

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.

A6 CRT BOARD

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 10			
C602	C632	Q668	R625
C603	C641	R604	R626
C609	C643	R605	R627
C671	C651	R608	R630
C615		R609	R632
C616	Q606	R610	
C617	Q610	R614	
C618	Q615	R616	
C619	Q645	R623	
C624	Q656	R624	
C626	Q665		

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		

COMPONENT LOCATION TABLE

ASSEMBLY NUMBER	SCHEM LOCATION	BOARD LOCATION
C602	2C	3C
C603	1C	1G
C609	4E	2E
C612	7C	3E
C615	7C	3D
C616	2C	3C
C617	7D	3D
C618	7E	3E
C619	6E	3C
C624	4F	3D
C626	7G	2D
C632	8G	1F
C643	3D	4B
C651	3E	3B
C670	4E	2D
C671	7C	3D
C673	7D	3D
C680	7E	3E
C681	7F	3E
C682	7F	2D
C683	7F	2D
C684	7F	2D
C685	7F	2D
C686	7F	2D
C687	7F	2D
C688	7F	2D
C689	7F	2D
C690	7F	2D
C691	7F	2D
C692	7F	2D
C693	7F	2D
C694	7F	2D
C695	7F	2D
C696	7F	2D
C697	7F	2D
C698	7F	2D
C699	7F	2D
C700	7F	2D
C701	7F	2D
C702	7F	2D
C703	7F	2D
C704	7F	2D
C705	7F	2D
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C710	7F	2D
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C713	7F	2D
C714	7F	2D
C715	7F	2D
C716	7F	2D
C717	7F	2D
C718	7F	2D
C719	7F	2D
C720	7F	2D
C721	7F	2D
C722	7F	2D
C723	7F	2D
C724	7F	2D
C725	7F	2D
C726	7F	2D
C727	7F	2D
C728	7F	2D
C729	7F	2D
C730	7F	2D
C731	7F	2D
C732	7F	2D
C733	7F	2D
C734	7F	2D
C735	7F	2D
C736	7F	2D
C737	7F	2D
C738	7F	2D
C739	7F	2D
C740	7F	2D
C741	7F	2D
C742	7F	2D
C743	7F	2D
C744	7F	2D
C745	7F	2D
C746	7F	2D
C747	7F	2D
C748	7F	2D
C749	7F	2D
C750	7F	2D
C751	7F	2D
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C754	7F	2D
C755	7F	2D
C756	7F	2D
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C767	7F	2D
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C814	7F	2D
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C818	7F	2D
C819	7F	2D
C820	7F	2D
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C998	7F	2D
C999	7F	2D
C1000	7F	2D

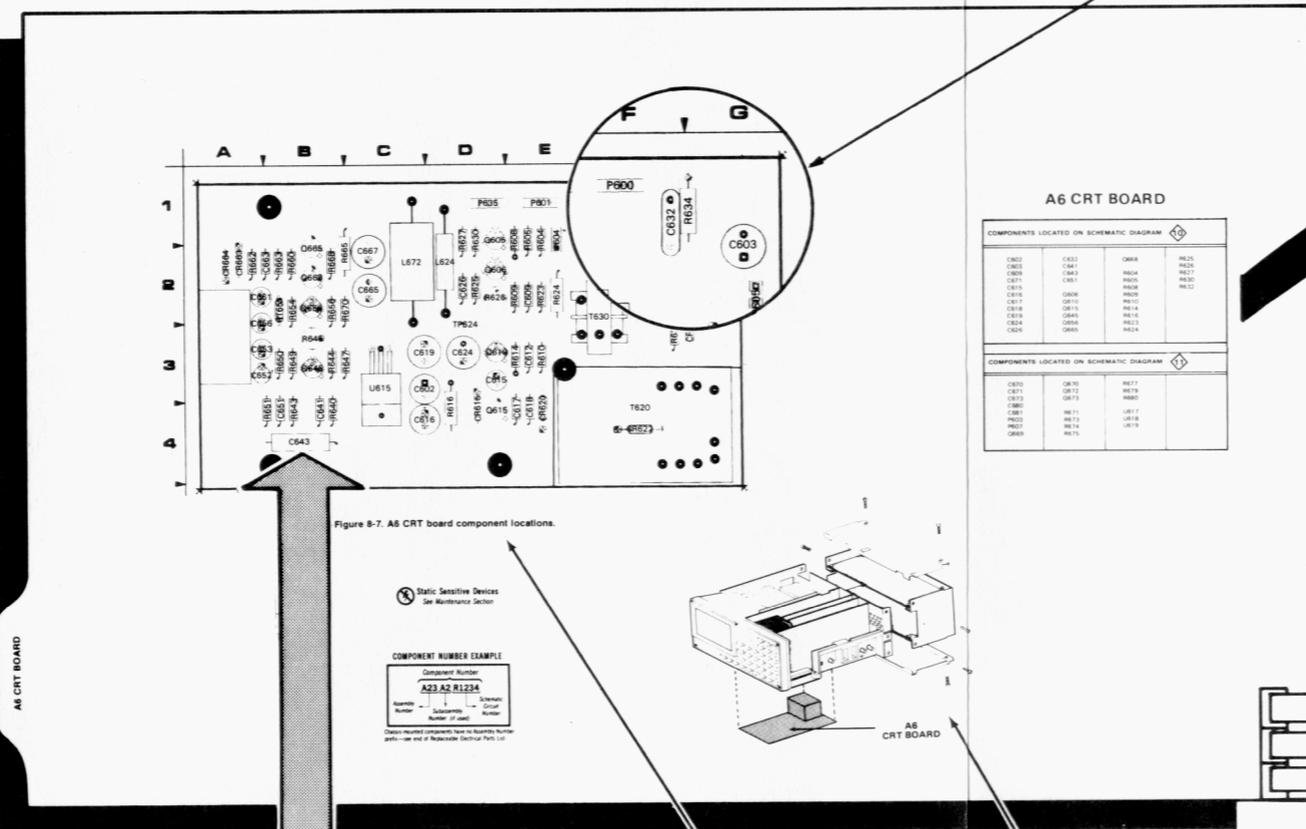


Figure 8-7. A6 CRT board component locations.

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE
A23 A2 R1234
Assembly Number Schematic Number
Number of Card

Chassis Mounted Components Refer to Assembly Number
and/or to Maintenance Section Parts List

ASSEMBLY NUMBER AND CIRCUIT BOARD NAME

ILLUSTRATION FOR INSTRUMENT CIRCUIT BOARD LOCATION

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
			R627	7G	1D
			R630	4F	1D
Q606					
Q610	4E	2D	TP624	3B	2D
Q615	7C	3D			
Q645	7D	3D	U615	1D	3C
	3E	3B			

CHASSIS MOUNTED PARTS					
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Circuit Number
Circuit board with its illustration and locate component by area and shape on the illustration.

adjacent to the Circuit Board Illustration and Number of the desired component.

Schematic Diagram Number in which the component is located.

3. Locate the Component on the Schematic Diagram

- 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).
- Scan the Component Location Table adjacent to the schematic diagram and find the Circuit Number of the desired component.
- Under the SCHEM LOCATION column, read the grid coordinates for the desired component.
- Using the Circuit Number and grid coordinates, locate the component on the schematic diagram.

