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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.

PLEASE CHECK FOR CHANGE INFORMATION AT THE REAR OF THIS MANUAL.

335 OSCILLOSCOPE

SERVICE

INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

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Product Group 53

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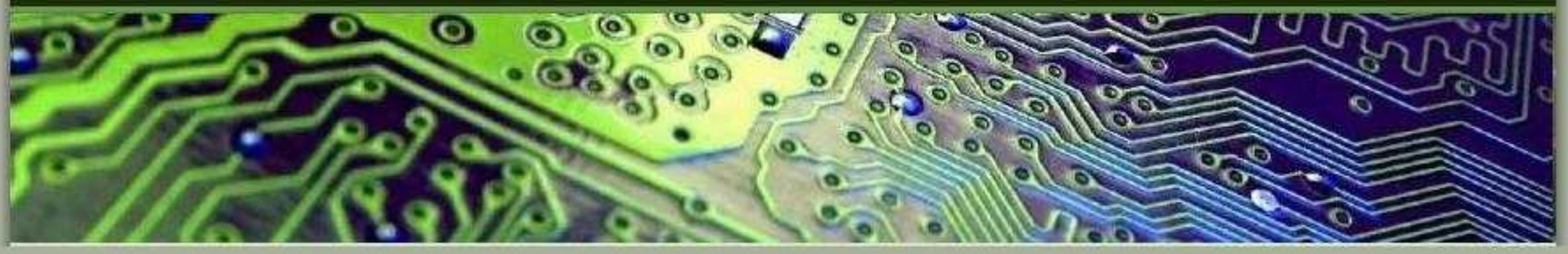

INSTRUMENT SERIAL NUMBERS

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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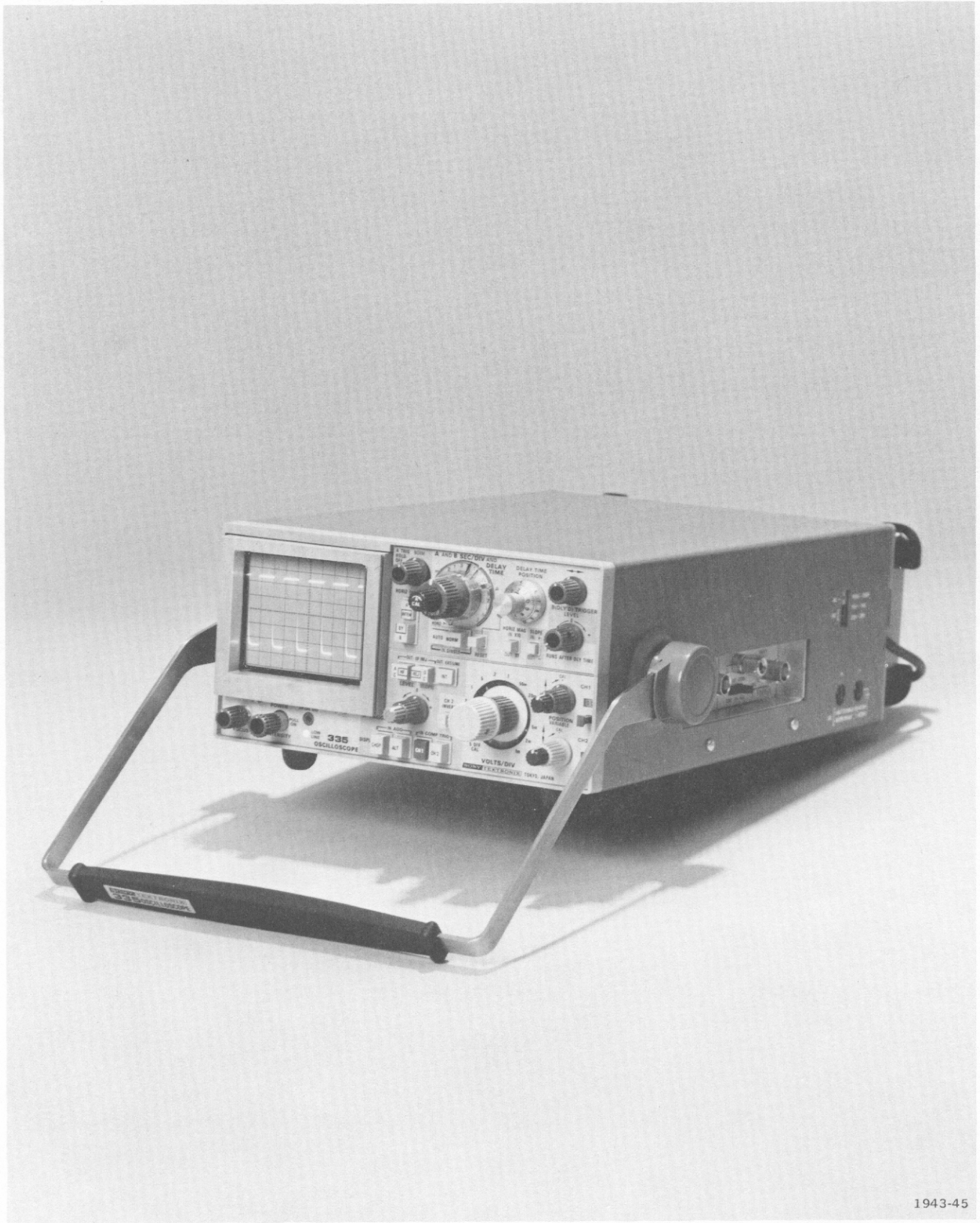


Fig. 1-1. 335 Oscilloscope.

335 SPECIFICATION

The Sony/Tektronix 335 Oscilloscope is a solid-state portable instrument that combines small size and light weight with the ability to make precision waveform measurements. The instrument is mechanically constructed to withstand the shock, vibration and other extremes of environment associated with portability.

A dual trace dc to 35 megahertz vertical system provides calibrated deflection factors from 1 millivolt to 10 volts/division.

The trigger circuits provide stable sweep triggering over the full vertical bandwidth. Separate controls are provided to select the desired mode of triggering. The A sweep can be operated in one of three modes: automatic triggering, normal triggering, or single sweep. A variable trigger-holdoff control provides the ability for A sweep to trigger stably on aperiodic signals.

The horizontal deflection system provides calibrated sweep rates from 0.5 second to 0.2 microsecond/division. A ten-times magnifier increases each sweep rate by a factor of 10 to provide a maximum sweep rate of 20 nanoseconds/division in the .2 μ position of the SEC/DIV switch. The delayed sweep feature allows the beginning of the B sweep to be delayed a selected amount from the start of the A sweep to provide accurate relative time measurements. In the EXT HORIZ mode of operation, the horizontal amplifier provides a horizontal deflection factor of 20 millivolts to 2 volts/division (dependent on the settings of the EXT ATTEN and HORIZ MAG switches).

The 335 can operate from a nominal line voltage of 115 or 230 volts ac. The 335 can also operate from an external dc voltage source of +12 or +24 volts.

The following electrical characteristics apply over an ambient temperature range of +20° C to +30° C (+68° F to +86° F) unless otherwise stated. Warmup time for the specified accuracies is 30 minutes.

The 335 meets the EMC requirements of MIL-STD-461A, when tested in accordance with the following test methods of MIL-STD-462: CE-01, CE-03, CS-01, CS-02, CS-06, RE-02 (limited to 1 GHz), (T) RE-04, RS-01, and RS-03 (limited to 1 GHz).

SPECIFICATION

TABLE 1-1

Electrical Characteristics

Characteristic	Performance Requirement		Supplemental Information
VERTICAL DEFLECTION SYSTEM			
Deflection Factor			
Calibrated Range	1 mV to 10 V/Div		13 steps in a 1-2-5 sequence
Accuracy	Within 3% over the calibrated range		
Uncalibrated Range (VARIABLE)	Continuously variable between calibrated deflection factors.		Each calibrated deflection factor increased by at least 2.5 to 1.
Frequency Response			
Upper −3 dB point	+20° C to +30° C	−15° C to +55° C	Bandwidth measured with a 6 div reference signal, vertically centered.
1 mV to 5 mV/div	Dc to at least 25 MHz	DC to at least 20 MHz	
10 mV to 5 V/div	Dc to at least 35 MHz	DC to at least 30 MHz	
10 V/div	Dc to at least 25 MHz	Dc to at least 20 MHz	

TABLE 1-1 (cont)

Characteristic	Performance Requirement		Supplemental Information	
VERTICAL DEFLECTION SYSTEM (cont)				
Lower −3 dB point	With 1X or no probe	With 10X probe		
Dc Coupled	DC	DC		
Ac Coupled	10 Hz	1 Hz		
Risetime			5 div positive-going step vertically centered. Risetime is calculated from the formula 0.35 ÷ bandwidth.	
			+20°C to +30°C	−15°C to +55°C
1 mV to 5 mV/div			14 ns or less	17.5 ns or less
10 mV to 5 V/div			10 ns or less	11.7 ns or less
10 V/div			14 ns or less	17.5 ns or less
Maximum Safe Input Voltage				
Dc Coupled			300 V (dc + peak ac) 300 V p-p ac at 1 kHz or less	
Ac Coupled			300 V (dc + peak ac) 300 V p-p ac at 1 kHz or less	
Input RC Characteristics				
Input Resistance			1 MΩ within 2%	
Input Capacitance			Approximately 24 pF	
Signal Delay	Allows viewing leading edge of triggering waveform.		Approximately 180 ns	
Chopped Repetition Rate	Approximately 300 kHz		Within +20%, −30%	
HORIZONTAL DEFLECTION SYSTEM				
Sweep Rate				
Calibrated Range				
A Sweep	0.5 s to 0.2 μs/div		20 steps in a 1-2-5 sequence	
B Sweep	50 ms to 0.2 μs/div		17 steps in a 1-2-5 sequence	
Magnifier	Increases each sweep rate by a factor of 10. Increases fastest sweep rate to 20 ns/div.			

TABLE 1-1 (cont)

Characteristic	Performance Requirement		Supplemental Information
HORIZONTAL DEFLECTION SYSTEM (cont)			
Accuracy	Unnmagnified	Magnified*	Accuracy measured over center 8 graticule divisions
+20°C to +30°C	3%	5%	
−15°C to +55°C	4%	6%	*Exclude the first 10 magnified divisions and all divisions past 90 div.
Uncalibrated Range (A Sweep Only)	Continuously variable between calibrated settings.		Each calibrated sweep rate decreased by at least 2.5 to 1.
EXT HORIZ Input			
Resistance			Approximately 1 MΩ
Capacitance			24 pF within 20%
Sensitivity	20 mV to 2 V/Div		Within 20%. Sensitivity depends on setting of HORIZ MAG and EXT ATTEN.
Bandwidth (10 div Reference)			Dc to at least 500 kHz
Differential Time Measurement Accuracy	For measurements of 1 or more major dial div	For measurements of less than 1 major dial div	The differential time measurement accuracy specification is valid only for DELAY TIME position dial settings between 1.00 and 9.00.
+15°C to +35°C	±2%	±0.02 major dial div	
Delay Time Jitter	Within 0.005% of the maximum available delay time (less than 1 part in 20,000). Maximum available delay time is 10 times the A SEC/DIV setting.		
TRIGGERING SYSTEM			
Sensitivity			
DC Coupled	.35 division internal or 70 millivolts external from dc to 10 megahertz, increasing to 1.5 divisions internal or 250 millivolts external at 35 megahertz.		

TABLE 1-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
	TRIGGERING SYSTEM (cont)	
AC Coupled	.35 division internal or 70 millivolts external from 60 hertz to 10 megahertz, increasing to 1.5 divisions internal or 250 millivolts external at 35 megahertz. Attenuates all signals below about 60 hertz.	
LF REJ Coupled	.5 division internal or 100 millivolts external from 40 kilohertz to 10 megahertz, increasing to 2 divisions internal or 360 millivolts external at 35 megahertz. Blocks dc and attenuates all signals below about 40 kilohertz.	
HF REJ Coupled	.5 division internal or 100 millivolts external from 60 hertz to 20 kilohertz. Blocks dc and attenuates all signals below about 60 hertz and above about 20 kilohertz.	In Single Sweep Mode, AC coupled, with no trigger signal supplied, once armed, the single sweep should remain armed if no controls are operated and the trigger level has been set to just trigger on the peaks of a 1 division peak-to-peak (or larger) medium frequency sine wave signal
External Trigger		
LEVEL Control Ranges EXT ATTEN—X1		At least +0.8 V to −0.8 V
EXT ATTEN—X10		At least +8 V to −8 V
Maximum Safe Input Voltage		250 V (dc + peak ac) 250 V p-p ac at 1 kHz or less
Input Resistance		1 MΩ within 3% at dc
Input Capacitance		24 pF within 20%.
	CALIBRATOR	
Output Voltage +20°C to +30°C	0.5 V within 1% (open circuit)	
−15°C to +55°C		0.5 V within 3% (open circuit)

TABLE 1-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
	CALIBRATOR (cont)	
Repetition Rate		
+20°C to +30°C	1 kHz within 2%	
Output Resistance	10 kΩ	Within 10%
	EXTERNAL BLANKING (Z-AXIS INPUT)	
Sensitivity	Zero to +5 V peak signal causes noticeable intensity modulation at normal viewing intensity.	Positive-going signal decreases intensity.
Usable Frequency Range	Dc to at least 600 kHz	
Input Resistance	At least 10 kΩ	
Maximum Safe Input Voltage		50 V (dc + peak ac) 50 V p-p ac at 1 kHz or less
	POWER SOURCES	
Line Voltage		
Regulating Ranges		
115 V		
Low (LO)	90 V to 110 V	
Medium (M)	104 V to 126 V	
High (H)	108 V to 132 V	
230 V		
Low (LO)	180 V to 220 V	
Medium (M)	207 V to 250 V	
High (H)	216 V to 250 V	
Maximum Power Consumption	24 watts at 115 V, 50 Hz	Medium Regulating Range Position
Line Frequency	48 to 440 Hz	
External DC Voltage		
Regulating Ranges		
+12 V	+11 V to +14 V	
+24 V	+22 V to +28 V	
Maximum Input Current		
+12 V	2.0 A	
+24 V	1.0 A	

TABLE 1-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
	ENVIRONMENTAL	
Temperature Operating	−15°C to +55°C	
Storage	−40°C to +75°C	
Altitude Operating	To 15,000 feet.	Maximum allowable operating temperature decreases by 1°C per each thousand feet from 5,000 feet to 15,000 feet.
Storage	To 50,000 feet.	
Humidity—Operating And Storage	5 cycles (120 hours) referenced to MIL-E-16400 F.	
Vibration—Operating and Non-Operating	15 minutes along each of the 3 major axes at a total displacement of 0.025 inch peak-to-peak (4 g at 55 hertz) with the frequency varied from 10 to 55 hertz in one minute sweeps. Frequency held at 55 hertz in one minute sweeps. Frequency held at 55 hertz for 3 minutes. All major resonances must be above 55 hertz.	
Shock—Operating and Non-Operating	30 g; 1/2 sine wave; 11 millsecond duration; 2 shocks per axis in each direction; for a total of 12 shocks.	

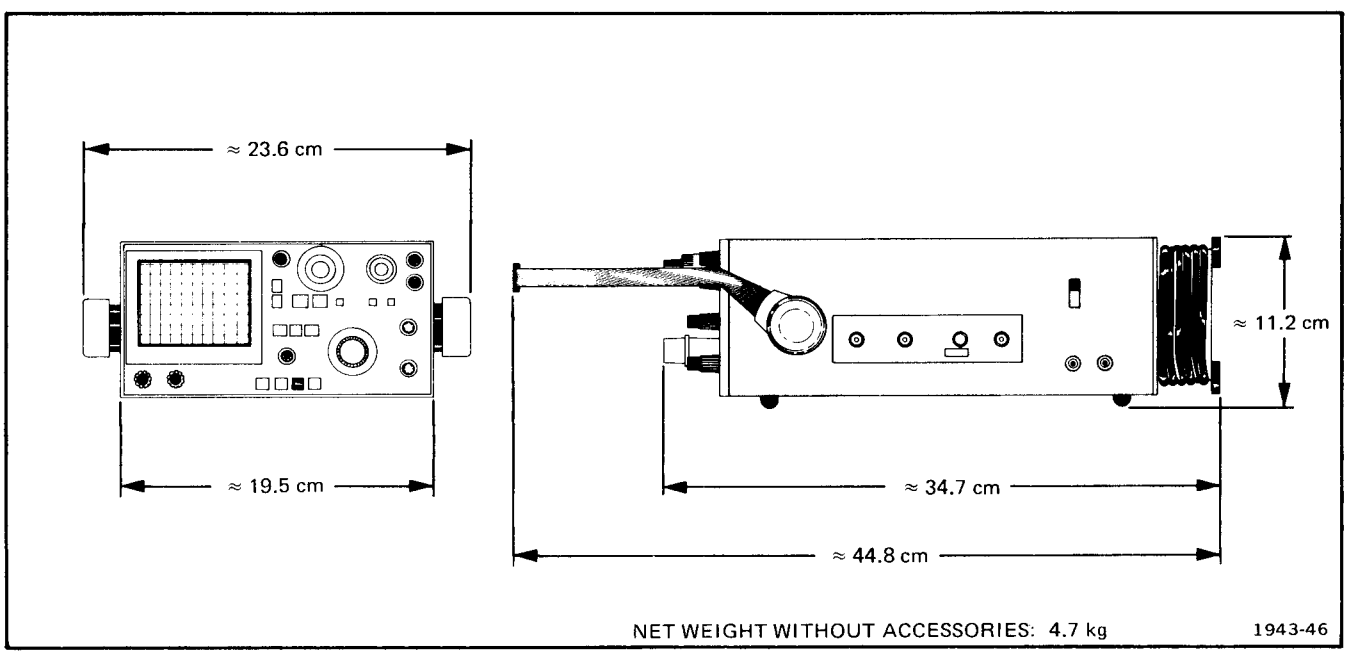


Fig. 1-2. Dimensional drawing.

OPERATING INFORMATION

This section of the manual will familiarize the operator with the instrument power requirements, functions of controls and connectors and how to obtain a basic display. For more complete information, refer to the 335 Operators manual.

SAFETY INFORMATION

In the AC mode, the 335 is designed to operate from a single-phase power source with one of the current-carrying conductors (the neutral Conductor) at ground (earth) potential. Operation from power sources where both current-carrying conductors are live with respect to ground (such as phase-to-phase on a three-wire system) is not recommended since only the Line Conductor has over-current (fuse protection within the instrument.

The 335 has a three-wire power cord for connection to the power source and safety earth. The ground (earth) terminal of the plug connects directly to the instrument frame.

Power Cord Conductor Identification

Conductor	Color	Alternate Color
Ungrounded (Line)	Brown	Black
Grounded (Neutral)	Blue	White
Grounding (Earthing)	Green-Yellow	Green-Yellow

OPERATING VOLTAGE

The 335 can operate from a nominal line voltage of 115 or 230 volts ac. The 335 can also operate from an external dc voltage source of +12 or +24 volts nominal.

Ac Powered Operation

Set the AC/DC switch to AC (see Fig. 2-1). In the AC mode, the 335 can operate from either a 115 V or 230 V nominal line voltage, 48 to 440 Hz.

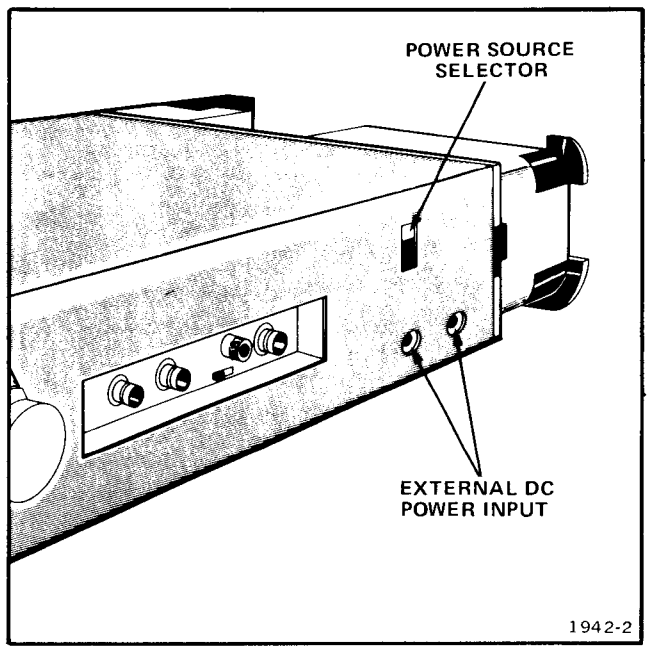


Fig. 2-1. Controls for dc operation.

Set the Line Voltage Selector Switch to the nominal line voltage available. Remove the instrument rear cover to change the setting of theLine Voltage Selector switch (see Fig. 2-2). Fuse size must be changed when changing nominal line voltage setting (refer to Fuse Information in this section).

Set the Regulating Range Selector Switch (see Fig. 2-2) so the expected line-voltage fluctuations remain within the Regulating Range selected (see Table 2-1).

TABLE 2-1

AC Regulating Ranges

Regulating Range Selector Switch Position	115 V Nominal	230 V Nominal
HI	108 to 132 V	216 to 264 V
M	103.5 to 126.5 V	207 to 253 V
LO	90 to 110 V	180 to 220 V

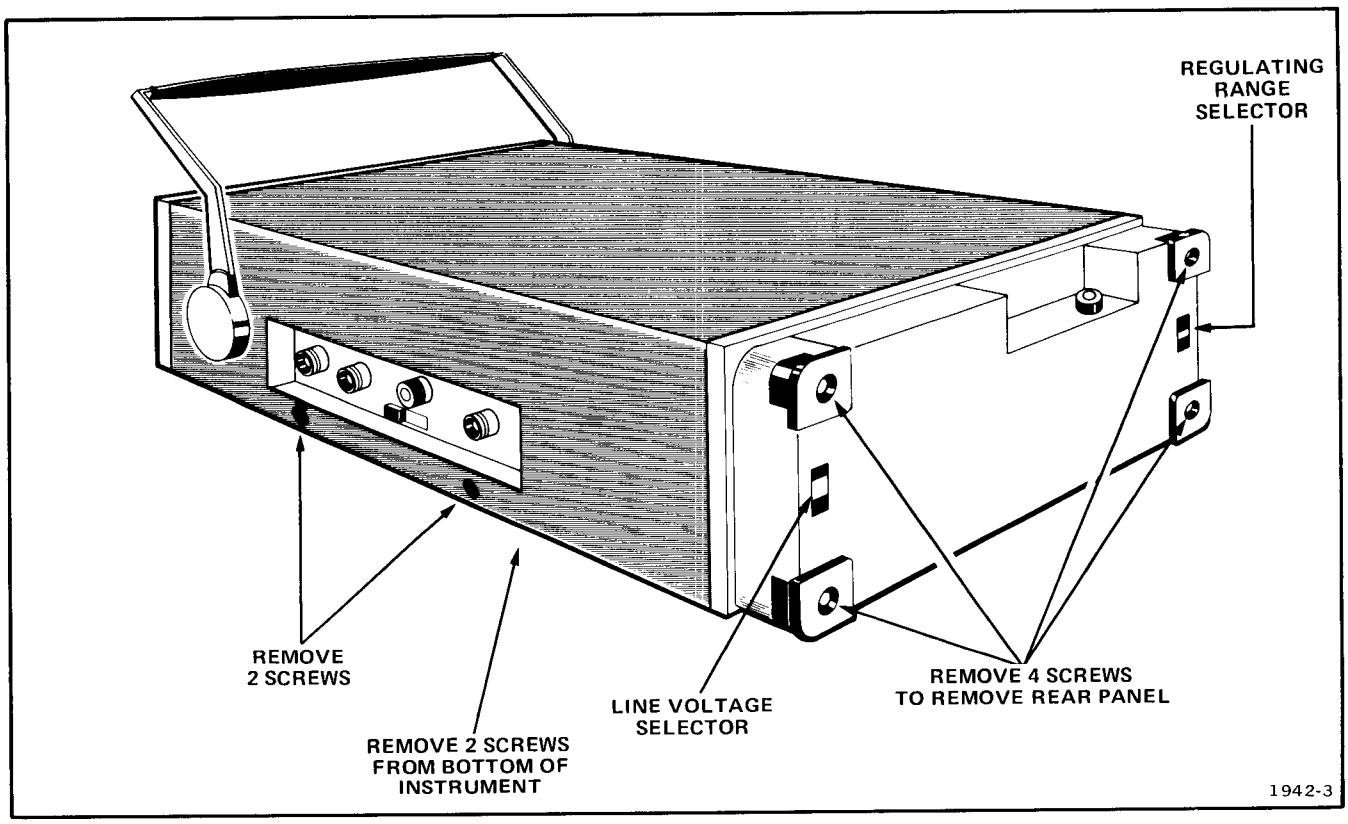


Fig. 2-2. Cabinet removal.

External Dc Powered Operation

The 335 can operate from an external dc power source of either 11 V to 14 V or 22 V to 28 V. Set the Power Source Selector Switch (see Fig. 2-1) to the available dc voltage. Apply the external dc power to the two banana jacks on the right side panel (see Fig. 2-1).

Fuse Information

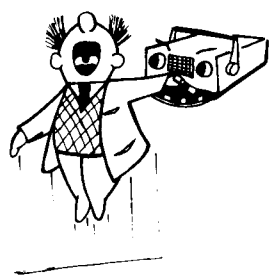
The 335 contains three power fuses. Be sure to use the correct fuse for the power source used (see Table 2-2).

TABLE 2-2

Power Source	F1000	F1002	F1003
115 V ac	400 mA		
230 V ac	200 mA		
11-14 V dc		2 A	
22-28 V dc		2 A	1 A

To change the fuses, you must remove the instrument cover. Use the following procedure to remove the cabinet.

WARNING



Dangerous potentials exist at several points throughout this instrument. When the instrument is operated with the cover removed, do not touch exposed connections or components. Some transistors may have elevated cases. Disconnect power before cleaning the instrument or replacing parts.

1. Loosen the four screws holding the cabinet feet (cord wrap) and remove the cord-wrap feet (see Fig. 2-2).

2. Remove the grey-plastic rear cover.

3. Loosen (do not remove) the two screws holding the power cord strain relief (115/230 V ac selector switch mounting) and slide the strain relief toward instrument center.

4. Remove two screws below the connector panel on the right side of the cabinet.

5. Remove two screws from the cabinet bottom.

6. Position the handle to clear the instrument and slide the cabinet off the rear of the instrument.

7. The fuses are located on the bottom of the instrument near the rear (see Fig. 2-3).

8. To replace the cabinet, reverse the removal procedure. Be sure the power cord does not become looped through the side-panel cutout.

OBTAINING A BASIC DISPLAY

1. Preset the 335 controls as follows:

NOTE

See Operation of Controls, Connectors, and Indicators for detailed instructions concerning control operation.

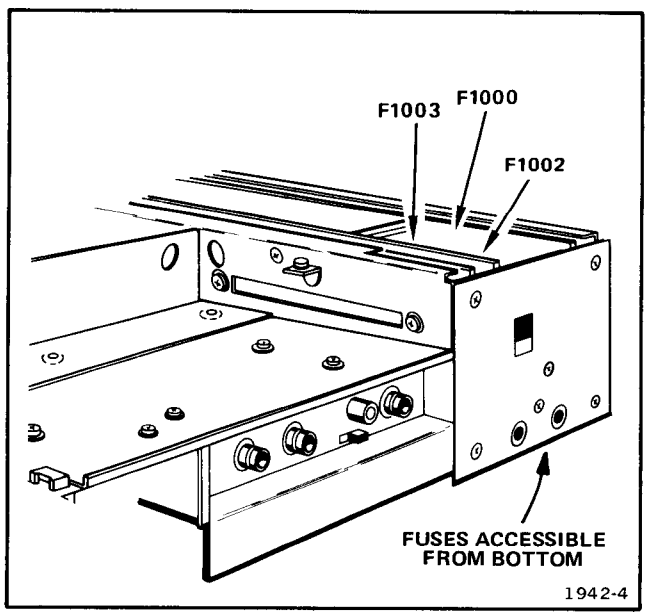


Fig. 2-3. Fuse Location.

Vertical (CH 1 and CH 2 if applicable)

DISPLAY	CH 1
VOLTS/DIV	10
VARIABLE	Calibrated detent
AC-GND-DC	GND
POSITION	Midrange

Horizontal (A and B if applicable)

HORIZ DISPLAY	A
SEC/DIV	1 ms
A CAL	Calibrated detent
POSITION	Midrange
DELAY TIME POSITION	Fully counterclockwise

CRT and Power

INTENSITY	Fully counterclockwise
FOCUS	As desired
POWER	ON

TRIGGER

A TRIG HOLDOFF	NORM
A and B SLOPE	+
A LEVEL	0
B LEVEL	DLY)D SWEEP (in detent)
Source	Channel 1
Coupling	AC
Trigger Mode	AUTO

2. Advance the INTENSITY control clockwise until you can see the trace.

3. Connect the signal to the CH 1 VERT INPUT connector via the probe supplied with the instrument.

NOTE

Be sure the probe is properly compensated (see Operator adjustments and checks).

4. Set the CH 1 AC-GND-DC switch to select the desired method of coupling the input signal to the preamplifier circuit. AC coupling may cause tilting (integration) of square waves below about 1 kHz.

5. Adjust the CH 1 VOLTS/DIV switch to obtain the desired display amplitude while adjusting the CH 1 POSITION control to locate the display with the crt viewing area.

6. Adjust the A LEVEL control for a stable display.

7. Adjust the A SEC/DIV switch to obtain the desired display. Using the .5 V CAL OUT signal, the display should look like Fig. 2-4 (using a 10X probe with a VOLTS/DIV switch setting of .01 V and a SEC/DIV switch setting of .5 ms).

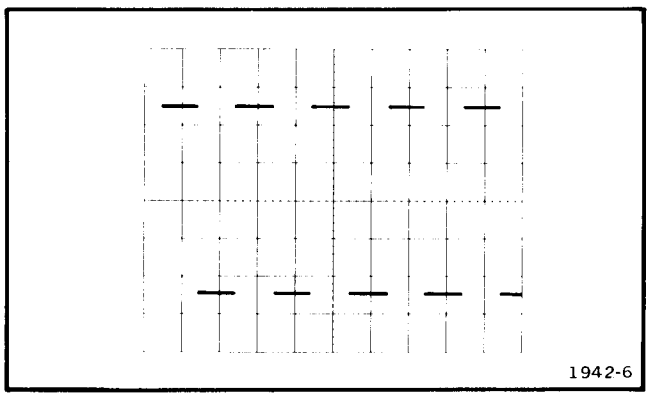


Fig. 2-4. Display of .5 V CAL OUT signal.

SIGNAL GROUND

The most reliable signal measurements are made when the 335 and the unit under test are connected together by a common reference (ground) lead in addition to the signal lead or probe. The ground strap on the probe provides the best ground. Also, you can connect a ground lead to the chassis ground connector on the 335 right side panel.

INPUT COUPLING CAPACITOR PRECHARGING

In the AC positions of the AC-GND-DC switches, voltage transients exceeding the 500 V maximum input voltage can be generated if you take successive measurements on 2 signals with different dc levels—even though both dc levels are within the maximum input voltage specifications. For instance, after measuring the ripple on a +400 V dc supply, the probe is connected to a -250 V dc supply. The resulting transient is 650 V in amplitude.

Setting the AC-GND-DC switch to GND disconnects the input signal from the Vertical Preamplifier circuit and connects it to ground through the input coupling capacitor and a 1 MΩ resistor. This allows the input coupling capacitor to precharge to the average dc level of the signal applied to the probe. Use the following procedure to prevent accidentally generated voltage transients from reaching the Preamplifier circuit and also reduce the amount of charging current drawn from the circuit under test.

1. Before you connect the probe tip to a signal source, set the AC-GND-DC switch to GND.

2. Touch the probe tip to the oscilloscope chassis ground. Wait several seconds for the input coupling capacitor to discharge.

3. Connect the probe tip to the signal source.

4. Wait several seconds for the input coupling capacitor to charge.

5. Set the AC-GND-DC switch to AC. The display will remain on screen so the ac component of the signal can be measured in the normal manner.

OPERATOR'S ADJUSTMENTS AND CHECKS

To verify the basic accuracy of the 335, make the following checks and adjustments. See the Calibration section of the 335 Service Manual for calibration information.

Probe Compensation

Improper probe compensation is the most common source of operator error (see Fig. 2-5). Recheck probe compensation when moving a probe from one scope to another or from one channel to the other.

To compensate the probe, obtain a normal sweep display of the .5 V CAL OUT signal. Set the VOLTS/DIV switch to .1 (10 m for a X10 probe). Adjust probe compensation for a flat-top waveform. See the probe manual for specific probe compensation instructions.

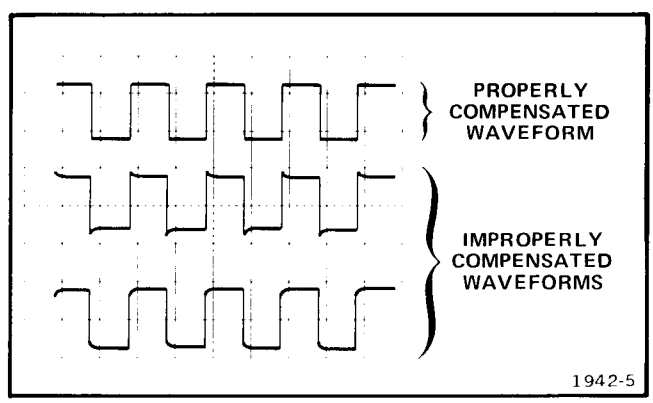


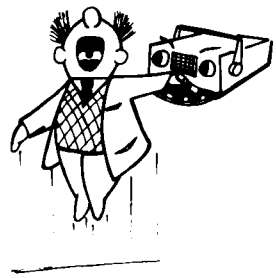
Fig. 2-5. Probe compensation.

Vertical Gain Check

Obtain a normal sweep display of the .5 V CAL OUT signal. Set the VOLTS/DIV switch to .1 (10 m if using a X10 probe). Be certain the VARIABLE VOLTS/DIV control is in the calibrated position. Check the display for a vertical deflection of 4.85 to 5.15 divisions. You may use any signal of known amplitude to check vertical gain. Check displayed amplitude to be the same as the known signal amplitude plus or minus 3%.

Basic Timing Check

Be certain the A CAL control is in the calibrated position. Obtain a normal sweep display of any signal of known freqeuncy, such as a 60 Hz line or the .5 V CAL OUT signal. If a 60 Hz line voltage is used, connect the probe tip to the live conductor.



WARNING

To prevent possible cross grounding when using the line voltage, do not use the ground clip on the probe. The 335 chassis provides an adequate ground reference.

Set the SEC/DIV control to display one cycle over several horizontal divisions. Check the displayed duration of one cycle to be the same as the duration of one cycle of the known signal plus or minus 3% (duration = 1/frequency). If you use a 60 Hz line voltage, check the duration of one cycle to be 16.16 to 17.16 ms. If you use the .5 V CAL signal, check the duration of one cycle to be 0.96 to 1.03 ms. The accuracy of the .5 V CAL OUT signal is plus or minus 2%. This could cause an apparent error of 5%.

LOCATION AND OPERATION OF EXTERNAL CONTROLS, CONNECTORS, AND INDICATORS

The following information will familiarize the operator with the location and operation of external controls, connectors, and indicators. These controls, connectors, and indicators are accessible from outside the instrument with its cabinet in place. All other controls are internal and should not be adjusted except during instrument calibration. In this discussion, a pushbutton is considered set to the out position unless otherwise stated.

CRT, POWER, AND EXTERNAL BLANKING FIG. 2-6

1. **POWER/INTENSITY.** Front panel dual purpose control. Pull out on the control to turn on instrument power. A yellow band becomes visible at the base of the control when the power switch is turned on.

   Turn the control clockwise to increase display brightness.

2. **FOCUS.** Front panel control which adjusts to provide optimum display definition.

3. **Power Source Selector.** Right side panel three-position switch which provides selection of ac line voltage or external dc voltage operation. The AC position, in conjunction with the Line Voltage Selector switch and the Regulating Range Selector switch, allows the 335 to operate over a wide range of ac line voltages (see Table 2-1). Two positions of the Power Source Selector switch allow operation from an external dc source of either 11 to 14 V or 22 to 28 V.

4. + **and** −. Right side panel inputs for the application of an external dc power source.

5. **Line Voltage Selector.** Rear panel two-position switch which can be set to allow operation from an ac source of either 115 V or 230 V (when Power Source Selector switch is in the AC position). Remove the rear panel to change the switch setting.

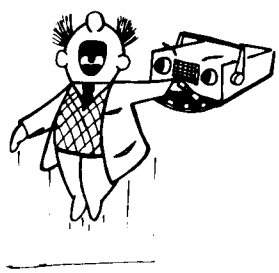
6. **Regulating Range Selector.** Rear panel three-position switch which selects one of three regulating ranges for each of the two nominal line voltages (see Table 2-1). Set the Regulating Range Selector switch so that the expected line voltage fluctuations fall within the regulating range chosen.

7. **LOW LINE Indicator.** Front panel indicator which glows green when the instrument is turned on. When the power source falls below the specified level, the indicator blinks on and off.

8. **EXT BLANK.** Rear panel input for external-blanking signals. A + 5-volt zero to peak signal causes noticeable intensity modulation (positive-going signal decreases intensity). Only one input is provided. The 335 and external-blanking signal source should have a common ground reference, such as the power line common.

CAUTION

Avoid cross grounding as instrument damage may result.



WARNING

If either the 335 or the external blanking signal source are floating, establishing a common ground can produce a shock hazard.

If a common references does not exist, connect the external blanking signal ground to the ground connector on the 335 right side panel.

9. **Ground Connector.** Right side panel connector for common ground connections.

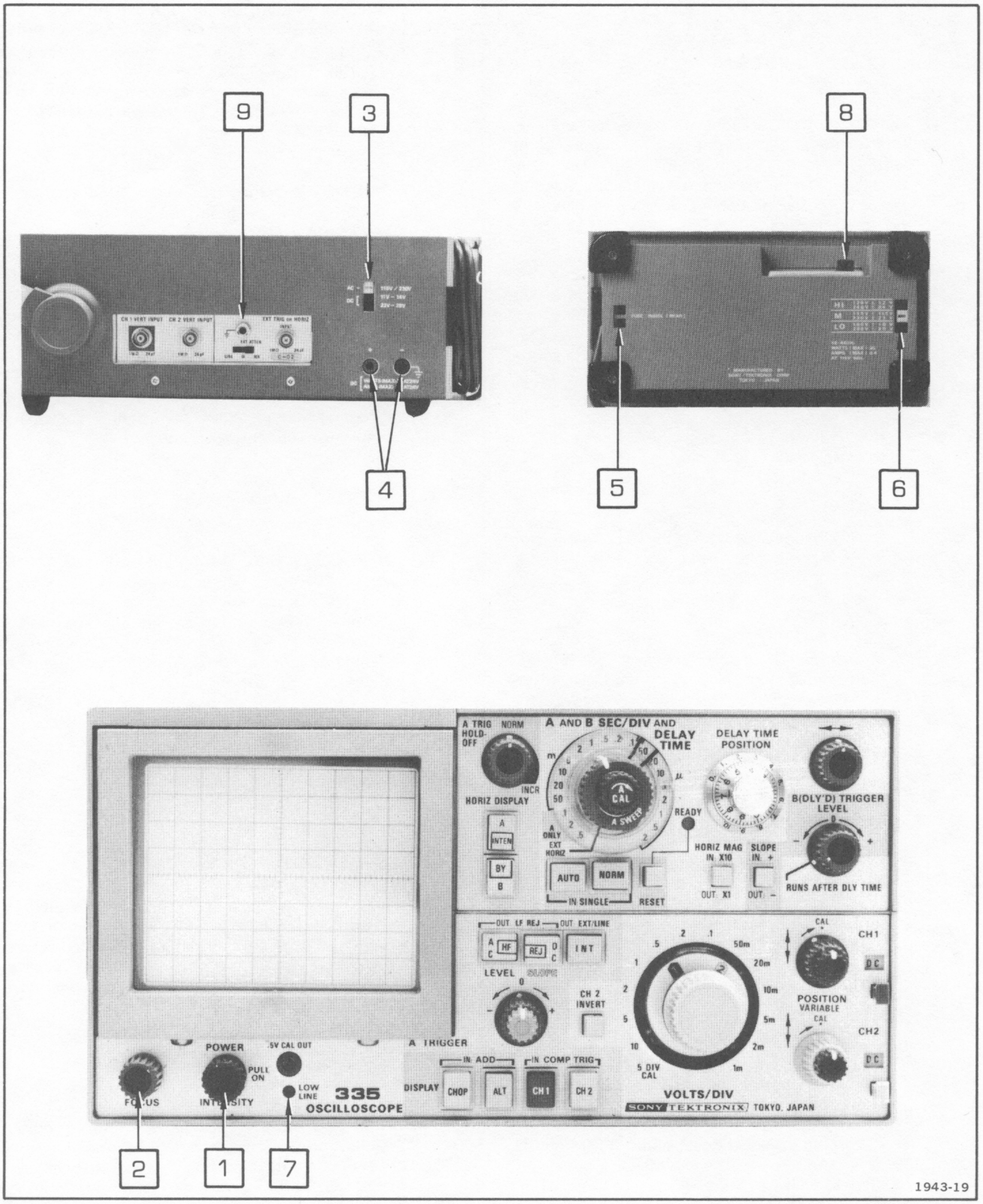


Fig. 2-6. Crt, power, and external blanking controls, connectors, and indicators.

VERTICAL
FIG. 2-7

10. **CH 1 VERT INPUT and**

11. **CH 2 VERT INPUT.** Right side panel BNC connectors for the application of external signals to the vertical deflection system. In the External Horizontal mode of operation, the signal connected to either VERT INPUT connector can provide Y-Axis (vertical) deflection. Use the DISPLAY switch to select the desired channel.

12. **DISPLAY.** Front panel control, composed of four pushbutton switches, which determine the operating modes of the vertical system. The CH 1 and CH 2 pushbuttons also determine the source of the signal supplied to the A trigger generator when using internal triggering.

    CH 1 (Channel 1 Only): Set the CH 1 pushbutton to the in position to display the signal applied to the CH 1 VERT INPUT connector.

    CH 2 (Channel 2 Only): Set the CH 2 pushbutton to the in position to display the signal applied to the CH 2 VERT INPUT connector.

    ALT (Alternate): Set the ALT pushbutton to the in position. The display now switches between the signals applied to the CH 1 and CH 2 VERT INPUT connectors. This switching occurs at the end of each sweep (during retrace and holdoff). This mode is useful when viewing both input signals at sweep speeds of one millisecond/division or faster. When using slower sweep speeds, use the chopped mode to avoid a flickering display. To obtain the best triggering results for non-time-related signals, set Trigger Coupling to LF REJ (both the AC and DC pushbuttons set to the out position) and Trigger Source to COMP TRIG (both the CH 1 and CH 2 pushbuttons set to the in position). Then carefully adjust the A TRIGGER LEVEL control. To show proper time relationship for time-related signals, set Trigger Source to CH 1 (CH 1 pushbutton set to the in position).

    CHOP (Chopped): Set the CHOP pushbutton to the in position. The display now switches between the signals applied to the CH 1 and CH 2 VERT INPUT connectors. This switching occurs at a fixed rate of about 300 kilohertz. This mode is useful when viewing both input signals at sweep speeds of 0.5 millisecond/division or slower. When using sweep speeds faster than 0.5 millisecond/division, the chopped segments may become visible. For faster sweep rates, use the Alternate (ALT) mode. Composite triggering (COMP TRIG) allows the display to trigger on the switching transients. To obtain the best triggering results, set Trigger Source to CH 1 or CH 2.

    ADD: Set both the ALT and the CHOP pushbuttons to the in position. The display is now the algebraic sum of the signals applied to the CH 1 and CH 2 VERT INPUT connectors (CH 1 plus CH 2). The CH 2 INVERT pushbutton set to the in position (inverted) provides a difference display of the signals applied to the CH 1 and CH 2 VERT INPUT connectors (CH 1 minus CH 2).

13. **CH 2 INVERT.** Set the CH 2 INVERT pushbutton to the in position to invert the Channel 2 display. Useful for common-mode rejection.

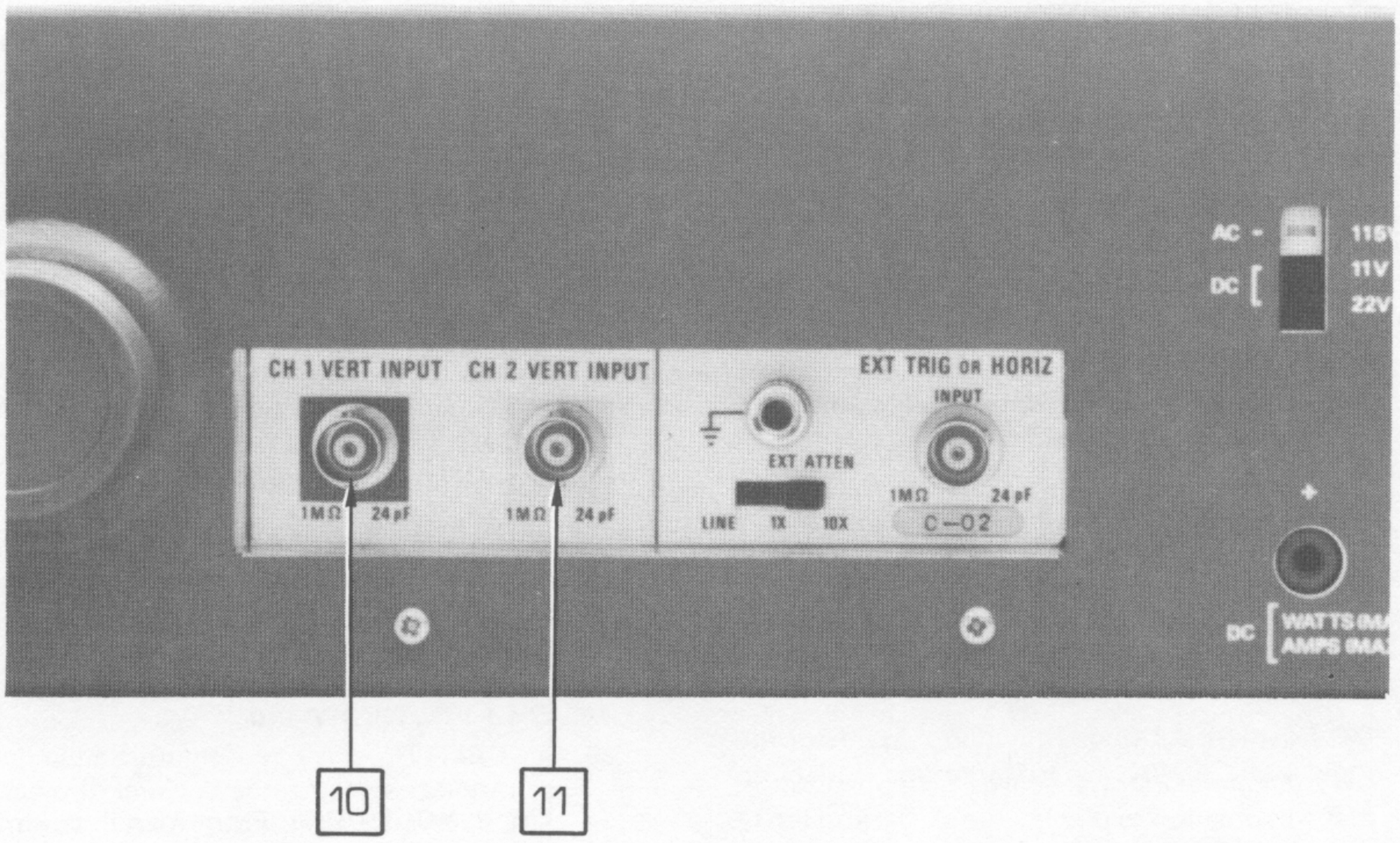
14. **CH 1 VOLTS/DIV and**

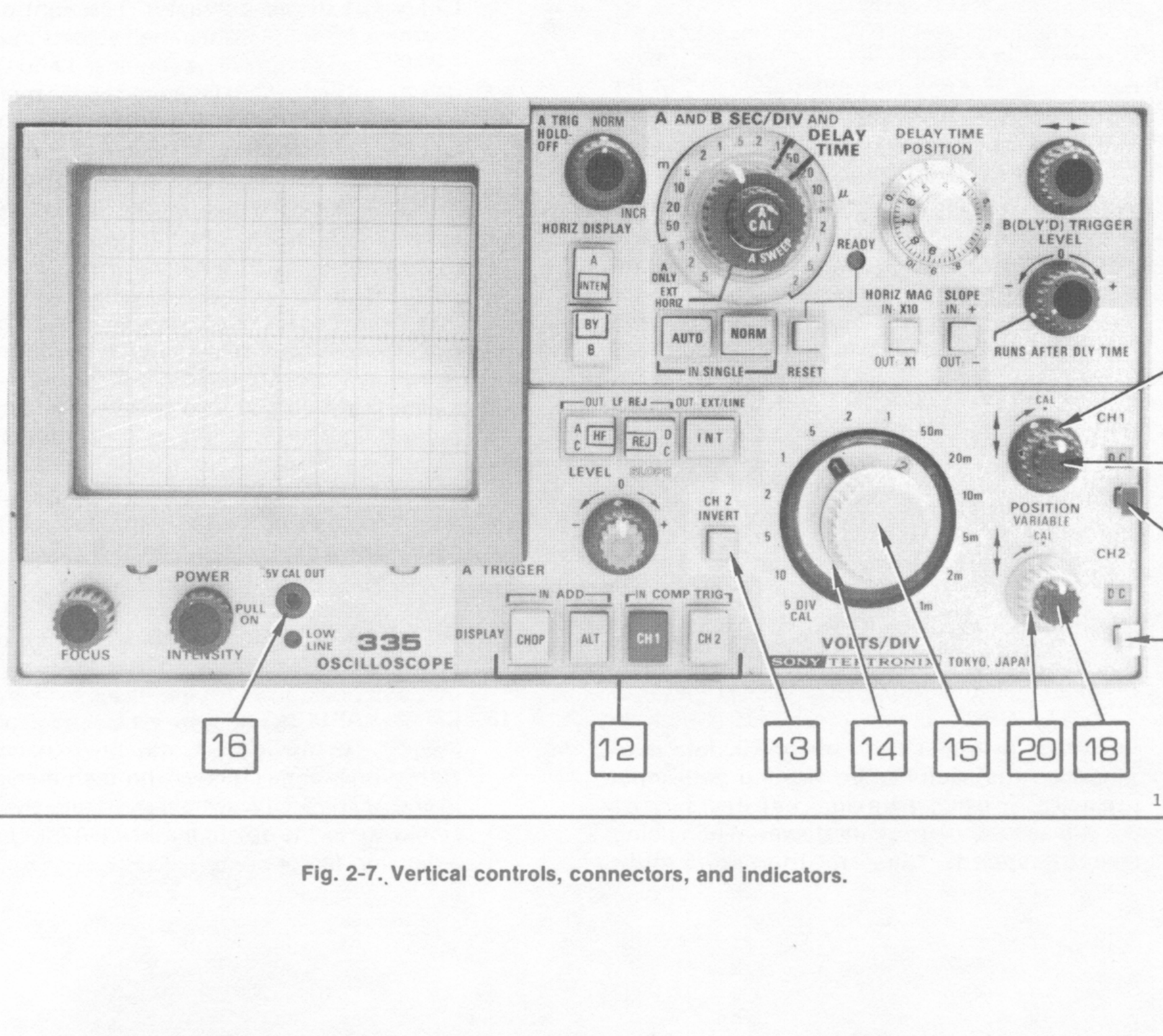
15 **CH 2 VOLTS/DIV.** Front panel controls which select the vertical deflection factors. The dark grey knob (closest to the front panel) selects the Channel 1 deflection factor. The light grey knob (farthest from the front panel) selects the Channel 2 deflection factors. The Channel 1 and Channel 2 deflection factors are indicated by the markings Ch 1 and CH 2 respectively on skirts of the VOLTS/DIV switches (fully counterclockwise) a five division vertical display appears on the crt. Use this display to verify the accuracy of the vertical deflection system.

16. **.5 V CAL OUT.** Front panel pin connector. An internally generated 0.5 volts square wave (1 kilohertz within 2%) is available at this connector for use in checking the attenuation factor and compensation of probes. In the 5 DIV CAL position of the VOLTS/DIV switches, this signal passes internally to the vertical preamplifiers to provide a check of vertical gain.

17. **CH 1 VARIABLE and**

18. **CH 2 VARIABLE.** Front panel controls which provide continuously variable (uncalibrated) deflection factors between the calibrated positions of the VOLTS/DIV switches. Rotate the controls clockwise to the detent marked CAL for calibrated deflection factors.





1943-20

Fig. 2-7. Vertical controls, connectors, and indicators.

19. **CH 1 POSITION and**

20. **CH 2 POSITION.** Front panel controls which position the display vertically.

21. **CH 1 AC-GND-DC and**

22. **CH 2 AC-GND-DC.** Front panel three position switches which select the method of coupling the input signal to the vertical deflection system. Pull out or push in to operate.

    AC Position: The dc component of the input signal is blocked.

    GND Position: The input to the vertical attenuator circuit is grounded (does not ground the input signal). Provides a ground reference display and allows precharging the vertical input coupling capacitor.

    DC Position: All frequency components of the input signal are passed to the vertical deflection system.

HORIZONTAL
FIG. 2-8

23. **HORIZ DISPLAY.** Front panel control, consisting of 2 pushbutton switches, which determines the operating mode of the horizontal deflection system.

    A (A Sweep Mode): Set the A pushbutton to the in position. The A sweep generator provides horizontal deflection at a rate determined by the A SEC/DIV switch. The B sweep generator is inoperative.

    B (B Delayed Mode): Set the B pushbutton to the in position. The B sweep generator provides horizontal deflection at a rate determined by the B SEC/DIV switch. The A sweep generator continues to operate. The start of B sweep is delayed from the start of A sweep by a time which is determined by the settings of the A SEC/DIV switch and the DELAY TIME POSITION dial. To compute the duration of this delay, multiply the A SEC/DIV switch setting by the DELAY TIME POSITION dial setting.

    A INTEN (A Intensified Mode): Set both the A and B pushbuttons to the in position at the same time. Horizontal deflection is provided by the A sweep generator at a rate determined by the A SEC/DIV switch. The B sweep generator continues to operate. During the time B sweep is running, the A sweep display is intensified (made brighter). The setting of the DELAY TIME POSITION dial determines the horizontal position of the intensified zone. The setting of the B SEC/DIV switch determines the length of the intensified zone. The A Intensified mode is useful for locating the portion of the A sweep display which would be displayed in the B Delayed Mode. You can also use the A Intensified mode to make very accurate time difference measurements.

24. **A SEC/DIV.** Front panel control (grey knob) which selects the sweep rate of the A sweep generator and/or selects the basic time (to be multiplied by the DELAY TIME POSITION dial) for A Intensified or B Delayed operation.

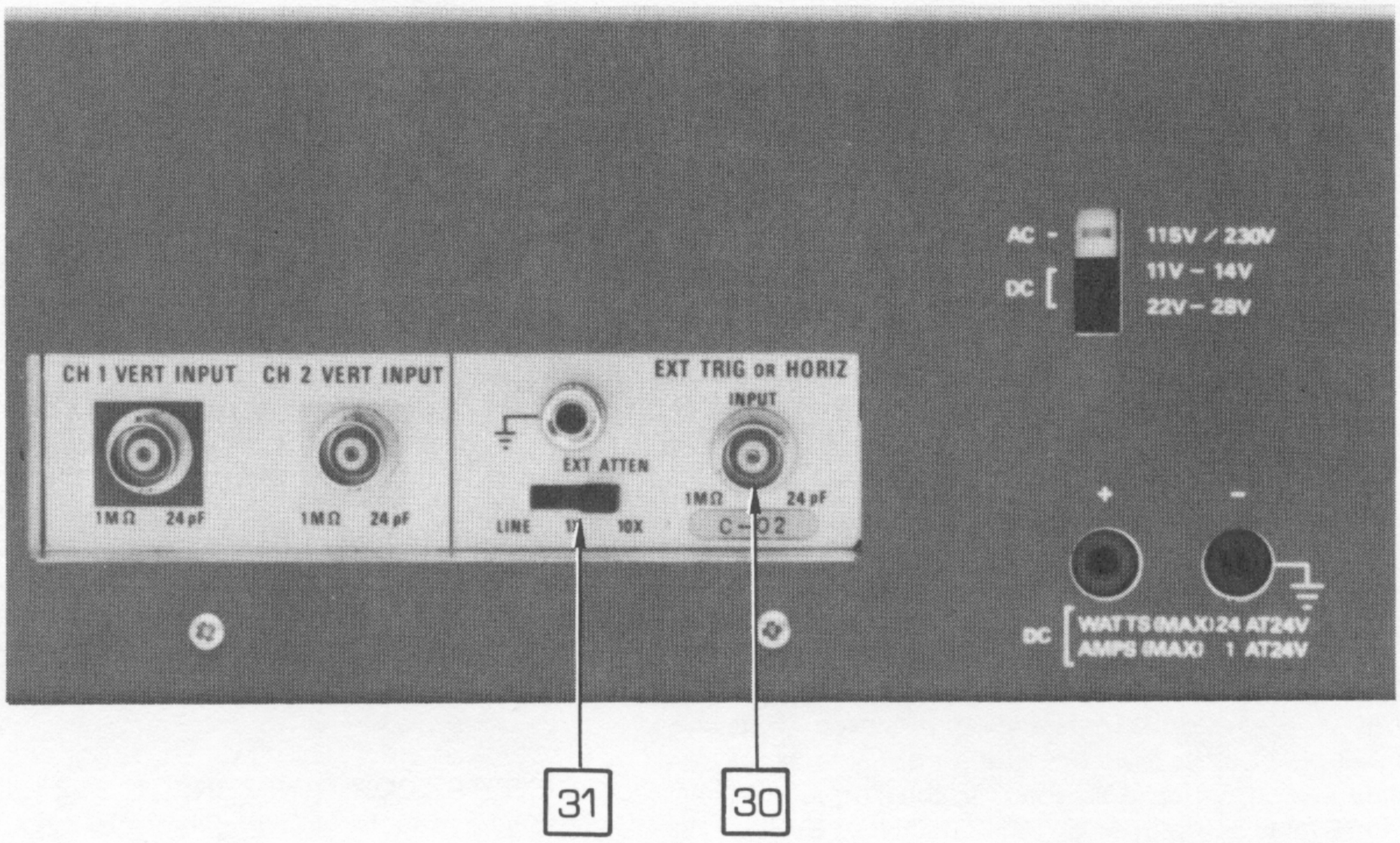
25. **B SEC/DIV.** Front panel control (clear plastic skirt) which selects the sweep rate of the B sweep generator circuit.

26. **A CAL.** Provides continuously variable (uncalibrated) sweep rates between the calibrated A SEC/DIV switch settings. The A CAL control must be in the calbrated detent (fully clockwise) for calibrated A sweep rates and delay times. The A CAL control does not affect B sweep rates.

27. **DELAY TIME POSITION.** Front panel control which adjusts the delay time between the beginning of A sweep and the beginning of B sweep. Multiply the DELAY TIME POSITION dial setting by the A SEC/DIV switch setting to calculate the delay time. The A CAL control must be in the calibrated detent (fully clockwise) for calibrated delay times. The delay time available is from 0.10 to 10.10 times the A SEC/DIV switch settings. The A CAL control must be in the calibrated detent (fully clockwise) for calibrated A sweep rates and delay times. The A CAL control does not affect B sweep rates.

28. **POSITION.** Front panel control which positions the crt display horizontally.

29. **HORIZ MAG.** Front panel control consisting of one pushbutton. Setting the HORIZ MAG pushbutton to the in position (X10) increases each sweep rate by a factor of 10. Increases the sweep rate to 0.02 microsecons/division in the .2 μ position of the SEC/DIV switches. The portion of the unmagnified display (which will be displayed in magnified form) is the center horizontal division (0.5 division on each side of the center vertical graticule line).



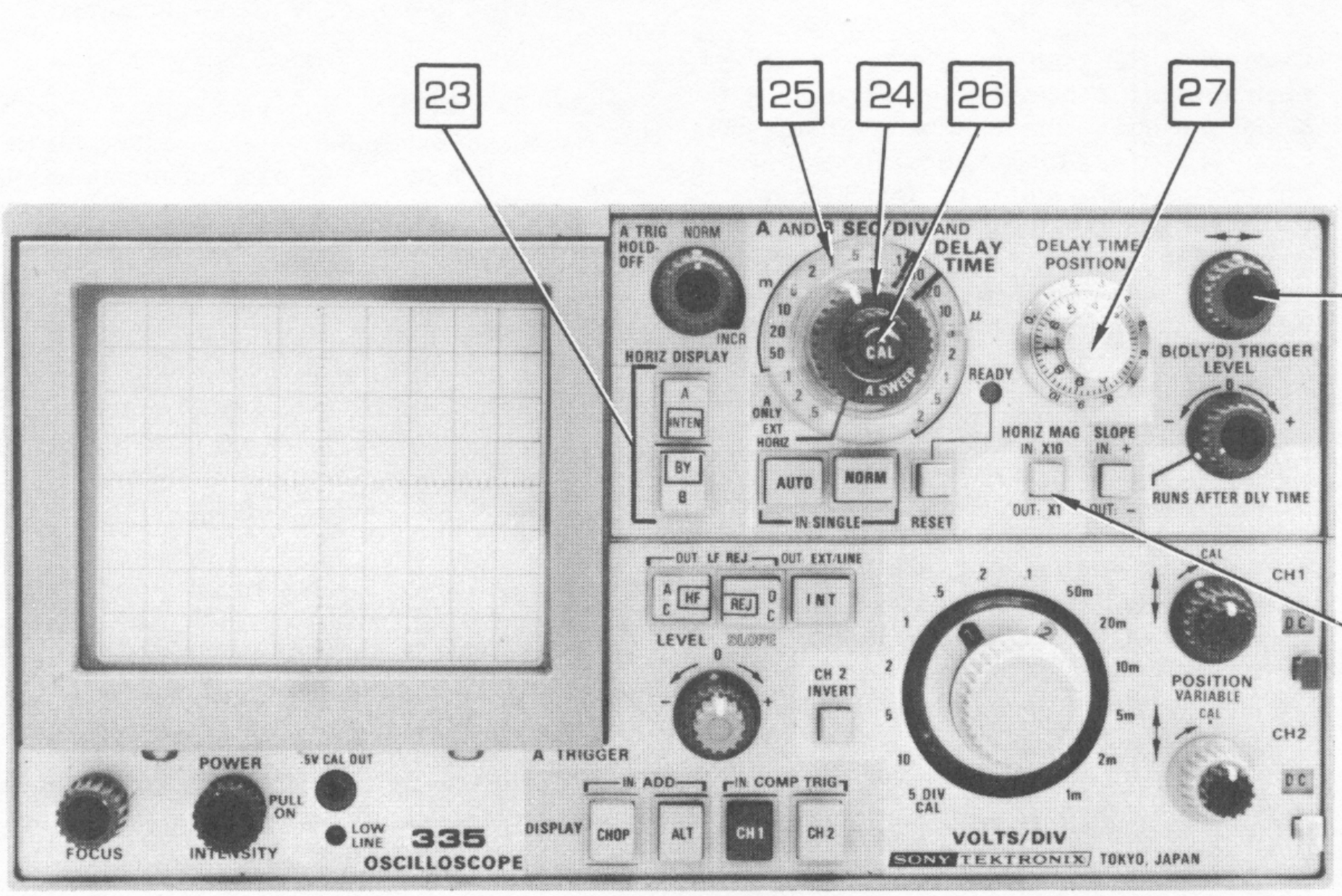


Fig. 2-8. Horizontal controls, connectors, and indicators.

30. **EXT TRIG OR HORIZ INPUT.** Right side panel BNC connector. With the A SEC/DIV switch set to the EXT HORIZ position, the signal applied here provides horizontal deflection. The basic sensitivity is about 200 millivolts/division. Use of the HORIZ MAG X10 switch increases horizontal sensitivity to about 20 millivolts/division. Use of the EXT ATTEN swtich decreases horizontal sensitivity to about two volts/division. Also see 33.

31. **EXT ATTEN.** Dual purpose right side panel control consisting of a three-position slide switch. The signal connected to the EXT TRIG or HORIZ INPUT connector is attenuated by a factor of 10 in the 10X position, or passed unattenuated in the 1X position, of this control. Also see Line under Triggering Source, 32.

TRIGGERING
FIG. 2-9

32. **Source.** The source of the signal supplied to the A trigger generator is determined by three front panel pushbutton switches and a right side panel slide switch. When B sweep is in the Triggerable After Delay mode (see B TRIGGERING LEVEL), the same signal is supplied to both the A and B trigger generators.

Channel 1: Set both the CH 1 and the INT pushbuttons to the in position. A sample of the signal present in the Channel 1 preamplifier circuit is used as a trigger signal. Since the CH 1 pushbutton is also part of the DISPLAY switch, Channel 1 is automatically chosen as the trigger source in the Channel 1 only mode of operation. In the ALT or CHOP modes, the Channel 2 display will be unstable if it is not time-related to the Channel 1 display.

Channel 2: Set both the INT and the CH 2 pushbuttons to the in position. A sample of the signal present in the Channel 2 preamplifier is used as a trigger signal. Since the CH 2 pushbutton is also a part of the DISPLAY switch. Channel 2 is automatically chosen as the trigger source in the Channel 2 only mode of operation. In the ALT or CHOP modes, the Channel 1 display will be unstable if it is not time-related to the Channel 2 display.

Composite (COMP TRIG): Set the INT, CH 1, and CH 2 pushbuttons to the in position. The trigger signal is now obtained from the signal(s) displayed on the crt. Does not show the time-relationship of the Channel 1 and Channel 2 signals in the Alternate Vertical mode. Do not use composite triggering in the Chop mode because the display will trigger on the switching transients and not on the desired signal.

External: Set the INT pushbutton to the out position. With the EXT ATTEN slide switch on the instrument side panel set to 1X or 10X, the signal connected to the EXT TRIG OR HORIZ INPUT connector is used as a trigger signal. The settings of the CH 1 and CH 2 pushbuttons have no affect on trigger source selection when using external triggering.

Line: Set the INT pushbutton to the out position. With the EXT ATTEN slide switch on the instrument side panel set to LINE, a sample of the line voltage supplied to the instrument is used as a trigger signal. The settings of the CH 1 and CH 2 pushbuttons have no affect on trigger source selection when using line triggering.

Do not use Low Frequency Reject (LF REJ) coupling and line triggering together as the trigger signal will be attenuated.

33. **EXT TRIG OR HORIZ INPUT.** Right side panel BNC connector. In all positions of the A SEC/DIV switch except EXT HORIZ (fully counterclockwise), the signal applied here can be used to externally trigger the sweep.

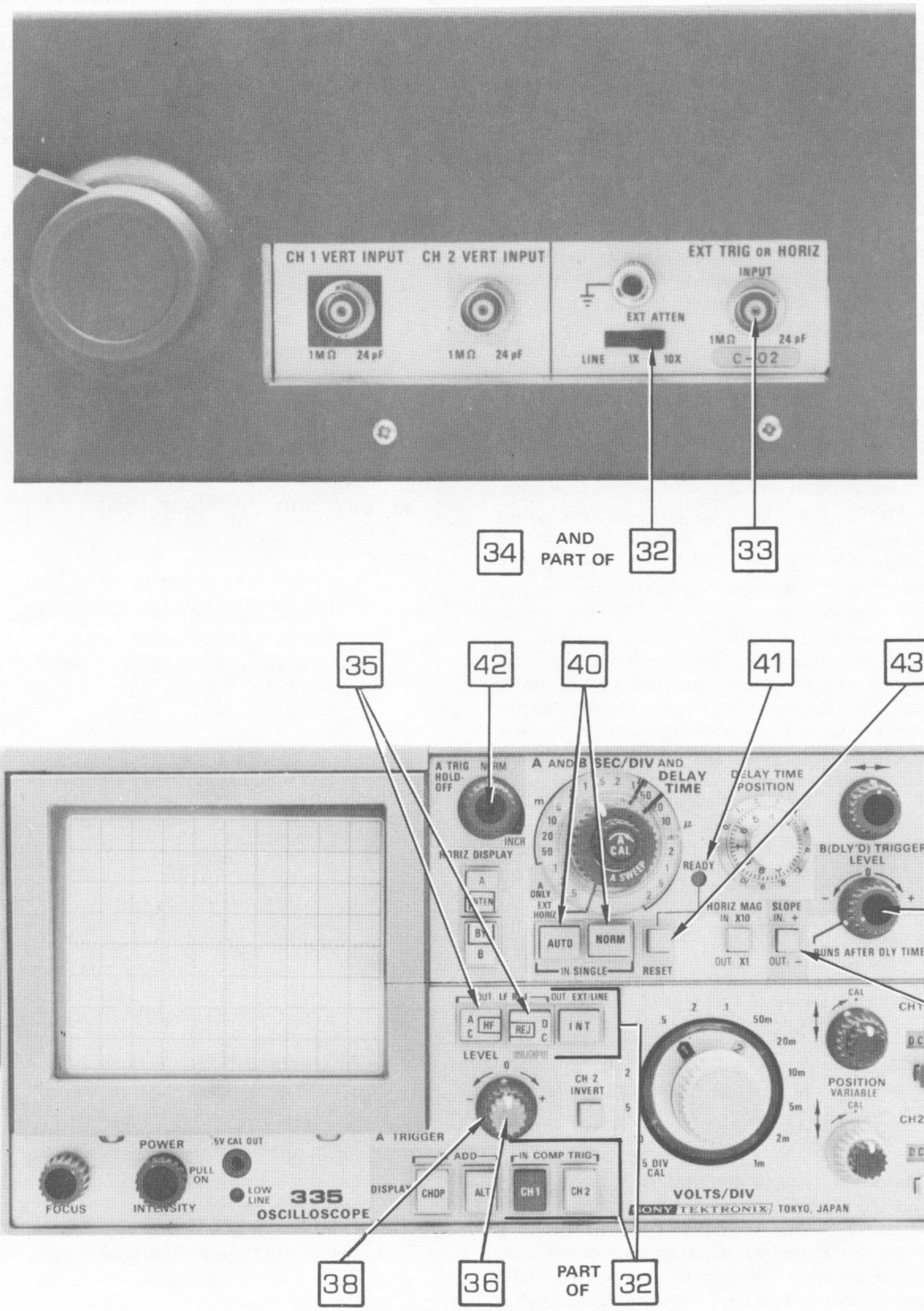
34. **EXT ATTEN.** Right side panel slide switch. When using external triggering, setting the EXT ATTEN switch to the 10X position attenuates the external trigger signal by a factor of 10.

35. **Coupling.** Front panel control, consisting of two pushbuttons, which selects the method of coupling the trigger signal to the A trigger generator. When B sweep is in the Triggerable After Delay mode (see 39, B TRIGGERING LEVEL control), the trigger signal is coupled to both the A and B trigger generators in the same manner.

AC: Set the AC pushbutton to the in position. AC coupling rejects dc and attenuates signals below about 60 hertz. Passes signals from about 60 hertz to about 35 megahertz.

DC: Set the DC pushbutton to the in position. DC coupling passes all signals from dc to about 35 megahertz.

HF REJ (High-Frequency Reject): Set both the AC and DC pushbuttons to the in position. High-Frequency Reject coupling blocks dc and attenuates signals below about 60 hertz and above about 20 kilohertz. Passes signals from about 60 hertz to about 20 kilohertz.



1943-22

Fig. 2-9. Triggering controls, connectors, and indicators.

LF REJ (Low-Frequency Reject): Set both the AC and DC pushbuttons to the out position. Low-Frequency Reject coupling blocks dc and attenuates signals below about 40 kilohertz. Passes signals from about 40 kilohertz to above 35 megahertz.

36. **A SLOPE.** Front panel two-position rotary switch mounted concentrically with the A LEVEL control. The A SLOPE switch selects the slope of the triggering signal which initiates the A sweep.

    +: Set the A SLOPE switch to its counterclockwise position. A sweep can now trigger on the positive-going portion of the triggering signal.

    −: Set the A SLOPE switch to its clockwise position. A Sweep can now trigger on the negative-going portion of the triggering signal.

37. **B SLOPE.** Front panel pushbutton switch. In the triggerable after delay mode (see 39, B TRIGGERING LEVEL control), the B SLOPE switch selects the slope of the triggering signal which initiates B sweep.

    +: Set the B SLOPE pushbutton to the in position. B sweep can now trigger on the positive-going portion of the triggering signal.

    −: Set the B SLOPE pushbutton to the out position. B sweep can now trigger on the negative-going portion of the triggering signal.

38. **A TRIGGER LEVEL.** Front panel control which selects the amplitude point on the trigger signal at which the A trigger generator initiates the A sweep.

39. **B (DLY'D) TRIGGER LEVEL.** Dual-purpose front panel control which selects the operating mode of B sweep and, in the Triggerable After Delay Time mode, adjusts the B Trigger Level.

    Runs After Delay Time Mode: Set the B DLY'D TRIGGER LEVEL control to the detent position (RUNS AFTER DLY TIME). In this mode, B sweep is initiated immediately upon completion of the delay time selected by the A SEC/DIV switch and the DELAY TIME POSITION dial. Multiply the setting of the A SEC/DIV by the setting of the DELAY TIME POSITION dial to calculate the exact delay time.

    Triggerable After Delay Time Mode: Set the B DLY'D TRIGGER LEVEL control out of the detent position. In this mode, B sweep will be initiated by the first adequate triggering signal available after the end of the delay time selected by the A SEC/DIV switch and the DELAY TIME POSITION dial. Turning the B DLY'D TRIGGER LEVEL control, out of its detent position, selects the amplitude point on the triggering signal at which B sweep is initiated.

40. **Trigger Mode.** Front panel switch, consisting of two pushbuttons, which determines the operating mode of the A Trigger circuit.

    AUTO (Automatic): Set the AUTO pushbutton to the in position. With the proper trigger control settings, the A sweep can be initiated by signals that have repetition rates above 20 hertz and are within the frequency range set by the Coupling switch. In the absence of an adequate trigger signal, or when the trigger controls are misadjusted, the sweep free-runs to provide a reference display.

    NORM (Normal): Set the NORM pushbutton to the in position. With proper trigger control settings, A sweep can be initiated by signals that are within the frequency range selected by the Coupling switch. In the absence of an adequate trigger signal, or when the trigger controls are misadjusted, the sweep does not run and there is no display.

    SINGLE Sweep: Set both the AUTO and NORM pushbuttons to the in position. The A Trigger circuit operates in the same manner as in NORM operation. However, upon receipt of an adequate trigger signal, one and only one sweep is presented. After a single sweep has been presented, another single sweep cannot be presented until the RESET pushbutton is pressed.

41. **Single Sweep READY Lamp.** A front panel indicator that, when lit, indicates that the A sweep generator has been reset and is prepared to present a single sweep display upon receipt of an adequate trigger signal. If the lamp is out, a single sweep has been displayed and further single sweep displays cannot be presented until the RESET pushbutton is pressed.

42. **A TRIG HOLDOFF.** A front panel control which provides control of the holdoff time between sweeps. Allows stable triggering on low repetition

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pulses or aperiodic signals. Obtain the best possible display using the A TRIGGER controls before using the A TRIG HOLDOFF control.

43. **RESET.** A front panel momentary-contact pushbutton switch to be used when operating in the Single Sweep mode. When the triggering controls are correctly set, only one sweep is presented every time the RESET pushbutton is pressed. In the absence of an adequate triggering signal (misadjusted triggering controls or a very low repetition rate), the READY light comes on when the RESET pushbutton is pressed, to indicate a single sweep display will be presented upon receipt of an adequate triggering signal.

CIRCUIT DESCRIPTION

This section of the manual contains a description of the circuitry used in the 335. The description begins with a general discussion of the instrument, using the basic block diagram shown in Fig. 3-1. Then, each circuit is described in detail. The diamond-enclosed number following a heading indicates the schematic diagram on which the circuitry being discussed is located. The schematic diagrams are located on the pullout pages at the rear of this manual.

BLOCK DIAGRAM DISCUSSION

The following discussion is given to aid in understanding the overall concept of the 335. Fig. 3-1 shows a basic block diagram of the 335. Only the basic interconnections between the blocks are shown. The diamond-enclosed number in each block indicates which schematic diagram shows the circuitry represented by the block. The schematic diagrams are located in the Diagrams section at the rear of this manual. The Diagrams section also contains a detailed block diagram of the 335.

Vertical System

Signals to be displayed on the crt are connected to the CH 1 VERT INPUT or the CH 2 VERT INPUT connector(s). The input signals are connected to the CH 1 and CH 2 Attenuators. The Attenuators provide deflection-factor switching. The signals from the Attenuators are connected to the CH 1 and CH 2 Preamplifiers. The Preamplifiers provide signal amplification, variable deflection factor adjustment, vertical positioning, and balance controls. The outputs of the Preamplifiers are connected to the Vertical Switching and Internal Trigger Pickoff circuits. The Vertical Switching portion of the circuit determines the signal(s) to be displayed on the crt. The output of the Vertical Switching circuit is connected to the Vertical Output Amplifier, which drives the vertical deflection plates of the crt. The Internal Trigger Pickoff portion of the Vertical Switching and Internal Trigger Pickoff circuits determines the source of the signal supplied to the Trigger Generators when using the internal (INT) triggering.

Calibrator

The Calibrator supplies a 1 kHz square wave to the CH 1 and CH 2 Attenuators. In the 5 DIV CAL position of the VOLTS/DIV switches, this signal produces a 5-division display on the crt to check vertical gain adjustment. The Calibrator also supplies a signal to the .5 V CAL OUT jack. This signal can be used to check the attenuation factor and compensation of probes.

Trigger System

A Trigger Generator. The A Trigger Generator produces a pulse that starts the A Sweep Generator. The Internal Trigger Pickoff and Trigger Switching circuits determine the source of the signal supplied to the A Trigger Generator circuit.

Two A Trigger modes are provided. In the NORM (normal) mode, a trigger pulse is generated only upon receipt of an adequate trigger signal. The AUTO (automatic) mode functions nearly the same as the NORM mode. The difference is that in the AUTO mode, after a period of time with no adequate trigger signal available, a trigger pulse is automatically generated. This produces a reference display on the crt when no signal is supplied to the A Trigger Generator or when the signal repetition rate is less than about 20 Hz.

B Trigger Generator. In the Triggerable After Delay mode, the B Trigger Generator operates in the same manner as the NORM mode of the A Trigger Generator. However, the B Trigger Generator does not produce a trigger pulse until receipt of the first adequate signal after the completion of a delay time. This delay time is determined by the settings of the A SEC/DIV and DELAY TIME POSITION controls.

In the RUNS AFTER DLY TIME mode the B Trigger Generator produces a trigger pulse as soon as the delay time is completed.

Horizontal System

Upon receipt of a trigger pulse, the A and B Trigger Generators produce linear sawtooth voltages. The start of the B Sweep sawtooth voltage is delayed from the start of the A Sweep sawtooth voltage by a time selected by the settings of the A SEC/DIV and DELAY TIME POSITION controls (see Trigger System).

The HORIZ DISPLAY switch selects which Sweep Generator output is connected to the Horizontal Amplifier. The Horizontal Amplifier drives the horizontal deflection plates of the crt. In the A INT setting of the HORIZ DISPLAY switch, the A Sweep Generator provides horizontal deflection and the display is intensified (made brighter) during the time the B Sweep Generator is running. This is useful for observing the portion of the A Sweep display that would be presented in the B DLY'D mode.

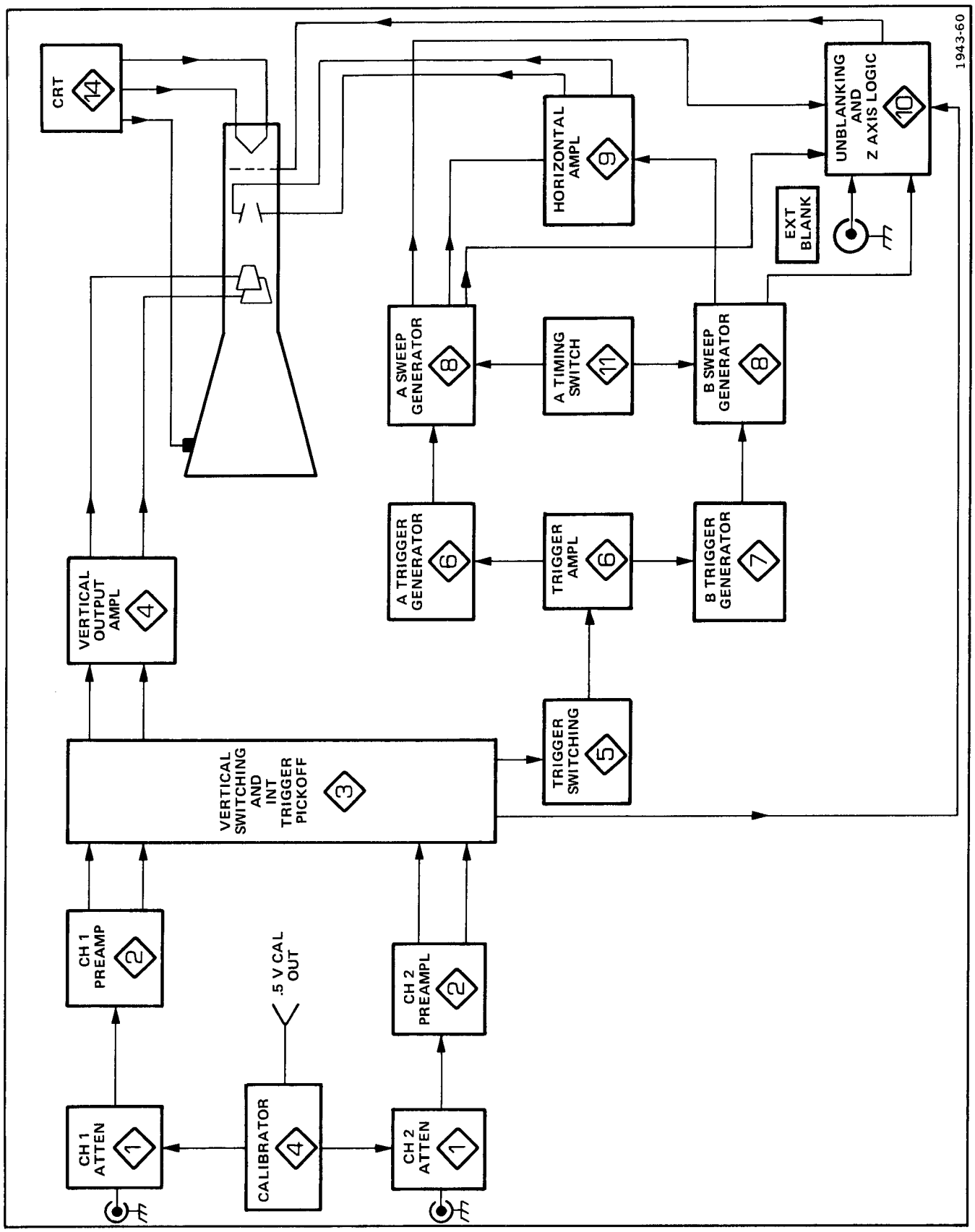


Fig. 3-1. Basic block diagram of the 335.

CRT Circuit and Power Supply

The CRT circuit provides the high voltages needed to operate the crt. The Power Supply circuit provides all other voltages needed to operate the 335.

Unblanking and Z-Axis Logic

The Unblanking and Z-Axis Logic circuit supplies a signal to the unblanking grid of the crt. Signals for controlling blanking and unblanking are supplied to this circuit from the A Sweep Generator, the B Sweep Generator, the Vertical Switching circuit (chopped switching transient blanking), and the EXT BLANK input connector.

CH 1 AND CH 2 ATTENUATORS ◇1

See Fig. 3-2 for a detailed block diagram of the CH 1 and CH 2 Attenuators.

Input signals, for vertical deflection on the crt, are connected to CH 1 VERT INPUT (J1) or CH 2 VERT INPUT (J11). The Attenuators provide control of input coupling and vertical deflection factors.

The CH 1 and CH 2 circuits are identical except that the CH 2 circuit contains an input capacitance adjustment (C11). This capacitor adjusts to match the input capacitance of CH 2 with CH 1. This eliminates the need to readjust probe compensation when moving the probe from one input to the other.

Since both circuits are identical, we will discuss the CH 1 circuit.

Input Coupling

The CH 1 AC-GND-DC switch, S2, controls the method of coupling the input signal to the Attenuators (see Fig. 3-2).

