-01			5	.SPACER,CKT BD:0.1 ID X 0.188 OD X 0.185 H, .PLASTIC	80009	361-1252-01

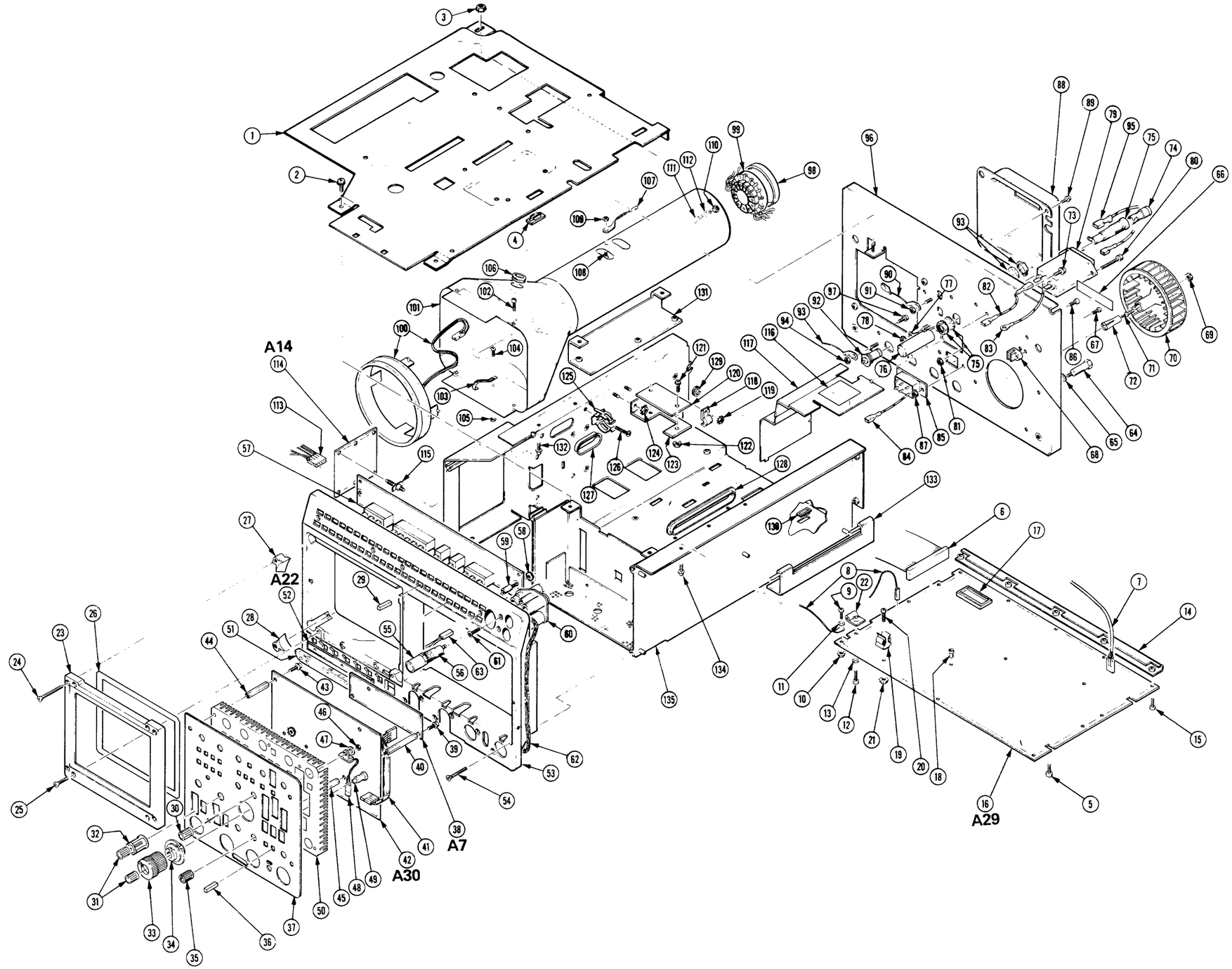
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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-24	175-7184-01			1	.CA ASSY,SP,ELEC:34,28 AWG,6.5 L,RIBBON	80009	175-7184-01
-25	175-7183-00			1	.CA ASSY,SP,ELEC:7,22 AWG,7.75 L,RIBBON	80009	175-7183-00
-26	214-3800-00			1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-27	136-0751-00			1	.SKT,PL-IN ELEK:MICROCKT,24 PIN	09922	DILB24P108
-28	175-7930-00			1	CA ASSY,SP,ELEC:3,26 AWG,11.0 L,RIBBON (OPTION 05 ONLY)	80009	175-7930-00
-29	175-7215-01	B010100	B012103	1	CA ASSY,SP,ELEC:24,28 AWG,FLEX	80009	175-7215-01
	174-0203-00	B012104		1	CA ASSY,SP,ELEC:24,28 AWG,7.45 L,RIBBON (OPTION 10 ONLY)	80009	174-0203-00
					ATTACHING PARTS		
-30	129-1107-00			2	SPACER,POST:0.98 L,6-32 SST 0.25 HEX	80009	129-1107-00
-31	210-0069-00			2	WASHER,LOCK:#8 SPLIT,0.04 THK STL	86928	ORDER BY DESCR
					END ATTACHING PARTS		
-32	337-0118-01			1	SHIELD,ELEC:GPIB (OPTION 10 ONLY)	80009	337-0118-01
-33	210-0201-00			1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL (OPTION 10 ONLY)	86928	A373-157-2
-34	200-2686-00			1	COVER,REAR:CRT (OPTION 10 ONLY)	80009	200-2686-00
					ATTACHING PARTS		
	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-35	175-7932-00			1	CA ASSY,SP,ELEC:6,26 AWG,5.00 L,9-N (OPTION 06,09 ONLY)	80009	175-7932-00
					ATTACHING PARTS		
-36	----- -----			1	.NUT,PLAIN,HEX:(PART OF CABLE ASSY)		
-37	210-0021-00			1	WASHER,LOCK:0.476 ID,INTL,0.018 THK,STL	78189	1222-01
-38	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-39	346-0120-00	B010100	B010200	1	STRAP,TIEDOWN,E:5.5 L MIN,PLASTIC	06383	SST1.5M
	343-0149-00	B010201		1	STRAP,TIEDOWN,E:6.75 L,PLASTIC (OPTION 06,09,10 ONLY)	06383	ORDER BY DESCR
-40	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE (OPTION 06,09 ONLY)	91836	K79-304M06
-41	175-7931-00			1	CABLE ASSY,RF:50 OHM COAX,4.25 L (OPTION 06,09 ONLY)	80009	175-7931-00
-42	334-5200-00			1	MARKER,IDENT:MKD WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	334-5200-00
-43	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX,20UA MAX @ 2.7V,0.6MA MAX @ 0.5V (OPTION 09 ONLY)	80009	334-5201-02
	131-1343-00			1	TERM SET,PIN:36-0.525 L X 0.025 SQ (OPTION 06,09 ONLY)	TK1483	082-3643-SS02
	334-0001-00			1	MARKER,IDENT:MKD WORD RECOGNIZER IN/OUT (OPTION 09 ONLY)	07416	58600-000
-44	380-0710-00			1	HOUSING,PROBE:LOWER,PC (OPTION 09 ONLY)	80009	380-0710-00
-45	380-0711-00			1	HOUSING,PROBE:UPPER,PC (OPTION 09 ONLY)	80009	380-0711-00
					ATTACHING PARTS		
-46	211-0318-00			4	SCREW,MACHINE:4-40 X 0.75,FLH,100 DEG,STL	83385	ORDER BY DESCR
-47	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					END ATTACHING PARTS		
-48	358-0675-00			1	STRAIN RLF,CA:UPPER (OPTION 09 ONLY)	80009	358-0675-00
-49	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC (OPTION 09 ONLY)	80009	358-0347-00
-50	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N (OPTION 09 ONLY)	80009	175-8853-01
-51	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY (OPTION 09 ONLY)	80009	361-0758-01
-52	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (SEE A32 REPL) (OPTION 09 ONLY)		
-53	----- -----			1	.TERM SET,PIN:(SEE A32J6300 REPL) .(OPTION 09 ONLY)		
-54	----- -----			1	.CONTACT SET,ELEC:(SEE A32J6370 REPL) .(OPTION 09 ONLY)		
-55	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6380 REPL)		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-					.(OPTION 09 ONLY)		
-56	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6385 REPL) .(OPTION 09 ONLY)		
-57	----- -----			1	.CONTACT SET,ELEC:(SEE A32J3708 REPL) .(OPTION 09 ONLY)		
-58	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (SEE A33 REPL) (OPTION 09 ONLY)		
-59	----- -----			1	.TERM SET,PIN:(SEE A33J6400 REPL) .(OPTION 09 ONLY)		
-60	----- -----			2	.CONTACT SET,ELEC:(SEE A33P6380,P6385 REPL) .(OPTION 09 ONLY)		
					STANDARD ACCESSORIES		
-61	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06,09 ONLY)	80009	012-0747-00
-62	206-0222-00			20	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06,09 ONLY)	80009	206-0222-00
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESS & MANUAL (OPTION 06,09 ONLY)	80009	010-6407-02
	010-6602-00			1	PROBE,TEMP:P6602,64.0 L,230 DEG C (OPTION 01 ONLY)	80009	010-6602-00
	012-0941-00			1	LEAD SET,METER:(2)LEAD,ELEC,(2)PROBE HEAD (OPTION 01 ONLY)	80009	012-0941-00
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	80009	016-0180-00
	016-0720-00			1	COVER,PROT:NYLON (OPTION 01 ONLY)	80009	016-0720-00
	020-0087-00			1	ACCESSORY PKG: (OPTION 01 ONLY)	80009	020-0087-00
	070-4181-00			1	MANUAL,TECH:REFERENCE,2445/2465 OPT 06/09 (OPTION 06,09 ONLY)	80009	070-4181-00
	070-5365-00			1	CARD,INFO:REF,DMM OPTION (OPTION 01 ONLY)	80009	070-5365-00
	070-6282-00			1	MANUAL,TECH:INTERFACING GUIDE,2445/2467 OPT 10 GPIB (OPTION 10 ONLY)	80009	070-6282-00
	200-2844-00			1	COVER,FRONT: (OPTION 01 ONLY)	80009	200-2844-00
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,CCIR (24X5A OPTION 05 ONLY)	80009	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,NTSC (24X5A OPTION 05 ONLY)	80009	378-0199-05
	378-0270-01			1	FILTER,LT,CRT:3.0 X 3.670,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-01
	378-0270-02			1	FILTER,LT,CRT:3.0 X 3.67,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-02
					OPTIONAL ACCESSORIES		
	070-5857-00			1	MANUAL,TECH:SERVICE OPTS,24X5A/2467	80009	070-5857-00
	070-6014-00			1	MANUAL,TECH:OPERATORS,2445A/55A/65A OPT 01, 06,05,09 & 10	80009	070-6014-00

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2445A ILLUSTRATION
24X5A/2467 OPTIONS SERVICE

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REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```
1 2 3 4 5                    Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
        **** END ATTACHING PARTS ****
   Detail Part of Assembly and/or Component
   Attaching parts for Detail Part
        **** END ATTACHING PARTS ****
      Parts of Detail Part
      Attaching parts for Parts of Detail Part
        **** END ATTACHING PARTS ****
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation.