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A6 CRT BOARD

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM

C602	C603	C609	C615	C616	C617	C618	C619	C624	C626
C602	C603	C609	C615	C616	C617	C618	C619	C624	C626

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM

C670	C671	C673	C680	C681	P603	P607	Q669
C670	C671	C673	C680	C681	P603	P607	Q669

A6 CRT BOARD

COMPONENTS LOCATED ON SCHEMATIC DIAGRAM 10

C602	C632	Q668	R625
C603	C641	R626	R626
C609	C643	R627	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		

COMPONENT LOCATION TABLE

ASSEMBLY

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C602	2C	3C	Q668	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
			R627	7G	1D
			R630	4F	1D

CHASSIS MOUNTED PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
L635	51	CHASSIS	V635	6J	CHASSIS

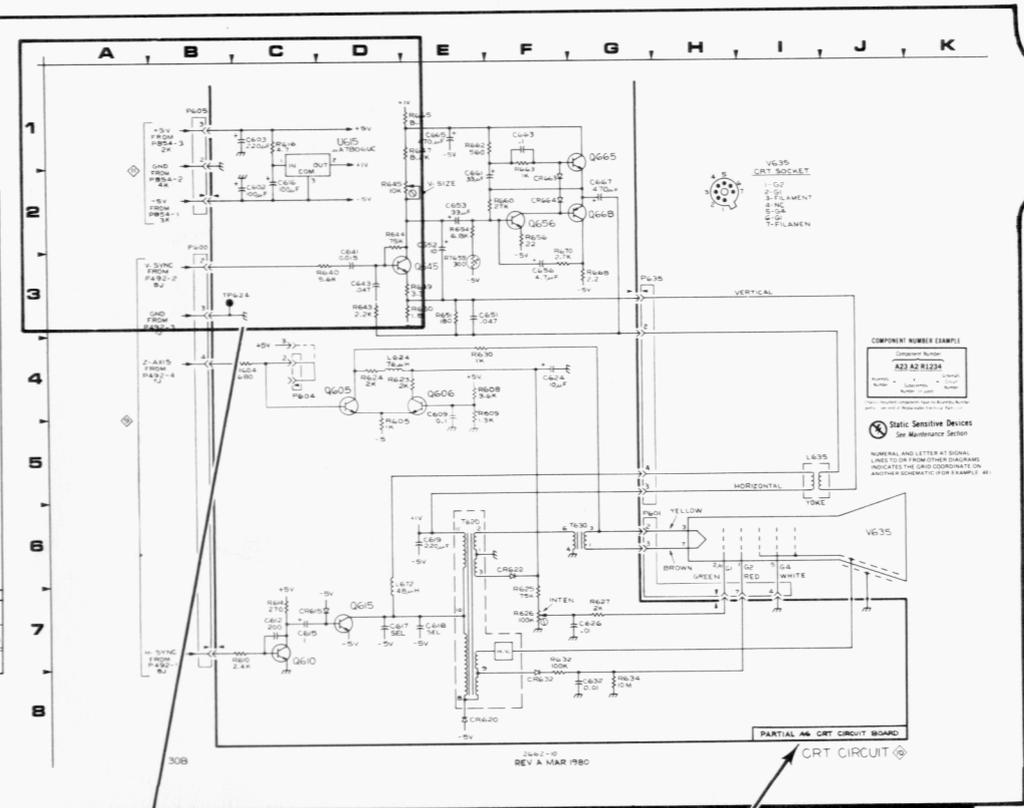
A6 ASSEMBLY

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
			R627	7G	1D
			R630	4F	1D

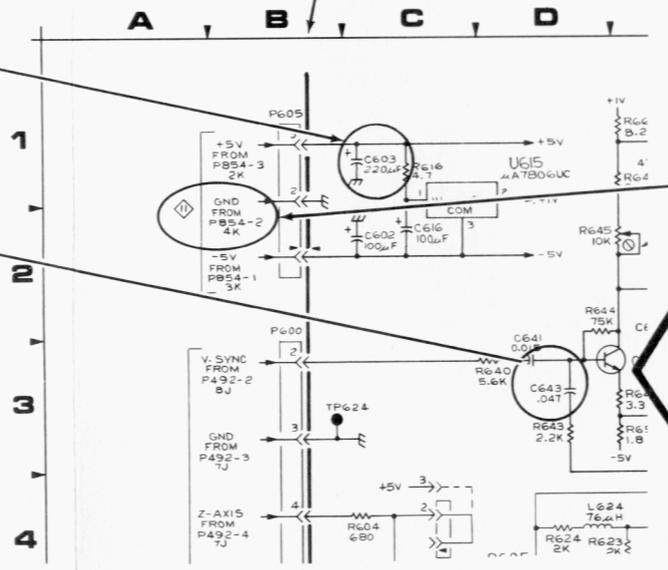
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
Q606	4E	2D	TP624	3B	2D
Q610	7C	3D			
Q615	7D	3D	U615	1D	3C
Q645	3E	3B			

CHASSIS MOUNTED PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
L635	51	CHASSIS	V635	6J	CHASSIS



PARTIAL A6 CRT CIRCUIT BOARD
CRT CIRCUIT 10



NUMERAL AND LETTER AT SIGNAL LINES TO OR FROM OTHER DIAGRAMS INDICATES THE GRID COORDINATES ON ANOTHER SCHEMATIC (FOR EXAMPLE: 4E)

TO IDENTIFY ANY COMPONENT IN A SCHEMATIC DIAGRAM AND TO LOCATE THAT COMPONENT ON ITS RESPECTIVE CIRCUIT BOARD.