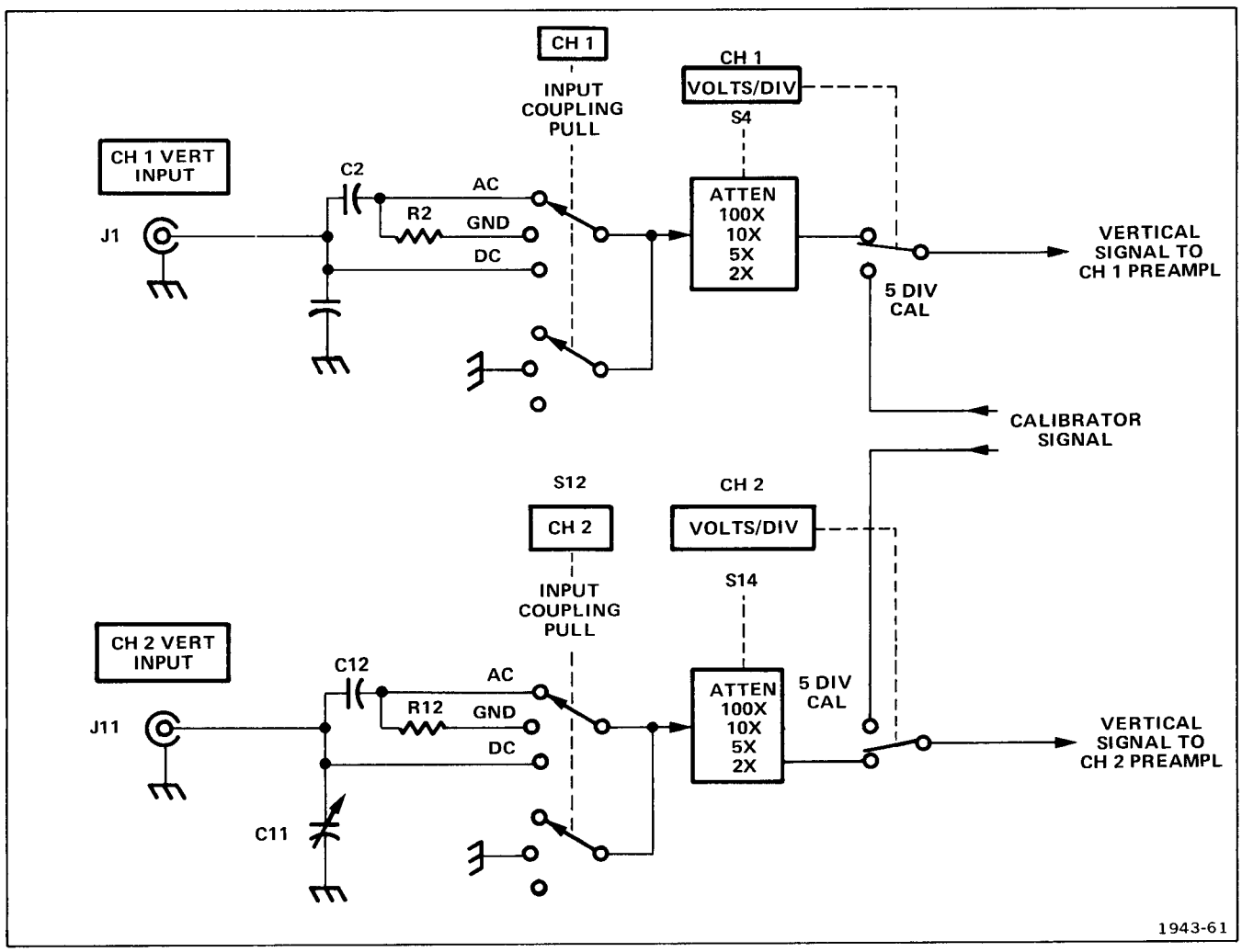


Fig. 3-2. Detailed block diagram of the CH 1 and CH 2 Attenuators.

AC. The input signal passes through C2 to the attenuators.

GND. The input to the Attenuators is grounded through S2. The input signal passes through C2 and R2 to ground. This allows C2 to charge to the average dc level of the input signal.

DC. The input signal is connected directly to the Attenuators.

Deflection Factor Selection

The basic vertical deflection factor of the 335 is 10 mV/division. To obtain the other deflection factors indicated by the VOLTS/DIV switch, one or more of four attenuators are switched into the circuit (in series) or the gain of the Preamplifier is increased by a factor of 10 (see CH 1 and CH 2 Vertical Preamp). Table 3-1 shows each deflection factor and the attenuation or gain switching needed to obtain it.

TABLE 3-1

Deflection Factors

VOLTS/DIV Setting	X10 GAIN Switching	Attenuators			
		2X	5X	10X	100X
1 m	X				
2 m	X	X			
5 m	X		X		
10 m					
20 m		X			
50 m			X		
.1				X	
.2		X		X	
.5			X	X	
1					X
2		X			X
5			X		X
10				X	X

The four attenuators are frequency-compensated voltage dividers. Fig. 3-3 shows a simplified schematic of the CH 1 2X attenuator. The other attenuators work in the same manner but use different ratios.

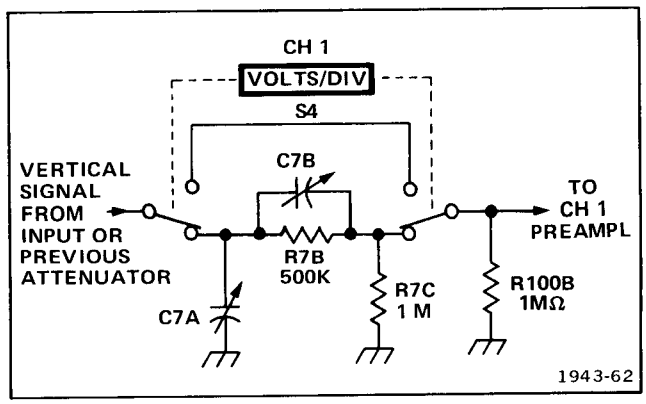


Fig. 3-3. Simplified schematic of the CH 1 2X Attenuator.

Resistor R7B and the parallel combination of R7C and R100B form the voltage divider. The resistance ratio is 1 to 1. Resistor R7B drops 50% of the signal. This leaves 50% of the signal to pass on to the CH 1 Preamp.

A shunt capacitor, C7A, provides adjustment of input capacitance to maintain a constant input impedance (1 MΩ paralleled by about 24 pF) as you change the VOLTS/DIV switch setting. A series capacitor, C7B, adjusts to provide correct attenuation at higher frequencies.

5 DIV CAL

In the 5 DIV CAL position of the VOLTS/DIV switches, the output of the Attenuator circuit is disconnected from the input to the Vertical Preamp and the Calibrator signal is connected in its place. This provides a 5-division vertical display on the crt for use in checking vertical system gain.

CH 1 AND CH 2 VERTICAL PREAMPLIFIER ◇2

The Vertical Preamplifier circuit provides input isolation, signal amplification, and control of variable deflection factor and vertical display position. In the 1 m, 2 m, and 5 m positions of the VOLTS/DIV switches, the gain of the Vertical Preamplifier is increased by a factor of 10. The CH 1 and CH 2 circuits are identical except that CH 2 can invert the CH 2 signal as displayed on the crt. See Fig. 3-4 for a simplified block diagram of the CH 1 Vertical Preamplifier.

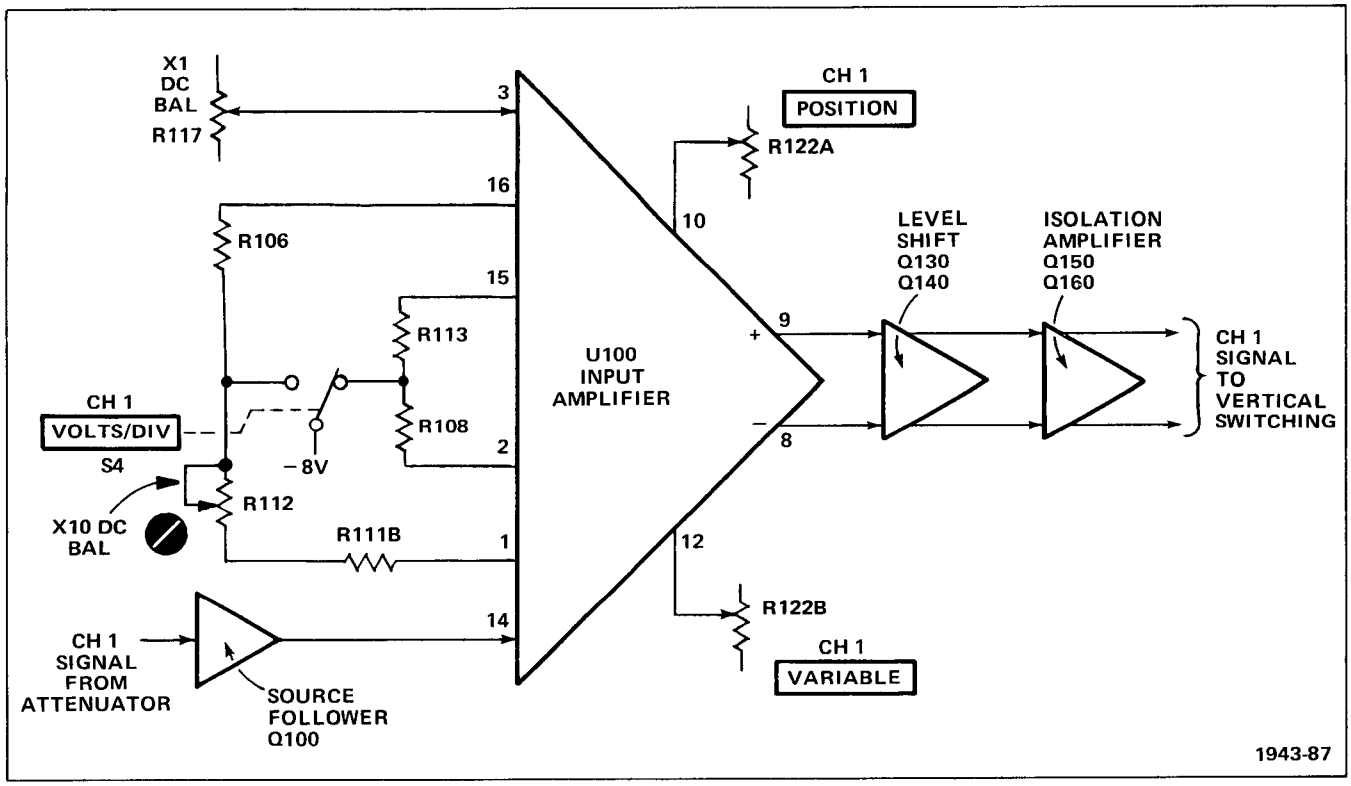


Fig. 3-4. Basic block diagram of the CH 1 Preamplifier.

Input Source Follower

See Fig. 3-5 for a schematic of the Input Source Follower.

The signal from the attenuator is connected to the gate of Q100A (Q200A). Resistor R100B (R200B), located on diagram 1, provides input resistance for the stage. Resistors R101A and R101B (R201A and R201B), located on diagram 1, protect the circuit by limiting gate current in the presence of high-amplitude positive-going input signals. Diode CR101 (CR201 and CR202) protects the circuit by clamping the gate of Q100A (Q200A) at about −8.7 volts (−9.4 volts) in the presence of high-amplitude negative-going input signals. FET Q100B (Q200B) provides a relatively constant current source for Q100A (Q200A).

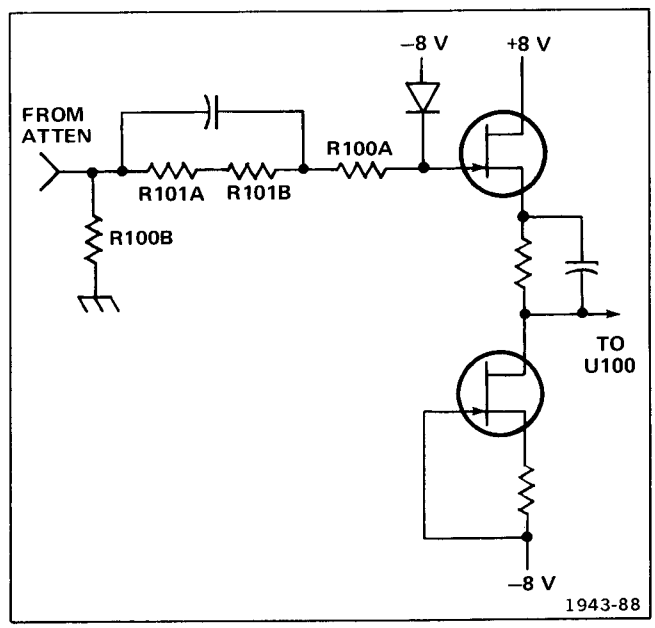


Fig. 3-5. Schematic of the input source follower.

U100 (U200)

The Tektronix-made integrated circuit U100 (U200) provides gain switching, variable deflection factor control, vertical position control, and polarity switching (CH 2 only). See Fig. 3-6 for a functional block diagram of U100 (U200).

In the 1 m, 2 m, and 5 m positions of the VOLTS/DIV switch the gain of U100 (U200) is increased by a factor of 10; this is in the X10 mode. In the X10 mode, −8 volts is connected to the junction of R106 and R112 (R206 and R212). Pins 1 and 16 are the current source for U100 (U200); see Fig. 3-4.

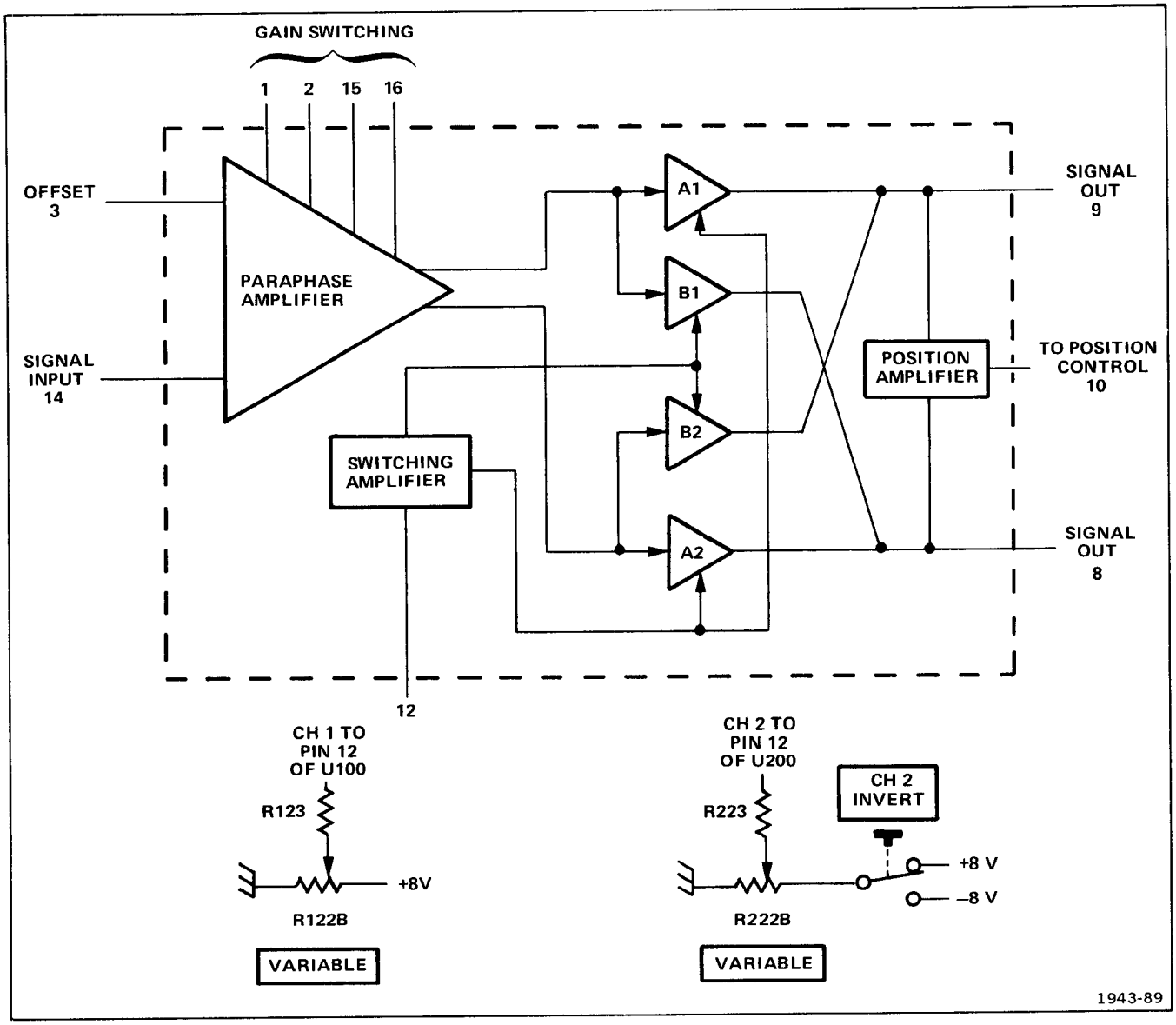


Fig. 3-6. Functional block diagram of U100 (U200).

In all positions of the VOLTS/DIV switch except 1 m, 2 m, and 5 m U100 (U200) operates in the X1 mode. To operate in the X1 mode, −8 volts is connected to R113 and R108 (R213 and R208). Pins 2 and 15 are now the current source for U100 (U200).

There are two adjustments for calibrating Vertical Preamplifier gain, R135 and R110B (R235 and R210B). In the X1 mode, both R135 and R110B (R235 and R210B) affect gain. In the X10 mode, only R135 (R235) affects gain. Due to this interaction R135 (R235) must be adjusted in the X10 mode first. Then R135 (R235) is adjusted in the X1 mode.

The output of the Source Follower is applied to pin 14 of U100 (U200). This is the input to a paraphase amplifier contained within U100 (U200). The outputs of the paraphase amplifier are 180° out of phase with each other. Each output of the paraphase amplifier is connected to a pair of steering amplifiers: A1—B1 and A2—B2. The switching amplifier controls the gains of the steering amplifier. In normal operation, only A1 and A2 pass the signal.

Adjustment of R122B (R222B) provides variable deflection factors. This is done by turning B1 and B2 on. As the VARIABLE control is rotated counterclockwise the amplitude of the output of B1 and B2 increases. The

outputs of A1 and B2 are connected together and are 180° out of phase with each other. The outputs of A1 and B2 add algebraically. This reduces the amplitude of the output signal at pin 9. Steering amplifiers A2 and B1 operate in the same manner to reduce the amplitude of the output signal at pin 8.

The CH 2 Vertical Preamplifier has the ability to invert the signals at pins 8 and 9 of U200. This is done by switching the voltage connected to pin 12, through R222B and R223, from +8 volts to −8 volts. This causes the switching amplifier to turn on steering amplifiers B1 and B2 and turn off steering amplifiers A1 and A2. In the inverted mode, variable deflection factors are obtained in a manner similar to normal operation except adjustment of R222B turns on A1 and A2 instead of B1 and B2.

Vertical positioning is done by adjusting R122A (R222A). This changes the dc level at pin 10 of U100 (U200). The vertical shift of the display is proportional to the voltage change at pin 10.

Level Shift and Isolation Amplifiers

Transistors Q130 and Q140 (Q230 and Q240) shift the level of the signal currents from pins 8 and 9 of U100 (U200). Overall amplifier gain is adjusted by R135 (R235). Reducing the resistance of R135 (R235) reduces gain by shunting signal current around the bases of Q150 and Q160 (Q250 and Q260). This reduced base drive reduces the signal current through R151 and R161 (R251 and R261). This reduces the signal amplitude supplied to U350 and U360.

Transistors Q150 and Q160 (Q250 and Q260) are connected as emitter followers. This provides isolation between the Vertical Amplifier circuits and U350 and U360.

VERTICAL SWITCHING AND INTERNAL TRIGGER PICKOFF ③

The Vertical Switching and Internal Trigger Pickoff circuit uses digital logic to perform the switching functions. Fig. 3-7 shows the logic symbols used on diagram 3. Fig. 3-8 shows a simplified block diagram of the circuit and a truth table for U300, U350, and U360 (the shaded areas of Fig. 3-8 apply to instruments with serial numbers below B300121). This circuit also contains the Delay Line.

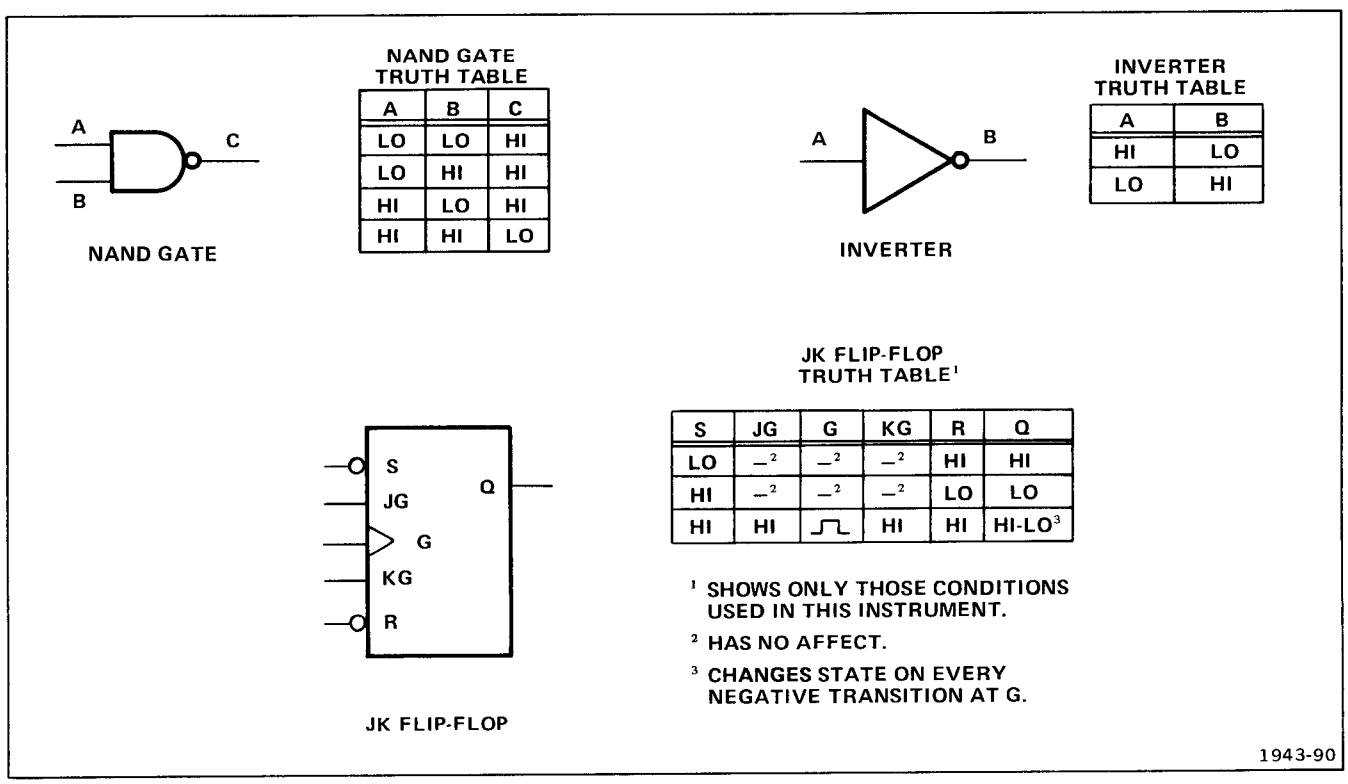
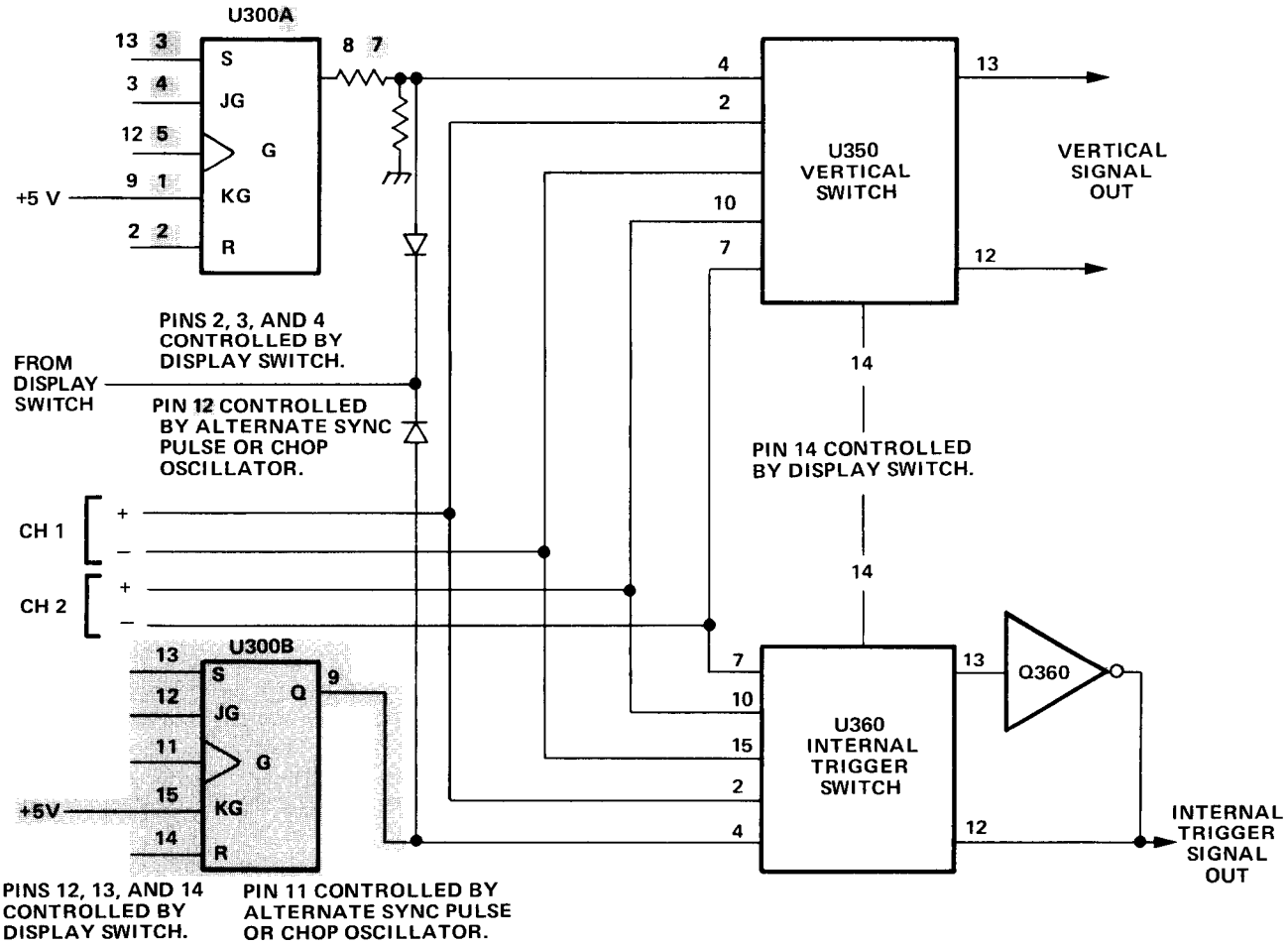


Fig. 3-7. Logic symbols and truth tables.

SHADED AREAS APPLY TO INSTRUMENTS BELOW SNB300121



DISPLAY SWITCH				U300A						U350		U300B						U360		RESULTANT VERT MODE	RESULTANT TRIG MODE
CH 1	CH 2	CHOP	ALT	13 2	2 3	3 4	12 5	8 7		4	14	11	12	13	14	9		4	14		
●				LO	HI	–[1]	–[1]	HI			LO	–[1]	–[1]	HI	LO	HI			LO	CH 1	CH 1
	●			HI	LO	–[1]	–[1]	LO			LO	–[1]	–[1]	LO	HI	LO			LO	CH 2	CH 2
●		●	●	HI	LO	–[1]	–[1]	LO			HI	–[1]	–[1]	HI	LO	HI			LO	ADD	CH 1
	●	●	●	HI	LO	–[1]	–[1]	LO			HI	–[1]	–[1]	LO	HI	LO			LO	ADD	CH 2
●	●	●	●	HI	LO	–[1]	–[1]	LO			HI	–[1]	–[1]	LO	HI	LO			HI	ADD	COMP
●			●	HI	HI	HI	⎍[2]	HI-LO[4]			LO	–[1]	–[1]	HI	LO	HI			LO	ALT	CH 1
	●		●	HI	HI	HI	⎍[2]	HI-LO[4]			LO	–[1]	–[1]	LO	HI	LO			LO	ALT	CH 2
●	●		●	HI	HI	HI	⎍[2]	HI-LO[4]			LO	⎍[2]	HI	HI	HI	HI-LO[4]			LO	ALT	COMP
●		●		HI	HI	HI	⎍[3]	HI-LO[5]			LO	–[1]	–[1]	HI	LO	HI			LO	CHOP	CH 1
	●	●		HI	HI	HI	⎍[3]	HI-LO[5]			LO	–[1]	–[1]	LO	HI	LO			LO	CHOP	CH 2

[1] HAS NO AFFECT ON OUTPUT.
[2] PULSE IS A SWEEP GATE FROM Q780.
[3] PULSE IS GENERATED BY CHOP OSCILLATOR—U340.
[4] CHANGES STATES AT THE END OF EACH A SWEEP.
[5] CHANGES STATES ON EACH NEGATIVE TRANSITION OF THE PULSE FROM THE CHOP OSCILLATOR.

1943-91

Fig. 3-8. Vertical Switching and Internal Trigger Pickoff logic.

Switching Logic

The CH 1 and CH 2 vertical signals are connected to U350 and U360. The Vertical Switching IC (U350) selects the signal supplied to the Vertical Output Amplifier. The source of the internal trigger signal is selected by U360. The state of pins 4 and 14 control which input signal appears at the output.

Pin 4 of U350 and U360 are controlled by U300 and the display switch. In instruments below serial number B3000121, pin 4 of U350 is controlled by U300A and pin 4 of U360 is controlled by U300B. The state of the output(s) of U300 is controlled by the DISPLAY switch, the chop oscillator, and the alternate sync pulse.

Pin 14 of both U350 and U360 is controlled by the DISPLAY switch. When pin 14 is LO, only one of the input signals appears at the output. When pin 14 is HI, the output signal is the algebraic sum of the input signals.

Delay Line

The output of U350 is connected to Delay Line DL370. The Delay Line delays the signal to the Vertical Output Amplifier by about 180 ns. This allows the Trigger Generator to start the Sweep Generator before the Vertical Signal reaches the crt. The delay allows the leading edge of the signal originating the trigger pulse to be displayed.

VERTICAL OUTPUT AMPLIFIER ◇4

For SN 303391 and up, the Vertical Output Amplifier consists of discrete amplifier devices Q461-Q471, Q481-Q491, Q483-Q484, Q493-Q494 and associated components. Vertical Output Amplifier transient response adjustment is provided by adjustable components C461, C475, C477 and R477. Variable resistor R367A (see diagram 3) provides ADD Mode Balance adjustment.

For SN below 303391, final amplification of the vertical signal is done by integrated circuit U400. The components connected between pins 2 and 4 compensate for signal distortions caused by the Delay Line. The components connected between pins 7 and 8 and between pins 14 and 15 provide thermal and high-frequency compensation.

TRIGGER SWITCHING ◇5

Trigger switching is done with mechanical switches. The trigger signal can be selected from one of several sources: Internal (see Vertical Switching and Internal Trigger Pickoff); a sample of the line voltage applied to the 335; or the signal applied to the EXT TRIG OR HORIZ INPUT connector. Most of the switching, as drawn on diagram 5, is easy to follow and needs no further discussion.

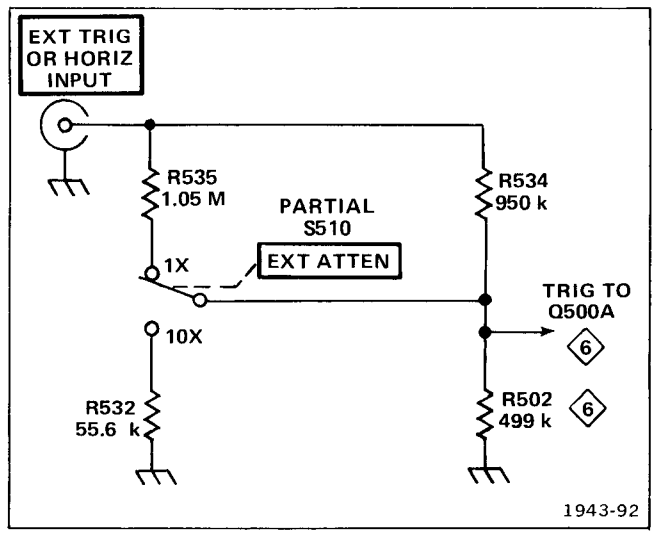


Fig. 3-9. Simplified diagram of the EXT ATTEN circuit.

The action of the EXT ATTEN circuit is not very obvious. Fig. 3-9 shows a simplified diagram of the circuit. The voltage divider action of the circuit supplies 50% of the input signal to Q500A in the 1X position of S510. In the 10X position of S510 5% of the input signal is supplied to Q500A.

CALIBRATOR ◇5

U1500 is connected as an astable multivibrator. Resistor R1501 adjusts calibrator frequency to 1 kHz. A resistive divider drops the multivibrator output voltage to 0.5 volt peak-to-peak at the front panel 0.5 V CAL OUT jack (for SN 300121-up, R1511 adjusts this voltage). Other resistive dividers drop the voltage to 50 mV peak-to-peak (for SN 300121-up, R1519 and R1516 adjust this voltage). The 50 mV signal is supplied to the vertical preamplifiers in the 5 DIV CAL positions of the VOLTS/DIV switches, where the signal is used for vertical gain adjustments.

TRIGGER AMPLIFIER ◇6

FET Q500A is connected as a source follower (see Fig. 3-10). It provides isolation between the trigger source and the trigger generators. A fairly constant current source for Q500A is provided by Q500B.

The output of the source follower is connected to Q510 and Q520. Both Q510 and Q520 are connected as emitter followers. The output of Q510 supplies the trigger signal to the B Trigger Generator. In the EXT HORIZ mode, the output of Q510 is connected to the Horizontal Amplifier. The output of Q520 supplies the trigger signal to the A Trigger Generator.

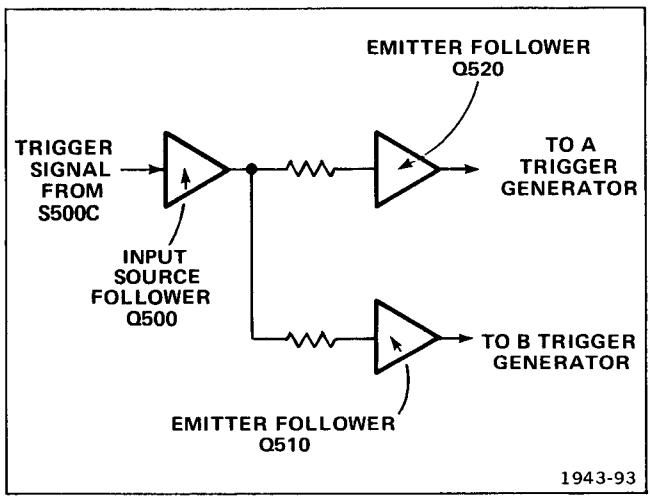


Fig. 3-10. Simplified block diagram of the Trigger Amplifier circuit.

A TRIGGER GENERATOR ◇6

The A Trigger Generator consists of the Input Comparator, Slope Switching, and Tunnel Diode circuits. The output of the A Trigger Generator is a fast-rise positive-going gate signal which initiates A Sweep generation. Fig. 3-11 shows a simplified block diagram of the A Trigger Generator.

Input Comparator

The Input Comparator consists of Q540 and Q545. Fig. 3-12 shows a simplified diagram of the Input Comparator. This circuit performs two functions. First, the single-ended trigger signal from Q520 is converted to a push-pull signal. Also, the input signal is compared to the dc level set by the LEVEL control, R540. Fig. 3-12 shows the response of this circuit to an input signal at three different settings of the LEVEL control.

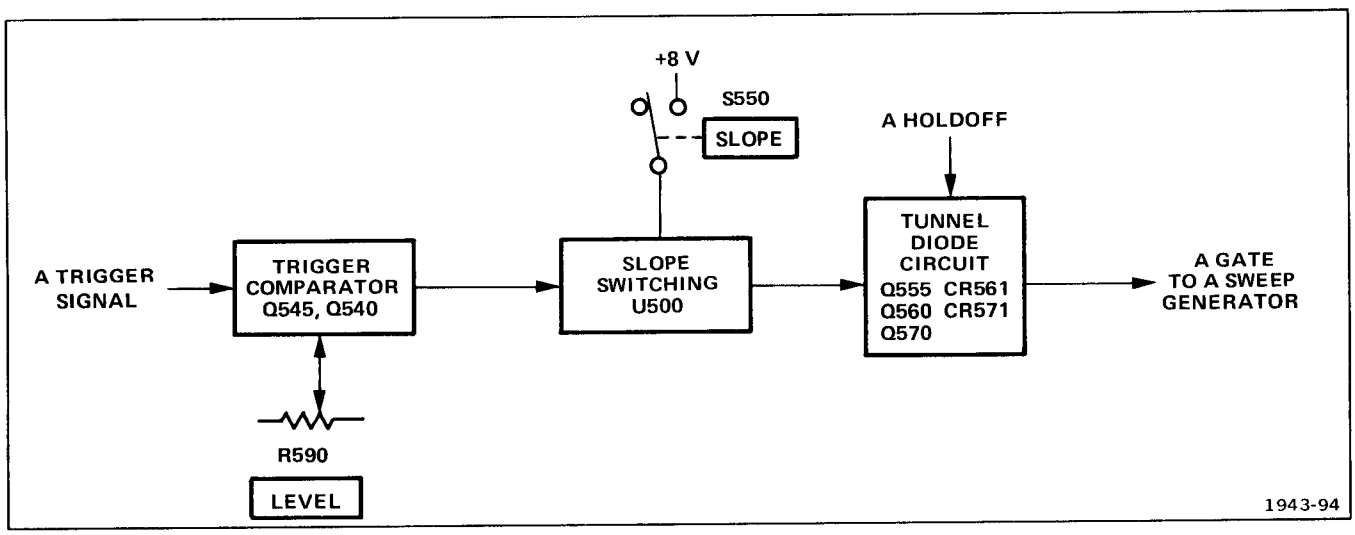


Fig. 3-11. Simplified block diagram of the A Trigger Generator circuit.

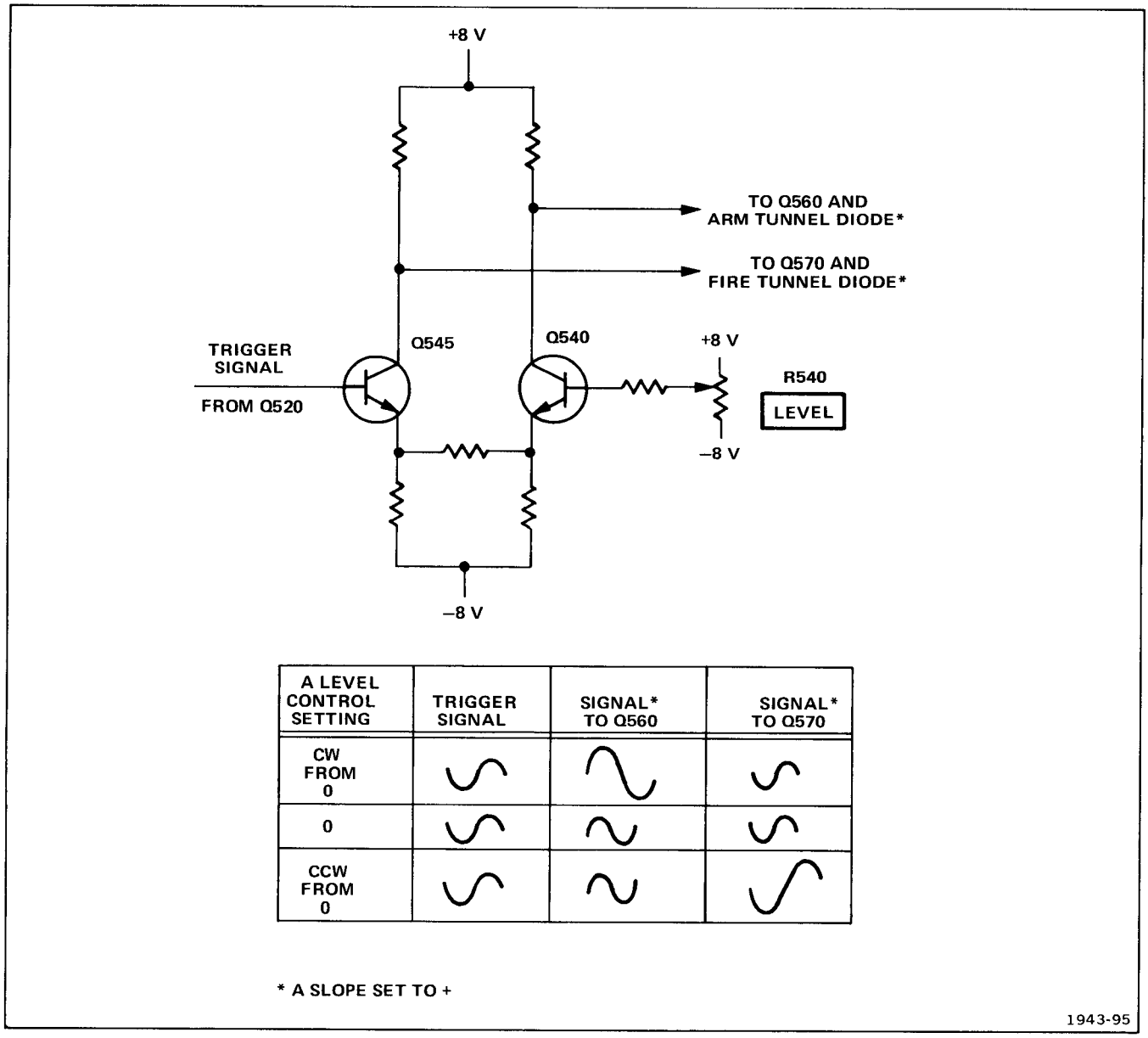


Fig. 3-12. Simplified diagram of the Input Comparator.

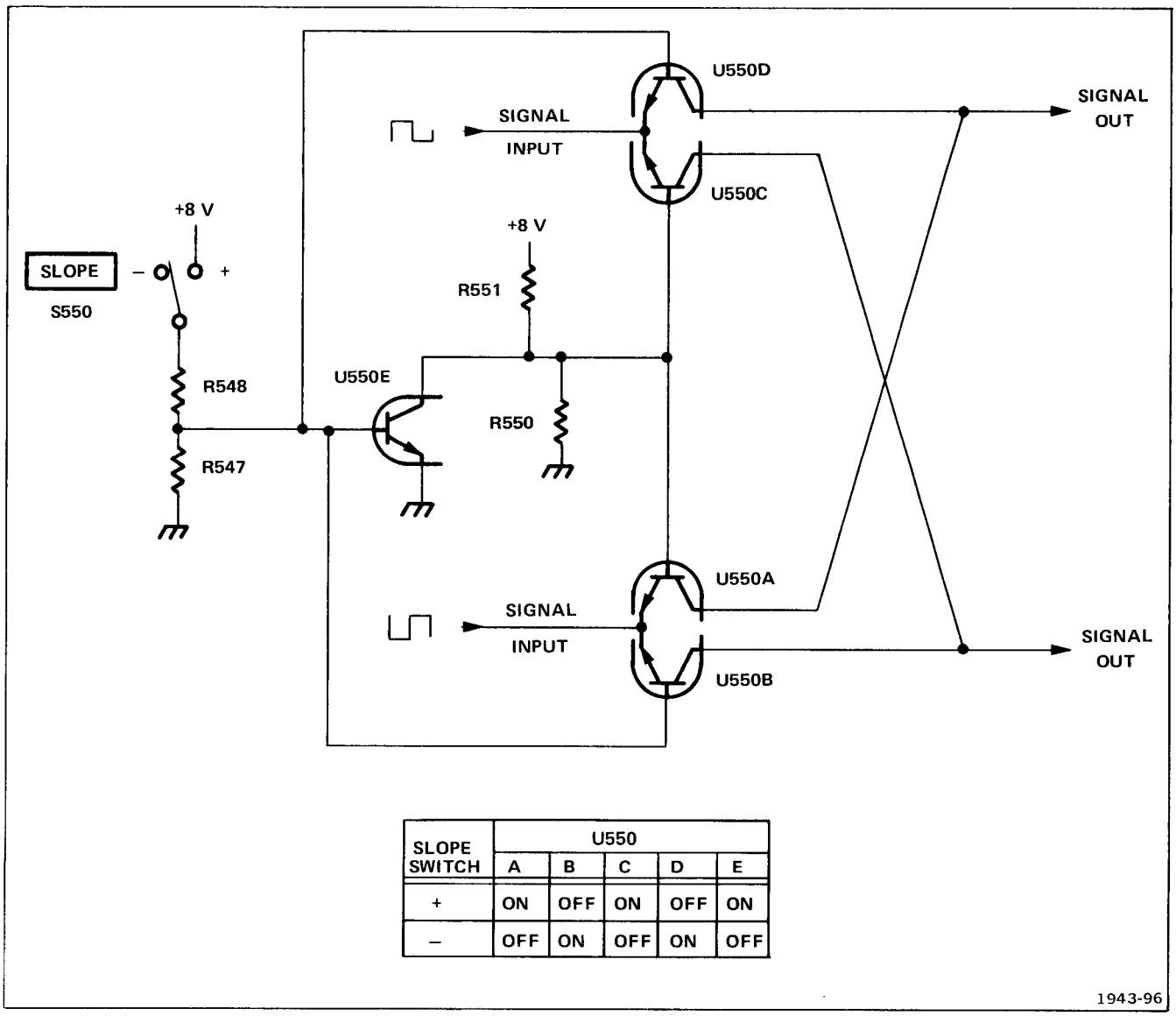
Slope Switching

Slope switching is done by inverting the input to the Tunnel Diode circuit. Fig. 3-13 shows a diagram of the Slope Switching circuit.

In the + (plus) position of the SLOPE switch the bases of U550B, U550D, and U550E are set to about 3 Vdc by R547 and R548. This turns on U550B, U550D, and U550E. The collector of U550E goes to about +1 Vdc which turns off U550A and U550C. Signal current passes through U550B and U550D to the Tunnel Diode circuit.

In the − (minus) position of the SLOPE switch the bases of U550B, U550D, and U550E are grounded through R547. This turns off U550B, U550D, and U550E.

When U550E turns off, its collector and the bases of U550A and U550C are set to about +3 Vdc by R550 and R551. This turns on U550A and U550C. Signal current flows through U550A and U550C to the Tunnel Diode circuit. Since the collectors of U550A and U550C are cross-coupled with the collectors of U550B and U550D, the signals supplied to the Tunnel Diode circuit are inverted.



SLOPE SWITCH	U550				
	A	B	C	D	E
+	ON	OFF	ON	OFF	ON
−	OFF	ON	OFF	ON	OFF

Fig. 3-13. Diagram of the A Slope Switch circuit.

Tunnel Diode Circuit

Fig. 3-14 shows a simplified diagram of the Tunnel Diode circuit.

Transistors Q560 and Q570 are common emitter amplifiers which provide the signal currents needed to switch the tunnel diodes. Transistor Q555 provides a constant-current source for Q560 and Q570.

During holdoff the tunnel diodes are held in their low-voltage state by a negative-going signal applied to the tunnel diodes through R560 and R570.

After holdoff has ended (but before triggering), both tunnel diodes are biased in their low-voltage state. Tunnel diode CR561 receives current from Q560 and R561. Tunnel diode CR571 receives current from Q570, R571, and the sensitivity adjustment R702-R705. Resistors R702 and R705 are found in diagram 8. Resistor R561 biases CR561 much closer to its switching point than R571 biases CR571. The additional current available by turning on Q570 cannot switch CR571 to its high-voltage state. If the sensitivity adjustment (R702) is correctly adjusted, the additional current available by turning on Q570 cannot switch CR571 to its high voltage state.

On the first half cycle of the trigger signal, the signal on the base of Q560 starts going more negative. This causes Q560 to start conducting more current. When the additional current from Q560 causes the current in CR561 to reach 4.7 mA, CR561 will switch to its high-voltage state. After CR561 switches, the currrent available through R561 will hold it in its high-voltage state.

On the second half cycle of the trigger signal, the signal on the base of Q570 starts going more negative while the signal on the base of Q560 starts going more positive. The current through Q570 starts increasing while the current through Q560 starts decreasing. Because CR561 is being held in its high-voltage state, the collector of Q560 (the anode of CR561) does not move toward ground as the current through it decreases. This provides extra current through R560 and R570 which biases CR571 closer to its switching point. Because of this increased bias current the extra current available by increasing conduction in Q570 can switch CR571 to its high-voltage state. When CR571 switches to its high-voltage state, the resulting 0.5 V fast-rise pulse is supplied to the A Sweep Generator. At the end of the A Sweep, a negative-going holdoff pulse is applied to R560 and R570. This switches CR561 and CR571 back to their low-voltage state.

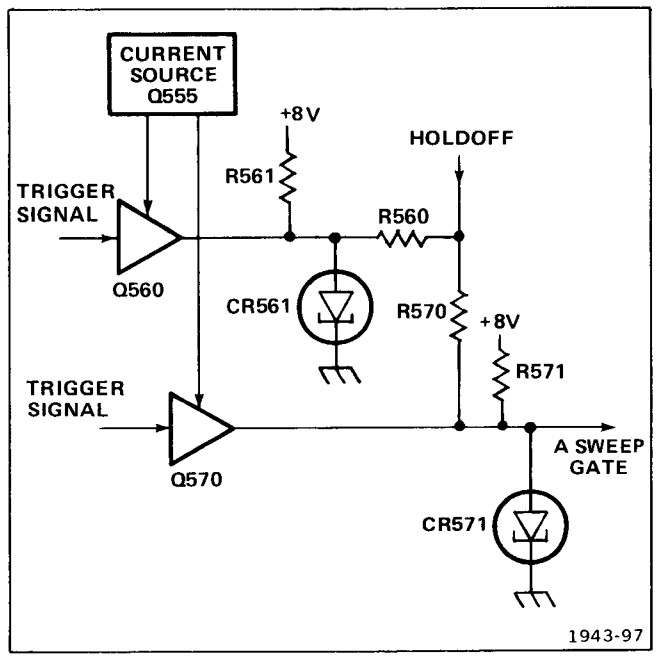


Fig. 3-14. Simplified diagram of the Tunnel Diode Circuit.

B TRIGGER GENERATOR ◇7

The B Trigger Generator operates in nearly the same manner as the A Trigger Generator. Only the differences will be discussed here.

Slope Switching

Slope switching in the B Trigger Generator is done mechanically, unlike the transistorized switching used in the A Trigger Generator.

Triggerable After Delay Time Mode

In the Triggerable After Delay Time mode, a negative-going holdoff signal is applied through R627 and R628. This holds CR629 and CR630 in their low-voltage state. The holdoff time is the A holdoff time plus a delay time selected by the A SEC/DIV and DELAY TIME POSITION controls. After the completion of the delay time, the holdoff signal is removed. Now CR629 and CR630 can be switched in the same manner as CR561 and CR571 (see Tunnel Diode Circuit under A Trigger Generator). The resulting B Gate signal initiates B Sweep generation.

Runs After Delay Time Mode

When the B LEVEL control is in the RUNS AFTER DLY TIME position, S630 closes, and causes the B Trigger Generator to operate in the Runs After Delay Time mode. In this mode, a negative-going holdoff signal is applied to

CR629 and CR630 through R626 and R630. This holds CR629 and CR630 in their low-voltage state. The holdoff time is the A holdoff time, plus a delay time selected by the A SEC/DIV and DELAY TIME POSITION controls. After the completion of the delay time, the B holdoff signal is removed. Now the current available from R629 through R627 and R628 immediately biases both CR629 and CR630 to their high-voltage state. The resulting B Gate signal activates the B Sweep Generator immediately upon completion of the selected delay time.

A SWEEP GENERATOR ◈8

Fig. 3-15 shows a simplified block diagram of the A Sweep Generator. The A Sweep Generator produces a linear sawtooth voltage when activated by the A Gate signal. This sawtooth voltage is connected to the Horizontal Amplifier to provided horizontal deflection on the crt. Fig. 3-16 shows the time-relationship of events during A Sweep generation.

A Sweep Start Comparator

The Sweep Start Comparator consists of U700A and U700B. Emitter follower U700C provides isolation between the Sweep Start Comparator and U730.

Before the A Trigger Generator produces an A Gate signal, U700A is off and U700B is on. The positive-going A Gate signal turns on U700A and turns off U700B. The collector of U700B steps positive. This positive-going step is coupled to pin 1 of U730 through emitter follower U700C. The positive-going step on pin 1 of U730 initiates sweep generation.

Miller Integrator

The Miller Integrator is part of U730.

When a positive pulse from the Sweep Start Comparator is applied to pin 1 of U730, the Miller Integrator produces a linear sawtooth voltage. The duration of the sawtooth is determined by the duration of the positive level on pin 1 of U730. The duration of this positive level is controlled by the Sweep Stop Comparator.

The linear sawtooth is generated by charging a capacitor (C_t) with a constant current. The constant current is produced by holding the voltage on pin 9 of U730 constant. This holds the voltage across R_t constant. The values of R_t and C_t are selected by the A SEC/DIV switch.

The Sawtooth output appears at pin 8 of U730.

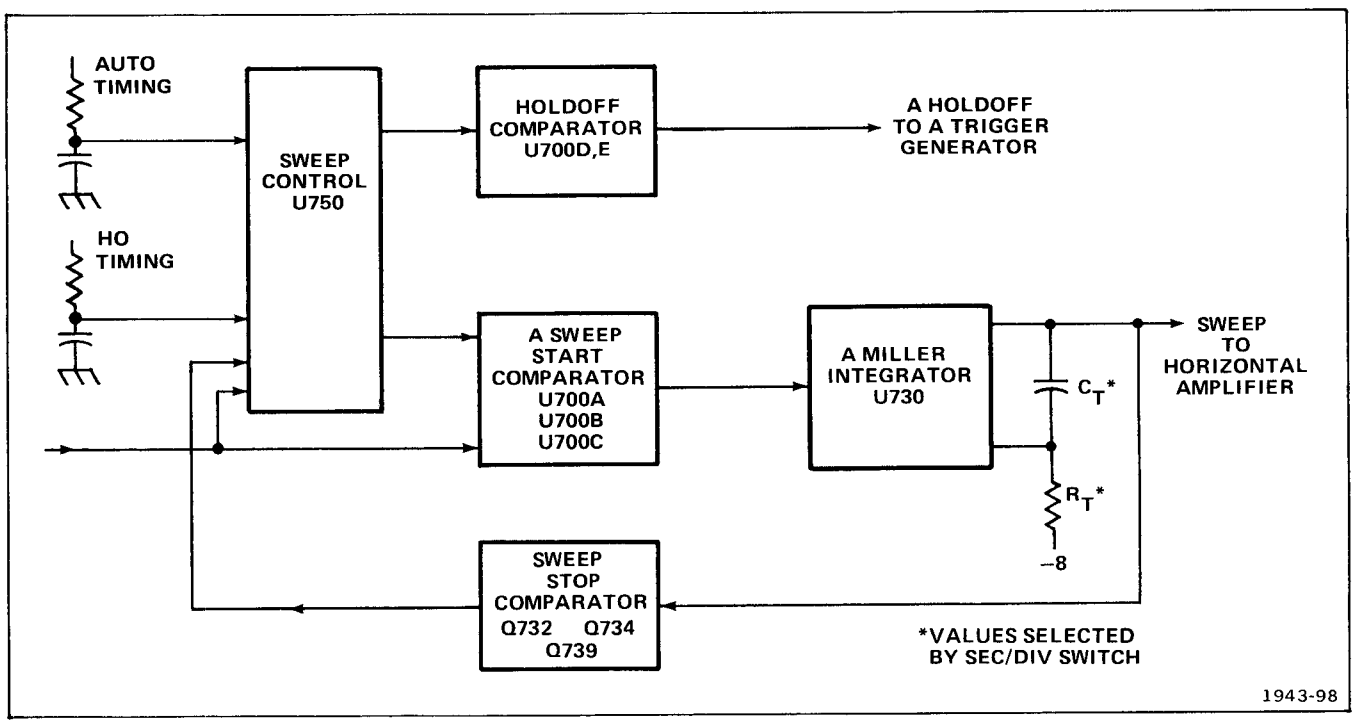


Fig. 3-15. Simplified block diagram of the A Sweep Generator.

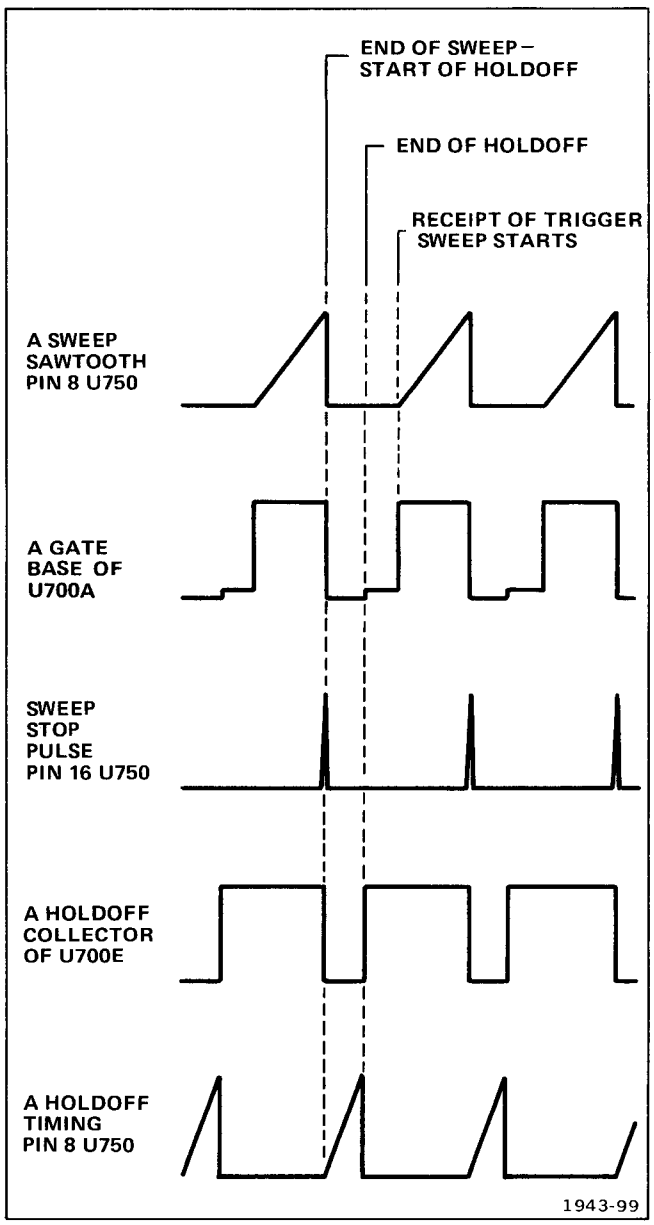


Fig. 3-16. Time relationship of events during A Sweep generation.

A Sweep Stop Comparator

The A Sweep Stop Comparator consists of Q732 and Q734. Emitter follower Q739 provides a buffer between the Sweep Stop Comparator and U750.

The A Sweep sawtooth is applied to the base of Q732. During holdoff and during the time the sweep is running, Q732 is on and Q734 is off. When the sawtooth reaches the voltage on the base of Q734, Q732 turns off and Q734 turns on. The collector of Q734 steps positive for an instant. This positive step is coupled to pin 16 of U750 through emitter follower Q739. A positive step on pin 16 of U750 starts holdoff and resets the A Sweep Generator.

A Holdoff

The A Holdoff circuitry supplies a negative-going pulse to the A Trigger Generator. This negative-going pulse resets the tunnel diodes. When tunnel diode CR571 steps low, the negative-going step is coupled through the A Sweep Start Comparator to pin 1 of U730. When pin 1 of U730 steps low, the Sweep Generator resets, and pin 8 of U730 rapidly goes to about 0 volt. Fig. 3-16 shows the time relationship of events, including holdoff, during A Sweep generation.

A Holdoff Comparator. The A Holdoff Comparator consists of U700D and U700E. When the sweep stop pulse causes pin 16 of U750 to momentarily step positive, pin 17 of U750 steps positive and remains positive. The positive level on pin 17 of U750 is level-shifted by VR764, turns on U700E, and turns off U700D. The collector of U700E steps negative to about −0.5 volt. This negative-going pulse is supplied to the A Trigger Generator.

A Holdoff Timing. The circuitry connected to pin 8 of U750 determines the duration of holdoff. This circuitry appears on diagram 11, but will be discussed here becuase of its close relation to the A Sweep Generator.

Pin 8 of U750 is normally held near ground. When a sweep-stop pulse is sensed at pin 16 of U750, pin 8 of U750 is released. Pin 8 of U750 starts going positive as the holdoff timing capacitor(s) (C745A, C745B, and C745C) starts charging. Changing the emitter resistance of Q744 or changing the bias on Q744 with the A TRIGGER HOLDOFF control (R742), varies the amount of current available to charge the holdoff timing capacitor(s). This varies holdoff time. When the voltage of pin 8 of U750 becomes sufficiently positive, circuitry within U750 sets pins 8 and 17 of U750 low. When pin 17 of U750 steps low, U700E turns off and holdoff ends.

Auto Mode Operation

In the AUTO mode, with no adequate trigger signal available, the A Sweep Generator automatically generates a sweep. This provides a reference display on the crt.

In the NORM mode, pin 6 of U750 is held near 0 volt continuously. In the AUTO mode, when pin 19 of U750 is grounded, pin 6 of U750 is released at the end of holdoff. As C746 charges, pin 6 of U750 moves positive. If an A Gate arrives at pin 1 of U750, pin 6 of U750 is reset ot 0 volt. If no A Gate arrives at pin 1 of U750, pin 6 of U750 continues positive until it reaches about +6 volts. When pin 6 of U750 reaches +6 volts, the Auto gate at pin 3 of U750 is enabled. Pin 3 of U750 steps negative. This turns off U700B. The collector of U700B steps positive. This positive step is coupled to pin 1 of U730 through emitter follower U700C, which initiates sweep generation. At the

end of the sweep, pin 3 steps positive and is held positive during holdoff. On subsequent sweep cycles, pin 3 steps negative immediately upon completion of holdoff. This continues until an A Gate signal arrives at pin 1 of U750 (see Fig. 3-17).

B SWEEP GENERATOR ◈8

Fig. 3-18 shows a simplified block diagram of the B Sweep Generator. The B Sweep Generator operates in a manner similar to the A Sweep Generator. The difference is that a B Sweep sawtooth cannot be initiated until after a delay time. This delay time is determined by the settings of the A SEC/DIV and DELAY TIME POSITION controls. With the B LEVEL control in the detent position, B Sweep is initiated immediately upon completion of the delay time. With the B LEVEL out of the detent position, B Sweep is initiated upon receipt of the first adequate trigger signal occurring after the completion of the delay time.

B Sweep Start Comparator

The B Sweep Start Comparator consists of U800A and U800B. Emitter follower U800C provides isolation between the Sweep Start Comparator and U815.

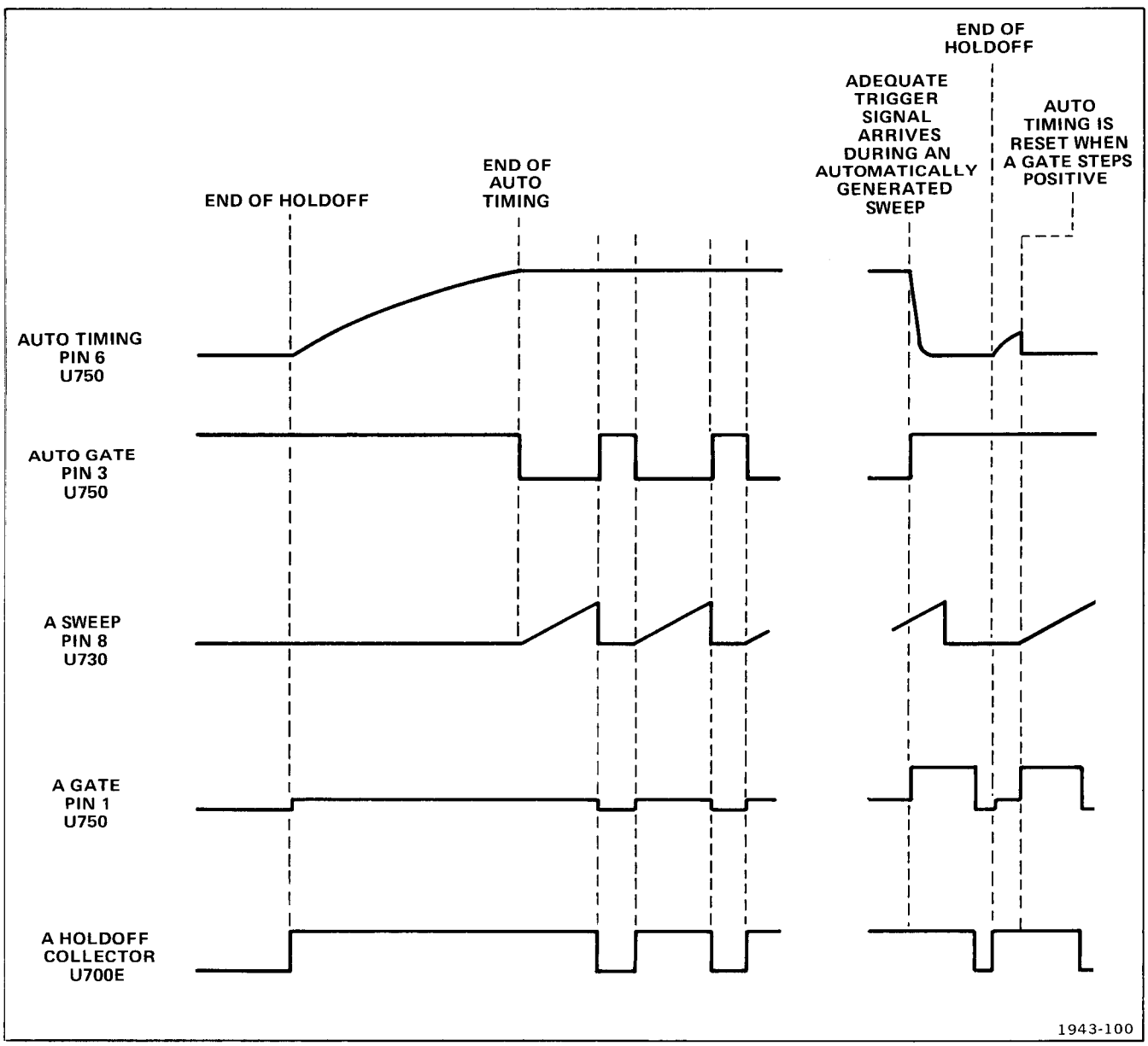


Fig. 3-17. Time relationship of events during AUTO mode operation.

Before the B Trigger Generator produces a B Gate signal U800A is off and U800B is on. The positive-going B Gate signal turns on U800A and turns off U800B. The collector of U800B steps positive. This positive-going step is coupled to pin 1 of U815 through emitter follower U800C. The positive-going step on pin 1 of U815 initiates sweep generation.

Miller Integrator

The Miller Integrator is part of U815.

When a positive pulse from the Sweep Start Comparator is applied to pin 1 of U815, the Miller Integrator produces a linear sawtooth voltage. The duration of the sawtooth is determined by the duration of the positive level on pin 1 of U815. The duration of this positive level is controlled by the B Sweep Stop Comparator (or by pin 4 of U730 if the A Sweep terminates before the B Sweep).

The linear sawtooth is generated by charging a capacitor (C_t) with a constant current. The constant current is produced by holding the voltage on pin 9 of U815 constant. This holds the voltage across R_t constant. The values of R_t and C_t are selected by the B SEC/DIV switch.

The sawtooth output is at pin 8 of U815.

B Sweep Stop Comparator

The B Sweep Stop Comparator is part of U815. U815 and U730 are identical integrated circuits. The circuitry in U730 that performs the Delay Pickoff Function, is the same as the circuitry in U815 that performs the B Sweep Stop Function.

The B Sweep sawtooth is compared, within U815, to the dc level at pin 6 of U815. When the sawtooth reaches the level of pin 6 of U815, a very short-duration positive-going pulse is generated at pin 4 of U815. This pulse is applied to the B Holdoff logic and terminates sweep generation. Fig. 3-19 shows the time relationships of the B Sweep sawtooth and the B Logic waveforms.

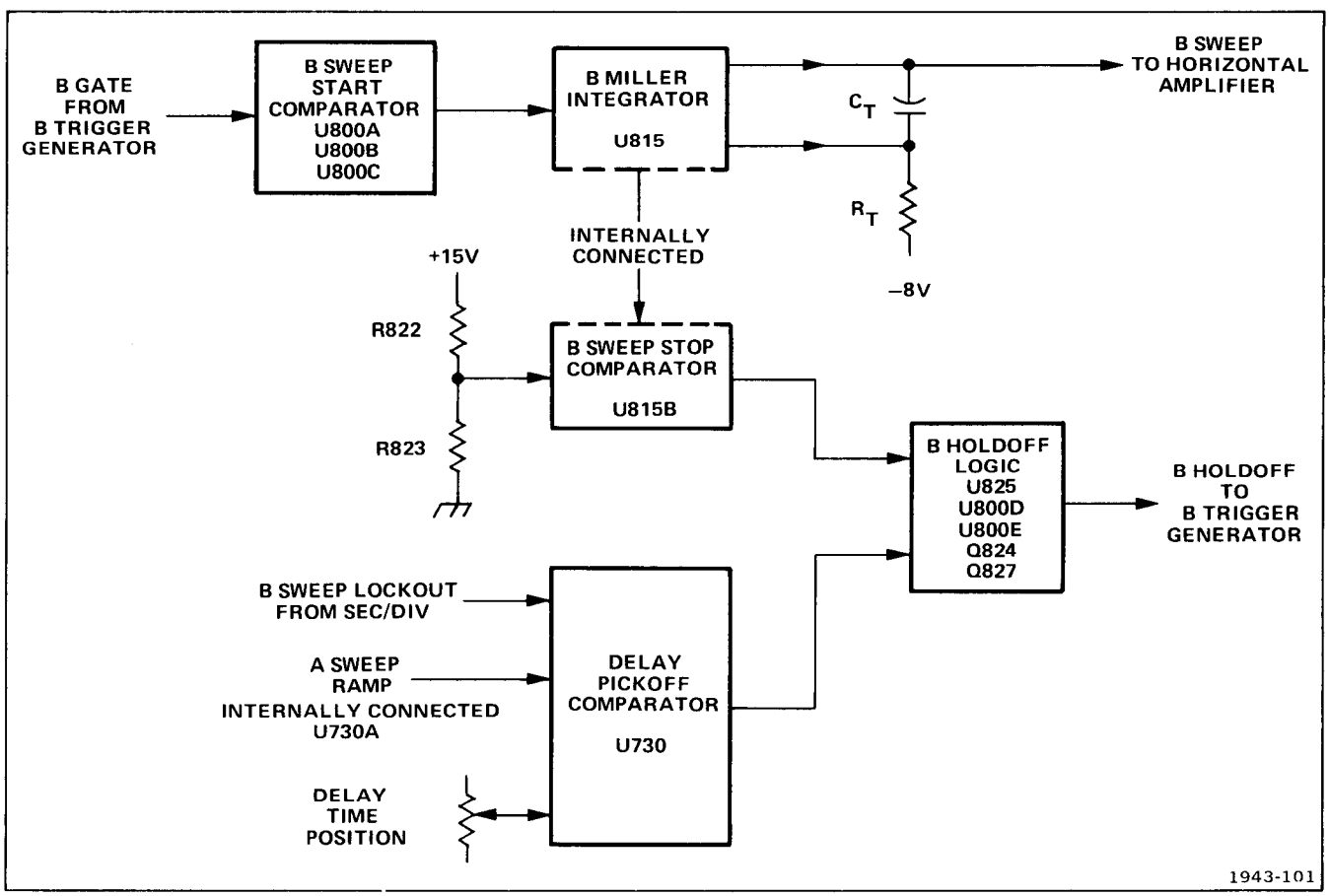
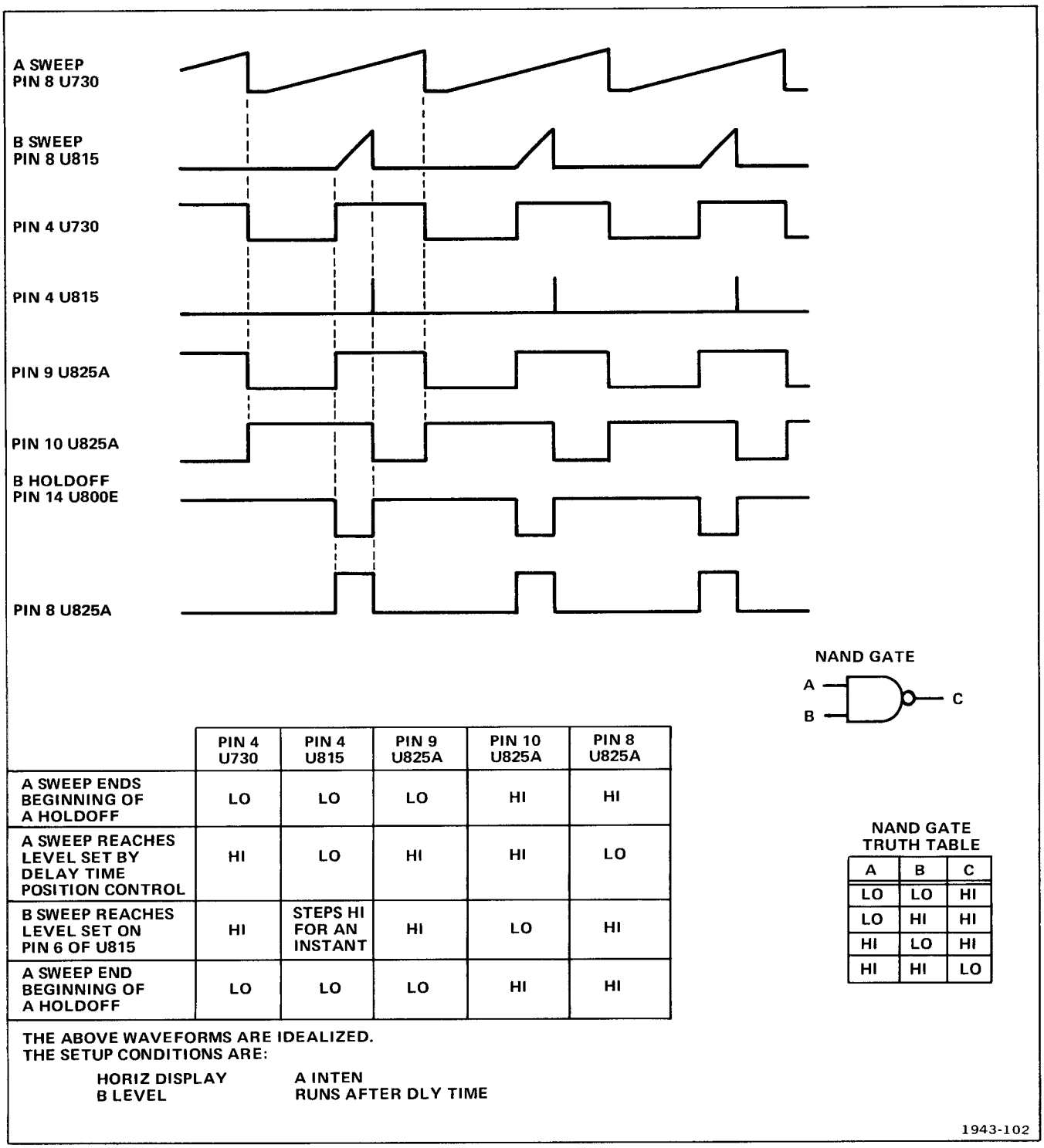


Fig. 3-18. Simplified block diagram of the B Sweep Generator.



	PIN 4 U730	PIN 4 U815	PIN 9 U825A	PIN 10 U825A	PIN 8 U825A
A SWEEP ENDS BEGINNING OF A HOLDOFF	LO	LO	LO	HI	HI
A SWEEP REACHES LEVEL SET BY DELAY TIME POSITION CONTROL	HI	LO	HI	HI	LO
B SWEEP REACHES LEVEL SET ON PIN 6 OF U815	HI	STEPS HI FOR AN INSTANT	HI	LO	HI
A SWEEP END BEGINNING OF A HOLDOFF	LO	LO	LO	HI	HI

NAND GATE TRUTH TABLE

A	B	C
LO	LO	HI
LO	HI	HI
HI	LO	HI
HI	HI	LO

Fig. 3-19. Time relationship of the B sawtooth and B holdoff logic waveforms.

Delay Pickoff

The Delay Pickoff is part of U730. U815 and U730 are identical integrated circuits. The circuitry that performs the B Sweep Stop Function in U815 is the same as the circuitry in U730 that performs the Delay Pickoff Function.

The A Sweep sawtooth is compared, within U730, to the dc level on pin 6 of the U730. The DELAY TIME POSITION control, R714, sets the dc level at pin 6 of U730. When the A sawtooth reaches the level of pin 6 of U730, pin 4 of U730 steps HI. This HI is applied to the B Holdoff Logic and

terminates B Holdoff. If the B LEVEL control is in the detent position, a B sawtooth is generated immediately upon termination of B Holdoff. If the B LEVEL control is out of the detent position, a B sawtooth is generated on receipt of the first adequate trigger signal occurring after the termination of B Holdoff (see B Trigger Generator).

B Holdoff Logic

The B Holdoff Logic circuit consists of Q824, Q827, U825, U800D, and U800E. Integrated circuit U825 contains 4 NAND gates, two of which are connected as a bistable multivibrator. A negative transistion at pin 12 or pin 4 of U825 will switch the state of the multivibrator. Transistors Q824 and Q827 are emitter followers which buffer the output of pin 4 of U815 and U730. Transistors U800D and U800E are connected as a comparator. Fig. 3-19 shows the time relationship of the B Sawtooth and the B Holdoff Logic waveforms.

When the B Sweep Stop pulse from pin 4 of U815 causes pin 2 of U825C to momentarily step HI, pin 3 of U825D steps LO. Pin 3 of U825D connects to pin 4 of U825C. When pin 4 of U825C steps LO, the state of the multivibrator switches, and pin 8 of U825A goes HI which turns on U800E. The collector of U800E steps negative. This negative step is the holdoff pulse. See Fig. 3-19 for the logic levels just after B Holdoff begins.

At the beginning of A Holdoff, pin 4 of U730 goes LO causing pin 12 of U825B to go LO. The state of the multivibrator switches, causing pin 10 of U825A to go HI. However, since pin 9 of U825A just stepped LO, pin 8 of U825A remains HI.

When A Sweep reaches the level of pin 6 of U730, pin 4 of U730 goes HI, causing pin 9 of U825A and pin 12 of U825B to go HI. The state of the multivibrator does not switch at this time. The HI on pins 9 and 10 of U825A cause pin 8 of U825A to step LO. This turns off U800E and terminates B Holdoff.

HORIZONTAL AMPLIFIER (9)

The Horizontal Amplifier provides final amplification of the horizontal signal. The output of the Horizontal Amplifier drives the horizontal deflection plates of the crt. Fig. 3-20 shows a simplified block diagram of the Horizontal Amplifier.

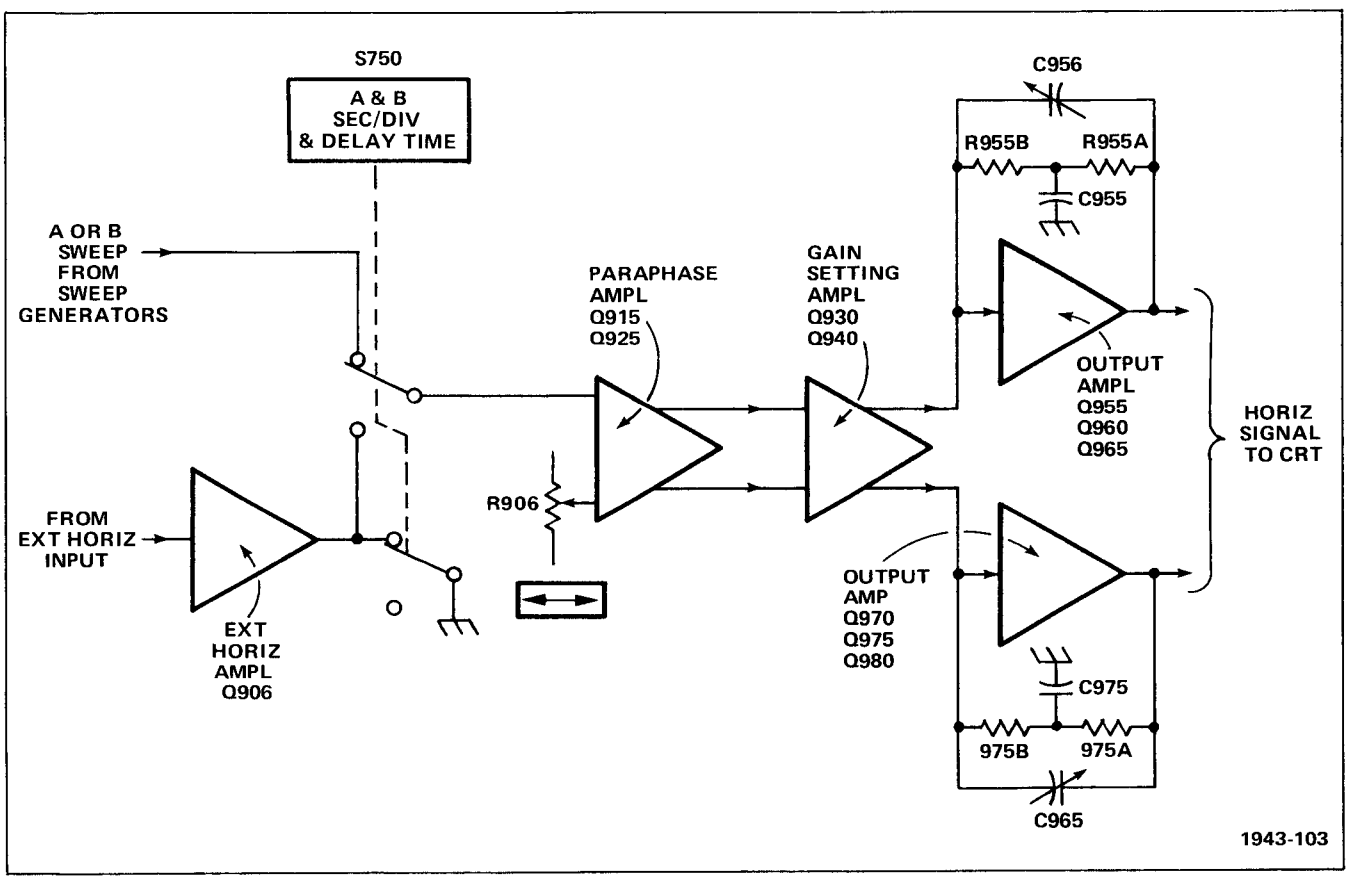


Fig. 3-20. Simplified block diagram of the Horizontal Amplifier.

EXT HORIZ Amplfiier

In all positions of the A SEC/DIV switch except EXT HORIZ, the outputs of the Sweep Generators are connected to the Horizontal Amplifier. In the EXT HORIZ position of the A SEC/DIV switch, the Sweep Generators are disabled, and their outputs are disconnected from the Horizontal Amplifier. In the place of the sweep signal, the signal connected to the EXT TRIG or HORIZ INPUT connector is applied to the Horizontal Amplifier.

Resistor R726B provides variable horizontal gain in the EXT HORIZ mode. Resistor R726B is ganged with R726A (found on diagram 11). Resistor R726B is adjusted by operating the A CAL control.

Input Paraphase Amplifier

The Input Paraphase Amplifier consists of Q915 and Q925. This emitter-coupled amplifier converts the single-ended input signal to a push-pull output. The Position controls (R906A and R906B) adjust the bias on Q925. This increases the gain on one side of the amplifier while reducing the gain on the other side of the amplifier. The result is a horizontal shift of the display without affecting the overall gain of the Horizontal Amplifier.

Gain Setting Amplifier

The Gain Setting Amplifier is a push-pull amplifier composed of Q930 and Q940. The gain of this stage is adjusted by changing the resistance between the emitters of Q930 and Q940. Decreased emitter resistance will decrease emitter degeneration and increase gain. Resistor R938 adjusts X1 gain while R940 adjusts gain in the X10 mode. Resistor R933A adjust quiescent dc current so a center-screen display will not shift when switching between the X1 and X10 horizontal modes.