Attaching parts must be purchased separately, unless otherwise specified.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
04811	PRECISION COIL SPRING CO	10107 ROSE ST P O BOX 5450	EL MONTE CA 91734
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 60477
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039
09772	WEST COAST LOCKWASHER CO INC	16730 E JOHNSON DRIVE P O BOX 3588	CITY OF INDUSTRY CA 91744
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125
16428	BELDEN CORP ELECTRONIC DIV	2200 US HWY 27 SOUTH P O BOX 1980	RICHMOND IN 47374
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119
24931	SPECIALTY CONNECTOR CO INC	2620 ENDRESS PLACE P O BOX D	GREENWOOD IN 46142
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
73743	FISCHER SPECIAL MFG CO	446 MORGAN ST	CINCINNATI OH 45206
77900	SHAKEPROOF DIV OF ILLINOIS TOOL WORKS	SAINT CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIVISION	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
85480	BRADY W H CO	727 W GLENDALE AVE	MILWAUKEE WI 53209
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201
88245	LITTON SYSTEMS INC USECO DIV	13536 SATICOY ST	VAN NUYS CA 91409
91836	KINGS ELECTRONICS CO INC	40 MARBLEDALE ROAD	TUCKAHOE NY 10707
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61101
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0433	PORTLAND SCREW CO	6520 N BASIN	PORTLAND OR 97217
TK0435	LEWIS SCREW CO	4114 S PEORIA	CHICAGO IL 60609
TK0588	UNIVERSAL PRECISION PRODUCTS	1775 NW 216TH	HILLSBORO OR 97123
TK0861	H SCHURTER AG DIST PANEL COMPONENTS	2015 SECOND STREET	BERKELEY CA 94170
TK1165	STEN MFG INC	9702 85TH AVENUE N	MINNEAPOLIS MN 55369
TK1168	TEXSUN INC	11368 W OLYMPIC BLVD	LOS ANGELES CA 90023
TK1169	DIEMAKERS	801 SECOND ST	MONROE CITY MO 63456
TK1285	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
TK1319	MORELLIS Q & D PLASTICS	1812 16-TH AVE	FOREST GROVE OR 97116
TK1326	NORTHWEST FOURSLIDE INC	5858 WILLOW LANE	LAKE OSWEGO OR 97034
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	343-0003-00			1	CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
					ATTACHING PARTS		
-2	211-0691-00			1	SCREW,MACHINE:6-32 X 0.625,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-3	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L,W/RTANG CONN	16428	CH8352, FH-8352
					SAFETY CONTROLLED		
-4	334-4377-04			1	MARKER,IDENT:MKD CAUTION	80009	334-4377-04
-5	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	80009	334-4378-01
-6	334-6341-00			1	MARKER,IDENT:MKD REAR BNC	80009	334-6341-00
-7	348-0780-00			2	FOOT,CABINET:W/CORD WRAP,REAR,BLACK	80009	348-0780-00
					POLYYURETHANE		
					ATTACHING PARTS		
-8	212-0154-00			4	SCREW,MACHINE:8-32 X 1.125,PNH,STL	83385	ORDER BY DESCR
					END ATTACHING PARTS		
-9	200-2275-03			1	COVER,REAR:	80009	200-2275-03
					(BNC HOLE PUNCHED OUT WHEN OPT 10 PRESENT)		
-10	333-2995-00			1	PANEL,FRONT:	80009	333-2995-00
-11	334-6643-00			1	MARKER,IDENT:MKD TEKTRONIX 2455A	22670	ORDER BY DESCR
	334-6644-00			1	MARKER,IDENT:MKD TEKTRONIX GPIB 2455A	22670	ORDER BY DESCR
-12	366-2041-03			4	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	80009	366-2041-03
	366-2036-00			1	PUSH BUTTON:GY,0.206 SQ,1.445 H	80009	366-2036-00
-13	333-2877-00			1	PANEL,FRONT:CRT	80009	333-2877-00
-14	348-0740-00			2	FOOT,CABINET:BOTTOM FRONT,PLASTIC	80009	348-0740-00
					ATTACHING PARTS		
-15	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-16	200-2779-00			1	COVER,TOP:TRIM	80009	200-2779-00
-17	101-0095-01			1	TRIM,DECORATIVE:FRONT	80009	101-0095-01
					ATTACHING PARTS		
	211-0718-00			10	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	83486	ORDER BY DESCR
					END ATTACHING PARTS		
-18	334-6645-00			1	MARKER,IDENT:MKD TEKTRONIX 2455A HANDLE	80009	334-6645-00
-19	367-0303-04			1	.HANDLE,CARRYING:12.86 L,GRIP & INDEX	80009	367-0303-04
					ATTACHING PARTS		
-20	212-0144-00			2	.SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE,	93907	225-38131-012
					.SPCL HD		
					END ATTACHING PARTS		
-21	437-0309-00			1	.CABINET,SCOPE:	80009	437-0309-00
	348-0764-04			1	.SHLD GSKT,ELEK:0.125 X 0.188,WIRE MESH,2	80009	348-0764-04
					.LAYERS,37.0 L		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
					ATTACHING PARTS		
-2	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-3	210-0457-00			4	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-4	343-1012-00			1	RETAINER,CKT BD:POLYCARBONATE	80009	343-1012-00
-5	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-6	175-8324-00			1	CA ASSY,SP,ELEC:40,36 AWG,4.0 L,RIBBON	80009	175-8324-00
-7	175-8323-00			1	CA ASSY,SP,ELEC:3,26 AWG,13.0 L,9-N	80009	175-8323-00
-8	196-2924-00			1	LEAD ASSY,ELEC:2,24 AWG,5.5 L,9-1/9-2	80009	196-2924-00
					(DMM BD TO HVPS TO FRONT PANEL FUSE HOLDER)		
					ATTACHING PARTS		
-9	211-0304-00			1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-10	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-11	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-12	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-13	----- -----			2	(CALLED OUT IN ERROR-PART OF 211-0711-00)		
-14	407-2842-00			1	BRACKET,CKT BD:ALUMINUM	80009	407-2842-00
					ATTACHING PARTS		
-15	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-16	----- -----			1	CKT BD ASSY:DGTL MULTIMETER(SEE A29 REPL)		
-17	136-0755-00			1	SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP	09922	DILB28P-108
-18	358-0136-00			18	.INSULATOR,BSHG:0.075 ID X 0.203 OD X 0.075	88245	420971
-19	344-0356-00			2	.CLIP,ELECTRICAL:FUSE,BRONZE,ALBALOY PL	71400	5960-63
					ATTACHING PARTS		
-20	211-0722-00			2	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
-21	210-0457-00			2	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
	361-1270-00			5	.SPACER,RELAY:PLASTIC	80009	361-1270-00
-22	214-3492-00			2	HINGE HALF:DMM,ALUMINUM	TK1165	80630-000
-23	426-1864-01			1	FRAME,CRT:	TK1169	ORDER BY DESCR
					ATTACHING PARTS		
-24	211-0713-00			4	SCREW,MACHINE:6-32 X 1.25,FLH,100 DEG,STL	83385	ORDER BY DESCR
-25	213-0194-00			4	THUMBSCREW:0.25-36 X 0.203,0.312 OD HD,BRS	80009	213-0194-00
-26	348-0731-01			1	GASKET:CRT,POLYETHYLENE	80009	348-0731-01
	337-2926-03			1	SHLD,IMPLOSION:4.44 X 3.67 X 0.06,CLEAR	80009	337-2926-03
-27	343-0993-00			2	RETAINER,CRT:BLACK,PLASTIC	80009	343-0993-00
					(UPPER LEFT/LOWER RT/BLACK)		
-28	343-0992-00			2	RETAINER,CRT:CLEAR,PLASTIC	80009	343-0992-00
					(UPPER RT/LOWER LEFT/NATURAL)		
-29	366-2013-02			13	PUSH BUTTON:IVORY GRAY,0.186 SQ X 0.48 H	80009	366-2013-02
-30	366-1833-00			3	KNOB:GRAY,0.25 ID X 0.392 OD X 0.466 H	80009	366-1833-00
-31	366-2145-01			3	KNOB:DOVE GRAY,TIME/DIV,0.08 ID X0.392 OD X	80009	366-2145-01
					0.466 H		
-32	366-2038-00			2	KNOB:GY,0.25 ID X 0.706 OD X 0.6H	80009	366-2038-00
-33	366-2039-02			1	KNOB:GX,B SWEEP	80009	366-2039-02
-34	366-2040-00			1	KNOB:CLEAR,A SWEEP,0.252 ID X 1.12 OD	80009	366-2040-00
-35	366-2041-03			7	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	80009	366-2041-03
-36	366-2017-00			16	PUSH BUTTON:0.18 SQ X 0.644 H,IVORY GY	80009	366-2017-00
-37	333-3274-00			1	PANEL,FRONT:	22670	ORDER BY DESCR
-38	----- -----			1	CKT BD ASSY:FRONT PANEL VAR(SEE A7 REPL)		
					(STANDARD MANUAL)		
					ATTACHING PARTS		
-39	211-0304-00			3	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-40	129-0941-00			2	SPCR,POST:1.86 L,4-40 INT/EXT,STL,0.188 HEX	80009	129-0941-00
-41	175-4597-00			1	CA ASSY,SP,ELEC:5,26 AWG,4.0 L,RIBBON	80009	175-4597-00
-42	----- -----			1	CKT BD ASSY:FRONT PANEL(SEE A6 REPL)		
					(STANDARD MANUAL)		
					ATTACHING PARTS		
-43	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-44	129-0938-00			5	SPCR POST:1.102 L,4-40 EA END,AL,0.188 HEX	80009	129-0938-00
-45	129-0978-00			2	SPACER,POST:0.375-32,AL,0.5 HEX	80009	129-0978-00
-46	220-0495-00			2	NUT,PLAIN,HEX:0.375-32 X 0.438 HEX,BRS	73743	ORDER BY DESCR
-47	210-0012-00			3	WASHER,LOCK:0.384 ID,INTL,0.022 THK,STL	09772	ORDER BY DESCR

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-48	----- -----			1	SWITCH,PUSH:SPST,0.1A,125VAC (SEE CHASSIS S3185 REPL)(STANDARD INST)		
-49	377-0550-01			10	INSERT,KNOB:0.178 ID X 0.37 OD X 0.64	80009	377-0550-01
-50	354-0632-01			1	RING,MOUNTING:5.41 X 4.18,BRASS	80009	354-0632-01
-51	378-0204-00			1	REFLECTOR,LIGHT:INT SCALE ILLUMINATION	80009	378-0204-00
-52	----- -----			1	CKT BD ASSY:LED (SEE A22 REPL)		
	361-1317-00			3	.SPACER,SLEEVE:0.375 L X 0.085 ID,PVC BLK	80009	361-1317-00
-54	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL END ATTACHING PARTS	83385	ORDER BY DESCR
-56	352-0765-01			1	FUSEHOLDER:3AG,PNL MT	80009	352-0765-01
-57	----- -----			1	CKT BD ASSY:FRONT PANEL(EXTENDED) (SEE A30 REPL)		
-59	361-1273-01			3	SPACER,CKT BD:W/POST SPACER	80009	361-1273-01
-60	352-0691-01			1	HOLDER,CONN:POLYCARBONATE ATTACHING PARTS	80009	352-0691-01
-61	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL END ATTACHING PARTS	83385	ORDER BY DESCR
	136-0765-00			2	JACK,TIP:BANANA	80009	136-0765-00
	196-1577-01			1	LEAD,ELECTRICAL:24 AWG,3.0 L,9-1 (FROM DMM BD)	80009	196-1577-01
-62	348-0792-02			1	GASKET:ELECTRICAL SHIELD,37.0 L	80009	348-0792-02
-63	175-8730-00			1	CA ASSY,SP,ELEC:2,26 AWG,7.5 L	80009	175-8730-00
-64	361-1188-00			1	SPACER,POST:1.15 L,4-40 THD ONE END,STL, 0.312 HEX	80009	361-1188-00
-65	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-66	334-4865-00			1	MARKER,IDENT:MKD FAN,CAUTION	80009	334-4865-00
-67	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-68	386-4863-00			1	SUPPORT,CKT BD:	80009	386-4863-00
-69	220-0555-00			1	NUT,PLAIN,HEX:8-32 X 0.25 HEX,STL CD PL	TK0433	ORDER BY DESCR
-70	369-0043-01			1	IMPLR,FAN ASSY:2.8 DIA,0.25 DIA SHAFT, POLYAMIDE	80009	369-0043-01
	343-1190-00			1	COLLAR,IMPELLER:0.464 X 0.25,ALUMINUM	80009	343-1190-00
-71	355-0192-00			1	STUD,SHLDR&STEP:4-40/8-32 ENDS,0.5 L,SST	TK0588	ORDER BY DESCR
-72	343-1040-01			1	COLLAR,FAN MT:POLYMIDE	80009	343-1040-01
-73	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-74	200-2264-00			1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-75	204-0833-00			1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	TK0861	031 1653 (FEU)
-76	200-2265-00			1	CAP,FUSEHOLDER:5 X 20MM FUSES	TK0861	FEK 031.1663
-77	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01 ATTACHING PARTS	80009	195-3984-00
-78	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL END ATTACHING PARTS	78189	511-061800-00
-79	119-1536-00			1	FILTER,RFI:3A,250VAC,50/60HZ ATTACHING PARTS	54583	ZUB2203-00
-80	211-0332-00			2	SCR,ASSEM WSHR:4-40 X 0.5,PNH,STL CD PL, TORX T9	01536	ORDER BY DESCR
-81	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-82	195-3989-00			1	LEAD,ELECTRICAL:18 AWG,4.0 L,8-9	80009	195-3989-00
-83	195-3990-00			1	LEAD,ELECTRICAL:18 AWG,4.5 L,5-4	80009	195-3990-00
-84	195-3987-00			1	LEAD,ELECTRICAL:22 AWG,2.6 L,8-19	80009	195-3987-00
	195-3988-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-29	80009	195-3988-00
-85	----- -----			1	SWITCH,SLIDE:DPDT: (SEE CHASSIS S90 REPL)(STANDARD MANUAL) ATTACHING PARTS		
-86	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-87	210-0586-00			2	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-88	200-2686-00			1	COVER,REAR:CRT ATTACHING PARTS	80009	200-2686-00
-89	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL END ATTACHING PARTS	83486	ORDER BY DESCR
-90	195-8410-00			1	LEAD,ELECTRICAL:22 AWG,1.65 L (GROUND FROM REAR PLATE TO CRT SHEILD) ATTACHING PARTS	80009	195-8410-00
-91	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL END ATTACHING PARTS	TK0435	ORDER BY DESCR
-92	131-1910-01			4	CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR284-1