PULL OUT PAGE TABS FOR SCHEMATIC DIAGRAMS

CRT CIRCUIT 10

SCHEMATIC DIAGRAM NAME AND NUMBER

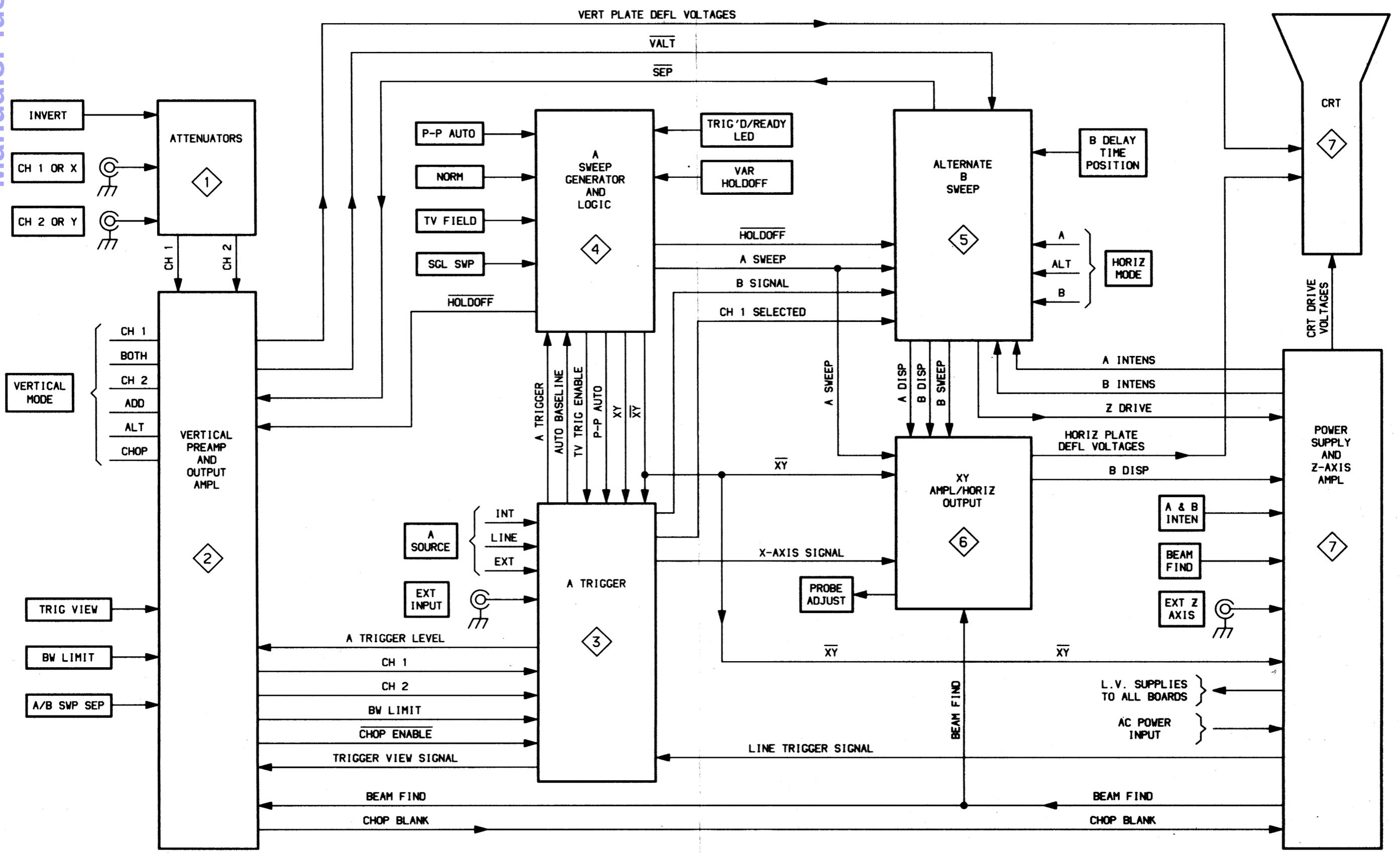


Figure 9-4. Basic block diagram.

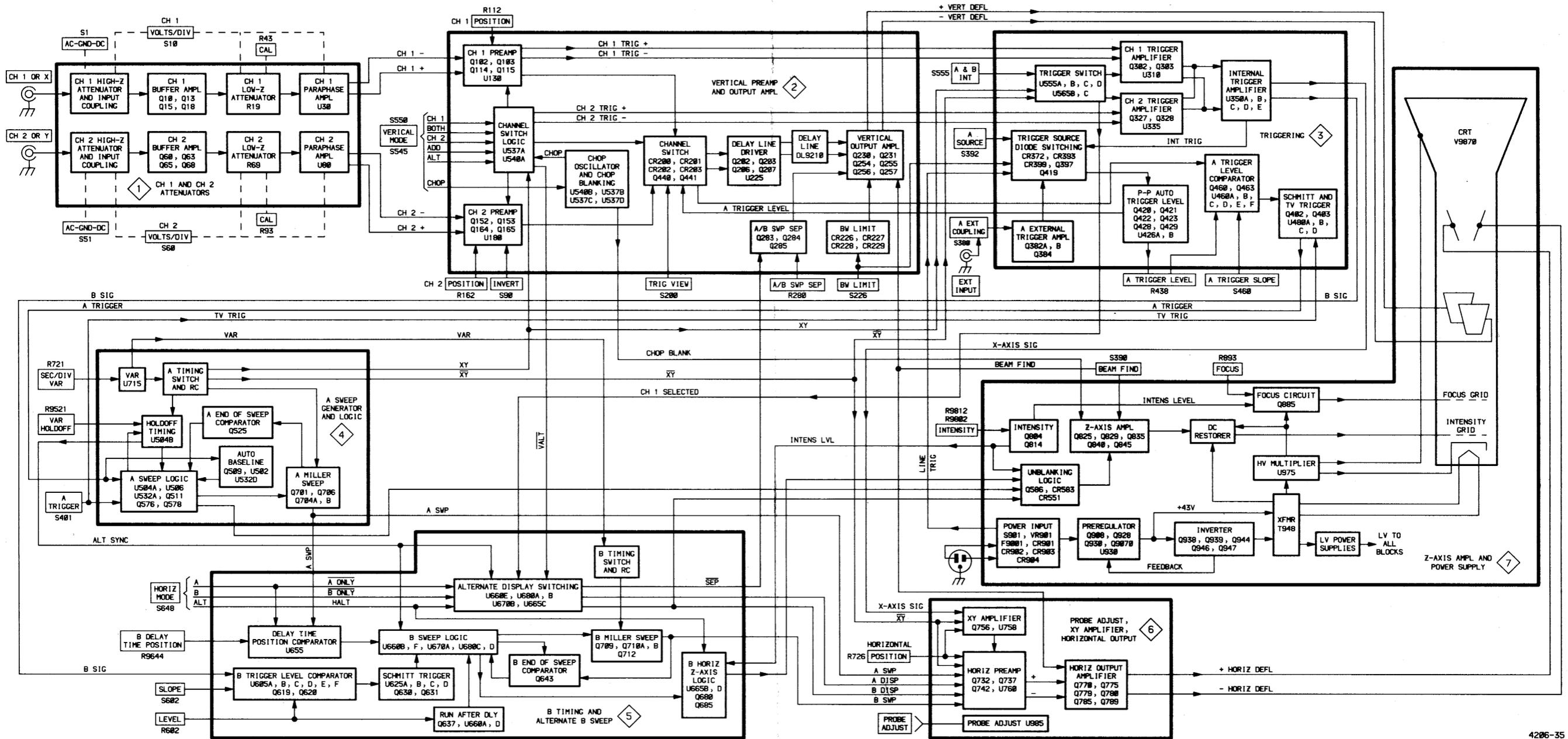
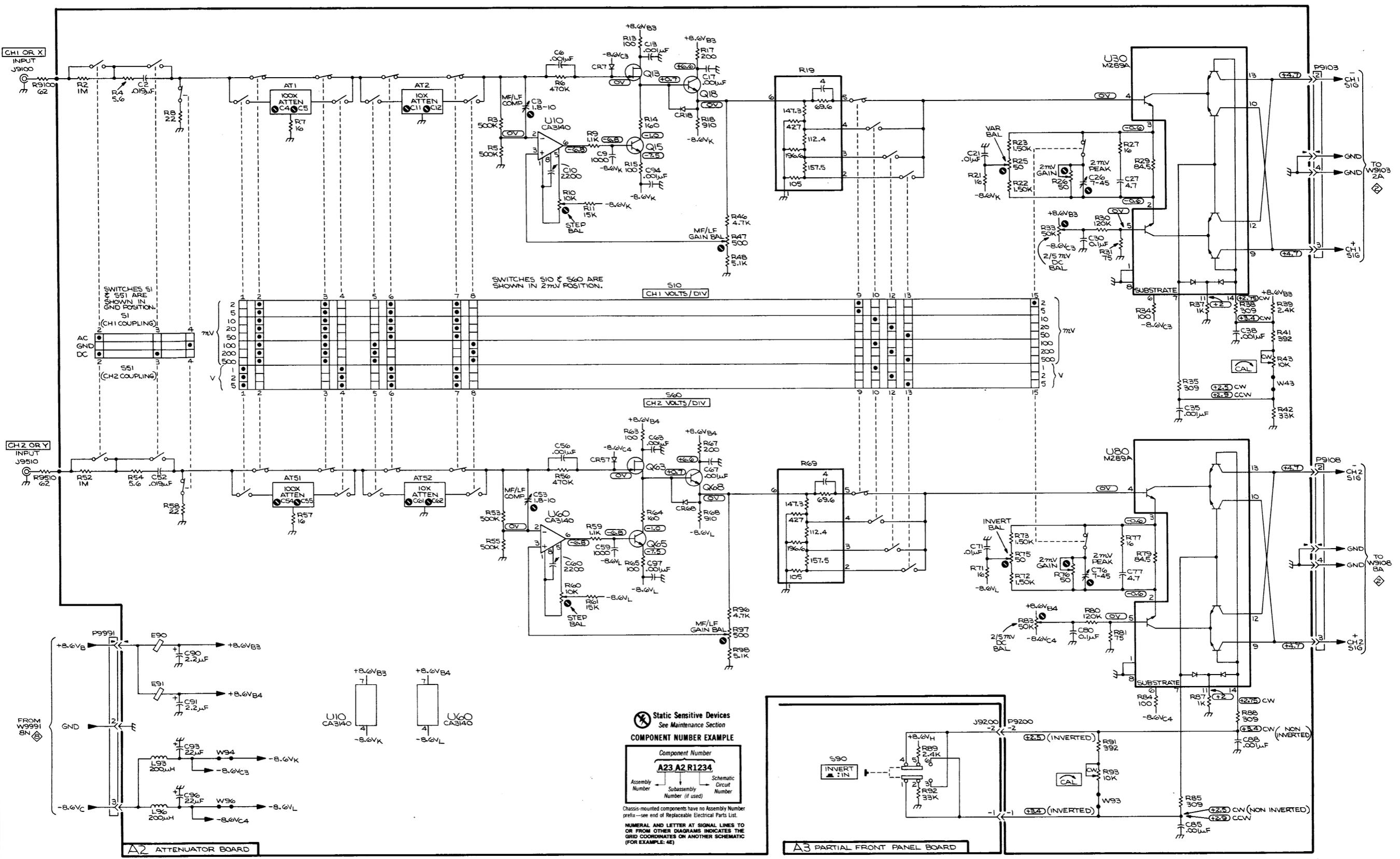