Output Amplifier

The push-pull signal from the Gain Setting Amplifier is connected to the Output Amplifier. Each half of the Output Amplifier can be considered as a single-ended feedback amplifier. The amplifiers have a very low input impedance and are current driven.

Diodes CR950 and CR967 provide Output Amplifier protection when positive-going signal amplitude becomes excessive. One or both of these diodes become reverse biased when the collector level of Q930 or Q940 goes more positive than about 0 volt.

Diodes CR930 and CR940 provide Output Amplifier protection when positive-going signal amplitude becomes excessive. One or both of these diodes become forward biased when the collector of Q930 or Q940 goes more positive than about +0.7 volt. This shunts some of the Output Amplifiers input signal current to ground.

Transistors Q965 and Q970 are inverting amplifier stages whose collector signals drive the emitters of complementary amplifier Q955-Q960 and Q975-Q980 respectively.

UNBLANKING AND Z AXIS LOGIC 

The Unblanking and Z Axis Logic circuit produces an output current, which is supplied to the Z Axis Amplifier. The more current that is supplied to the Z Axis Amplifier, the brighter the display will be. The Z Axis Logic circuit uses digital logic to switch the currents. Fig. 3-21 shows a simplified diagram of the Unblanking and Z Axis Logic. The logic levels shown in Fig. 3-21 are for a quiescent display; that is, from the beginning of holdoff to the beginning of A Sweep with no chop blanking or EXT BLANK signals present.

A Sweep Unblanking Current Switch

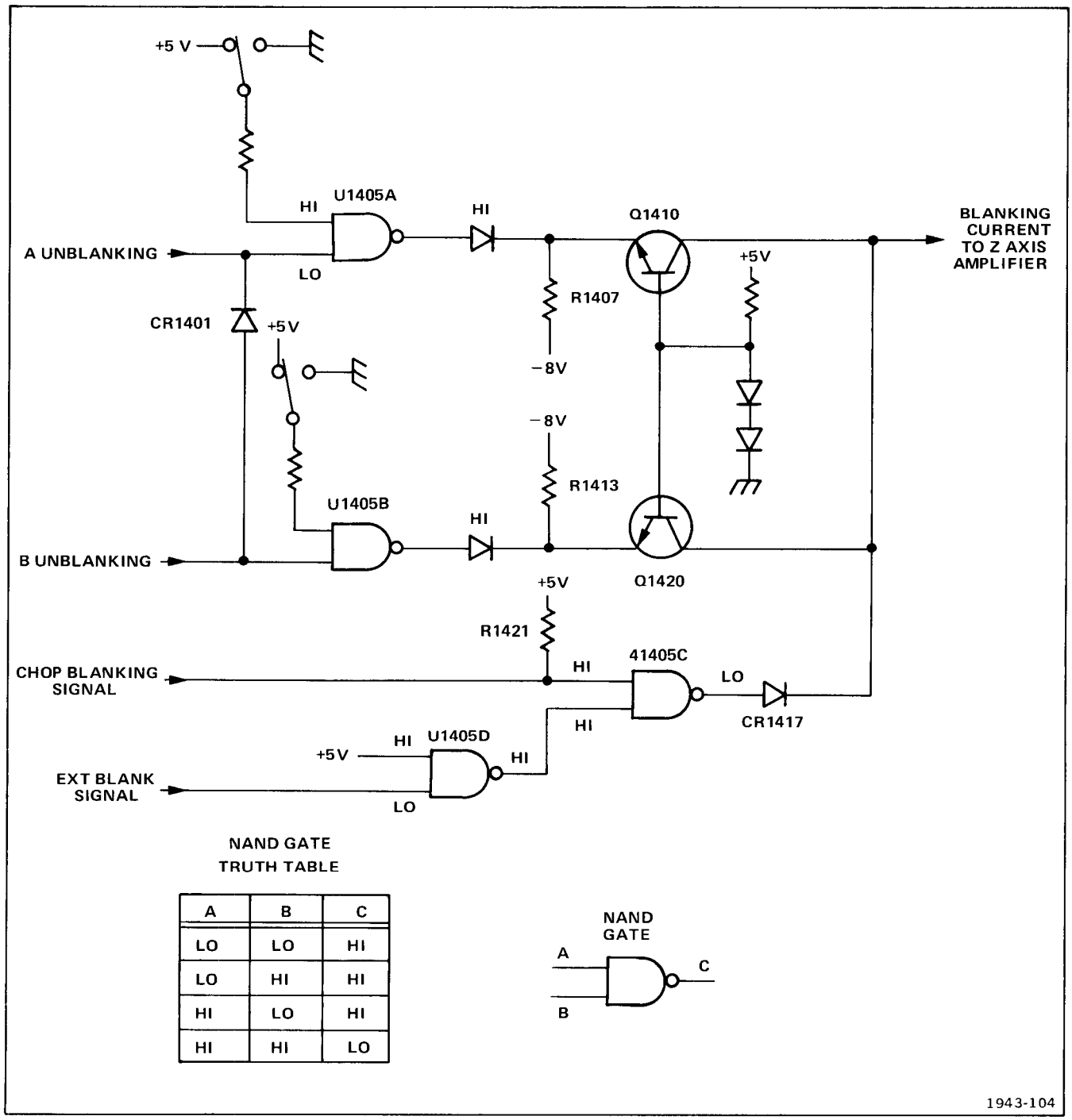
The components controlling the A Sweep unblanking current are U1405A, Q1410, and CR1407. With the A pushbutton set to the in position, pin 5 of U1405A is set HI (see Fig. 3-21). When the A Gate signal is LO, U700C (diagram 8) is off. While U700C is off, pin 4 of U1405A is held LO through R710 and R711. Since pin 5 of U1405A is HI and pin 4 of U1405A is LO, pin 6 of U1405A will be HI. This HI forward biases CR1407 which reverse biases the base-emitter junction of Q1410. Holding Q1410 off prevents any A unblanking current from passing to the Z Axis Amplifier.

When the A Gate signal steps HI, U700C starts conducting, and the emitter of U700C steps positive, which sets pin 4 of U1405A HI. Now both pins 4 and 5 of U1405A are HI, which causes pin 6 of U1405A to go LO. The LO on pin 6 of U1405A reverse biases CR1407. This removes the positive voltage on the emitter of Q1410 and allows Q1410 to turn on. Now the A unblanking current, determined by R1407, flows through Q1410 to the Z Axis Amplifier.

B Sweep Unblanking Current Switch

The components controlling the B Sweep unblanking current are U1405B, Q1420, and CR1413. With the B pushbutton set to the in position, pin 9 of U1405B is set HI. When the B Gate signal is LO U800C (diagram 8) is off. While U800C is off, pin 10 of U1405B is held LO through R808. Since pin 9 of U1405B is HI and pin 10 of U1405B is LO, pin 6 of U1405B is HI. This HI forward biases CR1413, which reverse biases the base-emitter junction of Q1420. Holding Q1420 off, prevents any B unblanking current from passing to the Z Axis Amplifier.

When the B Gate signal steps HI, U800C starts conducting. The emitter of U800C steps positive, which sets pin 10 of U1405B HI. Now both pins 9 and 10 of U1405B are HI,



NAND GATE TRUTH TABLE

A	B	C
LO	LO	HI
LO	HI	HI
HI	LO	HI
HI	HI	LO

Fig. 3-21. Simplified block diagram of the Z Axis Logic circuit.

which causes pin 8 of U1405B to go LO. The LO on pin 8 of U1405B reverse biases CR1413. This removes the positive voltage on the emitter of Q1420 and allows Q1420 to turn on. Now, the current determined by R1413 flows through Q1420 to the Z Axis Amplifier.

Diode CR1401 is connected between pin 4 of U1405A and pin 10 of U1405B. This diode ensures that the display will be blanked at the end of the A Sweep regardless of the state of B Sweep. At the end of the A Sweep, pin 4 of U1405A steps LO. This forward biases CR1401 and clampls pin 10 of U1405B LO.

A Intensified Operation

In the A Intensified mode, both the A and B current switches pass unblanking current to the Z Axis Amplifier as just explained. During the time B Sweep runs, the currents passed by Q1410 and Q1420 add algebraically. The additional current supplied to the Z Axis Amplifier during B Sweep causes the display to be intensified, i.e., made brighter.

Chop Blanking

The components controlling chop blanking are U1405C and CR1417.

With no external blanking signal present, pin 12 of U1405C is HI. When no chop blanking signal is present, pin 13 of U1405C is held HI through R1421. Since both pins 12 and 13 of U1405C are HI, pin 11 of U1405C will be LO. This LO, reverse biases CR1417. When CR1417 is reverse biased, the circuit has no effect on the unblanking current supplied to the Z Axis Amplifier.

When a chop blanking signal is present, pin 13 of U1405C is set LO to blank the crt, and HI to unblank the crt. When pin 13 of U1405C goes LO, pin 11 of U1405C goes HI. This HI forward biases CR1417. When CR1417 is forward biased, the emitter of Q1430 (Z Axis Amplifier) is pulled sufficiently positive to turn off Q1430. Since Q1430 is off, no unblanking current flows into the Z Axis Amplifier. The crt will be blanked.

External Blanking

The components controlling external blanking are U1405C, U1405D, and CR1417.

Pin 2 of U1405D is constantly held HI. With no external blanking signal present, pin 1 of U1405D is held LO through R1418. This causes pin 3 of U1405D to be HI. Pin 3 of U1405D holds pin 12 of U1405C HI. With no chopped blanking signal present, pin 13 of U1405C is HI. Since both pins 12 and 13 of U1405C are HI, pin 11 of U1405C will be LO. This LO reverse biases CR1417. With CR1417 reverse biased, the circuit has no effect on the unblanking current supplied to the Z Axis Amplifier.

When a positive-going external blanking signal is present, pin 1 of U1405D is set HI. Both pins 1 and 2 of U1405D are now HI, therefore, pin 3 of U1405D goes LO. This sets pin 12 of U1405C LO, which causes pin 11 of U1405C to go HI, which in turn forward biases CR1417. When CR1417 is forward biased, the emitter of Q1430 is pulled sufficiently positive to turn off Q1430. Since Q1430 is off, no unblanking current flows into the Z Axis Amplifier. The crt will be blanked.

Z-AXIS AMPLIFIER (10)

The Z-Axis Amplifier circuit, controls the crt intensity level from several inputs. The effect of these input signals is to either increase or decrease the trace intensity, or to completely blank portions of the display. The input transistor Q1430 is a current-driven, low input impedance amplifier. It provides termination for the input signals as well as isolation between the input signals and the following stages. The current signals from the various control sources are connected to the emitter of Q1430, and the algebraic sum of the signals determines the collector conduction level.

Q1435, Q1440, and Q1442 compose a feedback amplifier stage; R1434A and R1434B are feedback elements. C1434 provides high frequency compensation. Q1435 is an emitter follower, providing drive to complementary amplifier Q1440-Q1442. CR1442 provides protection in the event of high-voltage arcing.

A AND B TIMING SWITCH (11)

The Timing switch is controlled by the A and B SEC/DIV controls. This switch selects the RC time constant used by the Sweep Generators.

This circuit also contains the components that control A Holdoff timing; see A Holdoff under A Sweep Generator.

POWER SUPPLY CONVERTER (12)

Fig. 3-22 shows a simplified block diagram of the Power Supply Converter circuit.

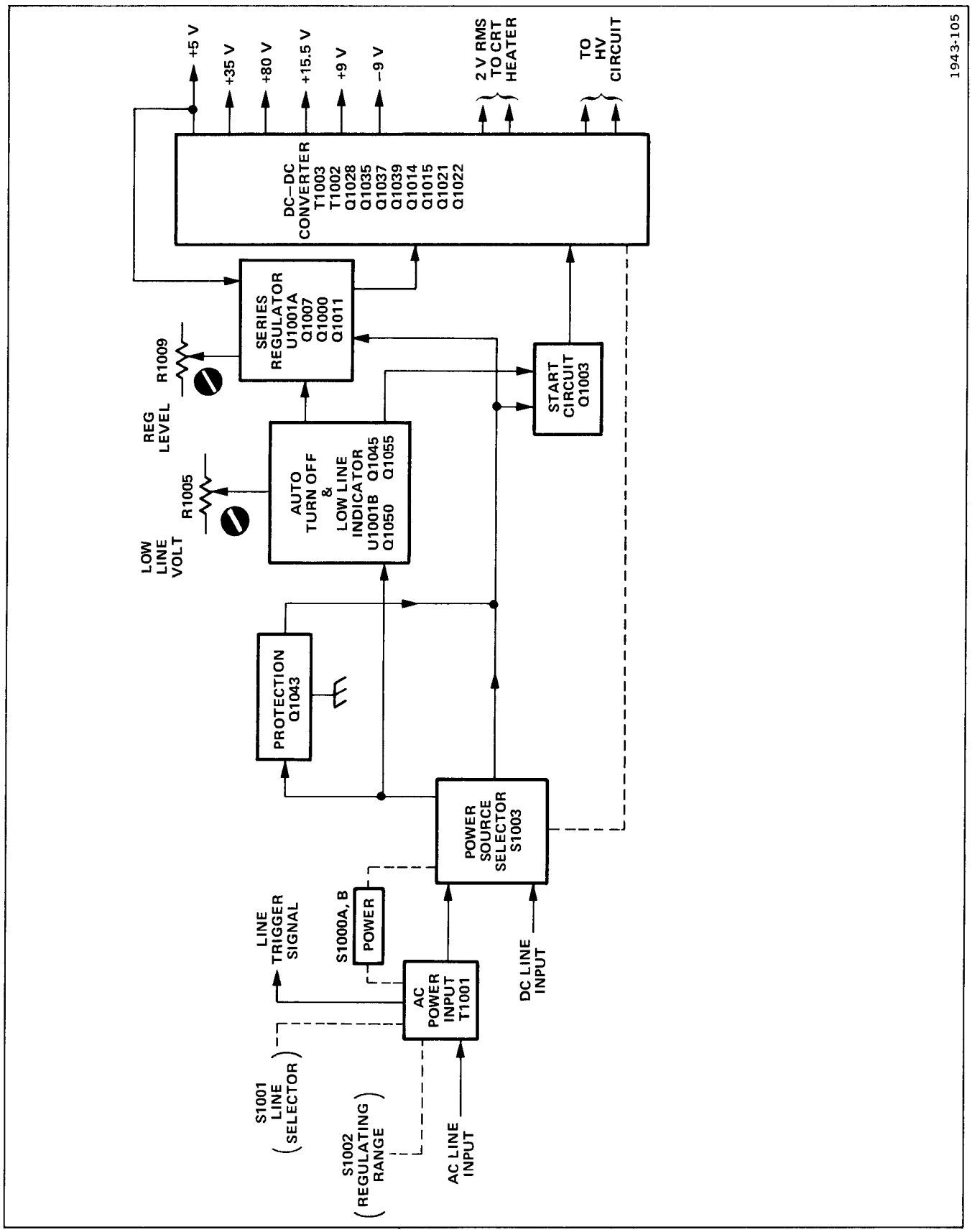


Fig. 3-22. Simplified block diagram of the Power Supply Converter circuit.

Circuit Description—335 Service

The Power Supply Converter allows the 335 to operate from an ac line voltage of 115 volts or 230 volts nominal, or from a dc voltage of 12 volts or 24 volts dc. The AC Input circuit converts the ac line voltage to a dc voltage. The dc voltage from the AC Input circuit or from an external dc source is supplied to the DC-DC Converter through the Series Regulator circuit. The DC-DC Converter supplies a 20 kHz square wave to the primary of the power transformer. The Series Regulator senses changes in the +5 volt supply, and corrects for the change, by varying the current supplied to the DC-DC Converter. Thus, holding the +5 volt supply constant holds the other secondary voltages constant by means of the turns ratio of the power transformer T1002.

AC Input Circuit

The AC Input is composed of T1001, CR1005, and associated circuitry. The output of this circuit is supplied to the DC-DC Converter through the Series Regulator when operating from an ac power source.

The Regulating Range Selector, S1002, selects the turns ratio of T1001. The Regulating Range Selector should be set so expected line voltage fluctuations fall within the range selected. This ensures that the output of the AC Input circuit remains within the range of operation of the Series Regulator and DC-DC Converter.

The primary of T1001 contains two separate windings. The Line Voltage Selector S1001 connects these windings in parallel for 115-volt operation, and in series for 230-volt operation.

The output of the secondary of T1001 is full-wave rectified by CR1005 and filtered by C1003.

Start Circuit

When the 335 is first turned on, the DC-DC Converter is not oscillating, so there are no secondary voltages. Transistor Q1003 turns on, supplying voltage to R1028 and R1038 in place of the +8.5 volt supply. When the DC-DC Converter starts oscillating, Q1003 turns off, and the +8.5 volt supply provides the voltage to R1028 and R1038. Circuit Action is as follows:

1. When the POWER switch is turned on, a positive dc voltage is applied to R1000. This supplies the collector voltage for Q1003.

2. The above-mentioned voltage passes through P1010-4, P1043-3, R1047, R1048, P1002-4, P1006-1, and R1003 to the base of Q1003. Transistor Q1003 turns on.

3. When Q1003 turns on, C1004 charges. The voltage on C1004 is supplied to R1028 and R1038 in place of the +8.5 volt supply.

4. Transistors Q1028 and Q1035 compose an astable multivibrator. Because of the slight differences in Q1028 and Q1035, one or the other will turn on first. The multivibrator will start oscillating.

5. After the DC-DC Converter starts up, the +8.5 volt supply will set the emitter of Q1003 to +8.5 volts. The base of Q1003 is held at +8.2 volts by VR1004. Therefore Q1003 will be biased off.

DC-DC Converter

Transistors Q1028 and Q1035 compose an astable multivibrator. The frequency of oscillation is about 20 kHz. The frequency-determining components are C1028, C1035, R1035, and R1031. The outputs of the multivibrator are amplified by Q1037 and Q1039. The outputs of Q1037 and Q1039 drive transistor pairs Q1014-Q1015 and Q1021-Q1022. These transistor pairs drive the primary of the power transformer T1002.

Series Regulator

The Series Regulator consists of U1001A, Q1007, Q1000, Q1011, and VR1008.

The Series Regulator controls the amplitude of the secondary voltages by controlling the amount of current driving the primary of T1002. The Series Regulator is referenced to the +5 volt supply. Any change in the +5 volt supply is sensed, inverted, and amplified by U1001A. U1001A supplies a correction signal to Q1000 through emitter follower Q1007. The correction signal changes the bias on Q1000, which changes the current supplied to the primary of T1002. This holds the +5 volt supply constant. Holding the +5 volt supply constant holds the other supplies constant through the turns ratio of T1002.

Series Regulator Protection

The Series Regulator Protection circuit consists of VR1043 and Q1043.

In the 11 to 14 volt position of S1003, if the dc line voltage goes too far positive, VR1043 starts conducting. When VR1043 conducts, current is supplied to the gate of SCR Q1043. This current turns on Q1043 which shorts the dc line to ground. The large amount of current drawn by this action opens the power fuse.

Auto Turnoff

The Auto Turnoff circuit shuts down the DC-DC Converter when the dc line voltage or the output of the AC Input circuit falls below a set level. The circuit consists of U1001B and associated circuitry.

Pin 6 of U1001B is referenced to VR1008 through R1004, R1005, and R1006. Pin 5 of U100B is connected to the dc line voltage or the output of the AC Input circuit through voltage dividers R1011-R1013 and R1012-R1013.

When voltage supplied to the 335 is high enough, pin 5 of U1001B is more positive than pin 6 of U1001B. This positive difference is amplified, and holds pin 7 of U1001B near the positive supply voltage on pin 8 of U1001. The positive voltage on pin 5 of U1001B reverse-biases CR1001. When CR1001 is reverse-biased, the circuit has no effect on the operation of the DC-DC Converter.

When the voltage supplied to the 335 is too low, pin 5 of U1001B goes less positive than pin 6 of U1001B. This negative difference is amplified by U1001B, causing the voltage on pin 7 of U1001B to drop to near ground. The less positive voltage on pin 7 of U1001B forward-biases CR1001, which pulls pin 3 of U1001A less positive. This causes pin 1 of U1001A to go less positive and turn off Q1007 and Q1000. Also, when pin 7 of U1001B steps to near ground, the base of Q1003 is held near ground through R1003. This ensures Q1003 is held off and will not try to restart the DC-DC Converter.

Q1045 is a programmable unijunction transistor, which operates as a relaxation oscillator. Each time Q1045 turns on, the base of Q1050 goes more positive, turning on Q1050. This pulls the base of Q1055 less positive, turning on Q1055. When Q1055 is turned on, current flows through R1056 to the LOW LINE indicator, CR1055. This causes the LOW LINE indicator to blink whenever pin 7 of U1001B is held near ground. When the DC-DC Converter is oscillating +5 volts is applied to R1057. This supplies current to hold CR1055 on (not blinking) when the 335 is on and operating normally.

INTERFACE AND LOW-VOLTAGE REGULATORS (13)

The Interface and Low-Voltage Regulators circuit provides two functions. It contains many of the interconnections between the various circuit boards. It also contains three Low-Voltage Regulators.

Each Low-Voltage Regulators is an operational amplifier which controls a regulating transistor. The + (plus) input of the operational amplifier is connected to a stable reference voltage. The − (minus) input is connected to the supply being regulated (through a voltage divider, in the case of the −8 volt and +15 volt supplies). Any error in the supply voltage is sensed by the − (minus) input of the operational amplifier. The error signal is inverted, amplified, and applied to the regulating transistor.

CRT CIRCUIT (14)

The CRT circuit produces the high voltages needed to operate the crt. Fig. 3-23 shows a simplified block diagram of the CRT circuit.

Heater Supply

The crt filament is supplied by a separate winding of T1002. In instruments below serial number B300121, the output of T1002 is rectified and current limited by T1267 and Q1267. The Heater Supply is elevated to −1960 volts through R1265 and R1266.

Anode Supply

Power transformer T1002 provides a regulated 20 kHz square wave to drive the anode supply. See Power Supply Converter, for a discussion of how this voltage is regulated. The voltage from T1002 is supplied to a X10 voltage multiplier U1230. The output of the multiplier is connected to the anode of the crt.

Cathode Supply

The same winding of T1002 that supplies the anode multiplier supplies the cathode multiplier, U1214. The cathode multiplier is a X2 multiplier. The Cathode Supply is regulated by the Cathode Regulator.

Cathode Regulator

Under normal operating conditions, the voltage between the positive and negative outputs of U1214 is about 2025 volts. The positive output of U1214 is connected to the output of the cathode regulator. The cathode regulator holds the positive output of U1214 at about +65 volts. The result is that the negative output of U1214 is about −1960 volts with respect to ground (−2025 V + 65 V = −1960 V). Regulation occurs as follows:

1. Changing the current demanded from U1214 changes its voltage output. Let us assume that current increases, causing the voltage output of U1214 to decrease by 10 volts (voltage from the positive to the negative outputs of U1214 drops to −2015 volts).

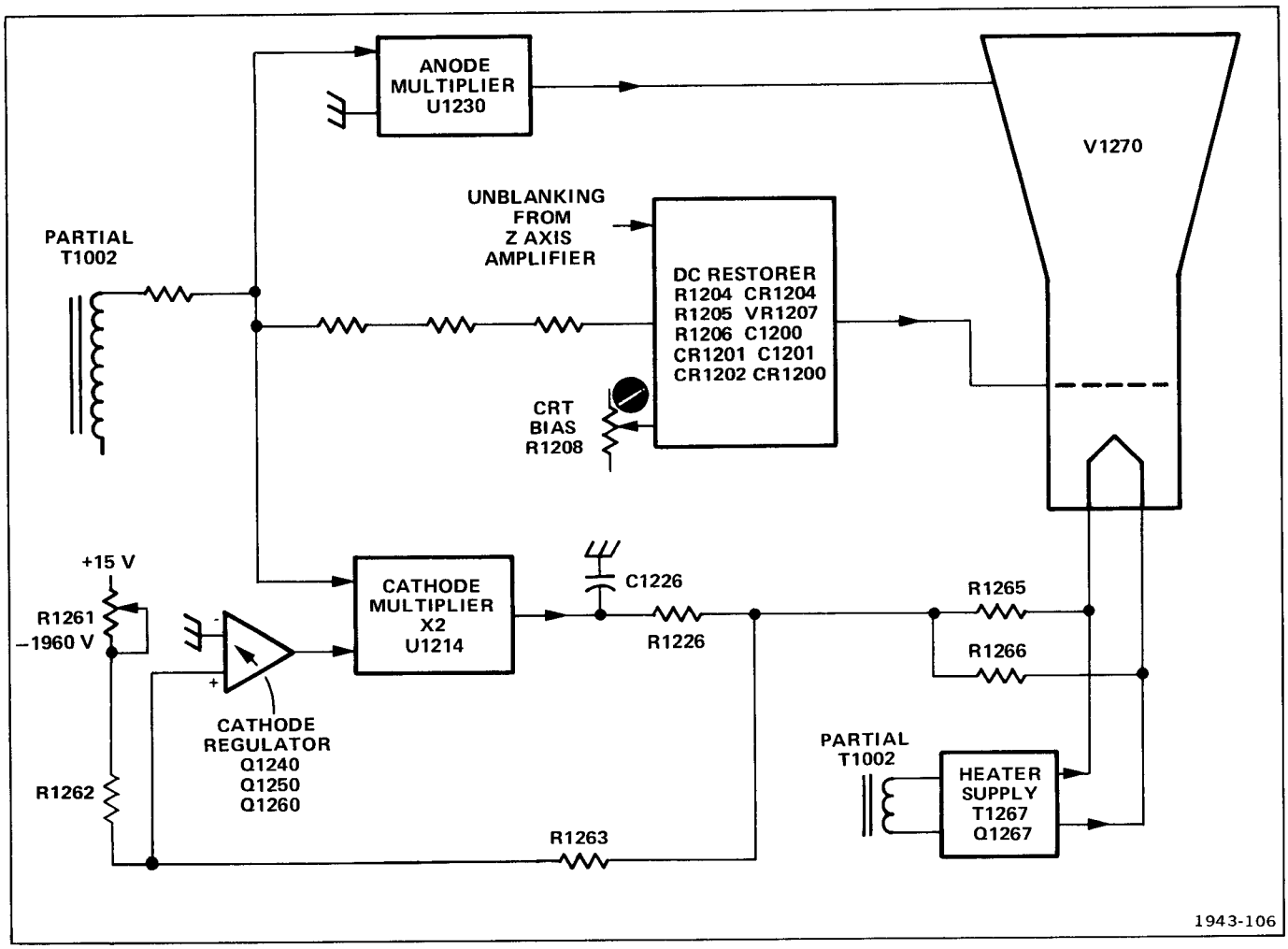


Fig. 3-23. Simplified block diagram of the CRT circuit.

2. This results in a positive-going change on the negative output of U1214. This is sensed on the gate of source follower Q1260, through the voltage divider composed of R1226, R1263, R1262, and R1261.

3. The positive-going change on the gate of Q1260 is coupled to the base of Q1250. This causes the collector of Q1250 to go more negative by 10 volts (to +55 volts).

4. Therefore, the voltage on the negative output of U1214 remains at −1960 volts with respect to ground (−2015 V +55 V = −1960 V).

DC Restorer

Fig. 3-24 shows a simplified diagram of the DC Restorer. The DC Restorer takes the low-voltage potentials from the output of the Z Axis Amplifier and from the grid bias adjustment, and references them to the negative high voltage on the crt control grid. The grid is held more negative than the cathode. The more negative the grid, the dimmer the crt display will be. The DC Restorer is driven by the 20 kHz square wave from T1002, through R1204, R1205, and R1206. Circuit action is as follows:

1. On positive-going excursions of the voltage from T1002, CR1204 clamps the voltage at point A (see Fig. 3-24). Point B is clamped at −1960 volts by CR1202. Therefore, the positive end of C1201 (point A) charges to the level set by the grid bias control. Diode CR1201 is reverse biased.

2. On negative-going transitions of the voltage from T1002, CR1200 clamps the voltage at point A, to the level set by the output of the Z Axis Amplifier. Point B steps negative by an amount equal to the difference in the levels at which CR1200 and CR1204 clamp point A. Diode CR1201 becomes forward biased, and CR1202 becomes reverse biased. The grid is now at the level of point B (more negative than −1960 volts, by an amount equal to the

difference in the levels at which CR1200 and CR1204 clip). Capacitor C1201 discharges slightly through CR1201, adding some charge to C1200. C1200 holds the grid voltage more negative than the cathode during positive-going excursions of the voltage from T1002 (while CR1201 is reverse biased).

3. The action just described is fairly slow because of the time it takes to charge the capacitors involved. Fast changes at the output of the Z Axis Amplifier are coupled to the crt grid through C1200. This provides abrupt intensity changes, while the action of the DC Restorer provides sustained intensity changes.

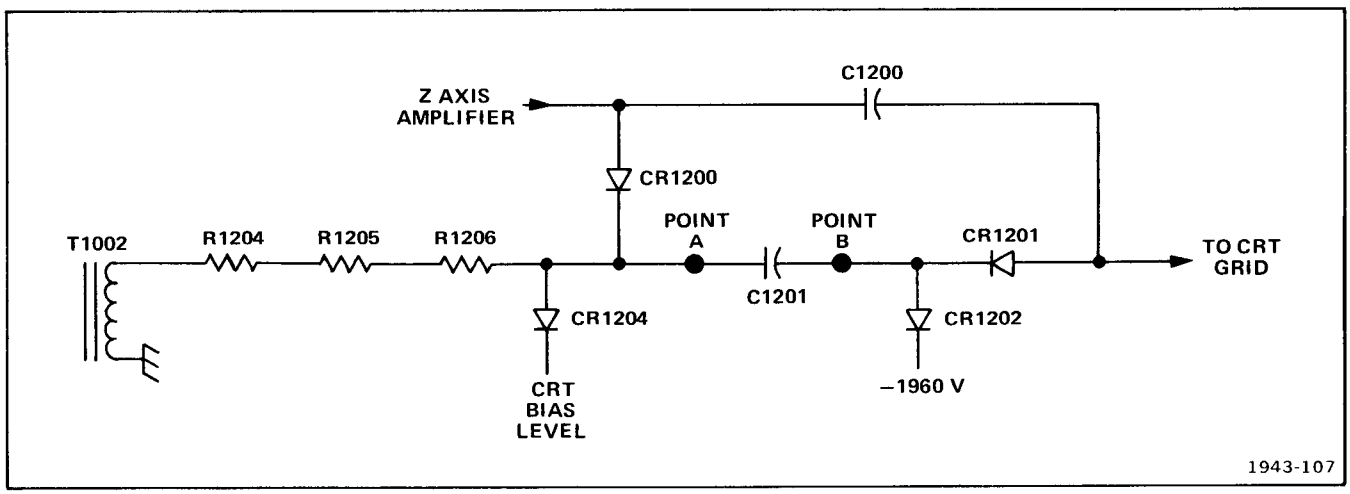
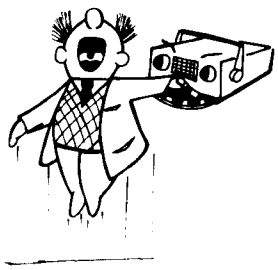


Fig. 3-24. Simplified diagram of the DC Restorer circuit.

MAINTENANCE

This section of the manual contains information for use in preventive maintenance, troubleshooting, and corrective maintenance.

CABINET REMOVAL



WARNING

Dangerous potentials exist at several points throughout this instrument. When the instrument is operated with the cover removed, do not touch exposed connections or components. Some transistors may have elevated cases. Disconnect power before cleaning the instrument or replacing parts.

To remove the wrap around cabinet, use the following procedure:

1. Loosen the four screws holding the cabinet feet (cord wrap) and remove the cord-wrap feet (see Fig. 4-1).

2. Remove the grey-plastic rear cover.

3. Loosen (do not remove) the two screws holding the power cord strain relief (115/230 V ac selector switch mounting) and slide the strain relief toward instrument center.

4. Remove two screws below the connector panel on the right side of the cabinet.

5. Remove two screws from the cabinet bottom.

6. Position the handle to clear the instrument and slide the cabinet off the rear of the instrument.

7. To replace the cabinet, reverse the removal procedure. Be sure the power cord does not become looped through the side-panel cutout.

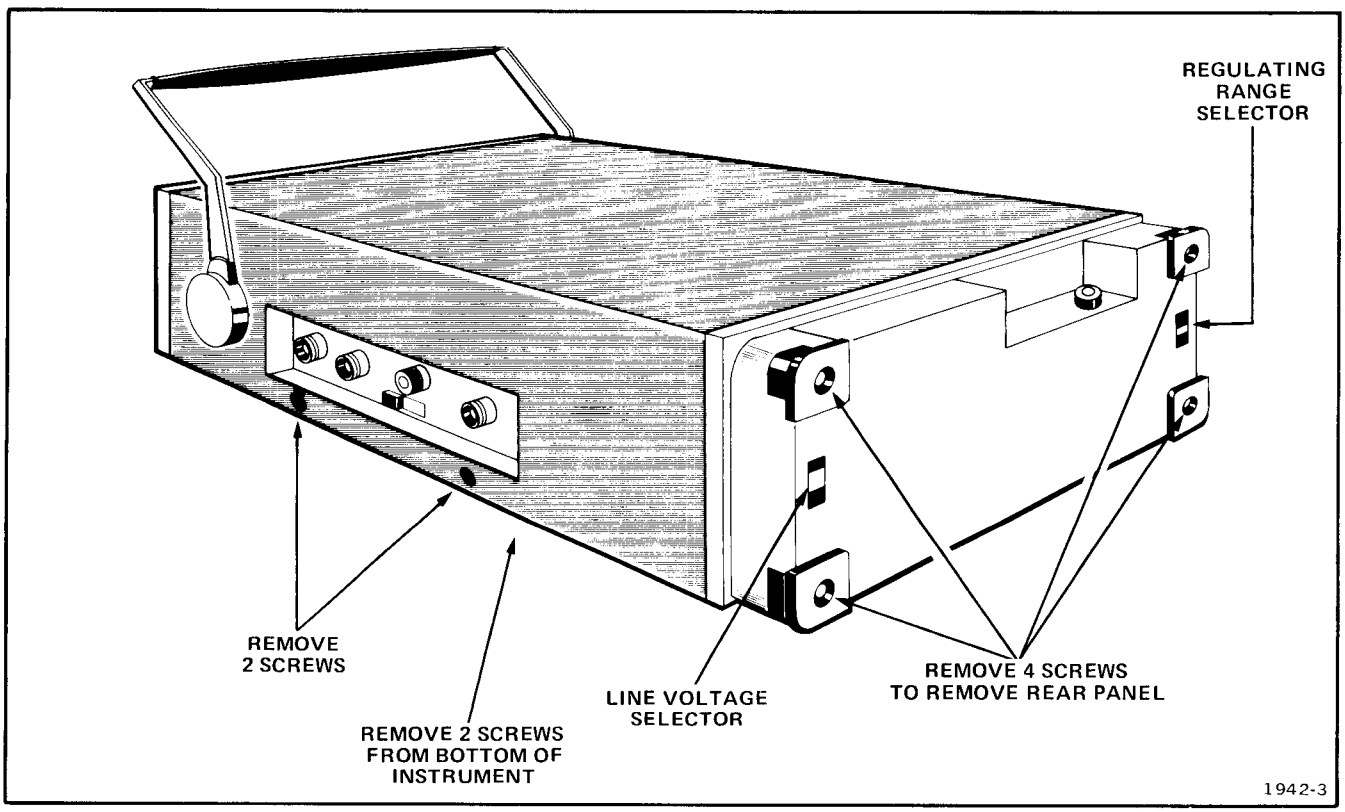


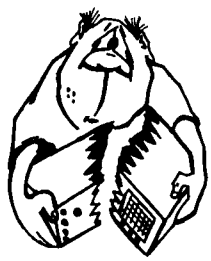
Fig. 4-1. Cabinet removal.

PREVENTIVE MAINTENANCE

Preventive maintenance includes cleaning and visual inspection. To ensure instrument reliability, perform preventive maintenance on a regular basis. A convenient time to perform preventive maintenance is just before performing an adjustment procedure. If you use the 335 in a severe environment, perform preventive maintenance more often.

CLEANING

Clean the 335 as often as operating conditions require. A buildup of dust and dirt in the 335 acts as an insulating blanket. This can cause overheating and component breakdown. In a high-humidity environment dust and dirt can provide an electrical conduction path and cause a short circuit. The 335 cabinet reduces the amount of dust and dirt getting inside the 335. If you operate the 335 with the cabinet off you must clean the 335 more often.



Avoid the use of chemical cleaning agents that might damage the plastics used in the instrument. In particular, avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Exterior

Remove loose dust on the outside of the 335 with a soft cloth or small brush. A brush is useful for cleaning hard to reach areas such as on and around front-panel controls. Clean off any dirt that is left, with a soft cloth dampened with a solution of mild detergent and water. Do not use abrasive cleaners.

Interior

To clean the interior, blow off built up dust with dry, low-pressure air. Remove any remaining dust with a soft brush or cloth dampened with a solution of mild detergent and water. Use a cotton swab for cleaning in narrow spaces.

VISUAL INSPECTION

Inspect the 335 for such problems as broken connections, poorly seated transistors, and heat-damaged parts.

Repair any obvious problems. However, take particular care if you find any heat-damaged parts. Overheating usually indicates other circuit problems. To prevent a recurrence of the damage, find and correct the cause of the overheating.

SEMICONDUCTOR CHECKS

We do not recommend periodic checks of the semiconductors in the 335. The best check of semiconductor performance is actual operation in the instrument. More details on checking semiconductors are given under troubleshooting.

RECALIBRATION

To ensure measurement accuracy, check the calibration of the 335 every 1000 hours of operation or every 6 months if used infrequently. Also, if you have replaced any components you should check and readjust the circuit repaired (see partial procedures in the introduction to the Adjustment Procedure in Section 6).

TROUBLESHOOTING

The following information is helpful when troubleshooting the 335. Information found in other sections of this manual, such as the Circuit Description and Circuit Diagrams, is also helpful in finding circuit problems.

TROUBLESHOOTING EQUIPMENT

Use the following equipment, or equivalent, when troubleshooting the 335:

1. A dynamic semiconductor tester such as the Tektronix 577-177-178 Curve Tracer System, a Tektronix 576 Curve Tracer, a 7CT1N Curve Tracer plug-in unit and a 7000-Series Oscilloscope system, or a 5CT1N Curve Tracer plug-in unit and a 5000-Series Oscilloscope.

2. A multimeter having at least 10 megohms input resistance (100 MΩ on 2000 V scale), dc voltage range, 0 to 2000 volts; and an ohmmeter. Accuracy on the dc voltage scale should be within 2% of full scale.

3. A test oscilloscope with a frequency response of dc to 10 megahertz; deflection factors from 1 mV/Div to 10 V/Div. A 10X, 10 megohm voltage probe should be used to reduce circuit loading in high-impedance circuits.

4. A digital voltmeter with an accuracy of 0.1% for checking low-voltage power supplies.

TROUBLESHOOTING CHART

Fig. 4-2 is a guide for locating a defective circuit. Start at the top of the chart and perform the checks given on the left side of the page until a step is found that does not produce the desired results. Further checks, or the circuit in which the trouble is probably located, are listed to the right of each step. This chart does not include checks for all possible defects.

After the trouble area has been located, locate the defective component, using one or more of the procedures following this chart.

TROUBLESHOOTING PROCEDURE

This troubleshooting procedure is arranged to check the simple trouble possibilities first. The first few checks ensure proper connections, control operation, and associated equipment problems. If you do not find the trouble with these checks, move on to the troubleshooting chart and the remaining steps in this procedure.

1. Check Control Settings

Incorrect control settings can indicate a trouble that does not exist. If you have any questions about the correct function of a control, see either the Operators manual or the Operating Information section of this manual (Section 2).

2. Check Power Source

Check the power source. Be certain the 335 is set to operate from the power source available. Check the power connections.

3. Check Associated Equipment

Check the equipment being used with the 335 for proper operation. Also check the interconnections between the associated equipment and the 335.

4. Visual Check

You can locate many troubles (such as unsoldered connections, broken wires, and damaged parts) by visual inspection. If you find heat-damaged parts, find and repair the cause of overheating to prevent a recurrance of the damage.

5. Check Instrument Calibration

Check the calibration of the instrument, or the affected circuit if the trouble appears to be in one circuit. The apparent trouble may be a result of misadjustment and may be corrected by readjustment. Complete adjustment instructions are given in the Adjustment Procedure.

6. Isolate Trouble To A Circuit

Use the troubleshooting chart (Fig. 4-2) to isolate the trouble to a given circuit. Use the voltages and waveforms given in the Diagrams section to help locate the defective area of the circuit.

If the trouble appears to be in several circuits, suspect the power supply. Table 4-1 gives the power supply tolerances and ripple voltage. See the Adjustment Locations in the pullout pages for power supply test points.

7. Check Individual Components

The following information describes methods of checking individual components in the 335. To check two-lead components that are soldered in place, unsolder one lead. This isolates the measurement from the associated circuitry.

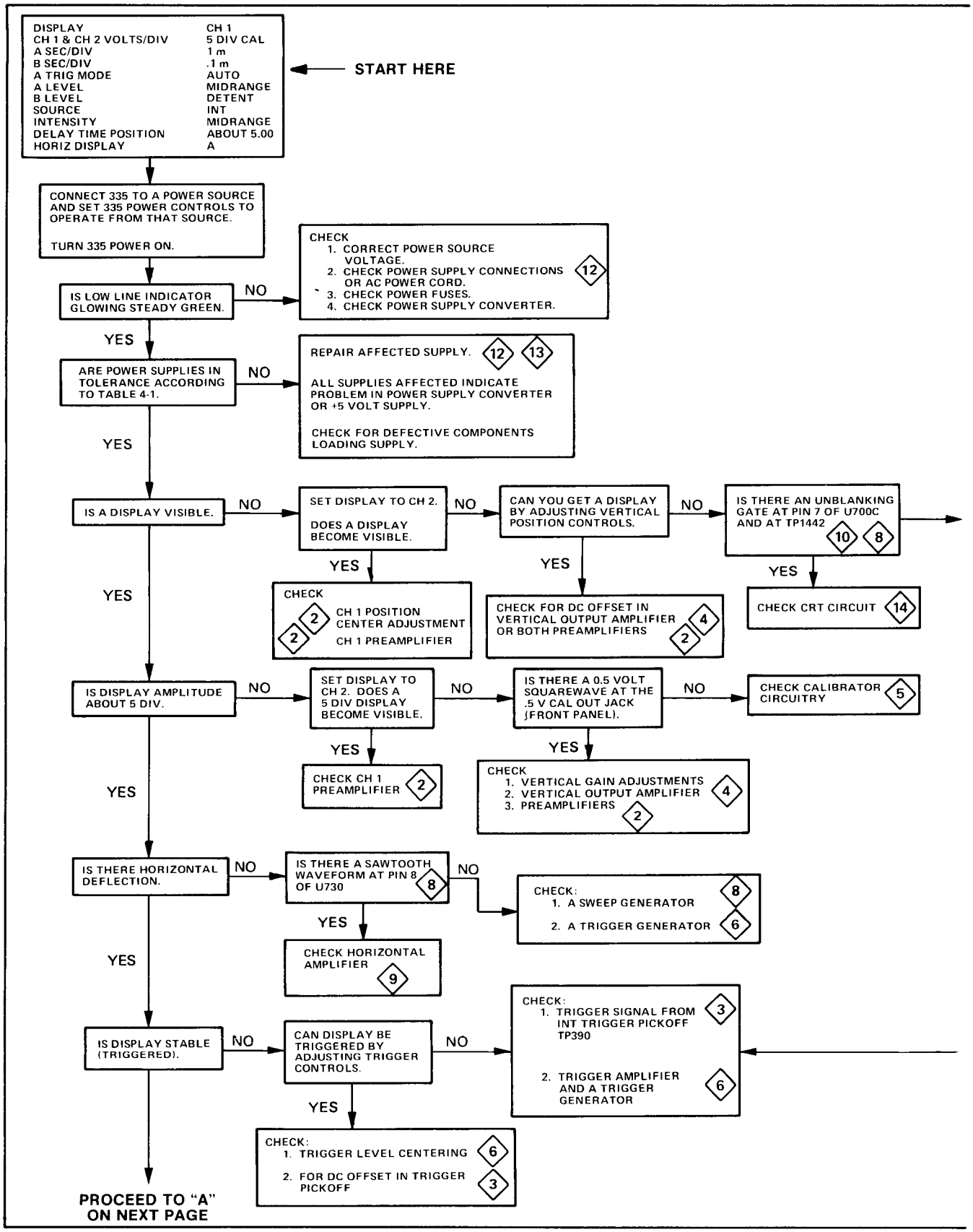


Fig. 4-2. Troubleshooting chart.

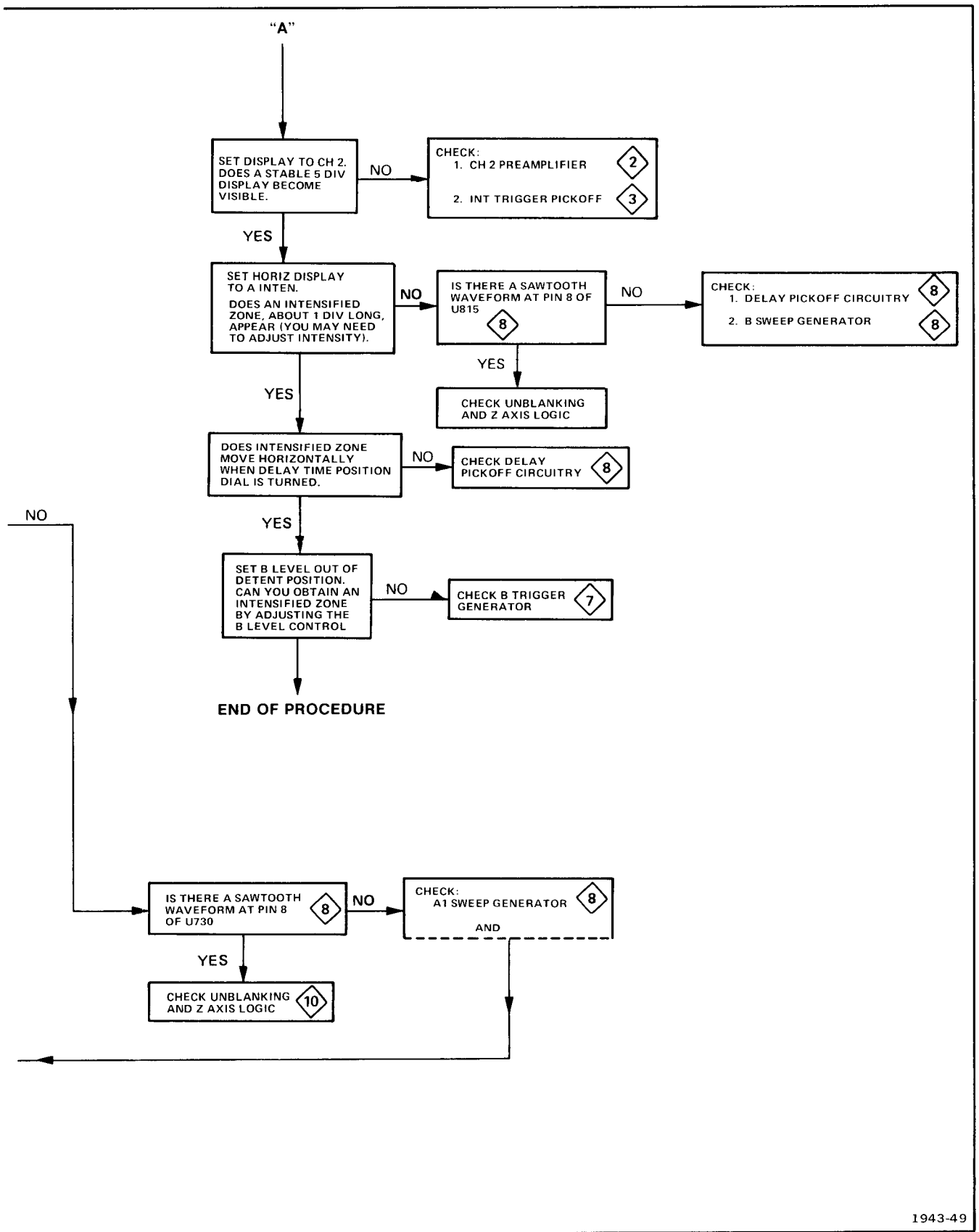
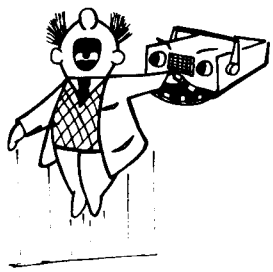


Fig. 4-2. Troubleshooting chart (cont).

TABLE 4-1

Power Supply Tolerance and Ripple

Supply	Tolerance	Ripple (p-p)
−8 V	1.8%	60 mV
+8 V	1.5%	60 mV
+15 V	0.5%	60 mV
+5 V	10%	100 mV
+35 V	10%	400 mV
+80 V	10%	1 V
−1960 V	2%	40 V

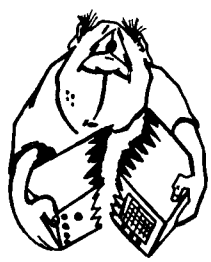


WARNING

To prevent shock, disconnect the 335 from the power source before removing any parts.

INTEGRATED CIRCUITS. A good understanding of circuit operation is desirable when troubleshooting circuits using integrated circuits (IC's). Use care when checking voltages and waveforms around the IC's so that adjacent leads are not short circuited. A convenient means of clipping a test probe to dual-in-line IC packages is with an IC test clip. This test clip also serves as an extraction tool. See Fig. 4-3 for IC lead configuration.

DIODES. A diode can be checked for an open or a short circuit by measuring the resistance between terminals using an ohmmeter on the R × 1k scale. The diode resistance should be very high in one direction and very low with the meter leads reversed.



CAUTION

To prevent damage to simiconductors, disconnect the 335 from the power source before removing any parts.

CAUTION

Do not use an ohmmeter scale that has a high internal voltage. High current may damage the diode. Do not check tunnel or back diodes with an ohmmeter.

TRANSISTORS. A good check of transistor operation is actual performance under operating conditions. A transistor can be most effectively checked by substituting a new component or one that has been checked previously. However, be sure that circuit conditions are not such that a replacement transistor might also be damaged. If substitute transistors are not available, use a dynamic tester. See Fig. 4-3 for transistor lead configuration.

CAPACITORS. A leaky or shorted capacitor can best be detected by checking resistance with an ohmmeter on the highest scale. Do not exceed the voltage rating of the capacitor. The resistance reading should be high after initial charge of the capacitor. An open capacitor can be detected with a capacitance meter or by checking whether the capacitor passes ac signals.

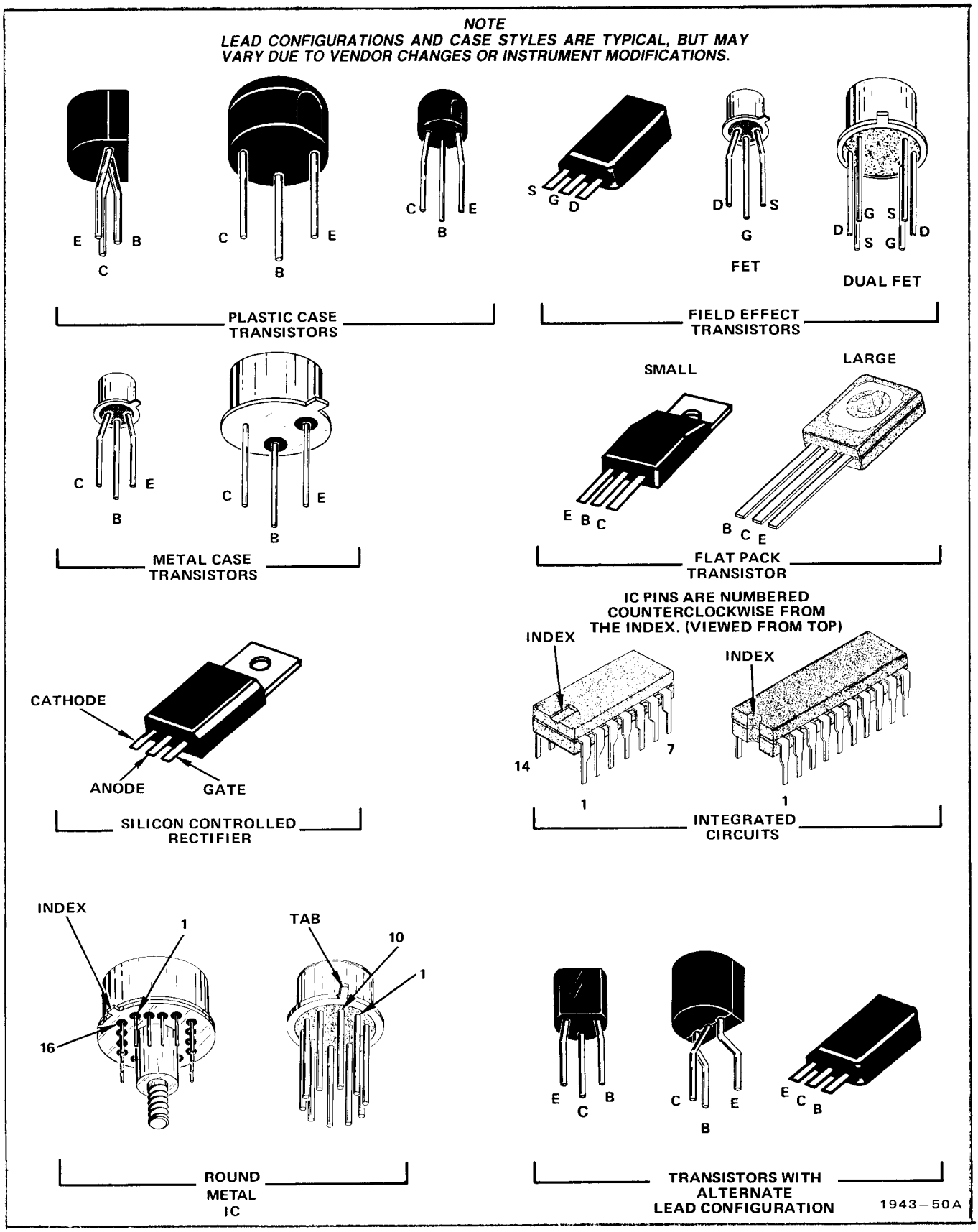


Fig. 4-3. Semiconductor lead configuration.

A leaky tantalum decoupling capacitor can appear good when checked but fail when in use (see Troubleshooting Chart).

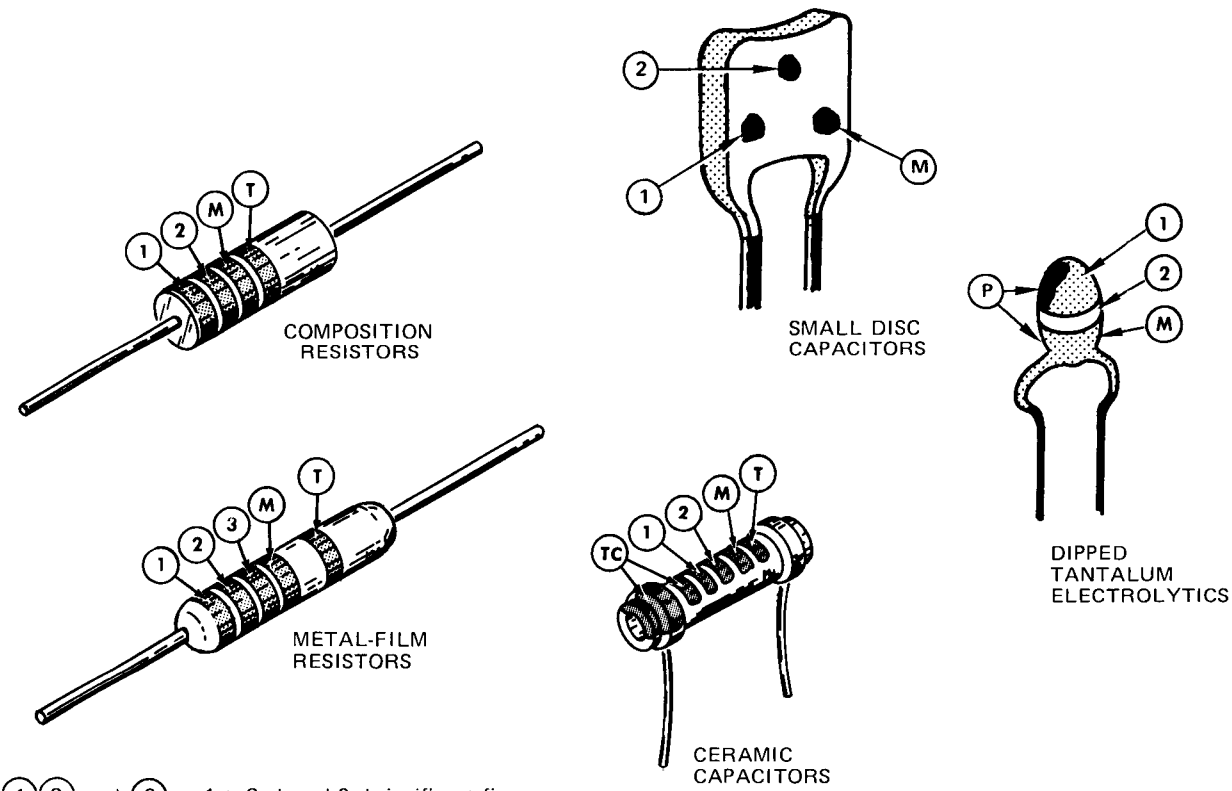
See Fig. 4-4 for capacitor color codes.

RESISTORS. Check resistors with an ohmmeter. Check the Electrical Parts List for tolerance of the resistors used in this instrument. Resistors normally do not need to be replaced unless the measured value varies widely from the specified value. See Fig. 4-4 for resistor color codes.

Repair and Readjust Circuit

If any defective parts are located, follow the replacement procedures given in this section. Check the performance of any circuit that has been repaired or has had any electrical components replaced. See partial procedures in the introduction to the Adjustment Procedure (Section 6 in this manual).

COLOR CODE 1861-20



(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	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	—

Fig. 4-4. Color codes.

CORRECTIVE MAINTENANCE

OBTAINING REPLACEMENT PARTS

Most electrical and mechanical parts can be obtained through your local Tektronix field office or representative. However, you should be able to obtain many of the standard electronic components from a local commercial source in your area. Before you purchase or order a part from a source other than Tektronix, Inc., please check the electrical parts list for the proper value, rating, tolerance and description.

NOTE

When selecting replacement parts, it is important to remember that the physical size and shape of a component may affect its performance in the instrument. All replaceable parts should be direct replacements unless it is known that a different component will not adversely affect instrument performance.

Some parts are manufactured or selected by Tektronix, Inc., to satisfy particular requirements, or are manufactured for Tektronix, Inc., to our specifications. Most of the mechanical parts have been manufactured by Tektronix, Inc. To determine the manufacturer of a part, refer to the Parts List Cross Index of Code Number to Manufacturer. This is found in the parts list.

When ordering replacement parts from Tektronix, Inc., include the following information:

1. Instrument Type.

2. Instrument serial number.

3. A description of the part (if electrical, include circuit number).

4. Tektronix part number.

SELECTABLE COMPONENTS

R1218A

If the cathode ray tube V1270 is replaced, it may be necessary to select an alternate value for R1218A to provide proper high-voltage regulation. The correct value of R1218A (between 1.8 kΩ, 2.2 kΩ, 3.9 kΩ, 4.7 kΩ, and 5.6 kΩ, all 1 W, 5%) may be determined as follows:

1. Set a digital voltmeter (DVM) to a +100 volt dc range and connect the high lead to TP1250 (see A7 board on diagram 14) and the low lead to circuit ground.

2. Set the INTENSITY control fully counterclockwise and check for a DVM reading of approximately +90 volts.

3. Set the INTENSITY control fully clockwise and check for a DVM reading of approximately +30 volts.

4. If the voltage readings in steps 2 and 3 are high, select a higher value for R1218A.

5. If the voltage readings in steps 2 and 3 are low, select a lower value for R1218A.

6. After selecting the optimum value for R1218A, perform Adjustment Procedure subsection A, Power Supply and Display steps 1 through 3.

CIRCUIT BOARD and SUB-ASSEMBLY REMOVAL and REPLACEMENT

WARNING

Disconnect the 335 from the power source before removing or replacing components or circuit boards.

The following information will aid you in removing circuit boards and sub-assemblies from the 335. See Fig. 4-5 for identification and location of the circuit boards in the 335. You may find the exploded drawing, located in the Mechanical Parts List, helpful in the following procedures.

Horizontal Module

1. Loosen two screws at bottom of plastic crt bezel. Screws are captive — do not remove.

2. Lift bezel away from crt face.

3. Remove horizontal deflection leads from crt neck pins.

4. Remove screw from rear center of Sweep board.

5. Carefully pull the module away from the instrument (forward). Be careful not to damage crt leads.

6. Unsolder the coaxial cable (grey with green stripe) from W and WG on the Horizontal board.

7. To replace, reverse the foregoing procedure.

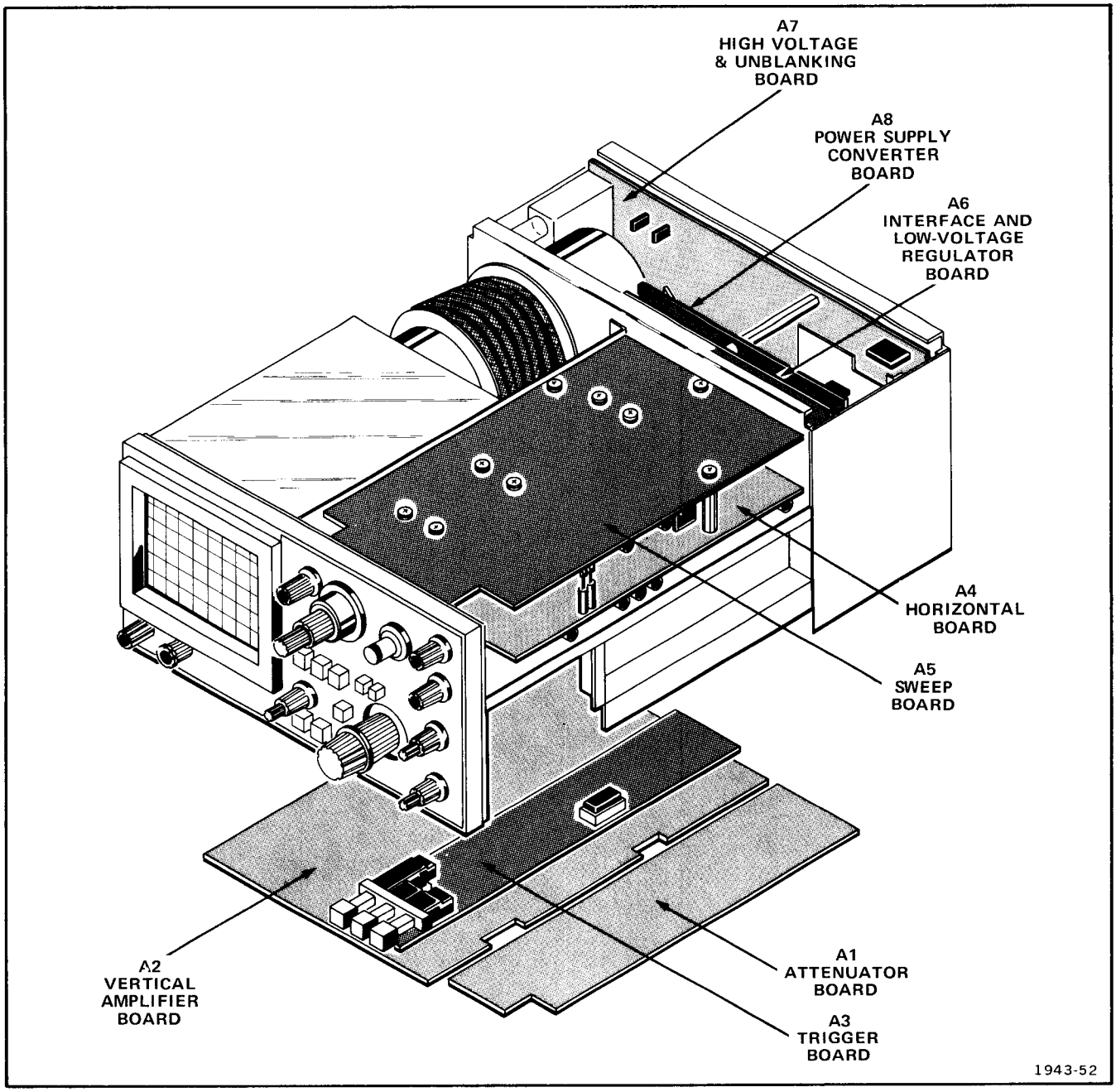


Fig. 4-5. Circuit board location.

Sweep Board (Assembly A5)

1. Remove Horizontal module.

2. Remove ten screws from Sweep board.

3. Unsolder two connections between the Horizontal and Sweep boards.

4. 

CAUTION

Be careful not to damage the SEC/DIV switch contacts and circuit board interconnecting pins when removing or replacing the Sweep board.

Carefully pull the Sweep board away from the Horizontal board.

5. There are three plug-on connectors attached to the Sweep board. These may come loose as you remove the Sweep board. If they don't, remove them and make note of their location.

6. 

CAUTION

When replacing the Sweep board, be careful to correctly align the circuit board interconnecting pins.

Do not over-tighten the six screws to the SEC/DIV switch assembly.

To replace the Sweep board, reverse the foregoing procedure.

Horizontal Board (Assembly A4)

1. Remove Horizontal module.

2. Remove Sweep board.

NOTE

To prevent misalignment of the cam-switch assembly during reinstallation of Horizontal board, leave cam-switch assembly attached to Horizontal board.

3. Remove two small screws from front of Horizontal board.

4. Remove A CAL, A SEC/DIV, and B SEC/DIV knobs.

5. Remove plug-on connectors from P600 and P925.

6. Carefully pull Horizontal board away from front panel assembly.

7. To reinstall Horizontal board, reverse the foregoing procedure. Be sure to correctly position the ready light through the hole in the front panel.

Vertical Amplifier Board (Assembly A2)

NOTE

See Fig. 4-6 for the locations of the screws and wires mentioned in the following procedure.

1. Remove the POWER/INTENSITY and FOCUS shafts.

2. There are eight soldered connections between the Vertical Amplifier board and the Attenuator board. Unsolder these connections from the Vertical Amplifier board. When replacing the Vertical Amplifier board, be careful not to short these connections to each other or to the attenuator shield.

3. Disconnect the two single-pin plug-on connectors from the Attenuator board.

4. Unsolder four delay-line leads and two braided shields from the Vertical Amplifier board.

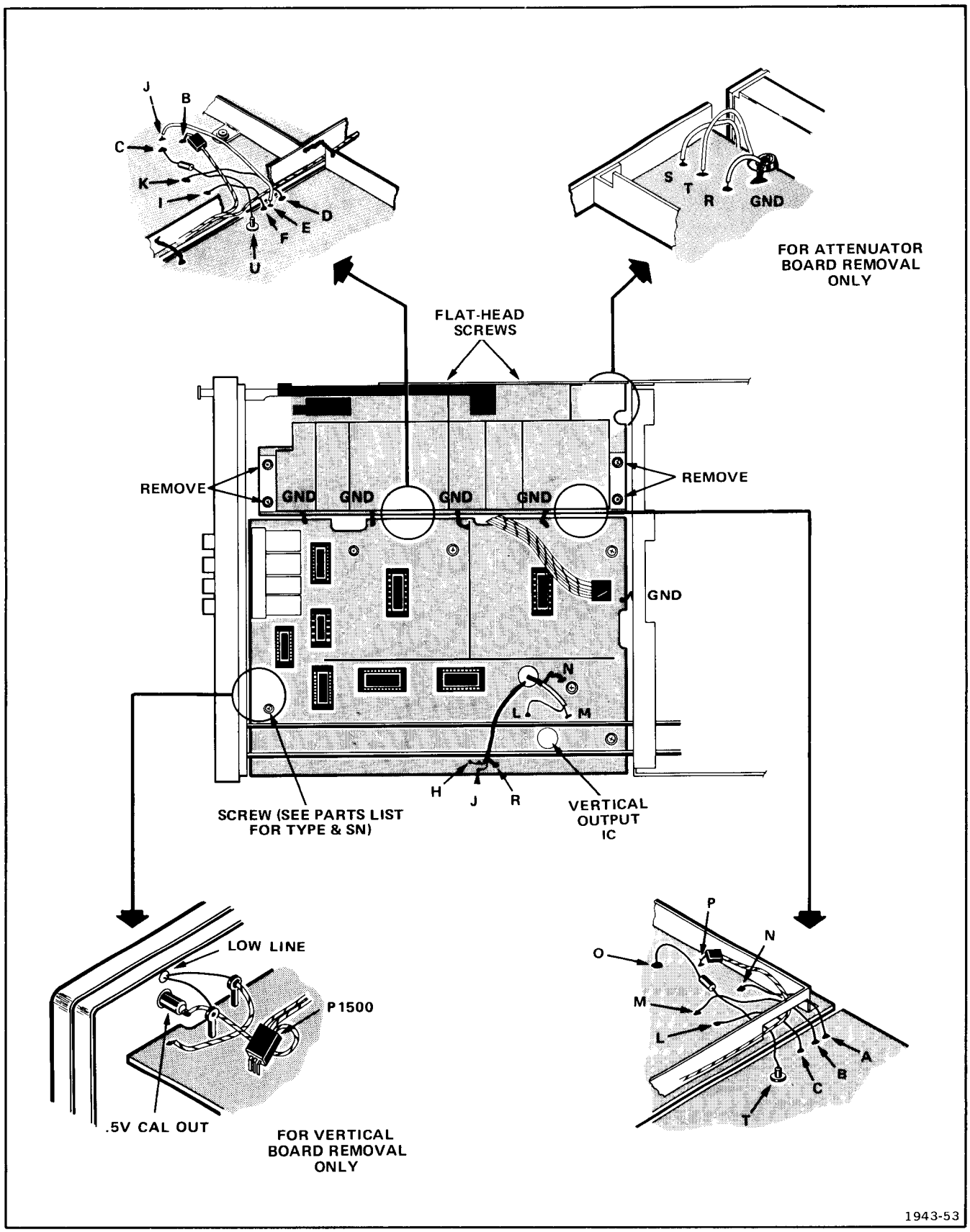


Fig. 4-6. Vertical Board and Attenuator Board removal.

5. Unsolder one end of each of the four ground braids between the Vertical Amplifier board and the Attenuator board. Unsolder the ground braid near the rear of the instrument.

6. Unsolder the brown-on-white wire from the .5 V CAL OUT jack.

7. Unsolder the two leads of the vertical output IC (U400) which pass through the Vertical Amplifier board and the chassis. These leads are accessable from the side of the 335.

8. Unsolder the orange-on-white wire located near the IC leads you just unsoldered.

9. Remove the nut from the mounting stud of the vertical output IC (U400).

10. Remove six screws from the Vertical Amplifier board.

11. Disconnect the plug-on connectors from the Vertical Amplifier board. Make note of their location for board replacement.

12. Set the CH 1, CH 2, ALT, and CHOP pushbuttons to the in position.

13. Carefully slide the Vertical Amplifier board to the rear of the instrument while lifting up on the rear of the board. Guide the delay line through the hold in the board.

14. To replace the Vertical Amplifier board, reverse the foregoing procedure observing the following precautions:

a. Be certain you don't leave any wires or cables under the board where you can't reach them.

b. Guide the delay line through the hole in the board.

c. Locate the LOW LINE indicator in the hole in the front panel.

d. Guide the two vertical output IC leads through the holes in the chassis.

Trigger Board (Assembly A3)

NOTE

You can gain access to most of the parts on the trigger board without removing it as follows:

a. Remove the Horizontal module.

b. Remove four flat-head screws (see Fig. 4-7).

c. Remove the shield. The circuit board you see through the holes is the Trigger board.

1. Remove the Vertical Amplifier board.

2. Disconnect two plug-on connectors from the Trigger board. Make note of their locations for board replacement.

3. Remove the three 3/16 inch hexagonal posts.

4. Set the AC, DC, and INT pushbuttons to the in position.

5. Slide the Trigger board to the rear of the instrument while lifting up on the rear of the board. The solder lug mounted on the chassis may get in the way. If so, remove it.

6. If you need to completely remove the Trigger board, unsolder the orange-on-grey and the green-on-grey coaxial cables. Note the location for reinstallation.

7. To reinstall the Trigger board, reverse the foregoing procedure. Be careful to correctly route the cables. Use the end of the small screwdriver to align the three pushbuttons with the holes in the front panel.

Attenuator Board (Assembly A1)

NOTE

See Fig. 4-8 for the locations of the screws and wires mentioned in this procedure.

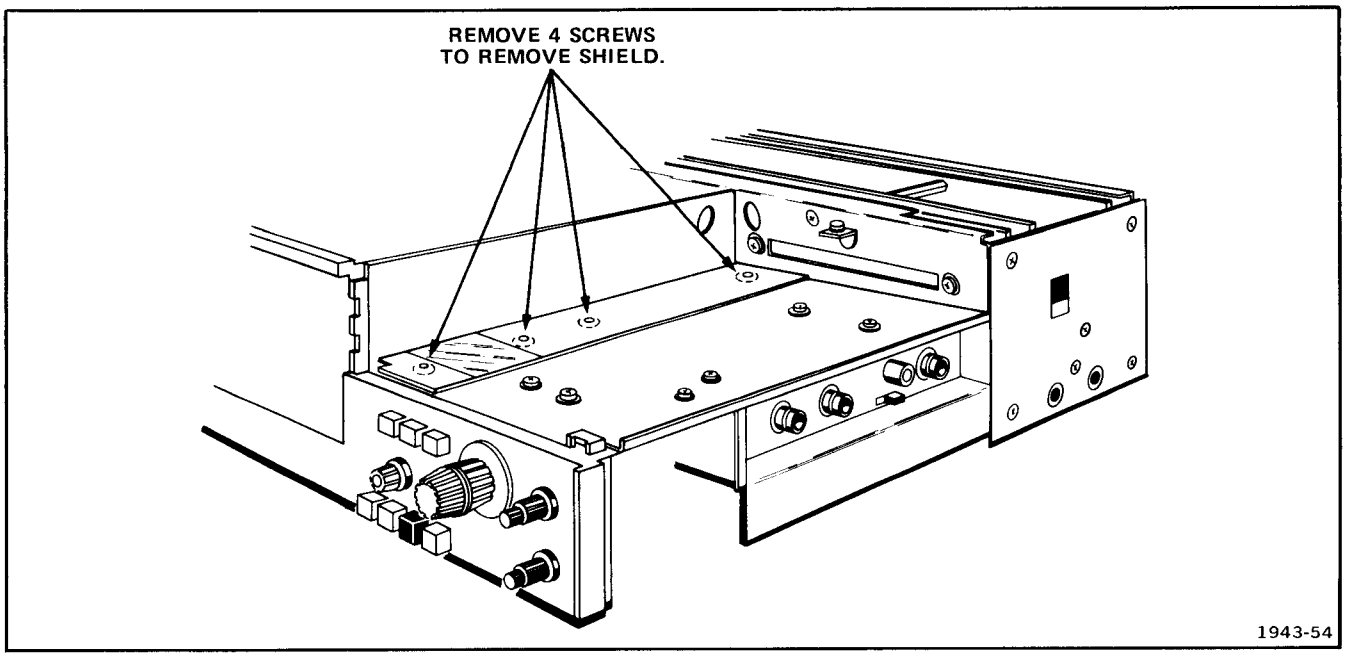


Fig. 4-7. Trigger Board access, shown with shield removed.

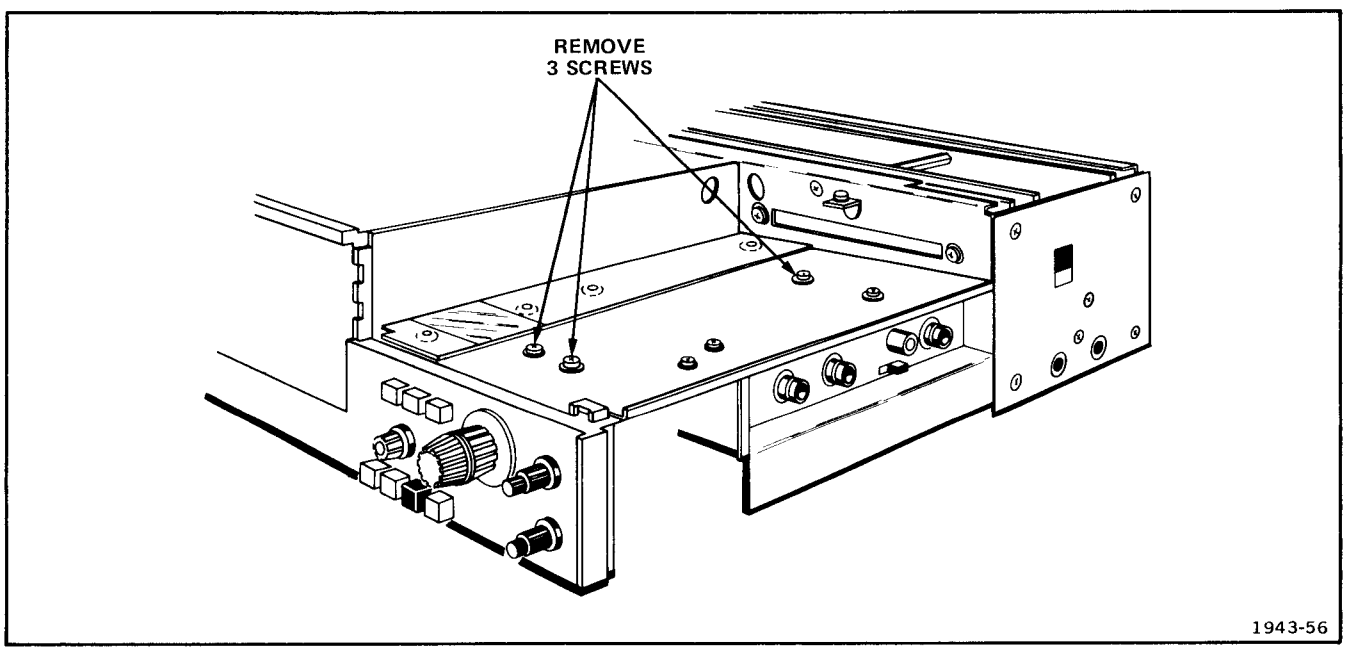


Fig. 4-8. VOLTS/DIV-switch cam removal.

CAUTION

Be careful not to damage the VOLTS/DIV switch contacts.

1. There are eight soldered connections between the Vertical Amplifier board and the Attenuator board. Unsolder them from the Vertical Amplifier board.

2. Disconnect the two single-pin plug-on connectors from the Attenuator board.

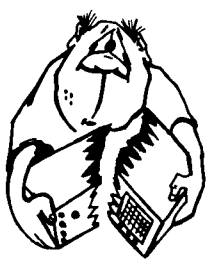
3. Unsolder the four ground connections between the Attenuator board and the Vertical Amplifier board.

4. Unsolder two red wires, two green wires, and one coaxial cable from the Attenuator board.

5. Remove six screws from the Attenuator board.

6. Remove two flat-head screws which hold the attenuator shield to the chassis. These screws are accessible from the side of the instrument.

7. Lift the two black plastic AC-GND-DC switch couplers away from the switches.

8. 

CAUTION

Be careful not to damage the VOLTS/DIV switch contacts located on the under side of the Attenuator board.

Carefully lift the Attenuator board away from the instrument.

9. To replace the Attenuator board, reverse the foregoing procedure. Be certain not to leave the red and green wires and the coax under the board where you can't reach them.

VOLTS/DIV Switch Cam

1. Remove Horizontal module.

2. Remove Attenuator board.

3. Remove three screws (see Fig. 4-8).

4. Lift rear of cam assembly and slide assembly toward the rear of the instrument to remove.

5. To replace cam assembly, reverse the foregoing procedure. Be sure you route the cable located near the front of the instrument so nothing rubs against it when you rotate the CH 1 VOLTS/DIV knob.

Power Supply and High Voltage Section

1. There are two plastic shields covering the power supply and high voltage section. Slide these shields toward the side of the 335 to remove.

2. Remove the Focus and Intensity shafts.

3. Remove the Horizontal module.

4. Remove the screws shown in Fig. 4-9.

5. *NOTE*

You must remove several plug connectors as you remove the power supply and high voltage section. To make replacement easier, wrap a piece of tape around each connector and write the P number on the tape.

Slowly and carefully pull the power supply and high voltage section away from the rest of the 335.

6. To replace the power supply and high voltage section, reverse the foregoing procedure.

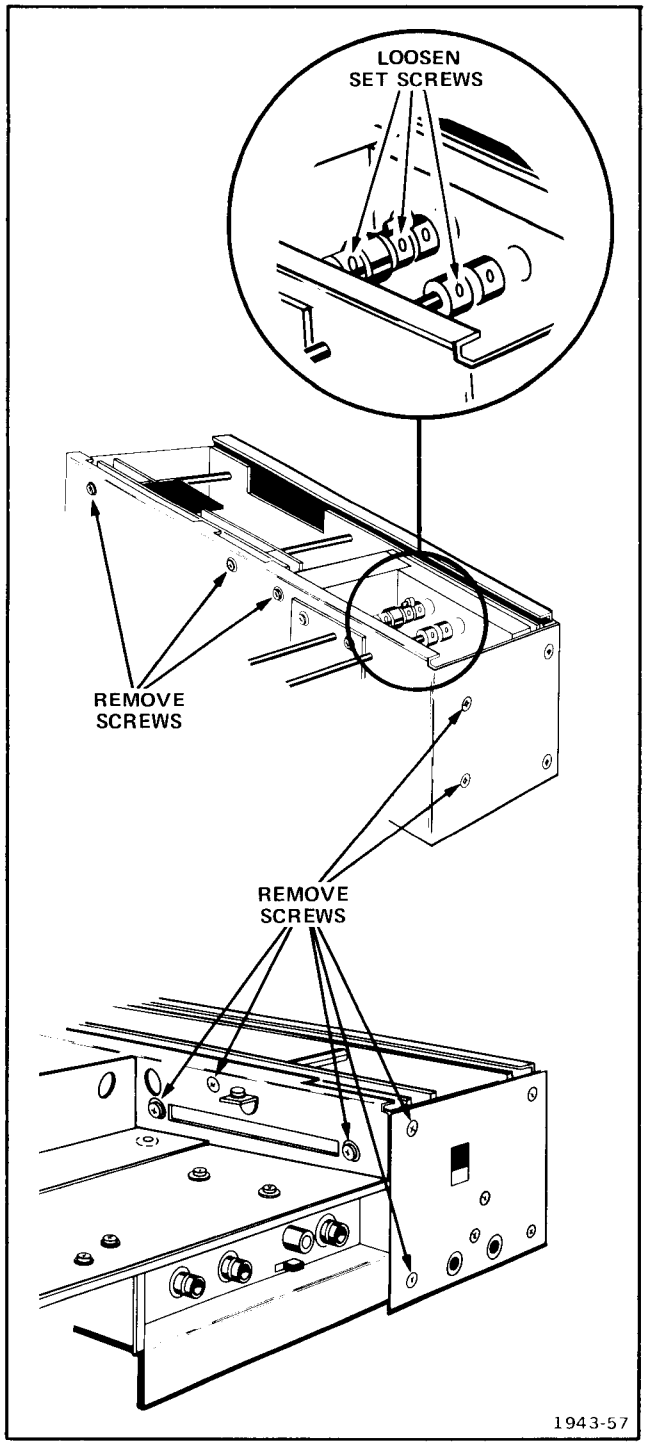


Fig. 4-9. Power supply and high voltage section removal.

Interface and Low-Voltage Regulator Board (Assembly A6)

1. Remove power supply and high voltage section.

2. Remove the three 3/16 inch hexagonal posts.

3. Disconnect P1601 and P1605.

4.

CAUTION

Use care not to damage the power supply interconnecting pins during board removal or replacement.

Pull Interface and Low-Voltage Regulator board away from the rest of the power supply and high voltage section.