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-93	195-9513-00			1	LEAD,ELECTRICAL:22 AWG,1.4 L, ATTACHING PARTS	80009	195-9513-00
-94	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL END ATTACHING PARTS	TK0435	ORDER BY DESCR
-95	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	80009	195-3984-00
-96	386-5048-01			1	PLATE,REAR:PWR SPLY	80009	386-5048-01
-97	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX END ATTACHING PARTS	01536	ORDER BY DESCR
-98	200-0917-01			1	COVER,CRT SKT:2.052 OD X 0.291 H,PLASTIC	80009	200-0917-01
-99	198-4603-01			1	WIRE SET,ELEC:W/CRT SOCKET	80009	198-4603-01
-100	119-1478-01			1	COIL,TUBE DEFL:FXD,TRACE ROTATION	80009	119-1478-01
-101	337-2931-01			1	SHIELD,CRT: ATTACHING PARTS	TK1285	337-2931-01
-102	211-0337-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,SST END ATTACHING PARTS	01536	ORDER BY DESCR
-103	214-0291-00			1	CONTACT,ELEC:CRT CONNECTOR,CU BE SIL PL ATTACHING PARTS	04811	ORDER BY DESCR
-104	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-105	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-106	348-0762-00			1	GROMMET,PLASTIC:BLACK,ROUND,0.54 ID	80009	348-0762-00
-107	195-6851-01			1	LEAD,ELECTRICAL:BRAIDED,1.65 L ATTACHING PARTS	80009	195-6851-01
-108	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-109	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL END ATTACHING PARTS	TK0435	ORDER BY DESCR
-110	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
-111	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-112	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-113	175-8010-01			1	CA ASSY,SP,ELEC:5,22 AWG,10.5 L,RIBBON	80009	175-8010-01
-114	----- -----			1	CKT BD ASSY:DYNAMIC CENTERING (SEE A14 REPL)(STANDARD MANUAL) ATTACHING PARTS		
-115	361-0067-00			3	SPACER,CKT BD:0.187,NYLON END ATTACHING PARTS	06915	LCBS3M
-116	334-4759-00			1	MARKER,IDENT:MKD SHIELDS INVERTER	80009	334-4759-00
-117	337-3120-00			1	SHIELD,ELEC:DMM,TOP	80009	337-3120-00
-118	343-0081-00			1	STRAP,RETAINING:0.125 DIA,NYLON ATTACHING PARTS	85480	CPNY-172BK
-119	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL END ATTACHING PARTS	78189	511-061800-00
-120	307-1154-00			1	PASSIVE NETWORK:CRT TERMINATOR ATTACHING PARTS	80009	307-1154-00
-121	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-122	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL END ATTACHING PARTS	78189	511-061800-00
-123	407-2809-00			1	BRACKET,ANGLE:RESISTOR,AL ATTACHING PARTS	80009	407-2809-00
-124	210-0457-00			2	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL END ATTACHING PARTS	78189	511-061800-00
-125	343-1099-00			1	RTNR,POWER SPLY:LOW VOLTAGE,FRONT,PC ATTACHING PARTS	TK1168	ORDER BY DESCR
-126	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX END ATTACHING PARTS	01536	ORDER BY DESCR
-127	348-0763-00			1	GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	80009	348-0763-00
-128	348-0751-00			1	GROMMET,PLASTIC:NATURAL,3.11 X 0.645 OBLONG	80009	348-0751-00
-129	348-0757-00			1	GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	80009	348-0757-00
-130	343-1012-00			1	RETAINER,CKT BD:POLYCARBONATE	80009	343-1012-00
-131	407-3092-00			1	BRKT,CMPNT MTG:DMM ATTACHING PARTS	80009	407-3092-00
-132	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
	211-0730-00			1	SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	80009	211-0730-00
	210-0858-00			1	WASHER,FLAT:0.172 ID X 0.5 OD X 0.062,BRS END ATTACHING PARTS	12327	ORDER BY DESCR
-133	407-3124-00			1	BRKT ASSY,HINGE:ALUMINUM ATTACHING PARTS	80009	407-3124-00
-134	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX END ATTACHING PARTS	01536	ORDER BY DESCR

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.
2-135	441-1618-02			1		CHASSIS,SCOPE:	80009	441-1618-02

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
-2	200-2871-00			1	COVER,ELEC CONN: (OPTION 05,10 ONLY)	TK1319	ORDER BY DESCR
-3	200-2277-00			1	COVER,ELEC CONN: (OPTION 10 ONLY)	TK1319	56411-000
-4	361-1286-00			1	SPACER,BRACKET:7.5 L,POLYCARBONATE,BLACK (OPTION 06,09,10 ONLY)	80009	361-1286-00
					ATTACHING PARTS		
-5	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL (OPTION 06,09,10 ONLY)	80009	211-0722-00
					END ATTACHING PARTS		
-6	343-1012-00			2	RETAINER,CKT BD:POLYCARBONATE (OPTION 10 ONLY)	80009	343-1012-00
-7	337-3141-00			1	SHIELD,ELEC:BULKHEAD (OPTION 10 ONLY)	80009	337-3141-00
-8	175-7180-00			1	CA ASSY,SP,ELEC:20,28 AWG,9.50 L,RIBBON (OPTION 10 ONLY)	80009	175-7180-00
-9	175-7925-01			1	CABLE ASSY,RF:50 OHM COAX,21.25 L (OPTION 05 ONLY)	80009	175-7925-01
-10	175-7927-01			1	CA ASSY,SP,ELEC:10,36 AWG,11.75 L,RIBBON (OPTION 05,06,09 ONLY)	80009	175-7927-01
-11	175-9478-00			1	CABLE ASSY,RF:75 OHM COAX,12.0 L,O-N (OPTION 05 ONLY)	80009	175-9478-00
	175-7929-00			1	CA ASSY,SP,ELEC:4,26 AWG,18.0 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7929-00
-12	175-7928-00			1	CA ASSY,SP,ELEC:10,28 AWG,!8.75 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7928-00
-13	----- -----			1	CIRCUIT BD ASSY:TV OPTION (SEE A25 REPL) (OPTION 05 ONLY)		
	----- -----			1	CIRCUIT BD ASSY:COUNTER/TRIGGER/TIMER (SEE A27 REPL) (OPTION 06,09 ONLY)		
-14	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 05,06,09 ONLY)	09922	DILB28P-108
	129-1056-00			1	.SPCR,POST:0.4 L,6-32 INT/EXT,STL,0.312 HEX	80009	129-1056-00
	131-0933-00			1	.TERMINAL,STUD:0.5 L,BRASS ALBALOY PL	80009	131-0933-00
	210-0006-00			1	.WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
	211-0722-00			1	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
	214-3799-00			1	.HEAT SINK,ELEC:ALUMINUM .(OPTION 06,09 ONLY)	TK1680	214-3799-00
	343-0005-00			1	.CLAMP,LOOP:0.437 ID,PLASTIC	06915	E7 CLEAR ROUND
-15	----- -----			1	CIRCUIT BD ASSY:GPIB OPTION (SEE A23 REPL) (OPTION 10 ONLY)		
-16	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 10 ONLY)	09922	DILB28P-108
-17	----- -----			1	CIRCUIT BD ASSY:LED (SEE A22 REPL) (OPTION 10 ONLY)		
					ATTACHING PARTS		
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL	80009	211-0378-00
					END ATTACHING PARTS		
-18	378-0896-01			1	.LENS,LIGHT:CLEAR LED .(OPTION 10 ONLY)	80009	378-0896-01
-19	175-7185-00			1	.CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON .(OPTION 10 ONLY)	80009	175-7185-00
-20	386-0867-00			1	PLATE,MOUNTING:LED (OPTION 10 ONLY)	80009	386-0867-00
					ATTACHING PARTS		
	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	01536	ORDER BY DESCR
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL	80009	211-0378-00
					END ATTACHING PARTS		
-21	----- -----			1	CIRCUIT BD ASSY:BUFFER (SEE A20 REPL)		
					ATTACHING PARTS		
-22	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-23	361-1252-01			5	.SPACER,CKT BD:0.1 ID X 0.188 OD X 0.185 H, .PLASTIC	80009	361-1252-01
-24	175-7184-01			1	.CA ASSY,SP,ELEC:34,28 AWG,6.5 L,RIBBON	80009	175-7184-01
-25	175-7183-00			1	.CA ASSY,SP,ELEC:7,22 AWG,7.75 L,RIBBON	80009	175-7183-00
-26	214-3800-00			1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-27	136-0751-00			1	.SKT,PL-IN ELEK:MICROCKT,24 PIN	09922	DILB24P108
-28	175-7930-00			1	CA ASSY,SP,ELEC:3,26 AWG,11.0 L,RIBBON (OPTION 05 ONLY)	80009	175-7930-00
-29	175-7215-01			1	CA ASSY,SP,ELEC:24,28 AWG,FLEX (OPTION 10 ONLY)	80009	175-7215-01
					ATTACHING PARTS		
-30	129-1107-00			2	SPACER,POST:0.98 L,6-32 SST 0.25 HEX	80009	129-1107-00
-31	210-0069-00			2	WASHER,LOCK:#8 SPLIT,0.04 THK STL	86928	ORDER BY DESCR
					END ATTACHING PARTS		
-32	337-0118-01			1	SHIELD,ELEC:GPIB (OPTION 10 ONLY)	80009	337-0118-01
-33	210-0201-00			1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL (OPTION 10 ONLY)	86928	A373-157-2
-34	200-2686-00			1	COVER,REAR:CRT (OPTION 10 ONLY)	80009	200-2686-00
					ATTACHING PARTS		
	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-35	175-7932-00			1	CA ASSY,SP,ELEC:6,26 AWG,5.00 L,9-N (OPTION 06,09 ONLY)	80009	175-7932-00
					ATTACHING PARTS		
-36	----- -----			1	.NUT,PLAIN,HEX:(PART OF CABLE ASSY)		
-37	210-0021-00			1	WASHER,LOCK:0.476 ID,INTL,0.018 THK,STL	78189	1222-01
-38	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-39	343-0149-00			1	STRAP,TIEDOWN,E:6.75 L,PLASTIC (OPTION 06,09,10 ONLY)	06383	ORDER BY DESCR
-40	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE (OPTION 06,09 ONLY)	91836	K79-304M06
-41	175-7931-00			1	CABLE ASSY,RF:50 OHM COAX,4.25 L (OPTION 06,09 ONLY)	80009	175-7931-00
-42	334-5200-00			1	MARKER,IDENT:MKD WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	334-5200-00
-43	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX,20UA MAX @ 2.7V,0.6MA MAX @ 0.5V (OPTION 09 ONLY)	80009	334-5201-02
	131-1343-00			1	TERM SET,PIN:36-0.525 L X 0.025 SQ (OPTION 06,09 ONLY)	TK1483	082-3643-SS02
	334-0001-00			1	MARKER,IDENT:MKD WORD RECOGNIZER IN/OUT (OPTION 09 ONLY)	07416	58600-000
-44	380-0710-00			1	HOUSING,PROBE:LOWER,PC (OPTION 09 ONLY)	80009	380-0710-00
-45	380-0711-00			1	HOUSING,PROBE:UPPER,PC (OPTION 09 ONLY)	80009	380-0711-00
					ATTACHING PARTS		
-46	211-0318-00			4	SCREW,MACHINE:4-40 X 0.75,FLH,100 DEG,STL	83385	ORDER BY DESCR
-47	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					END ATTACHING PARTS		
-48	358-0675-00			1	STRAIN RLF,CA:UPPER (OPTION 09 ONLY)	80009	358-0675-00
-49	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC (OPTION 09 ONLY)	80009	358-0347-00
-50	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N (OPTION 09 ONLY)	80009	175-8853-01
-51	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY (OPTION 09 ONLY)	80009	361-0758-01
-52	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (SEE A32 REPL) (OPTION 09 ONLY)		
-53	----- -----			1	.TERM SET,PIN:(SEE A32J6300 REPL) .(OPTION 09 ONLY)		
-54	----- -----			1	.CONTACT SET,ELEC:(SEE A32J6370 REPL) .(OPTION 09 ONLY)		
-55	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6380 REPL) .(OPTION 09 ONLY)		
-56	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6385 REPL) .(OPTION 09 ONLY)		
-57	----- -----			1	.CONTACT SET,ELEC:(SEE A32J3708 REPL) .(OPTION 09 ONLY)		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-58	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (SEE A33 REPL) (OPTION 09 ONLY)		
-59	----- -----			1	.TERM SET,PIN:(SEE A33J6400 REPL) .(OPTION 09 ONLY)		
-60	----- -----			2	.CONTACT SET,ELEC:(SEE A33P6380,P6385 REPL) .(OPTION 09 ONLY)		
					STANDARD ACCESSORIES		
-61	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06,09 ONLY)	80009	012-0747-00
-62	206-0222-00			20	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06,09 ONLY)	80009	206-0222-00
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESS & MANUAL (OPTION 06,09 ONLY)	80009	010-6407-02
	010-6602-00			1	PROBE,TEMP:P6602,64.0 L,230 DEG C (OPTION 01 ONLY)	80009	010-6602-00
	012-0941-00			1	LEAD SET,METER:(2)LEAD,ELEC,(2)PROBE HEAD (OPTION 01 ONLY)	80009	012-0941-00
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	80009	016-0180-00
	016-0720-00			1	COVER,PROT:NYLON (OPTION 01 ONLY)	80009	016-0720-00
	020-0087-00			1	ACCESSORY PKG: (OPTION 01 ONLY)	80009	020-0087-00
	070-4181-00			1	MANUAL,TECH:REFERENCE,2445/2465 OPT 06/09 (OPTION 06,09 ONLY)	80009	070-4181-00
	070-5365-00			1	CARD,INFO:REF,DMM OPTION (OPTION 01 ONLY)	80009	070-5365-00
	070-6282-00			1	MANUAL,TECH:INTERFACING GUIDE,2445/2467 OPT 10 GPIB (OPTION 10 ONLY)	80009	070-6282-00
	200-2844-00			1	COVER,FRONT: (OPTION 01 ONLY)	80009	200-2844-00
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,CCIR (24X5A OPTION 05 ONLY)	80009	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,NTSC (24X5A OPTION 05 ONLY)	80009	378-0199-05
	378-0270-01			1	FILTER,LT,CRT:3.0 X 3.670,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-01
	378-0270-02			1	FILTER,LT,CRT:3.0 X 3.67,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-02
					OPTIONAL ACCESSORIES		
	070-5857-00			1	MANUAL,TECH:SERVICE OPTS,24X5A/2467	80009	070-5857-00
	070-6014-00			1	MANUAL,TECH:OPERATORS,2445A/55A/65A OPT 01, 06,05,09 & 10	80009	070-6014-00

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REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```
1 2 3 4 5                    Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
                **** END ATTACHING PARTS ****
  Detail Part of Assembly and/or Component
  Attaching parts for Detail Part
                **** END ATTACHING PARTS ****
    Parts of Detail Part
    Attaching parts for Parts of Detail Part
                **** END ATTACHING PARTS ****
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