Figure 9-5. Detailed block diagram.

A B C D E F G H J K L M N P S

1
2
3
4
5
6
7
8
9



SWITCHES S1
S51 ARE
SHOWN IN
GND POSITION.
S1
(CH1 COUPLING)
S51
(CH2 COUPLING)

SWITCHES S10 & S60 ARE
SHOWN IN 27mV POSITION.

S10
CH1 VOLTS/DIV

S60
CH2 VOLTS/DIV

A2 ATTENUATOR BOARD

A3 PARTIAL FRONT PANEL BOARD

CH1 & CH2 ATTENUATORS

⚡ Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

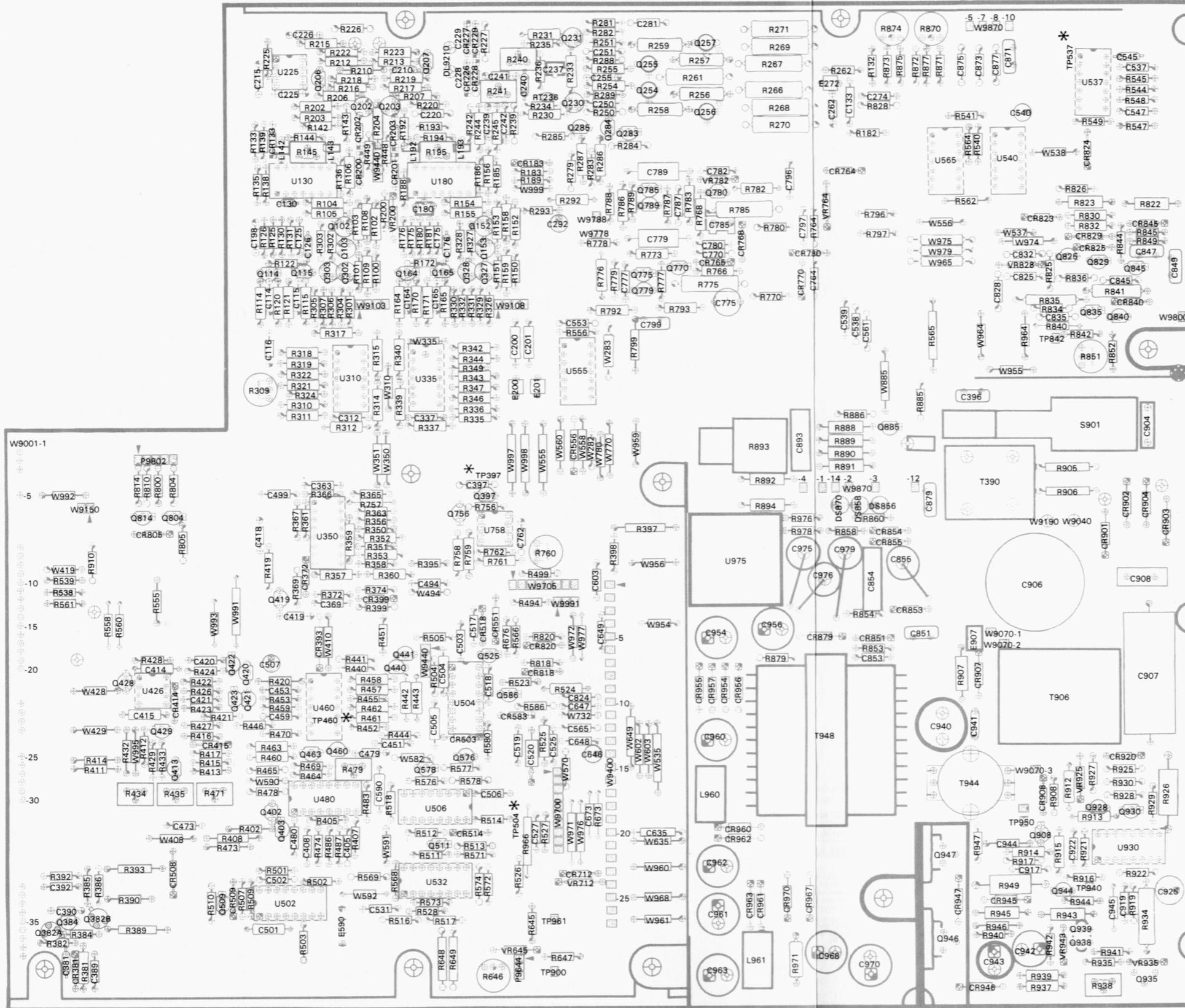
Component Number			
A23	A2	R1234	
Assembly Number	Subassembly Number (if used)	Schematic Circuit Number	

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

NUMERAL AND LETTER AT SIGNAL LINES TO OR FROM OTHER DIAGRAMS INDICATES THE GRID COORDINATES ON ANOTHER SCHEMATIC (FOR EXAMPLE: 4E)

A B C D E F G H J

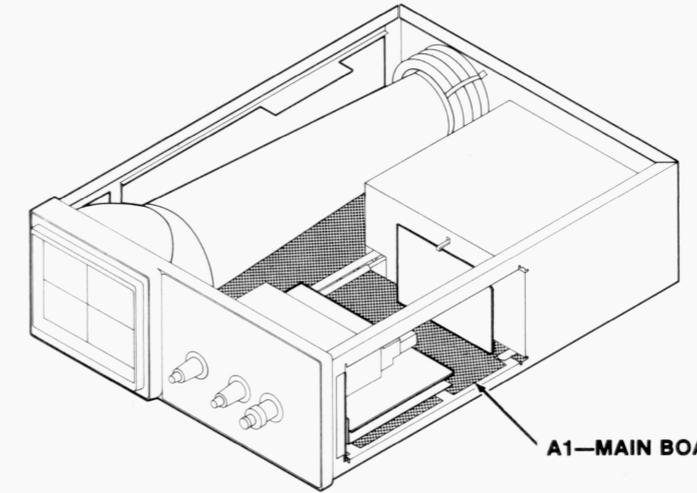
3 4 5 6 7 8



*These components are located on the reverse side of the circuit board.

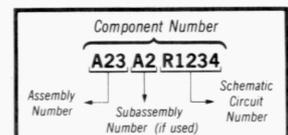
Figure 9-7. A1—Main board.