5. To replace the Interface and Low-Voltage Regulator board, reverse the foregoing procedure.

Power Supply Converter Board (Assembly A8)

1. Remove the power supply and high voltage section.

2. Remove the Interface and Low-Voltage Regulator board.

3. Remove five screws from the side panel and remove the side panel (see Fig. 4-10).

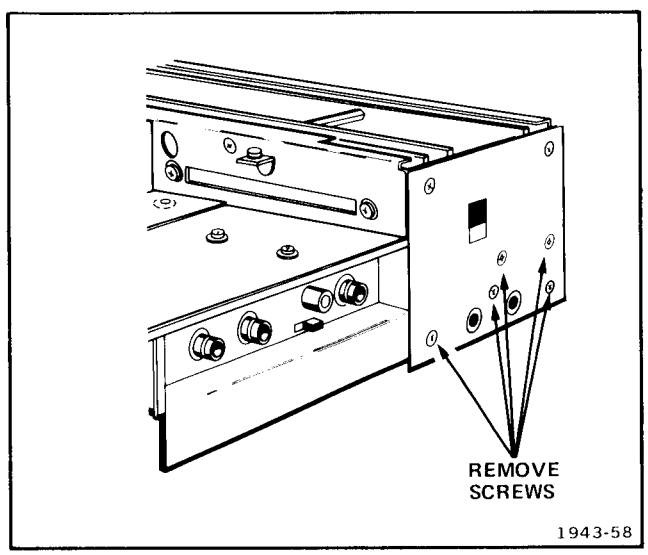


Fig. 4-10. Power supply converter board removal.

4. Disconnect the plug-on connectors from the Power Supply Converter board. Make note of their positions for replacement.

5. Carefully lift the Power Supply Converter board away from the rest of the power supply and high voltage section.

6. To replace the Power Supply Converter board, reverse the foregoing procedure.

High Voltage and Unblanking Board (Assembly A7)

1. Remove the power supply and high voltage section.

2. Remove the Interface and Low-Voltage Regulator board.

3. Remove the Power Supply Converter board.

4. Remove the three 3/16 inch hexagonal posts.

5. Remove the one screw holding the board to the rear chassis.

6. Disconnect the plug-on connectors. Note their locations or mark plugs for easier replacement.

7. Unsolder the black wire which is looped through the hole in the circuit board. During replacement, be sure this wire is looped through this hole.

8. Carefully lift the High-Voltage and Unblanking board away from the rear chassis.

9. Remove the two screws holding the power-switch assembly.

10. Unsolder the remaining wires making note of their location for use in replacement.

11. To replace the High-Voltage and Unblanking board, reverse the foregoing procedure.

CRT

1. Loosen the two captive screws at the bottom of the crt bezel. These screws are captive, do not remove them.

2. Lift the bezel away from the crt face.

3. Disconnect the horizontal and vertical deflection plate leads from the crt neck pins.

4. Slide the plastic boot on the anode lead toward the front of the 335 (see Fig. 4-11). Unsolder the anode lead.

5. While removing the crt, hold your hand over the front of the crt to prevent it from falling. Slide the crt forward while removing the socket at the rear of the crt.

6. To replace the crt, reverse the foregoing procedure. Be certain you make a smooth solder joint on the anode lead. There will be a corona discharge from any sharp points on the connection.

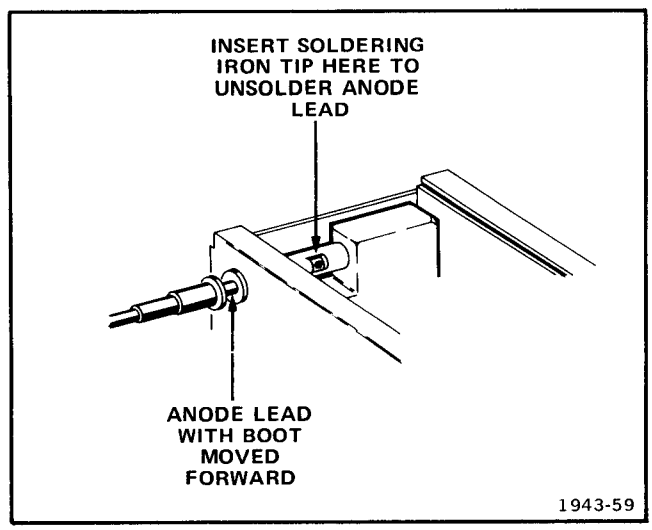


Fig. 4-11. Crt removal.

REPACKAGING FOR SHIPMENT

If the Tektronix instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing: owner (with address) and the name of an individual at your firm that can be contacted. Include complete instrument serial number and a description of the service required.

Save and re-use the package in which your instrument was shipped. If the original packaging is unfit for use or not available, repackage the instrument as follows:

Surround the instrument with polyethylene sheeting to protect the finish of the instrument. Obtain a carton of corrugated cardboard of the correct carton strength and having inside dimensions of no less than six inches more than the instrument dimensions. Cushion the instrument by tightly packing three inches of dunnage or urethane foam between carton and instrument, on all sides. Seal carton with shipping tape or industrial stapler.

The carton test strength for your instrument is 275 pounds.

PERFORMANCE CHECK

INTRODUCTION

Purpose

This procedure is designed to be used by incoming inspection to check a newly purchased instrument or by quality control to check an instrument after performance of an adjustment procedure. You do not need to remove the instrument cover. All checks are made from the front panel.

Calibration Interval

To ensure instrument accuracy, check the calibration of the 335 every 1000 hours of operation, or every 6 months if used infrequently. If specifications are not met, see the Adjustment Procedure in Section 6 of this manual.

Limits and Tolerances

The limits and tolerances given in this procedure are valid, after a 30 minute warm-up period, if the 335 was calibrated in an ambient temperature of +20° C to +30° C. All limits and tolerances given are for the 335 under test and do not include test equipment tolerances.

Partial Procedures

If one aspect of the 335 measurement capability is more critical to your application, you may wish to perform a partial procedure and check that aspect at intervals more frequent than 1000 hours. Also, if you have replaced components, check the performance of the repaired circuit by performing a partial procedure. To make partial procedures easier to perform, the performance check is divided into several sections, each of which stands alone. An equipment required list and setup instructions are provided at the beginning of each section.

Equipment Required

The complete Performance Check requires the following equipment. For equipment specifications, usage, and recommended types, see Table 6-1 in the Adjustment Procedure section of this manual.

1. Amplitude calibrator.
2. Square-wave generator.
3. Leveled sine-wave generator.
4. Low-frequency sine-wave generator.
5. Time-mark generator.
6. 50 Ω BNC cable.
7. 50 Ω BNC termination.
8. 50 Ω BNC 10X attenuator (2 required).
9. 50 Ω BNC dual-input coupler (2 required).
10. 6 GR to BNC adapter (if 106 square-wave generator is used).
11. BNC T-connector.
12. BNC to banana adapter.
13. 10X probe (supplied with 335).
14. BNC to probe tip adapter.
15. Cable with banana connectors.

INDEX TO PERFORMANCE CHECK

A. VERTICAL

Equipment Required

1. Amplitude Calibrator.
2. Square-wave Generator.
3. Leveled Sine-wave Generator.
4. 50 Ω BNC Cable.
5. 50 Ω BNC Termination.
6. 10X Probe.
7. 10X Attenuator (2 required).
8. GR to BNC Adapter (if 106 Square-wave generator is used).

335 Control Settings

NOTE

Allow 335 to warm up for 30 minutes before starting Performance Check.

Power and Display

POWER/INTENSITY	POWER—On INTENSITY—As desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

VOLTS/DIV	1 m
VARIABLE	CAL
POSITION	Midrange
AC-GND-DC	GND
DISPLAY	CH 1
CH 2 INVERT	Button out

Horizontal

HORIZ DISPLAY	A
A and B SEC/DIV	.5 m
A CAL	Detent
HORIZ MAG	OUT: X1
DELAY TIME POSITION	Fully counterclockwise
Position	Midrange

Trigger

Trigger Mode	AUTO
A LEVEL	Clockwise
B (DLY'D) TRIGGER LEVEL	RUNS AFTER DLY TIME
A and B SLOPE	+
Coupling	AC
Source	INT—CH 1
A TRIG HOLDOFF	NORM (detent)
EXT ATTEN	1X

1. Deflection Factor Accuracy

a. Connect the amplitude calibrator to CH 1 input through a 50 Ω cable.

b. Set CH 1 AC-GND-DC switch to DC.

c. CHECK—CH 1 deflection factor accuracy according to Table 5-1.

d. Set:

CH 1 AC-GND-DC	GND
CH 2 AC-GND-DC	DC
DISPLAY	CH 2

e. Move the 50 Ω bnc cable from CH 1 input to CH 2 input.

f. CHECK—CH 2 deflection factor accuracy according to Table 5-1.

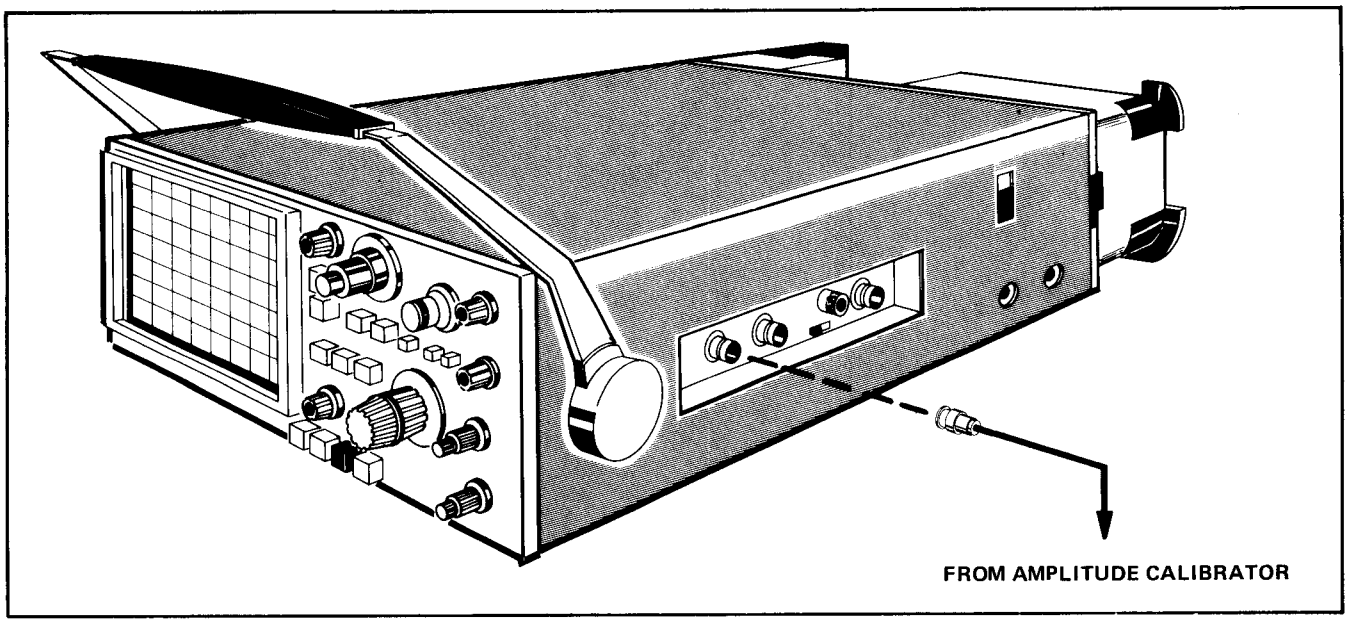


Fig. 5-1. Equipment setup.

TABLE 5-1

Deflection Factor Accuracy

VOLTS/DIV Setting	Amplitude Calibrator	Vertical Deflection
1 m	5 mV	4.85 to 5.15
2 m	10 mV	4.85 to 5.15
5 m	20 mV	3.88 to 4.12
10 m	50 mV	4.85 to 5.15
20 m	.1 V	4.85 to 5.15
50 m	.2 V	3.88 to 4.12
.1	.5 V	4.85 to 5.15
.2	1 V	4.85 to 5.15
.5	2 V	3.88 to 4.12
1	5 V	4.85 to 5.15
2	10 V	4.85 to 5.15
5	20 V	3.88 to 4.12
10	50 V	4.85 to 5.15
5 div Cal		4.85 to 5.15

2. VARIABLE VOLTS/DIV Range

a. Set CH 1 and CH 2 VOLTS/DIV to 20 m.

b. Set amplitude calibrator output to 0.1 V.

c. CHECK—Display ampitude reduces from 5 divisions to 2 divisions or less when CH 2 VARIABLE control is turned fully counterclockwise. Move 50 Ω bnc cable from CH 2 input to CH 1 input.

d. Set:

DISPLAY	CH 1
CH 1 AC-GND-DC	DC
CH 2 AC-GND-DC	GND

e. CHECK—Display amplitude reduces from 5 divisions to 2 divisions or less when CH 1 VARIABLE Control is turned fully counterclockwise.

f. Set both VARIABLE controls to CAL (detent).

g. Disconnect test equipment.

3. VOLTS/DIV Compensation

a. Connect test equipment as shown in Fig. 5-2A.

b. Set CH 1 and CH 2 VOLTS/DIV 10 m.

c. Set generator frequency to 1 kHz.

d. Adjust square-wave generator amplitude and add or remove attenuators to maintain a 5-division display throughout the rest of step 3.

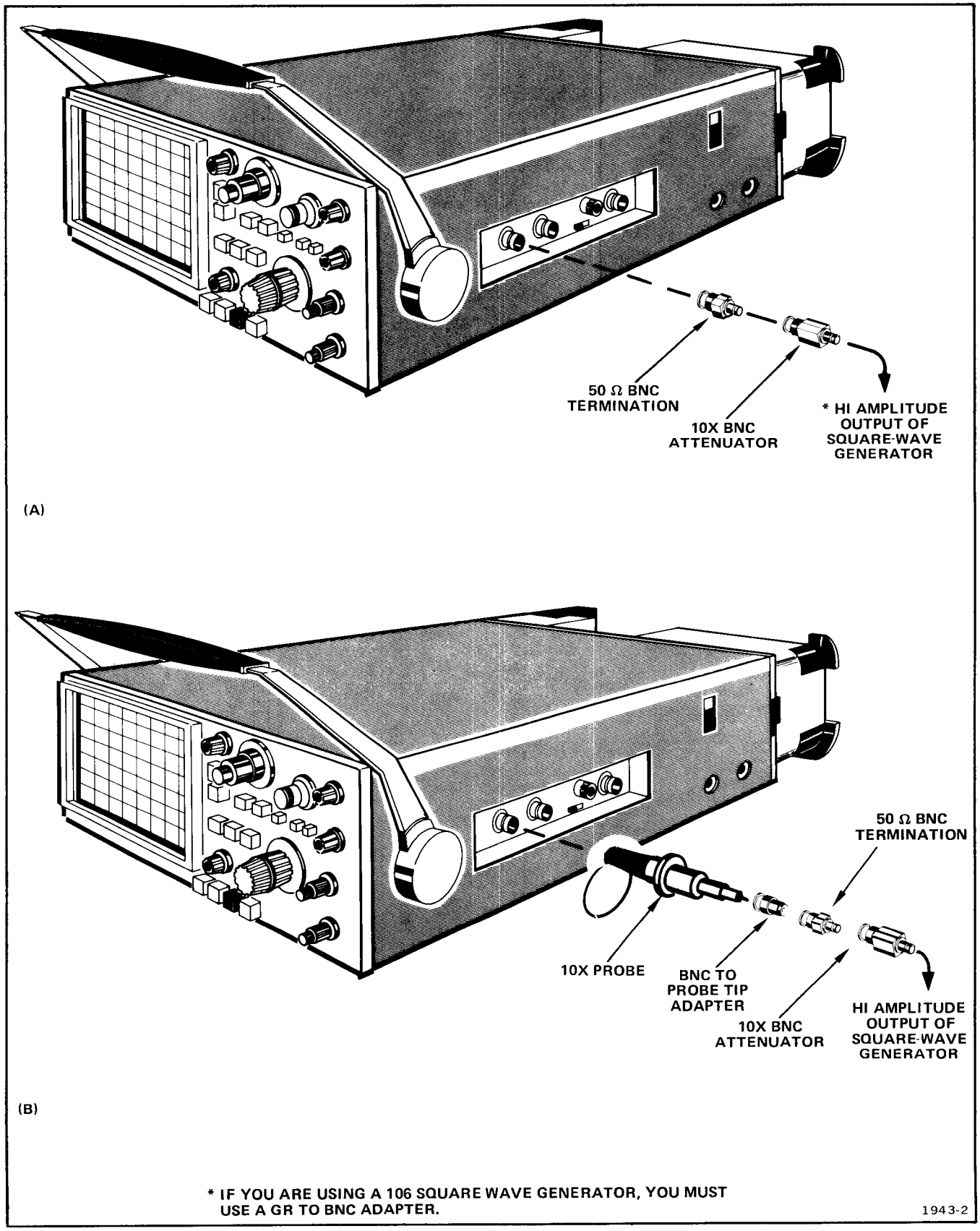


Fig. 5-2. Equipment setup.

e. CHECK—0.3 division or less overshoot or rolloff of waveform.

f. Connect test equipment as shown in Fig. 5-2B.

g. Adjust probe compensation for best flat-top waveform.

h. CHECK—All CH 1 VOLTS/DIV switch settings for 0.15 division or less overshoot or rolloff of a 5-division waveform (0.25 division or less at 10 V setting).

i. Move test setup to CH 2 VERT INPUT connector and set DISPLAY to CH 2 and CH 2 AC-GND-DC to DC.

j. CHECK—All CH 2 VOLTS/DIV switch settings for 0.15 division or less overshoot or rolloff of a 5-division waveform (0.25 division or less at 10 V setting).

k. Disconnect test equipment.

4. Frequency Response (Bandwidth)

a. Connect equipment as shown in Fig. 5-3. Add or remove attenuators as needed to maintain a 6-division display of the reference signal.

b. Set:

CH 2 VOLTS/DIV	1 m
CH 2 AC-GND-DC	DC
CH 1 AC-GND-DC	GND
A LEVEL	cw (Free running)

c. Set leveled sine-wave generator to reference frequency and adjust generator amplitude for a 6-division display.

d. Without readjusting amplitude, set generator frequency according to Table 5-2.

e. CHECK—Display amplitude is 4.2 divisions or greater.

TABLE 5-2

Frequency Response (+20° C to +30° C)

CH 1 or CH 2 VOLTS/DIV	Leveled Sine-wave Generator Frequency
1 m through 5 m	25 MHz
10 m through 5 V	35 MHz
10 V	25 MHz

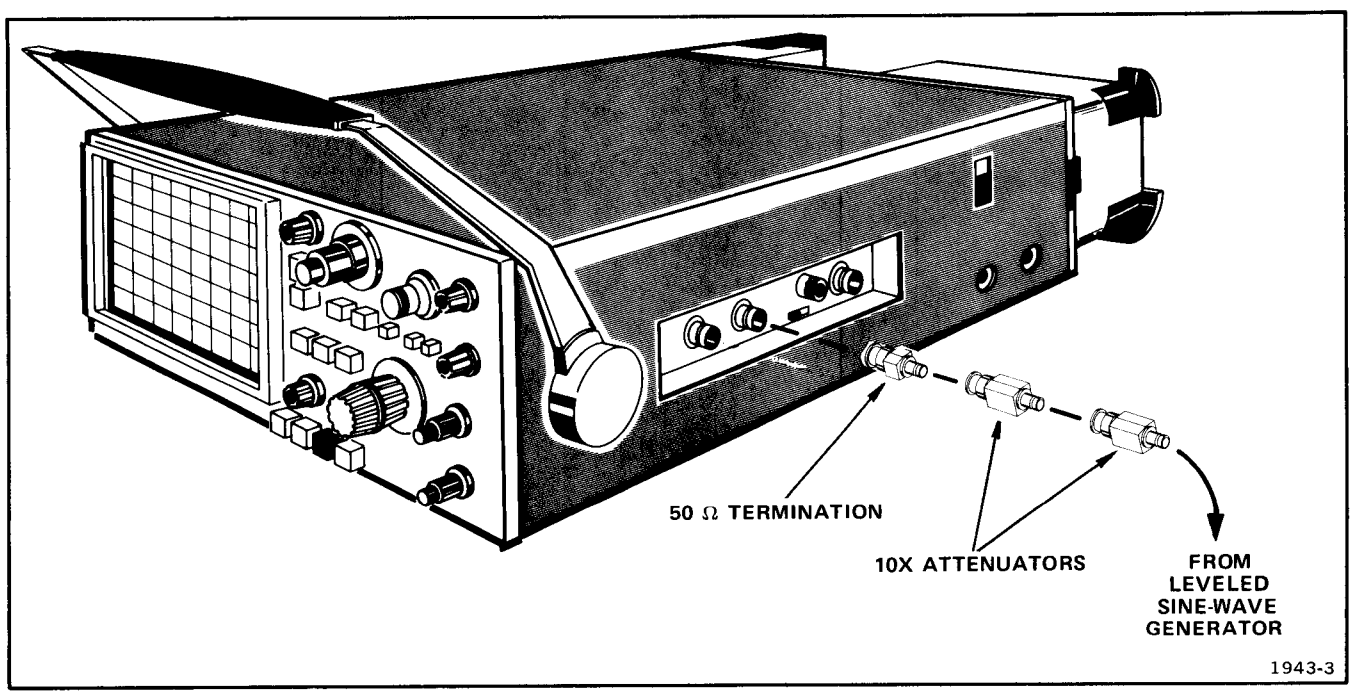


Fig. 5-3. Equipment setup.

f. Repeat step 4, parts c through e, for as many CH 2 VOLTS/DIV switch position as generator amplitude allows.

g. Set:

CH 2 AC-GND-DC	GND
CH 1 AC-GND-DC	DC
DISPLAY	CH 1

h. Move test signal to CH 1 VERT INPUT connector.

i. Repeat step 4, parts c through e, for as many Ch 1 VOLTS/DIV switch positions as generator amplitude allows.

j. Disconnect test equipment.

B. TRIGGERING

Equipment Required

1. Leveled Sine-wave Generator.
2. Low-frequency Sine-wave Generator.
3. 50 Ω BNC Cable.
4. 50 Ω BNC Termination.
5. Dual-Input Coupler (2 required).
6. 10X Probe (supplied with 335).

335 Control Settings (*Indicates Change From Previous Step)

NOTE

Allow 335 to warm up for 30 minutes before starting Performance Check.

Power and Display

POWER/INTENSITY	POWER—On INTENSITY—As desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

*VOLTS/DIV	*10 m
VARIABLE	CAL
POSITION	Midrange
*AC-GND-DC	*AC
*DISPLAY	*CH 1
CH 2 INVERT	Button out

Horizontal

HORIZ DISPLAY	A
*A and B SEC/DIV	*1 μ
A CAL	Detent
HORIZ MAG	OUT: X1
DELAY TIME POSITION	Fully counterclockwise
Position	Midrange

Trigger

Trigger Mode	AUTO
A LEVEL	As needed
*B (DLY'D) TRIGGER LEVEL	*As needed
A and B SLOPE	+
Coupling	AC
Source	INT—CH 1
A TRIG HOLDOFF	NORM (detent)
EXT ATTEN	1X

1. High-Frequency Internal Triggering

a. Connect test equipment to CH 1 VERT INPUT, CH 2 VERT INPUT, and EXT TRIG or HORIZ INPUT as shown in Fig. 5-4.

b. CHECK—Stable display can be obtained in both + and − positions of A SLOPE switch with equipment settings listed in Table 5-3.

c. Set:

A LEVEL	As needed for a stable display
HORIZ DISPLAY	B
B LEVEL	As needed for a stable display

d. CHECK—Stable display can be obtained in both + and − positions of B SLOPE switch with equipment settings listed in Table 5-3.

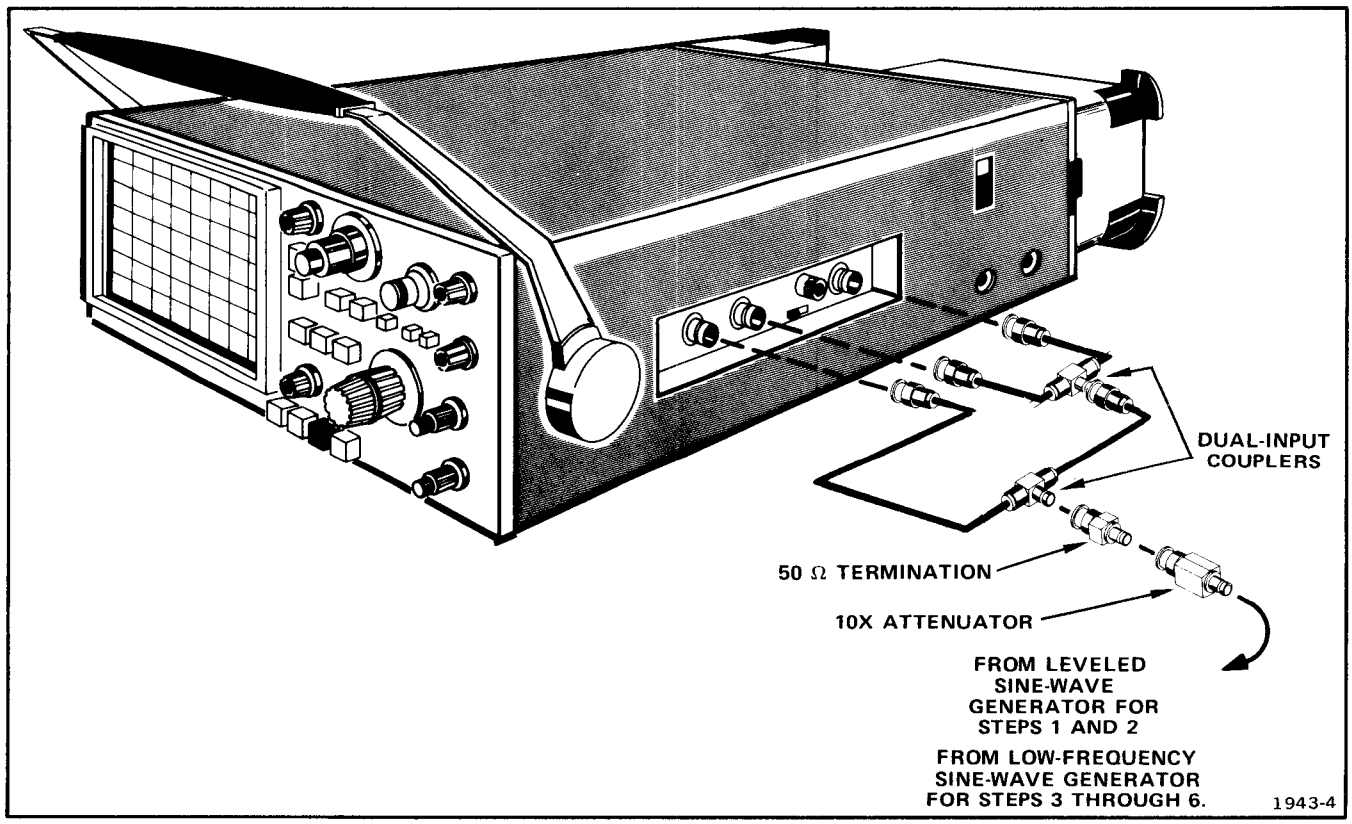


Fig. 5-4. Equipment setup.

TABLE 5-3

H. F. Internal Triggering Checks

SOURCE	COUPLING	Display[1] Amplitude	Leveled Sine-wave Generator Frequency	A and B SEC/DIV	HORIZ MAG Button
CH 1	AC, DC,	0.35 div	1 MHz	1 μ	Out
CH 2	AC, DC,	0.35 div	1 MHz	1 μ	Out
COMP	AC, DC,	0.35 div	1 MHz	1 μ	Out
CH 1	LF REJ	0.5 div	1 MHz	1 μ	Out
CH 2	LF REJ	0.5 div	1 MHz	1 μ	Out
COMP	LF REJ	0.5 div	1 MHz	1 μ	Out
CH 1	LF REJ	2.0 div	35 MHz	.2 μ	In
CH 2	LF REJ	2.0 div	35 MHz	.2 μ	In
COMP	LF REJ	2.0 div	35 MHz	.2 μ	In
COMP	AC, DC,	1.5 div	35 MHz	.2 μ	In
CH 2	AC, DC,	1.5 div	35 MHz	.2 μ	In
CH 1	AC, DC,	1.5 div	35 MHz	.2 μ	In

[1]**To obtain 0.35 division display:**
- **A. Set CH 1 VOLTS/DIV to 1 m.**
- **B. Adjust generator amplitude for a 3.5-division display.**
- **C. Set CH 1 VOLTS/DIV to 10 m.**

To obtain 0.5 division display:
- **A. Set CH 1 VOLTS/DIV to 1 m.**
- **B. Adjust generator for a 5 division display.**
- **C. Set CH 1 VOLTS/DIV to 10 m.**

To obtain 1.5 division display:
- **A. Set CH 1 VOLTS/DIV to 2 m.**
- **B. Adjust generator amplitude for a 7.5-division display.**
- **C. Set Ch 1 VOLTS/DIV to 10 m.**

2. High-Frequency External Triggering

a. Set:

HORIZ DISPLAY	A
SOURCE	EXT/LINE
EXT ATTEN	1X

b. CHECK—Stable display can be obtained in both + and − positions of A SLOPE switch with equipment settings listed in Table 5-4.

c. Set:

A LEVEL	cw
HORIZ DISPLAY	B

d. CHECK—Stable display can be obtained in both + and − positions of B SLOPE switch with equipment settings listed in Table 5-4.

3. Low-Frequency Internal Triggering

a. Disconnect BNC cable from leveled sine-waved generator output and connect to output of low-frequency sine-wave generator.

b. Set:

HORIZ DISPLAY	A
A and B SEC/DIV	10 m
CH 1 VOLTS/DIV	1 m
DISPLAY	CH 1
HORIZ MAG	Button out
SOURCE	INT

c. Set low-frequency generator frequency to 60 Hz.

d. CHECK—Stable display can be obtained in both + and − positions of A SLOPE switch with equipment settings listed in Table 5-5.

e. Set:

A LEVEL	cw
HORIZ DISPLAY	B

f. CHECK—Stable display can be obtained in both + and − positions of B SLOPE switch with equipment settings listed in Table 5-5.

TABLE 5-4

H. F. External Triggering Checks

Trigger Coupling	Signal[1] Amplitude	Leveled Sine-wave Generator Frequency	A and B SEC/DIV	HORIZ MAG Button
AC, DC,	70 mV	1 MHz	1 μ	Out
AC, DC,	250 mV	35 MHz	.2 μ	In

[1]**To obtain 70 mV of 1 MHz:**
A. Set Ch 1 VOLTS/DIV to 10 m.
B. Set generator to reference frequency.
C. Adjust generator amplitude for a 7-division display.
D. Set generator frequency to 1 MHz.

To obtain 250 mV of 35 MHz:
A. Set CH 1 VOLTS/DIV to 50 m.
B. Set generator to reference frequency.
C. Adjust generator amplitude for a 5-division display.
D. Set generator frequency to 35 MHz.

TABLE 5-5

L. F. Internal Triggering Checks

Trigger Source	Trigger Coupling	Amplitude
CH 1	AC, DC	0.35 div
CH 2	AC, DC	0.35 div
COMP	AC, DC	0.35 div
COMP	HF REJ	0.5 div
CH 2	HF REJ	0.5 div
CH 1	HF REJ	0.5 div

[1]**To obtain 0.35 division display:**
A. Set CH 1 VOLTS/DIV to 1 m.
B. Adjust generator amplitude for a 3.5 division display.
C. Set CH 1 VOLTS/DIV to 10 m.

To obtain a 0.5 division display:
A. Set CH 1 VOLTS/DIV to 1 m.
B. Adjust generator amplitude for a 5 division display.
C. Set CH 1 VOLTS/DIV to 10 m.

4. Low-Frequency External Triggering

a. Set:

HORIZ DISPLAY	A
SOURCE	EXT/LINE
EXT ATTEN	1X
CH 1 VOLTS/DIV	10 m
DISPLAY	CH 1

b. Set generator amplitude for a 7-division display.

c. CHECK—Stable display can be obtained in both the + and − positions of A SLOPE switch in the following trigger coupling modes:

AC
DC

d. Set:

A LEVEL	cw
HORIZ DISPLAY	B

e. CHECK—Stable display can be obtained in both the + and − positions of B SLOPE switch in the following trigger coupling modes:

AC
DC

f. Set:

CH 1 VOLTS/DIV	20 m
Trigger Coupling	HF REJ

g. Set generator amplitude for 5 division display.

h. CHECK—Stable display can be obtained in both the + and − positions of B SLOPE switch.

i. Set HORIZ DISPLAY to A.

j. CHECK—Stable display can be obtained in both + and − positions of A SLOPE switch.

5. Low-Frequency Reject (LF REJ)

a. Set:

Coupling	LF REJ
Source	INT-COMP
A SEC/DIV	1 m
HORIZ DISPLAY	A
CH 1 VOLTS/DIV	1 m

b. Set generator frequency to 1 kHz and adjust generator amplitude for a 4-division display.

c. Set CH 1 VOLTS/DIV to 10 m.

d. CHECK—Stable display can not be obtained.

e. Without changing generator amplitude, set generator frequency to 100 kHz and SEC/DIV to 20 μ.

f. CHECK—Stable display can be obtained.

6. High-Frequency Reject (HF REJ)

a. Set:

Coupling	HF REJ
CH 1 VOLTS/DIV	1 m
SEC/DIV	1 μ

b. Set generator to 1 MHz and adjust generator amplitude for a 4-division display.

c. Set CH 1 VOLTS/DIV to 10 m.

d. CHECK—Stable display cannot be obtained.

e. Without changing amplitude, set generator frequency to 10 kHz and set SEC/DIV to .1 m.

f. CHECK—Stable display can be obtained.

g. Disconnect test equipment.

7. Line Triggering

a. Set:

A SEC/DIV	5 ms
Source	EXT/LINE
EXT ATTEN	LINE
Coupling	HF REJ
CH 2 AC-GND-DC	GND

b. Connect equipment as shown in Fig. 5-5.

c. Adjust CH 1 VOLTS/DIV for about 4 or 5 divisions of display.

d. CHECK—Stable display can be obtained in both + and − positions of A SLOPE switch.

e. Disconnect test equipment.

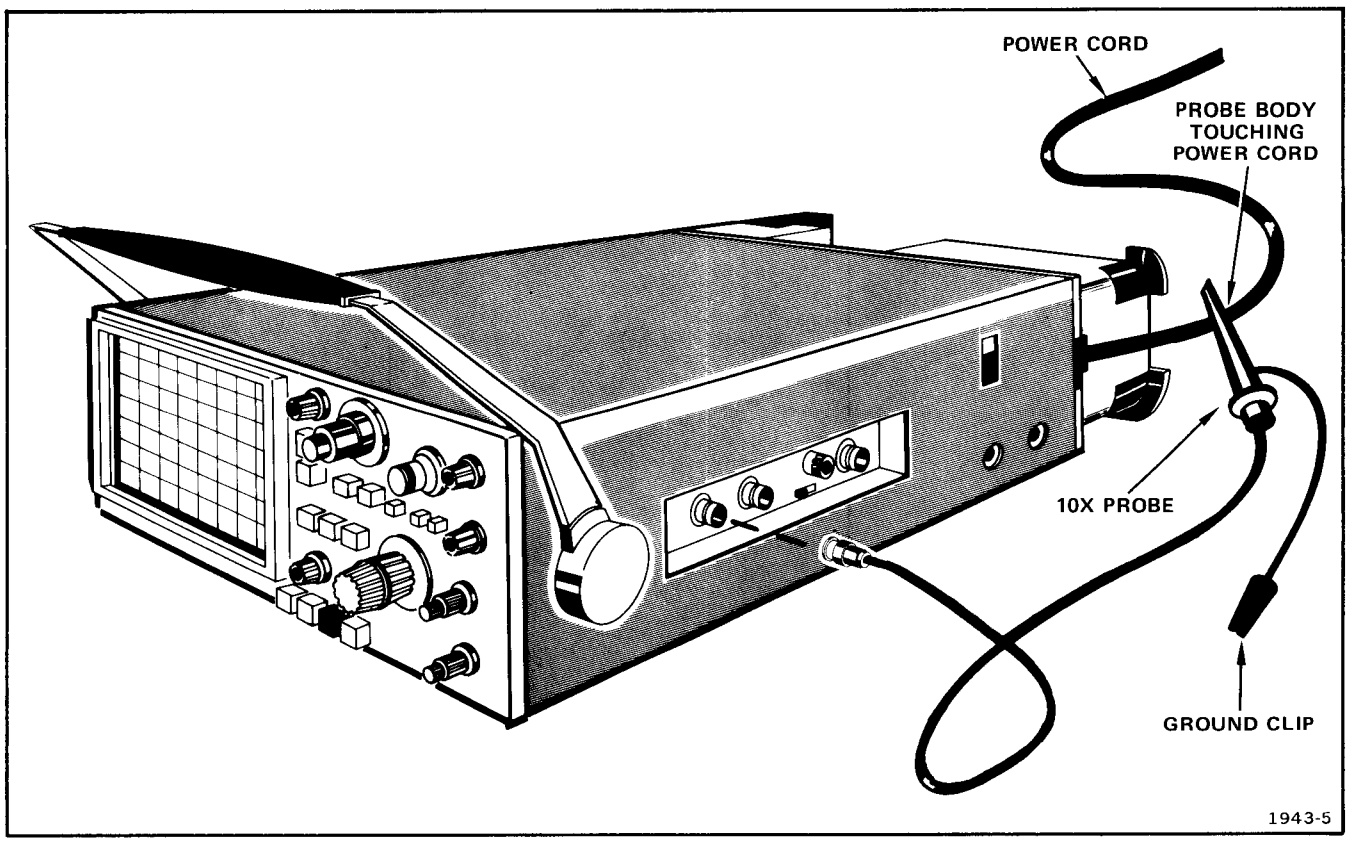


Fig. 5-5. Equipment setup.

C. HORIZONTAL

Equipment Required

1. Time-mark Generator.
2. Amplitude Calibrator.
3. 50 Ω BNC Cable.
4. 50 Ω Termination.

335 Control Settings (*Indicates Change From Previous Step)

NOTE

If you are performing a partial procedure, allow 335 to warm up for 30 minutes before starting Performance Check.

Power and Display

POWER/INTENSITY	POWER—On INTENSITY—As desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

*VOLTS/DIV	*as needed
VARIABLE	CAL
POSITION	Midrange
*CH 1 AC-GND-DC	*DC
*AC-GND-DC	*GND
*DISPLAY	*CH 1
CH 2 INVERT	Button out

Horizontal

HORIZ DISPLAY	A
*A and B SEC/DIV	*.5 m
A CAL	Detent
HORIZ MAG	OUT: X1
DELAY TIME POSITION	Fully counterclockwise
Position	Midrange

Trigger

Trigger Mode	AUTO
A LEVEL	As required
*B (DLY'D) TRIGGER LEVEL	*RUNS AFTER DLY TIME
A and B SLOPE	+
*Coupling	*AC
*Source	*INT—CH 1
A TRIG HOLDOFF	NORM (detent)
*EXT ATTEN	*1X

1. A SEC/DIV Accuracy

a. Connect test equipment as shown in Fig. 5-6.

b. Set CH 1 VOLTS/DIV so display amplitude is about 3 divisions.

c. CHECK—A SEC/DIV accuracy within 3% over center 8 divisions displayed (see Fig. 5-7) using equipment settings given in Table 5-6.

TABLE 5-6

A SEC/DIV Accuracy

A SEC/DIV	Time-Mark Gen.
.2 μ	[2]0.2 μs
.5 μ	0.5 μs
1 μ	1 μs
2 μ	[2]2 μs
5 μ	5 μs
10 μ	10 μs
20 μ	[2]20 μs
50 μ	50 μs
.1 m	0.1 ms
.2 m	[2]0.2 ms
.5 m	0.5 ms
1 m	1 ms
2 m	[2]2 ms
5 m	5 ms
10 m	10 ms
20 m	[2]20 ms
[1]50 m	[1]50 ms
[1].1	[1]0.1 s
[1].2	[1/2]0.2 s
[1].5	[1]0.5 s

[1]Change A Trigger Mode to NORM. Reduce intensity as needed.

[2]If the time-mark generator you are using does not have decade multiples of 2, use decade multiples of 1 and check for 2 time-marks per division.

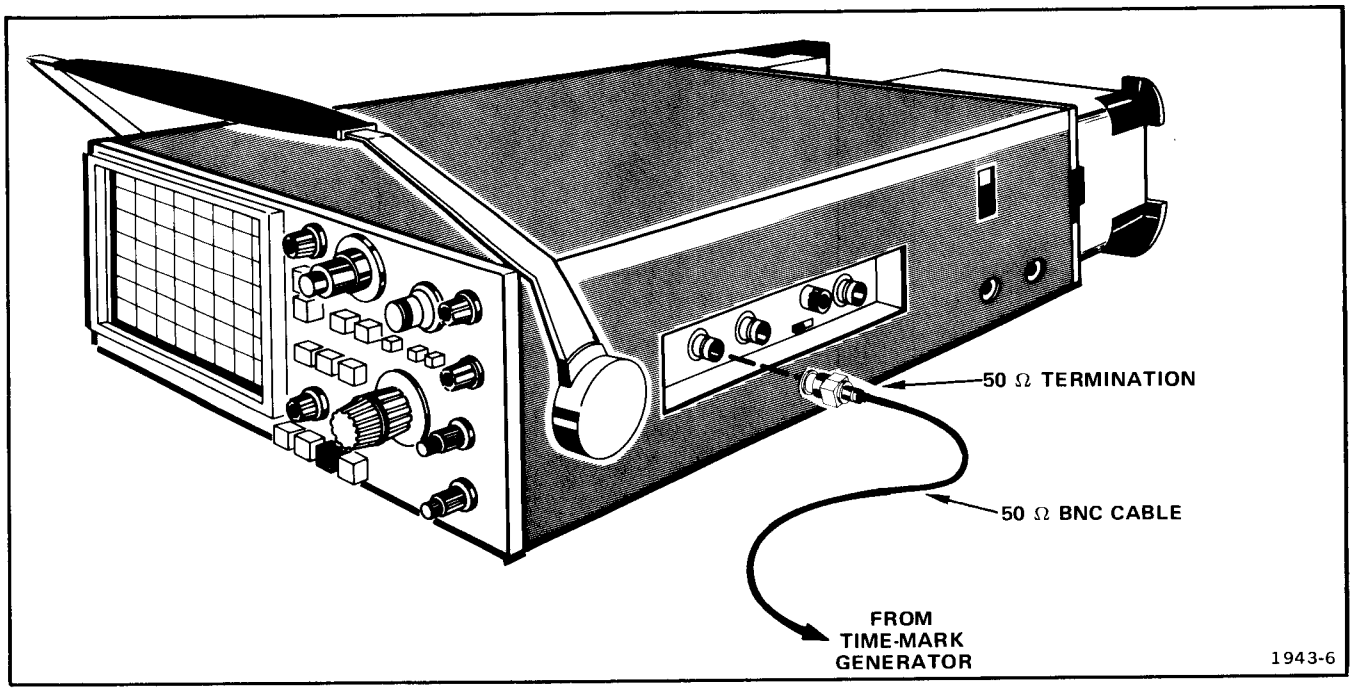


Fig. 5-6. Equipment setup.

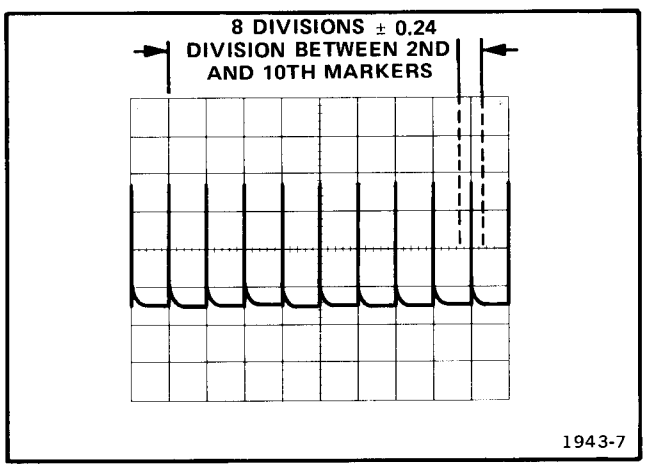


Fig. 5-7. SEC/DIV accuracy.

2. A CAL (Variable) Range

a. Set A SEC/DIV to 1 m.

b. Set generator to 5 ms time marks.

c. Rotate A CAL control fully counterclockwise.

d. CHECK—Distance between time marks is 2 divisions or less.

e. Return A CAL control to detent position.

3. B SEC/DIV Accuracy

a. Set:

HORIZ DISPLAY	B
B LEVEL	RUNS AFTER DLY TIME
A LEVEL	As needed for a stable display
A Trigger Mode	AUTO

b. CHECK—B SEC/DIV accuracy within 3% over center 8 divisions displayed (see Fig. 5-7) using equipment settings given in Table 5-7.

4. A and B Magnified SEC/DIV Accuracy

a. Set:

HORIZ MAG	IN: X10
A Trigger Mode	AUTO

b. CHECK—Magnified B SEC/DIV within 5% (+20° C to +30° C) over center 8 divisions displayed (see Fig. 5-8) using equipment settings given in Table 5-8 (accuracy applied over entire magnified sweep length except as noted in Table 5-8).

c. Set:

HORIZ DISPLAY	A
A Trigger Mode	AUTO

TABLE 5-7

B SEC/DIV Accuracy

A SEC/DIV	B SEC/DIV	Time-Mark Gen.
.5 μ	.2 μ	[2]0.2 μs
1 μ	.5 μ	0.5 μs
2 μ	1 μ	1 μs
5 μ	2 μ	[2]2 μs
10 μ	5 μ	5 μs
20 μ	10 μ	10 μs
50 μ	20 μ	[2]20 μs
.1 m	50 μ	50 μs
.2 m	.1 m	0.1 ms
.5 m	.2 m	[2]0.2 ms
1 m	.5 m	0.5 ms
2 m	1 m	1 ms
5 m	2 m	[2]2 ms
10 m	5 m	5 ms
20 m	10 m	10 ms
[1]50 m	[1]20 m	[1/2]20 ms
[1]100 m	[1]50 m	[1]50 ms

[1]Change A TRIG MODE to NORM if needed.

[2]If the time-mark generator you are using does not have time-marks which are decade multiples of 2, use decade multiples of 1 and check for 2 time-marks per division.

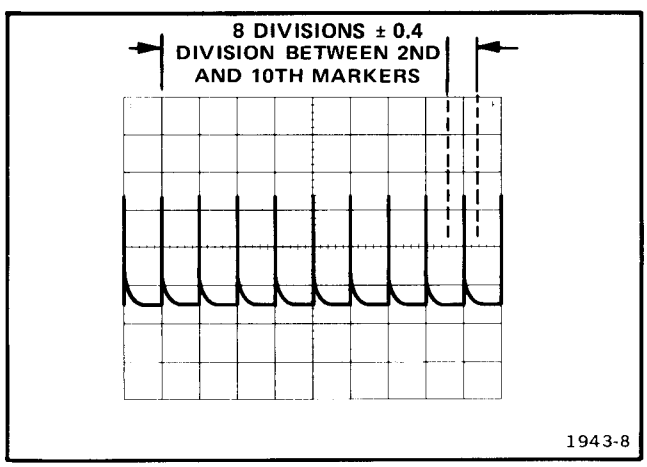


Fig. 5-8. Magnified SEC/DIV accuracy.

d. CHECK—Magnified A SEC/DIV within 5% (+20°C to +30°C) over center 8 divisions displayed (see Fig. 5-8) using equipment settings given in Table 5-8 (accuracy applies over entire magnified sweep length except as noted in Table 5-8).

TABLE 5-8

Magnified A and B SEC/DIV Accuracy

A and B SEC/DIV	Time-Mark Generator	Portions of Total Sweep Length Excluded From Measurement
.2 μ	[2]20 ns	Exclude the first 10 div and all the divisions past 90 div.
.5 μ	50 ns	
1 μ	.1 μs	
2 μ	[2].2 μs	
5 μ	.5 μs	
10 μ	1 μs	
20 μ	[2]2 μs	
50 μ	5 μs	
.1 m	10 μs	
.2 m	[2]20 μs	
.5 m	50 μs	
1 m	.1 ms	
2 m	[2].2 ms	none
5 m	.5 ms	
10 m	1 ms	
20 m	[2]2 ms	
[1]50 m	5 ms	
A SWEEP ONLY		
[1].1	10 ms	none
[1].2	[2]20 ms	
[1].5	50 ms	

[1]Set Trigger Mode to NORM.

[2]If the time-mark generator you are using does not have time-marks which are decade multiples of 2, use multiples of 1 and check for 2 time-marks per division.

5. Differential Time Measurement Accuracy

a. Set:

HORIZ DISPLAY	B
B LEVEL	RUNS AFTER DLY TIME
A Trigger Mode	AUTO

b. Set A and B SEC/DIV and time-mark generator to settings given in Table 5-9.

c. Set DELAY TIME POSITION dial (DTP dial) to 1.00.

d. Adjust Horizontal Position control so top of first displayed time-mark crosses the center vertical graticule line. If the top of the time-mark is not visible, slightly readjust the DTP dial until the top of the time-mark is visible and note the DTP dial setting.

NOTE

If the time-mark generator you are using has time-marks which are decade multiples of 2, use the B SEC/DIV and Time-Mark generator settings given in parenthesis.

TABLE 5-9

Differential Time-Measurement Accuracy

A SEC/DIV	B SEC/DIV	Time-Mark Generator
2 μ	.2 μ	1 μs (2 μs)
5 μ	.5 μ	5 μs
10 μ	1 μ	10 μs
20 μ	1 μ (2 μ)	10 μs (20 μs)
50 μ	5 μ	50 μs
.1 m	10 μ	.1 ms
.2 m	10 μ (20 μ)	.1 ms (0.2 ms)
.5 m	50 μ	.5 ms
1 m	.1 m	1 ms
2 m	.1 m (.2 m)	1 ms (2 ms)
5 m	.5 m	5 ms
10 m	1 m	10 ms
20 m	1 m (2 m)	10 ms (20 ms)
[1]50 m	[1]5 m	50 ms
[1].1 m	[1]10 m	0.1 s
[1].2	[1]10 m (20 m)	0.1 s (0.2 s)
[1].5	[1]50 m	0.5 s

[1]**Set Trigger Mode to normal.**

e. Set DTP dial to 9.00. Slightly readjust DTP dial until the top of the displayed time-mark crosses the center vertical graticule line.

f. CHECK—DTP dial setting is 7.84 to 8.16 plus the setting in step d.

Examples:

If DTP dial setting in step d was 1.00 then DTP dial setting in step f must be between 8.84 and 9.16;

or

If DTP dial setting in step d was 1.10 then DTP dial setting in step f must be between 8.94 and 9.26.

6. Delay Jitter

a. Set:

A SEC/DIV	1 m
B SEC/DIV	0.5 μ
DELAY TIME POSITION	1.00
HORIZ DISPLAY	A
A SLOPE	+

b. Set time-mark generator for 1 ms markers.

c. Set HORIZ DISPLAY to B.

d. Slightly readjust the DTP dial to locate a time-mark within the graticule area.

e. CHECK—Horizontal jitter is 1 division or less.

f. Set DTP dial to 9.00.

g. Slightly readjust DTP dial to locate a time-mark within the graticule area.

h. CHECK—Horizontal jitter is 1 division or less.

i. Disconnect test equipment.

7. A TRIG HOLDOFF Range

NOTE

This check is an approximation. An exact check requires removal of instrument cover and use of a test oscilloscope. If you wish to make an exact check, see the Calibration Procedure.

a. Set:

A SEC/DIV	1 m
A Trigger Mode	AUTO
A TRIG HOLDOFF	NORM (detent)
A Trigger LEVEL	Clockwise

b. CHECK—Trace flickers rapidly.

c. Set:

A TRIG HOLDOFF	Fully clockwise

d. CHECK—Trace flickers more slowly (about 15 sweeps every 10 seconds).

e. Set A TRIG HOLDOFF to detent.

8. Chopped Mode Repetition Rate

a. Set:

A SEC/DIV	1 μ
Trigger Source	COMP
DISPLAY	CHOP

b. Vertically position the two traces about three or four divisions apart.

c. Adjust A Trigger LEVEL for a stable display.

d. CHECK—Duration of one cycle is about 3.3 μs (see Fig. 5-9).

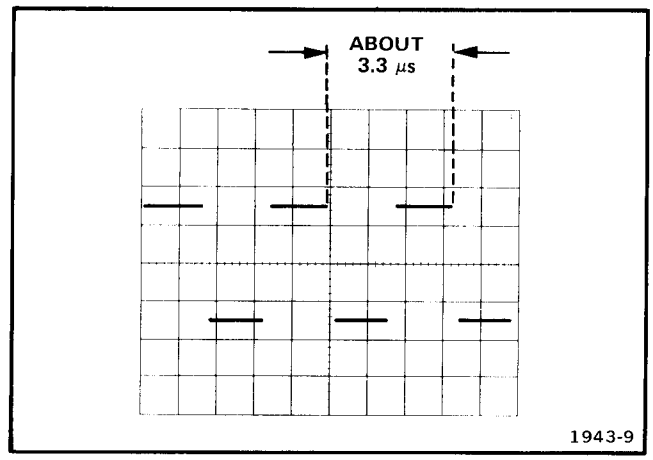


Fig. 5-9. Chopped waveform.

9. External Horizontal Sensitivity

a. Connect equipment to EXT TRIG or HORIZ INPUT as shown in Fig. 5-10.

CAUTION

Reduce display intensity in X-Y mode. A bright stationary dot may damage crt phosphor.

b. Set:

A SEC/DIV	EXT HORIZ
Trigger Source	EXT
EXT ATTEN	1X

c. Set amplitude calibrator output to 1 volt.

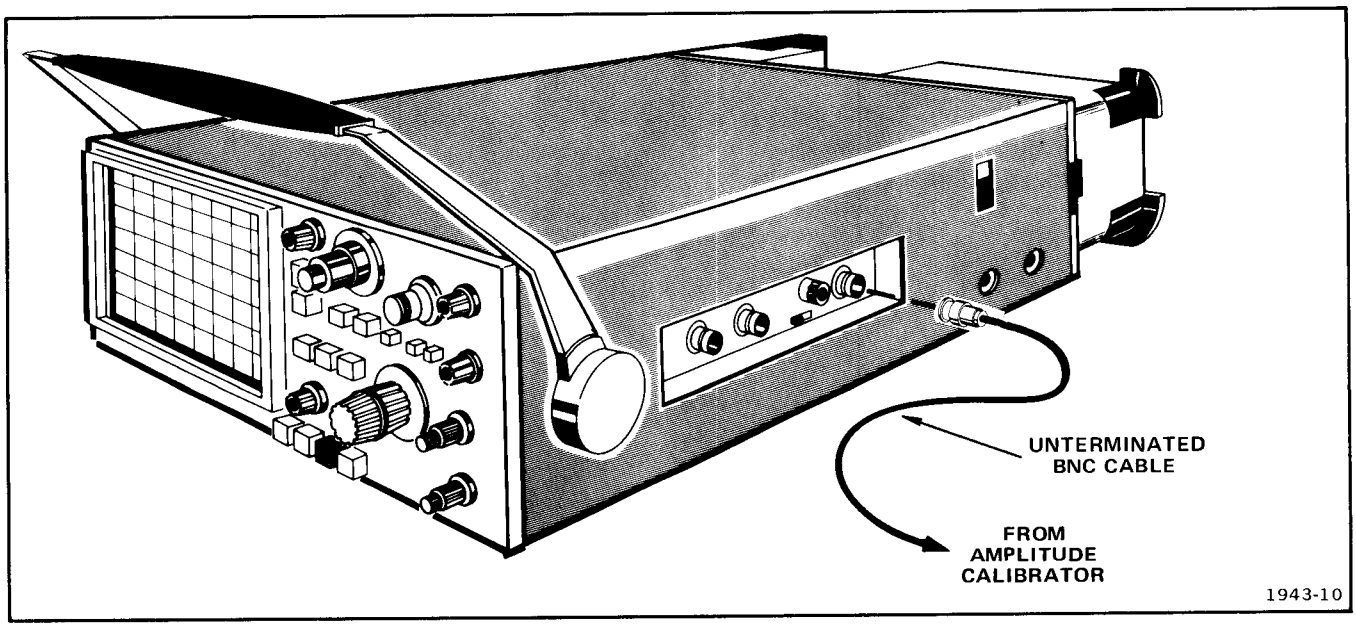


Fig. 5-10. Equipment setup.

d. CHECK—Display is a pair of dots, separated horizontally by approximately 5 divisions.

e. Set EXT ATTEN to 10X.

f. Set generator output to 10 volts.

g. CHECK—Display is a pair of dots, horizontally separated by approximately 5 divisions.

D. EXTERNAL BLANKING AND CALIBRATOR

Equipment Required

1. Leveled sine-wave generator.
2. Amplitude Calibrator.
3. Time-mark Generator.
4. 10X Probe (supplied with 335).
5. 50 Ω BNC Cable.
6. 50 Ω BNC Termination.
7. 50 Ω BNC T Connector.
8. BNC-to-Banana Patch Cord.

335 Control Settings (*Indicates Change From Previous Step)

NOTE

If you are performing a partial procedure, allow 335 to warm up for 30 minutes before starting Performance Check.

Power and Display

POWER/INTENSITY	POWER—On INTENSITY—As desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

*VOLTS/DIV	*10 m
VARIABLE	CAL
POSITION	Midrange
AC-GND-DC	GND
DISPLAY	CH 1
CH 2 INVERT	Button out

Horizontal

HORIZ DISPLAY	A
A and B SEC/DIV	1 m
A CAL	Detent
HORIZ MAG	OUT: X1
DELAY TIME POSITION	Fully cw
Position	Midrange

Trigger

Trigger Mode	AUTO
A LEVEL	Clockwise
B (DLY'D) TRIGGER LEVEL	RUNS AFTER DLY TIME
A and B SLOPE	+
Coupling	AC
Source	EXT
A TRIG HOLDOFF	NORM (detent)
*EXT ATTEN	*1X

1. External Blanking Sensitivity

a. Connect equipment to EXT TRIG or HORIZ INPUT connector and EXT BLANK connector as shown in Fig. 5-11.

b. Set amplitude calibrator amplitude to 5 volts.

c. CHECK—Intensity modulation visible at normal INTENSITY setting (adjust A LEVEL as needed for a stable display).

d. Disconnect equipment.

2. .5 V CAL OUT (Calibrator) Frequency Accuracy

a. Connect test equipment as shown in Fig. 5-12 and set Time-Mark Generator to 1 ms.

NOTE

Be certain your probe is properly compensated. See operator adjustments and checks in Section 2 of this manual.

b. Set:

HORIZ DISPLAY	A INTEN
B LEVEL	RUNS AFTER DLY TIME
A SLOPE	+
Trigger Source	INT-COMP
DISPLAY	ALT
Trigger Coupling	LF REJ
A SEC/DIV	.5 m
B SEC/DIV	50 μ
CH 1 VOLTS/DIV	20 m
CH 2 VOLTS/DIV	.5
A LEVEL	Carefully adjusted so both waveforms are stable.

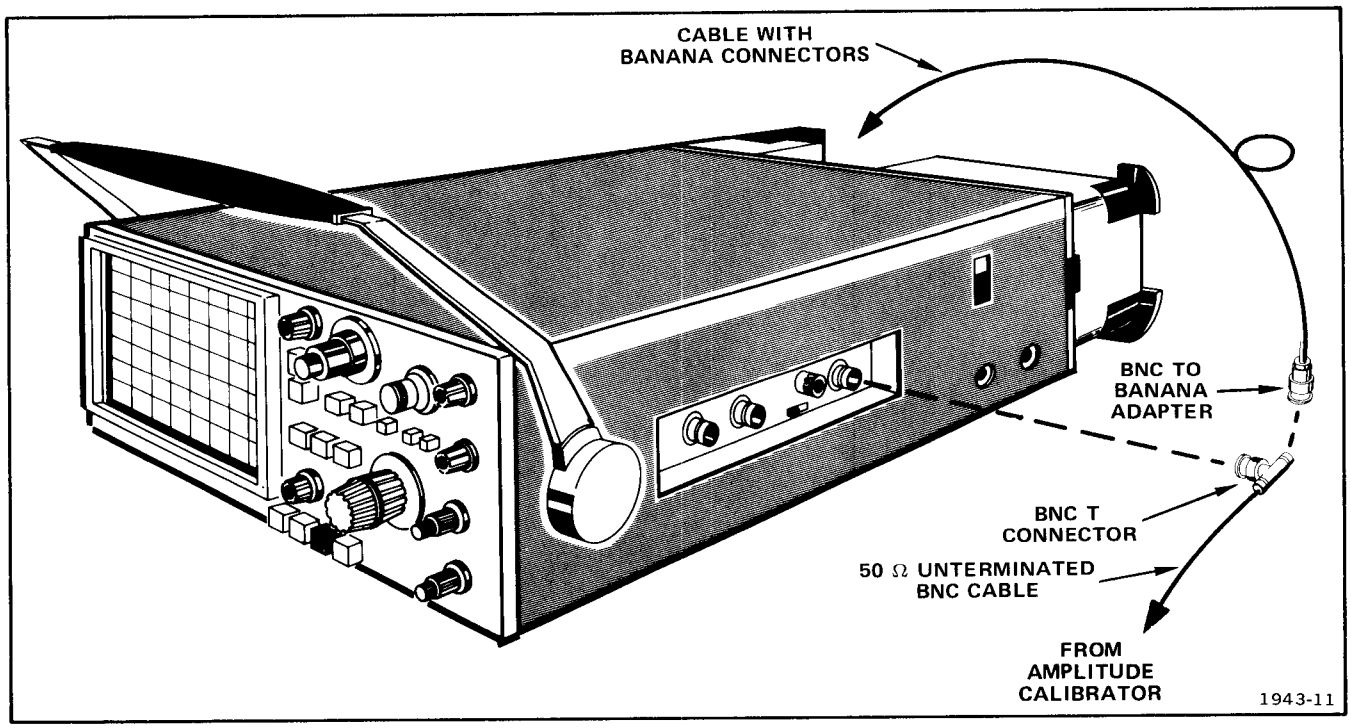


Fig. 5-11. Equipment setup.

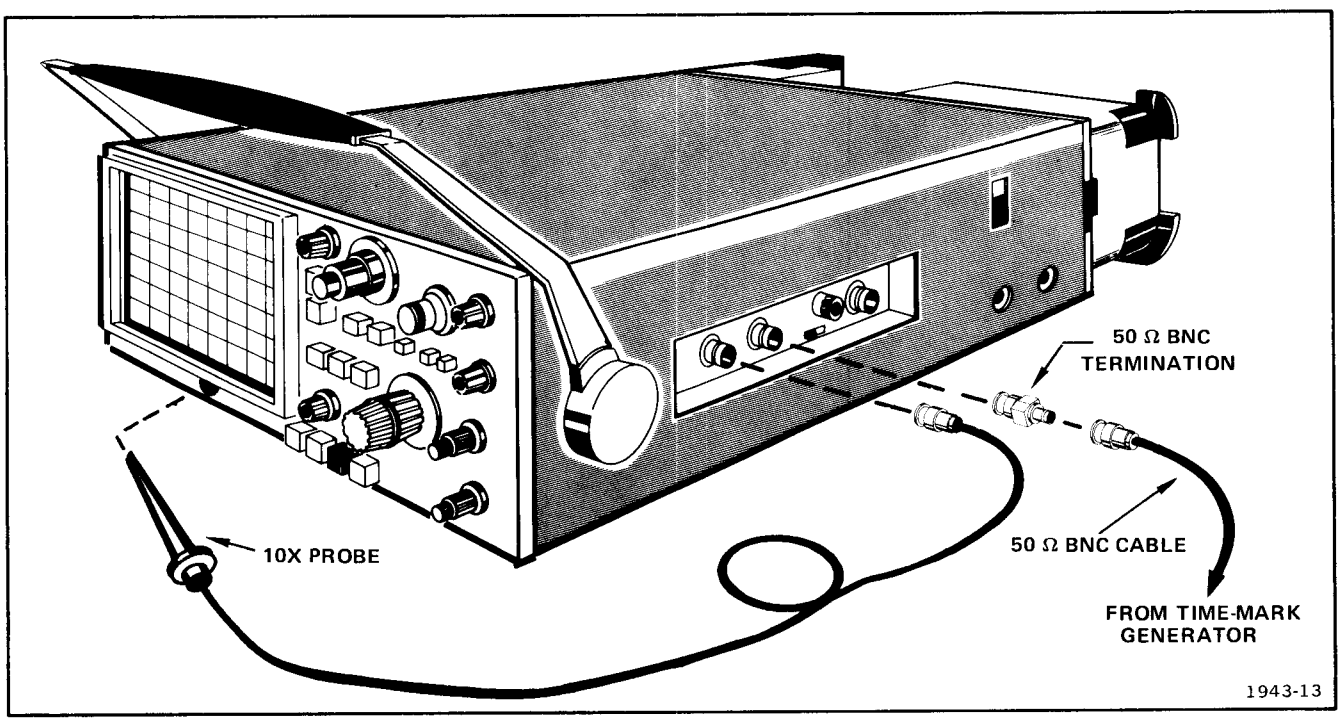


Fig. 5-12. Equipment setup.

c. CHECK—Approximately 1 cycle of calibrator waveform per time-mark (see Fig. 5-13).

d. Adjust DTP dial so 6th time-mark is intensified (see Fig. 5-14).

e. Set HORIZ DISPLAY to B.

f. Adjust DTP dial so time-marker and Calibrator waveforms are visible (see Fig. 5-14).

g. CHECK—Horizontal difference between rising portion of time-mark and rising portion of Calibrator waveform is 2 divisions or less (see Fig. 5-14).

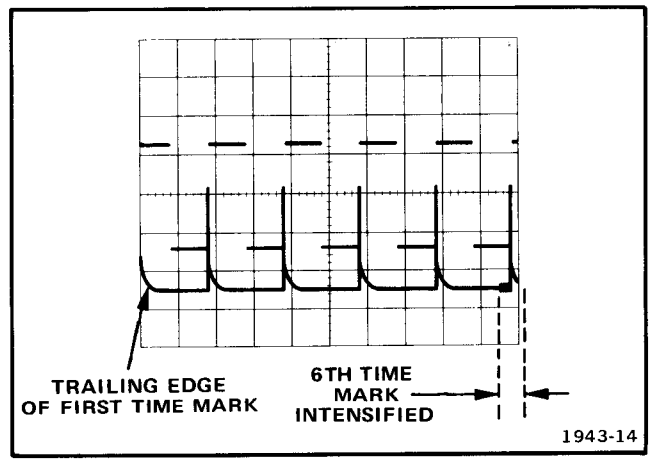


Fig. 5-13. Rough calibrator frequency check.

3. Calibrator Approximate Amplitude

a. Set:

HORIZ MAG	X1
Trigger Source	INT—CH 1
DISPLAY	CH 1
CH 1 VOLTS/DIV	10 m

b. CHECK—Display amplitude is 5 divisions. If you wish to make a more accurate check, see the Adjustment Procedure.

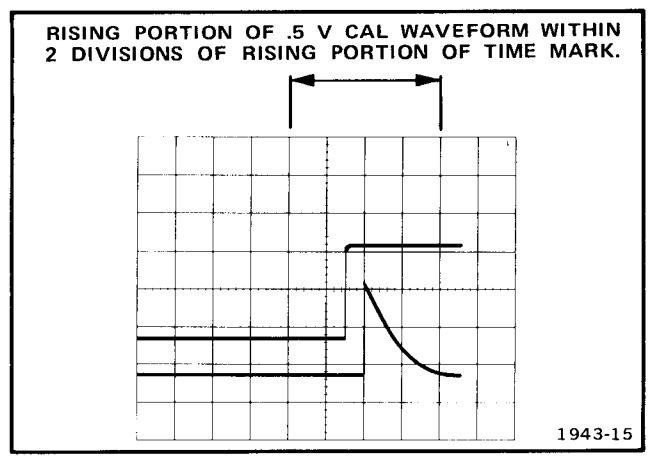


Fig. 5-14. Calibrator frequency check (B sweep display).

ADJUSTMENT PROCEDURE

INTRODUCTION

Purpose

This is an adjustment procedure only. It does not check all instrument specifications. For instance, vertical gain is only checked at the VOLTS/DIV settings where it is adjusted (1 m and 10 m). If the 335 operates normally, performance of an adjustment procedure will ensure optimum operation. If you wish to verify all instrument specifications after performing an adjustment procedure, perform a Performance Check (Section 5 of this manual).

Calibration Interval

To ensure measurement accuracy, check the calibration of the 335 every thousand hours of operation or every six months if used infrequently.

Limits and Tolerances

All limits and tolerances given in this procedure are calibration guides and should not be interpreted as instrument specifications unless they are also found in the Specification section of this manual (Section 1).

All limits and tolerances given are for the 335 under test and do not include test equipment error.

All limits and tolerances given are for an ambient temperature of +20° C to +30° C.

Partial Procedures

If one aspect of the 335 measurement capability is critical to your application, you may wish to perform a partial adjustment procedure at intervals more frequent than 1000 hours. Also, if you have replaced components you should check the adjustment of the circuit repaired. To make partial procedures easier to perform, the adjustment procedure is divided into several sections, each of which stands alone. An equipment required list and setup instructions are given at the beginning of each section.

Cabinet Removal

Performance of the adjustment procedure requires removal of the instrument cover.

Dangerous potentials exist at several points throughout this instrument. When the instrument is operated with the cover removed, do not touch exposed connections or components. Some transistors may have elevated cases. Disconnect power before cleaning the instrument or replacing parts.

To remove the wrap-around cabinet, use the following procedure:

1. Loosen the four screws holding the cabinet feet (cord wrap) and remove the cord-wrap feet (see Fig. 6-1).

2. Remove the grey-plastic rear cover.

3. Loosen (do not remove) the two screws holding the power cord strain relief (115/230 V ac selector switch mounting) and slide the strain relief toward instrument center.

4. Remove two screws below the connector panel on the right side of the cabinet.

5. Remove two screws from the cabinet bottom.

6. Position the handle to clear the instrument and slide the cabinet off the rear of the instrument.

7. To replace the cabinet, reverse the removal procedure. Be sure the power cord does not become looped through the side-panel cutout.

Equipment Required

The equipment required to perform the complete adjustment procedure is listed in Table 6-1. Test equipment is named by the functional description rather than by specific front panel nomenclature.

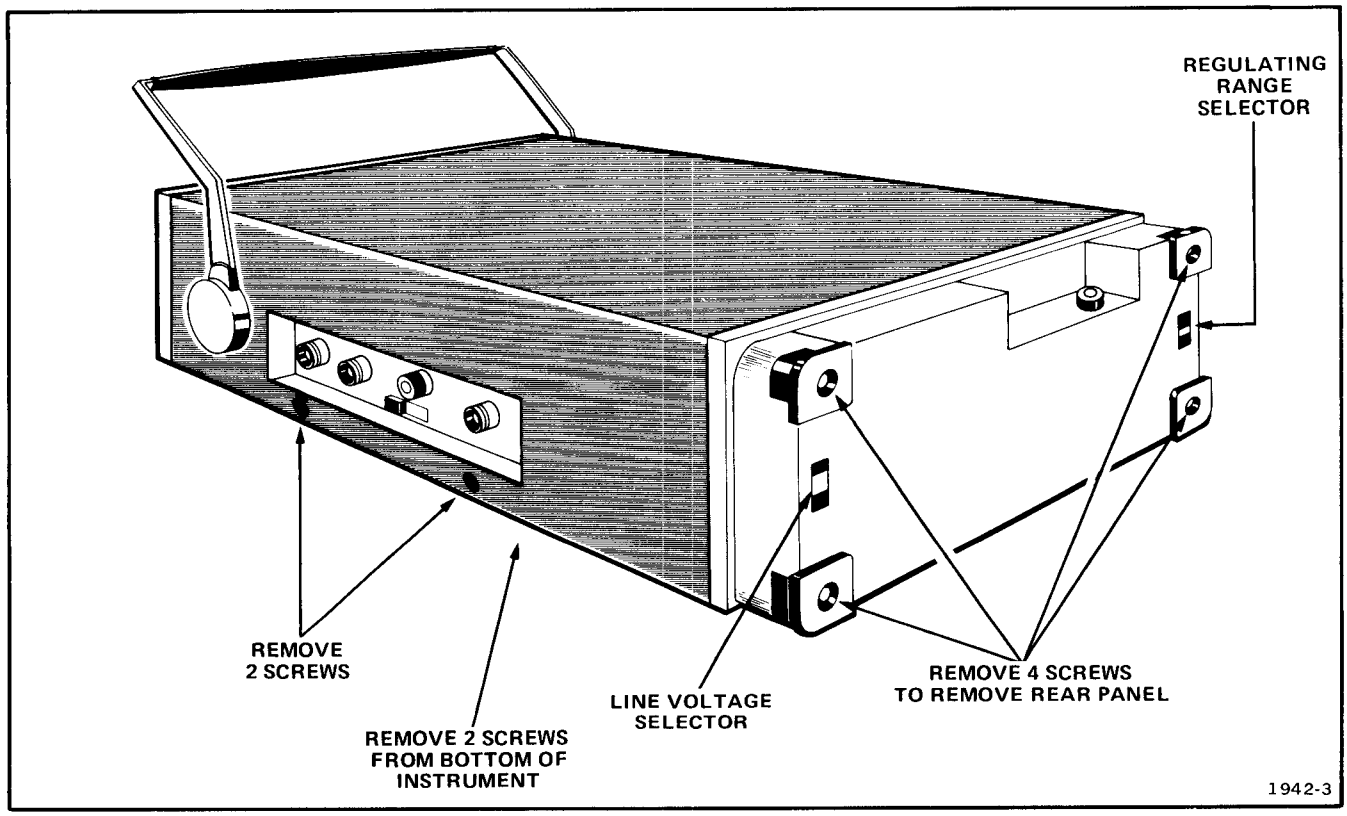


Fig. 6-1. Cabinet removal.

TABLE 6-1

Test Equipment

Description	Minimum Specifications	Usage	Examples of Applicable Test Equipment
1. Dc Voltmeter[2]	Calibrated for <1% error at −2030 V and −1960 V; Input impedance, 100 MΩ or greater.	High-voltage supply.	A. Triplett Model 630 NA. B. Simpson Model 262.
2. Digital Voltmeter[2]	Range, 0 to at least 15.000 V; Accuracy, ±0.15%; Display, 4-1/2 digits.	+15 volts supply. Calibrator amplitude.	A. Tektronix DM 501 Digital Multimeter.[1] B. Any digital voltmeter which meets minimum specifications.
3. Time-Mark Generator	Markers, 20 ns to 0.5 s; marker accuracy, ±0.1%.	Focus and astigmatism. Geometry. Timing.	A. Tektronix TG 501 Time Mark Generator.[1] B. Tektronix 2901 Time Mark Generator.

[1]**Requires a TM 500 series power module.**

[2]**Used for calibration only; NOT used for performance check.**

TABLE 6-1 (cont)

Description	Minimum Specifications	Usage	Examples of Applicable Test Equipment
4. Test oscilloscope, with 10X probe	Vertical deflection factor, 5 mV to 10 V/DIV; Sweep rate, 5 s to 5 μs/DIV; Bandwidth, dc to at least 4 MHz.	EXT HORIZ compensation. A TRIG HOLDOFF range.	A. Sony-Tektronix 335 Oscilloscope with included 10X probe. B. Sony-Tektronix 323 Oscilloscope with included 10X probe.
5. Dc Power Supply[2]	Output voltage, 20 to 24 V adjustable to 21.8; maximum current, 1 A.	Power supply turnoff.	
6. Leveled Sine-wave Generator	Frequency, 350 kHz to above 35 MHz; output amplitude, 0.5 V, p-p to above 4 V p-p; reference frequency, 50 kHz; amplitude accuracy, constant within 3% of output frefrequency is changed.	Vertical output amplifier bias. Vertical system frequency response. Triggering.	A. Tektronix SG 503 Leveled Sine-wave Generator.[1] B. Tektronix Type 191 Constant Amplitude Signal Generator.
7. Amplitude Calibrator	Amplitude accuracy, within 0.25%; signal amplitude 5 mV to 50 V; output, 1 kHz square wave.	Vertical gain. X Gain. EXT HORIZ compensation.	A. Tektronix PG 506 Calibration Generator.[1] B. Tektronix 067-0502-01 Calibration Fixture.
8. Square-wave Generator	Repetition rate, 1 kHz to 100 kHz; risetime from fast-rise output, 1 ns or less; amplitude from fast-rise output, to at least 0.5 V; amplitude from hi-amplitude output, to at least 2 V.	VOLTS/DIV compensation. Transient response.	A. Tektronix PG 506 Calibration Generator.[1] B. Tektronix Type 106 Square-wave Generator.
9. Cables (2 required)	Connectors, banana plugs.	Dc power connection.	012-0039-00 (Black). 012-0031-00 (Red).
10. Cable	Connector, BNC; length, 42 inches; impedance	Signal interconnection.	A. Tektronix Part No. 012-0057-01.
11. T Connector	Connectors, 2 BNC female to 1 BNC Male.	Signal interconnection.	A. Tektronix Part No. 103-0030-00.
12. Dual-input Coupler (2 required)	Connectors, 2 BNC male to 1 BNC Female.	Signal interconnection.	A. Tektronix Part No. 067-0525-01.

TABLE 6-1 (cont)

Description	Minimum Specifications	Usage	Examples of Applicable Test Equipment
13. 5X Attenuator	Ratio, 5:1; impedance, 50 Ω; connectors, BNC.	Signal Attenuation.	A. Tektronix Part No. 011-0060-02.
14. 10X Attenuator	Ratio, 10:1; impedance, 50 Ω; connectors, BNC.	Signal Attenuation.	A. Tektronix Part No. 011-0059-02.
15. Termination	Impedance, 50 Ω; connectors, BNC.	Signal termination.	A. Tektronix Part No. 011-0049-01.
16. BNC-to-banana adapter	Connectors, BNC male to banana Female.	External Blanking.	Tektronix Part No. 103-0033-00.
17. BNC to probe tip adapter	Connectors, BNC male to probe tip.	VOLTS/DIV compensation	Tektronix Part No. 013-0084-01.
18. Calibration shield		Adjusting attenuator compensation.	Tektronix Part No. 067-0749-00.

INDEX TO ADJUSTMENT PROCEDURE

A. POWER SUPPLY AND DISPLAY

Equipment Required

1. Dc Voltmeter.
2. Digital Voltmeter.
3. Test oscilloscope.
4. X10 Probe.
5. Time-mark generator.
6. Dc power supply.
7. Cables (2) with banana plugs for connecting dc power supply.
8. 50 Ω BNC cable.
9. 50 Ω BNC termination.

Refer to Adjustment Locations pullout pages in diagrams section for adjustment and test point (TP) locations.

335 Control Settings

NOTE

Allow 335 to warm up for 30 minutes before starting adjustment procedure.

Power and Display

POWER/INTENSITY	POWER-on INTENSITY-ccw
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

VOLTS/DIV	10 m
VARIABLE	CAL
POSITION	Midrange
AC-GND-DC	GND
DISPLAY	CH 1
CH 2 INVERT	Out

Horizontal

HORIZ DISPLAY	A
A and B SEC/DIV	1 m
A CAL	Detent
HORIZ MAG	X1
DELAY TIME POSITION	ccw
Position	Midrange

Trigger

Mode	AUTO
A LEVEL	cw
B LEVEL	RUNS AFTER DLY TIME
A and B SLOPE	+
Coupling	AC
Source	INT-CH 1
A TRIG HOLDOFF	NORM
EXT ATTEN	1X

NOTE

If problems are encountered in Steps 1 through 3 after V1270 crt has been replaced, refer to R1218A selection in Corrective Maintenance.

1. −2030 Volts

a. Set:

POWER	OFF
Power Source Selector	22 V — 28 V

b. Connect dc power supply and digital voltmeter to 335 as shown in Fig. 6-2.

c. Set dc power supply for a digital voltmeter reading of 24.00 volts.

d. Connect shorting strap between TP1250 and ground.

e. Turn 335 POWER on.

f. Connect + lead of dc voltmeter to ground and − lead to TP1270.

g. ADJUST—R1009 for a dc voltmeter reading of 2030 volts.

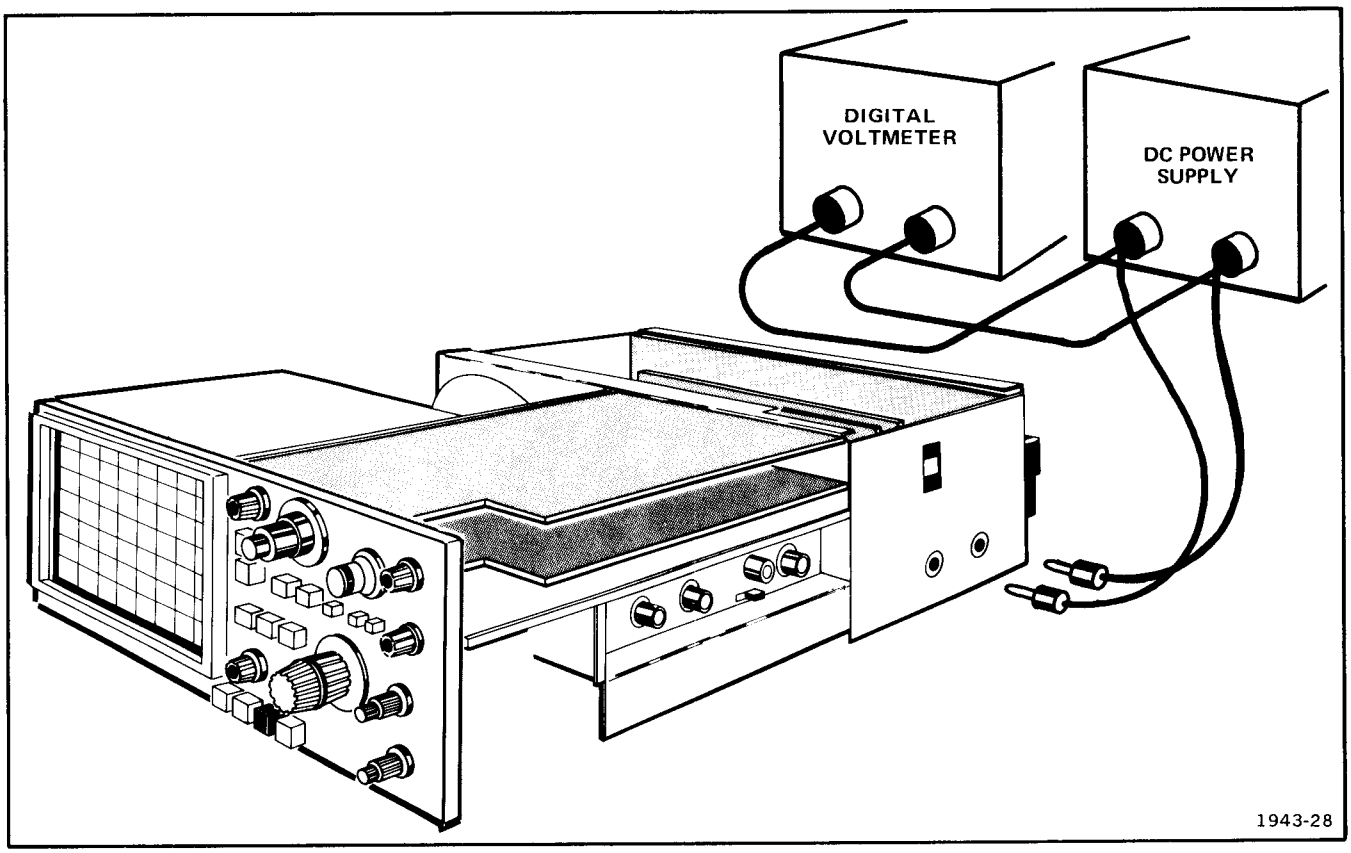


Fig. 6-2. Equipment setup.

h. Turn 335 POWER off.

i. Remove shorting strap. Leave dc voltmeter connected to TP1270.

j. Turn 335 POWER on.

2. +15 Volts

a. Disconnect digital voltmeter from dc power supply and connect between +15 volt test point and ground.

b. ADJUST—R1080 for a digital voltmeter reading of 15.00 volts.

c. Disconnect digital voltmeter from 335 and reconnect to dc power supply.

3. −1960 Volts

a. ADJUST—R1261 for a dc voltmeter reading of −1960 volts.

b. Disconnect dc voltmeter.

4. Power Supply Turnoff Level

a. Set:

POWER	OFF
Power Source	11 V to 14 V

b. Connect voltmeter across EXT DC connector.

c. Set dc power supply to 10.9 volts.

d. Turn on POWER.

e. ADJUST—R1005 very slowly until 335 turns off (trace disappears) and LOW LINE blinks.

f. Turn 335 POWER off and set Power Source selector to 22-28 V.

g. Set dc power supply to 24 V and turn POWER on.

h. Slowly decrease dc supply voltage until the 335 turns off and LOW LINE blinks. Check that the supply voltage is between 21.2 V and 22.0 V.

i. Disconnect test equipment.