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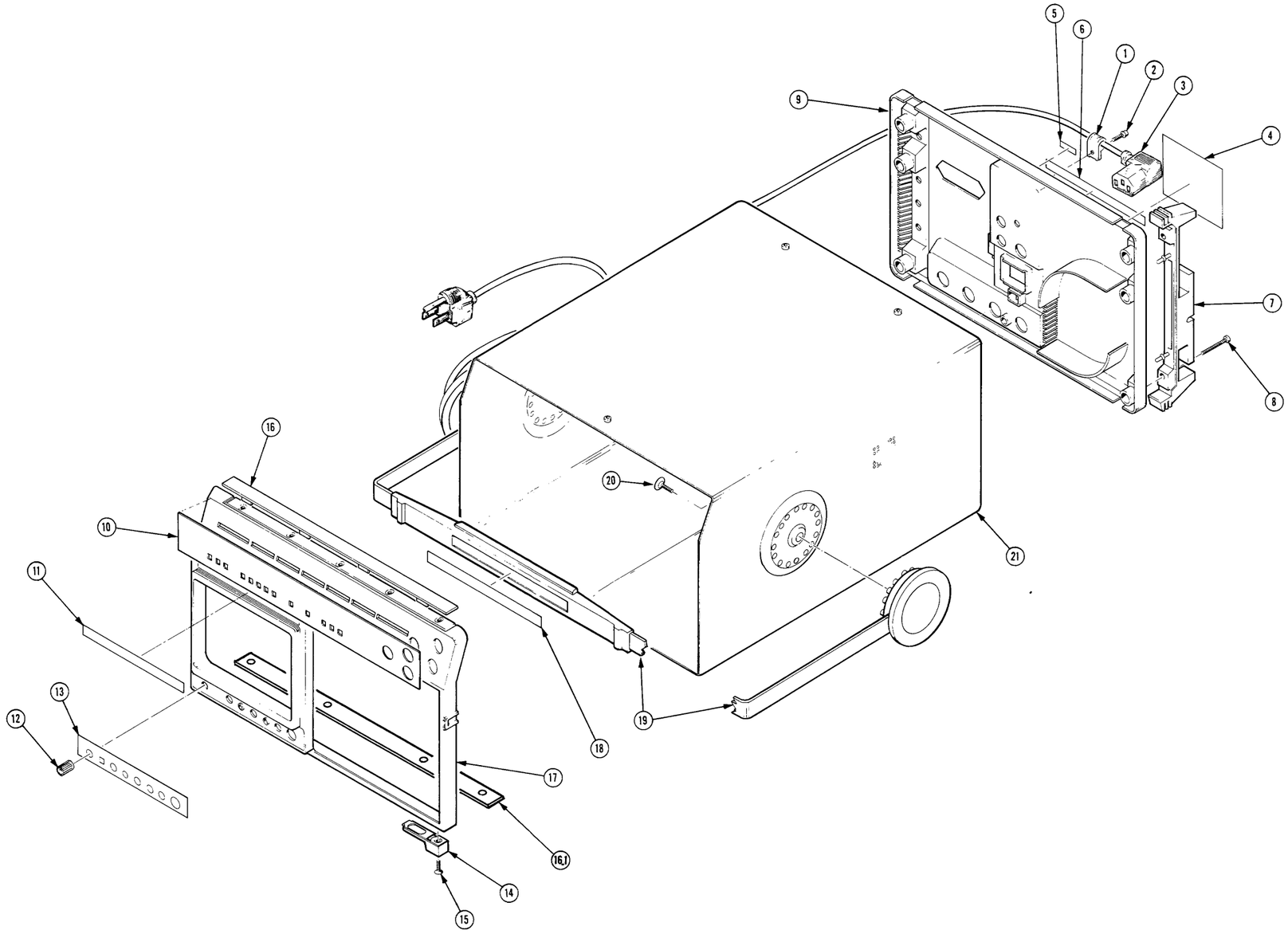
CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
04811	PRECISION COIL SPRING CO	10107 ROSE ST P O BOX 5450	EL MONTE CA 91734
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 60477
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039
09772	WEST COAST LOCKWASHER CO INC	16730 E JOHNSON DRIVE P O BOX 3588	CITY OF INDUSTRY CA 91744
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125
16428	BELDEN CORP ELECTRONIC DIV	2200 US HWY 27 SOUTH P O BOX 1980	RICHMOND IN 47374
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS	30 HUNTER LANE	CAMP HILL PA 17011
22670	G M NAMEPLATE INC	2040 15TH AVE WEST	SEATTLE WA 98119
24931	SPECIALTY CONNECTOR CO INC	2620 ENDRESS PLACE P O BOX D	GREENWOOD IN 46142
54583	TDK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
73743	FISCHER SPECIAL MFG CO	446 MORGAN ST	CINCINNATI OH 45206
77900	SHAKEPROOF DIV OF ILLINOIS TOOL WORKS	SAINT CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIVISION	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
85480	BRADY W H CO	727 W GLENDALE AVE	MILWAUKEE WI 53209
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201
88245	LITTON SYSTEMS INC USECO DIV	13536 SATICOY ST	VAN NUYS CA 91409
91836	KINGS ELECTRONICS CO INC	40 MARBLEDALE ROAD	TUCKAHOE NY 10707
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61101
S3629	SCHURTER AG H C/O PANEL COMPONENTS CORP	2015 SECOND STREET	BERKELEY CA 94170
TK0433	PORTLAND SCREW CO	6520 N BASIN	PORTLAND OR 97217
TK0435	LEWIS SCREW CO	4114 S PEORIA	CHICAGO IL 60609
TK0588	UNIVERSAL PRECISION PRODUCTS	1775 NW 216TH	HILLSBORO OR 97123
TK0861	H SCHURTER AG DIST PANEL COMPONENTS	2015 SECOND STREET	BERKELEY CA 94170
TK1165	STEN MFG INC	9702 85TH AVENUE N	MINNEAPOLIS MN 55369
TK1168	TEXSUN INC	11368 W OLYMPIC BLVD	LOS ANGELES CA 90023
TK1169	DIEMAKERS	801 SECOND ST	MONROE CITY MO 63456
TK1285	GEROME MFG CO INC	PO BOX 737	NEWBURG OR 97132
TK1319	MORELLIS Q & D PLASTICS	1812 16-TH AVE	FOREST GROVE OR 97116
TK1326	NORTHWEST FOURSLIDE INC	5858 WILLOW LANE	LAKE OSWEGO OR 97034
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK2092	DEMPSEY INDUSTRIES INC	802 N FOURTH ST	MIAMISBURG OH 45342-1812