4206-37

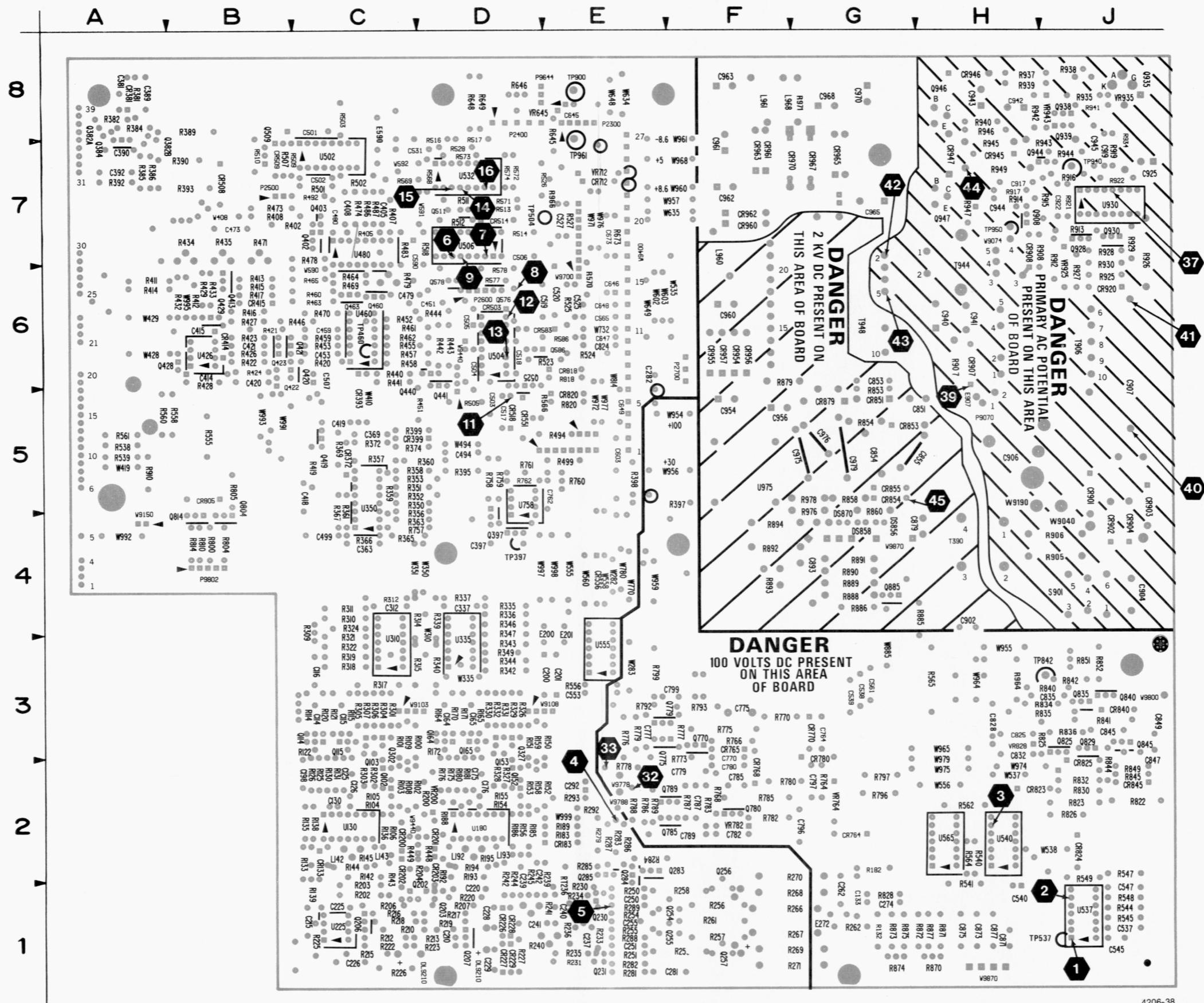


⊗ Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

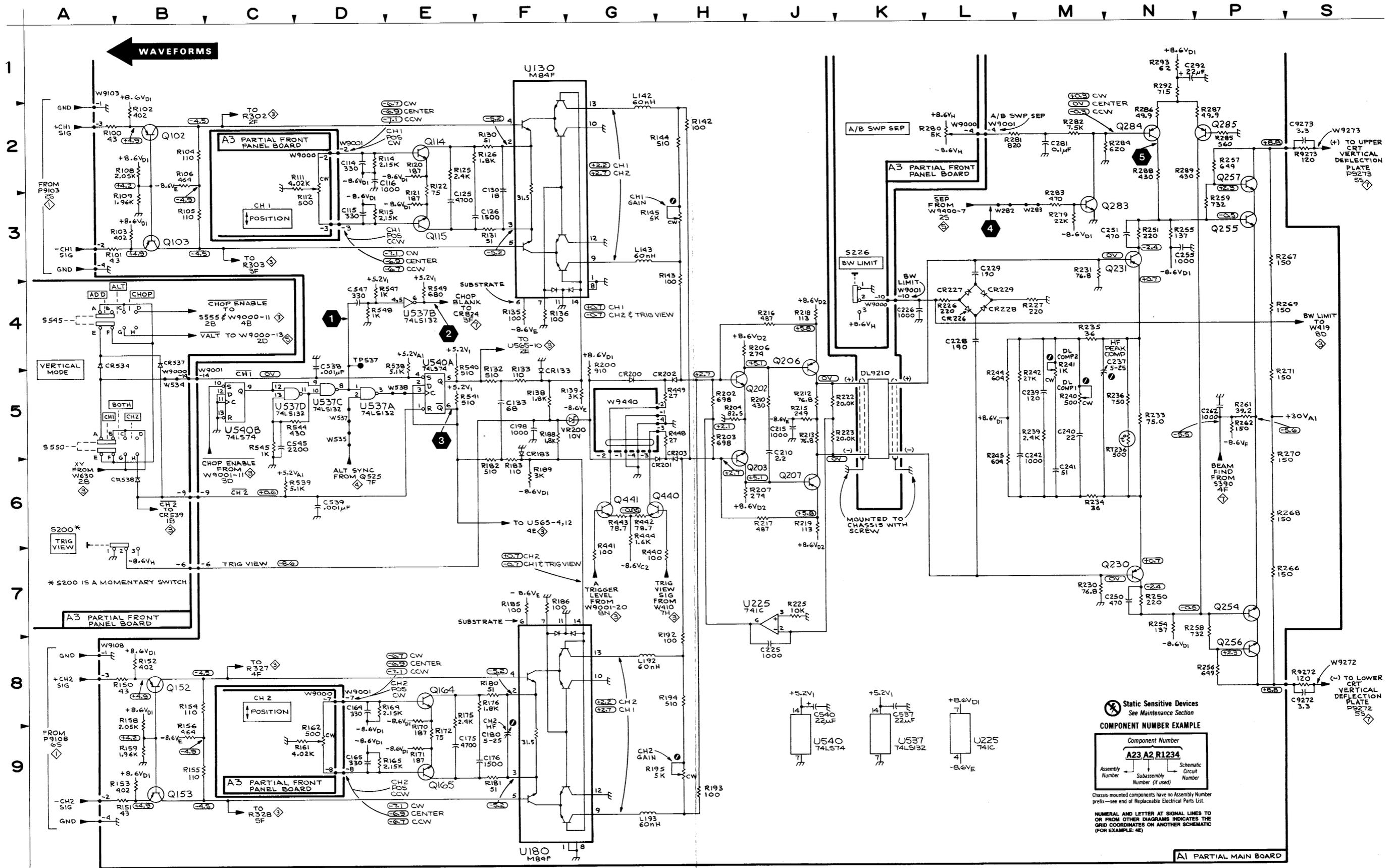


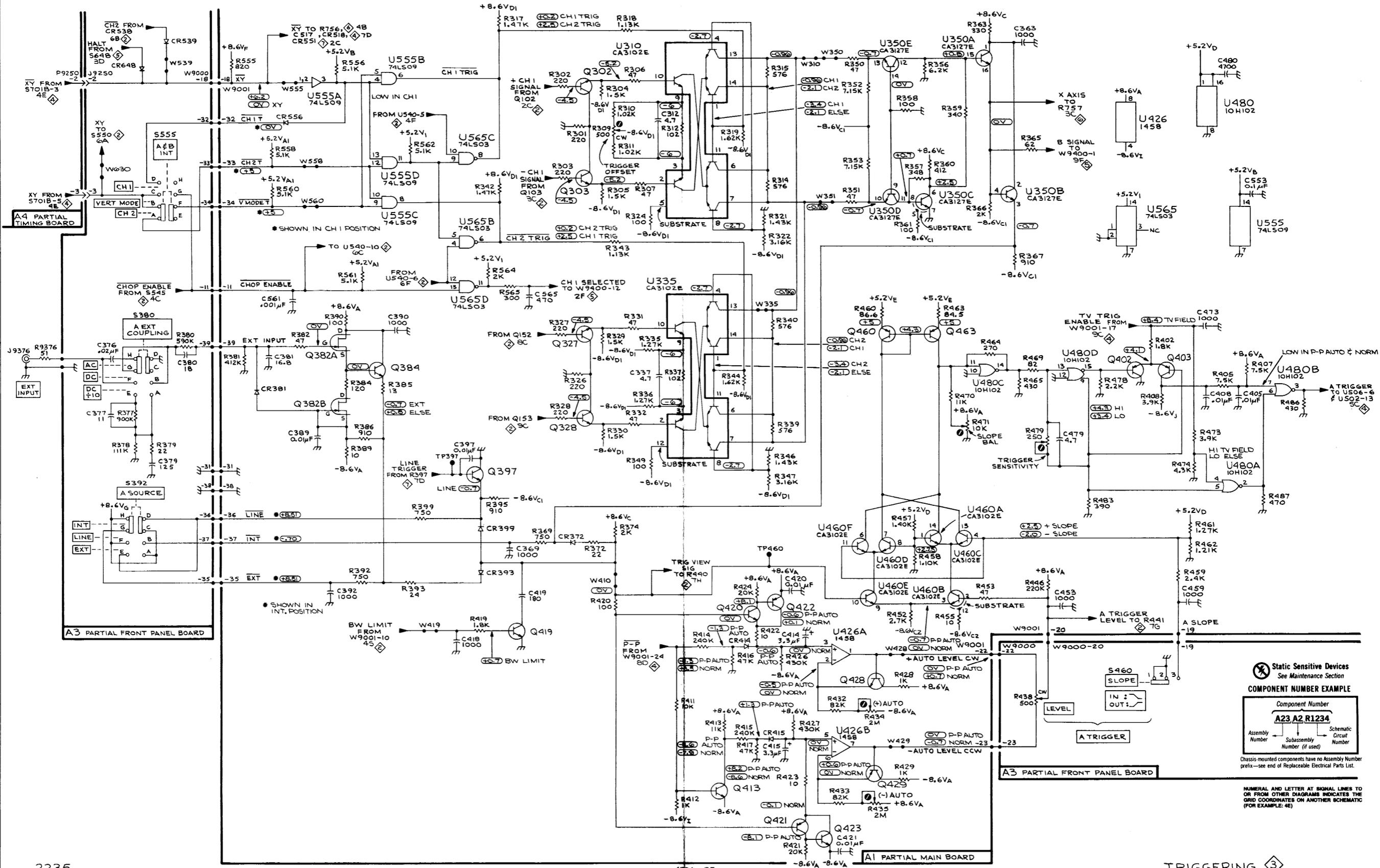
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



4206-38

Figure 9-8. Circuit view of A1—Main board.





Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