5. Crt Grid Bias

a. Set:

Power Source Selector	AC
POWER	On
A SEC/DIV	EXT HORIZ

b. Connect dc voltmeter between TP1442 and ground.

c. Adjust INTENSITY for a dc voltmeter reading of 15 volts.

d. ADJUST—R1208 for no visible dot on crt, then readjust R1208 until dot just becomes visible.

e. Set INTENSITY fully ccw.

WARNING

TP1226 and TP1270 are both elevated to approximately −1960 V. Use of a dc voltmeter not capable of such voltage may cause equipment damage and personal injury.

f. Connect dc voltmeter between TP1226 and TP1270. Note meter reading.

g. Set INTENSITY fully cw. Note dc voltmeter reading.

h. CHECK—Meter reading in step 5 part g is 0.34 volt or less greater than dc voltmeter reading noted in step 5 part f.

i. ADJUST—If the difference in the dc voltmeter reading is greater than 0.34 volt, slightly readjust R1208 to limit voltage change to 0.34 volt.

j. Disconnect dc voltmeter.

6. Trace Rotation

a. Set:

INTENSITY	Visible display
HORIZ DISPLAY	A
A and B SEC/DIV	1 m

b. Vertically and horizontally center trace.

c. ADJUST—R1275 to make trace parallel with center horizontal graticule line.

7. Z-Axis Compensation

a. Set:

SEC/DIV	2 μ
INTENSITY	Low intensity display

b. ADJUST—C1434 so dot at beginning of trace is slightly brighter than rest of trace.

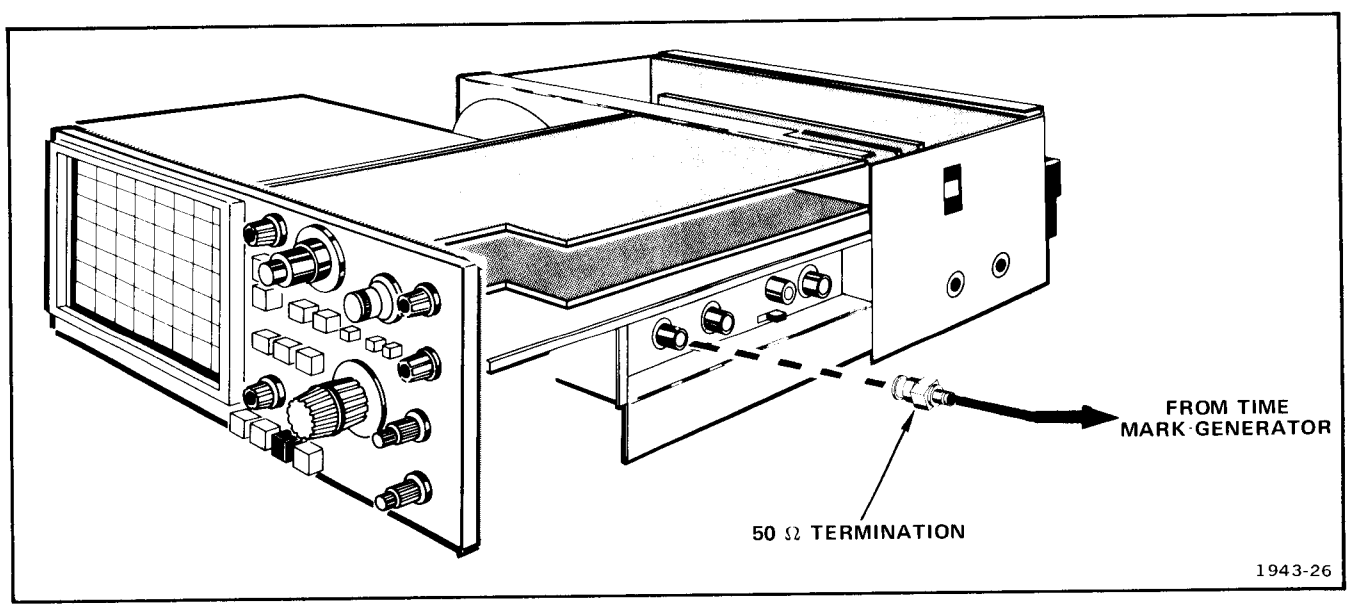


Fig. 6-3. Equipment setup.

8. FOCUS and Astigmatism

a. Set:

CH1 VOLTS/DIV	.5
SEC/DIV	1 m
INTENSITY	For a low intensity display
CH1 AC-GND-DC	DC

b. Connect test equipment to CH 1 VERT INPUT connector as shown in Fig. 6-3.

c. Set time mark generator for 1 ms markers.

d. Adjust INTENSITY for low-intensity display.

e. ADJUST-FOCUS (front panel) and R1271 (astigmatism) for best defined display.

9. Geometry

a. Set:

SEC/DIV	.5 m
VOLTS/DIV	.1

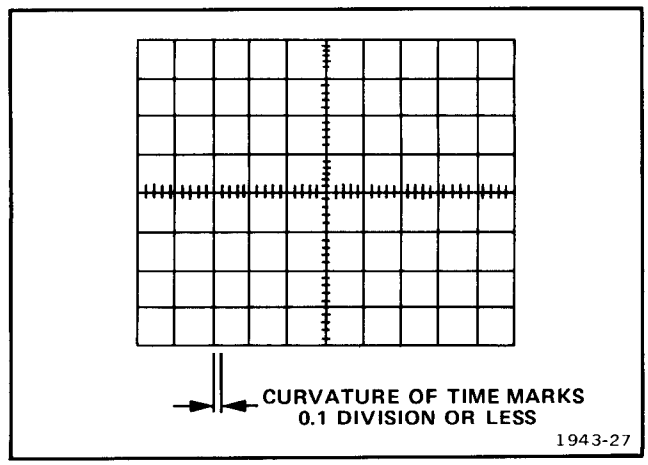


Fig. 6-4. Geometry.

b. Adjust A CAL control for exactly 1 marker per graticule division.

c. ADJUST—R1273 for minimum curvature of time marks (see Fig. 6-4).

d. Disconnect test equipment.

B. VERTICAL

Equipment Required

1. Leveled sine-wave generator.
2. Amplitude calibrator.
3. Square-wave generator.
4. 50 Ω BNC cable.
5. 50 Ω BNC termination.
6. 5X BNC attenuator.
7. 10X BNC attenuator.
8. 10X probe.
9. BNC to probe tip adapter.
10. Calibration shield.

Refer to Adjustment Locations pullout pages in diagrams section for adjustment and test point (TP) locations.

335 Control Settings (*Indicates Change From Previous Step)

NOTE

Allow 335 to warm up 30 minutes before starting adjustment procedure.

Power and Display

*POWER/INTENSITY	POWER-on INTENSITY-as desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

*VOLTS/DIV	10 m
*VARIABLE	CAL
POSITION	Midrange
CH 1 AC-GND-DC	DC
CH 2 AC-GND-DC	GND
DISPLAY	CH 1
CH 2 INVERT	Out

Horizontal

HORIZ DISPLAY	A
A and B SEC/DIV	1 m
*A CAL	Detent
HORIZ MAG	X1
DELAY TIME POSITION	ccw
Position	Midrange

Trigger

Mode	AUTO
A LEVEL	cw
B LEVEL	RUNS AFTER DELAY TIME
A and B SLOPE	+
Coupling	AC
Source	INT — CH 1
A TRIG HOLDOFF	NORM
EXT ATTEN	1X

1A. ADD Mode Balance (SN 303391—up)

a. Set CH 1 and CH 2 AC-GND-DC to GND.

b. Preset R367A to physical midrange (see Adjustment Locations).

c. Press DISPLAY ALT button in, and with no signal applied, use CH 1 and CH 2 POSITION controls to superimpose both traces at the center horizontal graticule line.

d. Leave the ALT button in, and also press the CHOP button in to select ADD mode. Note position of trace on crt graticule, then release CHOP button to return to ALT mode.

e. ADJUST—R367A ADD Mode Balance to position the superimposed traces to the same point on the graticule where trace was noted in part d ADD mode operation.

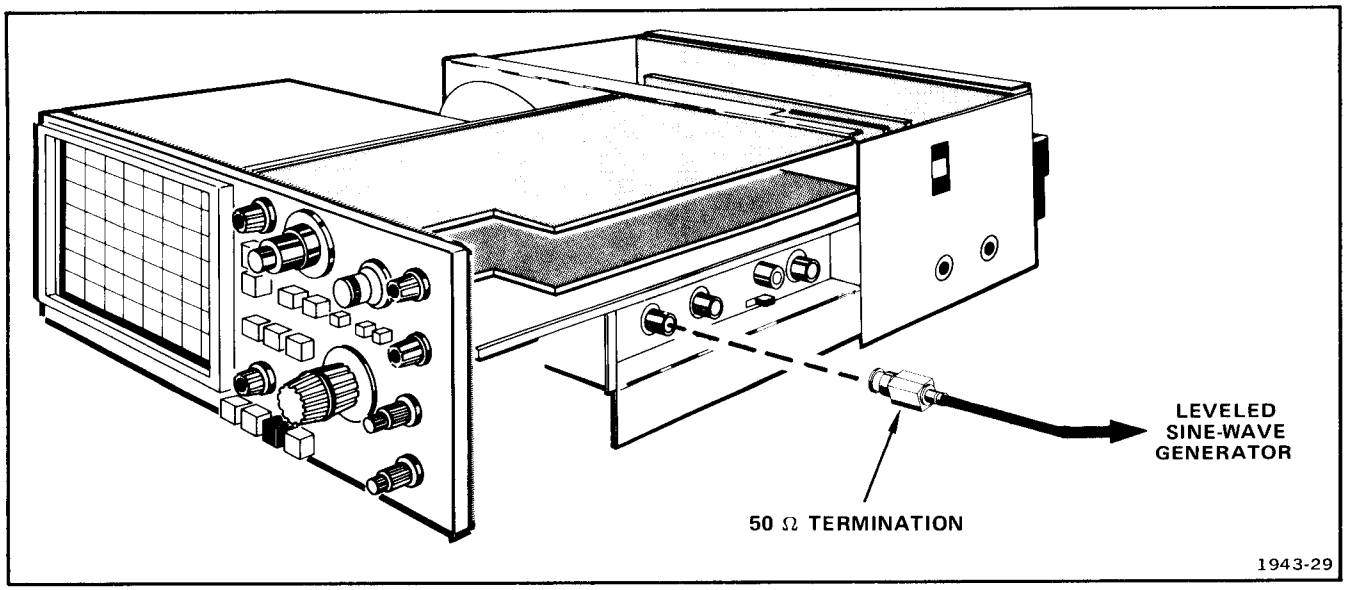


Fig. 6-5. Equipment setup.

f. Repeat parts c through e as necessary for traces superimposed at graticule center in ALT mode and trace at graticule center in ADD mode.

g. Release ALT and CHOP buttons and proceed to step 3.

1B. Vertical Output Amplifier Bias (SN 300000—303390)

INTERACTION

Vertical Output Amplifier bias adjustment (R403) affects transient response, bandwidth, and vertical gain.

a. Connect test equipment as shown in Fig. 6-5.

b. Set leveled sine-wave generator frequency to 1 MHz and adjust generator amplitude and CH 1 VOLTS/DIV for about 2 divisions of display.

c. ADJUST—R403 for maximum display amplitude.

d. Disconnect test equipment.

2. Dc Bias (SN 300000—303390)

a. Set:

CH 1 VOLTS/DIV	5 DIV CAL
CH 1 VARIABLE	For 2 division display at graticule center.

b. ADJUST—R445 for minimum vertical compression and expansion when positioning display to top and bottom of graticule.

c. Set CH 1 VOLTS/DIV to 10 m and DISPLAY to ALT. Position CH 1 and CH 2 traces to graticule center. Switch DISPLAY to ADD. Check ADD trace shift for a trace within 1 division of graticule center.

3. CH 1 Variable Balance

a. Connect test equipment as shown in Fig. 6-6.

b. Set:

DISPLAY	CH 1
CH 1 VOLTS/DIV	10 m
CH 1 AC-GND-DC	GND
CH 1 VARIABLE	ccw

c. Vertically position trace to center horizontal graticule line.

d. ADJUST—R117 for minimum trace shift as you rotate CH 1 VARIABLE control from extreme to extreme.

e. Set CH 1 VARIABLE control to CAL.

4. CH 1 Step Attenuator Balance

a. Set CH 1 VOLTS/DIV to 10 m.

b. Vertically position trace to center horizontal graticule line.

c. Set CH 1 VOLTS/DIV to 5 m.

d. ADJUST—R112 to move trace back to center horizontal graticule line.

e. Repeat step 4 parts a through d for 1.5 div or less trace shift.

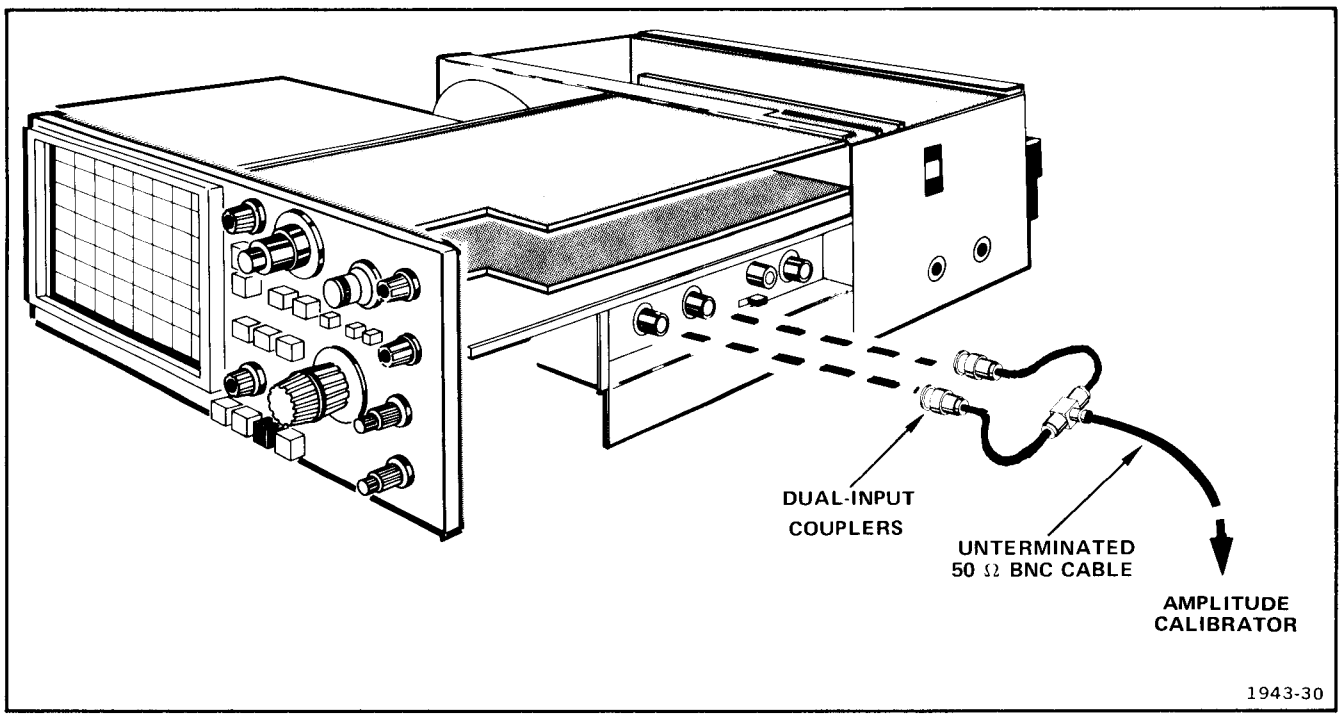


Fig. 6-6. Equipment Setup.

5. CH 1 POSITION Control Centering

a. Set:

CH 1 AC-GND-DC	AC
CH 1 VOLTS/DIV	10 m

b. Set generator amplitude to 100 mV.

c. Adjust CH 1 VARIABLE for 8 division vertical display. Set generator amplitude to 200 mV.

d. ADJUST—R124 while rotating CH 1 POSITION from extreme to extreme. Adjust R124 until display is same distance above graticule center in one extreme of rotation as it is below graticule center in the other extreme of rotation.

e. Set:

CH 1 AC-GND-DC	GND
CH 1 VARIABLE	detent

6. CH 2 INVERT Balance

a. Set DISPLAY to CH 2.

b. Operate the INVERT switch several times.

c. ADJUST—R217 for minimum trace shift as INVERT switch is operated.

d. Set INVERT to normal (button out).

7. CH 2 Step Attenuator Balance

a. Set CH 2 VOLTS/DIV to 10 m.

b. Vertically position trace to center horizontal graticule line.

c. Set CH 2 VOLTS/DIV to 5 m.

d. ADJUST—R212 to move trace back to center horizontal graticule line.

e. Repeat step 7 parts a through d for 1.5 divisions or less trace shift.

8. CH 2 POSITION Control Centering

a. Set:

CH 2 AC-GND-DC	AC
CH 2 VOLTS/DIV	10 m

b. Set amplitude calibrator amplitude to 100 mV.

c. Adjust CH 2 VARIABLE for 8 division vertical display. Set generator amplitude to 200 mV.

d. ADJUST—R224 while rotating CH 2 POSITION from extreme to extreme. Adjust R224 until display is same distance above graticule center in one extreme of rotation as it is below graticule center in the other extreme of rotation.

e. Set:

CH 2 AC-GND-DC	GND
CH 2 VARIABLE	detent

9. CH 1 Gain

a. Set generator amplitude to 5 mV.

b. Set:

DISPLAY	CH 1
CH 1 and CH 2 VOLTS/DIV	1 m
CH 1 AC-GND-DC	DC

c. ADJUST—R135 for 5 divisions of display.

d. Set CH 1 VOLTS/DIV to 10 m.

e. Set generator amplitude to 50 m.

f. ADJUST—R110B for 5 divisions of display.

10. CH 2 Gain

a. Set generator amplitude to 5 mV.

b. Set:

DISPLAY	CH 2
CH 1 AC-GND-DC	GND
CH 2 AC-GND-DC	DC

c. ADJUST—R235 for 5 divisions of display.

d. Set CH 2 VOLTS/DIV to 10 m.

e. Set generator amplitude to 50 mV.

f. ADJUST—R210B for a 5 division display.

g. Disconnect test equipment.

11. CH 1 and CH 2 VOLTS/DIV Compensation

a. Install calibration shield.

b. Connect test equipment to CH 1 VERT INPUT connector as shown in Fig. 6-7.

c. Set:

CH 1 VOLTS/DIV	10 m
SEC/DIV	.2 m
DISPLAY	CH 1
A LEVEL	For triggered waveform

d. Set square-wave generator high-amplitude output frequency to 1 kHz and adjust generator amplitude for 5 division display. Remove attenuator if necessary to maintain 5 division amplitude for remainder of this step.

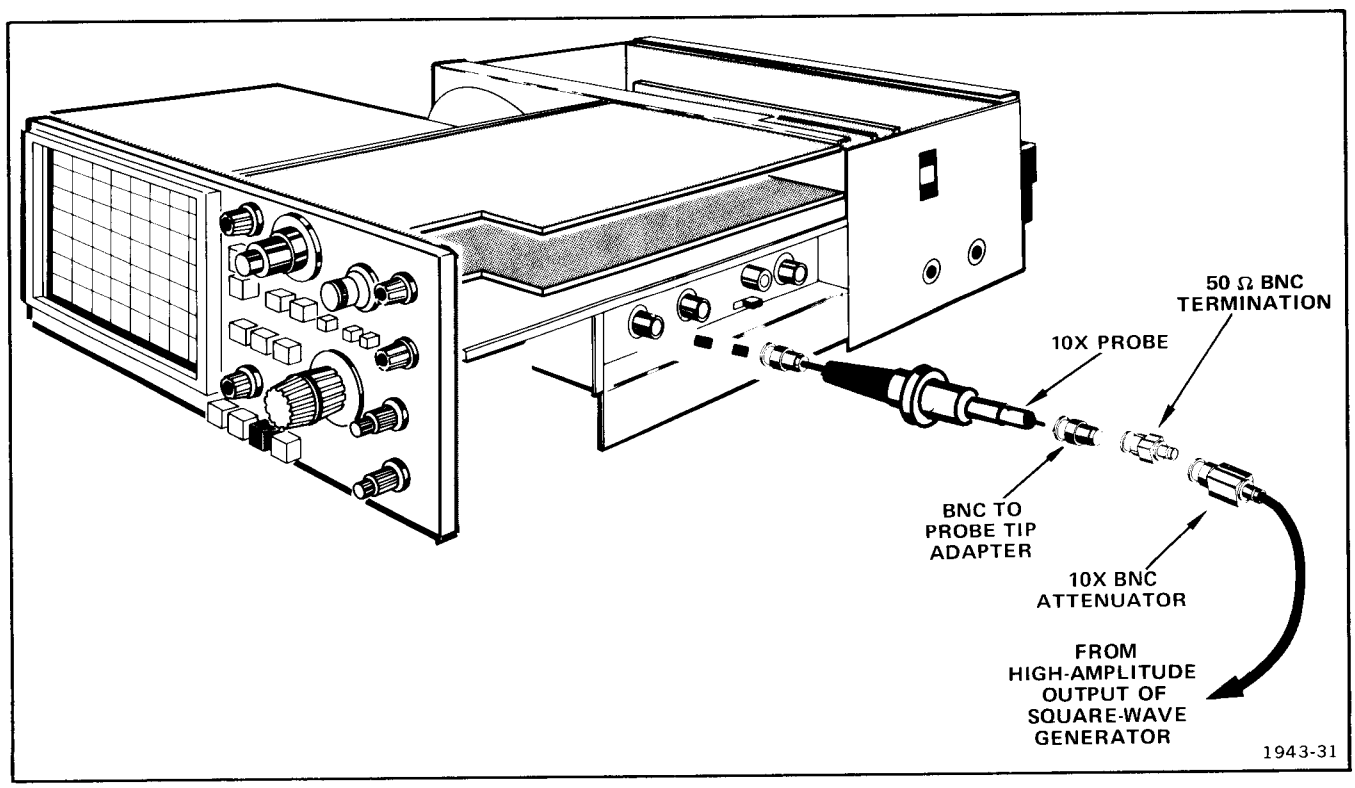


Fig. 6-7. Equipment setup.

e. Adjust probe compensation for best flat-top waveform.

f. ADJUST—CH 1 adjustments for best flat-top waveform according to Table 6-2. Set generator amplitude for 5-division display for each adjustment.

g. Set:

DISPLAY	CH 2
CH 2 VOLTS/DIV	10 m

h. Move test setup to CH 2 VERT INPUT connector.

i. ADJUST—CH 2 adjustments for best flat-top waveform according to Table 6-2. Set generator amplitude for 5-division display for each adjustment.

j. Disconnect test equipment.

12. Transient Response

INTERACTION

CH 1 Preamplifier adjustments interact with each other. CH 2 Preamplifier adjustments interact with each other. The vertical Output Amplifier adjustments interact with both CH 1 and CH 2 Preamplifier adjustments (see Fig. 6-8).

Following this adjustment procedure, you first adjust CH 1 Preamplifier and Vertical Output Amplifier together. Next you adjust CH 2 Preamplifier. If you have trouble adjusting CH 2 Preamplifier, try slightly readjusting the Vertical Output Amplifier. After readjusting Vertical Output Amplifier recheck and readjust CH 1 Preamplifier.

NOTE

Risetime measurements are given as calibration aids only. If you can obtain a waveform with aberrations of 0.2 division or less, with the risetimes given, the vertical system should pass the bandwidth check.

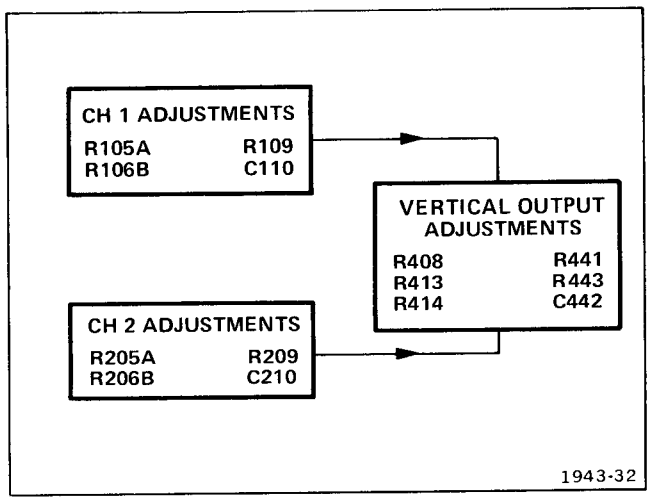


Fig. 6-8. Transient response interaction.

a. Connect equipment to CH 1 VERT INPUT connector as shown in Fig. 6-9. Add or remove attenuators as needed to maintain a 5 division display.

b. Set:

CH 1 and CH 2 VOLTS/DIV	10 m
CH 2 AC-GND-DC	GND

NOTE

For SN 303391—UP, perform parts c through g, then skip to part m and perform parts m through u. For SN 300000—303390, skip to part h and perform parts h through u.

c. Set SEC/DIV to .2μ; A LEVEL, INTENSITY, and Horizontal POSITION so leading edge and flat top of positive-going waveform can be observed during the remainder of step 12.

d. Set the square-wave generator fast-rise output for a 5-division 100 kHz display.

e. ADJUST—R477 and C477 (see Adjustment Locations) for best flat-top waveform with aberrations not to exceed ±0.2 division or a total of 0.2 division peak-to-peak.

TABLE 6-2

VOLTS/DIV Compensation

CH 1 or CH 2 VOLTS/DIV	Corner		Flat-Top	
	CH 1	CH 2	CH 1	CH 2
10 m				C11
20 m	C7A	C17A	C7B	C17B
50 m	C6A	C16A	C6B	C16B
.1	C5A	C15A	C5B	C15B
1	C4A	C14A	C4B	C14B

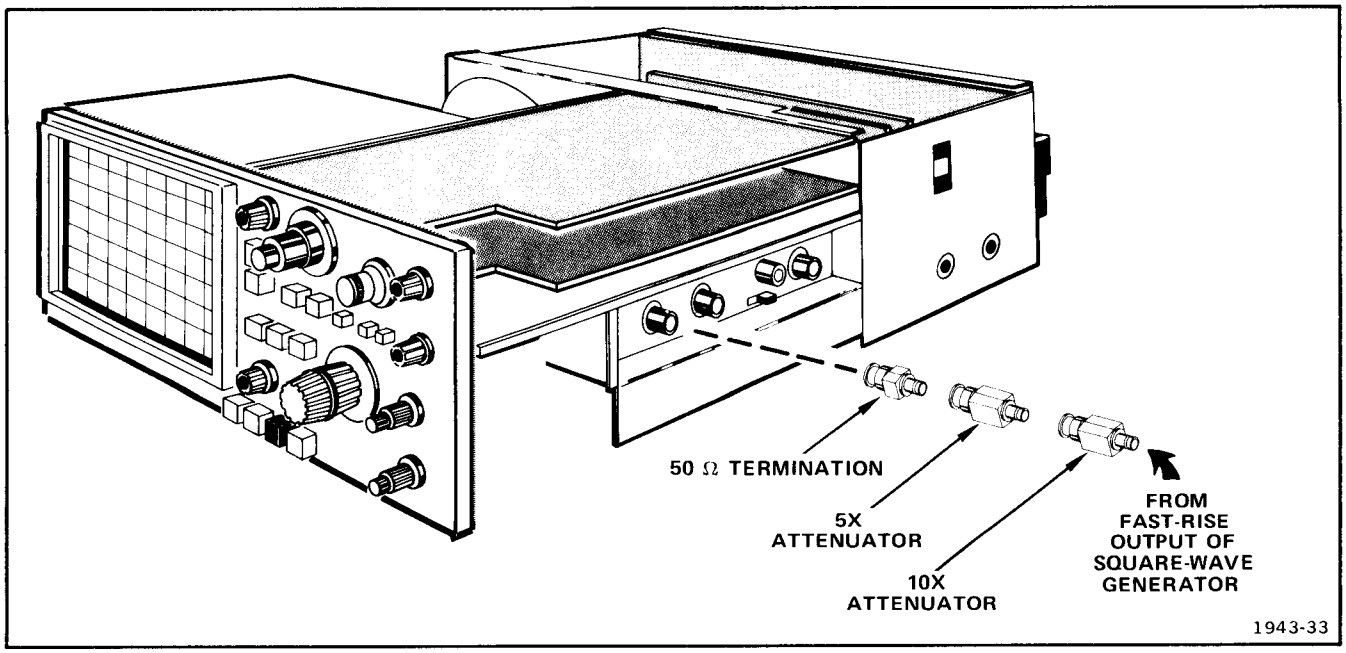


Fig. 6-9. Equipment setup.

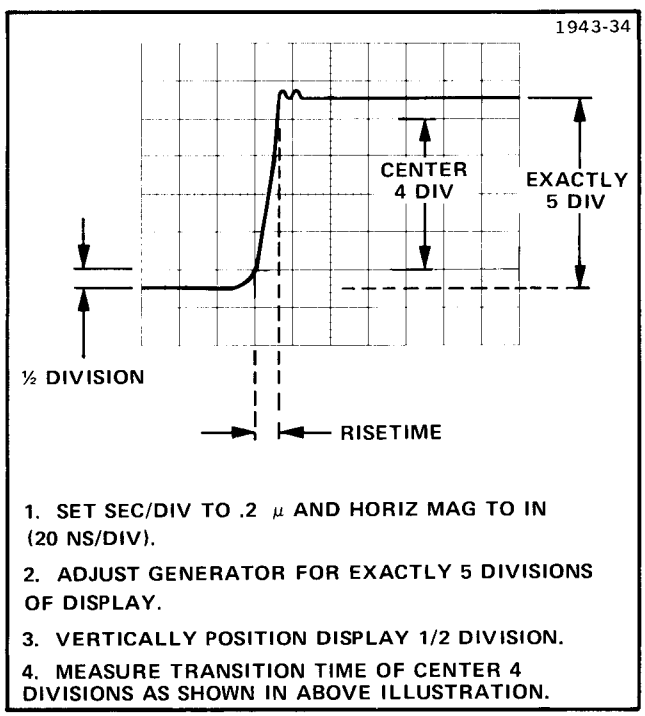


Fig. 6-10. Risetime measurement.

f. ADJUST—C110, R109, C461 and C475 (see Adjustment Locations) for best front corner and flat-top waveform with risetime of 10 ns or less and total aberrations not to exceed 0.2 division peak-to-peak (see Fig. 6-10).

g. Repeat parts e and f as necessary.

h. Set square-wave generator fast-rise output frequency to 1 kHz and generator amplitude for 5 divisions of display.

i. ADJUST—R414 for best flat-top waveform with aberrations of ±0.2 division, not to exceed 0.2 division peak-to-peak.

j. Set generator frequency to 100 kHz.

k. Set SEC/DIV to .2 μ.

l. ADJUST—C110, R109, R408, R413, R441, C442, and R443 for flat-top waveform with aberrations of 0.2 division or less and a risetime of 10 ns or less (see Fig. 6-10).

m. Set CH 1 VOLTS/DIV to 1 m and add 10X attenuator, if needed. Adjust generator amplitude for 5 division display.

n. ADJUST—R105A and R106B for flat-top waveform with aberrations of 0.2 division or less and risetime of 14 ns or less.

o. Move test setup to CH 2 VERT INPUT connector.

p. Set:

CH 2 VOLTS/DIV	1 m
DISPLAY	CH 2
CH 1 AC-GND-DC	GND
CH 2 AC-GND-DC	DC

q. Adjust generator for 5 division display.

r. ADJUST—R205A and R206B for flat-top waveform with aberrations of 0.2 division or less and risetime of 14 ns or less.

s. Set CH 2 VOLTS/DIV to 10 m and remove 10X attenuator, if necessary, from test setup. Adjust generator amplitude for 5 division display.

t. ADJUST—C210 and R209 for flat-top waveform with aberrations of 0.2 division or less and risetime of 10 ns or less.

u. Disconnect test equipment and remove calibration shield.

13. Frequency Response (Check Only)

NOTE

If bandwidth check fails, readjust transient response for faster risetime.

a. Connect test equipment to CH 2 VERT INPUT connector as shown in Fig. 6-11. Add or remove attenuators as needed to maintain 6 division reference display.

b. Set:

CH 2 VOLTS/DIV	1 m
A LEVEL	ccw (free-running)
HORIZ MAG	X1 (out)

c. Set leveled sine-wave generator to reference frequency and adjust generator amplitude for a 6-division display.

TABLE 6-3

Frequency Response

CH 1 or CH 2 VOLTS/DIV	Leveled Sine-wave Generator Frequency
1 m through 5 m	25 MHz
10 m through 5 V	35 MHz

d. Without readjusting generator amplitude, set generator frequency according to Table 6-3.

e. CHECK—Display amplitude is 4.2 divisions or greater.

f. Repeat step 13 parts c through e for as many CH 2 VOLTS/DIV switch positions desired or as generator amplitude allows.

g. Set:

CH 1 VOLTS/DIV	1 m
CH 2 AC-GND-DC	GND
CH 1 AC-GND-DC	DC
DISPLAY	CH 1

h. Move test setup to CH 1 VERT IN connector.

i. Repeat step 13 parts c through e for as many CH 1 VOLTS/DIV switch positions as desired or as generator amplitude allows.

j. Disconnect test equipment.

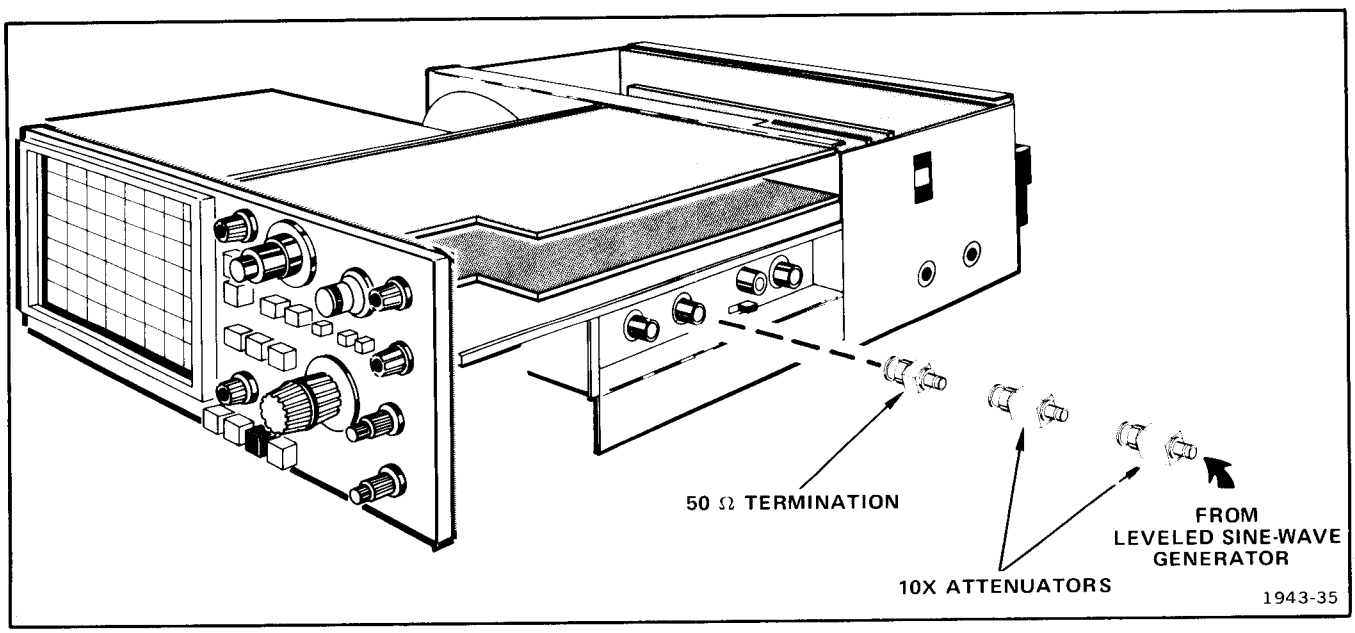


Fig. 6-11. Equipment setup.

C. TRIGGER

Equipment Required

1. Leveled sine-wave generator.
2. 50 Ω BNC cable.
3. 50 Ω BNC 10X attenuator.
4. 50 Ω BNC termination.

Refer to Adjustment Locations pullout pages in diagrams section for adjustment and test point (TP) locations.

335 Control Settings (*Indicates Change From Previous Step)

NOTE

Allow 335 to warm up 30 minutes before starting adjustment procedure.

Power and Display

POWER/INTENSITY	POWER-on INTENSITY-as desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

*VOLTS/DIV	1 m
VARIABLE	CAL
POSITION	Midrange
CH 1 AC-GND-DC	DC
CH 2 AC-GND-DC	GND
DISPLAY	CH 1
CH 2 INVERT	Out

Horizontal

HORIZ DISPLAY	A
A and B SEC/DIV	.2 μ
A CAL	Detent
HORIZ MAG	X1 (out)
DELAY TIME POSITION	ccw
Position	Midrange

Trigger

Mode	AUTO
A LEVEL	As needed
B LEVEL	RUNS AFTER DLY TIME
A and B SLOPE	+
Coupling	AC
Source	INT-CH 1
A TRIG HOLDOFF	NORM
EXT ATTEN	1X

1. A Sensitivity

NOTE

This adjustment sets sensitivity slightly higher than specification for ease of adjustment.

a. Connect test equipment to CH 1 VERT INPUT connector as shown in Fig. 6-12.

b. Set leveled sine-wave generator frequency to 1 MHz. Adjust generator amplitude for 3 division display. Do not readjust generator amplitude throughout the remainder of steps 1 and 2.

c. Set CH 1 VOLTS/DIV to 10 m (0.3 division display).

d. ADJUST—R705 so you can obtain stable display by adjusting A LEVEL.

e. Set CH 1 VOLTS/DIV to 20 m (0.15 division display).

f. READJUST—R705 slightly so you cannot obtain stable display by adjusting A LEVEL.

g. Repeat step 1 parts c through f until, by adjusting A LEVEL, you can obtain stable display of 0.3 division display (step 1d) but not of 0.15 division display (step 1f).

2. B Sensitivity

a. Set:

HORIZ DISPLAY	B
B LEVEL	Out of detent

b. Set CH 1 VOLTS/DIV to 10 m (0.3 division display).

c. ADJUST—R636 so you can obtain stable display by adjusting B LEVEL.

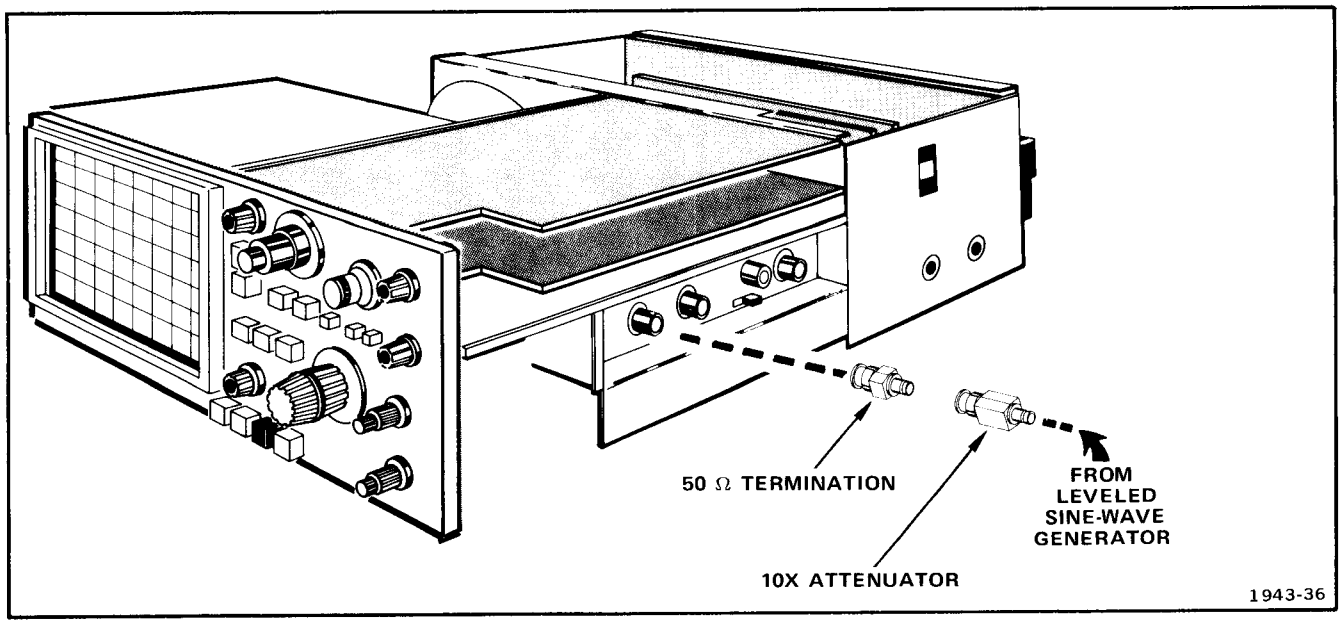


Fig. 6-12. Equipment setup.

d. Set CH 1 VOLTS/DIV to 20 m (0.15 division display).

e. READJUST—R636 slightly so you cannot obtain stable display by adjusting B LEVEL.

f. Repeat step 2 parts b through e until, by adjusting B LEVEL, you can obtain stable display of 0.3 division display (step 2c) but not of 0.15 division display (step 2e).

3. Trigger Dc Level

a. Set:

Trigger Coupling	AC
A and B SEC/DIV	10 μ
VOLTS/DIV	10 m
B LEVEL	As needed for stable display

b. Set generator frequency to 50 kHz (reference) and adjust generator amplitude for 2 division display.

c. Set CH 1 POSITION control to vertically center display. Do not readjust CH 1 POSITION control throughout steps 3 and 4.

d. Set B LEVEL control so display triggers at graticule center (see Fig. 6-13). Do not readjust B LEVEL control throughout remainder of step 3.

e. Set Trigger Coupling to DC.

f. ADJUST—R386 to move triggering point back to graticule center.

4. A and B LEVEL Control Centering

a. Set A and B LEVEL controls so indices point to 0.

b. ADJUST—R608 to move triggering point to graticule center.

c. Set HORIZ DISPLAY to A.

d. ADJUST—R543 to move trigger point to graticule center.

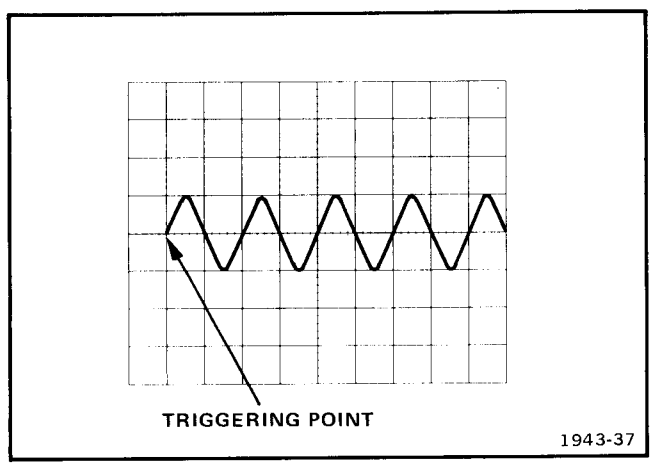


Fig. 6-13. Dc trigger level centering.

D. HORIZONTAL AND CALIBRATOR

Equipment Required

1. Time mark generator.
2. Amplitude calibrator.
3. 50 Ω BNC cable.
4. 50 Ω BNC termination.
5. Test oscilloscope.
6. 10X probe.

Refer to Adjustment Locations pullout pages in diagrams section for adjustment and test point (TP) locations.

335 Control Settings (*Indicates Change From Previous Step)

NOTE

Allow 335 to warm up for 30 minutes before starting adjustment procedure.

Power and Display

POWER/INTENSITY	POWER-on INTENSITY-as desired
FOCUS	As desired
Line Voltage Selector	115
Power Source Selector	AC

Vertical (both channels if applicable)

*VOLTS/DIV	.5
VARIABLE	CAL
POSITION	Midrange
CH 1 AC-GND-DC	DC
CH 2 AC-GND-DC	GND
DISPLAY	CH 1
CH 2 INVERT	Out

Horizontal

*HORIZ DISPLAY	A INTEN
*A SEC/DIV	1 m
*B SEC/DIV	5 μ
A CAL	Detent
HORIZ MAG	X1
*DELAY TIME POSITION	1.00
Position	Midrange

Trigger

Mode	AUTO
A LEVEL	As needed
*B LEVEL	RUNS AFTER DLY TIME
A and B SLOPE	+
Coupling	AC
Source	INT-CH 1
A TRIG HOLDOFF	NORM
EXT ATTEN	1X

1. Coarse Sweep Start and Stop

a. Connect equipment as shown in Fig. 6-14.

b. Set time mark generator for 1 ms markers.

c. Set DTP (DELAY TIME POSITION) to 1.00.

d. ADJUST—R713 so intensified zone starts at second marker (see Fig. 6-15).

e. Set DTP to 9.00.

f. ADJUST—R715 so intensified zone starts at tenth marker (see Fig. 6-15).

g. Due to interaction, repeat step 1 parts c through f as necessary.

2. Fine Sweep Start and Stop

a. Set HORIZ DISPLAY to B.

b. Set DTP to 1.00.

c. ADJUST—R713 so displayed marker starts at beginning of sweep (see Fig. 6-16).

d. Set DTP to 9.00.

e. ADJUST—R715 so displayed marker starts at beginning of sweep.

f. Due to interaction, repeat step 2 parts b through e until no further adjustment is needed.

g. Temporarily disconnect time-mark generator from CH 1 VERT INPUT connector.

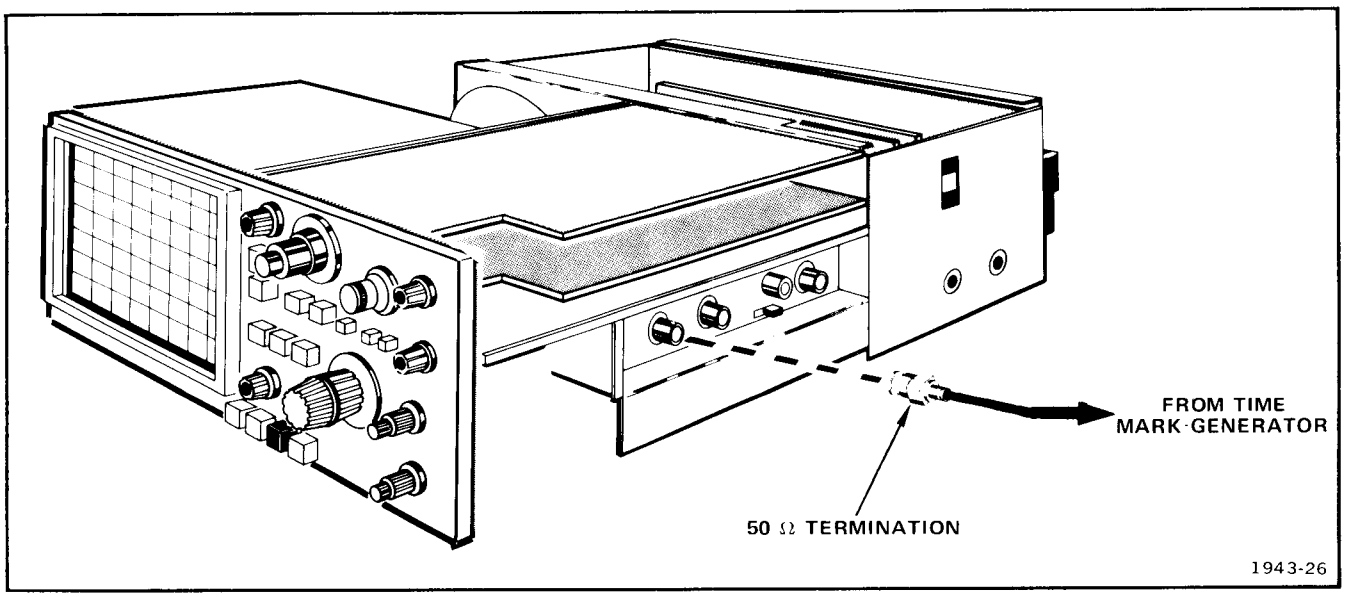


Fig. 6-14. Equipment setup.

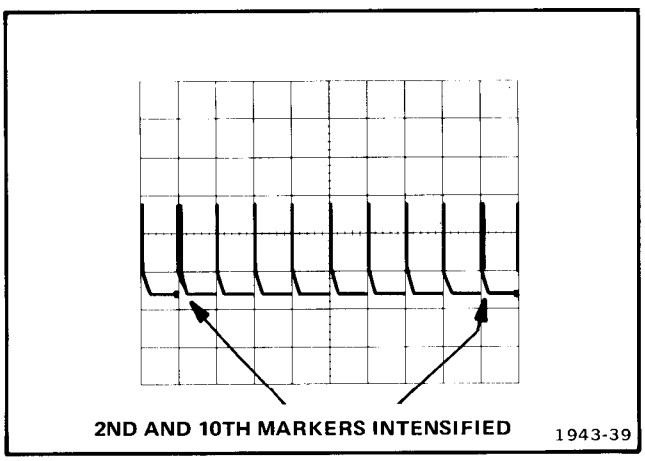


Fig. 6-15. Rough sweep start and stop.

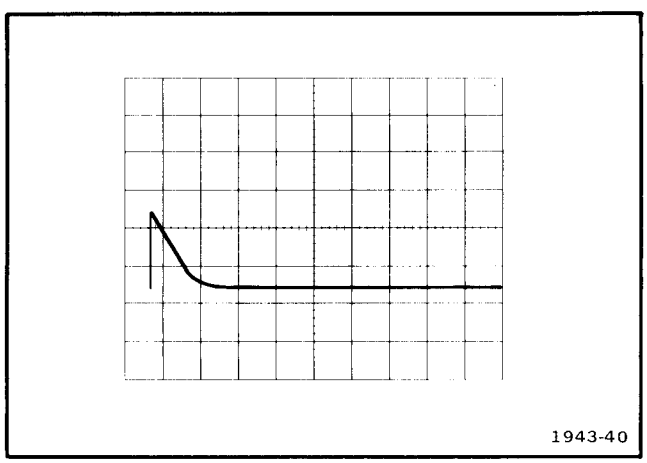


Fig. 6-16. Fine sweep start and stop.

3. Horizontal Limit Centering

a. Set:

HORIZ DISPLAY	A
SEC/DIV	EXT HORIZ
INT	Button out
INTENSITY	ccw

b. Slowly turn up INTENSITY to locate spot on crt. Do not allow bright spot to remain stationary because this will burn crt phosphor.

c. Vertically and horizontally position the spot to the center of the crt.

d. Connect Leveled Sine-Wave Generator to EXT TRIG OR HORIZ INPUT and 10X probe to right horizontal deflection plate as shown in Fig. 6-17.

e. Set generator for a 50 kHz signal and slowly increase generator amplitude until the test oscilloscope display starts to clip.

f. ADJUST—R933B to obtain equal clipping on top and bottom of test oscilloscope waveform.

g. Disconnect test equipment.

4. Horizontal Amplifier Gain

a. Reconnect time mark generator to CH 1 VERT INPUT (see Fig. 6-14).

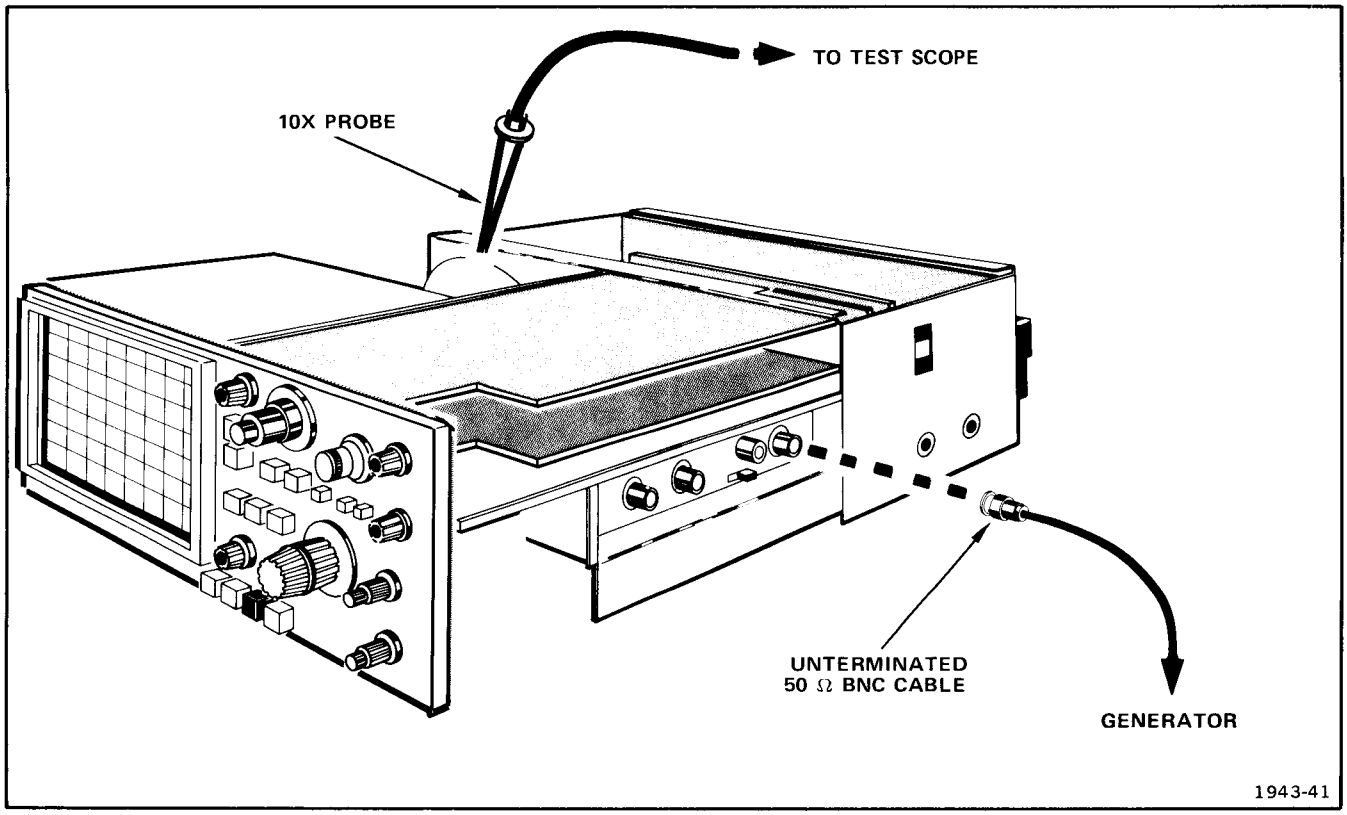


Fig. 6-17. Equipment setup.

b. Set:

A and B SEC/DIV	1 m
DELAY TIME POSITION	ccw
INT	Button in

c. ADJUST—R938 for 1 marker per division over center 8 divisions.

d. Set:

HORIZ MAG	X10 (in)
Horizontal Position	Midrange

e. Set generator for 0.1 ms markers.

f. ADJUST—R940 for 1 marker per division over center 8 divisions displayed.

5. Magnifier Registration

a. Set generator for 5 ms markers.

b. Horizontally position second marker to center vertical graticule line.

c. Set HORIZ MAG to X1 (out).

d. ADJUST—R933A to move second marker back to center vertical graticule line.

e. Due to interaction, repeat step 4 parts b through d for no shift of second marker when switching from X10 to X1.

6. B Sweep Cal

a. Set:

HORIZ MAG	X1 (out)
A SEC/DIV	2 m
B SEC/DIV	1 m
DTP	ccw
HORIZ DISPLAY	B
B LEVEL	Out of detent

b. Set generator for 1 ms markers and adjust B LEVEL for stable display.

c. ADJUST—R818 for 1 marker per division over center 8 divisions.

7. A Sweep 2 μs Timing

a. Set:

HORIZ DISPLAY	A
A SEC/DIV	2 μ
B SEC/DIV	.2 μ
B LEVEL	RUNS AFTER DLY TIME (detent)

b. Set generator for 1 μs markers.

c. ADJUST—C727C for 2 markers per division over center 8 divisions.

d. Set HORIZ DISPLAY to B.

e. Set DTP to 1.00.

f. Horizontally position center displayed marker to center vertical graticule line.

g. Set DTP to 9.00.

h. ADJUST—C727C to move center displayed marker to center vertical graticule line.

i. Due to interaction, repeat step 6 parts e through h until no further adjustment is needed.

8. B Sweep 1 μs Timing

a. Set:

DTP	ccw
B SEC/DIV	1 μ
B LEVEL	Out of detent

b. Adjust B LEVEL for stable display.

c. ADJUST—C850C for 1 marker per division over center 8 divisions.

9. High-Speed Magnified Timing

a. Set:

HORIZ DISPLAY	A
HORIZ MAG	X10 (in)
A SEC/DIV	.2 μ
HORIZONTAL POSITION	Midrange

b. Set generator for 20 ns markers (markers may be sine-wave with 20 ns between positive peaks).

c. ADJUST—C955 and C975 for 1 marker per division over center 8 divisions displayed. Try to set adjustment screws of C955 and C975 so they are about equal in length.

d. Set A SEC/DIV to .5 μ.

e. Set generator for 50 ns markers.

f. CHECK—One marker per division ±0.4 division over center 8 divisions displayed.

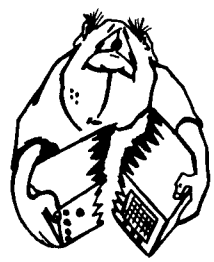
g. READJUST—C955, C975, and R933B, if necessary, for best compromise between .2 μ and .5 μ positions of SEC/DIV switch.

h. Disconnect test equipment.

10. EXT HORIZ Variable Balance

a. Set:

A SEC/DIV	EXT HORIZ
HORIZ MAG	X10 (in)
Trigger Source	EXT-CH 1
Trigger Coupling	DC



CAUTION

Set INTENSITY control for a low-intensity display after location of dot. Allowing bright dot to remain stationary will burn crt phosphor.

b. Adjust Vertical Position and Horizontal Position controls until a dot is visible.

c. Rotate A CAL from extreme to extreme several times.

d. ADJUST—R905, while rotating A CAL, until no horizontal dot movement is visible.

11. EXT HORIZ Compensation

a. Set test oscilloscope timing to 0.2 ms/division, and set EXT ATTEN to 10X.

b. Set 335 HORIZ MAG to X1 (out).

c. Reconnect test equipment as shown in Fig. 6-17 (probe to right horizontal deflection plate and amplitude calibrator to EXT TRIG OR HORIZ INPUT connector).

d. Set generator amplitude to 10 volts.

e. ADJUST—C537 for best flat-top waveform (on test oscilloscope).

f. Set EXT ATTEN to 1X and set generator amplitude to 1 volt.

g. ADJUST—C534 for best flat-top waveform (on test oscilloscope).

h. Set INTENSITY to ccw.

i. Disconnect test equipment.

12. Calibrator Amplitude (for instruments below SN 300121, perform only parts a, b, c, h, & i)

a. Set CH 1 and CH 2 VOLTS/DIV to 5 DIV CAL.

b. Connect a shorting strap across C1500 (see adjustment locations pullouts).

c. Connect the digital voltmeter between the .5 V CAL OUT plug and ground.

d. ADJUST—R1511 for a meter reading of 0.500 volts.

e. Connect the digital voltmeter between P1500-2 and ground.

f. Adjust R1516 for a digital voltmeter reading of 50.0 mV.

g. Connect the digital voltmeter between P1500-3 and ground.

h. Adjust R1519 for a digital voltmeter reading of 50.0 mV. (Below SN 300121, adjust R1519 for a reading of 0.500 V between .5 V CAL OUT plug and ground.)

i. Disconnect shorting strap and digital voltmeter.

13. Calibrator Repetition Rate

a. Connect test equipment as shown in Fig. 6-18 (probe to 0.5 V CAL OUT).

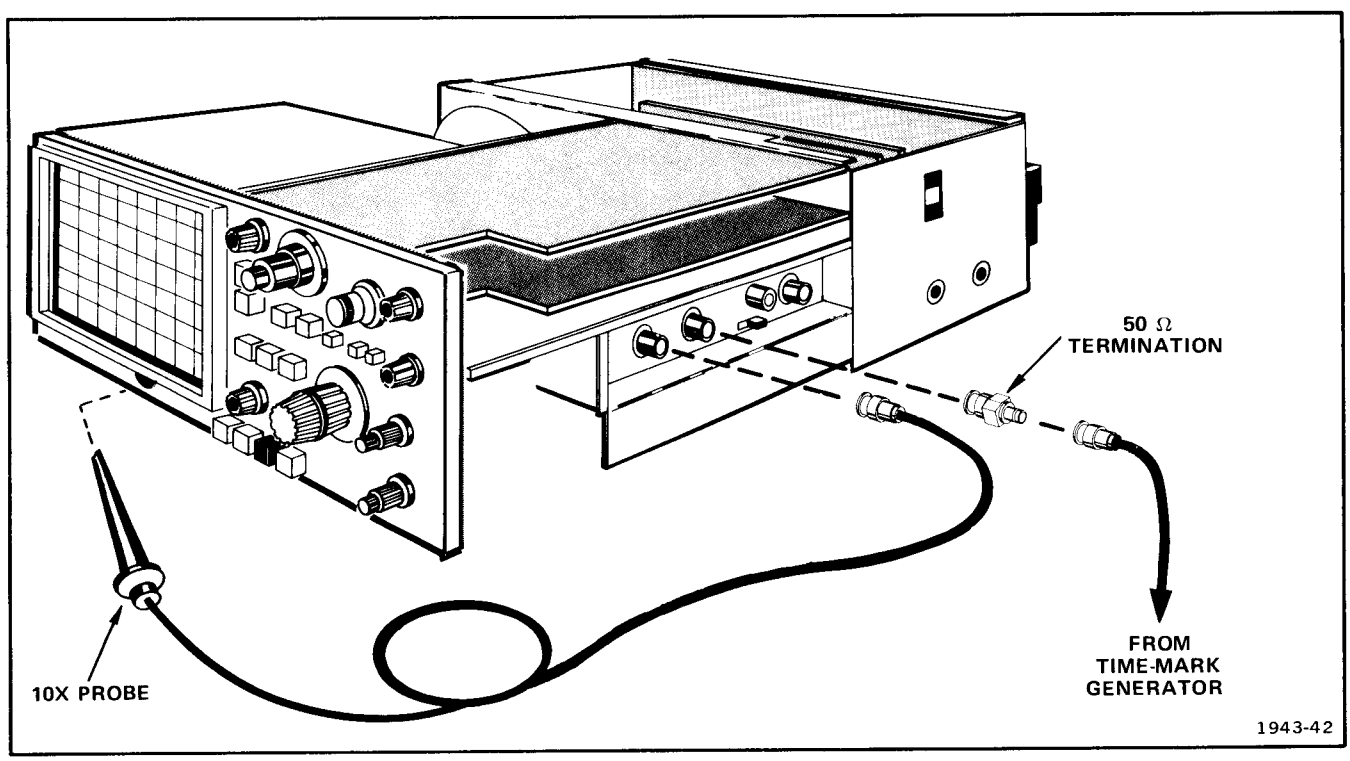


Fig. 6-18. Equipment setup.

b. Set:

HORIZ DISPLAY	A INTEN
B LEVEL	RUNS AFTER DLY TIME
A and B SLOPE	+
Trigger Mode	AUTO
Trigger Source	INT-COMP
DISPLAY	ALT
Trigger Coupling	LF REJ
A SEC/DIV	.5 m
B SEC/DIV	50 μ
CH 1 VOLTS/DIV	20 m (.2 VOLTS/DIV including probe attenuation)
CH 2 VOLTS/DIV	.5

c. Carefully adjust A LEVEL so both calibrator and time mark waveforms are stably displayed (see Fig. 6-19).

d. ADJUST—R1501 for 1 marker per 1 cycle of calibrator waveform (see Fig. 6-19).

e. Adjust DTP to intensify sixth marker (see Fig. 6-19).

f. Set HORIZ DISPLAY to B.

g. ADJUST—R1501 to superimpose rising edge of marker waveform and rising edge of calibrator waveform (see Fig. 6-20).

h. Disconnect test equipment.

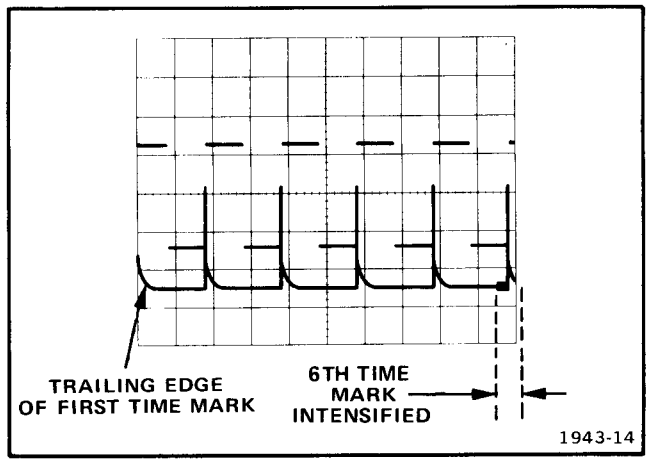


Fig. 6-19. Calibrator frequency (A Intensified display).

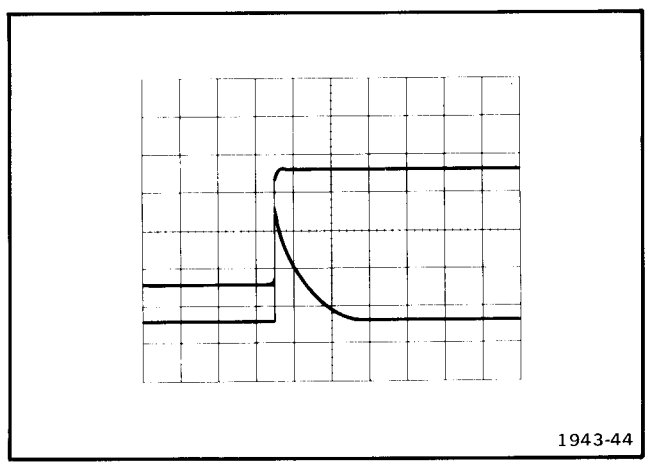


Fig. 6-20. Calibrator frequency (B Sweep display).

14. A TRIG HOLDOFF Range (Check Only)

a. Set:

A SEC/DIV	20 μ
A TRIG HOLDOFF	NORM

b. Set test oscilloscope:

Trigger slope	negative
Timing	0.1 ms/division

c. Connect 10X probe to test oscilloscope and touch probe tip to pin 1 of U730.

d. Set test oscilloscope timing and variable timing to make holdoff portion of test oscilloscope waveform 1 division long. Holdoff time is negative portion of waveform.

e. Set:

A TRIG HOLDOFF	Fully cw

f. CHECK—Holdoff time increases to 10 divisions or greater.

g. Disconnect test equipment.

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.

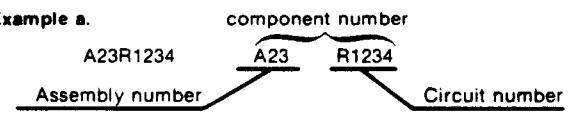
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

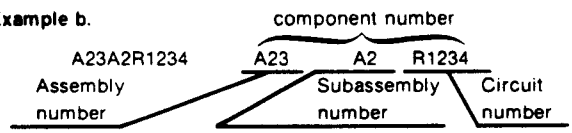
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

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.

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00853	SANGAMO WESTON INC COMPONENTS DIV	SANGAMO RD PO BOX 128	PICKENS SC 29671-9716
01002	GENERAL ELECTRIC CO CAPACITOR PRODUCTS DEPT	JOHN ST	HUDSON FALLS NY 12839
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPY PO BOX 655012	DALLAS TX 75265
02111	HAMILTON STANDARD CONTROLS INC SPECTROL DIV	17070 E GALE AVE P O BOX 1220	CITY OF INDUSTRY CA 91749
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	PYROFILM DIV DIV OF KDI ELECTRONICS INC	60 S JEFFERSON RD	WHIPPANY NJ 07981-1001
04099	CAPCO INC	1328 WINTERS AVE PO BOX 1028	GRAND JUNCTION CO 81502
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR PRODUCTS SECTOR	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
07263	FAIRCHILD SEMICONDUCTOR CORP NORTH AMERICAN SALES SUB OF SCHLUMBERGER LTD MS 118	10400 RIDGEVIEW CT	CUPERTINO CA 95014
07716	TRW INC TRW IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
09353	C AND K COMPONENTS INC	15 RIVERDALE AVE	NEWTON MA 02158-1057
12294	MURATA ERIE NORTH AMERICA INC DIV OF MURATA ERIE	5 FRASER AVE	TRENTON ONT CAN K8V 5S1
12697	CLAROSTAT MFG CO INC	LOWER WASHINGTON ST	DOVER NH 03820
12969	UNITRODE CORP	5 FORBES RD	LEXINGTON MA 02173-7305
14433	ITT SEMICONDUCTORS DIV		WEST PALM BEACH FL
14552	MICROSEMI CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704-5948
14936	GENERAL INSTRUMENT CORP DISCRETE SEMI CONDUCTOR DIV	600 W JOHN ST	HICKSVILLE NY 11802
15238	ITT SEMICONDUCTORS A DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORP	500 BROADWAY PO BOX 168	LAWRENCE MA 01841-3002
15454	AMETEK INC RODAN DIV	721 N POPLAR ST	ORANGE CA 92668
18324	SIGNETICS CORP MILITARY PRODUCTS DIV	4130 S MARKET COURT	SACRAMENTO CA 95834-1222
19701	MEPCO/CENTRALAB A NORTH AMERICAN PHILIPS CO MINERAL WELLS AIRPORT	PO BOX 760	MINERAL WELLS TX 76067-0760
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
26769	MEPCO/CENTRALAB A NORTH AMERICAN PHILIPS CO	5900 AUSTRALIAN AVE	WEST PALM BEACH FL 33407-2330
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051-0606
29604	STACKPOLE COMPONENTS CO SUB OF THE STACKPOLE CORP	PO BOX 14466	RALEIGH NC 27610
31918	ITT SCHADOW INC	8081 WALLACE RD	EDEN PRAIRIE MN 55344-2224
32997	BOURNS INC TRIMPOT DIV	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114
51406	MURATA ERIE NORTH AMERICA INC HEADQUARTERS AND GEORGIA OPERATIONS	2200 LAKE PARK DR	SMYRNA GA 30080
52763	STETCO INC	3344 SCHIERHORN	FRANKLIN PARK IL 60131
52769	SPRAGUE-GOODMAN ELECTRONICS INC	134 FULTON AVE	GARDEN CITY PARK NY 11040-5352
54473	MATSUSHITA ELECTRIC CORP OF AMERICA	ONE PANASONIC WAY PO BOX 1501	SECAUCUS NJ 07094-2917
56289	SPRAGUE ELECTRIC CO WORLD HEADQUARTERS	92 HAYDEN AVE	LEXINGTON MA 02173-7929

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
57668	ROHM CORP	8 WHATNEY PO BOX 19515	IRVINE CA 92713
59660	TUSONIX INC	7741 N BUSINESS PARK DR PO BOX 37144	TUCSON AZ 85740-7144
59821	MEPCO/CENTRALAB A NORTH AMERICAN PHILIPS CO	7158 MERCHANT AVE	EL PASO TX 79915-1207
60705	CERA-MITE CORPORATION	1327 6TH AVE	GRAFTON WI 53024-1831
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
72982	ERIE SPECIALTY PRODUCTS INC	645 W 11TH ST	ERIE PA 16512
73138	BECKMAN INDUSTRIAL CORP BECKMAN ELECTRONIC TECHNOLOGIES SUB OF EMERSON ELECTRIC	4141 PALM ST	FULLERTON CA 92635
75042	IRC ELECTRONIC COMPONENTS PHILADELPHIA DIV TRW FIXED RESISTORS	401 N BROAD ST	PHILADELPHIA PA 19108-1001
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97707-0001
80031	MEPCO/ELECTRA INC	22 COLUMBIA RD	MORRISTOWN NJ 07960
82104	STANDARD GRIBSBY INC	920 RATHBONE AVE	AURORA IL 60507
82389	SWITCHCRAFT INC SUB OF RAYTHEON CO	5555 N ELSTRON AVE	CHICAGO IL 60630-1314
91637	DALE ELECTRONICS INC	2064 12TH AVE PO BOX 609	COLUMBUS NE 68601-3632
98291	SEALECTRO CORP BICC ELECTRONICS	40 LINDEMAN DR	TURNBULL CT 06611-4739
S5372	HITACHI LTD	1-5-1 MARUNOUCHI CHIYODA-KU	TOKYO JAPAN
TK00L	TOSHIBA CO LTD	1-1-1 SHIBAURA MINATO-KU	TOKYO JAPAN
TK1345	ZMAN AND ASSOCIATES	7633 S 180TH	KENT WA 98032
TK1727	PHILIPS NEDERLAND BV AFD ELONCO	POSTBUS 90050	5600 PB EINDHOVEN THE NETHERLANDS
TK2038	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
TK2042	ZMAN & ASSOCIATES	7633 S 180TH	KENT WA 98032

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
A1	670-3771-00	300000	302935	CIRCUIT BD ASSY:ATTENUATOR	80009	670-3771-00
A1	670-3771-01	302936		CIRCUIT BD ASSY:ATTENUATOR	80009	670-3771-01
A2	670-3772-00	300000	300120	CIRCUIT BD ASSY:VERTICAL AMP	80009	670-3772-00
A2	670-3772-01	300121	303390	CIRCUIT BD ASSY:VERTICAL AMPLIFIER	80009	670-3772-01
A2	670-3772-02	303391		CIRCUIT BD ASSY:VERTICAL AMPL	80009	670-3772-02
A3	670-3773-00	300000	303650	CIRCUIT BD ASSY:TRIGGER GENERATOR	80009	670-3773-00
A3	670-3773-01	303651		CIRCUIT BD ASSY:TRIGGER GENERATOR	80009	670-3773-01
A4	670-3774-00	300000	300120	CIRCUIT BD ASSY:HORIZONTAL	80009	670-3774-00
A4	670-3774-01	300121	303650	CIRCUIT BD ASSY:HORIZONTAL	80009	670-3774-01
A4	670-3774-02	303651		CIRCUIT BD ASSY:HORIZONTAL	80009	670-3774-02
A5	670-3775-00	300000	310190	CIRCUIT BD ASSY:SWEEP	80009	670-3775-00
A5	670-3775-01	310391		CIRCUIT BD ASSY:SWEEP	80009	670-3775-01
A6	670-3776-00	300000	303650	CIRCUIT BD ASSY:INTERFACE & L.V. REGULATOR	80009	670-3776-00
A6	670-3776-01	303651		CIRCUIT BD ASSY:INTERFACE & LV REGULATOR	80009	670-3776-01
A7	670-3777-00	300000	300120	CIRCUIT BD ASSY:H.V. & UNBLANK	80009	670-3777-00
A7	670-3777-01	300121	303650	CIRCUIT BD ASSY:HV & UNBLANK	80009	670-3777-01
A7	670-3777-02	303651		CIRCUIT BD ASSY:HV & UNBLANK	80009	670-3777-02
A8	670-3778-00	300000	300215	CIRCUIT BD ASSY:POWER SUPPLY CONVERTER	80009	670-3778-00
A8	670-3778-01	300216	303650	CIRCUIT BD ASSY:POWER SUPPLY CONVERTER	80009	670-3778-01
A8	670-3778-02	303651		CIRCUIT BD ASSY:POWER SUPPLY CONVERTER	80009	670-3778-02
C1	281-0627-00			CAP,FXD,CER DI:1PF,+/-0.25PF,500V	52763	2RDPLZ007 1P00CC
C2	285-0816-00	300000	301375	CAP,FXD,PLASTIC:0.019UF,10%,600V	80009	285-0816-00
C2	285-1132-00	301376	308100	CAP,FXD,PLASTIC:0.019UF,10%,600V	80009	285-1132-00
C2	285-1132-01	308101		CAP,FXD,PLASTIC:0.019UF,10%,600V	TK2038	ORDER BY DESCR
C4	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C4A,B)	19701	2805D1R810BH03F0
C4	283-0760-00			CAP,FXD,MICA DI:400PF,10%,100V (C4C)	80009	283-0760-00
C5	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C5A,B)	19701	2805D1R810BH03F0
C5	283-0761-00			CAP,FXD,MICA DI:40PF,10%,100V (C5C)	80009	283-0761-00
C6	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C6A)	19701	2805D1R810BH03F0
C6	281-0178-00			CAP,VAR,PLASTIC:1-3.5PF,500V (C6B)	80031	2805D013R5BH02F0
C7	281-0178-00			CAP,VAR,PLASTIC:1-3.5PF,500V (C7A)	80031	2805D013R5BH02F0
C7	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C7B)	19701	2805D1R810BH03F0
C11	281-0178-00			CAP,VAR,PLASTIC:1-3.5PF,500V	80031	2805D013R5BH02F0
C12	285-0816-01	300000	301375	CAP,FXD,PLASTIC:0.019UF,10%,600V	80009	285-0816-01
C12	285-1132-00	301376	308100	CAP,FXD,PLASTIC:0.019UF,10%,600V	80009	285-1132-00
C12	285-1132-01	308101		CAP,FXD,PLASTIC:0.019UF,10%,600V	TK2038	ORDER BY DESCR
C14	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C14A,B)	19701	2805D1R810BH03F0
C14	283-0760-00			CAP,FXD,MICA DI:400PF,10%,100V (C14C)	80009	283-0760-00
C15	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C15A,B)	19701	2805D1R810BH03F0
C15	283-0761-00			CAP,FXD,MICA DI:40PF,10%,100V (C15C)	80009	283-0761-00
C16	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C16A)	19701	2805D1R810BH03F0
C16	281-0178-00			CAP,VAR,PLASTIC:1-3.5PF,500V (C16B)	80031	2805D013R5BH02F0
C17	281-0178-00			CAP,VAR,PLASTIC:1-3.5PF,500V (C17A)	80031	2805D013R5BH02F0
C17	281-0182-00			CAP,VAR,PLASTIC:1.8-10PF,300V (C17B)	19701	2805D1R810BH03F0

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
C101	283-0068-00	300000	305190	CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C101	283-0068-03	305191		CAP,FXD,CER DI:0.01UF,+100-0%,500V	80009	283-0068-03
C102	283-0032-00			CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C103	283-0139-00	300000	300150	CAP,FXD,CER DI:150PF,20%,50V	05397	C312C151M5G5CA
C103	283-0334-00	300151	302595	CAP,FXD,CER DI:130PF,+1-2%,500V	04222	SR207A131GAA
C103	283-0618-00	302596		CAP,FXD,MICA DI:130PF,2%,400V	00853	D155F131G0
C105	283-0103-00			CAP,FXD,CER DI:180PF,5%,500V	59821	2DDH73L181J
C106	283-0247-01			CAP,FXD,CER DI:680PF,10%,500V	80009	283-0247-01
C110	281-0184-00	300000	307520	CAP,VAR,PLASTIC:2-18PF,500VDC	TK1727	2222-809-05003
C110	281-0237-00	307521		CAP,VAR,CER DI:3.3-18PF,250V	80009	281-0237-00
C111	----- -----			(SELECTED)		
C170	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C170	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C171	290-0738-00	300000	300661	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C171	290-0536-00	300662	301375	CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
C171	290-0803-00	301376		CAP,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
C172	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C172	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C173	290-0739-00			CAP,FXD,ELCTLT:33UF,20%,25V,SONY/TEK	80009	290-0739-00
C174	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C174	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C200	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C200	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C201	283-0068-00	300000	305190	CAP,FXD,CER DI:0.01UF,+100-0%,500V	59660	871-533E103P
C201	283-0068-03	305191		CAP,FXD,CER DI:0.01UF,+100-0%,500V	80009	283-0068-03
C202	283-0032-00			CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C203	283-0139-00	300000	300150	CAP,FXD,CER DI:150PF,20%,50V	05397	C312C151M5G5CA
C203	283-0334-00	300151	302595	CAP,FXD,CER DI:130PF,+1-2%,500V	04222	SR207A131GAA
C203	283-0618-00	302596		CAP,FXD,MICA DI:130PF,2%,400V	00853	D155F131G0
C204	290-0134-01	300000	303390	CAP,FXD,ELCTLT:22UF,20%,15V	80009	290-0134-01
C204	290-0803-00	303391		CAP,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
C205	283-0103-00			CAP,FXD,CER DI:180PF,5%,500V	59821	2DDH73L181J
C206	283-0247-01			CAP,FXD,CER DI:680PF,10%,500V	80009	283-0247-01
C210	281-0184-00	300000	307520	CAP,VAR,PLASTIC:2-18PF,500VDC	TK1727	2222-809-05003
C210	281-0237-00	307521		CAP,VAR,CER DI:3.3-18PF,250V	80009	281-0237-00
C211	----- -----			(SELECTED)		
C270	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C270	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C271	290-0738-00	300000	300661	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C271	290-0536-00	300662	301375	CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
C271	290-0803-00	301376		CAP,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
C272	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C272	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C273	290-0739-00			CAP,FXD,ELCTLT:33UF,20%,25V,SONY/TEK	80009	290-0739-00
C300	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C300	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C320	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C320	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C335	281-0518-00			CAP,FXD,CER DI:47PF,+/-9.4PF,500V	52763	2RDPLZ007 47PCMU
C340	283-0204-00	300000	307110	CAP,FXD,CER DI:0.01UF,20%,50V	04222	SR155E103MAA
C340	283-0238-00	307111		CAP,FXD,CER DI:0.01UF,10%,50V	04222	SR205C103KAA
C341	283-0032-00			CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C342	283-0032-00			CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C343	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C343	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C345	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C386	290-0729-00	300000	307520	CAP,FXD,ELCTLT:15UF,20%,20V	80009	290-0729-00
C386	290-0527-00	307521		CAP,FXD,ELCTLT:15UF,20%,20V	05397	T368B156M020AS

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
C388	290-0740-00	300000	300120	CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C388	290-0738-00	300121	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C388	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C389	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C390	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C391	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C395	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C395	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C396	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C396	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C397	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C397	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C401	290-0271-00	300000	302595	CAP,FXD,ELCTLT:9UF,+20-15%,125V	26769	40LW905B125W1A
C401	290-0395-00	302596	303045	CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T110B475M050AS
C403	283-0003-00	300121	303390	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C404	283-0003-00	300000	303390	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C408	283-0065-00	300000	303390	CAP,FXD,CER DI:0.001UF,5%,50V	59660	0835-591Y5E0102J
C411	283-0032-00	300000	300120	CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C411	283-0247-01	300121	303390	CAP,FXD,CER DI:680PF,10%,500V	80009	283-0247-01
C412	283-0238-00	300000	303390	CAP,FXD,CER DI:0.01UF,10%,50V	04222	SR205C103KAA
C413	283-0032-00	300000	303390	CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C414	283-0111-00	300000	303390	CAP,FXD,CER DI:0.1UF,20%,50V	05397	C330C104M5U1CA
C415	283-0058-00	300000	303390	CAP,FXD,CER DI:0.027UF,10%,100V	04222	SR301C273KAA
C440	283-0144-00	300000	303390	CAP,FXD,CER DI:33PF,2%,500V	59660	801-547P2G330G
C442	281-0158-00	300000	303390	CAP,VAR,CER DI:7-45PF,100WVDC SUBMIN	59660	518-006 G 7-45
C443	281-0622-00	300000	300100	CAP,FXD,CER DI:47PF,1%,500V	52763	2RDPLZ007 47POLC
C443	283-0115-00	300101	303390	CAP,FXD,CER DI:47PF,5%,200V	59821	2DDT60K470J
C459	290-0738-00	300391	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C459	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C460	290-0738-00	300000	303390	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C461	281-0239-00	303391	307920	CAP,VAR,CER DI:8-60PF,+50-10%,50V	80009	281-0239-00
C461	281-0158-00	307921		CAP,VAR,CER DI:7-45PF,100WVDC SUBMIN	59660	518-006 G 7-45
C466	283-0032-00	303391		CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C467	283-0003-00	303391		CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C475	281-0239-00	303391	307920	CAP,VAR,CER DI:8-60PF,+50-10%,50V	80009	281-0239-00
C475	281-0158-00	307921		CAP,VAR,CER DI:7-45PF,100WVDC SUBMIN	59660	518-006 G 7-45
C476	283-0094-00	303391		CAP,FXD,CER DI:27PF,10%,200V	59821	2DDT73K270K
C477	281-0239-00	303391	307920	CAP,VAR,CER DI:8-60PF,+50-10%,50V	80009	281-0239-00
C477	281-0158-00	307921		CAP,VAR,CER DI:7-45PF,100WVDC SUBMIN	59660	518-006 G 7-45
C478	283-0032-00	303391		CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C501	283-0076-00			CAP,FXD,CER DI:27PF,10%,500V (C501A)	59660	831-500S2L270K
C501	283-0004-00			CAP,FXD,CER DI:0.02UF,+80-20%,150V (C501B)	59660	855-558Z5V0203Z
C502	283-0128-00			CAP,FXD,CER DI:100PF,5%,500V	59660	871-536T2H101J
C503	283-0004-00			CAP,FXD,CER DI:0.02UF,+80-20%,150V	59660	855-558Z5V0203Z
C504	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C504	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C511	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C511	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C521	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C521	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C522	283-0003-00	304661	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C522	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C532	283-0763-00			CAP,FXD,MICA DI:430PF,1%,100Y	80009	283-0763-00
C534	281-0184-00	300000	307520	CAP,VAR,PLASTIC:2-18PF,500VDC	TK1727	2222-809-05003
C534	281-0237-00	307521		CAP,VAR,CER DI:3.3-18PF,250V	80009	281-0237-00
C535	283-0764-00			CAP,FXD,MICA DI:22PF,+/-0.5PF,500V	80009	283-0764-00
C536	281-0628-00			CAP,FXD,CER DI:15PF,5%,500V	52763	2RDPLZ007 15POJC