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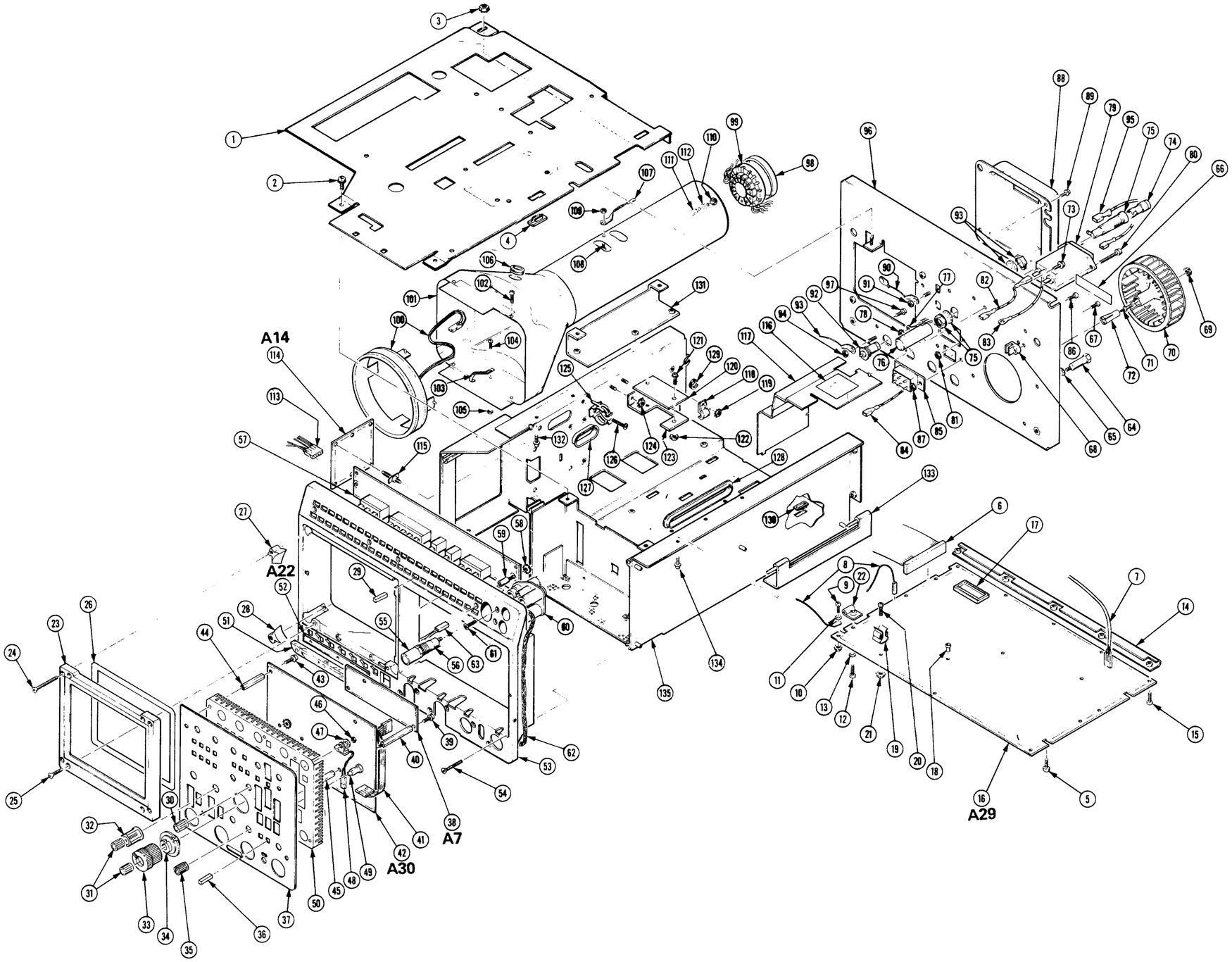
Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	343-0003-00			1	CLAMP,LOOP:0.25 ID,PLASTIC	06915	E4 CLEAR ROUND
					ATTACHING PARTS		
-2	211-0691-00			1	SCREW,MACHINE:6-32 X 0.625,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-3	161-0104-00			1	CABLE ASSY,PWR,:3 WIRE,98.0 L,W/RTANG CONN	16428	CH8352, FH-8352
					SAFETY CONTROLLED		
-4	334-4377-04			1	MARKER,IDENT:MKD CAUTION	80009	334-4377-04
-5	334-4378-01			1	MARKER,IDENT:MKD PROBE POWER	80009	334-4378-01
-6	334-6341-00			1	MARKER,IDENT:MKD REAR BNC	80009	334-6341-00
-7	348-0780-00			2	FOOT,CABINET:W/CORD WRAP,REAR,BLACK	80009	348-0780-00
					POLYYURETHANE		
					ATTACHING PARTS		
-8	212-0154-00			4	SCREW,MACHINE:8-32 X 1.125,PNH,STL	83385	ORDER BY DESCR
					END ATTACHING PARTS		
-9	200-2275-03			1	COVER,REAR:	80009	200-2275-03
					(BNC HOLE PUNCHED OUT WHEN OPT 10 PRESENT)		
-10	333-2995-00			1	PANEL,FRONT:	80009	333-2995-00
-11	334-6342-00			1	MARKER,IDENT:MKD TEKTRONIX 2465A	22670	ORDER BY DESCR
	334-6350-00			1	MARKER,IDENT:MKD TEKTRONIX 2465ACTS	22670	ORDER BY DESCR
	334-6343-00			1	MARKER,IDENT:MKD TEKTRONIX 2465A GPIB	22670	ORDER BY DESCR
	334-6348-00			1	MARKER,IDENT:MKD TEKTRONIX 2465ADVS	22670	ORDER BY DESCR
	334-6336-00			1	MARKER,IDENT:MKD TEKTRONIX 2465ADMS	22670	ORDER BY DESCR
-12	366-2041-03			4	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	80009	366-2041-03
	366-2036-00			1	PUSH BUTTON:GY,0.206 SQ,1.445 H	80009	366-2036-00
-13	333-2877-00			1	PANEL,FRONT:CRT	80009	333-2877-00
-14	348-0740-00			2	FOOT,CABINET:BOTTOM FRONT,PLASTIC	80009	348-0740-00
					ATTACHING PARTS		
-15	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-16	200-2779-00			1	COVER,TOP:TRIM	80009	200-2779-00
-17	101-0095-01			1	TRIM,DECORATIVE:FRONT	80009	101-0095-01
					ATTACHING PARTS		
	211-0718-00			10	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	83486	ORDER BY DESCR
					END ATTACHING PARTS		
-18	334-6340-00			1	MARKER,IDENT:MKD 2465A	07416	ORDER BY DESCR
	334-6347-00			1	MARKER,IDENT:MKD 2465ADMS	07416	ORDER BY DESCR
	334-6349-00			1	MARKER,IDENT:MKD 2465ADVS	07416	ORDER BY DESCR
	334-6350-00			1	MARKER,IDENT:MKD TEKTRONIX 2465ACTS	22670	ORDER BY DESCR
	334-6351-00			1	MARKER,IDENT:MKD 2465A	07416	ORDER BY DESCR
	437-0320-00			1	CABINET ASSY:	80009	437-0320-00
-19	367-0303-04			1	.HANDLE,CARRYING:12.86 L,GRIP & INDEX	80009	367-0303-04
					ATTACHING PARTS		
-20	212-0144-00			2	.SCREW,TPG,TF:8-16 X 0.562 L,PLASTITE,	93907	225-38131-012
					.SPCL HD		
					END ATTACHING PARTS		
-21	437-0309-00			1	.CABINET,SCOPE:	80009	437-0309-00
	348-0764-04			1	.SHLD GSKT,ELEK:0.125 X 0.188,WIRE MESH,2	80009	348-0764-04
					.LAYERS,37.0 L		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
					ATTACHING PARTS		
-2	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-3	210-0457-00			4	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-4	343-1012-00			1	RETAINER,CKT BD:POLYCARBONATE	80009	343-1012-00
-5	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-6	175-8324-00			1	CA ASSY,SP,ELEC:40,36 AWG,4.0 L,RIBBON	80009	175-8324-00
-7	175-8323-00			1	CA ASSY,SP,ELEC:3,26 AWG,13.0 L,9-N	80009	175-8323-00
-8	196-2924-00			1	LEAD ASSY,ELEC:2,24 AWG,5.5 L,9-1/9-2	80009	196-2924-00
					(DMM BD TO HVPS TO FRONT PANEL FUSE HOLDER)		
					ATTACHING PARTS		
-9	211-0304-00			1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-10	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
-11	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-12	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-13	----- -----			2	(CALLED OUT IN ERROR-PART OF 211-0711-00)		
-14	407-2842-00			1	BRACKET,CKT BD:ALUMINUM	80009	407-2842-00
					ATTACHING PARTS		
-15	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-16	----- -----			1	CKT BD ASSY:DGTL MULTIMETER(SEE A29 REPL)		
-17	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP	09922	DILB28P-108
-18	358-0136-00			18	.INSULATOR,BSHG:0.075 ID X 0.203 OD X 0.075	88245	420971
-19	344-0356-00			2	.CLIP,ELECTRICAL:FUSE,BRONZE,ALBALOY PL	71400	5960-63
					ATTACHING PARTS		
-20	211-0722-00			2	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
-21	210-0457-00			2	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
	361-1270-00			5	.SPACER,RELAY:PLASTIC	80009	361-1270-00
	337-3121-01			1	.SHIELD,ELEC:DMM,BOTTOM	80009	337-3121-01
	131-0183-00			6	.TERM,FEEDTHRU:0.57 L X 0.047 DIA,BRS,GLD PL	88245	ORDER BY DESCR
	131-0235-00			10	.TERMINAL,STUD:0.455 L,BIFURCATED	88245	ORDER BY DESCR
	210-0457-00			1	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
	211-0722-00			1	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
-22	214-3492-00			2	HINGE HALF:DMM,ALUMINUM	TK1165	80630-000
-23	426-1864-01			1	FRAME,CRT:	TK1169	ORDER BY DESCR
					ATTACHING PARTS		
-24	211-0713-00			4	SCREW,MACHINE:6-32 X 1.25,FLH,100 DEG,STL	83385	ORDER BY DESCR
-25	213-0194-00			4	THUMBSCREW:0.25-36 X 0.203,0.312 OD HD,BRS	80009	213-0194-00
-26	348-0731-01			1	GASKET:CRT,POLYETHYLENE	80009	348-0731-01
	337-2926-03			1	SHLD,IMPLOSION:4.44 X 3.67 X 0.06,CLEAR	80009	337-2926-03
-27	343-0993-00			2	RETAINER,CRT:BLACK,PLASTIC	80009	343-0993-00
					(UPPER LEFT/LOWER RT/BLACK)		
-28	343-0992-00			2	RETAINER,CRT:CLEAR,PLASTIC	80009	343-0992-00
					(UPPER RT/LOWER LEFT/NATURAL)		
-29	366-2013-02			13	PUSH BUTTON:IVORY GRAY,0.186 SQ X 0.48 H	80009	366-2013-02
-30	366-1833-00			3	KNOB:GRAY,0.25 ID X 0.392 OD X 0.466 H	80009	366-1833-00
-31	366-2145-01			3	KNOB:DOVE GRAY,TIME/DIV,0.08 ID X0.392 OD X	80009	366-2145-01
					0.466 H		
-32	366-2038-00			2	KNOB:GY,0.25 ID X 0.706 OD X 0.6H	80009	366-2038-00
-33	366-2039-02			1	KNOB:GX,B SWEEP	80009	366-2039-02
-34	366-2040-00			1	KNOB:CLEAR,A SWEEP,0.252 ID X 1.12 OD	80009	366-2040-00
-35	366-2041-03			7	KNOB:DOVE GRAY,BAR,0.172 X 0.41 X 0.496	80009	366-2041-03
-36	366-2017-00			16	PUSH BUTTON:0.18 SQ X 0.644 H,IVORY GY	80009	366-2017-00
-37	333-3274-00			1	PANEL,FRONT:	22670	ORDER BY DESCR
-38	----- -----			1	CKT BD ASSY:FRONT PANEL VAR(SEE A7 REPL)		
					(STANDARD MANUAL)		
					ATTACHING PARTS		
-39	211-0304-00			3	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-40	129-0941-00			2	SPCR,POST:1.86 L,4-40 INT/EXT,STL,0.188 HEX	80009	129-0941-00
-41	175-4597-00			1	CA ASSY,SP,ELEC:5,26 AWG,4.0 L,RIBBON	80009	175-4597-00
-42	----- -----			1	CKT BD ASSY:FRONT PANEL(SEE A6 REPL)		
					(STANDARD MANUAL)		
					ATTACHING PARTS		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-43	211-0304-00			5	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX END ATTACHING PARTS	01536	ORDER BY DESCR
-44	129-0938-00			5	SPCR POST:1.102 L,4-40 EA END,AL,0.188 HEX	80009	129-0938-00
-45	129-0978-00			2	SPACER,POST:0.375-32,AL,0.5 HEX	80009	129-0978-00
-46	220-0495-00			2	NUT,PLAIN,HEX:0.375-32 X 0.438 HEX,BRS	73743	ORDER BY DESCR
-47	210-0012-00			3	WASHER,LOCK:0.384 ID,INTL,0.022 THK,STL	09772	ORDER BY DESCR
-48	----- -----			1	SWITCH,PUSH:SPST,0.1A,125VAC (SEE CHASSIS S3185 REPL)(STANDARD INST)		
-49	377-0550-01			10	INSERT,KNOB:0.178 ID X 0.37 OD X 0.64	80009	377-0550-01
-50	354-0632-01			1	RING,MOUNTING:5.41 X 4.18,BRASS	80009	354-0632-01
-51	378-0204-00			1	REFLECTOR,LIGHT:INT SCALE ILLUMINATION	80009	378-0204-00
-52	----- -----			1	CKT BD ASSY:LED (SEE A22 REPL)		
	361-1317-00			3	.SPACER,SLEEVE:0.375 L X 0.085 ID,PVC BLK	80009	361-1317-00
-54	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL END ATTACHING PARTS	83385	ORDER BY DESCR
-56	352-0765-01			1	FUSEHOLDER:3AG,PNL MT	80009	352-0765-01
-57	----- -----			1	CKT BD ASSY:FRONT PANEL(EXTENDED) (SEE A30 REPL)		
-59	361-1273-01			3	.SPACER,CKT BD:W/POST SPACER	80009	361-1273-01
-60	352-0691-01			1	HOLDER,CONN:POLYCARBONATE ATTACHING PARTS	80009	352-0691-01
-61	213-0914-00			2	SCREW,TPG,TR:6-32 X 0.75,FLH,100 DEG,STL END ATTACHING PARTS	83385	ORDER BY DESCR
	136-0765-00			2	JACK,TIP:BANANA	80009	136-0765-00
	196-1577-01			1	LEAD,ELECTRICAL:24 AWG,3.0 L,9-1 (FROM DMM BD)	80009	196-1577-01
-62	348-0792-02			1	GASKET:ELECTRICAL SHIELD,37.0 L	80009	348-0792-02
-63	175-8730-00			1	CA ASSY,SP,ELEC:2,26 AWG,7.5 L	80009	175-8730-00
-64	361-1188-00			1	SPACER,POST:1.15 L,4-40 THD ONE END,STL, 0.312 HEX	80009	361-1188-00
-65	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-66	334-4865-00			1	MARKER,IDENT:MKD FAN,CAUTION	80009	334-4865-00
-67	211-0304-00			2	SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX (ATTACHING PART FOR 2-68)	01536	ORDER BY DESCR
-68	386-4863-00			1	SUPPORT,CKT BD:	80009	386-4863-00
-69	220-0555-00			1	NUT,PLAIN,HEX:8-32 X 0.25 HEX,STL CD PL	TK0433	ORDER BY DESCR
-70	369-0043-01			1	IMPLR,FAN ASSY:2.8 DIA,0.25 DIA SHAFT, POLYAMIDE	80009	369-0043-01
	343-1190-00			1	COLLAR,IMPELLER:0.464 X 0.25,ALUMINUM	80009	343-1190-00
-71	355-0192-00			1	STUD,SHLDR&STEP:4-40/8-32 ENDS,0.5 L,SST	TK0588	ORDER BY DESCR
-72	343-1040-01			1	COLLAR,FAN MT:POLYMIDE	80009	343-1040-01
-73	211-0711-00			1	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX (ATTACHING PART FOR 2-117)	01536	ORDER BY DESCR
-74	200-2264-00			1	CAP,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-75	204-0833-00			1	BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	TK0861	031 1653 (FEU)
-76	200-2265-00			1	CAP,FUSEHOLDER:5 X 20MM FUSES	TK0861	FEK 031.1663
					SUBPARTS FOR A2 BOARD INCLUDE:		
-77	195-3984-00			1	.LEAD,ELECTRICAL:22 AWG,4.0 L,8-01 ATTACHING PARTS	80009	195-3984-00
-78	210-0457-00			1	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL END ATTACHING PARTS	78189	511-061800-00
-79	119-1536-00			1	.FILTER,RFI:3A,250VAC,50/60HZ ATTACHING PARTS	54583	ZUB2203-00
-80	211-0332-00			2	.SCR,ASSEM WSHR:4-40 X 0.5,PNH,STL CD PL, .TORX T9	01536	ORDER BY DESCR
-81	210-0586-00			2	.NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-82	195-3989-00			1	.LEAD,ELECTRICAL:18 AWG,4.0 L,8-9	80009	195-3989-00
-83	195-3990-00			1	.LEAD,ELECTRICAL:18 AWG,4.5 L,5-4	80009	195-3990-00
-84	195-3987-00			1	.LEAD,ELECTRICAL:22 AWG,2.6 L,8-19	80009	195-3987-00
	195-3988-00			1	.LEAD,ELECTRICAL:22 AWG,4.0 L,8-29	80009	195-3988-00
-85	----- -----			1	.SWITCH,SLIDE:DPDT: (SEE CHASSIS S90 REPL)(STANDARD MANUAL) ATTACHING PARTS		
-86	211-0304-00			2	.SCR,ASSEM WSHR:4-40 X 0.312,PNH,STL,T9 TORX	01536	ORDER BY DESCR
-87	210-0586-00			2	.NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL END ATTACHING PARTS	78189	211-041800-00
-88	200-2686-00			1	COVER,REAR:CRT	80009	200-2686-00

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-					ATTACHING PARTS		
-89	211-0718-00			4	SCREW,MACHINE:6-32 X 0.312,FLH,100 DEG,STL	83486	ORDER BY DESCR
					END ATTACHING PARTS		
-90	195-8410-00			1	LEAD,ELECTRICAL:22 AWG,1.65 L	80009	195-8410-00
					(GROUND FROM REAR PLATE TO CRT SHEILD)		
					ATTACHING PARTS		
-91	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-92	131-1910-01			4	CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR284-1
-93	195-9513-00			1	LEAD,ELECTRICAL:22 AWG,1.4 L,	80009	195-9513-00
					ATTACHING PARTS		
-94	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-95	195-3984-00			1	LEAD,ELECTRICAL:22 AWG,4.0 L,8-01	80009	195-3984-00
-96	386-5048-01			1	PLATE,REAR:PWR SPLY	80009	386-5048-01
-97	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-98	200-0917-01			1	COVER,CRT SKT:2.052 OD X 0.291 H,PLASTIC	80009	200-0917-01
-99	198-4603-01			1	WIRE SET,ELEC:W/CRT SOCKET	80009	198-4603-01
-100	119-1478-01			1	COIL,TUBE DEFL:FXD,TRACE ROTATION	80009	119-1478-01
-101	337-2931-01			1	SHIELD,CRT:	TK1285	337-2931-01
					ATTACHING PARTS		
-102	211-0337-00			4	SCREW,MACHINE:4-40 X 0.25,PNH,SST	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-103	214-0291-00			1	CONTACT,ELEC:CRT CONNECTOR,CU BE SIL PL	04811	ORDER BY DESCR
					ATTACHING PARTS		
-104	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-105	210-0586-00			1	NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
					END ATTACHING PARTS		
-106	348-0762-00			1	GROMMET,PLASTIC:BLACK,ROUND,0.54 ID	80009	348-0762-00
-107	195-6851-01			1	LEAD,ELECTRICAL:BRAIDED,1.65 L	80009	195-6851-01
					ATTACHING PARTS		
-108	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-109	210-0551-00			1	NUT,PLAIN,HEX:4-40 X 0.25,ST CD PL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-110	210-0457-00			1	NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
-111	211-0324-00			1	SCR,ASSEM WSHR:4-40 X 0.188,PNH,T9 TORX DR	01536	829-06780-024
-112	210-0994-00			1	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-113	175-8010-01			1	CA ASSY,SP,ELEC:5,22 AWG,10.5 L,RIBBON	80009	175-8010-01
-114	----- -----			1	CKT BD ASSY:DYNAMIC CENTERING		
					(SEE A14 REPL)(STANDARD MANUAL)		
					ATTACHING PARTS		
-115	361-0067-00			3	SPACER,CKT BD:0.187,NYLON	06915	LCBS3M
					END ATTACHING PARTS		
-116	334-4759-00			1	MARKER,IDENT:MKD SHIELDS INVERTER	80009	334-4759-00
-117	337-3120-00			1	SHIELD,ELEC:DMM,TOP	80009	337-3120-00
					SUBPARTS OF A29 BOARD INCLUDE:		
-118	343-0081-00			1	.STRAP,RETAINING:0.125 DIA,NYLON	85480	CPNY-172BK
					ATTACHING PARTS		
-119	210-0457-00			1	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-120	307-1154-00			1	.PASSIVE NETWORK:CRT TERMINATOR	80009	307-1154-00
					ATTACHING PARTS		
-121	211-0711-00			2	.SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
-122	210-0457-00			2	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-123	407-2809-00			1	.BRACKET,ANGLE:RESISTOR,AL	80009	407-2809-00
					ATTACHING PARTS		
-124	210-0457-00			2	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
-125	343-1099-00			1	.RTNR,POWER SPLY:LOW VOLTAGE,FRONT,PC	TK1168	ORDER BY DESCR
					ATTACHING PARTS		
-126	211-0711-00			1	.SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-127	348-0763-00			1	.GROMMET,PLASTIC:NATURAL,OVAL,1.235 ID	80009	348-0763-00
-128	348-0751-00			1	.GROMMET,PLASTIC:NATURAL,3.11 X 0.645 OBLONG	80009	348-0751-00
-129	348-0757-00			1	.GROMMET,PLASTIC:BLACK,U SHAPE,0.25 ID	80009	348-0757-00
-130	343-1012-00			1	.RETAINER,CKT BD:POLYCARBONATE	80009	343-1012-00