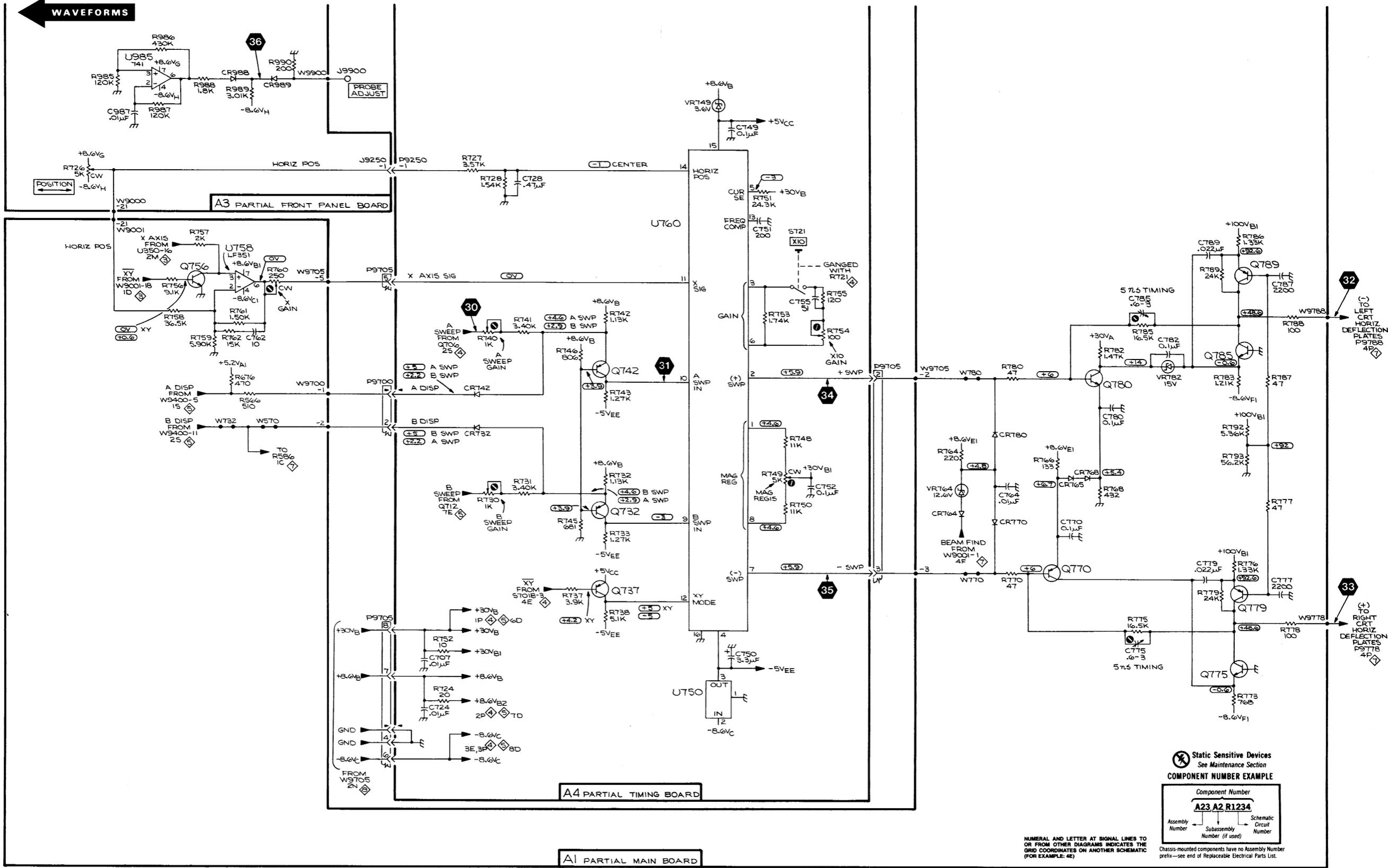
Component Number			
A23	A2	R1234	
Assembly Number	Subassembly Number (if used)	Schematic Circuit Number	

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

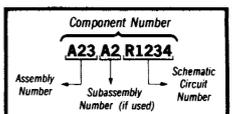
NUMERAL AND LETTER AT SIGNAL LINES TO OR FROM OTHER DIAGRAMS INDICATES THE GRID COORDINATES ON ANOTHER SCHEMATIC (FOR EXAMPLE: 4E)