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C537	281-0184-00	300000	307520	CAP,VAR,PLASTIC:2-18PF,500VDC	TK1727	2222-809-05003
C537	281-0237-00	307521		CAP,VAR,CER DI:3.3-18PF,250V	80009	281-0237-00
C541	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C546	281-0584-00	300329		CAP,FXD,CER DI:100PF,5%,500V	72982	0301000 Y5E0101J
C590	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C590	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C591	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C591	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C592	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C592	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C602	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C605	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C617	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C650	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C650	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C651	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C651	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C652	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C652	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C707	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C708	283-0226-00			CAP,FXD,CER DI:12PF,10%,500V	80009	283-0226-00
C710	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C712	290-0741-00	300000	307520	CAP,FXD,ELCTLT:1UF,20%,35V,SONY/TEK	80009	290-0741-00
C712	290-0534-00	307521		CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C717	290-0741-00	300000	307520	CAP,FXD,ELCTLT:1UF,20%,35V,SONY/TEK	80009	290-0741-00
C717	290-0534-00	307521		CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C717	283-0003-02	310391	310485	CAP,FXD,CER DI:0.01UF,150V (C717A)	80009	283-0003-02
C717	283-0003-00	310486		CAP,FXD,CER DI:0.01UF,+80-20%,150V (C717A)	59821	D103Z40Z5UJDCEX
C722	283-0149-00			CAP,FXD,CER DI:25PF,2%,200V	59660	865-528T2H250G
C723	283-0060-00			CAP,FXD,CER DI:100PF,5%,200V	59660	855-535U2J101J
C727	295-0134-00			CAP SET,MATCHED:1UF,0.1UF,0.01UF,0.001UF (C727A,B FURNISHED AS A UNIT WITH C850A,B)	TK2038	ORDER BY DESCR
C727	281-0096-00			CAP,VAR,AIR DI:5.5-18PF,350V (C727C)	52763	302324237
C727	283-0675-01			CAP,FXD,MICA DI:82PF,1%,300V (C727D)	80009	283-0675-01
C730	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C731	281-0670-00	300000	300120	CAP,FXD,CER DI:1.8PF,+/-0.1PF,500V	52763	2RDPLZ007 1P80BC
C731	281-0615-00	300121		CAP,FXD,CER DI:3.9PF,+/-0.5PF,200V	52763	2RDPLZ007 3P90DC
C739	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C745	283-0229-00			CAP,FXD,CER DI:220PF,10%,50V (C745A)	80009	283-0229-00
C745	290-0741-00	300000	307520	CAP,FXD,ELCTLT:1UF,20%,35V,SONY/TEK (C745B)	80009	290-0741-00
C745	290-0534-00	307521		CAP,FXD,ELCTLT:1UF,20%,35V (C745B)	05397	T368A105M035AZ
C745	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V (C745C)	59821	D103Z40Z5UJDCEX
C746	290-0741-00	300000	307520	CAP,FXD,ELCTLT:1UF,20%,35V,SONY/TEK	80009	290-0741-00
C746	290-0524-00	307521		CAP,FXD,ELCTLT:4.7UF,20%,10V	05397	T368A475M010AZ
C753	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C753	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C757	283-0060-00			CAP,FXD,CER DI:100PF,5%,200V	59660	855-535U2J101J
C767	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C769	283-0087-00			CAP,FXD,CER DI:300PF,10%,1000V	59660	0838020X5F00301K
C772	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C772	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C773	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00

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C773	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C774	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C774	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C807	283-0003-00	300000	310910	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C807	283-0204-00	310911		CAP,FXD,CER DI:0.01UF,20%,50V	04222	SR155E103MAA
C810	283-0226-00			CAP,FXD,CER DI:12PF,10%,500V	80009	283-0226-00
C813	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C813	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C814	283-0149-00			CAP,FXD,CER DI:25PF,2%,200V	59660	865-528T2H250G
C816	283-0060-00			CAP,FXD,CER DI:100PF,5%,200V	59660	855-535U2J101J
C820	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C820	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C823	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C825	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C828	283-0149-00			CAP,FXD,CER DI:25PF,2%,200V	59660	865-528T2H250G
C840	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C840	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C841	290-0740-00	300000	302595	CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C841	290-0803-00	302596		CAP,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
C842	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C842	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C850	----- -----			(C850A,B FUNISHED AS A UNIT WITH C727A,B)		
C850	281-0096-00			CAP,VAR,AIR DI:5.5-18PF,350V (C850C)	52763	302324237
C850	283-0675-01			CAP,FXD,MICA DI:82PF,1%,300V (C850D)	80009	283-0675-01
C939	281-0549-00	300121		CAP,FXD,CER DI:68PF,10%,500V	52763	2RDPLZ007 68POKU
C955	281-0095-00	300000	303160	CAP,VAR,PLASTIC:0.25-1.5PF,600V	12294	057001
C955	281-0095-01	303161	312130	CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0095-01
C955	281-0064-00	312131	312269	CAP,VAR,PLASTIC:0.25-1.5PF,600V	52769	ER-530-013
C955	281-0064-01	312270		CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0064-01
C956	283-0290-00			CAP,FXD,CER DI:1PF,+/-0.25PF,500V	80009	283-0290-00
C961	283-0341-00			CAP,FXD,CER DI:0.047UF,10%,100V	04222	SR301C473KAA
C963	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C965	283-0290-00			CAP,FXD,CER DI:1PF,+/-0.25PF,500V	80009	283-0290-00
C971	283-0341-00			CAP,FXD,CER DI:0.047UF,10%,100V	04222	SR301C473KAA
C975	281-0095-00	300000	303160	CAP,VAR,PLASTIC:0.25-1.5PF,600V	12294	057001
C975	281-0095-01	303161	312130	CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0095-01
C975	281-0064-00	312131	312269	CAP,VAR,PLASTIC:0.25-1.5PF,600V	52769	ER-530-013
C975	281-0064-01	312270		CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0064-01
C981	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C981	290-0523-00	307521	309905	CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C981	290-0536-00	309906	312270	CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T368B106M025AS
C981	290-1035-00	312271		CAP,FXD,ELCTLT:150UF,20%,16V	80009	290-1035-00
C982	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C983	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C983	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C984	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C984	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C985	290-0271-00	300000	304130	CAP,FXD,ELCTLT:9UF,+20-15%,125V	26769	40LW905B125W1A
C985	290-0841-00	304131		CAP,FXD,ELCTLT:4.7UF,+20-15%,100V	80009	290-0841-00
C1000	283-0032-00			CAP,FXD,CER DI:470PF,5%,500V	59660	831-000-Z5E0471J
C1001	283-0111-00			CAP,FXD,CER DI:0.1UF,20%,50V	05397	C330C104M5U1CA
C1002	290-0562-00	300000	300436	CAP,FXD,ELCTLT:210UF,+75-10%,40V	56289	600D217G040D14
C1002	290-0785-00	300437	303650	CAP,FXD,ELCTLT:160UF,+75 -10%,50VDC	01002	29F3533G4
C1002	290-0788-00	303651	308435	CAP,FXD,ELCTLT:220UF,20%,35V,ALUMINUM	56289	39D793
C1002	290-0788-01	308436		CAP,FXD,ELCTLT:220UF,20%,35V	80009	290-0788-01
C1003	290-0736-00			CAP,FXD,ELCTLT:3300UF,-10+100%,40V	80009	290-0736-00
C1004	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00

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C1005	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1006	283-0351-00	300527		CAP,FXD,CER DI:5000PF,20%,3000V	51406	DHR17Z5U502M3KV
C1007	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1008	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1009	290-0117-00			CAP,FXD,ELCTLT:50UF,+75-10%,50V	56289	30D506G050DD9
C1010	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1014	283-0231-01			CAP,FXD,CER DI:470PF,10%,500V	80009	283-0231-01
C1021	283-0231-01			CAP,FXD,CER DI:470PF,10%,500V	80009	283-0231-01
C1022	283-0067-00			CAP,FXD,CER DI:0.001UF,10%,200V	59660	835-515-YSE0102K
C1028	283-0087-00			CAP,FXD,CER DI:300PF,10%,1000V	59660	0838020X5F00301K
C1029	283-0087-00			CAP,FXD,CER DI:300PF,10%,1000V	59660	0838020X5F00301K
C1035	283-0087-00			CAP,FXD,CER DI:300PF,10%,1000V	59660	0838020X5F00301K
C1036	283-0087-00			CAP,FXD,CER DI:300PF,10%,1000V	59660	0838020X5F00301K
C1045	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1045	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1046	290-0183-01	300000	300120	CAP,FXD,ELCTLT:1UF,10%,35V	80009	290-0183-01
C1046	290-0741-00	300121	307520	CAP,FXD,ELCTLT:1UF,20%,35V,SONY/TEK	80009	290-0741-00
C1046	290-0534-00	307521		CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C1076	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1077	290-0741-00	300000	307520	CAP,FXD,ELCTLT:1UF,20%,35V,SONY/TEK	80009	290-0741-00
C1077	290-0534-00	307521		CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C1078	290-0739-00	300000	310460	CAP,FXD,ELCTLT:33UF,20%,25V,SONY/TEK	80009	290-0739-00
C1078	290-0979-00	310461		CAP,FXD,ELCTLT:33UF,20%,25V	80009	290-0979-00
C1079	290-0271-00	300000	302595	CAP,FXD,ELCTLT:9UF,+20-15%,125V	26769	40LW905B125W1A
C1079	290-0395-00	302596	304130	CAP,FXD,ELCTLT:4.7UF,20%,50V	05397	T110B475M050AS
C1079	290-0842-00	304131	312200	CAP,FXD,ELCTLT:10UF,20%,50V	80009	290-0842-00
C1079	290-1006-00	312201		CAP,FXD,ELCTLT:22UF,50V	80009	290-1006-00
C1080	290-0271-00	300000	302595	CAP,FXD,ELCTLT:9UF,+20-15%,125V	26769	40LW905B125W1A
C1080	290-0815-00	302596		CAP,FXD,ELCTLT:10UF,+100-10%,60V	80009	290-0815-00
C1081	290-0739-00	300000	310460	CAP,FXD,ELCTLT:33UF,20%,25V,SONY/TEK	80009	290-0739-00
C1081	290-0979-00	310461		CAP,FXD,ELCTLT:33UF,20%,25V	80009	290-0979-00
C1084	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1084	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1091	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1093	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1098	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1098	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1099	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1106	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1107	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1119	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1120	290-0740-00			CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1123	290-0740-00	300000	310610	CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1123	290-0770-00	310611		CAP,FXD,ELCTLT:100UF,+50-20%,25VDC	54473	ECE-A25V100L
C1124	290-0739-00	300000	310460	CAP,FXD,ELCTLT:33UF,20%,25V,SONY/TEK	80009	290-0739-00
C1124	290-0979-00	310461		CAP,FXD,ELCTLT:33UF,20%,25V	80009	290-0979-00
C1128	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1128	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1131	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1200	283-0120-00			CAP,FXD,CER DI:0.015UF,+80-30%,2500V	60705	564CZA252EZ153ZA
C1201	285-1040-00			CAP,FXD,PLASTIC:1200PF,10%,4000V	04099	TEK-17A
C1213	283-0003-00	300000	300120	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1213	283-0092-00	300121		CAP,FXD,CER DI:0.03UF,+80-20%,200V	59660	845-534Z5U0303Z
C1224	285-1040-00	300000	300120	CAP,FXD,PLASTIC:1200PF,10%,4000V	04099	TEK-17A
C1224	283-0071-00	300121	303650	CAP,FXD,CER DI:0.0068UF,+80-20%,5KV	51406	DHA 34Y5S682Z5KV
C1224	283-0071-01	303651		CAP,FXD,CER DI:0.0068UF,+80-30%,5KV	80009	283-0071-01
C1225	283-0120-00			CAP,FXD,CER DI:0.015UF,+80-30%,2500V	60705	564CZA252EZ153ZA
C1226	283-0120-00			CAP,FXD,CER DI:0.015UF,+80-30%,2500V	60705	564CZA252EZ153ZA
C1251	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX

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C1260	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1263	283-0087-00			CAP,FXD,CER DI:300PF,10%,1000V	59660	0838020X5F00301K
C1267	290-0733-00	300000	300120	CAP,FXD,ELCTLT:330UF,20%,3.15V	80009	290-0733-00
C1270	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1271	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1273	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1425	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1425	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1426	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1426	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1430	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1432	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1434	281-0095-00	300000	303160	CAP,VAR,PLASTIC:0.25-1.5PF,600V	12294	057001
C1434	281-0095-01	303161	312130	CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0095-01
C1434	281-0064-01	312131	312269	CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0064-01
C1434	281-0064-01	312270		CAP,VAR,PLASTIC:0.25-1.5PF,600V	80009	281-0064-01
C1435	283-0178-00			CAP,FXD,CER DI:0.1UF,20%,100V	05397	C330C104Z1U1CA
C1438	283-0081-00			CAP,FXD,CER DI:0.1UF,+80-20%,25V	59821	2DDU69E104Z
C1444	283-0178-00			CAP,FXD,CER DI:0.1UF,20%,100V	05397	C330C104Z1U1CA
C1450	283-0003-00			CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1451	290-0738-00	300000	307520	CAP,FXD,ELCTLT:2.2UF,20%,25V,SONY/TEK	80009	290-0738-00
C1451	290-0523-00	307521		CAP,FXD,ELCTLT:2.2UF,20%,20V	05397	T368A225M020AS
C1500	285-1117-00			CAP,FXD,PLASTIC:0.018UF,2%,100V	80009	285-1117-00
C1504	283-0003-00	300000	305190	CAP,FXD,CER DI:0.01UF,+80-20%,150V	59821	D103Z40Z5UJDCEX
C1504	283-0003-03	305191		CAP,FXD,CER DI:0.01UF,+80-20%,150V	80009	283-0003-03
C1505	290-0740-00	300000	300100	CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
C1505	290-0730-00	300101	300120	CAP,FXD,ELCTLT:22UF,20%,16V	80009	290-0730-00
C1505	290-0740-00	300121		CAP,FXD,ELCTLT:68UF,20%,16V,SONY/TEK	80009	290-0740-00
CR101	152-0323-00	300000	302595	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14433	WG1518
CR101	152-0324-00	302596	307920	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14552	MT5128
CR101	152-0323-03	307921		SEMICOND DVC,DI:SI,35V,0.1A	80009	152-0323-03
CR103	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR201	152-0323-00	300000	302595	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14433	WG1518
CR201	152-0324-00	302596	307920	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14552	MT5128
CR201	152-0323-03	307921		SEMICOND DVC,DI:SI,35V,0.1A	80009	152-0323-03
CR202	152-0323-00	300000	302595	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14433	WG1518
CR202	152-0324-00	302596	307920	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14552	MT5128
CR202	152-0323-03	307921		SEMICOND DVC,DI:SI,35V,0.1A	80009	152-0323-03
CR203	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR300	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR301	152-0327-00	300000	300120	SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR330	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR332	152-0327-00	300000	300120	SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR336	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR340	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR341	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR360	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR361	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR385	152-0327-00	300121		SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR500	152-0323-00	300000	302595	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14433	WG1518
CR500	152-0324-00	302596	307920	SEMICOND DVC,DI:SW,SI,35V,0.1A,DO-7	14552	MT5128
CR500	152-0323-03	307921		SEMICOND DVC,DI:SI,35V,0.1A	80009	152-0323-03
CR521	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR554	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR555	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR561	152-0630-00	300000	312225	SEMICOND DVC,DI:TUN,GE,4.7MA	80009	152-0630-00
CR561	152-0125-01	312226		SEMICOND DVC,DI:TUNNEL,4.7MA,18PF,DO-17	80009	152-0125-01
CR571	152-0630-00	300000	312225	SEMICOND DVC,DI:TUN,GE,4.7MA	80009	152-0630-00

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CR571	152-0125-01	312226		SEMICOND DVC,DI:TUNNEL,4.7MA,18PF,DO-17	80009	152-0125-01
CR602	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR629	152-0630-00	300000	312225	SEMICOND DVC,DI:TUN,GE,4.7MA	80009	152-0630-00
CR629	152-0125-01	312226		SEMICOND DVC,DI:TUNNEL,4.7MA,18PF,DO-17	80009	152-0125-01
CR630	152-0630-00	300000	312225	SEMICOND DVC,DI:TUN,GE,4.7MA	80009	152-0630-00
CR630	152-0125-01	312226		SEMICOND DVC,DI:TUNNEL,4.7MA,18PF,DO-17	80009	152-0125-01
CR709	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR734	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR752	150-1027-00			LT EMITTING DIO:GREEN,30MA	80009	150-1027-00
CR754	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR756	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR757	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR811	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR907	152-0327-00	301231		SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR930	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR940	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR950	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR967	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1000	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1000	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1001	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1003	152-0107-00	300050		SEMICOND DVC,DI:RECT,SI,400 V,400MA,A1	12969	"G727"
CR1005	152-0556-00			SEMICOND DVC,DI:RECT,SI,50,2.5A	14936	KBU4A
CR1006	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1007	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1011	152-0327-00	300000	300020	SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1029	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1030	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1035	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1037	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1055	150-1027-00			LT EMITTING DIO:GREEN,30MA	80009	150-1027-00
CR1078	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1079	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1080	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1091	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1105	152-0414-00			SEMICOND DVC,DI:RECT,SI,200V,1.0A,TEK A59	80009	152-0414-00
CR1123	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1124	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1200	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1201	152-0242-00			SEMICOND DVC,DI:SIG,SI,225V,0.2A,DO-7	07263	FDH5004
CR1202	152-0242-00			SEMICOND DVC,DI:SIG,SI,225V,0.2A,DO-7	07263	FDH5004
CR1204	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1240	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161
CR1250	152-0327-00	300121		SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1262	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1400	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1401	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1405	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1407	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1410	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1413	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1414	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1415	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1417	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1418	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1419	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1431	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1442	152-0061-00			SEMICOND DVC,DI:SW,SI,175V,0.1A,DO-35	07263	FDH2161

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CR1511	152-0327-00			SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
CR1519	152-0327-00	300121		SEMICOND DVC,DI:SIG,SI,100MA,75V,D2X5,BAX13	80009	152-0327-00
DL370	175-1477-01			CABLE,DLY LINE:150 OHM	80009	175-1477-01
F1000	159-0139-00	300000	312375	FUSE,CARTRIDGE:400MA,250V,MEDIUM (FOR 115VAC OPERATION)	80009	159-0139-00
F1000	159-0139-01	312376		FUSE,CARTRIDGE:0.4A,250V (FOR 115VAC OPERATION)	80009	159-0139-01
F1000	159-0080-00			FUSE,CARTRIDGE:DIN,0.2A,250V,10SEC (FOR 230VAC OPERATION)	75915	218.200
F1002	159-0107-00			FUSE,CARTRIDGE:DIN,2A,250VAC,TIME LAG	71400	GDC-2A
F1003	159-0064-00			FUSE,CARTRIDGE:DIN,1A,250V,10SEC	75915	212001
J1	131-0106-00			CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR158-1
J11	131-0106-00			CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR158-1
J15	129-0103-00			POST,BDG,ELEC:ASSEMBLY	80009	129-0103-00
J510	131-0106-00			CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR158-1
J1002	136-0490-00			JACK,TIP:BANANA,RED CAP	80009	136-0490-00
J1003	136-0491-00			JACK,TIP:BANANA,CHARCOAL GRAY CAP	80009	136-0491-00
J1420	136-0491-00			JACK,TIP:BANANA,CHARCOAL GRAY CAP	80009	136-0491-00
J1500	131-0251-00			JACK,TIP:U/W 0.08 OD TIP,RED	98291	016-8010-2
J1600	131-1662-00			CONN,RCPT,ELEC:15/30 CONTACTS	80009	131-1662-00
L4	----- -----			(PART OF CIRCUIT BOARD)		
L14	----- -----			(PART OF CIRCUIT BOARD)		
L173	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L273	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L401	108-0692-00	300000	303390	COIL,RF:FIXED,270UH	80009	108-0692-00
L772	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L1015	108-0554-00			COIL,RF:FIXED,5UH,+/-20%	TK1345	108-0554-00
L1020	108-0554-00			COIL,RF:FIXED,5UH,+/-20%	TK1345	108-0554-00
L1091	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L1105	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L1119	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L1270	108-0799-00			COIL,TUBE DEFL:TRACE ROTATION	80009	108-0799-00
L1425	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L1500	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
L1505	108-0692-00			COIL,RF:FIXED,270UH	80009	108-0692-00
LR400	108-0659-00	300000	303045	COIL,RF:FIXED,1.5UH	TK2042	ORDER BY DESCR
LR400	108-0333-00	303046	303390	COIL,RF:FIXED,881NH	TK1345	108-0333-00
LR402	108-0659-00	300000	303045	COIL,RF:FIXED,1.5UH	TK2042	ORDER BY DESCR
LR402	108-0333-00	303046	303390	COIL,RF:FIXED,881NH	TK1345	108-0333-00
Q100	151-1091-00	300000	306090	TRANSISTOR:FE,N CHANNEL,SI,TO-78 (Q100A,B)	80009	151-1091-00
Q100	151-1032-00	306091		TRANSISTOR:FET,DUAL N-CHAN,SI,TO-78A (Q100A,B)	80009	151-1032-00
Q130	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q140	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q150	151-0611-00			TRANSISTOR:NPN,SI	80009	151-0611-00
Q160	151-0611-00			TRANSISTOR:NPN,SI	80009	151-0611-00
Q200	151-1091-00	300000	306090	TRANSISTOR:FE,N CHANNEL,SI,TO-78 (Q200A,B)	80009	151-1091-00
Q200	151-1032-00	306091		TRANSISTOR:FET,DUAL N-CHAN,SI,TO-78A (Q200A,B)	80009	151-1032-00
Q230	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q240	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q250	151-0611-00			TRANSISTOR:NPN,SI	80009	151-0611-00
Q260	151-0611-00			TRANSISTOR:NPN,SI	80009	151-0611-00
Q322	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q335	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q340	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q360	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
Q365	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q370	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q375	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q380	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q385	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q390	151-0376-00	300000	300120	TRANSISTOR:NPN,SI,U-37	80009	151-0376-00
Q390	151-0220-00	300121		TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q461	151-0190-00	303391		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q471	151-0190-00	303391		TRANSISTOR:NPN,SI,TO-92	80009	151-0190-00
Q481	151-0199-00	303391		TRANSISTOR:PNP,SI,TO-92	80009	151-0199-00
Q483	151-0437-00	303391		TRANSISTOR:SELECTED	80009	151-0437-00
Q484	151-0437-00	303391		TRANSISTOR:SELECTED	80009	151-0437-00
Q491	151-0199-00	303391		TRANSISTOR:PNP,SI,TO-92	80009	151-0199-00
Q493	151-0437-00	303391		TRANSISTOR:SELECTED	80009	151-0437-00
Q494	151-0437-00	303391		TRANSISTOR:SELECTED	80009	151-0437-00
Q500	151-1042-00	300000	311700	SEMICOND DVC SE:FET,SI,TO-92 (Q500A,B)	80009	151-1042-00
Q500	151-1155-00	311701	312375	TRANSISTOR:FET,N-CHANNEL,8-12MA,IDSS (Q500A,B)	80009	151-1155-00
Q500	151-1042-00	312376		SEMICOND DVC SE:FET,SI,TO-92 (Q500A,B)	80009	151-1042-00
Q510	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q520	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q540	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q545	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q555	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q560	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q570	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q605	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q610	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q616	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q618	151-0221-02			TRANSISTOR:PNP,SI,TO-106	07263	S42530
Q620	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q630	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q640	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q720	151-1092-00	300000	312400	TRANSISTOR:FE,N CHANNEL,SI	80009	151-1092-00
Q720	151-1185-00	312401		TRANSISTOR:FET,SI,N-CHANNEL	80009	151-1185-00
Q732	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q734	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q739	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q744	151-0410-00			TRANSISTOR:PNP,SI,TO-92	04713	SPS6765
Q767	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q769	151-0410-00			TRANSISTOR:PNP,SI,TO-92	04713	SPS6765
Q780	151-1087-00	300000	304660	TRANSISTOR:NPN,SI	80009	151-1087-00
Q780	151-0611-00	304661		TRANSISTOR:NPN,SI	80009	151-0611-00
Q824	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q827	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q906	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q915	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q925	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q930	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q940	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q955	151-0489-00	300000	312485	TRANSISTOR:NPN,SI	80009	151-0489-00
Q955	151-0489-01	312486		TRANSISTOR:NPN,SI,TO-39	TK00L	2SC506
Q960	151-0406-00			TRANSISTOR:PNP,SI,TO-39	04713	ST1264
Q965	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q970	151-0220-00			TRANSISTOR:PNP,SI,TO-92	80009	151-0220-00
Q975	151-0489-00	300000	312485	TRANSISTOR:NPN,SI	80009	151-0489-00

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
Q975	151-0489-01	312486		TRANSISTOR:NPN,SI,TO-39	TK00L	2SC506
Q980	151-0406-00			TRANSISTOR:PNP,SI,TO-39	04713	ST1264
Q1000	151-0349-00			TRANSISTOR:NPN,SI,SELECTED,TO-127	04713	SJE924
Q1003	151-0601-00			TRANSISTOR:NPN,SI	80009	151-0601-00
Q1007	151-0601-00			TRANSISTOR:NPN,SI	80009	151-0601-00
Q1011	151-1092-00	300000	312400	TRANSISTOR:FE,N CHANNEL,SI	80009	151-1092-00
Q1011	151-1185-00	312401		TRANSISTOR:FET,SI,N-CHANNEL	80009	151-1185-00
Q1014	151-0306-00	300000	312410	TRANSISTOR:PNP,SI,TO-3	80009	151-0306-00
Q1014	151-0836-00	312411		TRANSISTOR:NPN,SI (2SC3007)	80009	151-0836-00
Q1015	151-0306-00	300000	312410	TRANSISTOR:PNP,SI,TO-3	80009	151-0306-00
Q1015	151-0836-00	312411		TRANSISTOR:NPN,SI (2SC3007)	80009	151-0836-00
Q1021	151-0306-00	300000	312410	TRANSISTOR:PNP,SI,TO-3	80009	151-0306-00
Q1021	151-0836-00	312411		TRANSISTOR:NPN,SI (2SC3007)	80009	151-0836-00
Q1022	151-0306-00	300000	312410	TRANSISTOR:PNP,SI,TO-3	80009	151-0306-00
Q1022	151-0836-00	312411		TRANSISTOR:NPN,SI (2SC3007)	80009	151-0836-00
Q1028	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q1035	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q1037	151-0601-00			TRANSISTOR:NPN,SI	80009	151-0601-00
Q1039	151-0601-00			TRANSISTOR:NPN,SI	80009	151-0601-00
Q1043	151-0506-00			SCR:SI,RD-44	80009	151-0506-00
Q1045	151-0516-00	300000	305620	TRANSISTOR:UJT,TO-98	80009	151-0516-00
Q1045	151-0508-00	305621		TRANSISTOR:UJT,SI,TO-98	03508	X13T520
Q1050	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q1055	151-0410-00			TRANSISTOR:PNP,SI,TO-92	04713	SPS6765
Q1084	151-0601-00			TRANSISTOR:NPN,SI	80009	151-0601-00
Q1098	151-0601-00			TRANSISTOR:NPN,SI	80009	151-0601-00
Q1128	151-1095-00			TRANSISTOR:PNP,SI	80009	151-1095-00
Q1240	151-0600-00	300000	300120	TRANSISTOR:PNP,SI,SONY,SCR MTG	80009	151-0600-00
Q1250	151-0899-00			TRANSISTOR:NPN,SI,1.25W,TO-202	S5372	2SC2278
Q1260	151-1092-00	300000	312400	TRANSISTOR:FE,N CHANNEL,SI	80009	151-1092-00
Q1260	151-1185-00	312401		TRANSISTOR:FET,SI,N-CHANNEL	80009	151-1185-00
Q1267	151-0601-00	300000	300120	TRANSISTOR:NPN,SI	80009	151-0601-00
Q1410	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q1420	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q1430	151-0333-00			TRANSISTOR:SELECTED	04713	SPS1752
Q1435	151-1087-00			TRANSISTOR:NPN,SI	80009	151-1087-00
Q1440	151-0489-00	300000	312485	TRANSISTOR:NPN,SI	80009	151-0489-00
Q1440	151-0489-01	312486		TRANSISTOR:NPN,SI,TO-39	TK00L	2SC506
Q1442	151-0406-00			TRANSISTOR:PNP,SI,TO-39	04713	ST1264
R1	315-0120-00			RES,FXD,FILM:12 OHM,5%,0.25W	57668	NTR25J-R12
R2	315-0105-00			RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R4	322-0624-01			RES,FXD,FILM:990K OHM,0.5%,0.25W,TC=T0 (R4B)	19701	5043RC990K0D
R4	321-1289-31			RES,FXD,FILM:10.1K OHM,1%,0.125W (R4C)	80009	321-1289-31
R4	317-0150-00			RES,FXD,CMPSN:15 OHM,5%,0.125W (R4D)	01121	BB1505
R4	317-0151-00			RES,FXD,CMPSN:150 OHM,5%,0.125W (R4E)	01121	BB1515
R4	317-0820-00			RES,FXD,CMPSN:82 OHM,5%,0.125W (R4F)	01121	BB8205
R4	317-0820-00			RES,FXD,CMPSN:82 OHM,5%,0.125W (R4G)	01121	BB8205
R5	317-0200-00			RES,FXD,CMPSN:20 OHM,5%,0.125W (R5A)	01121	BB2005
R5	322-0621-31			RES,FXD,FILM:900K OHM,0.5%,0.25W,TC=T0 (R5B)	80009	322-0621-31
R5	321-1389-31			RES,FXD,FILM:111K OHM,1%,0.125W,TC=T0 (R5C)	80009	321-1389-31
R5	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J

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				(R5D)		
R6	322-0620-31			RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0	80009	322-0620-31
				(R6B)		
R6	321-0618-01			RES,FXD,FILM:250K OHM,0.5%,0.125W,TC=T0	19701	5033RD250K0D
				(R6C)		
R6	315-0220-00			RES,FXD,FILM:22 OHM,5%,0.25W	19701	5043CX22R00J
				(R6D)		
R7	322-0610-31			RES,FXD,FILM:500K OHM,0.5%,0.25W,TC=T0	80009	322-0610-31
				(R7B)		
R7	322-0481-01			RES,FXD,FILM:1M OHM, 0.5%,0.25W,TC=T0	75042	CEBT0-1004D
				(R7C)		
R7	315-0220-00			RES,FXD,FILM:22 OHM,5%,0.25W	19701	5043CX22R00J
				(R7D)		
R11	315-0120-00			RES,FXD,FILM:12 OHM,5%,0.25W	57668	NTR25J-R12
R12	315-0105-00			RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R14	322-0624-01			RES,FXD,FILM:990K OHM,0.5%,0.25W,TC=T0	19701	5043RC990K0D
				(R14B)		
R14	321-1289-31			RES,FXD,FILM:10.1K OHM,1%,0.125W	80009	321-1289-31
				(R14C)		
R14	317-0150-00			RES,FXD,CMPSN:15 OHM,5%,0.125W	01121	BB1505
				(R14D)		
R14	317-0151-00			RES,FXD,CMPSN:150 OHM,5%,0.125W	01121	BB1515
				(R14E)		
R14	317-0820-00			RES,FXD,CMPSN:82 OHM,5%,0.125W	01121	BB8205
				(R14F)		
R14	317-0820-00			RES,FXD,CMPSN:82 OHM,5%,0.125W	01121	BB8205
				(R14G)		
R15	317-0200-00			RES,FXD,CMPSN:20 OHM,5%,0.125W	01121	BB2005
				(R15A)		
R15	322-0621-31			RES,FXD,FILM:900K OHM,0.5%,0.25W,TC=T0	80009	322-0621-31
				(R15B)		
R15	321-1389-31			RES,FXD,FILM:111K OHM,1%,0.125W,TC=T0	80009	321-1389-31
				(R15C)		
R15	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
				(R15D)		
R16	322-0620-31			RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0	80009	322-0620-31
				(R16B)		
R16	321-0618-31			RES,FXD,FILM:250K OHM,0.5%,0.125W,TC=T0	80009	321-0618-31
				(R16C)		
R16	315-0220-00			RES,FXD,FILM:22 OHM,5%,0.25W	19701	5043CX22R00J
				(R16D)		
R17	322-0610-31			RES,FXD,FILM:500K OHM,0.5%,0.25W,TC=T0	80009	322-0610-31
				(R17B)		
R17	322-0481-01			RES,FXD,FILM:1M OHM, 0.5%,0.25W,TC=T0	75042	CEBT0-1004D
				(R17C)		
R17	315-0220-00			RES,FXD,FILM:22 OHM,5%,0.25W	19701	5043CX22R00J
				(R17D)		
R100	317-0100-00	300000	302595	RES,FXD,CMPSN:10 OHM,5%,0.125W	01121	BB1005
				(R100A)		
R100	315-0100-00	302596	303390	RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
				(R100A)		
R100	315-0331-00	303391		RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
				(R100A)		
R100	322-0481-00			RES,FXD,FILM:1M OHM,1%,0.25W,TC=T0	75042	CEBT0-1004F
				(R100B)		
R101	315-0244-00			RES,FXD,FILM:240K OHM,5%,0.25W	19701	5043CX240K0J
				(R101A)		
R101	315-0244-00			RES,FXD,FILM:240K OHM,5%,0.25W	19701	5043CX240K0J
				(R101B)		
R103	321-0155-30	300000	301036	RES,FXD,FILM:402 OHM,1%,0.125W,TC=T0	80009	321-0155-30
R103	321-0155-02	301037	306090	RES,FXD,FILM:402 OHM,0.5%,0.125W,TC=T2	19701	5033RC402R0D
R103	321-0030-02	306091		RES,FXD,FILM:20.0 OHM,0.5%,0.125W,TC=T2	91637	CMF55116D20R00D
R104	321-0155-30	300000	301036	RES,FXD,FILM:402 OHM,1%,0.125W,TC=T0	80009	321-0155-30

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R104	321-0155-02	301037	306090	RES,FXD,FILM:402 OHM,0.5%,0.125W,TC=T2	19701	5033RC402R0D
R104	321-0030-02	306091		RES,FXD,FILM:20.0 OHM,0.5%,0.125W,TC=T2	91637	CMF55116D20R00D
R105	311-0605-02	300000	308280	RES,VAR,NONWW:TRMR,200 OHM,10%,0.5W (R105A)	80009	311-0605-02
R105	311-0605-00	308281		RES,VAR,NONWW:TRMR,200 OHM,0.5W (R105A)	32997	3329H-G48-201
R105	321-0022-30			RES,FXD,FILM:16.5 OHM,1%,0.125W,TC=T0 (R105B)	80009	321-0022-30
R106	321-0208-30			RES,FXD,FILM:1.43K OHM,1%,0.125W (R106A)	80009	321-0208-30
R106	311-0634-02	300000	308280	RES,VAR,NONWW:TRMR,500 OHM,10%,0.5W (R106B)	80009	311-0634-02
R106	311-0634-00	308281		RES,VAR,NONWW:TRMR,500 OHM,0.5W (R106B)	32997	3329H-L58-501
R107	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R108	321-0208-30	300000	300245	RES,FXD,FILM:1.43K OHM,1%,0.125W	80009	321-0208-30
R108	321-0208-37	300246		RES,FXD,FILM:1.43K OHM,0.1%,0.125W,TC=T9	80009	321-0208-37
R109	311-0633-01	300000	308280	RES,VAR,NONWW:TRMR,5K OHM,10%,0.5W	80009	311-0633-01
R109	311-0633-00	308281		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3329H-G48-502
R110	321-0146-30			RES,FXD,FILM:324 OHM,1%,0.125W,TC=T0 (R110A)	80009	321-0146-30
R110	311-0605-02	300000	308280	RES,VAR,NONWW:TRMR,200 OHM,10%,0.5W (R110B)	80009	311-0605-02
R110	311-0605-00	308281		RES,VAR,NONWW:TRMR,200 OHM,0.5W (R110B)	32997	3329H-G48-201
R111	----- -----			(R111A, NOMINAL VALUE SELECTED)		
R111	321-0201-30			RES,FXD,FILM:1.21K OHM,1%,0.125W,TC=T0 (R111B)	80009	321-0201-30
R112	311-0634-00			RES,VAR,NONWW:TRMR,500 OHM,0.5W	32997	3329H-L58-501
R113	321-0208-30	300000	300245	RES,FXD,FILM:1.43K OHM,1%,0.125W	80009	321-0208-30
R113	321-0208-37	300246		RES,FXD,FILM:1.43K OHM,0.1%,0.125W,TC=T9	80009	321-0208-37
R114	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R115	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R116	315-0151-00	300000	301036	RES,FXD,FILM:150 OHM,5%,0.25W (R116A)	57668	NTR25J-E150E
R116	321-0114-30	301037		RES,FXD,FILM:150 OHM,1%,0.125W,TC=T0 (R116A)	80009	321-0114-30
R116	321-0289-30			RES,FXD,FILM:10.0K OHM,1%,0.125W (R116B)	80009	321-0289-30
R117	311-1227-00	300000	303390	RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3386F-T04-502
R117	311-0633-02	303391		RES,VAR,NONWW:TRMR,5K OAM,0.5W	80009	311-0633-02
R119	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R120	321-0362-00	300000	306240	RES,FXD,FILM:57.6K OHM,1%,0.125W,TC=T0	19701	5043ED57K60F
R120	321-0306-00	306241		RES,FXD,FILM:15.0K OHM,1%,0.125W,TC=T0	19701	5033ED15J00F
R121	321-0354-30	300000	306240	RES,FXD,FILM:47.5K OHM,1%,0.125W	80009	321-0354-30
R121	321-0342-00	306241		RES,FXD,FILM:35.7K OHM,1%,0.125W,TC=T0	07716	CEAD35701F
R122	321-1235-00	300000	312235	RES,FXD,FILM:2.77K OHM,1%,0.125W,TC=T0	80009	321-1235-00
R122	311-1795-01	312236		RES,VAR,NONWW:PNL,10K X 10K,10%,0.1W	80009	311-1795-01
R123	315-0683-00			RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
R124	311-0613-00			RES,VAR,NONWW:TRMR,100K OHM,0.5W	32997	3329H-G48-104
R125	315-0132-00			RES,FXD,FILM:1.3K OHM,5%,0.25W	57668	NTR25J-E01K3
R130	321-0183-01			RES,FXD,FILM:787 OHM,5%,0.25W,TC=100PPM	80009	321-0183-01
R131	321-0146-30			RES,FXD,FILM:324 OHM,1%,0.125W,TC=T0	80009	321-0146-30
R132	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R134	315-0102-00	300000	300120	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R134	315-0471-00	300121		RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R135	311-0633-01	300000	308280	RES,VAR,NONWW:TRMR,5K OHM,10%,0.5W	80009	311-0633-01
R135	311-0633-00	308381		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3329H-G48-502
R140	321-0183-31			RES,FXD,FILM:787 OHM,0.5%,0.125W	80009	321-0183-31
R141	321-0146-30			RES,FXD,FILM:324 OHM,1%,0.125W,TC=T0	80009	321-0146-30

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R142	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R150	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R151	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R161	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R163	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	19701	5043CX20R00J
R164	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	19701	5043CX20R00J
R170	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R171	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R172	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R173	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R200	317-0100-00	300000	300436	RES,FXD,CMPSN:10 OHM,5%,0.125W	01121	BB1005
R200	317-0200-00	300437	302595	RES,FXD,CMPSN:20 OHM,5%,0.125W	01121	BB2005
R200	315-0200-00	302596	303390	RES,FXD,FILM:20 OHM,5%,0.25W	19701	5043CX20R00J
R200	315-0331-00	303391		RES,FXD,FILM:330 OHM,5%,0.25W	57668	NTR25J-E330E
R200	322-0481-00			RES,FXD,FILM:1M OHM,1%,0.25W,TC=T0 (R200B)	75042	CEBT0-1004F
R201	315-0244-00			RES,FXD,FILM:240K OHM,5%,0.25W	19701	5043CX240K0J
R203	321-0155-30	300000	301036	RES,FXD,FILM:402 OHM,1%,0.125W,TC=T0	80009	321-0155-30
R203	321-0155-02	301037	306090	RES,FXD,FILM:402 OHM,0.5%,0.125W,TC=T2	19701	5033RC402R0D
R203	321-0030-02	306091		RES,FXD,FILM:20.0 OHM,0.5%,0.125W,TC=T2	91637	CMF55116D20R00D
R204	321-0155-30	300000	301036	RES,FXD,FILM:402 OHM,1%,0.125W,TC=T0	80009	321-0155-30
R204	321-0155-02	301037	306090	RES,FXD,FILM:402 OHM,0.5%,0.125W,TC=T2	19701	5033RC402R0D
R204	321-0030-02	306091		RES,FXD,FILM:20.0 OHM,0.5%,0.125W,TC=T2	91637	CMF55116D20R00D
R205	311-0605-02	300000		RES,VAR,NONWW:TRMR,200 OHM,10%,0.5W (R205A)	80009	311-0605-02
R205	311-0605-00	308281		RES,VAR,NONWW:TRMR,200 OHM,0.5W (R205A)	32997	3329H-G48-201
R205	321-0022-30			RES,FXD,FILM:16.5 OHM,1%,0.125W,TC=T0 (R205B)	80009	321-0022-30
R206	321-0208-30			RES,FXD,FILM:1.43K OHM,1%,0.125W (R206A)	80009	321-0208-30
R206	311-0634-02	300000	308280	RES,VAR,NONWW:TRMR,500 OHM,10%,0.5W (R206B)	80009	311-0634-02
R206	311-0634-00	308281		RES,VAR,NONWW:TRMR,500 OHM,0.5W (R206B)	32997	3329H-L58-501
R207	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R208	321-0208-30	300000	300245	RES,FXD,FILM:1.43K OHM,1%,0.125W	80009	321-0208-30
R208	321-0208-37	300246		RES,FXD,FILM:1.43K OHM,0.1%,0.125W,TC=T9	80009	321-0208-37
R209	311-0633-01	300000	308280	RES,VAR,NONWW:TRMR,5K OHM,10%,0.5W	80009	311-0633-01
R209	311-0633-00	308281		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3329H-G48-502
R210	321-0146-30			RES,FXD,FILM:324 OHM,1%,0.125W,TC=T0 (R210A)	80009	321-0146-30
R210	311-0605-02	300000	308280	RES,VAR,NONWW:TRMR,200 OHM,10%,0.5W (R210B)	80009	311-0605-02
R210	311-0605-00	308281		RES,VAR,NONWW:TRMR,200 OHM,0.5W (R210B)	32997	3329H-G48-201
R211	----- -----			(R211A, NOMINAL VALUE SELECTED)		
R211	321-0201-30			RES,FXD,FILM:1.21K OHM,1%,0.125W,TC=T0 (R211B)	80009	321-0201-30
R212	311-0634-00			RES,VAR,NONWW:TRMR,500 OHM,0.5W	32997	3329H-L58-501
R213	321-0208-30	300000	300245	RES,FXD,FILM:1.43K OHM,1%,0.125W	80009	321-0208-30
R213	321-0208-37	300246		RES,FXD,FILM:1.43K OHM,0.1%,0.125W,TC=T9	80009	321-0208-37
R214	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R215	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R216	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W (R216A)	57668	NTR25J-E150E
R216	321-0289-30			RES,FXD,FILM:10.0K OHM,1%,0.125W (R216B)	80009	321-0289-30
R217	311-1227-00	300000	303390	RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3386F-T04-502
R217	311-0633-02	303391		RES,VAR,NONWW:TRMR,5K OAM,0.5W	80009	311-0633-02
R219	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9

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R220	321-0362-30	300000	306240	RES,FXD,FILM:57.6K OHM,1%,0.125W	80009	321-0362-30
R220	321-0306-00	306241		RES,FXD,FILM:15.0K OHM,1%,0.125W,TC=T0	19701	5033ED15J00F
R221	321-0354-30	300000	306240	RES,FXD,FILM:47.5K OHM,1%,0.125W	80009	321-0354-30
R221	321-0342-00	306241		RES,FXD,FILM:35.7K OHM,1%,0.125W,TC=T0	07716	CEAD35701F
R222	311-1795-00	300000	312235	RES,VAR,NONWW:PNL,10K X 10K OHM,10%,0.1W	80009	311-1795-00
R222	311-1795-01	312236		RES,VAR,NONWW:PNL,10K X 10K,10%,0.1W	80009	311-1795-01
R223	315-0683-00			RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
R224	311-0613-00			RES,VAR,NONWW:TRMR,100K OHM,0.5W	32997	3329H-G48-104
R225	315-0132-00			RES,FXD,FILM:1.3K OHM,5%,0.25W	57668	NTR25J-E01K3
R230	321-0183-31			RES,FXD,FILM:787 OHM,0.5%,0.125W	80009	321-0183-31
R231	321-0146-30			RES,FXD,FILM:324 OHM,1%,0.125W,TC=T0	80009	321-0146-30
R232	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R234	315-0102-00	300000	300120	RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R234	315-0471-00	300121		RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R235	311-0633-01	300000	308280	RES,VAR,NONWW:TRMR,5K OHM,10%,0.5W	80009	311-0633-01
R235	311-0633-00	308281		RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3329H-G48-502
R240	321-0183-31			RES,FXD,FILM:787 OHM,0.5%,0.125W	80009	321-0183-31
R241	321-0146-30			RES,FXD,FILM:324 OHM,1%,0.125W,TC=T0	80009	321-0146-30
R242	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R250	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R251	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R261	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R263	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	19701	5043CX20R00J
R264	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25W	19701	5043CX20R00J
R270	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R271	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R272	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R273	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R300	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R301	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R303	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R305	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R320	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R322	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R330	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R331	315-0123-00	300000	300120	RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
R331	315-0132-00	300121		RES,FXD,FILM:1.3K OHM,5%,0.25W	57668	NTR25J-E01K3
R332	315-0183-00	300000	300120	RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R334	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
R335	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R336	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
R337	315-0204-00	300000	300120	RES,FXD,FILM:200K OHM,5%,0.25W	19701	5043CX200K0J
R337	315-0123-00	300121		RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
R340	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R341	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R342	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R348	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
R350	321-0216-30			RES,FXD,FILM:1.74K OHM,1%,0.125W,TC=T0	80009	321-0216-30
R351	321-0216-30			RES,FXD,FILM:1.74K OHM,1%,0.125W,TC=T0	80009	321-0216-30
R352	321-0131-30			RES,FXD,FILM:226 OHM,1%,0.125W,TC=T0	80009	321-0131-30
R354	321-0176-30			RES,FXD,FILM:665 OHM,1%,0.125W	80009	321-0176-30
R356	321-0216-30			RES,FXD,FILM:1.74K OHM,1%,0.125W,TC=T0	80009	321-0216-30
R357	321-0216-30			RES,FXD,FILM:1.74K OHM,1%,0.125W,TC=T0	80009	321-0216-30
R358	321-0131-30			RES,FXD,FILM:226 OHM,1%,0.125W,TC=T0	80009	321-0131-30
R360	321-0249-30			RES,FXD,FILM:3.83K OHM,0 1%,0.125W	80009	321-0249-30
R361	321-0249-30			RES,FXD,FILM:3.83K OHM,0 1%,0.125W	80009	321-0249-30
R362	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R363	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E

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R364	321-0249-00			RES,FXD,FILM:3.83K OHM,1%,0.125W,TC=T0	19701	5033ED3K83F
R364	321-0249-30			RES,FXD,FILM:3.83K OHM,0 1%,0.125W	80009	321-0249-30
R365	321-0249-30			RES,FXD,FILM:3.83K OHM,0 1%,0.125W	80009	321-0249-30
R366	321-0176-00			RES,FXD,FILM:665 OHM,1%,0.125W,TC=T0	07716	CEAD665R0F
R366	321-0176-30			RES,FXD,FILM:665 OHM,1%,0.125W	80009	321-0176-30
R367	321-0126-00	300000	303390	RES,FXD,FILM:200 OHM,1%,0.125W,TC=T0	19701	5033ED200R0F
R367	321-0121-00	303391	307310	RES,FXD,FILM:178 OHM,1%,0.125W,TC=T0	07716	CEAD178R0F
R367	321-0124-00	307311		RES,FXD,FILM:191 OHM,1%,0.125W, TC=T0	07716	CEAD191R0F
R367	311-0643-02	303391	307310	RES,VAR,WW:TRMR,50 OHM,10%,0.5W (R367A)	80009	311-0643-02
R367	311-1007-00	307311		RES,VAR,NONWW:TRMR,20 OHM,20%,0.5W (R367A)	32997	3329H-G48-200
R368	321-0126-30			RES,FXD,FILM:200 OHM,1%,0.125W,TC=T0	80009	321-0126-30
R369	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R370	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R371	321-0193-30			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R372	321-0193-30			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R373	321-0193-30			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R374	321-0193-30			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R375	321-0181-30			RES,FXD,FILM:750 OHM,1%,0.125W	80009	321-0181-30
R376	315-0510-00			RES,FXD,FILM:51 OHM,5%,0.25W	19701	5043CX51R00J
R379	321-0138-30			RES,FXD,FILM:267 OHM,1%,0.125W,TC=T0	80009	321-0138-30
R380	321-0181-30			RES,FXD,FILM:750 OHM,1%,0.125W	80009	321-0181-30
R385	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W (R385A)	57668	NTR25J-E150E
R385	315-0681-00	300000	300120	RES,FXD,FILM:680 OHM,5%,0.25W (R385B)	57668	NTR25J-E680E
R385	315-0271-00	300121		RES,FXD,FILM:270 OHM,5%,0.25W (R385B)	57668	NTR25J-E270E
R386	311-0635-03	300000	308280	RES,VAR,NONWW:TRMR,1K OHM,10%,0.5W	80009	311-0635-03
R386	311-0635-00	308281		RES,VAR,NONWW:TRMR,1K OHM,0.5W	32997	3329H-G48-102
R387	321-0162-30	300000	300120	RES,FXD,FILM:475 OHM,1%,0.125W,TC=T0	80009	321-0162-30
R387	321-0172-30	300121	305010	RES,FXD,FILM:604 OHM,1%,1/8W,TC=T0	80009	321-0172-30
R387	321-0172-00	305011		RES,FXD,FILM:604 OHM,1%,0.125W,TC=T0	19701	5033ED604R0F
R388	315-0101-00	300000	300120	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R388	321-0260-30	300121		RES,FXD,FILM:4.99K OHM,1%,0.125W	80009	321-0260-30
R389	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R390	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R391	315-0821-00	300000	300020	RES,FXD,FILM:820 OHM,5%,0.25W	19701	5043CX820R0J
R391	315-0751-00	300021		RES,FXD,FILM:750 OHM,5%,0.25W	57668	NTR25J-E750E
R392	321-0235-30	300121		RES,FXD,FILM:2.74K OHM,1%,0.125W	80009	321-0235-30
R393	321-0231-30	300121		RES,FXD,FILM:2.49K OHM,1%,0.125W	80009	321-0231-30
R394	317-0430-00	300121		RES,FXD,CMPSN:43 OHM,5%,0.125W	01121	BB4305
R395	317-0430-00			RES,FXD,CMPSN:43 OHM,5%,0.125W	01121	BB4305
R396	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R397	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R398	307-0111-00			RES,FXD,CMPSN:3.6 OHM,5%,0.25W	80009	307-0111-00
R401	323-0191-00	300000	303390	RES,FXD,FILM:953 OHM,1%,0.5W,TC=T0	75042	CECT0-9530F
R402	323-0191-00	300000	303390	RES,FXD,FILM:953 OHM,1%,0.5W,TC=T0	75042	CECT0-9530F
R403	311-0609-00	300000	303390	RES,VAR,NONWW:TRMR,2K OHM,0.5W	32997	3329H-L58-202
R403	317-0101-00	300000	303390	RES,FXD,CMPSN:100 OHM,5%,0.125W (R403A)	01121	BB1015
R404	315-0330-00	300000	303390	RES,FXD,FILM:33 OHM,5%,0.25W	19701	5043CX33R00J
R405	315-0362-00	300000	303390	RES,FXD,FILM:3.6K OHM,5%,0.25W	19701	5043CX3K600J
R406	321-0151-30	300000	303390	RES,FXD,FILM:365 OHM,1%,0.125W,TC=T0	80009	321-0151-30
R407	315-0121-00	300000	303390	RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
R408	311-0635-00	300000	303390	RES,VAR,NONWW:TRMR,1K OHM,0.5W	32997	3329H-G48-102
R409	321-0151-30	300000	303390	RES,FXD,FILM:365 OHM,1%,0.125W,TC=T0	80009	321-0151-30
R410	321-0151-30	300000	303390	RES,FXD,FILM:365 OHM,1%,0.125W,TC=T0	80009	321-0151-30
R411	315-0241-00	300000	303390	RES,FXD,FILM:240 OHM,5%,0.25W	19701	5043CX240R0J

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R412	315-0241-00	300000	303390	RES,FXD,FILM:240 OHM,5%,0.25W	19701	5043CX240R0J
R413	311-0643-00	300000	303390	RES,VAR,NONWW:TRMR,50 OHM,0.5W	32997	3329H-L58-500
R414	311-0635-00	300000	303390	RES,VAR,NONWW:TRMR,1K OHM,0.5W	32997	3329H-G48-102
R415	315-0561-00	300000	303390	RES,FXD,FILM:560 OHM,5%,0.25W	19701	5043CX560R0J
R416	321-0151-30	300000	303390	RES,FXD,FILM:365 OHM,1%,0.125W,TC=T0	80009	321-0151-30
R420	321-0189-30	300000	303390	RES,FXD,FILM:909 OHM,1%,1/8W,TC=T0	80009	321-0189-30
R421	321-0082-30	300000	303390	RES,FXD,FILM:69.8 OHM,1%,0.125W,TC=T0	80009	321-0082-30
R430	321-0189-30	300000	303390	RES,FXD,FILM:909 OHM,1%,1/8W,TC=T0	80009	321-0189-30
R431	321-0082-30	300000	303390	RES,FXD,FILM:69.8 OHM,1%,0.125W,TC=T0	80009	321-0082-30
R440	321-0065-30	300000	303390	RES,FXD,FILM:46.4OHM,1%,0.125W,TC=T0	80009	321-0065-30
R441	311-0633-00	300000	303390	RES,VAR,NONWW:TRMR,5K OHM,0.5W	32997	3329H-G48-502
R442	321-0047-30	300000	303390	RES,FXD,FILM:30.1 OHM,1%,0.125W,TC=T0	80009	321-0047-30
R443	311-0635-00	300000	303390	RES,VAR,NONWW:TRMR,1K OHM,0.5W	32997	3329H-G48-102
R444	321-0047-30	300000	303390	RES,FXD,FILM:30.1 OHM,1%,0.125W,TC=T0	80009	321-0047-30
R445	311-0605-00	300000	303390	RES,VAR,NONWW:TRMR,200 OHM,0.5W	32997	3329H-G48-201
R446	321-0183-31	300000	303390	RES,FXD,FILM:787 OHM,0.5%,0.125W	80009	321-0183-31
R450	321-0065-30	300000	303390	RES,FXD,FILM:46.4OHM,1%,0.125W,TC=T0	80009	321-0065-30
R451	321-0193-30	300000	303390	RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R453	321-0138-30	300000	303390	RES,FXD,FILM:267 OHM,1%,0.125W,TC=T0	80009	321-0138-30
R459	315-0100-00	303391		RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R460	315-0100-00	300000	303390	RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R461	321-0082-30	303391		RES,FXD,FILM:69.8 OHM,1%,0.125W,TC=T0	80009	321-0082-30
R462	321-0065-30	303391		RES,FXD,FILM:46.4OHM,1%,0.125W,TC=T0	80009	321-0065-30
R463	321-0189-30	303391		RES,FXD,FILM:909 OHM,1%,1/8W,TC=T0	80009	321-0189-30
R466	315-0472-00	303391		RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R467	315-0562-00	303391		RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R471	321-0082-30	303391		RES,FXD,FILM:69.8 OHM,1%,0.125W,TC=T0	80009	321-0082-30
R472	321-0065-30	303391		RES,FXD,FILM:46.4OHM,1%,0.125W,TC=T0	80009	321-0065-30
R473	321-0189-30	303391		RES,FXD,FILM:909 OHM,1%,1/8W,TC=T0	80009	321-0189-30
R474	321-0183-00	303391		RES,FXD,FILM:787 OHM,1%,0.125W,TC=T0	07716	CEAD787R0F
R475	321-0189-30	303391		RES,FXD,FILM:909 OHM,1%,1/8W,TC=T0	80009	321-0189-30
R476	322-0195-30	303391		RES,FXD,FILM:1.05K OHM,1%,0.25W,TC-T0	80009	322-0195-30
R477	311-0644-03	303391	308280	RES,VAR,NONWW:TRMR,20K OHM,0.5W	80009	311-0644-03
R477	311-0644-00	308281		RES,VAR,NONWW:TRMR,20K OHM,0.5W	32997	3329H-G48-203
R478	315-0223-00	303391		RES,FXD,FILM:22K OHM,5%,0.25W	19701	5043CX22K00J92U
R481	321-0115-00	303391		RES,FXD,FILM:154 OHM,1%,0.125W,TC=T0	19701	5043ED154R0F
R482	322-0180-00	303391		RES,FXD,FILM:732 OHM,1%,0.25W,TC=T0	75042	CEBT0-7320F
R483	322-0210-00	303391		RES,FXD,FILM:1.50K OHM,1%,0.25W,TC=T0	75042	CEBT0-1501F
R484	322-0210-00	303391		RES,FXD,FILM:1.50K OHM,1%,0.25W,TC=T0	75042	CEBT0-1501F
R485	315-0470-00	303391		RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R486	323-0191-00	303391		RES,FXD,FILM:953 OHM,1%,0.5W,TC=T0	75042	CECT0-9530F
R487	323-0191-00	303391		RES,FXD,FILM:953 OHM,1%,0.5W,TC=T0	75042	CECT0-9530F
R491	321-0115-00	303391		RES,FXD,FILM:154 OHM,1%,0.125W,TC=T0	19701	5043ED154R0F
R492	322-0180-00	303391		RES,FXD,FILM:732 OHM,1%,0.25W,TC=T0	75042	CEBT0-7320F
R493	322-0210-00	303391		RES,FXD,FILM:1.50K OHM,1%,0.25W,TC=T0	75042	CEBT0-1501F
R494	322-0210-00	303391		RES,FXD,FILM:1.50K OHM,1%,0.25W,TC=T0	75042	CEBT0-1501F
R495	315-0470-00	303391		RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R496	323-0191-00	303391		RES,FXD,FILM:953 OHM,1%,0.5W,TC=T0	75042	CECT0-9530F
R497	323-0191-00	303391		RES,FXD,FILM:953 OHM,1%,0.5W,TC=T0	75042	CECT0-9530F
R500	315-0562-00			RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R501	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R502	321-0452-30			RES,FXD,FILM:499K OHM,1%,0.125W,TC=T0	80009	321-0452-30
R504	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R505	315-0150-00			RES,FXD,FILM:15 OHM,5%,0.25W	19701	5043CX15R00J
R507	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R508	315-0132-00			RES,FXD,FILM:1.3K OHM,5%,0.25W	57668	NTR25J-E01K3
R510	315-0150-00			RES,FXD,FILM:15 OHM,5%,0.25W	19701	5043CX15R00J
R511	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R512	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R520	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R521	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R522	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R532	321-1673-31			RES,FXD,FILM:55.6K OHM,0.5%,0.125W,TC=T0	80009	321-1673-31
R534	322-0622-30			RES,FXD,FILM:950K OHM,1%,0.25W,TC=T0	80009	322-0622-30
R535	322-1604-31			RES,FXD,FILM:1.05M OHM,0.5%,0.125W,TC=T0	80009	322-1604-31
R540	311-1192-00	300000	308435	RES,VAR,NONWW:PNL,10K OHM,1W,W/SW (R540 FURNISHED AS A UNIT WITH S550)	12697	381-CM39695
R540	311-1192-02	308436	311970	RES,VAR,NONWW:PNL,10K OHM,20%,1W,W/SLEEVE (R540 FURNISHED AS A UNIT WITH S550)	80009	311-1192-02
R540	311-1192-03	311971		RES,VAR,NONWW:PNL,10K OHM,1W,W/INSUL (R540 FURNISHED AS A UNIT WITH S550)	80009	311-1192-03
R541	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
R542	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R543	311-0607-02	300000	308280	RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-0607-02
R543	311-0607-00	308381		RES,VAR,NONWW:TRMR,10K OHM,0.5W	73138	82-25-2
R544	315-0392-00	300000	300328	RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R544	315-0242-00	300329		RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4
R545	321-0247-30			RES,FXD,FILM:3.65K OHM,1%,0.125W	80009	321-0247-30
R546	315-0560-00			RES,FXD,FILM:56 OHM,5%,0.25W	57668	NTR25J-E56E0
R547	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R548	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R549	315-0104-00			RES,FXD,FILM:100K OHM,5%,0.25W	57668	NTR25J-E100K
R550	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R551	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R554	321-0136-30			RES,FXD,FILM:255 OHM,1%,0.125W,TC=T0	80009	321-0136-30
R555	321-0136-30			RES,FXD,FILM:255 OHM,1%,0.125W,TC=T0	80009	321-0136-30
R556	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R557	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R558	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R559	321-0173-30			RES,FXD,FILM:619 OHM,1%,0.125W	80009	321-0173-30
R560	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
R561	321-0228-30			RES,FXD,FILM:2.32K OHM,1%,0.125W,TC=T0	80009	321-0228-30
R570	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
R571	321-0265-30			RES,FXD,FILM:5.62K OHM,1%,0.125W	80009	321-0265-30
R590	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R591	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R592	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R600	260-1713-00	300000	303333	SWITCH,PUSH:1 BTN,2POLE,PUSH-PUSH	82104	2039PB402-0001
R600	260-1713-01	303334		SWITCH,PUSH:1 BTN,2 POLE,CH2 INVERT	80009	260-1713-01
R603	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R604	321-0247-30			RES,FXD,FILM:3.65K OHM,1%,0.125W	80009	321-0247-30
R605	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R607	315-0392-00	300000	300328	RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R607	315-0242-00	300329		RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4
R608	311-1743-00			RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-1743-00
R609	315-0681-00			RES,FXD,FILM:680 OHM,5%,0.25W	57668	NTR25J-E680E
R610	311-1798-00			RES,VAR,NONWW:PNL,10K OHM,10%,0.1W W/SW (R610 FURNISHED AS A UNIT WITH S630)	80009	311-1798-00
R611	315-0560-00			RES,FXD,FILM:56 OHM,5%,0.25W	57668	NTR25J-E56E0
R612	321-0247-00			RES,FXD,FILM:3.65K OHM,1%,0.125W,TC=T0	19701	5043ED3K650F
R613	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R615	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R616	321-0136-30			RES,FXD,FILM:255 OHM,1%,0.125W,TC=T0	80009	321-0136-30
R617	321-0173-30			RES,FXD,FILM:619 OHM,1%,0.125W	80009	321-0173-30
R618	321-0136-30			RES,FXD,FILM:255 OHM,1%,0.125W,TC=T0	80009	321-0136-30
R620	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R621	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9

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R622	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R626	321-0228-30			RES,FXD,FILM:2.32K OHM,1%,0.125W,TC=T0	80009	321-0228-30
R627	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
R628	315-0121-00			RES,FXD,FILM:120 OHM,5%,0.25W	19701	5043CX120R0J
R629	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R630	----- -----			(FURNISHED AS A UNIT WITH R610)		
R630	321-0265-30			RES,FXD,FILM:5.62K OHM,1%,0.125W	80009	321-0265-30
R635	315-0153-00	300000	300328	RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R635	315-0113-00	300329		RES,FXD,FILM:11K OHM,5%,0.25W	19701	5043CX11K00J
R636	311-1743-00			RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-1743-00
R650	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R651	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R652	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R700	317-0271-00	300000	310910	RES,FXD,CMPSN:270 OHM,5%,0.125W	01121	BB2715
R700	315-0271-00	310911		RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
R701	321-0164-30			RES,FXD,FILM:499 OHM,1%,1/8W,TC=T0	80009	321-0164-30
R702	315-0153-00	300000	300328	RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R702	315-0113-00	300329		RES,FXD,FILM:11K OHM,5%,0.25W	19701	5043CX11K00J
R703	321-0183-31			RES,FXD,FILM:787 OHM,0.5%,0.125W	80009	321-0183-31
R704	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R705	311-1743-00			RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-1743-00
R707	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R708	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R709	315-0183-00			RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R710	315-0152-00			RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R711	315-0101-00	300000	310910	RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R712	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
R713	311-1605-00			RES,VAR,NONWW:CKT BD,50K OHM,10%,0.5W	80009	311-1605-00
R714	311-0946-00	300000	302430	RES,VAR,WW:TRMR,50K OHM,2W	02111	534-0070
R714	311-1953-00	302431	310835	RES,VAR,WW:PNL,50K OHM,3%,2W	02111	534-586
R714	311-1953-01	310836		RES,VAR,WW:50K OHM,5%,2W,LINEAR	80009	311-1953-01
R715	311-1743-00			RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-1743-00
R716	321-0193-30			RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R717	315-0820-00			RES,FXD,FILM:82 OHM,5%,0.25W	57668	NTR25J-E82E0
R718	321-0331-30			RES,FXD,FILM:27.4K OHM,1%,0.125W	80009	321-0331-30
R720	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R721	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R722	315-0820-00			RES,FXD,FILM:82 OHM,5%,0.25W	57668	NTR25J-E82E0
R723	321-0285-30			RES,FXD,FILM:9.09K OHM,1%,0.125W,TELEQ	80009	321-0285-30
R725	322-0510-02			RES,FXD,FILM:2.0M OHM,0.5%,0.25W,TC=T2 (R725A,B)	03888	PME60C20003D
R725	322-0620-31	300000	310910	RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R725C)	80009	322-0620-31
R725	322-0620-01	310911		RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R725C)	75042	CEBT0-8003D
R725	322-0620-31	300000	310910	RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R725D)	80009	322-0620-31
R725	322-0620-01	310911		RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R725D)	75042	CEBT0-8003D
R725	321-1661-31			RES,FXD,FILM:80K OHM,0.5%,0.125W,TC=T0 (R725E,F)	80009	321-1661-31
R725	321-1308-31			RES,FXD,FILM:16K OHM,0.5%,0.125W,TC=T0 (R725G)	80009	321-1308-31
R726	311-1796-00	300000	303280	RES,VAR,NONWW:PNL,20K X 20K OHM,10%,0.1W	80009	311-1796-00
R726	311-1796-01	303281		RES,VAR,NONWW:PNL,20K X 20K OHM,10%,0.1W	80009	311-1796-01
R729	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R730	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R732	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R734	315-0242-00			RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4

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R736	321-0265-30			RES,FXD,FILM:5.62K OHM,1%,0.125W	80009	321-0265-30
R737	321-0289-30			RES,FXD,FILM:10.0K OHM,1%,0.125W	80009	321-0289-30
R738	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R739	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R740	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R741	315-0272-00	300000	301290	RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
R741	315-0392-00	301291		RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R742	311-1794-00			RES,VAR,NONWW:PNL,30K,10%,0.125W	80009	311-1794-00
R743	315-0333-00			RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
R744	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
R745	315-0273-00			RES,FXD,FILM:27K OHM,5%,0.25W	57668	NTR25J-E27K0
R746	315-0623-00	300000	304285	RES,FXD,FILM:62K OHM,5%,0.25W	19701	5043CX62K00J
R746	315-0204-00	304286		RES,FXD,FILM:200K OHM,5%,0.25W	19701	5043CX200K0J
R747	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
R748	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R749	315-0241-00			RES,FXD,FILM:240 OHM,5%,0.25W	19701	5043CX240R0J
R750	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
R752	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R754	315-0622-00			RES,FXD,FILM:6.2K OHM,5%,0.25W	19701	5043CX6K200J
R755	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R758	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R760	315-0103-00	300000	301375	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R760	315-0471-00	301376		RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R761	315-0112-00			RES,FXD,FILM:1.1K OHM,5%,0.25W	19701	5043CX1K100J
R762	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R763	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R764	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
R767	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R768	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R769	321-0230-30			RES,FXD,FILM:2.43K OHM,1%,0.125W	80009	321-0230-30
R770	321-0265-30			RES,FXD,FILM:5.62K OHM,1%,0.125W	80009	321-0265-30
R772	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R773	315-0100-00	300000	301805	RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R773	315-0120-00	301806		RES,FXD,FILM:12 OHM,5%,0.25W	57668	NTR25J-R12
R774	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R780	315-0153-00	300000	300100	RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R780	315-0682-00	300101		RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R781	315-0562-00			RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R782	315-0393-00			RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R801	321-0183-31			RES,FXD,FILM:787 OHM,0.5%,0.125W	80009	321-0183-31
R802	321-0164-30			RES,FXD,FILM:499 OHM,1%,1/8W,TC=T0	80009	321-0164-30
R804	315-0332-00			RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3
R805	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R807	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R808	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R810	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R811	315-0183-00			RES,FXD,FILM:18K OHM,5%,0.25W	19701	5043CX18K00J
R813	315-0820-00			RES,FXD,FILM:82 OHM,5%,0.25W	57668	NTR25J-E82E0
R816	315-0820-00			RES,FXD,FILM:82 OHM,5%,0.25W	57668	NTR25J-E82E0
R817	315-0433-00			RES,FXD,FILM:43K OHM,5%,0.25W	19701	5043CX43K00J
R818	311-1745-00			RES,VAR,NONWW:TRMR,100K OHM,10%,0.5W	80009	311-1745-00
R820	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R821	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R822	321-0265-30	300000	310910	RES,FXD,FILM:5.62K OHM,1%,0.125W	80009	321-0265-30
R822	321-0265-00	310911		RES,FXD,FILM:5.62K OHM,1%,0.125W,TC=T0	19701	5043ED5K620F
R823	321-0289-30			RES,FXD,FILM:10.0K OHM,1%,0.125W	80009	321-0289-30
R825	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R826	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9

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R827	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R828	315-0242-00			RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4
R829	315-0432-00			RES,FXD,FILM:4.3K OHM,5%,0.25W	57668	NTR25J-E04K3
R830	315-0471-00	300000	301290	RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
R830	315-0391-00	301291		RES,FXD,FILM:390 OHM,5%,0.25W	57668	NTR25J-E390E
R831	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R832	315-0622-00			RES,FXD,FILM:6.2K OHM,5%,0.25W	19701	5043CX6K200J
R835	321-0285-30			RES,FXD,FILM:9.09K OHM,1%,0.125W,TELEQ	80009	321-0285-30
R840	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R850	322-0510-02			RES,FXD,FILM:2.0M OHM,0.5%,0.25W,TC=T2 (R850A,B)	03888	PME60C20003D
R850	322-0620-31	300000	310910	RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R850C)	80009	322-0620-31
R850	322-0620-01	310911		RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R850C)	75042	CEBT0-8003D
R850	322-0620-31	300000	310910	RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R850D)	80009	322-0620-31
R850	322-0620-01	310911		RES,FXD,FILM:800K OHM,0.5%,0.25W,TC=T0 (R850D)	75042	CEBT0-8003D
R850	321-1661-31			RES,FXD,FILM:80K OHM,0.5%,0.125W,TC=T0 (R850E)	80009	321-1661-31
R850	321-1661-31			RES,FXD,FILM:80K OHM,0.5%,0.125W,TC=T0 (R850F)	80009	321-1661-31
R850	321-1308-31			RES,FXD,FILM:16K OHM,0.5%,0.125W,TC=T0 (R850G)	80009	321-1308-31
R900	315-0911-00			RES,FXD,FILM:910 OHM,5%,0.25W	57668	NTR25J-E910E
R903	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R904	315-0622-00			RES,FXD,FILM:6.2K OHM,5%,0.25W	19701	5043CX6K200J
R905	311-1740-00			RES,VAR,NONWW:TRMR,1K OHM,10%,0.5W	80009	311-1740-00
R906	311-1797-00			RES,VAR,NONWW:PNL,20K X 20K OHM,10%,0.1W	80009	311-1797-00
R907	315-0822-00	300000	301230	RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R907	315-0562-00	301231		RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R908	315-0182-00	300000	300328	RES,FXD,FILM:1.8K OHM,5%,0.25W	57668	NTR25J-E1K8
R908	315-0202-00	300329	301230	RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R908	315-0152-00	301231		RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R909	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R910	321-0216-30			RES,FXD,FILM:1.74K OHM,1%,0.125W,TC=T0	80009	321-0216-30
R924	321-0264-30			RES,FXD,FILM:5.49K OHM,1%,0.125W	80009	321-0264-30
R925	321-0251-30			RES,FXD,FILM:4.02K OHM,1%,0.125W	80009	321-0251-30
R926	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R927	321-0251-30			RES,FXD,FILM:4.02K OHM,1%,0.125W	80009	321-0251-30
R929	321-0207-30			RES,FXD,FILM:1.4K OHM,1%,0.125,TC=T0	80009	321-0207-30
R930	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R931	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W	57668	NTR25J-E 20K
R932	321-0207-30			RES,FXD,FILM:1.4K OHM,1%,0.125,TC=T0	80009	321-0207-30
R933	311-1742-00			RES,VAR,NONWW:TRMR,500K OHM,10%,0.5W	80009	311-1742-00
R934	321-0282-30			RES,FXD,FILM:8.45K OHM,1%,0.125W,TC=T0	80009	321-0282-30
R935	321-0282-30			RES,FXD,FILM:8.45K OHM,1%,0.125W,TC=T0	80009	321-0282-30
R936	321-0286-30			RES,FXD,FILM:9.31K OHM,1%,0.125W	80009	321-0286-30
R937	321-0231-00	300000	300100	RES,FXD,FILM:2.49K OHM,1%,0.125W,TC=T0	19701	5033ED2K49F
R937	321-0260-30	300101		RES,FXD,FILM:4.99K OHM,1%,0.125W	80009	321-0260-30
R938	311-1742-00			RES,VAR,NONWW:TRMR,500K OHM,10%,0.5W	80009	311-1742-00
R939	321-0155-30			RES,FXD,FILM:402 OHM,1%,0.125W,TC=T0	80009	321-0155-30
R940	311-1604-00			RES,VAR,NONWW:CKT BD,200 OHM,10%,0.5W	80009	311-1604-00
R942	321-0265-30			RES,FXD,FILM:5.62K OHM,1%,0.125W	80009	321-0265-30
R946	321-0255-30			RES,FXD,FILM:4.42K OHM,1%,0.125W	80009	321-0255-30
R954	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R955	321-0289-30	300000	300120	RES,FXD,FILM:10.0K OHM,1%,0.125W (R955A)	80009	321-0289-30
R955	321-0327-30	300121		RES,FXD,FILM:24.9K OHM,+1%,1/8W,TC=T0	80009	321-0327-30

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
				(R955A)		
R955	321-0346-30	300030	300120	RES,FXD,FILM:39.2K OHM,1%,0.125W,TC=T0 (R955B)	80009	321-0346-30
R955	321-0327-30	300121		RES,FXD,FILM:24.9K OHM,+1%,1/8W,TC=T0 (R955B)	80009	321-0327-30
R957	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R960	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
R962	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R963	315-0124-00			RES,FXD,FILM:120K OHM,5%,0.25W	19701	5043CX120K0J
R971	315-0621-00			RES,FXD,FILM:620 OHM,5%,0.25W	57668	NTR25J-E620E
R972	321-0385-30			RES,FXD,FILM:100K OHM,1%,0.125W	80009	321-0385-30
R973	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R974	315-0242-00			RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4
R975	321-0289-30	300000	300120	RES,FXD,FILM:10.0K OHM,1%,0.125W (R975A)	80009	321-0289-30
R975	321-0327-30	300121		RES,FXD,FILM:24.9K OHM,+1%,1/8W,TC=T0 (R975A)	80009	321-0327-30
R975	321-0346-30	300000	300120	RES,FXD,FILM:39.2K OHM,1%,0.125W,TC=T0 (R975B)	80009	321-0346-30
R975	321-0327-30	300121		RES,FXD,FILM:24.9K OHM,+1%,1/8W,TC=T0 (R975B)	80009	321-0327-30
R978	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
R979	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R981	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R982	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R983	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R984	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R985	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1000	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1001	315-0205-00			RES,FXD,FILM:2M OHM,5%,0.25W	01121	CB2055
R1002	315-0622-00			RES,FXD,FILM:6.2K OHM,5%,0.25W	19701	5043CX6K200J
R1003	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25W	57668	NTR25J-E12K0
R1004	315-0473-00			RES,FXD,FILM:47K OHM,5%,0.25W	57668	NTR25J-E47K0
R1005	311-1605-00			RES,VAR,NONWW:CKT BD,50K OHM,10%,0.5W	80009	311-1605-00
R1006	315-0683-00	300000	300120	RES,FXD,FILM:68K OHM,5%,0.25W	57668	NTR25J-E68K0
R1006	315-0913-00	300121		RES,FXD,FILM:91K OHM,5%,0.25W	19701	5043CX91K00J
R1007	321-0318-30			RES,FXD,FILM:20.0K OHM,1%,0.125W	80009	321-0318-30
R1008	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
R1009	311-1744-00			RES,VAR,NONWW:TRMR,20K OHM,10%,0.5W	80009	311-1744-00
R1010	321-0348-30			RES,FXD,FILM:41.2K OHM,1%,0.125W	80009	321-0348-30
R1011	321-0299-30			RES,FXD,FILM:12.7K OHM,1%,0.125W,TC=T0	80009	321-0299-30
R1012	321-0336-30			RES,FXD,FILM:30.9K OHM,1%,0.125W	80009	321-0336-30
R1013	321-0260-30			RES,FXD,FILM:4.99K OHM,1%,0.125W	80009	321-0260-30
R1014	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R1015	315-0153-00			RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R1016	321-0289-30			RES,FXD,FILM:10.0K OHM,1%,0.125W	80009	321-0289-30
R1021	315-0151-00			RES,FXD,FILM:150 OHM,5%,0.25W	57668	NTR25J-E150E
R1022	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1028	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R1030	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R1031	315-0124-00			RES,FXD,FILM:120K OHM,5%,0.25W	19701	5043CX120K0J
R1032	315-0363-00			RES,FXD,FILM:36K OHM,5%,0.25W	57668	NTR25J-E36K0
R1035	315-0124-00			RES,FXD,FILM:120K OHM,5%,0.25W	19701	5043CX120K0J
R1036	315-0363-00			RES,FXD,FILM:36K OHM,5%,0.25W	57668	NTR25J-E36K0
R1037	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R1038	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R1042	321-0268-30			RES,FXD,FILM:6.04K OHM,1%,0.125W	80009	321-0268-30
R1043	307-0093-00			RES,FXD,CMPSN:1.2 OHM,5%,0.5W	01121	EB12G5
R1044	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R1045	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R1046	315-0105-00	300000	301805	RES,FXD,FILM:1M OHM,5%,0.25W	19701	5043CX1M000J
R1046	315-0684-00	301806		RES,FXD,FILM:680K OHM,5%,0.25W	01121	CB6845
R1047	315-0103-00	300000	301805	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1047	315-0333-00	301806		RES,FXD,FILM:33K OHM,5%,0.25W	57668	NTR25J-E33K0
R1048	315-0512-00	300000	301805	RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R1048	315-0153-00	301806		RES,FXD,FILM:15K OHM,5%,0.25W	19701	5043CX15K00J
R1049	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1050	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1053	315-0106-00			RES,FXD,FILM:10M OHM,5%,0.25W	01121	CB1065
R1054	315-0243-00			RES,FXD,FILM:24K OHM,5%,0.25W	57668	NTR25J-E24K0
R1055	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1056	315-0241-00			RES,FXD,FILM:240 OHM,5%,0.25W	19701	5043CX240R0J
R1057	315-0201-00			RES,FXD,FILM:200 OHM,5%,0.25W	57668	NTR25J-E200E
R1077	315-0302-00			RES,FXD,FILM:3K OHM,5%,0.25W	57668	NTR25J-E03K0
R1078	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1079	321-0255-30			RES,FXD,FILM:4.42K OHM,1%,0.125W	80009	321-0255-30
R1080	311-1740-00			RES,VAR,NONWW:TRMR,1K OHM,10%,0.5W	80009	311-1740-00
R1081	315-0122-00			RES,FXD,FILM:1.2K OHM,5%,0.25W	57668	NTR25J-E01K2
R1082	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1083	321-0286-30			RES,FXD,FILM:9.31K OHM,1%,0.125W	80009	321-0286-30
R1085	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1091	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25W	57668	NTR25J-E02K7
R1092	321-0303-31			RES,FXD,FILM:14K OHM,0.5%,0.125W,TC=T0	80009	321-0303-31
R1093	321-1308-31			RES,FXD,FILM:16K OHM,0.5%,0.125W,TC=T0	80009	321-1308-31
R1120	321-1662-31			RES,FXD,FILM:30K OHM,0.5%,0.125W,TC=T0	80009	321-1662-31
R1121	321-1308-31			RES,FXD,FILM:16K OHM,0.5%,0.125W,TC=T0	80009	321-1308-31
R1122	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1123	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R1129	315-0682-00			RES,FXD,FILM:6.8K OHM,5%,0.25W	57668	NTR25J-E06K8
R1200	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R1201	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R1202	316-0226-00			RES,FXD,CMPSN:22M OHM,10%,0.25W	01121	CB2261
R1203	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1204	315-0185-00			RES,FXD,FILM:1.8M OHM,5%,0.25W	01121	CB1855
R1205	315-0185-00			RES,FXD,FILM:1.8M OHM,5%,0.25W	01121	CB1855
R1206	315-0185-00			RES,FXD,FILM:1.8M OHM,5%,0.25W	01121	CB1855
R1207	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1208	311-1745-00			RES,VAR,NONWW:TRMR,100K OHM,10%,0.5W	80009	311-1745-00
R1210	301-0473-00	300000	305905	RES,FXD,FILM:47K OHM,5%,0.5W	19701	5053CX47K00J
R1210	303-0473-00	305906		RES,FXD,CMPSN:47K OHM,5%,1W	01121	GB4735
R1212	301-0822-00	300000	300120	RES,FXD,FILM:8.2K OHM,5%,0.5W	19701	5053CX8K200J
R1212	303-0822-00	300121		RES,FXD,CMPSN:8.2K OHM,5%,1W	01121	GB8225
R1218	303-0752-00	300000	300020	RES,FXD,CMPSN:7.5K OHM,5%,1W (R1218A)	01121	GB7525
R1218	303-0562-00	300021	305830	RES,FXD,CMPSN:5.6K OHM,5%,1W (R1218A)	01121	GB5625
R1218	----- -----	305831		(R1218A,SELECTED - SEE MAINT SECTION)		
R1218	303-0562-00			RES,FXD,CMPSN:5.6K OHM,5%,1W (R1218A)	01121	GB5625
R1218	303-0472-00			RES,FXD,CMPSN:4.7K OHM,5%,1W (1218A)	01121	GB4725
R1218	303-0392-00			RES,FXD,CMPSN:3.9K OHM,5%,1W (R1218A)	01121	GB3925
R1218	303-0222-00			RES,FXD,CMPSN:2.2K OHM,5%,1W (R1218A)	01121	GB2225
R1218	303-0182-00			RES,FXD,CMPSN:1.8K OHM,5%,1W (R1218A)	01121	GB1825
R1218	301-0392-00	300000	300020	RES,FXD,FILM:3.9K OHM,5%,0.5W (R1218B)	19701	5053CX3K900J