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-131	407-3092-00			1	.BRKT,CMPNT MTG:DMM	80009	407-3092-00
					ATTACHING PARTS		
-132	211-0711-00			2	.SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
	211-0730-00			1	.SCR,ASSEM WSHR:6-32 X 0.375,PNH,STL,T15	80009	211-0730-00
	210-0858-00			1	.WASHER,FLAT:0.172 ID X 0.5 OD X 0.062,BRS	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-133	407-3124-00			1	.BRKT ASSY,HINGE:ALUMINUM	80009	407-3124-00
					ATTACHING PARTS		
-134	211-0711-00			2	.SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
	211-0720-00			5	.SCR,ASSEM WSHR:6-32 X 0.50,PNH,STL,TORX,T15	01536	829-09487
	211-0722-00			1	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
					END ATTACHING PARTS		
-135	441-1618-02			1	CHASSIS,SCOPE:	80009	441-1618-02

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
-2	200-2871-00			1	COVER,ELEC CONN: (OPTION 05,10 ONLY)	TK1319	ORDER BY DESCR
-3	200-2277-00			1	COVER,ELEC CONN: (OPTION 10 ONLY)	TK1319	56411-000
-4	361-1286-00			1	SPACER,BRACKET:7.5 L,POLYCARBONATE,BLACK (OPTION 06,09,10 ONLY) ATTACHING PARTS	80009	361-1286-00
-5	211-0711-00			2	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX (OPTION 06,09,10 ONLY) END ATTACHING PARTS	01536	ORDER BY DESCR
-6	343-1012-00			2	RETAINER,CKT BD:POLYCARBONATE (OPTION 10 ONLY)	80009	343-1012-00
-7	337-3141-00			1	SHIELD,ELEC:BULKHEAD (OPTION 10 ONLY)	80009	337-3141-00
-8	175-7180-00			1	CA ASSY,SP,ELEC:20,28 AWG,9.50 L,RIBBON (OPTION 10 ONLY)	80009	175-7180-00
	200-3436-00			2	SHIELD,CAP:0.093 X 0.25 X 0.19,PLSTC,BLK (OPTION 05,06,09)	TK2092	200-3436-00
-9	175-7925-01			1	CABLE ASSY,RF:50 OHM COAX,21.25 L (OPTION 05 ONLY)	80009	175-7925-01
-10	175-7927-00	B010100	B011834	1	CA ASSY,SP,ELEC:10,28 AWG,11.00 L,RIBBON	80009	175-7927-00
	175-7927-01	B011835		1	CA ASSY,SP,ELEC:10,36 AWG,11.75 L,RIBBON (OPTION 05,06,09 ONLY)	80009	175-7927-01
-11	175-9478-00			1	CABLE ASSY,RF:75 OHM COAX,12.0 L,O-N (OPTION 05 ONLY)	80009	175-9478-00
	175-7929-00			1	CA ASSY,SP,ELEC:4,26 AWG,18.0 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7929-00
-12	175-7928-00			1	CA ASSY,SP,ELEC:10,28 AWG,!8.75 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7928-00
-13	----- -----			1	CIRCUIT BD ASSY:TV OPTION (SEE A25 REPL) (OPTION 05 ONLY)		
	----- -----			1	CIRCUIT BD ASSY:COUNTER/TRIGGER/TIMER (SEE A27 REPL) (OPTION 06,09 ONLY)		
-14	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 05,06,09 ONLY)	09922	DILB28P-108
	129-1056-00			1	.SPCR,POST:0.4 L,6-32 INT/EXT,STL,0.312 HEX	80009	129-1056-00
	131-0933-00			1	.TERMINAL,STUD:0.5 L,BRASS ALBALOY PL	80009	131-0933-00
	210-0006-00			1	.WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
	211-0722-00			1	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
	214-3799-00			2	.HEAT SINK,ELEC:ALUMINUM .(OPTION 06,09 ONLY)	TK1680	214-3799-00
	343-0005-00			1	.CLAMP,LOOP:0.437 ID,PLASTIC	06915	E7 CLEAR ROUND
-15	----- -----			1	CIRCUIT BD ASSY:GPIB OPTION (SEE A23 REPL) (OPTION 10 ONLY)		
-16	136-0755-00			2	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 10 ONLY)	09922	DILB28P-108
-17	----- -----			1	CIRCUIT BD ASSY:LED (SEE A22 REPL) (OPTION 10 ONLY) ATTACHING PARTS		
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL END ATTACHING PARTS	80009	211-0378-00
-18	378-0896-01			3	.LENS,LIGHT:CLEAR LED .(OPTION 10 ONLY)	80009	378-0896-01
-19	175-7185-00			1	.CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON .(OPTION 10 ONLY)	80009	175-7185-00
-20	386-0867-00			1	PLATE,MOUNTING:LED (OPTION 10 ONLY) ATTACHING PARTS	80009	386-0867-00
	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	01536	ORDER BY DESCR
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL END ATTACHING PARTS	80009	211-0378-00
-21	----- -----			1	CIRCUIT BD ASSY:BUFFER (SEE A20 REPL) ATTACHING PARTS		
-22	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX END ATTACHING PARTS	01536	ORDER BY DESCR
	214-2799-00			1	CIRCUIT BD ASSY INCLUDES: .HINGE,BUTT:1.95 W X 2.0 L,ALUMINUM	80009	214-2799-00

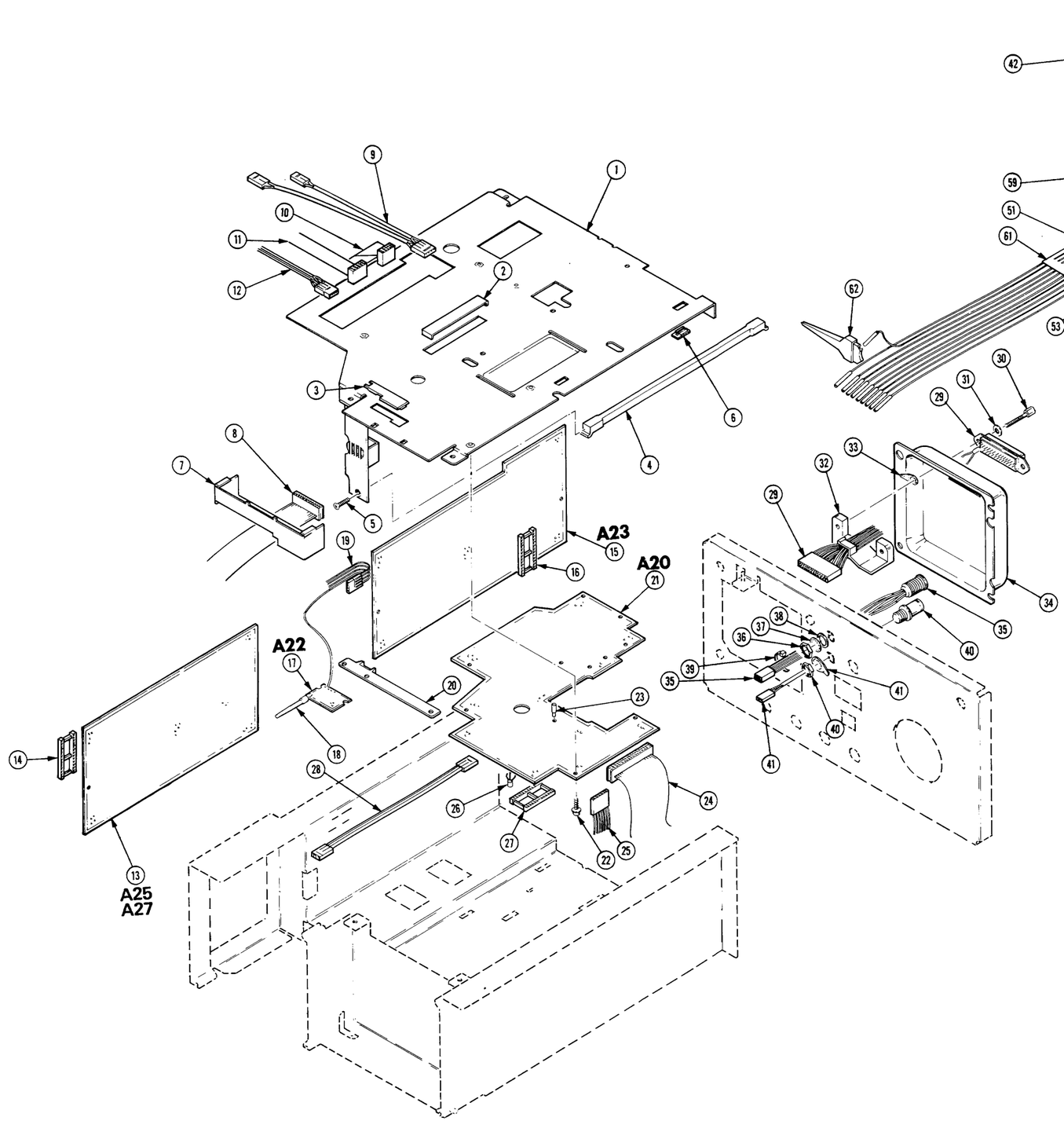
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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-					.(OPTION 10 ONLY)		
	214-3800-00			1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
	131-0993-00	B010100	B016891	1	.BUS,CONDUCTOR:SHUNT ASSEMBLY,BLACK	22526	65474-005
	131-3957-00	B016892		1	.BUS,CONDUCTOR:SHUNT ASSEMBLY,BLACK	80009	131-3957-00
-23	361-1252-01			5	.SPACER,CKT BD:0.1 ID X 0.188 OD X 0.185 H, .PLASTIC	80009	361-1252-01
-24	175-7184-01			1	.CA ASSY,SP,ELEC:34,28 AWG,6.5 L,RIBBON	80009	175-7184-01
-25	175-7183-00			1	.CA ASSY,SP,ELEC:7,22 AWG,7.75 L,RIBBON	80009	175-7183-00
-26	214-3800-00			1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-27	136-0751-00			1	.SKT,PL-IN ELEK:MICROCKT,24 PIN	09922	DILB24P108
-28	175-7930-00			1	CA ASSY,SP,ELEC:3,26 AWG,11.0 L,RIBBON (OPTION 05 ONLY)	80009	175-7930-00
-29	175-7215-01	B010100	B014743	1	CA ASSY,SP,ELEC:24,28 AWG,FLEX	80009	175-7215-01
	174-0203-00	B014744		1	CA ASSY,SP,ELEC:24,28 AWG,7.45 L,RIBBON (OPTION 10 ONLY)	80009	174-0203-00
					ATTACHING PARTS		
-30	129-1107-00			2	SPACER,POST:0.98 L,6-32 SST 0.25 HEX	80009	129-1107-00
-31	210-0069-00			2	WASHER,LOCK:#8 SPLIT,0.04 THK STL	86928	ORDER BY DESCR
					END ATTACHING PARTS		
-32	337-0118-01			1	SHIELD,ELEC:GPIB (OPTION 10 ONLY)	80009	337-0118-01
-33	210-0201-00			1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL (OPTION 10 ONLY)	86928	A373-157-2
-34	200-2686-02			1	COVER,REAR:CRT,ALUMINUM (OPTION 10 ONLY)	80009	200-2686-02
					ATTACHING PARTS		
	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-35	175-7932-00			1	CA ASSY,SP,ELEC:6,26 AWG,5.00 L,9-N (OPTION 06,09 ONLY)	80009	175-7932-00
					ATTACHING PARTS		
-36	----- -----			1	.NUT,PLAIN,HEX:(PART OF CABLE ASSY)		
-37	210-0021-00			1	WASHER,LOCK:0.476 ID,INTL,0.018 THK,STL	78189	1222-01
-38	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-39	346-0120-00	B010100	B010812	1	STRAP,TIEDOWN,E:5.5 L MIN,PLASTIC	06383	SST1.5M
	343-0149-00	B010813		2	STRAP,TIEDOWN,E:6.75 L,PLASTIC (OPTION 06,09,10 ONLY)	06383	ORDER BY DESCR
-40	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE (OPTION 06,09 ONLY)	91836	K79-304M06
-41	175-7931-00			1	CABLE ASSY,RF:50 OHM COAX,4.25 L (OPTION 06,09 ONLY)	80009	175-7931-00
-42	334-5200-00			1	MARKER,IDENT:MKD WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	334-5200-00
-43	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX,20UA MAX @ 2.7V,0.6MA MAX @ 0.5V (OPTION 09 ONLY)	80009	334-5201-02
	131-1343-00			1	TERM SET,PIN:36-0.525 L X 0.025 SQ (OPTION 06,09 ONLY)	TK1483	082-3643-SS02
	334-0001-00			1	MARKER,IDENT:MKD WORD RECOGNIZER IN/OUT (OPTION 09 ONLY)	07416	58600-000
-44	380-0710-00			1	HOUSING,PROBE:LOWER,PC (OPTION 09 ONLY)	80009	380-0710-00
-45	380-0711-00			1	HOUSING,PROBE:UPPER,PC (OPTION 09 ONLY)	80009	380-0711-00
					ATTACHING PARTS		
-46	211-0318-00			4	SCREW,MACHINE:4-40 X 0.75,FLH,100 DEG,STL	83385	ORDER BY DESCR
-47	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					END ATTACHING PARTS		
-48	358-0675-00			1	STRAIN RLF,CA:UPPER (OPTION 09 ONLY)	80009	358-0675-00
-49	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC (OPTION 09 ONLY)	80009	358-0347-00
-50	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N (OPTION 09 ONLY)	80009	175-8853-01
-51	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY (OPTION 09 ONLY)	80009	361-0758-01
-52	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-					(SEE A32 REPL) (OPTION 09 ONLY)		
-53	----- -----			1	.TERM SET,PIN:(SEE A32J6300 REPL) .(OPTION 09 ONLY)		
-54	----- -----			1	.CONTACT SET,ELEC:(SEE A32J6370 REPL) .(OPTION 09 ONLY)		
-55	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6380 REPL) .(OPTION 09 ONLY)		
-56	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6385 REPL) .(OPTION 09 ONLY)		
-57	----- -----			1	.CONTACT SET,ELEC:(SEE A32J3708 REPL) .(OPTION 09 ONLY)		
-58	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (SEE A33 REPL) (OPTION 09 ONLY)		
-59	----- -----			1	.TERM SET,PIN:(SEE A33J6400 REPL) .(OPTION 09 ONLY)		
-60	----- -----			2	.CONTACT SET,ELEC:(SEE A33P6380,P6385 REPL) .(OPTION 09 ONLY)		
					STANDARD ACCESSORIES		
-61	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06,09 ONLY)	80009	012-0747-00
-62	206-0222-00			20	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06,09 ONLY)	80009	206-0222-00
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESS & MANUAL (OPTION 06,09 ONLY)	80009	010-6407-02
	010-6602-00			1	PROBE,TEMP:P6602,64.0 L,230 DEG C (OPTION 01 ONLY)	80009	010-6602-00
	012-0941-01			1	LEAD SET,METER:(2)LEAD,ELEC (OPTION 01 ONLY)	80009	012-0941-01
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	80009	016-0180-00
	016-0720-00			1	COVER,PROT:NYLON (OPTION 01 ONLY)	80009	016-0720-00
	020-0087-00			1	ACCESSORY PKG: (OPTION 01 ONLY)	80009	020-0087-00
	070-4181-00			1	MANUAL,TECH:REFERENCE,2445/2465 OPT 06/09 (OPTION 06,09 ONLY)	80009	070-4181-00
	070-5365-00			1	CARD,INFO:REF,DMM OPTION (OPTION 01 ONLY)	80009	070-5365-00
	070-6282-00			1	MANUAL,TECH:INTERFACING GUIDE,2445/2467 OPT 10 GPIB (OPTION 10 ONLY)	80009	070-6282-00
	200-2844-00			1	COVER,FRONT: (OPTION 01 ONLY)	80009	200-2844-00
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,CCIR (24X5A OPTION 05 ONLY)	80009	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,NTSC (24X5A OPTION 05 ONLY)	80009	378-0199-05
	378-0270-01			1	FILTER,LT,CRT:3.0 X 3.670,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-01
	378-0270-02			1	FILTER,LT,CRT:3.0 X 3.67,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-02
					OPTIONAL ACCESSORIES		
	070-5857-00			1	MANUAL,TECH:SERVICE OPTS,24X5A/2467	80009	070-5857-00
	070-6014-00			1	MANUAL,TECH:OPERATORS,2445A/55A/65A OPT 01, 06,05,09 & 10	80009	070-6014-00