A B C D E F G H J K L M N P S

1
2
3
4
5
6
7
8
9



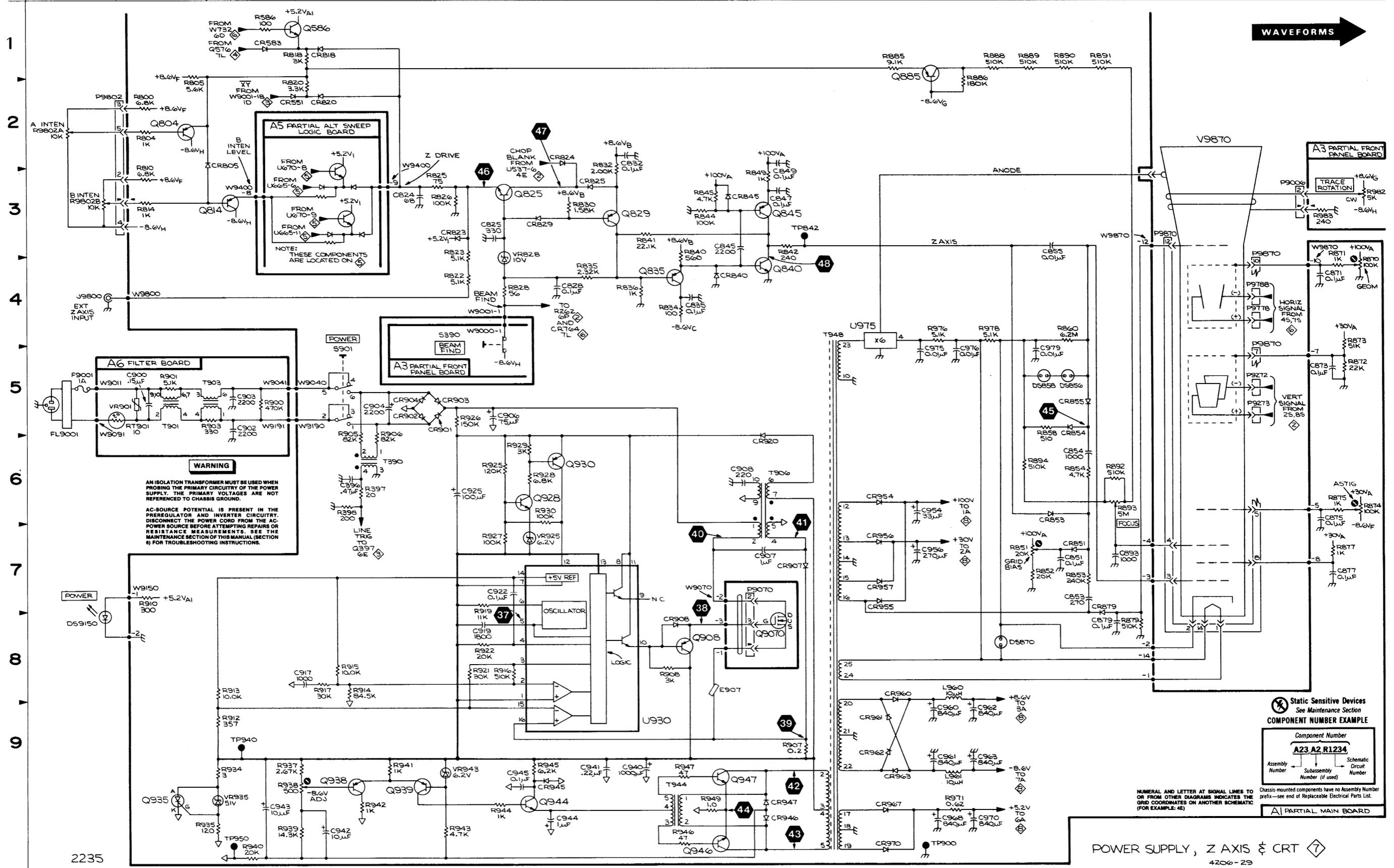
Static Sensitive Devices
See Maintenance Section
COMPONENT NUMBER EXAMPLE



NUMERAL AND LETTER AT SIGNAL LINES TO OR FROM OTHER DIAGRAMS INDICATES THE GRID COORDINATES ON ANOTHER SCHEMATIC (FOR EXAMPLE: 4E)

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

A B C D E F G H J K L M N P S



WARNING

AN ISOLATION TRANSFORMER MUST BE USED WHEN PROBING THE PRIMARY CIRCUITRY OF THE POWER SUPPLY. THE PRIMARY VOLTAGES ARE NOT REFERENCED TO CHASSIS GROUND.

AC-SOURCE POTENTIAL IS PRESENT IN THE PREREGULATOR AND INVERTER CIRCUITRY. DISCONNECT THE POWER CORD FROM THE AC-POWER SOURCE BEFORE ATTEMPTING REPAIRS OR RESISTANCE MEASUREMENTS. SEE THE MAINTENANCE SECTION OF THIS MANUAL (SECTION 9) FOR TROUBLESHOOTING INSTRUCTIONS.

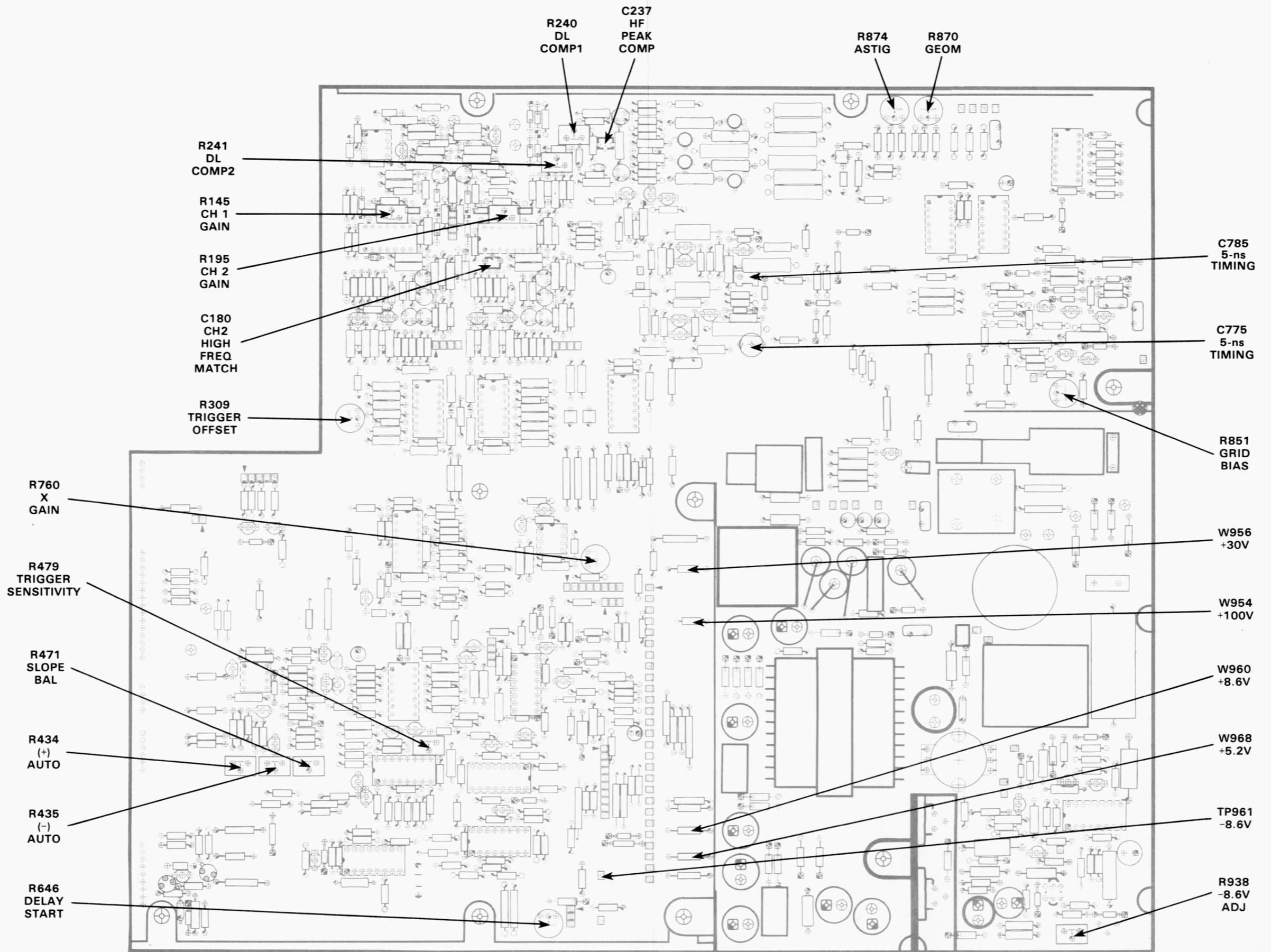
⊗ Static Sensitive Devices
See Maintenance Section
COMPONENT NUMBER EXAMPLE