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
R1218	303-0562-00	300021		RES,FXD,CMPSN:5.6K OHM,5%,1W (R1218B)	01121	GB5625
R1222	325-0196-00			RES,FXD,FILM:40M OHM,5%,2W,TC=200 PPM/DEG C	80009	325-0196-00
R1223	311-1739-00			RES,VAR,NONWW:5M OHM,0.5W	80009	311-1739-00
R1225	315-0155-00			RES,FXD,FILM:1.5M OHM,5%,0.25W	19701	5043CX1M500J
R1226	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25W	57668	NTR25JE01K0
R1240	315-0103-00	300000	300020	RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1240	315-0393-00	300021		RES,FXD,FILM:39K OHM,5%,0.25W	57668	NTR25J-E39K0
R1241	315-0513-00	300000	300020	RES,FXD,FILM:51K OHM,5%,0.25W	57668	NTR25J-E51K0
R1242	315-0754-00	300000	300020	RES,FXD,FILM:750K OHM,5%,0.25W,MI	19701	5043CX750K0J
R1242	316-0226-00	300021	300120	RES,FXD,CMPSN:22M OHM,10%,0.25W	01121	CB2261
R1251	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R1260	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1261	311-1744-00	300000	301375	RES,VAR,NONWW:TRMR,20K OHM,10%,0.5W	80009	311-1744-00
R1261	311-1246-00	301376	302595	RES,VAR,NONWW:TRMR,50K OHM,0.5W	32997	3386X-T07-503
R1261	311-1605-00	302596		RES,VAR,NONWW:CKT BD,50K OHM,10%,0.5W	80009	311-1605-00
R1262	321-0431-30	300000	301375	RES,FXD,FILM:301K OHM,1%,0.125W,TC=T0	80009	321-0431-30
R1262	321-0430-30	301376		RES,FXD,FILM:294K OHM,1%,0.125W,TC=T0	80009	321-0430-30
R1263	325-0196-00	300000	301375	RES,FXD,FILM:40M OHM,5%,2W,TC=200 PPM/DEG C	80009	325-0196-00
R1263	325-0196-01	301376		RES,FXD,FILM:40M OHM,2%,2W	80009	325-0196-01
R1265	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R1266	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R1267	307-0106-01	300000	300120	RES,FXD,CMPSN:4.7OHM,5%,0.25W	80009	307-0106-01
R1271	311-1745-00			RES,VAR,NONWW:TRMR,100K OHM,10%,0.5W	80009	311-1745-00
R1273	311-1745-00			RES,VAR,NONWW:TRMR,100K OHM,10%,0.5W	80009	311-1745-00
R1275	311-1743-00			RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-1743-00
R1316	311-0622-02	300121	308280	RES,VAR,NONWW:TRMR,100 OHM,10%,0.5	80009	311-0622-02
R1316	311-0622-00	308281		RES,VAR,NONWW:TRMR,100 OHM,0.5W	32997	3329H-L58-101
R1400	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1401	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1403	321-0251-30			RES,FXD,FILM:4.02K OHM,1%,0.125W	80009	321-0251-30
R1404	315-0912-00			RES,FXD,FILM:9.1K OHM,5%,0.25W	57668	NTR25J-E09K1
R1405	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1407	321-0267-30			RES,FXD,FILM:5.90K OHM,+1%,1/8W,TC=T0	80009	321-0267-30
R1411	321-0205-30			RES,FXD,FILM:1.33K OHM,1%,0.125W,TC=T0	80009	321-0205-30
R1413	321-0267-30			RES,FXD,FILM:5.90K OHM,+1%,1/8W,TC=T0	80009	321-0267-30
R1414	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25W	57668	NTR25J-E04K7
R1415	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1417	315-0112-00			RES,FXD,FILM:1.1K OHM,5%,0.25W	19701	5043CX1K100J
R1418	315-0822-00			RES,FXD,FILM:8.2K OHM,5%,0.25W	19701	5043CX8K200J
R1419	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25W	19701	5043CX10K00J
R1421	315-0242-00			RES,FXD,FILM:2.4K OHM,5%,0.25W	57668	NTR25J-E02K4
R1425	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1426	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1430	315-0562-00			RES,FXD,FILM:5.6K OHM,5%,0.25W	57668	NTR25J-E05K6
R1431	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R1432	315-0470-00			RES,FXD,FILM:47 OHM,5%,0.25W	57668	NTR25J-E47E0
R1433	315-0911-00			RES,FXD,FILM:910 OHM,5%,0.25W	57668	NTR25J-E910E
R1434	315-0223-00			RES,FXD,FILM:22K OHM,5%,0.25W (R1434A)	19701	5043CX22K00J92U
R1434	315-0203-00			RES,FXD,FILM:20K OHM,5%,0.25W (R1434B)	57668	NTR25J-E 20K
R1435	311-1812-00			RES,VAR,NONWW:PNL,1K OHM,10%,0.5W	80009	311-1812-00
R1436	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25W	57668	NTR25J-E03K9
R1438	315-0202-00			RES,FXD,FILM:2K OHM,5%,0.25W	57668	NTR25J-E 2K
R1439	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
R1444	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25W	57668	NTR25J-E02K2
R1445	315-0512-00			RES,FXD,FILM:5.1K OHM,5%,0.25W	57668	NTR25J-E05K1
R1447	315-0913-00			RES,FXD,FILM:91K OHM,5%,0.25W	19701	5043CX91K00J

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R1450	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1451	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RR00J
R1452	307-0125-00	300000	303390	RES,THERMAL:500 OHM,10%,NTC	15454	1DB501K-220-EC
R1500	321-0328-30	300000	300100	RES,FXD,FILM:25.5K OHM,1%,0.125W,TC=T0	80009	321-0328-30
R1500	321-0339-30	300101		RES,FXD,FILM:33.2K OHM,1%,0.125W	80009	321-0339-30
R1501	311-1022-01	300000	300100	RES,VAR,NONWW:TRMR,50K OHM,10%,0.5W,S/T	80009	311-1022-01
R1501	311-0607-02	300101	308280	RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-0607-02
R1501	311-0607-00	308281		RES,VAR,NONWW:TRMR,10K OHM,0.5W	73138	82-25-2
R1502	321-0289-30			RES,FXD,FILM:10.0K OHM,1%,0.125W	80009	321-0289-30
R1503	315-0152-00	300121		RES,FXD,FILM:1.5K OHM,5%,0.25W	57668	NTR25J-E01K5
R1510	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25W	57668	NTR25J-E270E
R1511	311-0609-02	300121	308280	RES,VAR,NONWW:TRMR,2K OHM,10%,0.5W	80009	311-0609-02
R1511	311-0609-00	308281		RES,VAR,NONWW:TRMR,2K OHM,0.5W	32997	3329H-L58-202
R1512	321-0289-30	300000	300070	RES,FXD,FILM:10.0K OHM,1%,0.125W	80009	321-0289-30
R1512	321-0289-01	300071	300120	RES,FXD,FILM:10.0K OHM,0.5%,0.125W,TC=T0	07716	CEAD10001D
R1512	321-0284-30	300121		RES,FXD,FILM:8.87K OHM,1%,0.125W	80009	321-0284-30
R1513	321-0381-30	300000	300035	RES,FXD,FILM:90.9K OHM,+1%,1/8W,TC=T0	80009	321-0381-30
R1513	321-1672-31	300036	300120	RES,FXD,FILM:70K OHM,0.5%,0.125W,TC=T0	80009	321-1672-31
R1513	321-0380-30	300121		RES,FXD,FILM:88.7K OHM,1%,0.125W	80009	321-0380-30
R1514	321-0385-31	300000	300035	RES,FXD,FILM:100K OHM,0.5%,0.125W	80009	321-0385-31
R1514	321-1671-31	300036	300120	RES,FXD,FILM:79K OHM,0.5%,0.125W,TC=T0	80009	321-1671-31
R1514	321-0339-30	300121		RES,FXD,FILM:33.2K OHM,1%,0.125W	80009	321-0339-30
R1515	321-0193-30	300000	300070	RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R1515	321-0193-01	300071	300120	RES,FXD,FILM:1K OHM,0.5%,0.125W,TC=T0	07716	CEAD10000D
R1515	321-0138-30	300121		RES,FXD,FILM:267 OHM,1%,0.125W,TC=T0	80009	321-0138-30
R1519	311-0607-02	300000	308280	RES,VAR,NONWW:TRMR,10K OHM,10%,0.5W	80009	311-0607-02
R1519	311-0607-00	308281		RES,VAR,NONWW:TRMR,10K OHM,0.5W	73138	82-25-2
R1521	321-0385-31	300000	300035	RES,FXD,FILM:100K OHM,0.5%,0.125W	80009	321-0385-31
R1521	321-1671-31	300036	300120	RES,FXD,FILM:79K OHM,0.5%,0.125W,TC=T0	80009	321-1671-31
R1521	321-0331-30	300121		RES,FXD,FILM:27.4K OHM,1%,0.125W	80009	321-0331-30
R1522	321-0193-30	300000	300070	RES,FXD,FILM:1K OHM,1%,0.125W,TC=T0	80009	321-0193-30
R1522	321-0193-01	300071	300120	RES,FXD,FILM:1K OHM,0.5%,0.125W,TC=T0	07716	CEAD10000D
R1522	321-0147-30	300121		RES,FXD,FILM:332 OHM,1%,0.125W,TC=T0	80009	321-0147-30
RT105	307-0125-00	312411		RES,THERMAL:500 OHM,10%,NTC	15454	1DB501K-220-EC
RT205	307-0125-00	312411		RES,THERMAL:500 OHM,10%,NTC	15454	1DB501K-220-EC
RT461	307-0124-00	312411		RES,THERMAL:5K OHM,10%,NTC	15454	1DC502K-220-EC
S2	260-1731-00	300000	308280	SWITCH,SLIDE:DP3T,1A,12VAC,CKT BD TERM	29604	68-0328
S2	260-0984-02	308281		SWITCH,SLIDE:DPTT,0.5A,125VAC,W/KNOB	80009	260-0984-02
S4	263-1107-00			SW CAM ACTR AS:VOLTS/DIV (S4 & S14 FURNISHED AS A UNIT)	80009	263-1107-00
S12	260-1731-00	300000	308280	SWITCH,SLIDE:DP3T,1A,12VAC,CKT BD TERM	29604	68-0328
S12	260-0984-02	308281		SWITCH,SLIDE:DPTT,0.5A,125VAC,W/KNOB	80009	260-0984-02
S14	----- -----			(S14 & S4 FURNISHED AS A UNIT)		
S220	260-1713-00	300000	303333	SWITCH,PUSH:1 BTN,2POLE,PUSH-PUSH	82104	2039PB402-0001
S220	260-1713-01	303334		SWITCH,PUSH:1 BTN,2 POLE,CH2 INVERT	80009	260-1713-01
S300	260-1712-00			SW,PUSH:4 BTN,2 POLE,VERT MODE/TRIG SOURCE	31918	ORDER BY DESCR
S500	260-1717-00	300000	303333	SWITCH,PUSH:3 BTN,2&4 POLE,TRIG CPLG	82104	2221PB400-10-03
S500	260-1717-01	303334		SWITCH,PUSH:3 BTN,2/4 POLE,TRIG CPLG SOURCE	80009	260-1717-01
S510	260-1730-00			SWITCH,SLIDE:DP3T,1A,125VAC (FURNISHED AS A UNIT WITH R540)	29604	68-0327
S700	260-1718-00	300000	303333	SWITCH,PUSH:3 BTN,2 POLE	82104	2222PB4021003
S700	260-1718-01	303334		SW,PUSH:3 BTN,2 POLE,RESET AUTO SGL NORM	31918	ORDER BY DESCR
S750	263-1104-00			SW CAM ACTR AS:TIME/DIV	80009	263-1104-00
S850	----- -----			(PART OF S850)		
S900	260-1716-00	300000	303333	SWITCH,PUSH:1 BTN,4POLE,PUSH-PUSH	82104	2220-PB404001
S900	260-1716-01	303334		SWITCH,PUSH:1 BTN,4 POLE,HORIZ DISPLAY	31918	ORDER BY DESCR
S910	260-1716-00	300000	303333	SWITCH,PUSH:1 BTN,4POLE,PUSH-PUSH	82104	2220-PB404001
S910	260-1716-01	303334		SWITCH,PUSH:1 BTN,4 POLE,HORIZ DISPLAY	31918	ORDER BY DESCR
S930	260-1713-00	300000	303333	SWITCH,PUSH:1 BTN,2POLE,PUSH-PUSH	82104	2039PB402-0001

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
S930	260-1713-01	303334		SWITCH,PUSH:1 BTN,2 POLE,CH2 INVERT	80009	260-1713-01
S1000	260-1615-00	300000	310303	SWITCH,TOGGLE:DPDT,5A,125VAC,ON-ON (S1000A)	09353	U318SHZQI
S1000	260-2083-00	310304		SWITCH,TOGGLE:DPDT,6A,125VAC,ON/ON (S1000A)	80009	260-2083-00
S1000	260-0834-00			SWITCH,TOGGLE:DPDT,5A,125VAC,ON-ON (S1000B)	09353	U21-SHZQE
S1001	260-1300-00			SWITCH,SLIDE:DPDT,3A,125VAC	82389	46206LFE
S1002	260-1728-00			SWITCH:4P3T	80009	260-1728-00
S1003	260-1728-00			SWITCH:4P3T	80009	260-1728-00
T1001	120-0980-00	300000	300120	XFMR,PWR,STU:	80009	120-0980-00
T1001	120-0980-01	300121	310610	XFMR,PWR,STU:	80009	120-0980-01
T1001	120-0980-02	310611		XFMR,PWR,STU:W/CONNECTOR	80009	120-0980-02
T1002	120-0973-00	300000	310610	XFMR,CONVERTER:	80009	120-0973-00
T1002	120-0973-01	310611		XFMR,CONVERTER:W/CONNECTOR	80009	120-0973-01
T1003	120-0974-00			XFMR,DRIVER:	80009	120-0974-00
T1267	120-1021-00	300000	300120	XFMR,PWR,STPDN:HEATER	80009	120-1021-00
T1267	120-1030-00	300121		XFMR,PWR,STPDN:	80009	120-1030-00
U100	155-0032-00			MICROCKT,LINEAR:PLRT INV & TRIG PICK-OFF	80009	155-0032-00
U200	155-0032-00			MICROCKT,LINEAR:PLRT INV & TRIG PICK-OFF	80009	155-0032-00
U300	156-0174-02	300000	300120	MICROCKT,DGTL:DUAL J-K M/S FF W/DATA LOCK,SCREENED (U300A,B)	01295	SN74111NP3
U300	156-0280-00	300121	308690	MICROCKT,DGTL:J-K MSTR-SLAVE FF	01295	SN74L72 N OR J
U300	156-0038-02	308691		MICROCKT,DGTL:J-K MASTER SLAVE FF,SCRN	01295	SN7472NP3
U320	156-0186-02			MICROCKT,DGTL:QUAD 2-INP NAND GATE,	18324	N7403(NB OR FB)
U330	156-0030-03			MICROCKT,DGTL:QUAD 2 INPUT NAND GATE,SCRN	18324	N7400(NB OR FB)
U340	156-0030-03			MICROCKT,DGTL:QUAD 2 INPUT NAND GATE,SCRN	18324	N7400(NB OR FB)
U350	155-0022-00			MICROCKT,DGTL:CHANNEL SWITCH	80009	155-0022-00
U360	155-0022-00			MICROCKT,DGTL:CHANNEL SWITCH	80009	155-0022-00
U400	155-0077-00	300000	300120	MICROCKT,LINEAR:H-106,HYBRID	80009	155-0077-00
U400	155-0115-00	300121	303390	MICROCKT,LINEAR:CRT VERT DEFL PL DRVR	80009	155-0115-00
U550	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
U700	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
U730	155-0028-00			MICROCKT,LINEAR:MILLER INTEGRATOR	80009	155-0028-00
U750	155-0049-01	300000	302430	MICROCKT,DGTL:W/LOCKOUT DSBL FCTN	80009	155-0049-01
U750	155-0049-02	302431		MICROCKT,DGTL:SWEEP CONT,W/LOCKOUT DISABLE	80009	155-0049-02
U800	156-0048-00			MICROCKT,LINEAR:5 XSTR ARRAY	02735	CA3046
U815	155-0028-00			MICROCKT,LINEAR:MILLER INTEGRATOR	80009	155-0028-00
U825	156-0113-03			MICROCKT,DGTL:QUAD 2 INP NAND GATE,SCRN,	01295	SN74L00NP3
U1001	156-0158-00			MICROCKT,LINEAR:DUAL OPNL AMPL	04713	MC1458P1/MC1458U
U1002	156-0158-00			MICROCKT,LINEAR:DUAL OPNL AMPL	04713	MC1458P1/MC1458U
U1003	156-0067-00			MICROCKT,LINEAR:OPNL AMPL,SEL	04713	MC1741CP1
U1214	119-0710-00	300000	301560	POWER SUPPLY:2KV AC P-P IN,2KV DC OUT	80009	119-0710-00
U1214	119-0710-01	301561		POWER SUPPLY:2KV AC P-P IN,2KV DC OUT	80009	119-0710-01
U1230	119-0711-00	300000	312355	POWER SUPPLY:2KV AC P-P IN,10KV DC OUT	80009	119-0711-00
U1230	119-0711-02	312356		POWER SUPPLY:2KV AC IN,10KV DC OUT	80009	119-0711-02
U1405	156-0113-03			MICROCKT,DGTL:QUAD 2 INP NAND GATE,SCRN,	01295	SN74L00NP3
U1500	156-0402-00	300000	308980	MICROCKT,LINEAR:TIMER	27014	LM555CN
U1500	156-0402-04	308981		MICROCKT,LINEAR:TIMER	80009	156-0402-04
V1270	154-0726-05			ELECTRON TUBE:CRT,P31,INT SCALE	80009	154-0726-05
VR738	152-0279-00	300000	300100	SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	14552	TD3810989
VR738	152-0175-00	300101		SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.5W,DO-7	14552	TD3810976
VR764	152-0278-00			SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7	80009	152-0278-00
VR963	152-0279-00			SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	14552	TD3810989
VR973	152-0278-00			SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7	80009	152-0278-00
VR1004	152-0217-00	300000	302140	SEMICOND DVC,DI:ZEN,SI,8.2V,5%,0.4W,DO-7	04713	SZG20
VR1004	152-0127-00	302141		SEMICOND DVC,DI:ZEN,SI,7.5V,5%,0.4W,DO-7	14433	Z5347 (1N958B)
VR1008	152-0279-00	300000	300020	SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	14552	TD3810989

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
VR1008	152-0175-00	300021		SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.5W,DO-7	14552	TD3810976
VR1009	152-0278-00			SEMICOND DVC,DI:ZEN,SI,3V,5%,0.4W,DO-7	80009	152-0278-00
VR1043	152-0243-00			SEMICOND DVC,DI:ZEN,SI,15V,5%,0.4W,DO-7	04713	SZ13203 (1N965B)
VR1077	152-0279-00			SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	14552	TD3810989
VR1081	152-0304-00			SEMICOND DVC,DI:ZEN,SI,20V,5%,0.4W,DO-7	15238	Z5411
VR1207	152-0286-00			SEMICOND DVC,DI:ZEN,SI,75V,5%,0.4W,DO-7	14552	1N982B
VR1241	152-0243-00	300121	302945	SEMICOND DVC,DI:ZEN,SI,15V,5%,0.4W,DO-7	04713	SZ13203 (1N965B)
VR1241	152-0241-00	302946		SEMICOND DVC,DI:ZEN,SI,33V,5%,0.4W,DO-7	14552	1N973B
VR1439	152-0279-00			SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	14552	TD3810989
VR1500	152-0175-00	300000	300035	SEMICOND DVC,DI:ZEN,SI,5.6V,5%,0.5W,DO-7	14552	TD3810976
VR1500	152-0279-00	300036	300120	SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	14552	TD3810989
VR1500	152-0195-00	300121		SEMICOND DVC,DI:ZEN,SI,5.1V,5%,0.4W,DO-7	04713	SZ11755RL

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols and Reference Designators

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).

Symbols used on the diagrams are based on ANSI Standard Y32.2-1970.

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 following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

A	Assembly, separable or repairable (circuit board, etc.)
AT	Attenuator, fixed or variable
B	Motor
BT	Battery
C	Capacitor, fixed or variable
CB	Circuit breaker
CR	Diode, signal or rectifier
DL	Delay line
DS	Indicating device (lamp)
E	Spark Gap
F	Fuse
FL	Filter
H	Heat dissipating device (heat sink, heat radiator, etc.)
HR	Heater
HY	Hybrid circuit
J	Connector, stationary portion
K	Relay
L	Inductor, fixed or variable
LR	Inductor/resistor combination
M	Meter
P	Connector, movable portion
Q	Transistor or silicon-controlled rectifier
R	Resistor, fixed or variable
RT	Thermistor
S	Switch
T	Transformer
TC	Thermocouple
TP	Test point
U	Assembly, inseparable or non-repairable (integrated circuit, etc.)
V	Electron tube
VR	Voltage regulator (zener diode, etc.)
Y	Crystal
Z	Phase shifter

The following special symbols are used on the diagrams:

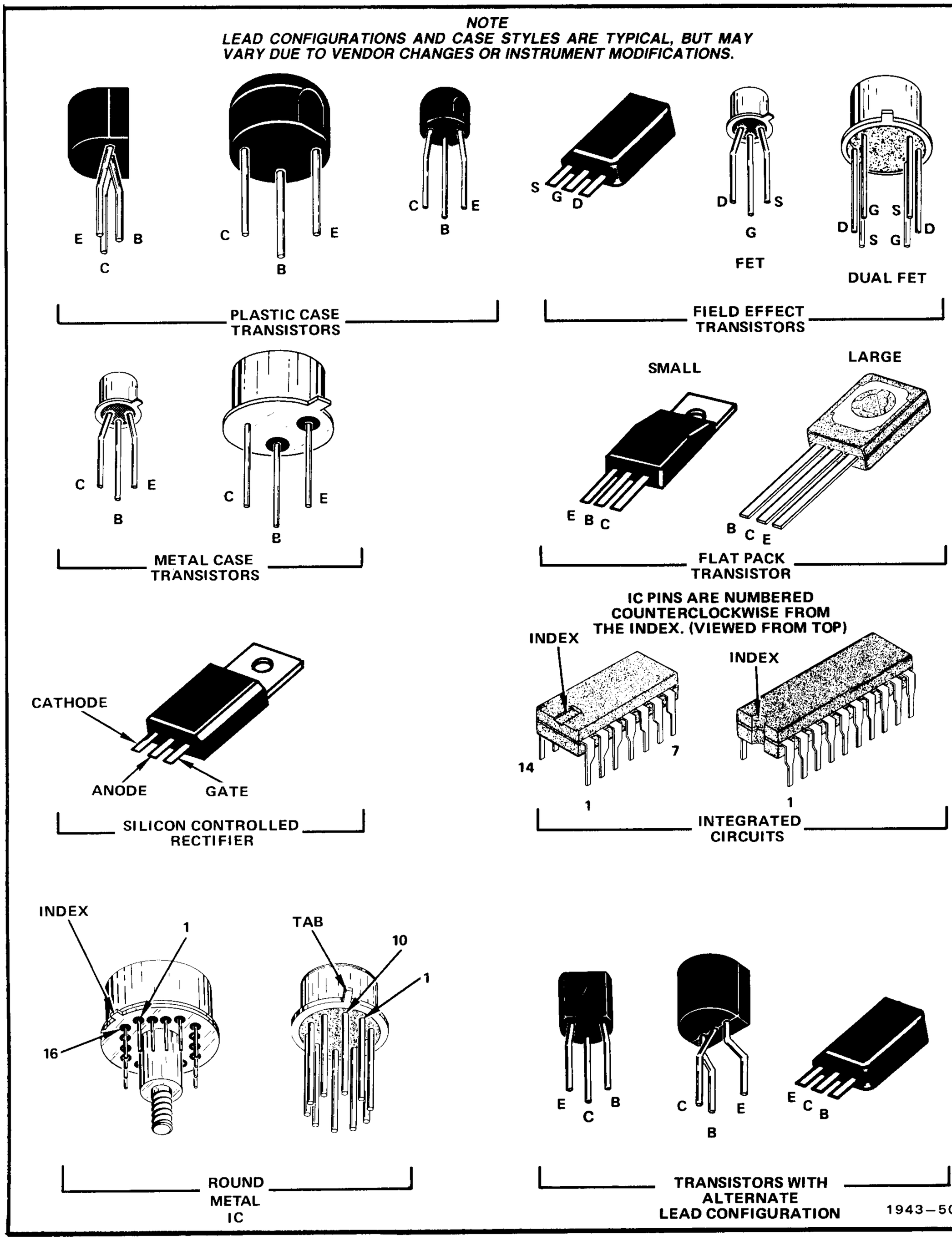


Fig. 8-1. Semiconductor lead configuration.

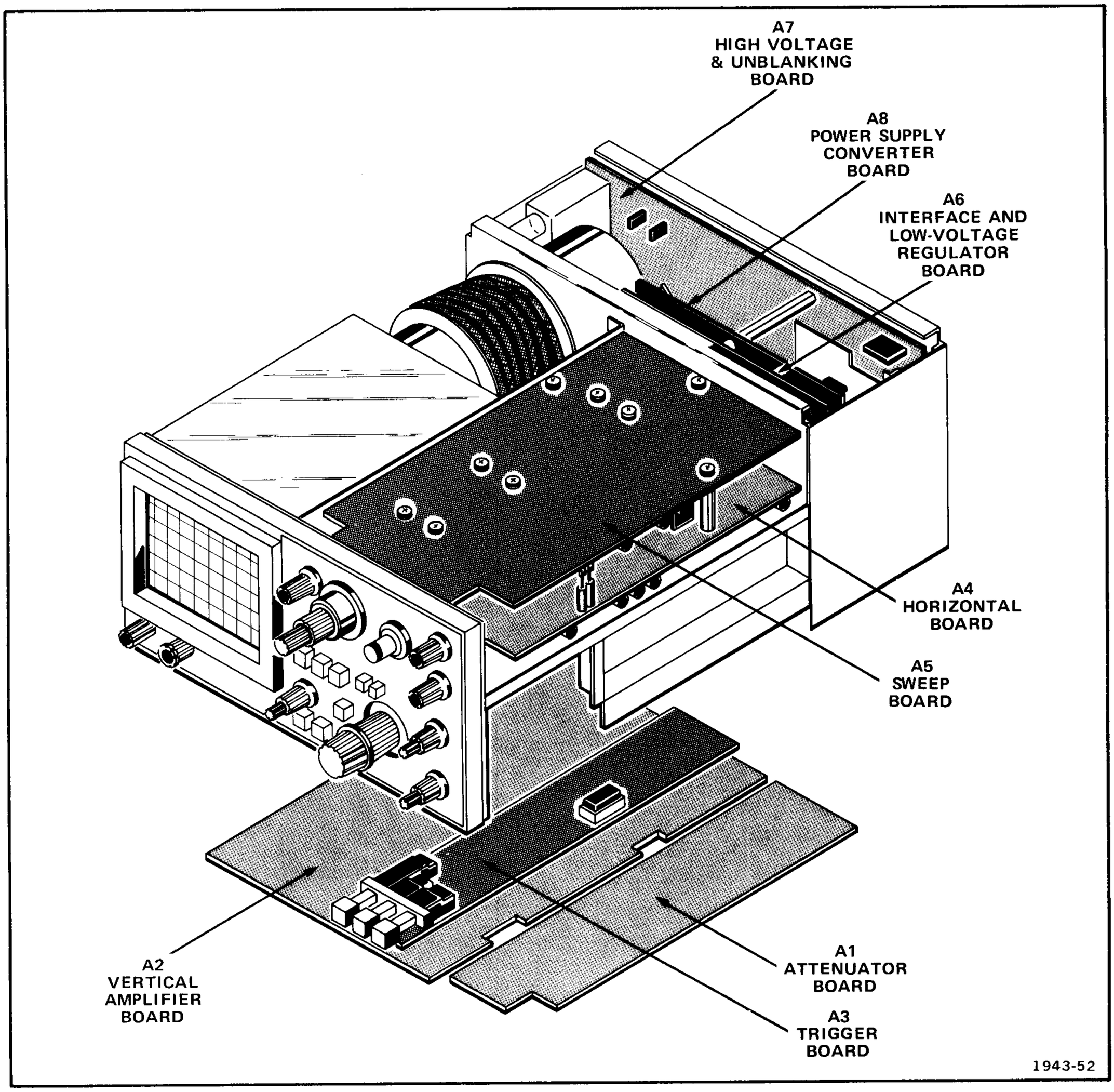
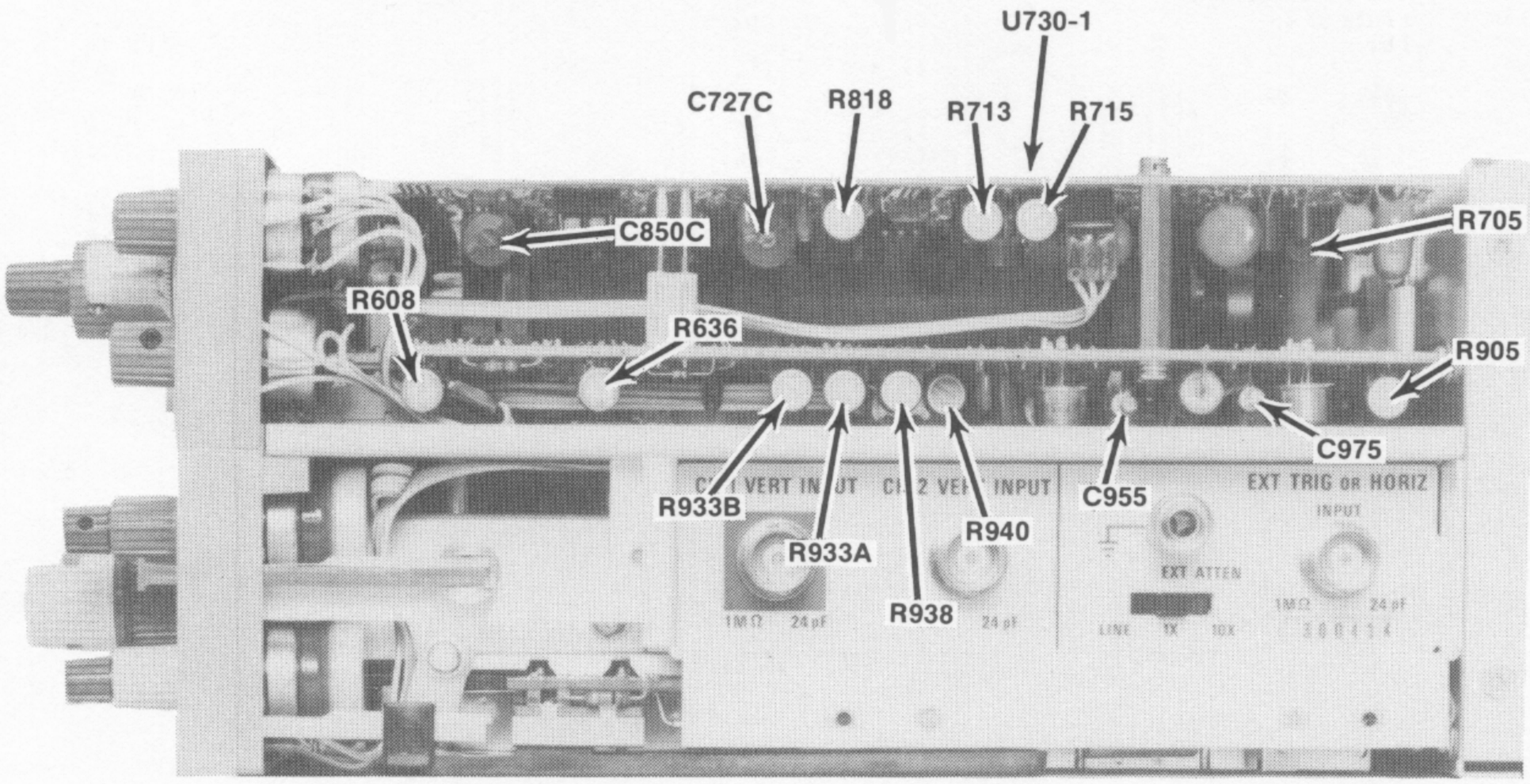


Fig. 8-4. Circuit board locations.



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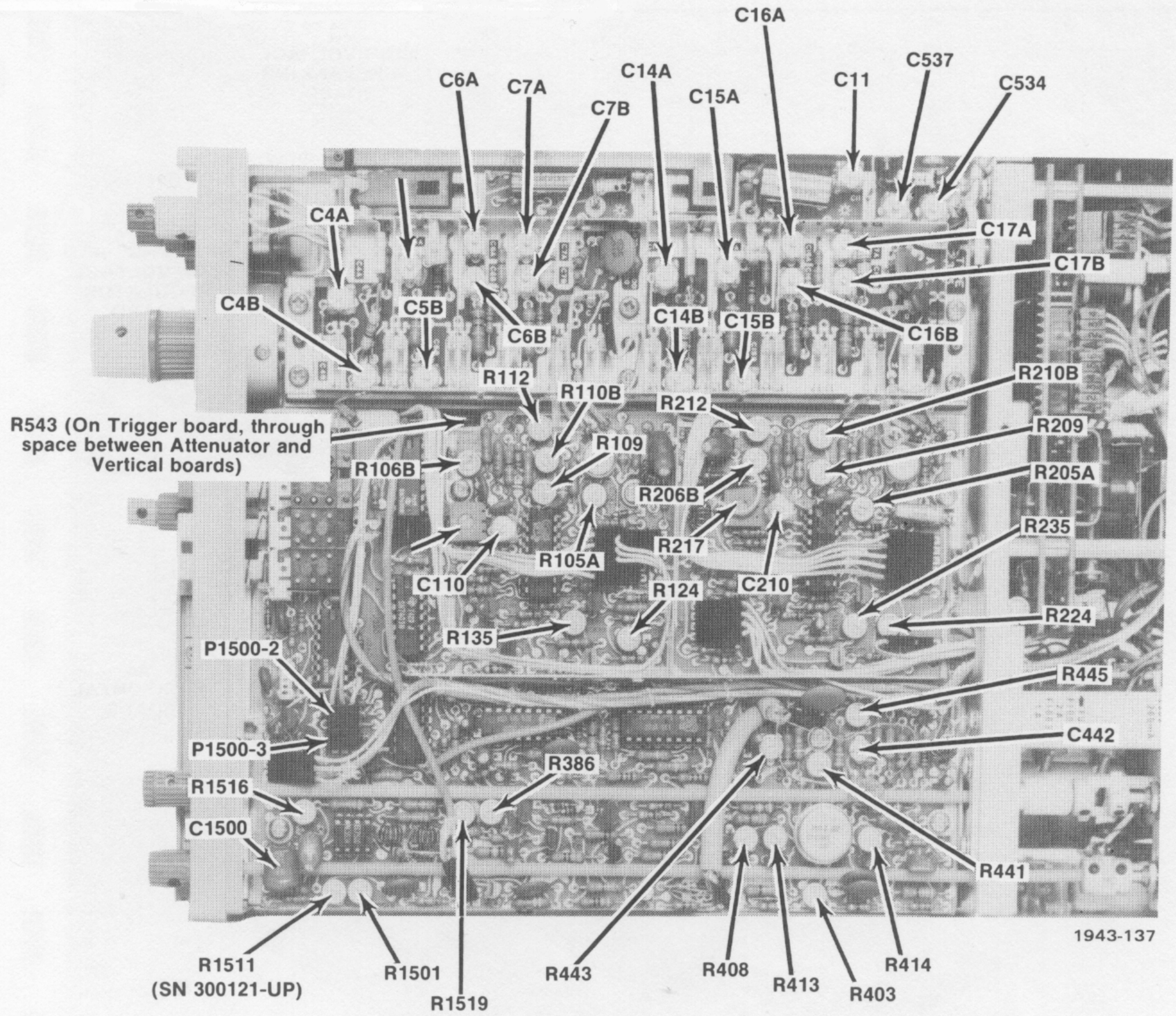
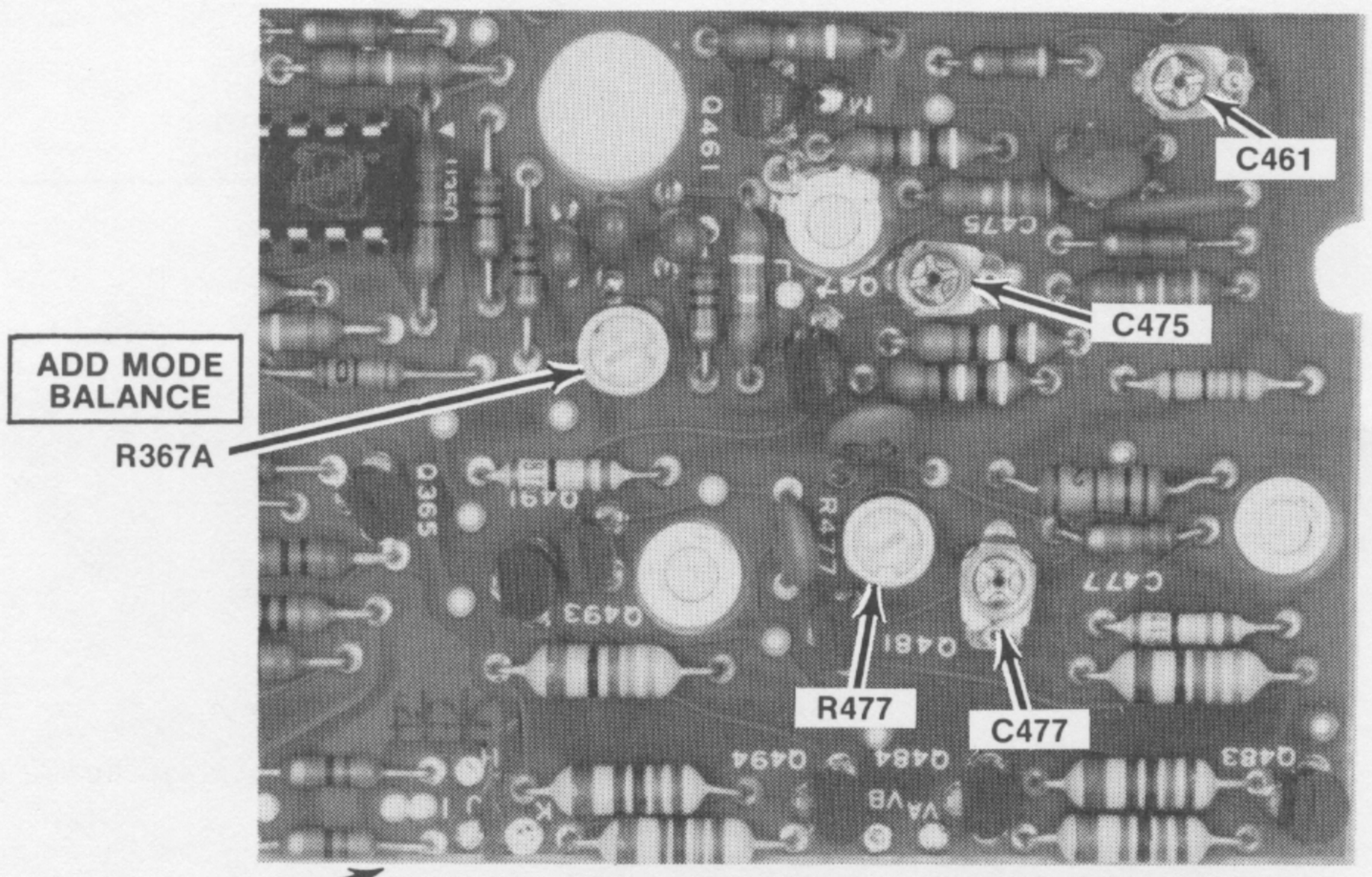
(A) Side of Instrument

Fig. 8-3. A, B & C. Adjustment locations 2 (Vertical, Trigger, Horizontal & Calibrator).

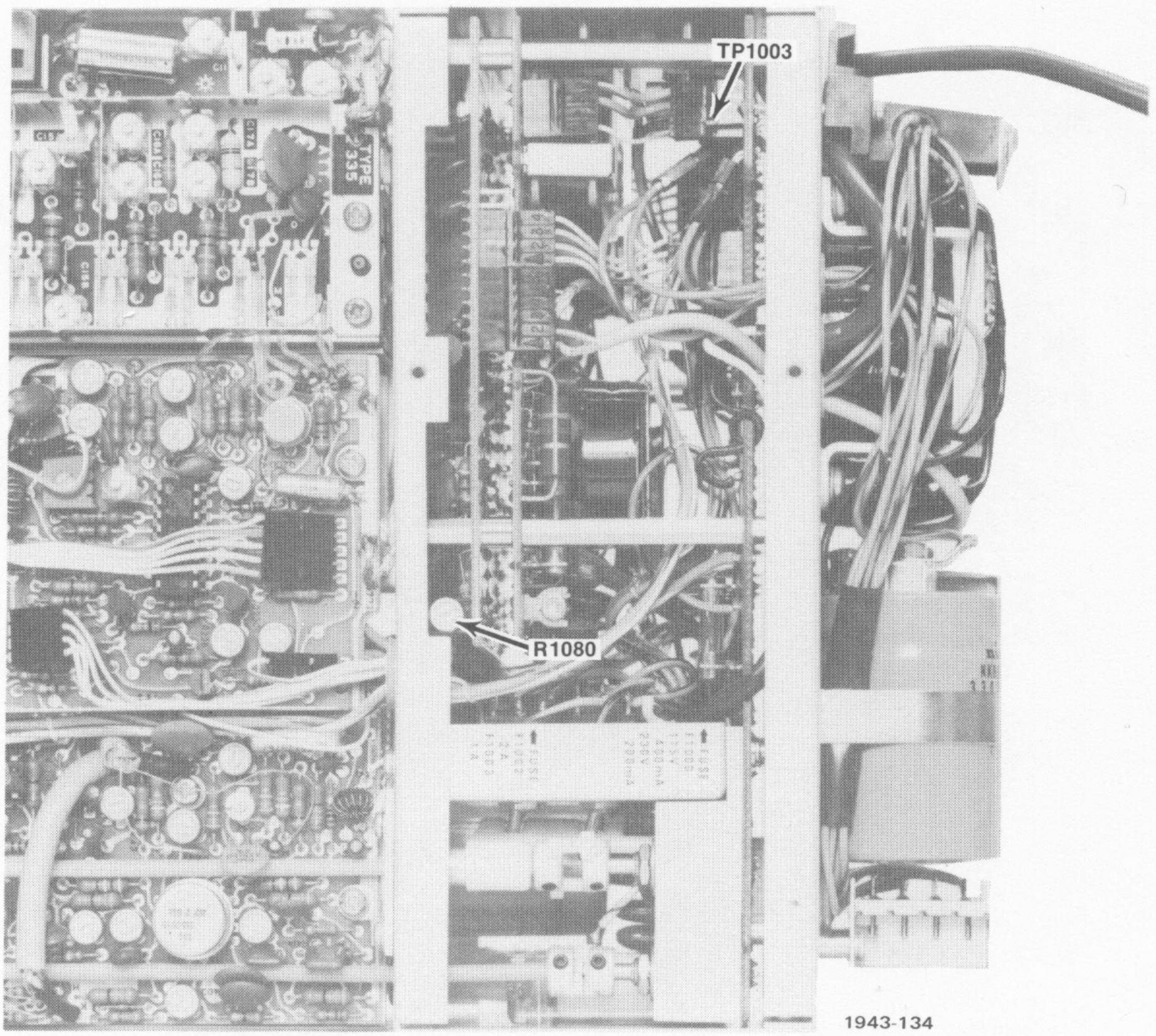
Fig. 8-3. A, B & C. Adjustment locations 2 (Vertical, Trigger, Horizontal & Calibrator).



(B) Bottom of Instrument (with I.C. Vertical—SN300000 through 303390).

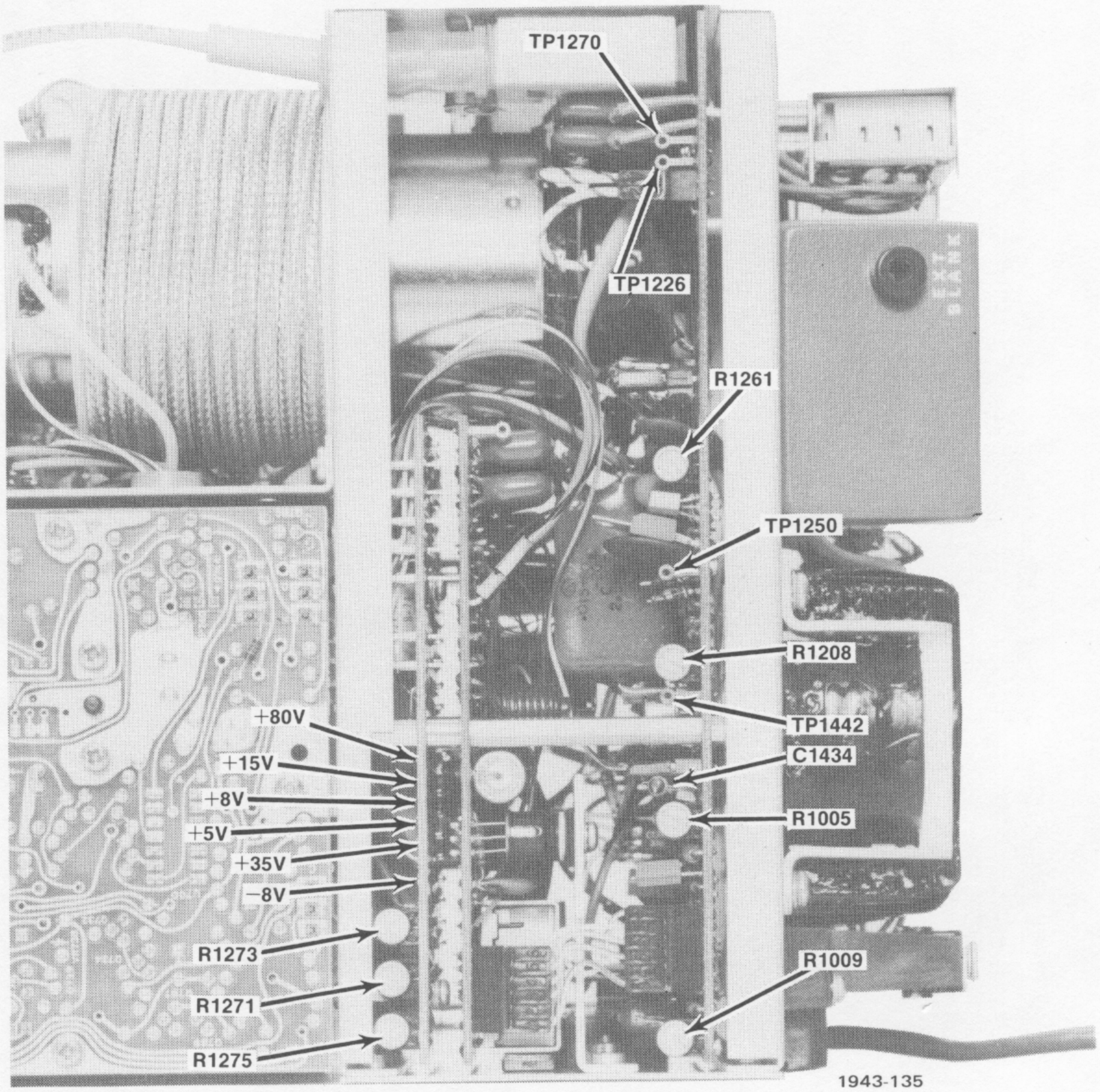


(C) A2 Discrete Vertical SN303391—up.



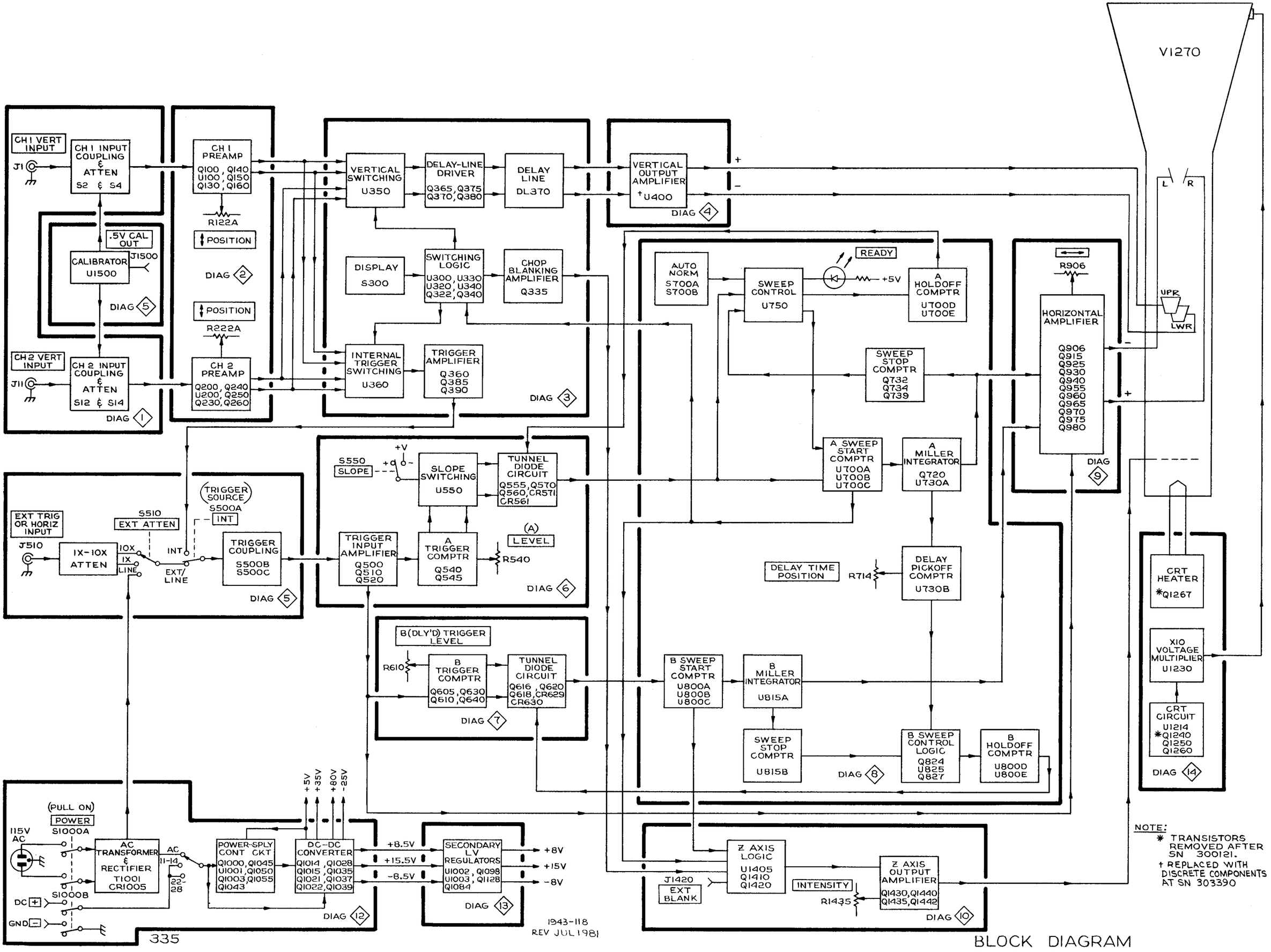
(A) Bottom of Instrument

Fig. 8-2. A & B. Adjustment locations 1 (Power Supply & Display).



(B) Top of Instrument

Fig. 8-2. A & B. Adjustment locations 1 (Power Supply & Display).



NOTE:
* TRANSISTORS REMOVED AFTER SN 300121.
† REPLACED WITH DISCRETE COMPONENTS AT SN 303390

BLOCK DIAGRAM

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

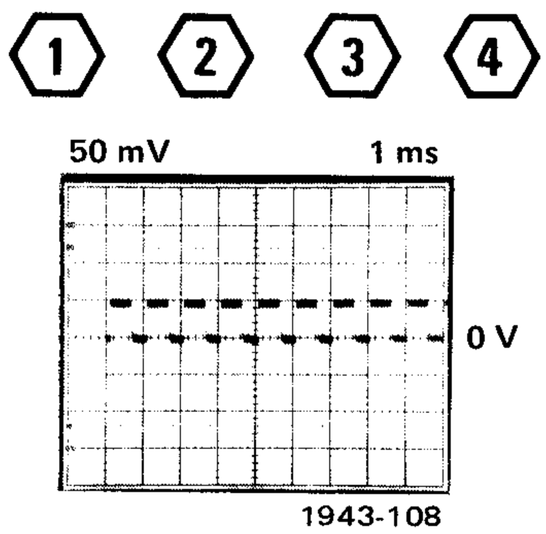
VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.



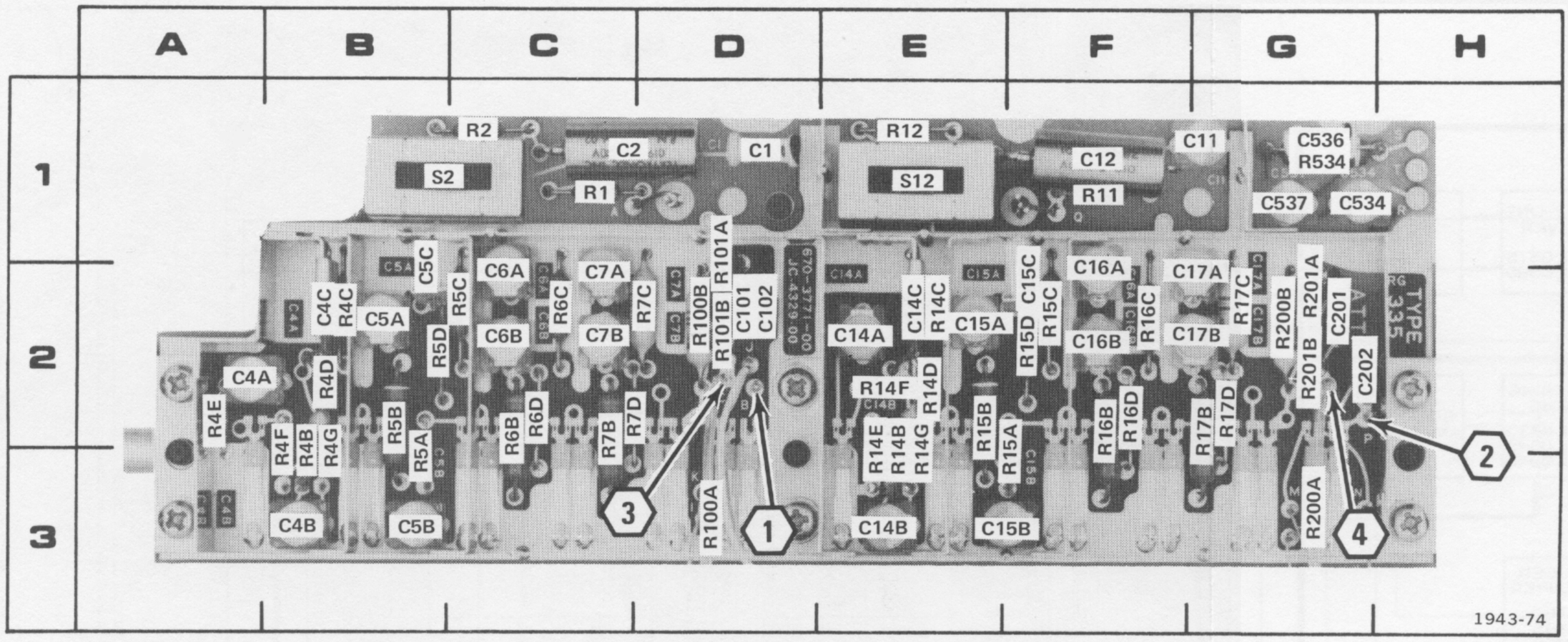
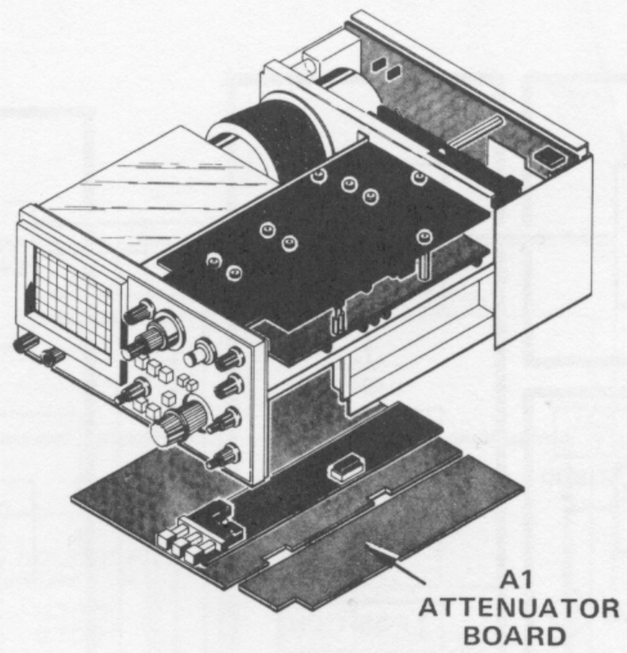
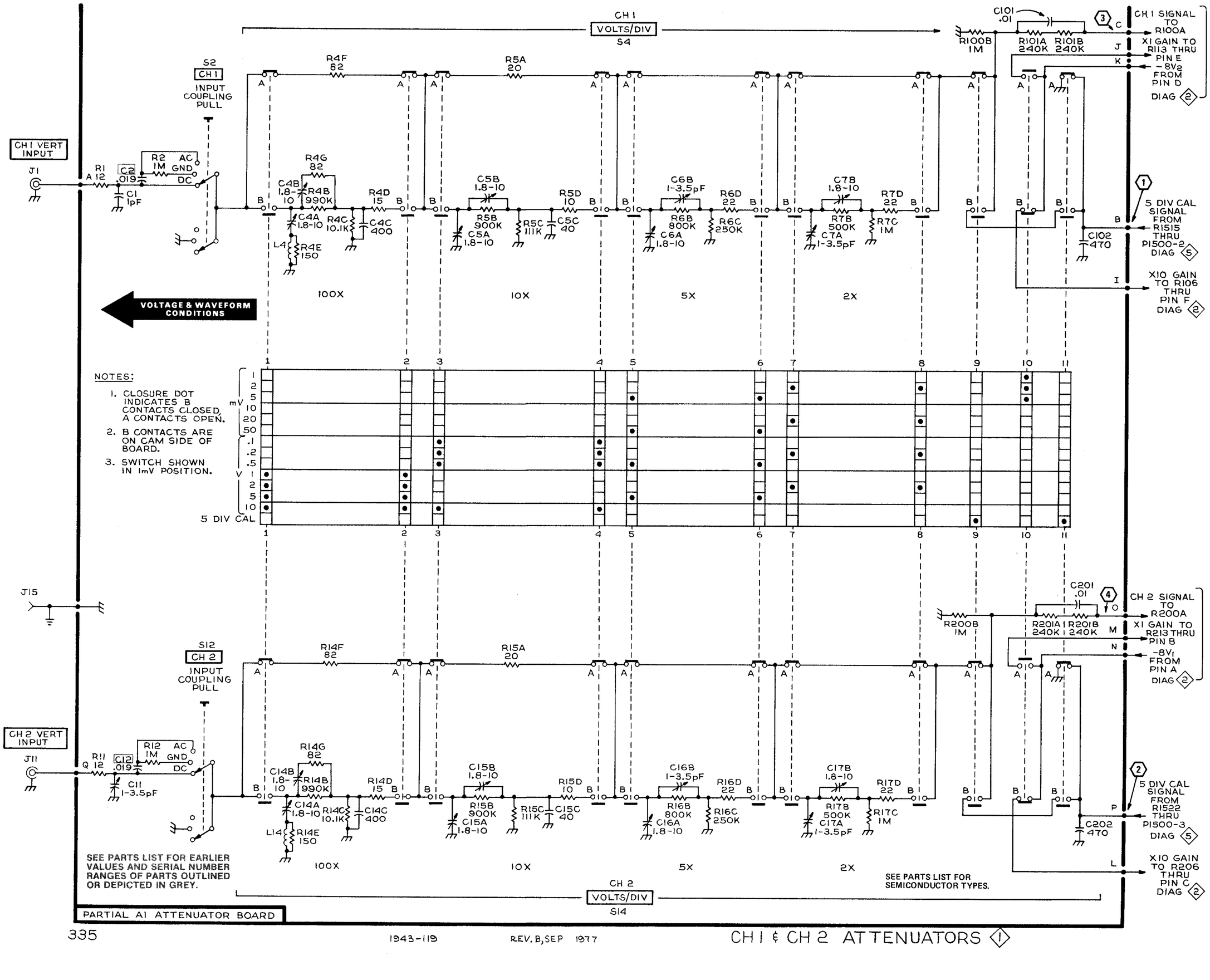


Fig. 8-5. A1 Attenuator board component locations.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1	1D	C12	1F	C202	2G	R5A	3B	R14C	2E	R17C	2G
C2	1C	C14A	2E	C534	1G	R5B	2B	R14D	2E	R17D	2G
C4A	2A	C14B	3E	C536	1G	R5C	2C	R14E	2E	R100B	2D
C4B	3B	C14C	2E	C537	1G	R5D	2B	R14F	2E	R101A	1D
C4C	2B	C15A	2E			R6B	2C	R14G	2E	R101B	2D
C5A	2B	C15B	3F	R1	1C	R6C	2C	R15A	2F	R200B	2G
C5B	3B	C16A	2F	R2	1C	R6D	2C	R15B	2E	R201A	2G
C5C	2B	C16B	2F	R4B	3B	R7B	2C	R15C	2F	R201B	2G
C6A	2C	C17A	2G	R4C	2B	R7C	2D	R15D	2F	R534	1G
C6B	2C	C17B	2G	R4D	2B	R7D	2D	R16B	2F		
C7A	2C	C101	2D	R4E	2A	R11	1F	R16C	2F		
C7B	2C	C102	2D	R4F	3B	R12	1E	R16D	2F		
C11	1G	C201	2G	R4G	3B	R14B	2E	R17B	2G		





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CH 1 & CH 2 ATTENUATORS ◇1

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

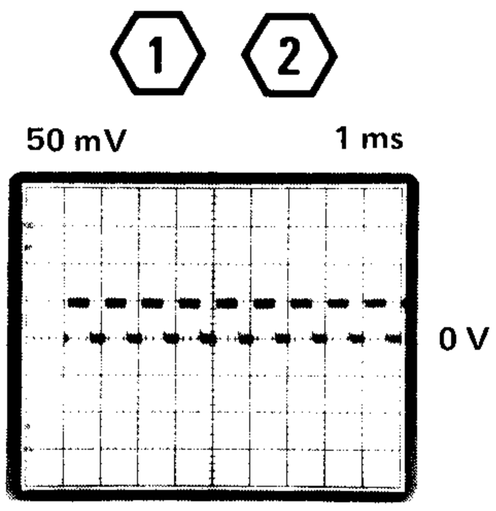
VOLTAGE CONDITIONS

These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		

1



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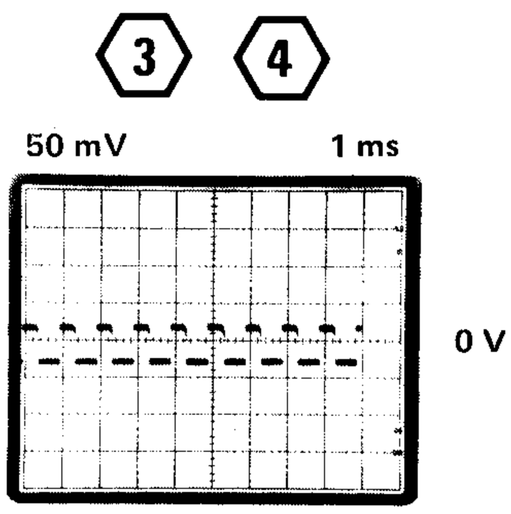

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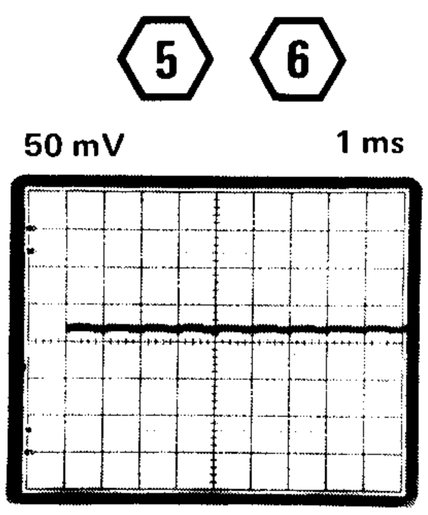

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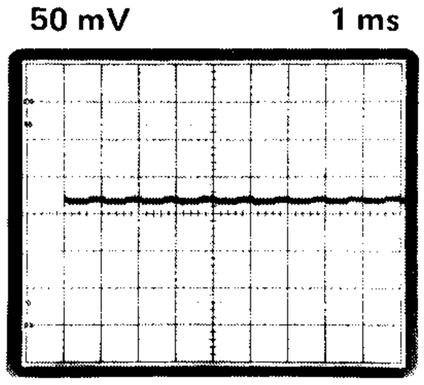
8.5 VDC AC COUPLED

7

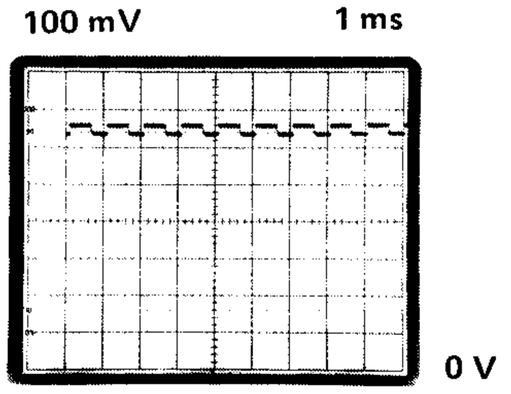


8.5 VDC AC COUPLED

8

8.5 VDC AC COUPLED

9



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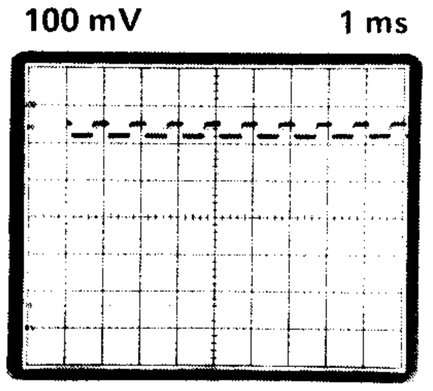

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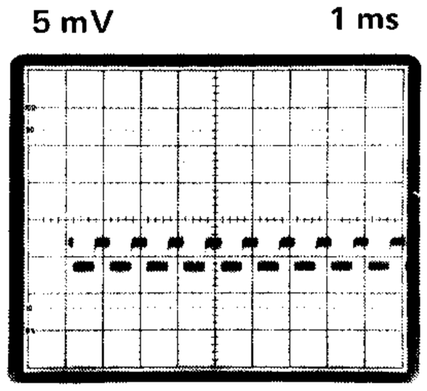
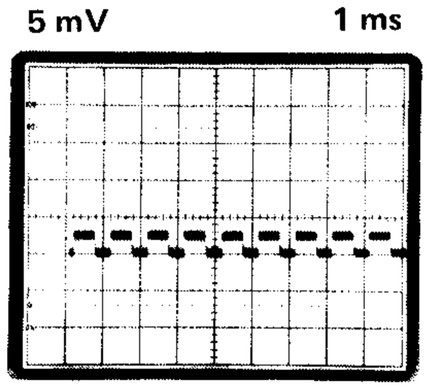
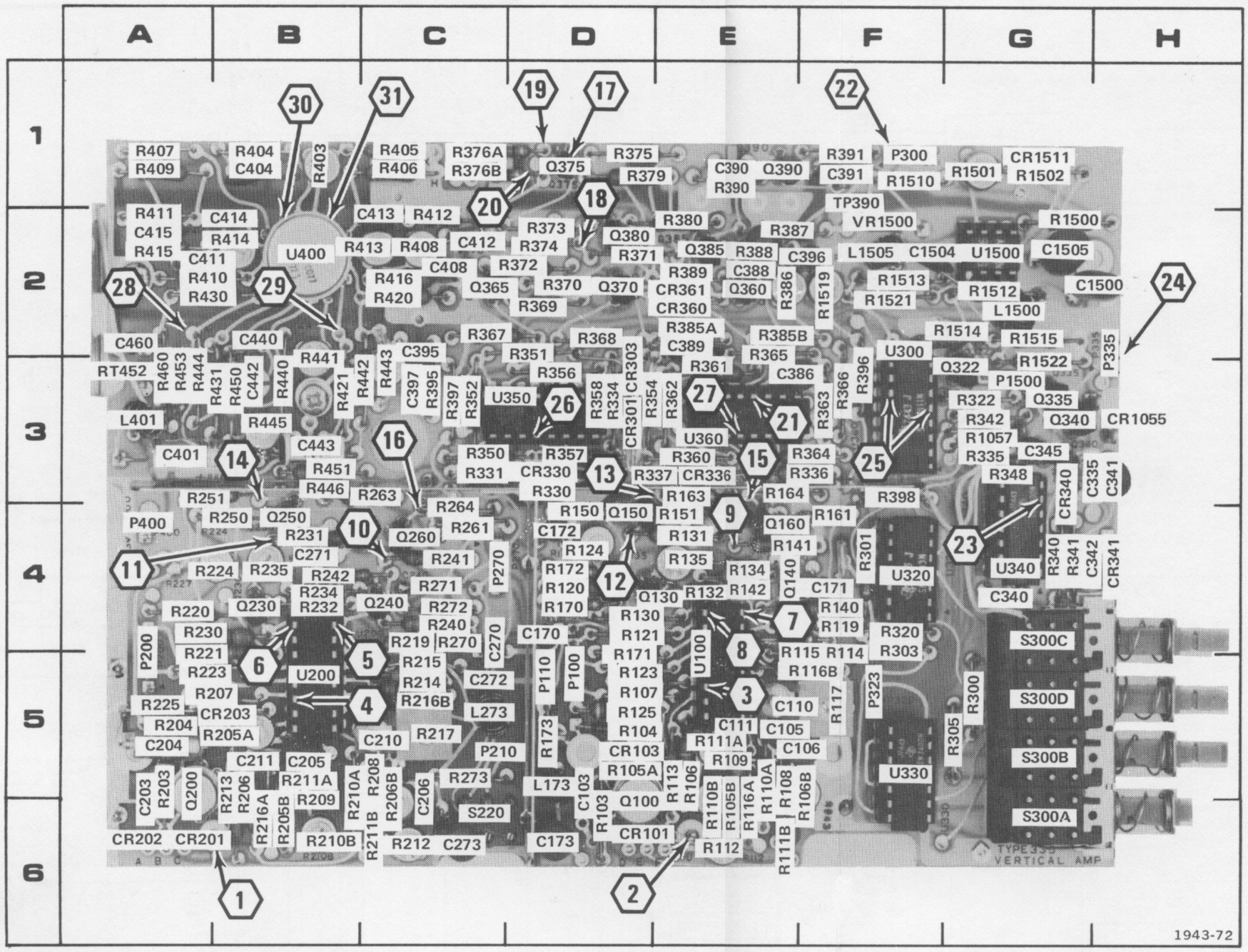


14

15



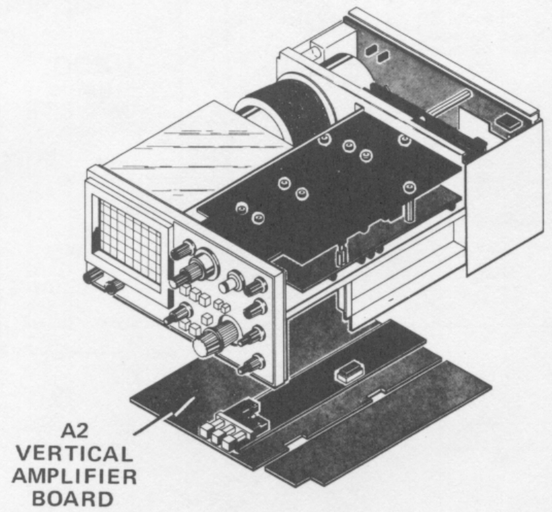
16



*See Parts List for serial number ranges.

[1]Located on back of board.

Fig. 8-7. A2 Vertical Amplifier component locations, below SN 300121.



CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C103	5D	C404	1B	L1505	5D	R163	3E	R234	4B	R356	3D	R401A[1]		R1502	1G
C105	5E	C408	2C		5E	R164	3E	R235	4B	R357	3D	R401B[1]		R1510	1F
C106	5F	C411	2B	LR400[1]	5E	R170	4D	R240	4C	R358	3D	R402B[1]		R1512	2G
C110	5E	C412	2C	LR402A	5F	R171	5D	R241	4C	R360	3E	R402C[1]		R1513	2F
C111	5E	C413	2C		5D	R172	4D	R242	4B	R361	3E	R403	1B	R1514	2F
C170	4D	C414	2B	P110	5E	R173	5D	R250	4B	R362	3E	R404	1B	R1515	2G
C171	4F	C415	2A	P270	5E	R203	5A	R251	3B	R363	3F	R405	1C	R1519	2F
C172	4D	C440	2B	P300	5E	R204	5A	R261	4C	R364	3F	R406	1C	R1521	2F
C173	6D	C442	3B	P323	5E	R205A	5B	R263	3C	R365	2E	R407	1A	R1522	3G
C174[1]		C443	3B	P335	5E	R205B	5B	R264	4C	R366	3F	R408	2C		
C200[1]		C460	2A	P1500	6E	R206A	5B	R270	4C	R367	2C	R409	1A	RT452	3A
C203	5A	C1500	2H		6E	R206B	5C	R271	4C	R368	2D	R410	2B		
C204	5A	C1504	2F	Q100	5E	R207	5B	R272	4C	R369	2D	R411	2A	S220[1]	
C205	5B	C1505	2G	Q130	4F	R208	5C	R273	5C	R370	2D	R412	2C		
C206	5C			Q140	4E	R209	5B	R300	5G	R371	2D	R413	2C	U100	5E
C210	5C	CR101	6D	Q150	6E	R210A	5B	R301	4F	R372	2D	R414	2B	U200	5B
C211	5B	CR103	5D	Q160	5F	R210B	6B	R303	4F	R373	2D	R415	2A	U300	3F
C270	4C	CR201	6A	Q200	5F	R211A	5B	R305	5G	R374	2D	R416	2C	U320	4F
C272	5C	CR202	6A	Q230	4F	R211B	6C	R320	4F	R375	1D	R420	2C	U330	5F
C273	6C	CR203	5B	Q240	4D	R212	6C	R322	3G	R376A	1C	R421	3B	U340	4G
C300[1]		CR300		Q250	4D	R213	5B	R330	3D	R376B	1C	R430	2B	U350	3D
C320[1]		CR301*	3D	Q260	5D	R214	5C	R331	3C	R379	1D	R431	3B	U360	3E
C335	3H	CR330	3D	Q322	4D	R215	5C	R332*		R380	2E	R440	3B	U400	2B
C341	3H	CR332		Q335	5D	R216A	5B	R334	3D	R385A	2E	R441	3B	U1500	2G
C342	4G	CR336	3E	Q340	4D	R216B	5C	R335	3G	R385B	2E	R442	3C		
C343[1]		CR340	3G	Q360	4E	R217	5C	R336	3F	R386	2E	R443	3C	VR1500	2F
C345	3G	CR341	4H	Q365	4E	R219	4C	R337	3E	R387	2E	R444	3A		
C386	3F	CR360	2E	Q370	4E	R220	4A	R340	4G	R388	2E	R445	3B		
C388	2E	CR361	2E	Q375	4E	R221	4B	R341	4G	R389	2E	R446	3B		
C389	2E	CR1511	1G	Q380	4F	R223	5A	R342	3G	R390	1E	R450	3B		
C390	1E			Q385	4E	R224	4B	R348	3G	R391	1F	R451	3B		
C395	2C	L173	5D	Q390	4E	R225	5A	R350	3C	R395	3C	R453	3A		
C396	2F	L273	5C		4D	R230	4A	R351	2D	R396	3F	R460	3A		
C397	3C	L401	3A	R103	4E	R231	4B	R352	3C	R397	3C	R1500	2G		
C401	3A	L1500	2G	R104	4F	R232	4B	R354	3E	R398	3F	R1501	1G		

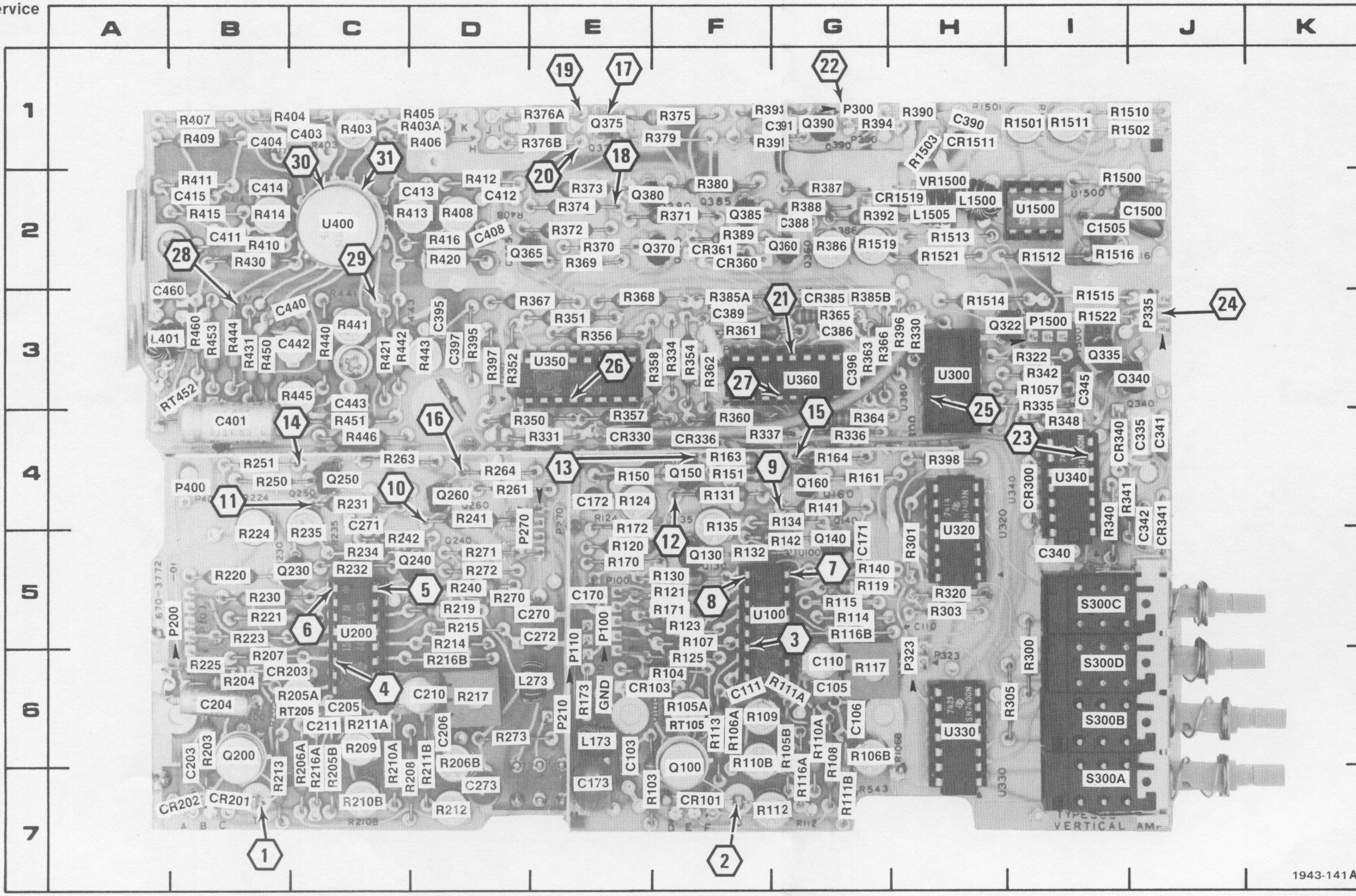
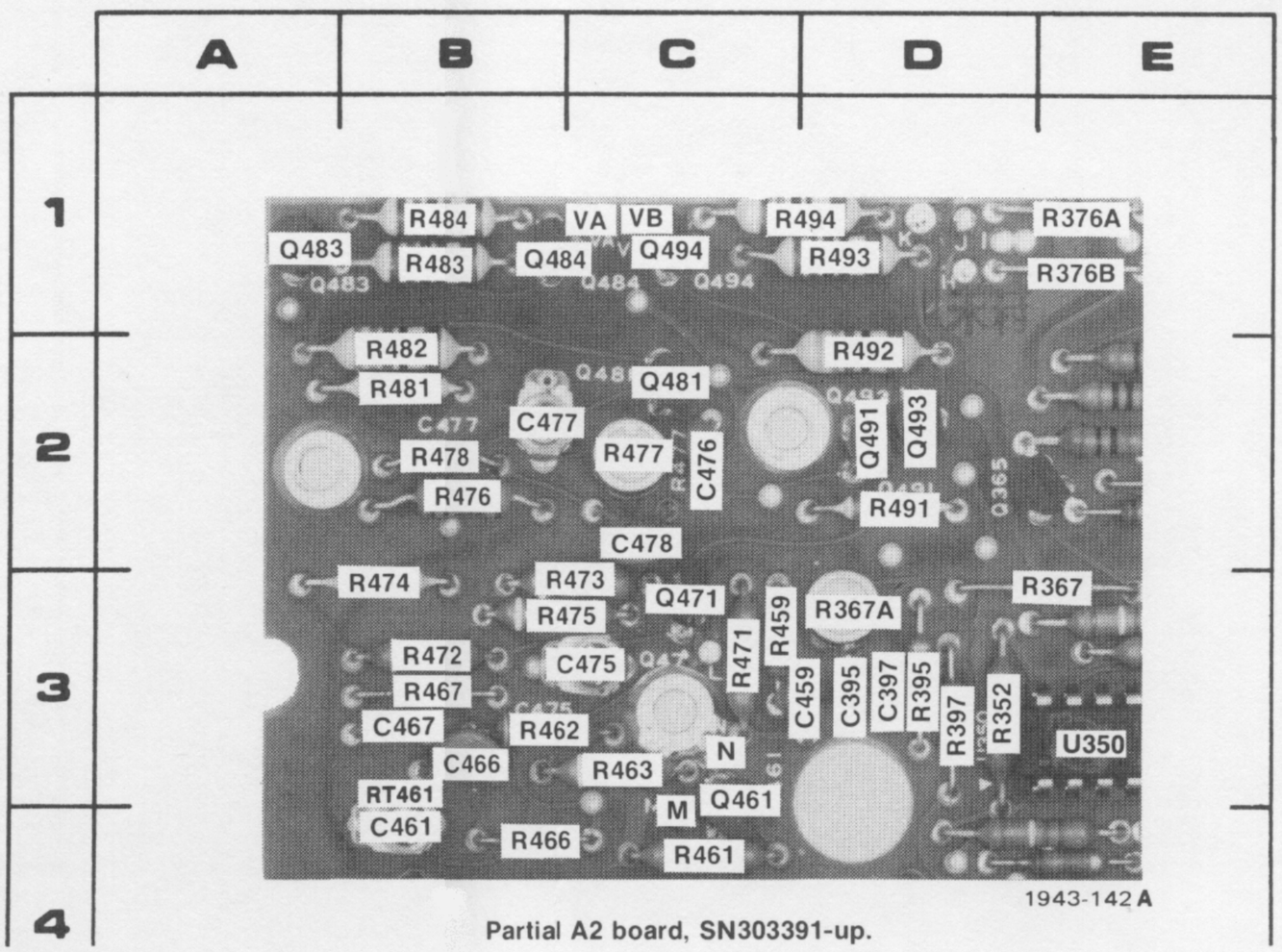


Fig. 8-6. A2 Vertical Amplifier component locations, SN 300121-303390

[1]Located on back of board.

*See Parts List for serial number ranges.