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2465A ILLUSTRATION
24X5A/2467 OPTIONS SERVICE

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REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```
1 2 3 4 5                    Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
                **** END ATTACHING PARTS ****
  Detail Part of Assembly and/or Component
  Attaching parts for Detail Part
                **** END ATTACHING PARTS ****
    Parts of Detail Part
    Attaching parts for Parts of Detail Part
                **** END ATTACHING PARTS ****
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

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CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 60477
06915	RICHCO PLASTIC CO	5825 N TRIPP AVE	CHICAGO IL 60646
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125
73743	FISCHER SPECIAL MFG CO	446 MORGAN ST	CINCINNATI OH 45206
77900	SHAKEPROOF DIV OF ILLINOIS TOOL WORKS	SAINT CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIVISION	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	4900 S W GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201
91836	KINGS ELECTRONICS CO INC	40 MARBLEDALE ROAD	TUCKAHOE NY 10707
TK1319	MORELLIS Q & D PLASTICS	1812 16-TH AVE	FOREST GROVE OR 97116
TK1326	NORTHWEST FOURSLIDE INC	5858 WILLOW LANE	LAKE OSWEGO OR 97034
TK1483	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
TK1680	TECHNICAL DYNAMICS ALUMINUM CORP	9124 SW 64TH	PORTLAND OR 97206
TK2092	DEMPSEY INDUSTRIES INC	802 N FOURTH ST	MIAMISBURG OH 45342-1812

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-1	407-1473-00			1	BRACKET,SUPPORT:CKT BD,ALUMINUM	80009	407-1473-00
-2	200-2871-00			1	COVER,ELEC CONN: (OPTION 05,10 ONLY)	TK1319	ORDER BY DESCR
-3	200-2277-00			1	COVER,ELEC CONN: (OPTION 10 ONLY)	TK1319	56411-000
-4	361-1286-00			1	SPACER,BRACKET:7.5 L,POLYCARBONATE,BLACK (OPTION 06,09,10 ONLY) ATTACHING PARTS	80009	361-1286-00
-5	211-0722-00			2	SCREW,MACHINE:6-32 X 0.25,PNH,STL (OPTION 06,09,10 ONLY) END ATTACHING PARTS	80009	211-0722-00
-6	343-1012-00			2	RETAINER,CKT BD:POLYCARBONATE (OPTION 10 ONLY)	80009	343-1012-00
-7	337-3141-00			1	SHIELD,ELEC:BULKHEAD (OPTION 10 ONLY)	80009	337-3141-00
-8	175-7180-00			1	CA ASSY,SP,ELEC:20,28 AWG,9.50 L,RIBBON (OPTION 10 ONLY)	80009	175-7180-00
	200-3436-00			2	SHIELD,CAP:0.093 X 0.25 X 0.19,PLSTC,BLK (OPTIONS 05,06,09)	TK2092	200-3436-00
-9	175-7925-00	B010100	B010281	1	CABLE ASSY,RF:50 OHM COAX,19.0 L	80009	175-7925-00
	175-7925-01	B010282		1	CABLE ASSY,RF:50 OHM COAX,21.25 L (OPTION 05 ONLY)	80009	175-7925-01
-10	175-7927-01			1	CA ASSY,SP,ELEC:10,36 AWG,11.75 L,RIBBON (OPTION 05,06,09 ONLY)	80009	175-7927-01
-11	175-9478-00			1	CABLE ASSY,RF:75 OHM COAX,12.0 L,0-N (OPTION 05 ONLY)	80009	175-9478-00
	175-7929-00			1	CA ASSY,SP,ELEC:4,26 AWG,18.0 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7929-00
-12	175-7928-00			1	CA ASSY,SP,ELEC:10,28 AWG,!8.75 L,RIBBON (OPTION 06,09 ONLY)	80009	175-7928-00
-13	----- -----			1	CIRCUIT BD ASSY:TV OPTION (SEE A25 REPL) (OPTION 05 ONLY)		
	----- -----			1	CIRCUIT BD ASSY:COUNTER/TRIGGER/TIMER (SEE A27 REPL) (OPTION 06,09 ONLY)		
-14	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 05,06,09 ONLY)	09922	DILB28P-108
	129-1056-00			1	.SPCR,POST:0.4 L,6-32 INT/EXT,STL,0.312 HEX	80009	129-1056-00
	131-0933-00			1	.TERMINAL,STUD:0.5 L,BRASS ALBALOY PL	80009	131-0933-00
	210-0006-00			1	.WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
	211-0722-00			1	.SCREW,MACHINE:6-32 X 0.25,PNH,STL	80009	211-0722-00
	214-3799-00			1	.HEAT SINK,ELEC:ALUMINUM .(OPTION 06,09 ONLY)	TK1680	214-3799-00
	343-0005-00			1	.CLAMP,LOOP:0.437 ID,PLASTIC	06915	E7 CLEAR ROUND
-15	----- -----			1	CIRCUIT BD ASSY:GPIB OPTION (SEE A23 REPL) (OPTION 10 ONLY)		
-16	136-0755-00			1	.SKT,PL-IN ELEK:MICROCIRCUIT,28 DIP .(OPTION 10 ONLY)	09922	DILB28P-108
	334-6344-00			1	MARKER,IDENT:MKD TEKTRONIX 2467 GPIB (OPTION 10 ONLY)	80009	334-6344-00
-17	----- -----			1	CIRCUIT BD ASSY:LED (SEE A22 REPL) (OPTION 10 ONLY) ATTACHING PARTS		
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL END ATTACHING PARTS	80009	211-0378-00
-18	378-2057-00			1	.LENS,LIGHT:CLEAR,PLASTIC,PIPE .(OPTION 10 ONLY)	80009	378-2057-00
-19	175-7185-00			1	.CA ASSY,SP,ELEC:4,26 AWG,7.5 L,RIBBON .(OPTION 10 ONLY)	80009	175-7185-00
-20	386-0867-00			1	PLATE,MOUNTING:LED (OPTION 10 ONLY) ATTACHING PARTS	80009	386-0867-00
	211-0337-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,SST	01536	ORDER BY DESCR
	211-0378-00			1	SCR,ASSEM WSHR:4-40 X 0.375.PNH,STL,CD PL END ATTACHING PARTS	80009	211-0378-00
-21	----- -----			1	CIRCUIT BD ASSY:BUFFER (SEE A20 REPL) ATTACHING PARTS		
-22	211-0711-00			5	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX END ATTACHING PARTS	01536	ORDER BY DESCR