Component Number		
A23	A2	R1234
Assembly Number	Subassembly Number (if used)	Schematic Circuit Number

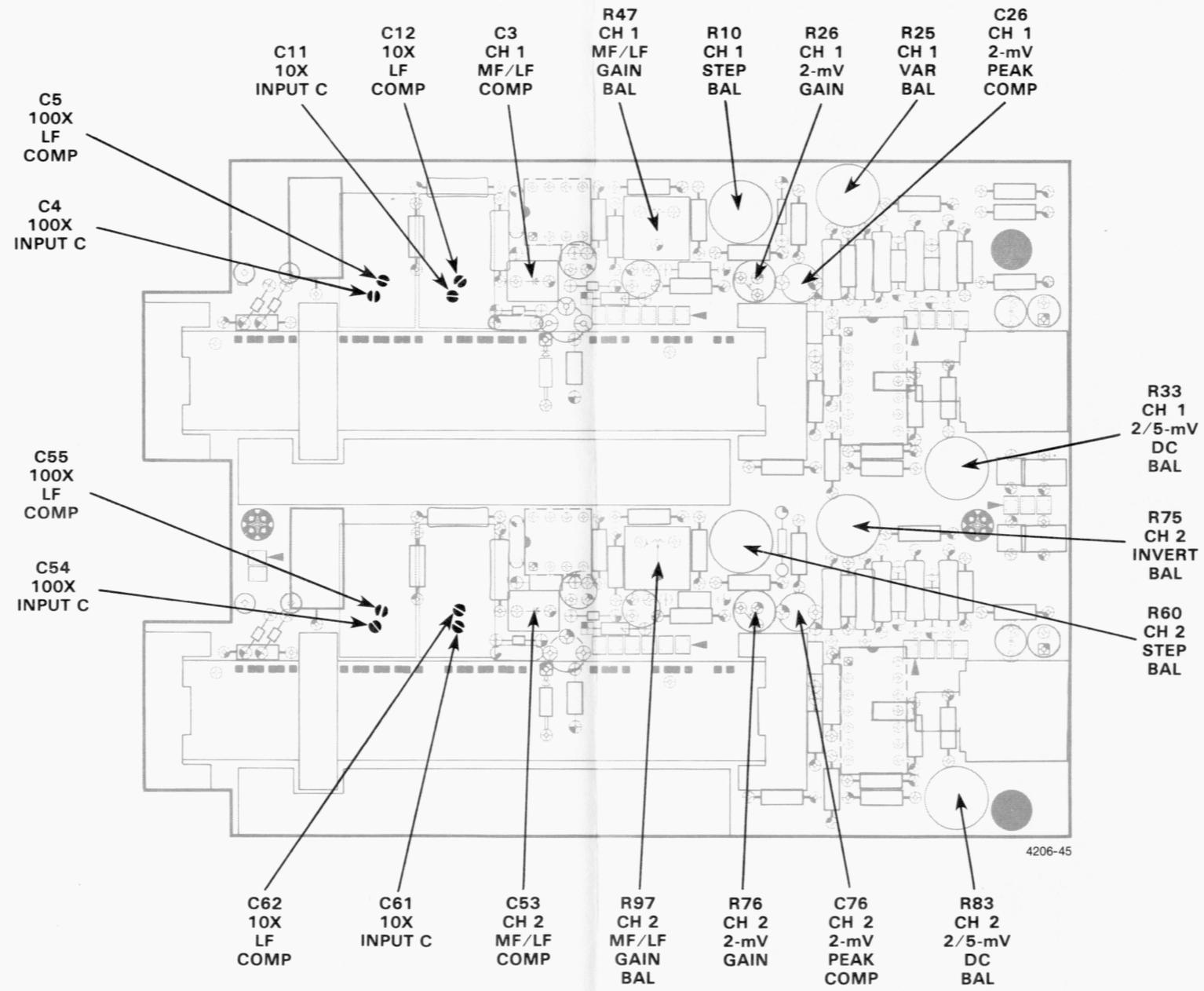
Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

POWER SUPPLY, Z AXIS & CRT

4200-29



A1—MAIN BOARD ADJUSTMENT LOCATIONS



A2—ATTENUATOR BOARD ADJUSTMENT LOCATIONS

GENERAL NOTES

- Use schematic diagrams, the overall block diagram, circuit board illustrations, and circuit descriptions when analyzing instrument malfunctions and locating test points. The schematic diagrams include typical waveforms and voltages that are intended as an aid in troubleshooting.
- Always set the POWER switch to OFF and unplug the line cord before swapping, removing, or replacing components, and before connecting or disconnecting instrument leads and cables.
- When analyzing circuit malfunctions, consider connectors and cables as possible causes of failure.

SPECIFIC NOTES

- Set initial front-panel controls as follows:

POWER Switch	ON (button in)
A INTENSITY	Midrange
FOCUS	Midrange
Vertical POSITION	Midrange
VERTICAL MODE	CH 1
CH 1 VOLTS/DIV	0.1V
CH 1 VOLTS/DIV Variable	Cal detent
CH 1 AC-GND-DC	GND
Horizontal POSITION	Midrange
HORIZONTAL MODE	A
A SEC/DIV	0.1ms
A SEC/DIV Variable	Cal detent
X10 Magnifier	Off (knob in)
A TRIGGER Mode	P-P AUTO
A&B INT	VERT MODE
A SOURCE	INT

- Verify the low-voltage power supplies at the following test points:

SUPPLY	TEST POINT	TOLERANCE
+5.2V	W968	5.04 to 5.36V
+8.6V	W960	8.43 to 8.77V
-8.6V	TP961	-8.56 to -8.64V
+30V	W956	29.1 to 30.9V
+100V	W954	97 to 103V

NOTE

A HV probe is required to measure the -2kV supply. Turn off the power and make the test equipment connections to the oscilloscope. Set the voltmeter to read at least -3kV, then turn the oscilloscope power back on to take the reading. After obtaining the reading, turn off the oscilloscope power to disconnect the test equipment connections, and replace the crt socket cover.

Verify the -2kV supply at pin 2 of the crt socket. The voltage should be between -1900 and -2100V.

WARNING

- The Preregulator and Inverter circuits have a floating common reference with respect to chassis ground. Ac-source potential is present on the common reference points. Connect the instrument to the ac-power source through an isolation transformer to prevent the possibility of personal injury or equipment damage when troubleshooting these circuits.