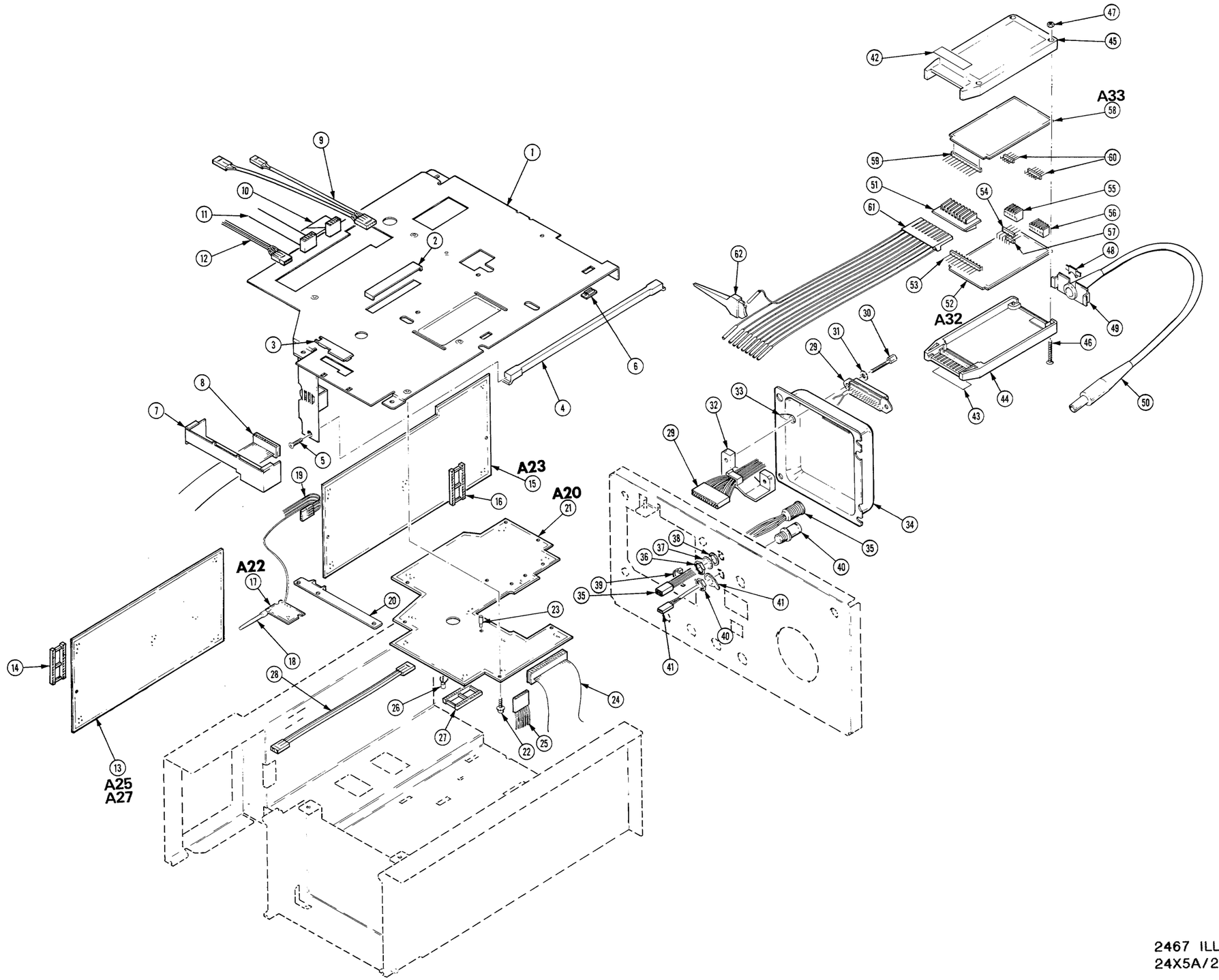
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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-23	361-1252-01			5	.SPACER,CKT BD:0.1 ID X 0.188 OD X 0.185 H, .PLASTIC	80009	361-1252-01
-24	175-7184-01			1	.CA ASSY,SP,ELEC:34,28 AWG,6.5 L,RIBBON	80009	175-7184-01
-25	175-7183-00			1	.CA ASSY,SP,ELEC:7,22 AWG,7.75 L,RIBBON	80009	175-7183-00
-26	214-3800-00			1	.SPRING,RETAINER:0.016 THK,SST	TK1326	214-3800-00
-27	136-0751-00			1	.SKT,PL-IN ELEK:MICROCKT,24 PIN	09922	DILB24P108
-28	175-7930-00			1	CA ASSY,SP,ELEC:3,26 AWG,11.0 L,RIBBON (OPTION 05 ONLY)	80009	175-7930-00
-29	174-0203-00			1	CA ASSY,SP,ELEC:24,28 AWG,7.45 L,RIBBON (OPTION 10 ONLY)	80009	174-0203-00
					ATTACHING PARTS		
-30	129-1107-00			2	SPACER,POST:0.98 L,6-32 SST 0.25 HEX	80009	129-1107-00
-31	210-0069-00			2	WASHER,LOCK:#8 SPLIT,0.04 THK STL	86928	ORDER BY DESCR
					END ATTACHING PARTS		
-32	337-0118-01			1	SHIELD,ELEC:GPIB (OPTION 10 ONLY)	80009	337-0118-01
-33	210-0201-00			1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL (OPTION 10 ONLY)	86928	A373-157-2
-34	200-2686-00			1	COVER,REAR:CRT (OPTION 10 ONLY)	80009	200-2686-00
					ATTACHING PARTS		
	211-0711-00			4	SCR,ASSEM WSHR:6-32 X 0.25,PNH,STL,TORX	01536	ORDER BY DESCR
					END ATTACHING PARTS		
-35	175-7932-00			1	CA ASSY,SP,ELEC:6,26 AWG,5.00 L,9-N (OPTION 06,09 ONLY)	80009	175-7932-00
					ATTACHING PARTS		
-36	----- -----			1	.NUT,PLAIN,HEX:(PART OF CABLE ASSY)		
-37	210-0021-00			1	WASHER,LOCK:0.476 ID,INTL,0.018 THK,STL	78189	1222-01
-38	210-0902-00			1	WASHER,FLAT:0.47 ID X 0.656 OD X 0.03,STL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-39	346-0120-00	B010100	B010432	1	STRAP,TIEDOWN,E:5.5 L MIN,PLASTIC	06383	SST1.5M
	343-0149-00	B010433		1	STRAP,TIEDOWN,E:6.75 L,PLASTIC (OPTION 06,09,10 ONLY)	06383	ORDER BY DESCR
-40	131-0103-00			1	CONN,RCPT,ELEC:BNC,FEMALE (OPTION 06,09 ONLY)	91836	K79-304M06
-41	175-7931-00			1	CABLE ASSY,RF:50 OHM COAX,4.25 L (OPTION 06,09 ONLY)	80009	175-7931-00
-42	334-5200-00			1	MARKER,IDENT:MKD WORD RECOGNIZER PROBE (OPTION 09 ONLY)	80009	334-5200-00
-43	334-5201-02			1	MARKER,IDENT:MKD-0.5V TO 5.5V PEAK MAX,20UA MAX @ 2.7V,0.6MA MAX @ 0.5V (OPTION 09 ONLY)	80009	334-5201-02
	131-1343-00			1	TERM SET,PIN:36-0.525 L X 0.025 SQ (OPTION 06,09 ONLY)	TK1483	082-3643-SS02
	334-0001-00			1	MARKER,IDENT:MKD WORD RECOGNIZER IN/OUT (OPTION 09 ONLY)	07416	58600-000
-44	380-0710-00			1	HOUSING,PROBE:LOWER,PC (OPTION 09 ONLY)	80009	380-0710-00
-45	380-0711-00			1	HOUSING,PROBE:UPPER,PC (OPTION 09 ONLY)	80009	380-0711-00
					ATTACHING PARTS		
-46	211-0318-00			4	SCREW,MACHINE:4-40 X 0.75,FLH,100 DEG,STL	83385	ORDER BY DESCR
-47	210-0406-00			4	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					END ATTACHING PARTS		
-48	358-0675-00			1	STRAIN RLF,CA:UPPER (OPTION 09 ONLY)	80009	358-0675-00
-49	358-0347-00			1	STRAIN RLF,CA:LOWER,PLASTIC (OPTION 09 ONLY)	80009	358-0347-00
-50	175-8853-01			1	CA ASSY,SP,ELEC:6,26 AWG,80.5 L,8-N (OPTION 09 ONLY)	80009	175-8853-01
-51	361-0758-01			1	SPACER,PROBE:ACETAL SLATE GRAY (OPTION 09 ONLY)	80009	361-0758-01
-52	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #1 (SEE A32 REPL) (OPTION 09 ONLY)		
-53	----- -----			1	.TERM SET,PIN:(SEE A32J6300 REPL) .(OPTION 09 ONLY)		
-54	----- -----			1	.CONTACT SET,ELEC:(SEE A32J6370 REPL) .(OPTION 09 ONLY)		

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Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-55	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6380 REPL) .(OPTION 09 ONLY)		
-56	----- -----			1	.CONN,RCPT,ELEC:(SEE A32J6385 REPL) .(OPTION 09 ONLY)		
-57	----- -----			1	.CONTACT SET,ELEC:(SEE A32J3708 REPL) .(OPTION 09 ONLY)		
-58	----- -----			1	CIRCUIT BD ASSY:WORD RECOGNIZER PROBE #2 (SEE A33 REPL) (OPTION 09 ONLY)		
-59	----- -----			1	.TERM SET,PIN:(SEE A33J6400 REPL) .(OPTION 09 ONLY)		
-60	----- -----			2	.CONTACT SET,ELEC:(SEE A33P6380,P6385 REPL) .(OPTION 09 ONLY)		
					STANDARD ACCESSORIES		
-61	012-0747-00			1	LEAD SET,ELEC:10 WIDE,25 CML (OPTION 06,09 ONLY)	80009	012-0747-00
-62	206-0222-00			20	TIP,PROBE:MICROCIRCUIT TEST (OPTION 06,09 ONLY)	80009	206-0222-00
	010-6407-02			1	PROBE,WORD RECO:P6407,W/ACCESS & MANUAL (OPTION 06,09 ONLY)	80009	010-6407-02
	016-0180-00			1	VISOR,CRT:FOLDING (OPTION 05 ONLY)	80009	016-0180-00
	070-4181-00			1	MANUAL,TECH:REFERENCE,2445/2465 OPT 06/09 (OPTION 06,09 ONLY)	80009	070-4181-00
	070-6282-00			1	MANUAL,TECH:INTERFACING GUIDE,2445/2467 OPT 10 GPIB (OPTION 10 ONLY)	80009	070-6282-00
	378-0199-04			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,CCIR (24X5A OPTION 05 ONLY)	80009	378-0199-04
	378-0199-05			1	FILTER,LT,CRT:BLUE,4.105 X 3.415 X 0.03 THK ,ACRYLIC,NTSC (24X5A OPTION 05 ONLY)	80009	378-0199-05
	378-0270-01			1	FILTER,LT,CRT:3.0 X 3.670,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-01
	378-0270-02			1	FILTER,LT,CRT:3.0 X 3.67,BLUE ACRYLIC (2467 OPTION 05 ONLY)	80009	378-0270-02
					OPTIONAL ACCESSORIES		
	070-5854-01			1	MANUAL,TECH:OPERATORS,2467	80009	070-5854-01
	070-5857-00			1	MANUAL,TECH:SERVICE OPTS,24X5A/2467	80009	070-5857-00

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2467 ILLUSTRATION
24X5A/2467 OPTIONS SERVICE

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MANUAL CHANGE INFORMATION

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.

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MANUAL CHANGE INFORMATION

Date: 8-13-87 Change Reference: M64178

Product: 24X5A/2467 OPTIONS SERVICE Manual Part No.: 070-5857-00

DESCRIPTION PRODUCT GROUP 38

EFFECTIVE SERIAL NUMBERS: 2445A B013427
2465A B017478

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

CHANGE TO:

A30C4310	281-0909-00	CAP,FXD,CER DI:0.022UF,20%,50V

DIAGRAM CHANGES

DIAGRAM 31 DMM EXTENDED FRONT PANEL

Change C4310 (location 3B) to a 0.022 μF capacitor.

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MANUAL CHANGE INFORMATION

Date: 08-28-87 Change Reference: M60561

Product: 24X5A/2467 OPTION SERVICE Manual Part No.: 070-5857-00

DESCRIPTION Product Group 38

EFFECTIVE SERIAL NUMBER: 2445A B012644
EFFECTIVE SERIAL NUMBER: 2465A B015897
EFFECTIVE SERIAL NUMBER: 2467 B011208

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

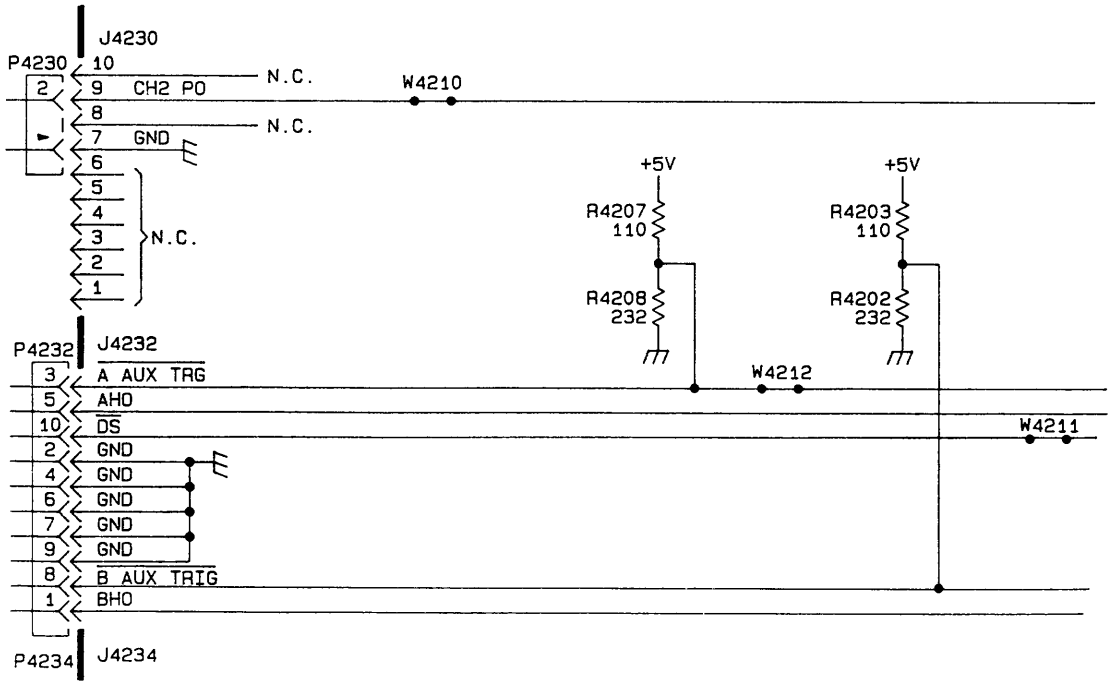
ADD:

A20W4211	131-0566-00	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L
A20W4212	131-0566-00	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L

DIAGRAM CHANGES

DIAGRAM 21 BUFFER BOARD ANALOG & POWER DISTRIBUTIONS

Add wires W4211 and W4212 as shown below.



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MANUAL CHANGE INFORMATION

Date: 09-14-87 Change Reference: M60561 REV

Product: 24X5A/2467 OPTION SERVICE Manual Part No.: 070-5857-00

DESCRIPTION Product Group 38

EFFECTIVE SERIAL NUMBER: 2445A B012644
EFFECTIVE SERIAL NUMBER: 2465A B015897
EFFECTIVE SERIAL NUMBER: 2467 B011208

REPLACEABLE ELECTRICAL PARTS LIST CHANGES

ADD:

A20W4211	131-0566-00	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L
A20W4212	131-0566-00	BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L

DIAGRAM CHANGES

DIAGRAM 21 BUFFER BOARD ANALOG & POWER DISTRIBUTIONS

Add wires W4211 and W4212 as shown below.