CKT NO	GRID LOC
C103	6E
C105	6G
C106	6G
C110	6G
C111	6F
C170	5E
C171	5G
C172	4E
C173	7E
C174[1]	
C200[1]	
C203	6B
C204	6B
C205	6C
C206	6D
C210	6D
C211	6C
C270	5E
C271	4C
C272	5E
C273	7D
C300[1]	
C320[1]	
C335	4J
C340	5I
C341	4J
C342	4J
C343[1]	
C345	3I
C386	3G
C388	2G
C389	3F
C390	1H
C391	1G
C395	3D
C396	3G
C397	3D
C401*	4B
C403*	1C
C404*	1B
C408*	2D
C411*	2B
C412*	2D
C413*	2D
C414*	2B
C415*	2B
C440*	3B
C442*	3C
C443*	3C
C459*	3C
C460*	3A
C461*	4B
C466*	3B
C467*	3B
C475*	3C
C476*	2C
C477*	2B
C478*	2C
C1500	2J
C1504[1]	
C1505	2I
CR101	7F
CR103	6E
CR201	7B
CR202	7B
CR203	6B
CR300	4I
CR330	4E
CR336	4F
CR340	4I
CR341	4J
CR360	2F
CR361	2F
CR385	3G
CR1511	1H
CR1519	2H
GND	6E
L173	6E
L273	6E
L401*	3A
L1500	2H
L1505	2H
LR400[1]*	
LR402A[1]*	
P100	5E
P110	6E
P200	5B
P210	6E
P270	5D
P300	1G
P323	6H
P335	3J
P400	4B
P1500	3I
Q100	7F
Q130	5F
Q140	5G
Q150	4F
Q160	4G
Q200	6B
Q230	5C
Q240	5D
Q250	4C
Q260	4D
Q322	3H
Q335	3I
Q340	3J
Q360	2G
Q365	2D
Q370	2F
Q375	1E
Q380	2E
Q385	2F
Q390	1G
Q461*	3C
Q471*	3C
Q481*	2C
Q483*	1A
Q484*	1B
Q491*	2D
Q493*	2D
Q494*	1C
R103	7E
R104	6F
R105A	6F
R105B	6G
R106A	6F
R106B	6G
R107	5F
R108	6G
R109	6F
R110A	6G
R110B	6F
R111A	6G
R111B	7G
R112	7G
R113	6F
R114	5G
R115	5G
R116A	7G
R116B	5G
R117	6G
R119	5G
R120	5E
R121	5F
R123	5F
R124	4E
R125	6F
R130	5F
R131	4F
R132	5F
R134	4G
R135	4F
R140	5G
R141	4G
R142	5G
R150	4E
R151	4F
R161	4G
R163	4F
R164	4G
R170	5E
R171	5F
R172	4E
R173	6E
R203	6B
R204	6B
R205A	6C
R205B	7C
R206A	7C
R206B	6D
R207	6B
R208	7C
R209	6C
R210A	7C
R210B	7C
R211A	6C
R211B	6D
R212	7D
R213	7B
R214	5D
R215	5D
R216A	7C
R216B	6D
R217	6D
R219	5D
R220	5B
R221	5B
R223	5B
R224	5B
R225	6B
R230	5B
R231	4C
R232	5C
R234	5C
R235	5C
R240	5D
R241	4D
R242	5C
R250	4B
R251	4B
R261	4D
R263	4C
R264	4D
R270	5D
R271	5D
R272	5D
R273	6D
R300	6I
R301	5H
R303	5H
R305	6I
R320	5H
R322	3I
R330	3H
R331	4E
R334	3F
R335	3I
R336	4G
R337	4F
R340	4I
R341	4I
R342	3I
R348	4I
R350	4E
R351	3E
R352	3D
R354	3F
R356	3E
R357	4E
R358	3F
R360	4F
R361	3F
R362	3F
R363	3G
R364	4G
R365	3G
R366	3G
R367	3E
R367A*	3D
R368	3E
R369	2E
R370	2E
R371	2F
R372	2E
R373	2E
R374	2E
R375	1F
R376A	1E
R376B	1E
R379	1F
R380	2F
R385A	3F
R385B	3G
R386	2G
R387	2G
R388	2G
R389	2F
R390	1H
R391	1G
R392	2G
R393	1F
R394	1G
R395	3D
R396	3H
R397	3D
R398	4H
R401A[1]*	
R401B[1]*	
R402B[1]*	
R402C[1]*	
R403*	1C
R403A*	1D
R404*	1C
R405*	1D
R406*	1D
R407*	1B
R408*	2D
R409*	1B
R410*	2B
R411*	2B
R412*	2D
R413*	2D
R414*	2B
R415*	2B
R416*	2D
R420*	2D
R421*	3C
R430*	2B
R431*	3B
R440*	3C
R441*	3C
R442*	3C
R443*	3D
R444*	3B
R445*	3C
R446*	4C
R450*	3B
R451*	4C
R453*	3B
R459*	3C
R460*	3B
R461*	4C
R462*	3B
R463*	3C
R466*	4B
R467*	3B
R471*	3C
R472*	3B
R473*	3B
R474*	3B
R475*	3B
R476*	2B
R477*	2C
R478*	2B
R481*	2B
R482*	2B
R483*	1B
R484*	1B
R485[1]*	
R486[1]*	
R487[1]*	
R491*	2D
R492*	2D
R493*	1D
R494*	1C
R495[1]*	
R496[1]*	
R497[1]*	
R1057	3I
R1500	2I
R1501	1I
R1502	1J
R1503	1H
R1510	1J
R1511	1I
R1512	2I
R1513	2H
R1514	3H
R1515	3I
R1516	2I
R1519	2G
R1521	2H
R1522	3I
RT105*	6F
RT205*	6C
RT452*	3B
RT461*	3B
S220[1]	
S300A	7I
S300B	6I
S300C	5I
S300D	6I
U100	5F
U200	5C
U300	3H
U320	5H
U330	6H
U340	4I
U350	3E
U360	3G
U400*	2C
U1500	2I
VR1500	2H



1943-142 A

Partial A2 board, SN303391-up.

PARTIAL A2 VERTICAL AMPLIFIER BOARD

VOLTAGE & WAVEFORM CONDITIONS

CH 1 SIGNAL FROM R101B THRU PIN C DIAG ①

R100A 10

CR101

Q100A

Q100B

R103 20 C103 130

R104 20

CR103

R107 47

R105A 200

R105B 16.5

C105 180

C106 680

R106A 1.43K

R106B 500

C111 SEL

R111A SEL

R111B 1.21K

R112 500 X10 DC BAL

RT105 500

PARTIAL A1 ATTEN BD

R116B 10.0K

R116A 150

X1 BALANCE R117 5K

R113 1.43K

R109 5K

R110B 200 X1 GAIN

R110A 324

R108 1.43K

C110 3.3-18

U100 INPUT AMPLIFIER

INPUT BAL

SIGNAL OUT

EMTR CUR SOURCE

BIAS

GAIN SWITCHING

POSITION

NORM -INV

GAIN SWITCHING

EMTR CUR SOURCE

POSN CUR SOURCE

SIGNAL IN

SIGNAL OUT

R115 2K

R114 3K

CH 1 POSITION CENTER R124 100K

R120 15K

C174 .01

R121 35.7K

R123 68K

R125 1.3K

R119 3.9K

(CH 1) POSITION P100

R122A 10K

R122B 10K

VARIABLE (CH 1)

CH 1 VOLTS/DIV S4

SEE DIAG ①

R130 787

R140 787

Q130 ⑫

Q140 ⑨

R131 324

R132 100

R134 470

R135 5K CW X10 GAIN

R141 324

R142 100

R150 100

Q150† (+4.5)

R151 8.2K

R161 8.2K

R163 20 → + TO PIN 10 U350, U360

R164 20 → − TO PIN 7 U350, U360

CH 1 SIGNAL TO DIAG ③

Q160

R170 10 C170 2.2µF R171 10 C171 6.8µF R172 10 C172 2.2µF

P110 R +15V, Q +8V, P −8V

TO DIAG ⑥

C173 33µF R173 10 L173 270µH

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

CH 2 SIGNAL FROM R201B THRU PIN O DIAG ①

R200A 20

CR202

CR201

Q200A

Q200B

R203 20 C203 130

R204 20

CR203

R207 47

R205A 200

R205B 16.5

C205 180

C206 680

R206A 1.43K

R206B 500

C211 SEL

R211A SEL

R211B 1.21K

R212 500 X10 DC BAL

RT205 500

PARTIAL A1 ATTEN BD

R216B 10.0K

R216A 150

X1 BALANCE R217 5K

R213 1.43K

R209 5K

R210B 200 X1 GAIN

R210A 324

R208 1.43K

C210 3.3-18

U200 INPUT AMPLIFIER

INPUT BAL

SIGNAL OUT

EMTR CUR SOURCE

BIAS

GAIN SWITCHING

POSITION

NORM -INV

GAIN SWITCHING

EMTR CUR SOURCE

POSN CUR SOURCE

SIGNAL IN

SIGNAL OUT

R215 2K

R214 3K

CH 2 POSITION CENTER R224 100K

R220 15K

C200 .01

R221 35.7K

R223 68K

R225 1.3K

R219 3.9K

(CH 2) POSITION P200

R222A 10K

R222B 10K

P210

(CH 2) VARIABLE

S220 CH 2 INVERT

CH 2 VOLTS/DIV S14

SEE DIAG ①

R230 787

R240 787

Q230 ⑪

Q240 ⑩

R231 324

R232 100

R234 470

R235 5K CW X10 GAIN

R241 324

R242 100

R250 100

Q250 (+4.5)

R251 8.2K

R261 8.2K

R263 20 → + TO PIN 2 U350, U360

R264 20 → − TO PIN 15 U350, U360

CH 2 SIGNAL TO DIAG ③

Q260

R270 10 C270 2.2µF R271 10 C271 6.8µF R272 10 C272 2.2µF

P270 R +15V, Q +8V, P +5V, S −8V

FROM P1603 DIAG ⑬

C273 33µF R273 10 L273 270µH

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

NOTES:

△ VOLTS/DIV 1mV–5mV.

△△ VOLTS/DIV 10mV–10V.

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

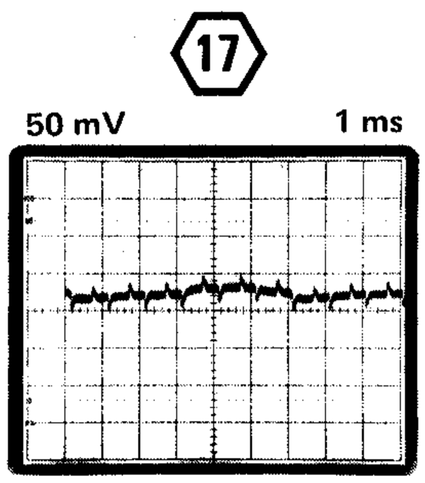
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

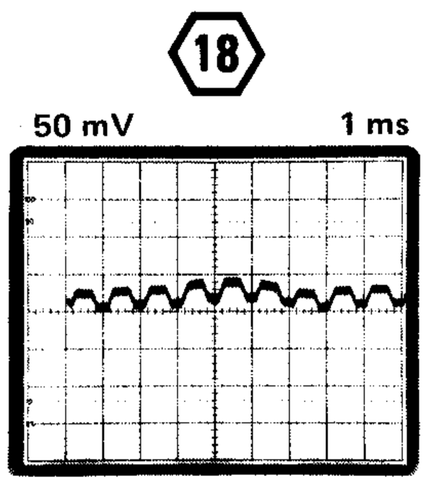
VOLTAGE CONDITIONS

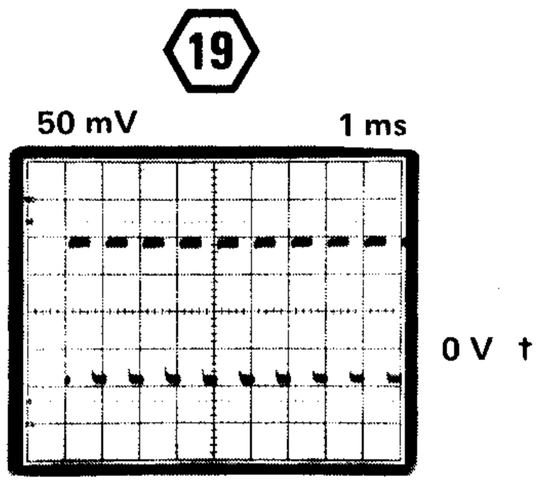
These voltages are typical values; actual values may vary as much as 20%.

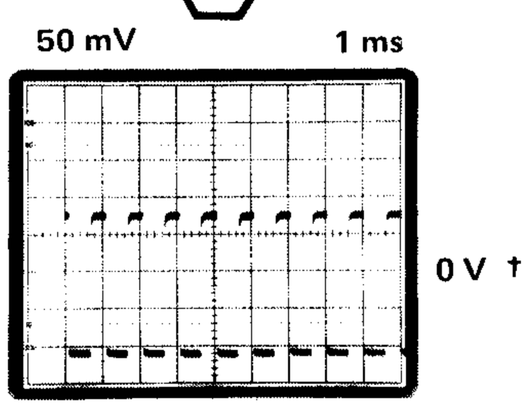
335 Controls

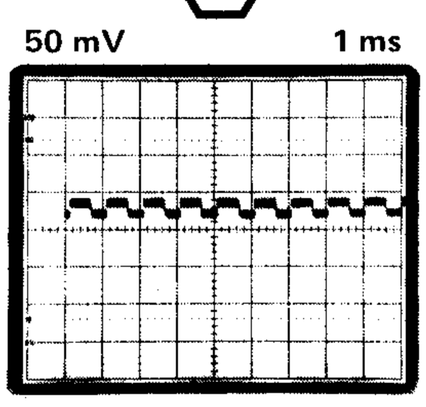
SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		

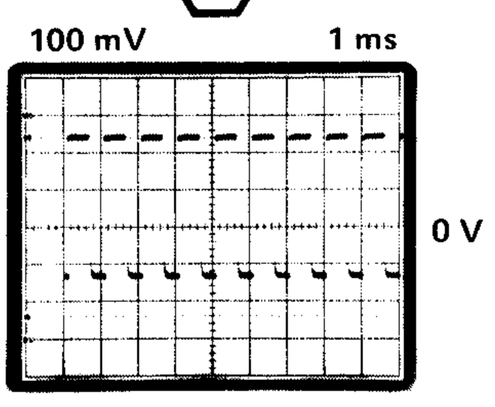


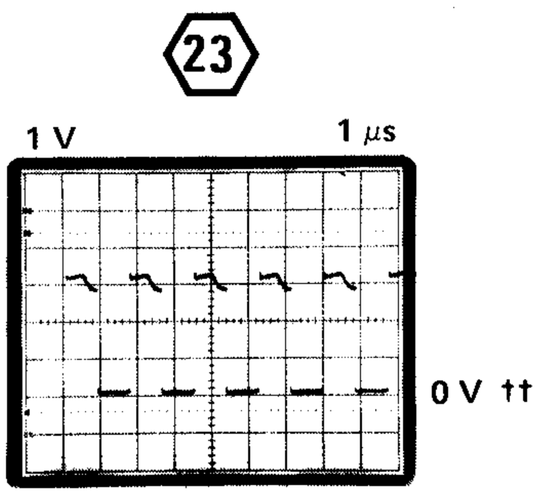


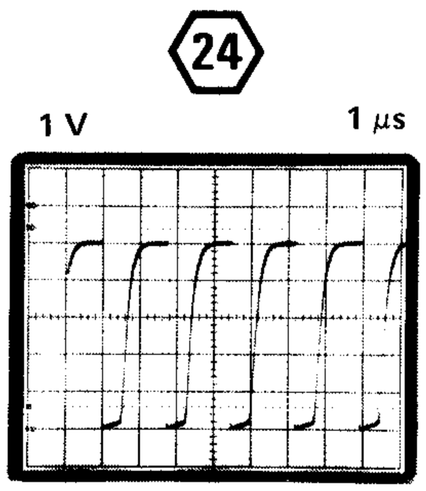


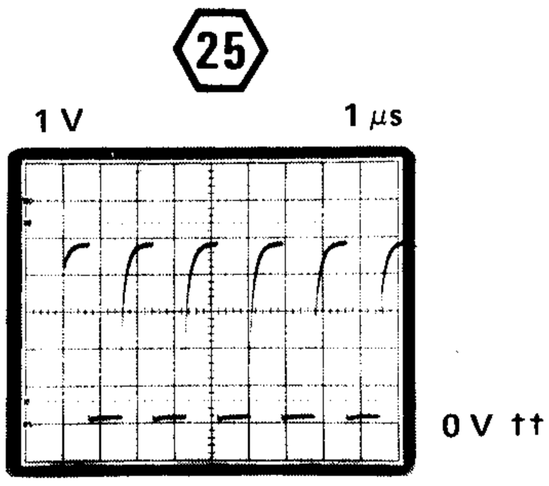


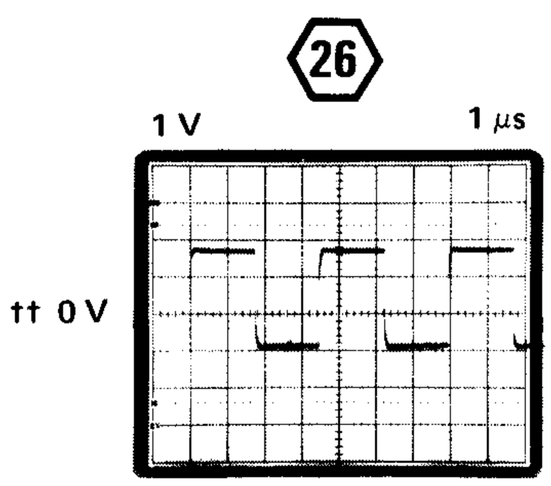


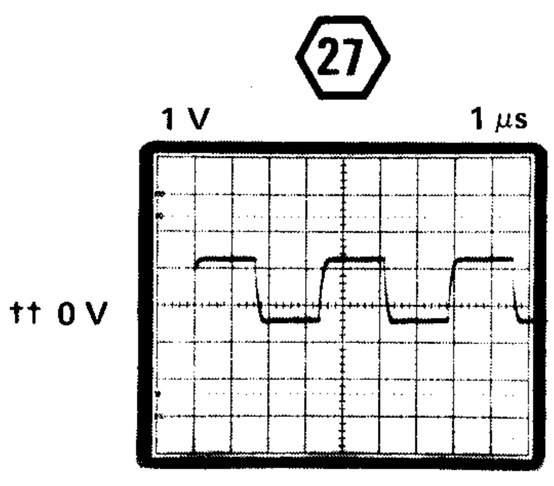








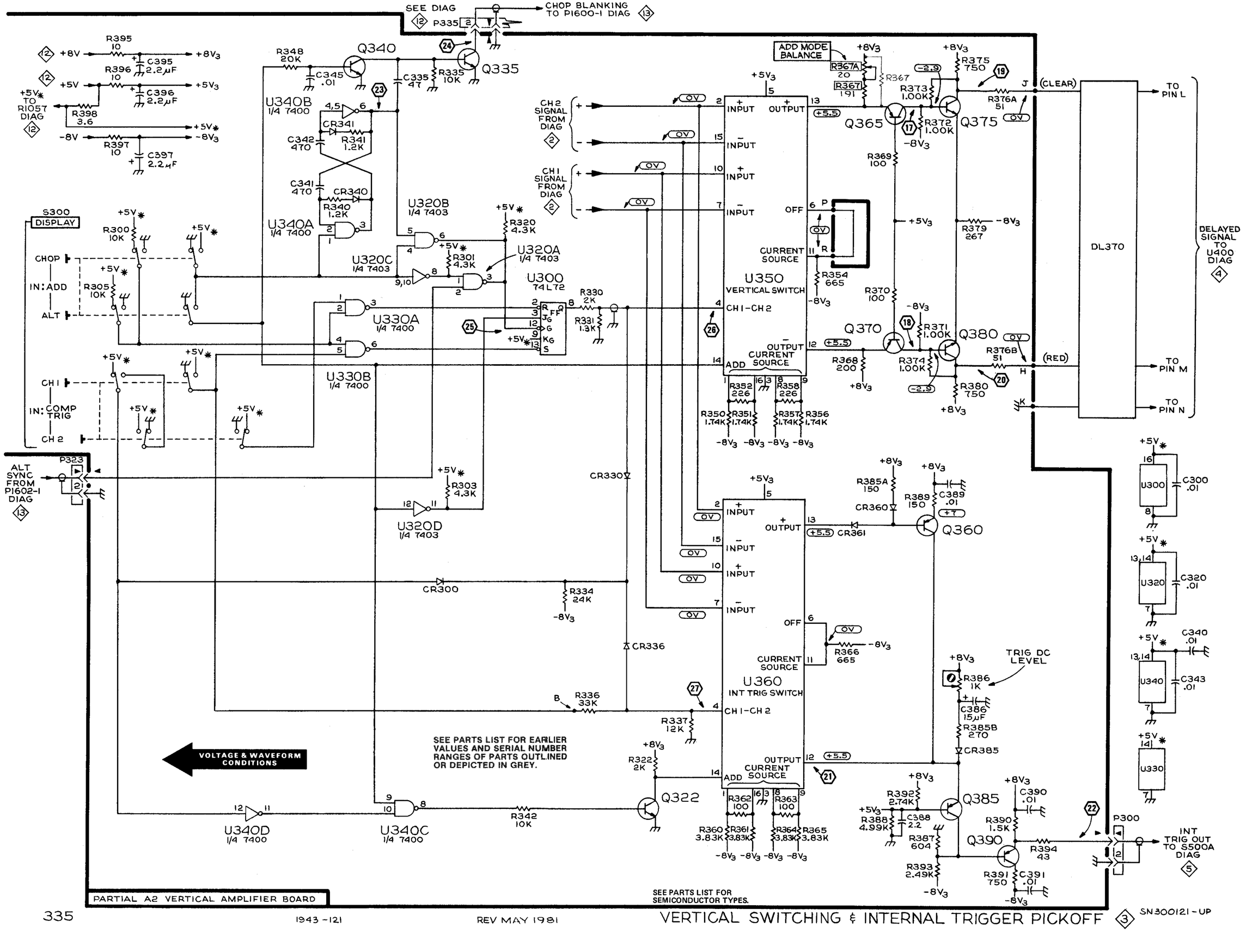




1943-110

†† 335 DISPLAY TO CHOP TEST OSCILLOSCOPE TRIGGER SOURCE TO CH 1.

† 0 V LEVEL DEPENDS ON THE SETTINGS OF THE VERTICAL POSITION CONTROLS.


SEE DIAG 12
P335
CHOP BLANKING TO P1600-1 DIAG 13
R395 10
+8V 12
C395 2.2µF
+8V3
R396 10
+5V 12
C396 2.2µF
+5V3
+5V* TO R1057 DIAG 12
R398 3.6
+5V*
-8V
R397 10
C397 2.2µF
-8V3
R348 20K
C345 .01
Q340
Q335
C335 47
R335 10K
24
23
U340B 1/4 7400
4,5
6
CR341
C342 470
R341 1.2K
C341 470
CR340
R340 1.2K
U340A 1/4 7400
2
3
1
U320B 1/4 7403
5
6
4
+5V*
R320 4.3K
U320C 1/4 7403
9,10
8
R301 4.3K
U320A 1/4 7403
3
2
U300 74L72
R
S
Q
FF
J
G
K
25
+5V*
R330 2K
R331 1.3K
S300
DISPLAY
+5V*
R300 10K
CHOP
IN: ADD
ALT
R305 10K
U330A 1/4 7400
U330B 1/4 7400
IN: COMP TRIG
CH 1
CH 2
P323
ALT SYNC FROM P1602-1 DIAG 13
+5V*
R303 4.3K
12
11
U320D 1/4 7403
CR330
CR300
R334 24K
-8V3
CR336
B
R336 33K
27
R337 12K
+8V3
R322 2K
Q322
U340D 1/4 7400
U340C 1/4 7400
R342 10K
VOLTAGE & WAVEFORM CONDITIONS
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.
CH2 SIGNAL FROM DIAG 2
CH1 SIGNAL FROM DIAG 2
OV
+5V3
5
+ INPUT
- INPUT
2
15
10
7
+ OUTPUT
13
+5.5
U350
VERTICAL SWITCH
OFF
6 P
11 R
CURRENT SOURCE
CH1-CH2
4
26
R354 665
-8V3
OUTPUT CURRENT SOURCE
ADD
12
14
R352 226
R358 226
R350 1.74K
R351 1.74K
R357 1.74K
R356 1.74K
ADD MODE BALANCE
R367A 20
R367 191
+8V3
R375 750
R373 1.00K
-2.9
19
Q365
17
R372 1.00K
Q375
-8V3
R376A 51
J
(CLEAR)
R369 100
+5V3
R379 267
-8V3
R370 100
-8V3
Q370
18
R371 1.00K
Q380
R376B 51
H
(RED)
20
R368 200
+8V3
R374 1.00K
-2.9
R380 750
+8V3
K
TO PIN L
TO PIN M
TO PIN N
DL370
DELAYED SIGNAL TO U400 DIAG 4
+8V3
R385A 150
CR360
R389 150
C389 .01
Q360
CR361
+5V3
5
+ INPUT
- INPUT
2
15
10
7
+ OUTPUT
13
+5.5
U360
INT TRIG SWITCH
OFF
6
11
CURRENT SOURCE
CH1-CH2
4
R366 665
-8V3
OUTPUT CURRENT SOURCE
ADD
12
14
21
R362 100
R363 100
R360 3.83K
R361 3.83K
R364 3.83K
R365 3.83K
TRIG DC LEVEL
R386 1K
C386 15µF
R385B 270
CR385
+8V3
R392 2.74K
+5V3
R388 4.99K
C388 2.2
R387 604
R393 2.49K
-8V3
Q385
Q390
C390 .01
R390 1.5K
R394 43
R391 750
C391 .01
-8V3
22
P300
INT TRIG OUT TO S500A DIAG 5
+5V*
16
U300
C300 .01
8
13,14
U320
C320 .01
7
C340 .01
U340
C343 .01
14
U330
SEE PARTS LIST FOR SEMICONDUCTOR TYPES.
PARTIAL A2 VERTICAL AMPLIFIER BOARD
335
1943-121
REV MAY 1981
VERTICAL SWITCHING & INTERNAL TRIGGER PICKOFF 3
SN300121-UP

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

VOLTAGE CONDITIONS

These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		

17
50 mV 1 ms
AC COUPLED

18
50 mV 1 ms
AC COUPLED

19
50 mV 1 ms
0 V †

20
50 mV 1 ms
0 V †

21
50 mV 1 ms
AC COUPLED

22
100 mV 1 ms
0 V

23
1 V 1 μs
0 V ††

24
1 V 1 μs
0 V ††

25
1 V 1 μs
0 V ††

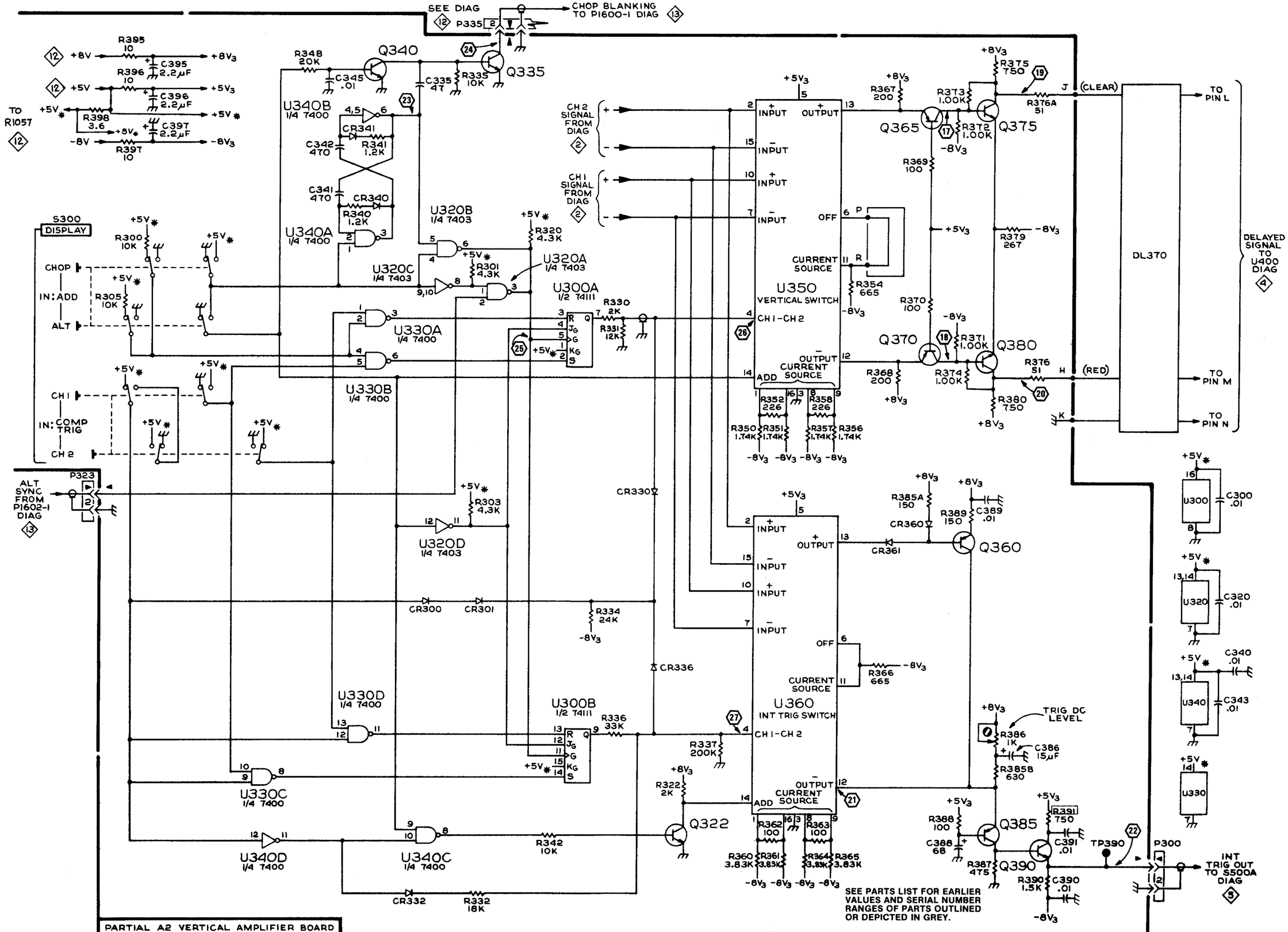
26
1 V 1 μs
†† 0 V

27
1 V 1 μs
†† 0 V

1943-110

†† 335 DISPLAY TO CHOP TEST OSCILLOSCOPE TRIGGER SOURCE TO CH 1.

† 0 V LEVEL DEPENDS ON THE SETTINGS OF THE VERTICAL POSITION CONTROLS.



PARTIAL A2 VERTICAL AMPLIFIER BOARD

1943-133 REV.B,SEP 1977

VERTICAL SWITCHING & INTERNAL TRIGGER PICKOFF 3

BELOW SN 300121

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

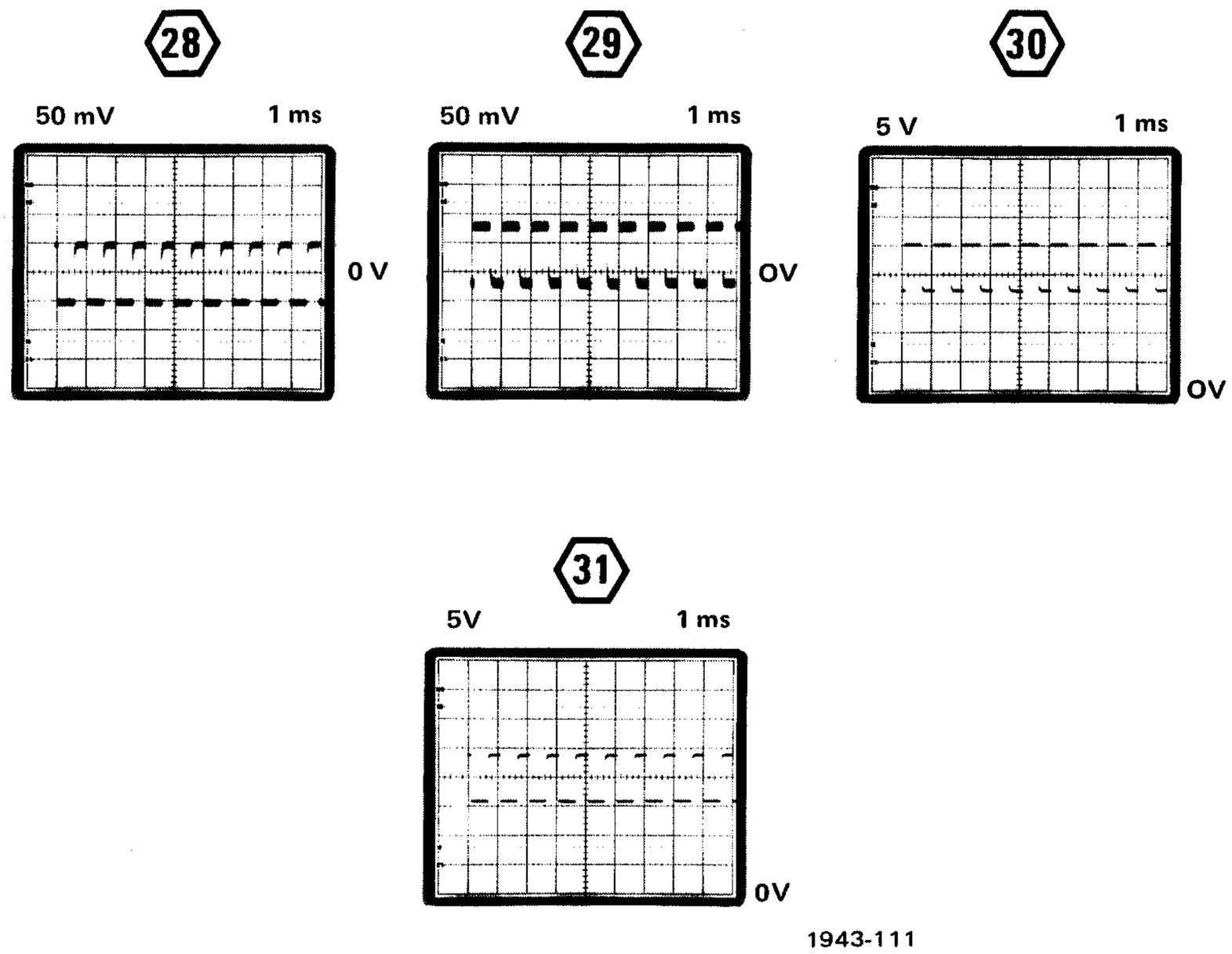
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

VOLTAGE CONDITIONS

These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		



VOLTAGE & WAVEFORM CONDITIONS

DELAYED SIGNAL FROM DL370 DIAG 3

(RED) M

(CLEAR) L

N

R431 69.8

R421 69.8

ø 0V 1

29

5

SIGNAL IN

+8V4

R404 33

C404 .01

11

+V

U400
CRT DEFLECTION PLATE DRIVER

-0.7 2

R450 46.4

RT452 500 t°

R441 5K

R446 787

R445 200

-8V3

DC BIAS

C442 7-45

C440 33

R440 46.4

R453 267

4 -0.7

EMITTER CURRENT SOURCE

EMITTER CURRENT SOURCE

SIGNAL IN

SIGNAL OUT

14 15 7 8

C415 .027

R415 560

C414 0.1

R414 1.0K

R411 240

C411 (SEL)

R409 365

R410 365

R413 50

C413 470

C412 .01

R412 240

R408 1K

C408 .001

R416 365

R406 365

R460 10

+8V

C460 2.2µF

+8V4

+ SIGNAL OUT 12

30

ø +20

BIAS

10

R403A 100

C403 .01

+8V4

R403 2K

R405 3.6K

OUTPUT BIAS 13 (+7.5)

R407 120

+8V4

COLL SUPPLY 6 (+2.6)

+8V4

R420 909

BIAS 3 (+2.7)

R442 30.1

C443 47

R443 1K

R451 1K

R444 30.1

COLL SUPPLY 16 (+2.8)

R430 909

+8V4

31

ø +20

1.6K

LR400 910nH

+

VERTICAL SIGNAL TO V1270 UPPER DEFLECTION PLATE DIAG 14

R401B 953

R401A 953

PARTIAL A2 VERT AMPL BD

L401 270µH

P400

+35V FROM P1603-1 DIAG 13

C401

R402B 953

R402C 953

LR402A 910nH

1.6K

-

VERTICAL SIGNAL TO V1270 LOWER DEFLECTION PLATE DIAG 14

NOTE:

ø CRT BEAM CENTERED.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

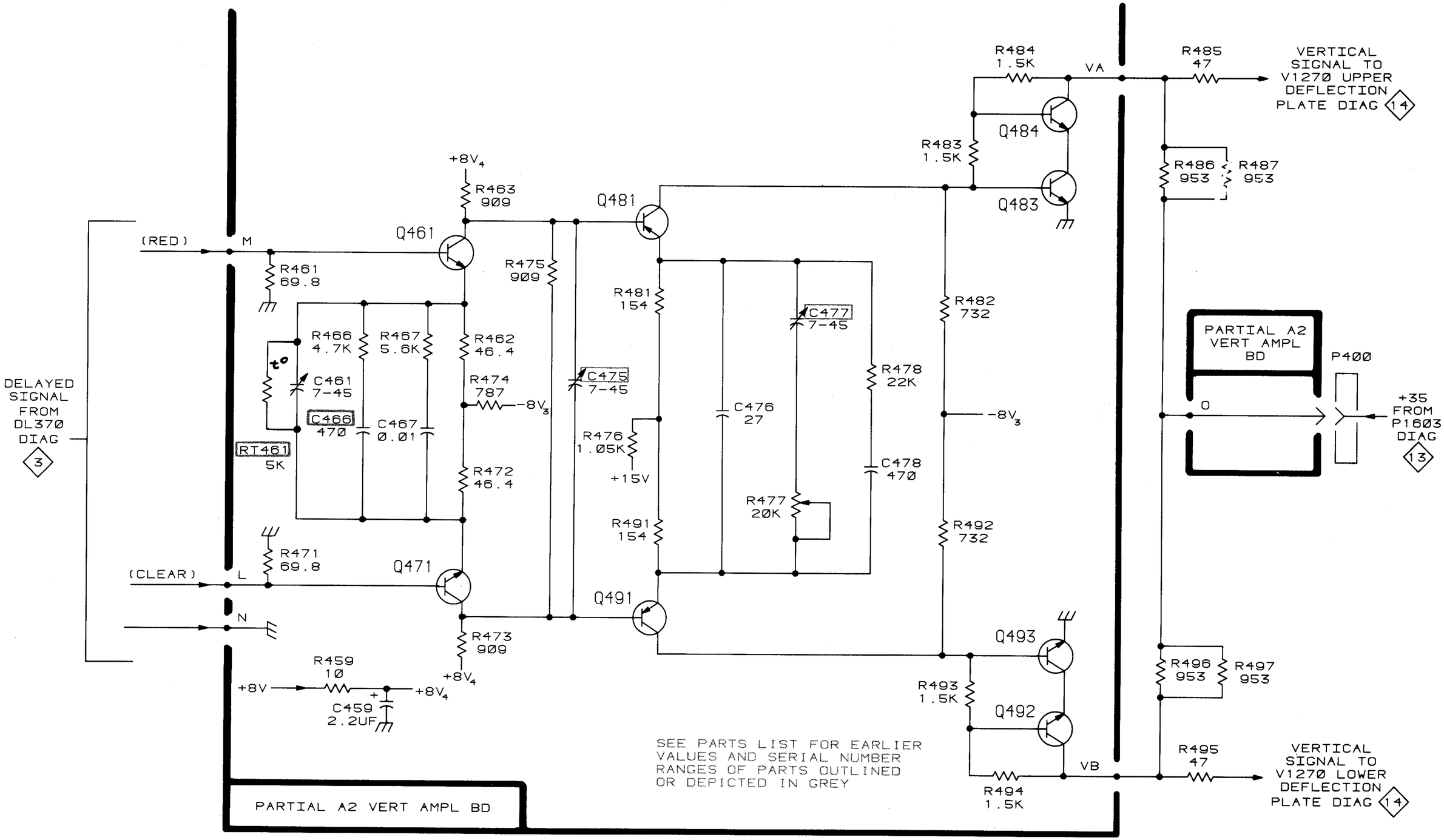
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

PARTIAL A2 VERTICAL AMPLIFIER BOARD

1943-122
REV. B, SEP 1978

VERTICAL OUTPUT AMPLIFIER (IC VERSION) 4

SN300000-303390



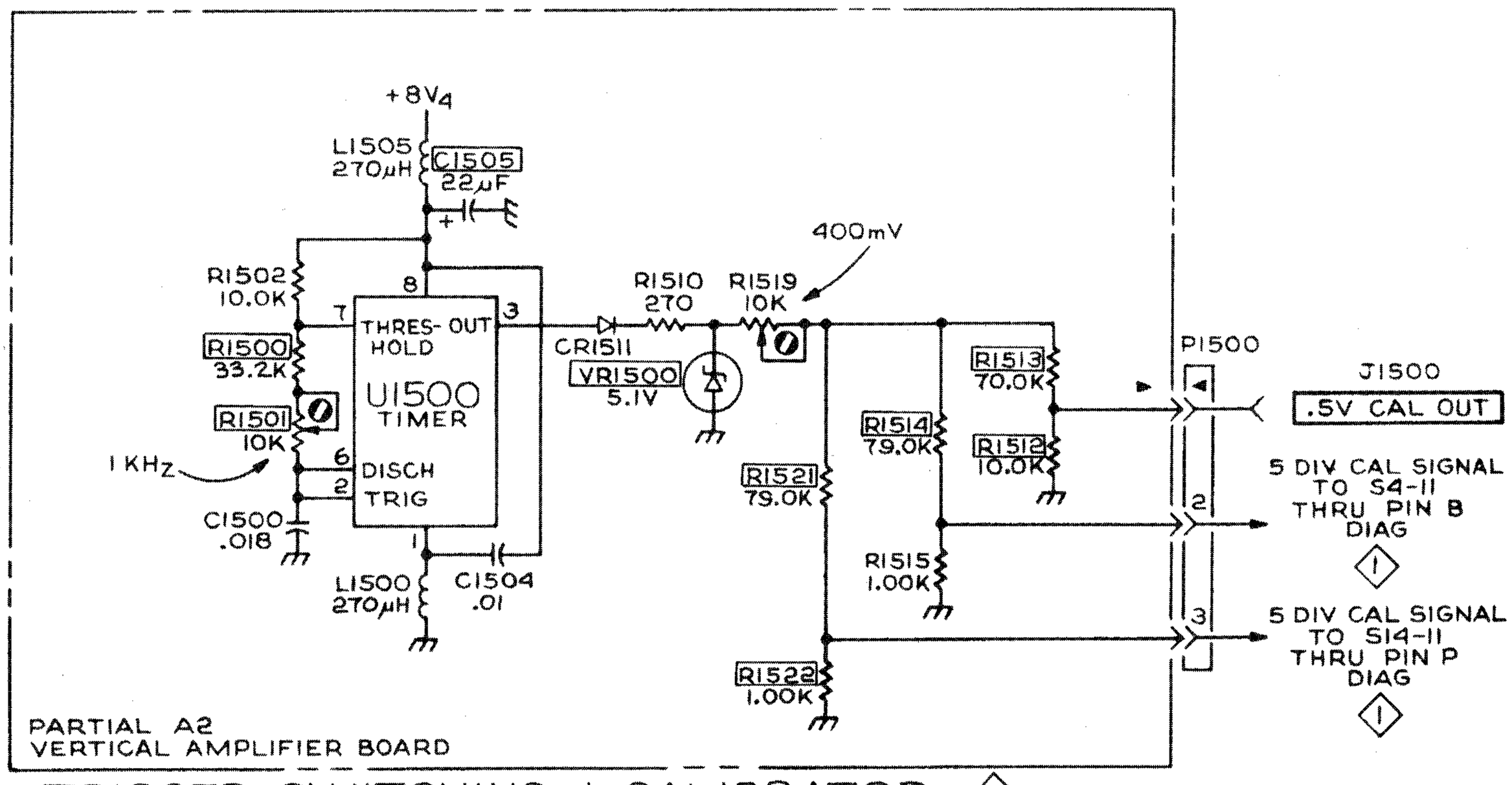
335

VERTICAL OUTPUT AMPLIFIER (DISCRETE VERSION) 4

SN 303391-UP

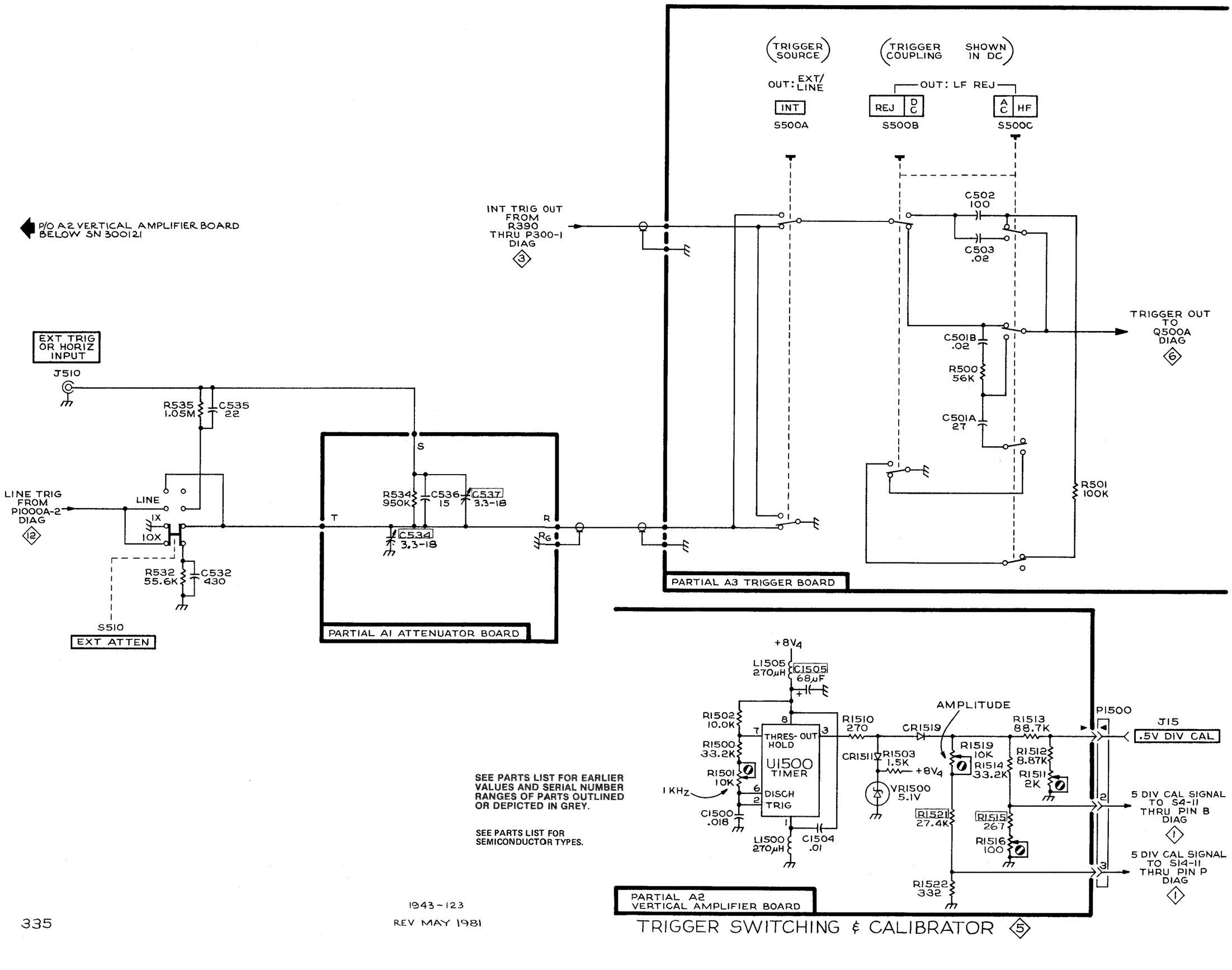
1943-144

REV JUL 1987



TRIGGER SWITCHING & CALIBRATOR ◇5

(PARTIAL) FOR SN BELOW 300121



SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

TRIGGER SWITCHING & CALIBRATOR 5

1943-123
REV MAY 1981

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

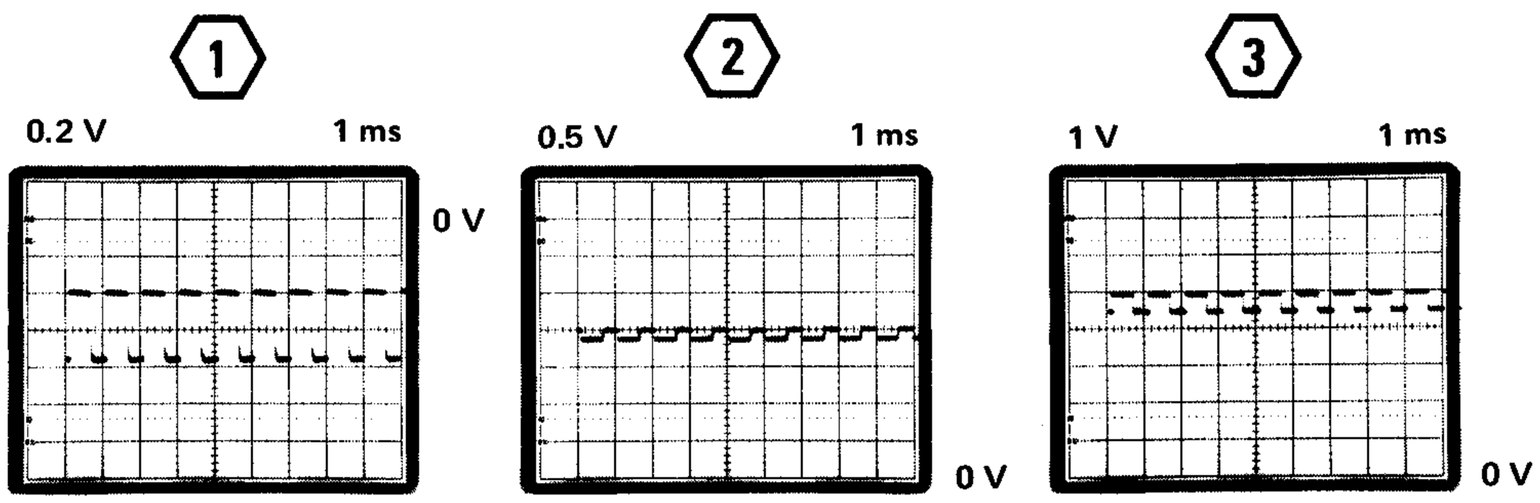
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

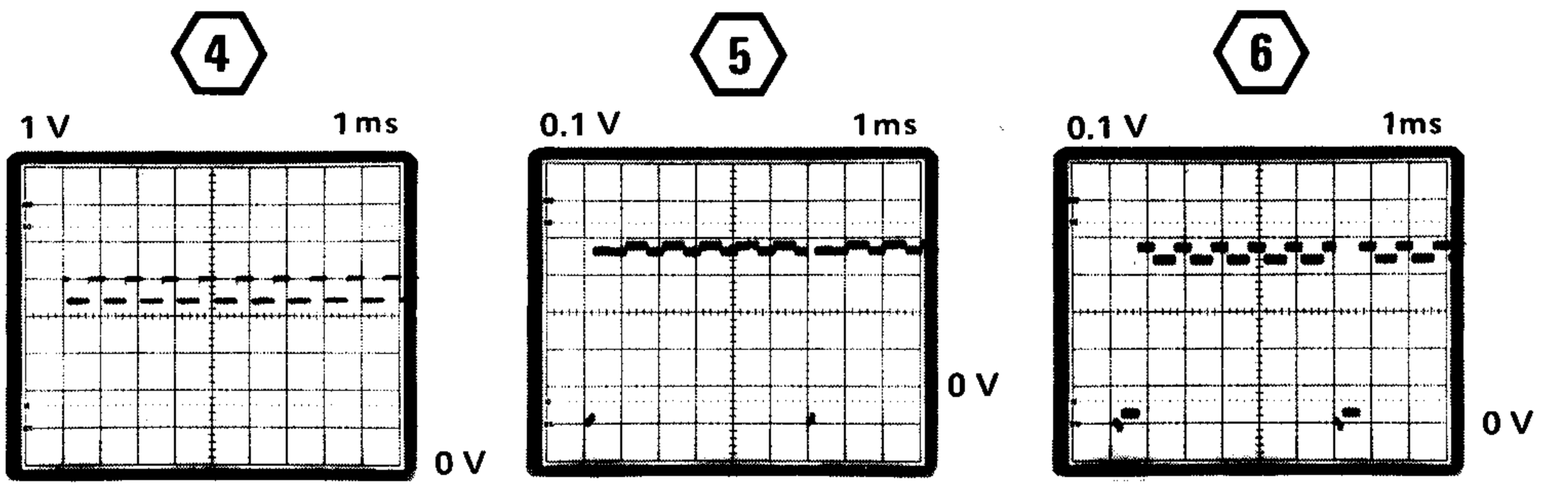
VOLTAGE CONDITIONS

These voltages are typical values; actual values may vary as much as 20%.

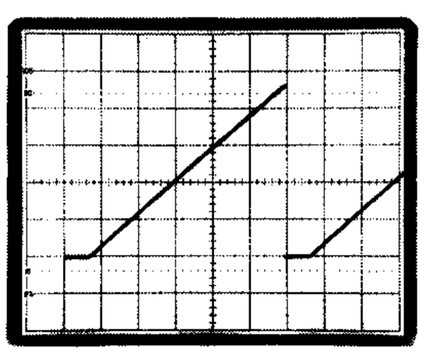
335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		



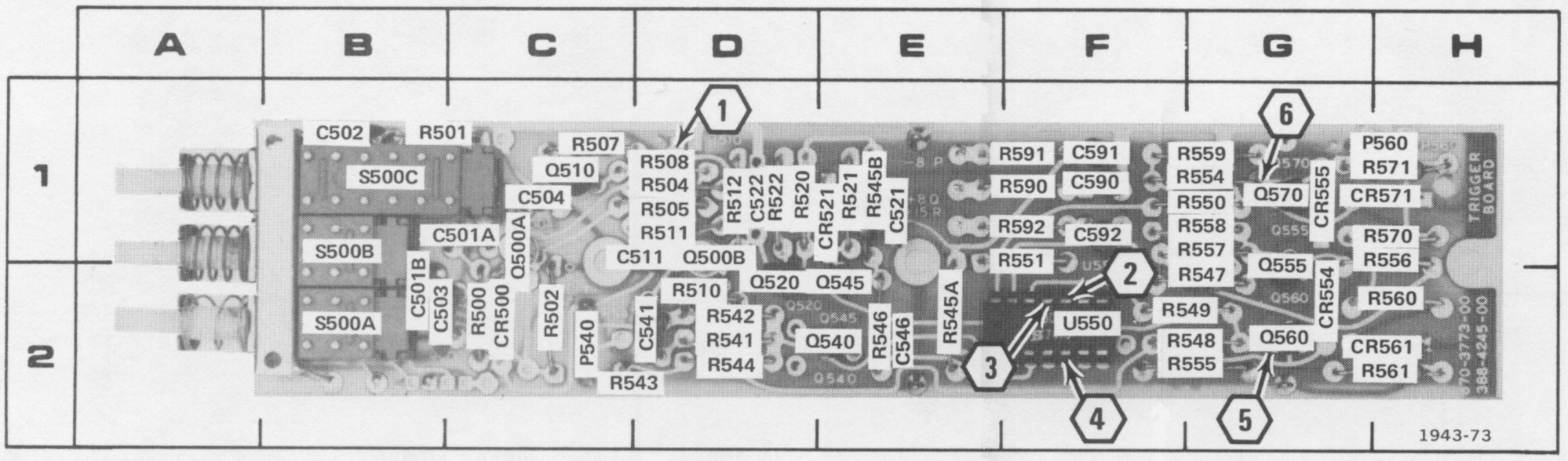


A SWEEP FOR TIME COMPARISON



FROM PIN 8 OF U730

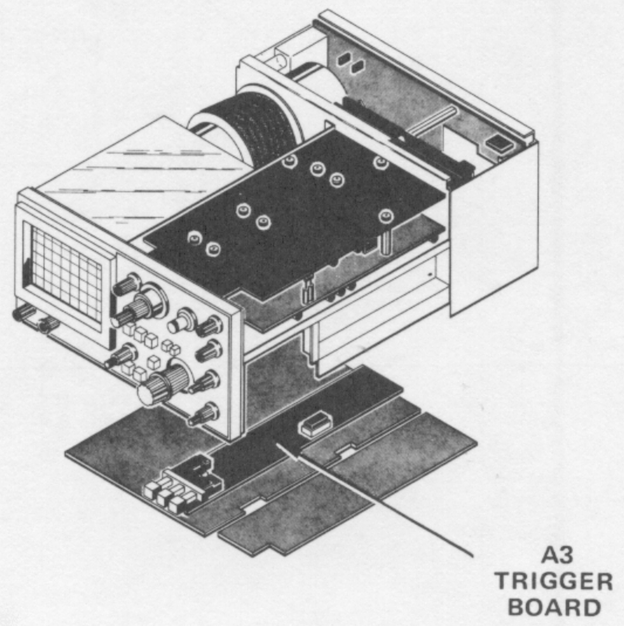
1943-112



*See Parts List for serial number ranges.

Fig. 8-8. A3 Trigger board component locations.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C501A	1C	CR500	2C	Q540	2E	R508	1D	R545B	1E	R559	1G
C501B	2B	CR521	1E	Q545	2E	R510	2D	R546	2E	R560	1H
C502	1B	CR554	2G	Q555	1G	R511	1D	R547	2G	R561	1H
C503	2B	CR555	1G	Q560	2G	R512	1D	R548	2G	R570	1H
C504	1C	CR561	1H	Q570	1G	R520	1D	R549	2G	R571	1H
C511	1D	CR571	1H			R521	1E	R550	1G	R590	1F
C521	1E			R500	2C	R522	1D	R551	1F	R591	1F
C522	1D	P540	2C	R501	1B	R541	2D	R554	1G	R592	1F
C541	2D	P560	1H	R502	2C	R542	2D	R555	2G		
C546*	2E			R504	1D	R543	2D	R556	1H	S500A	2B
C590	1F	Q500		R505	1D	R544	2D	R557	1G	S500B	1B
C591	1F	Q510	1C	R507	1C	R545A	2E	R558	1G	S500C	1B
C592	1F	Q520	2D								



VOLTAGE & WAVEFORM CONDITIONS

FROM P110 DIAG (2)

+15V → R 592 10 → C592 2.2μF → +15V5

+8V → Q 590 10 → C590 2.2μF → +8V5

-8V → P 591 10 → C591 2.2μF → -8V5

TRIGGER OUT FROM S500C DIAG (5)

CR500

Q500A

Q500B

R502 499K

R504 100

C504 2.2μF

R505 15

C511 2.2μF

R510 15

R511 100

R512 100

R507 100

Q510

C522 .01

R522 47

-7.2

Q520

R520 5.1K

C521 .01

CR521

R521 10K

Q545

R545B 3.65K

R545A 3.65K

C546 100

R546 56

Q540

R542 47

R544 2.4K

R541 680

C541 .01

R543 10K

LEVEL CENTER

P540 3 2

R540 10K ('A') LEVEL

R508 1.3K

'B' TRIG OR EXT HORIZ TO R900 THRU P901-2 DIAG (9)

(1)

S550 SLOPE ('A')

P540 4 5

R548 5.1K

R547 3.0K

U550D 1/5 3046

U550C 1/5 3046

U550B 1/5 3046

U550A 1/5 3046

U550E 1/5 3046

R550 3.0K

R551 5.1K

R549 100K

+8V5 R559 619

R554 255

R555 255

Q560

R561 2.32K

R560 120

CR561 4.7mA ARMING TD

Q570

R571 5.62K

R570 120

CR571 4.7mA FIRING TD

CR554

CR555

+15V5 R557 3K

R558 3.9K

R556 1.2K

Q555

'A' HOLDOFF FROM P1600-5 DIAG (13)

P560 1 2

P560 3 4

'A' GATE TO P1600-3 DIAG (13)

NOTES:

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

Δ 'A' SLOPE -.

ΔΔ 'A' SLOPE +.

ϕ 'A' LEVEL SET TO MIDRANGE.

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

PARTIAL A3 TRIGGER BOARD

335

1943-124

REV MAY 1981

TRIGGER AMPLIFIER & A TRIGGER GENERATOR (6)

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

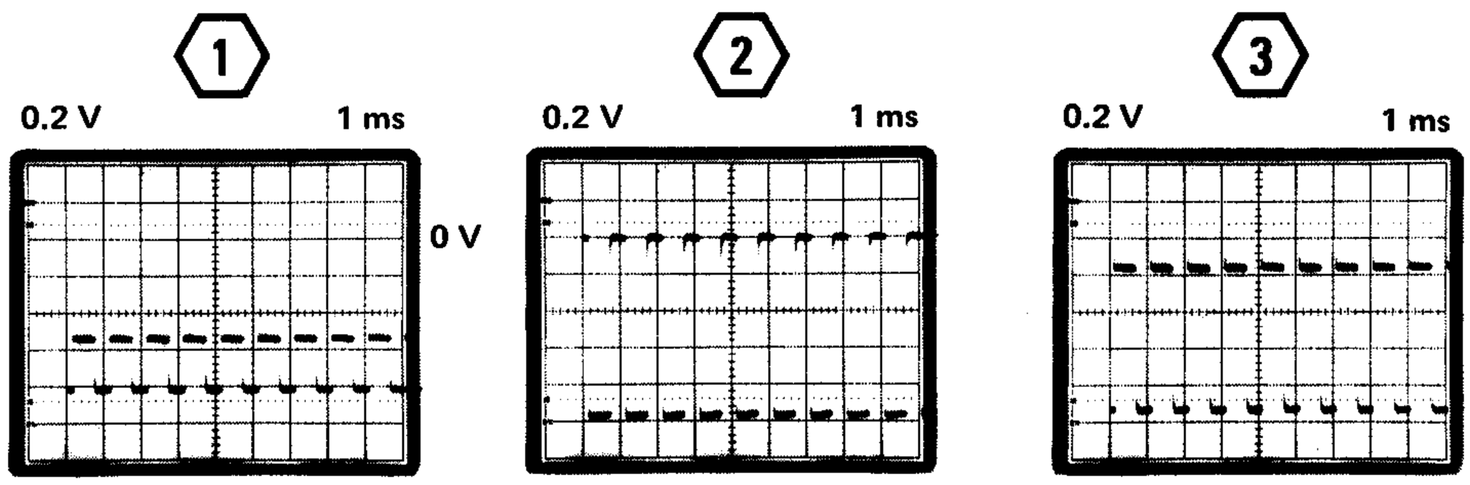
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

VOLTAGE CONDITIONS

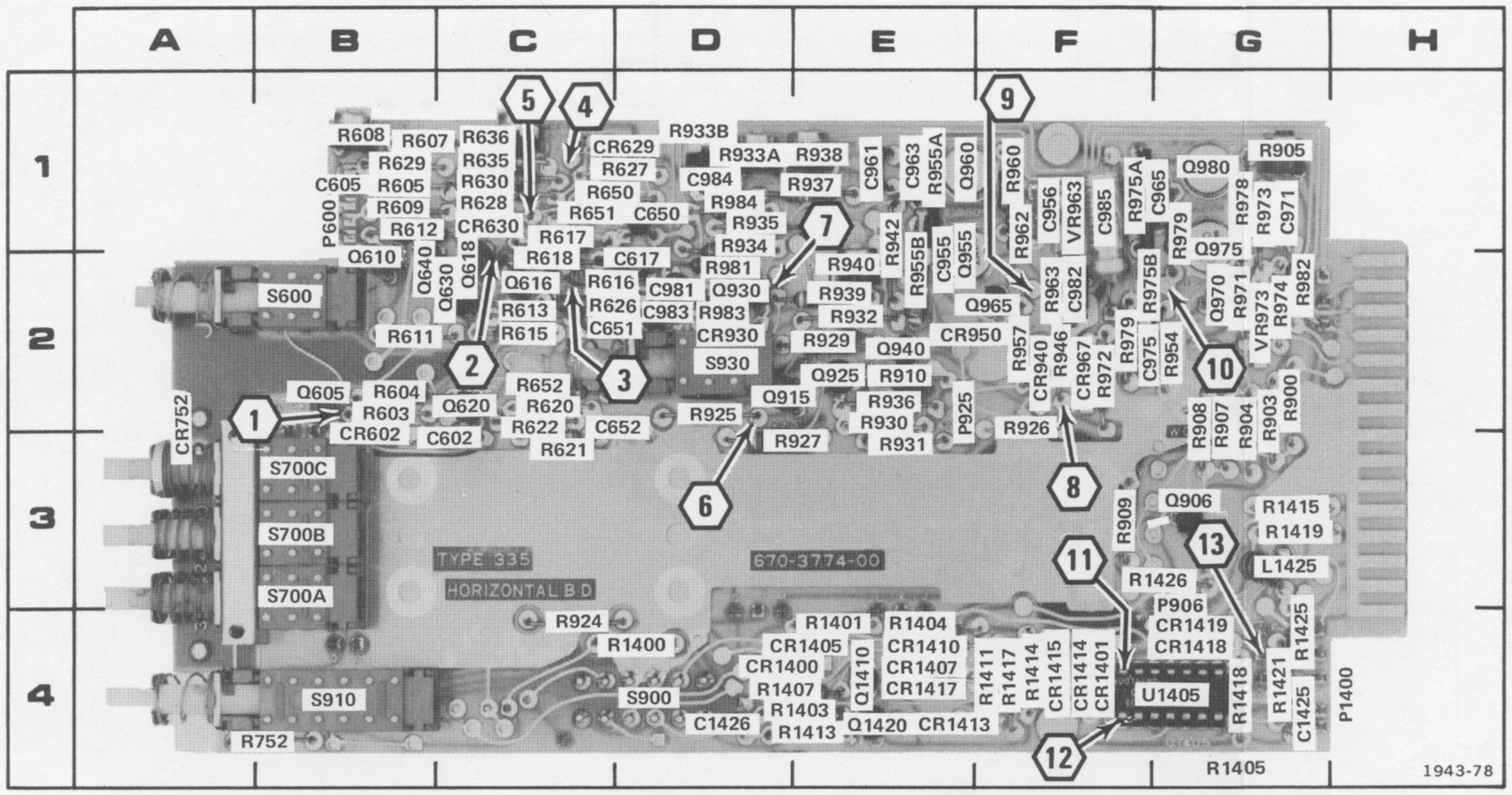
These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		



1943-113



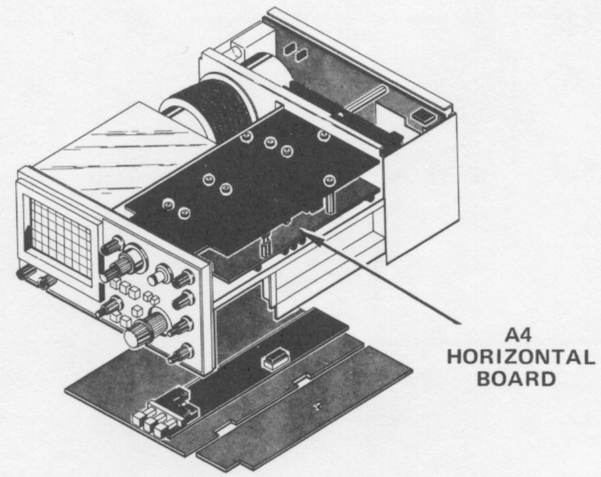
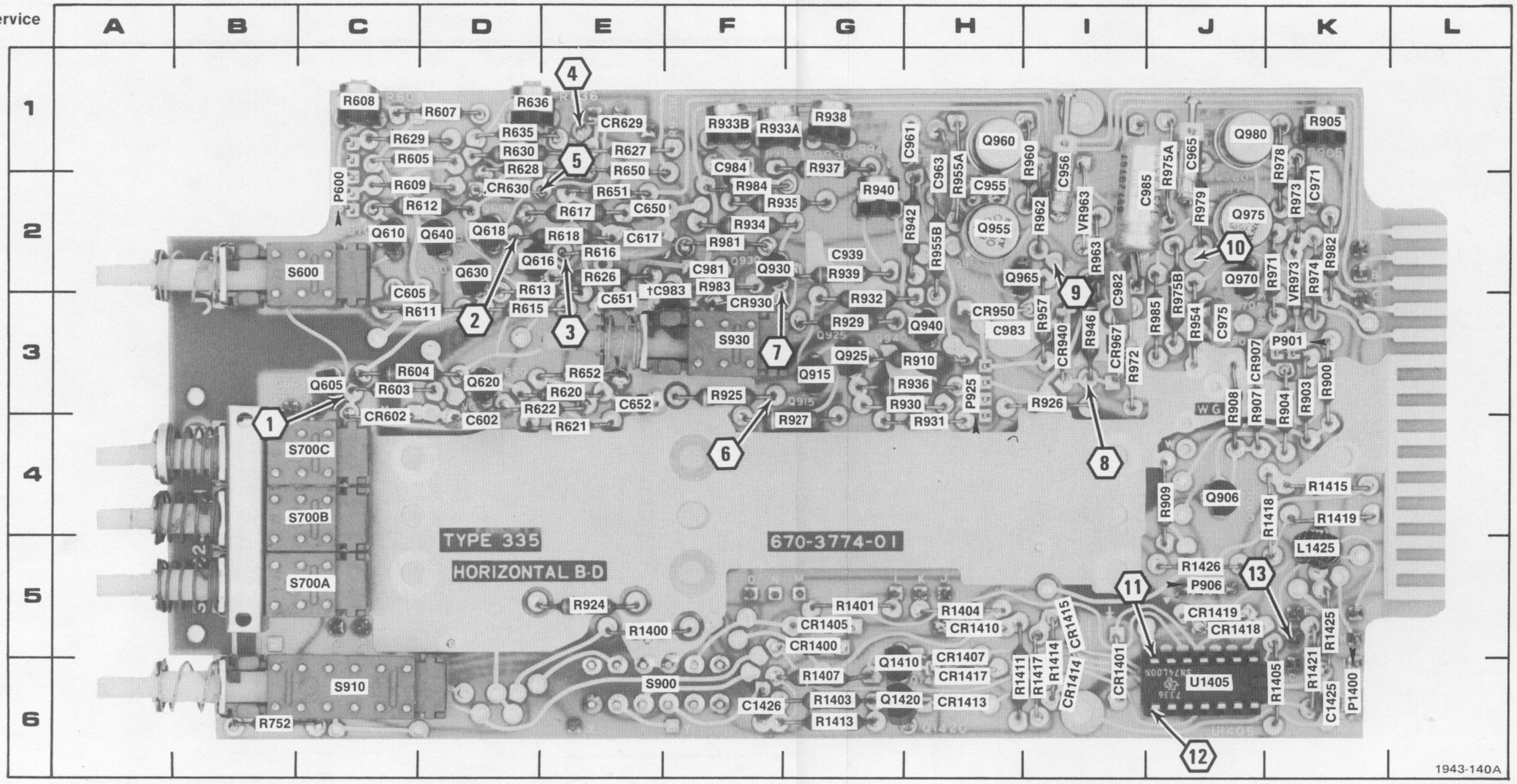


Fig. 8-10. A4 Horizontal board component locations, below SN 300121.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C602	3C	CR1405	4E	Q960	1E	R636	1C	R942	1E	R1414	4F
C605	1B	CR1407	4E	Q965	2F	R650	1D	R946	2F	R1415	3G
C617	2D	CR1410	4E	Q970	2G	R651	1C	R954	2G	R1417	4F
C650	1D	CR1413	4E	Q975	1G	R652	2C	R955A	1E	R1418	4G
C651	2C	CR1414	4F	Q980	1G	R752	4B	R955B	2E	R1419	3G
C652	2D	CR1415	4F	Q1410	4E	R900	2G	R957	2F	R1421	4G
C955	2E	CR1417	4E	Q1420	4E	R903	2G	R960	1F	R1425	4G
C956	1F	CR1418	4G			R904	2G	R962	1F	R1426	3G
C961	1E	CR1419	4G	R603	2B	R905	1G	R963	2F		
C963	1E			R604	2B	R907	2G	R971	2G	S600	2B
C965	1G	L1425	3G	R605	1B	R908	2G	R972	2F	S700A	3B
C971	1H			R607	1B	R909	3F	R973	1G	S700B	3B
C975	2F	P600	1B	R608	1B	R910	2E	R974	2G	S700C	3B
C981	2D	P906	3G	R609	1B	R924	4C	R975A	1F	S900	4D
C982	2F	P925	2E	R611	2B	R925	2D	R975B	2F	S910	4B
C983	2D	P1400	4H	R612	1B	R926	2F	R978	1G	S930	2D
C984	1D			R613	2C	R927	3D	R979	1G		
C985	1F	Q605	2B	R615	2C	R929	2E	R981	2D	U1405	4G
C1425	4G	Q610	2B	R616	2C	R930	2E	R982	2G		
C1426	4D	Q616	2C	R617	1C	R931	3E	R983	2D	VR963	1F
		Q618	2C	R618	2C	R932	2E	R984	1D	VR973	2G
CR602	2B	Q620	2C	R620	2C	R933A	1D	R985			
CR629	1C	Q630	2C	R621	3C	R933B	1D	R1400	4D		
CR630	1C	Q640	2B	R622	2C	R934	1D	R1401	4E		
CR930	2D	Q906	3G	R626	2C	R935	1D	R1403	4E		
CR940	2F	Q915	2D	R627	1D	R936	2E	R1404	4E		
CR950	2F	Q925	2E	R628	1C	R937	1E	R1405	4G		
CR967	2F	Q930	2D	R629	1B	R938	1E	R1407	4E		
CR1400	4E	Q940	2E	R630	1C	R939	2E	R1411	4F		
CR1401	4F	Q955	2E	R635	1C	R940	2E	R1413	4E		

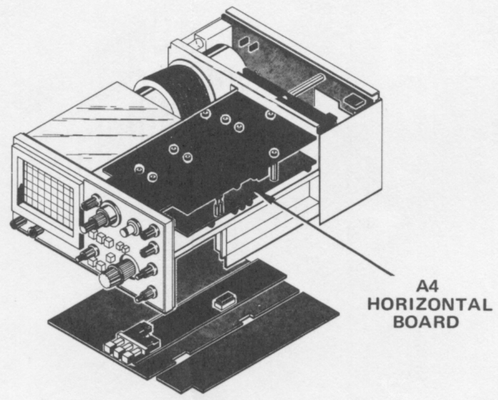


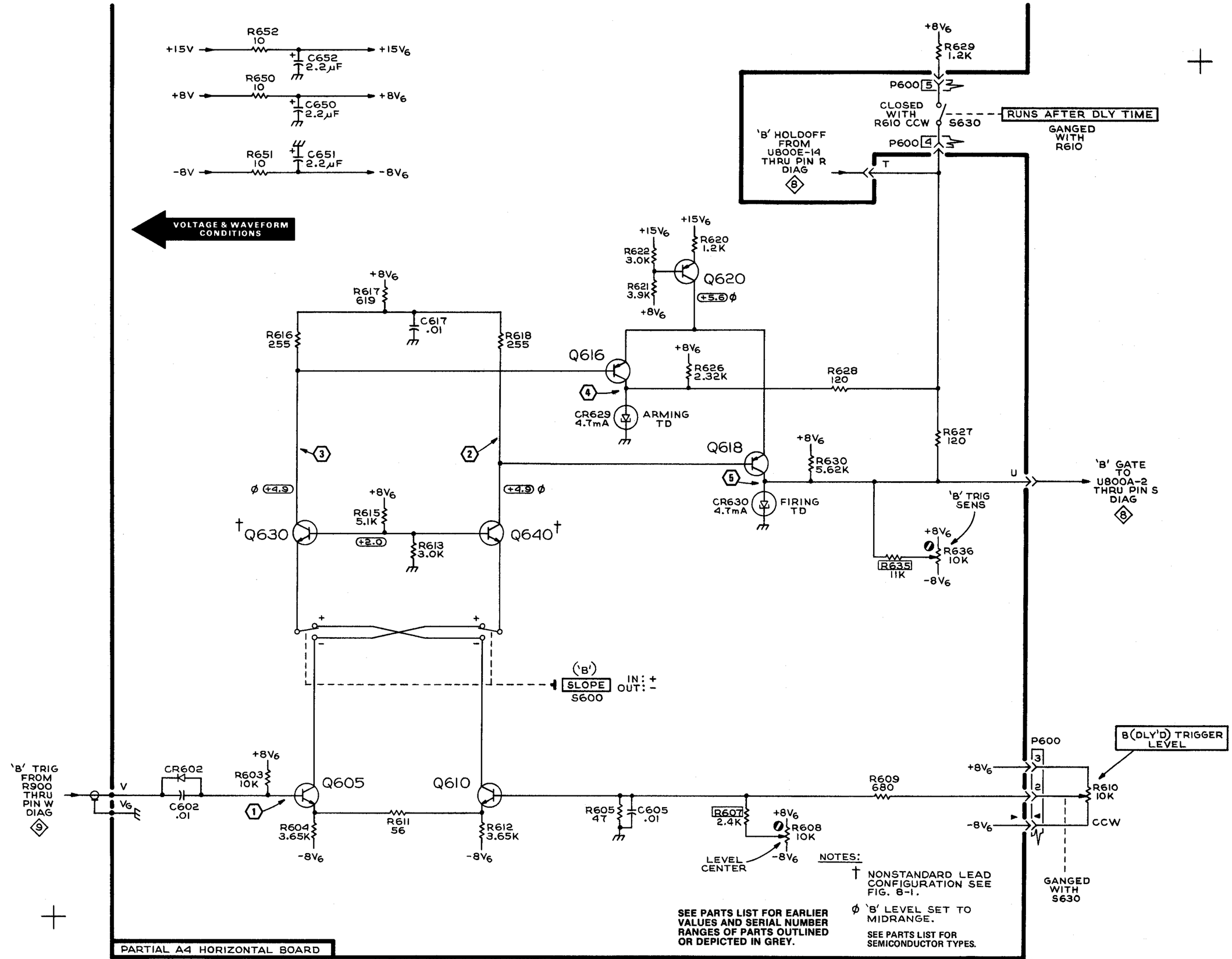
*See Parts List for serial number ranges.

†Earlier location.

Fig. 8-9. A4 Horizontal board component locations, SN 300121-up.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C602	4D	C1425	6K	CR1415	5I	Q630	2D	R605	1C	R635	1D	R929	3G	R957	3I	R1401	5G	S700B	4C
C605	3C	C1426	6F	CR1417	6H	Q640	2D	R607	1D	R636	1D	R930	3H	R960	1I	R1403	6G	S700C	4C
C617	2E			CR1418	5J	Q906	4J	R608	1C	R650	1E	R931	4H	R962	2I	R1404	5H	S900	6E
C650	2E	CR602	4C	CR1419	5J	Q915	3G	R609	2C	R651	2E	R932	3G	R963	2I	R1405	6K	S910	6C
C651	3E	CR629	1E			Q925	3G	R611	3C	R652	3E	R933A	1F	R971	2K	R1407	6G	S930	3F
C652	3E	CR630	2D	L1425	5K	Q930	2F	R612	2D	R752	6B	R933B	1F	R972	3I	R1411	6H		
C939	2G	CR907*	3J			Q940	3H	R613	2D	R900	3K	R934	2F	R973	2K	R1413	6G	U1405	6J
C955	2H	CR930	3F	P600	2C	Q955	2H	R615	3D	R903	3K	R935	2F	R974	2K	R1414	6I		
C956	1I	CR940	3I	P901	3K	Q960	1H	R616	2E	R904	3K	R936	3H	R975A	1J	R1415	4K	VR963	2I
C961	1H	CR950	3H	P906	5J	Q965	2H	R617	2E	R905	1K	R937	1G	R975B	2J	R1417	6I	VR973	2K
C963	1H	CR967	3I	P925	3H	Q970	2J	R618	2E	R907	3J	R938	1G	R978	1K	R1418	4K		
C965	1J	CR1400	5G	P1400	6K	Q975	2J	R620	3E	R908	3J	R939	2G	R979	2J	R1419	4K		
C971	2K	CR1401	6I			Q980	1J	R621	4E	R909	4J	R940	2G	R981	2F	R1421	6K		
C975	3J	CR1405	5G	Q605	3C	Q1410	6G	R622	3E	R910	3H	R942	2H	R982	2K	R1425	5K		
C981	2F	CR1407	6H	Q610	2C	Q1420	6G	R626	2E	R924	5E	R946	3I	R983	2F	R1426	5J		
C982	2I	CR1410	5H	Q616	2D			R627	1E	R925	3F	R954	3J	R984	2F				
C983*	3H	CR1413	6H	Q618	2D	R603	3C	R628	1D	R926	3I	R955A	2H	R985	3J	S600	2C		
C984	1F	CR1414	6I	Q620	3D	R604	3C	R629	1C	R927	4G	R955B	2H	R1400	5E	S700A	5C		
C985	2J							R630	1D										




R652 10
+15V
+15V6
C652 2.2µF
R650 10
+8V
+8V6
C650 2.2µF
R651 10
C651 2.2µF
-8V
-8V6
VOLTAGE & WAVEFORM CONDITIONS
+8V6
R629 1.2K
P600 5
CLOSED WITH R610 CCW
S630
RUNS AFTER DLY TIME
GANGED WITH R610
'B' HOLDOFF FROM U800E-14 THRU PIN R DIAG
8
P600 4
T
+15V6
R620 1.2K
R622 3.0K
R621 3.9K
Q620
+5.6 ϕ
+8V6
R617 619
C617 .01
R616 255
R618 255
Q616
+8V6
R626 2.32K
R628 120
4
CR629 4.7mA
ARMING TD
R627 120
Q618
+8V6
R630 5.62K
5
CR630 4.7mA
FIRING TD
U
'B' GATE TO U800A-2 THRU PIN S DIAG
8
'B' TRIG SENS
+8V6
R636 10K
R635 11K
-8V6
3
2
ϕ +4.9
+4.9 ϕ
+8V6
R615 5.1K
+2.0
†Q630
Q640†
R613 3.0K
+
-
('B') SLOPE S600 IN: + OUT: -
'B' TRIG FROM R900 THRU PIN W DIAG
9
V
V6
CR602
C602 .01
+8V6
R603 10K
1
Q605
Q610
R604 3.65K
-8V6
R611 56
R612 3.65K
-8V6
R605 47
C605 .01
R607 2.4K
+8V6
R608 10K
LEVEL CENTER
-8V6
R609 680
P600
3
+8V6
2
R610 10K
-8V6
CCW
B(DLY'D) TRIGGER LEVEL
GANGED WITH S630
NOTES:
† NONSTANDARD LEAD CONFIGURATION SEE FIG. 8-1.
ϕ 'B' LEVEL SET TO MIDRANGE.
SEE PARTS LIST FOR SEMICONDUCTOR TYPES.
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.
PARTIAL A4 HORIZONTAL BOARD
335
1943-125
REV A, JUNE 1976
B TRIGGER GENERATOR
7

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted
SLOPE	+	HORIZ DISPLAY	A INTEN		for a stable intensified zone.

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

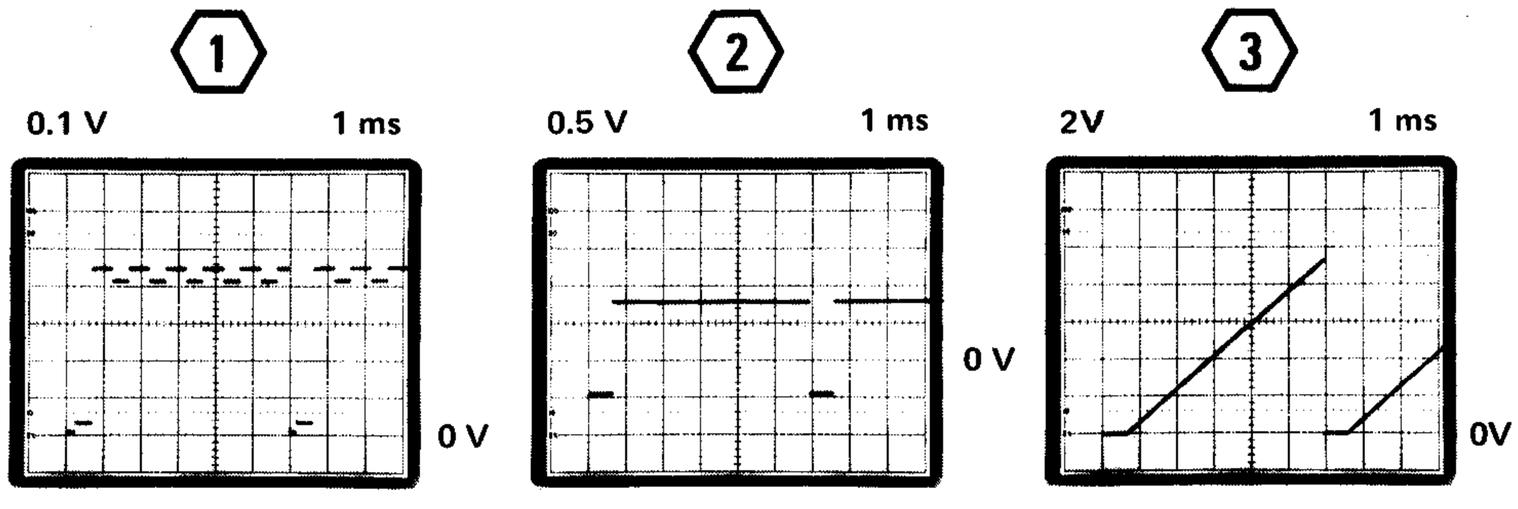
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

VOLTAGE CONDITIONS

These voltages are typical values; actual values may vary as much as 20%.

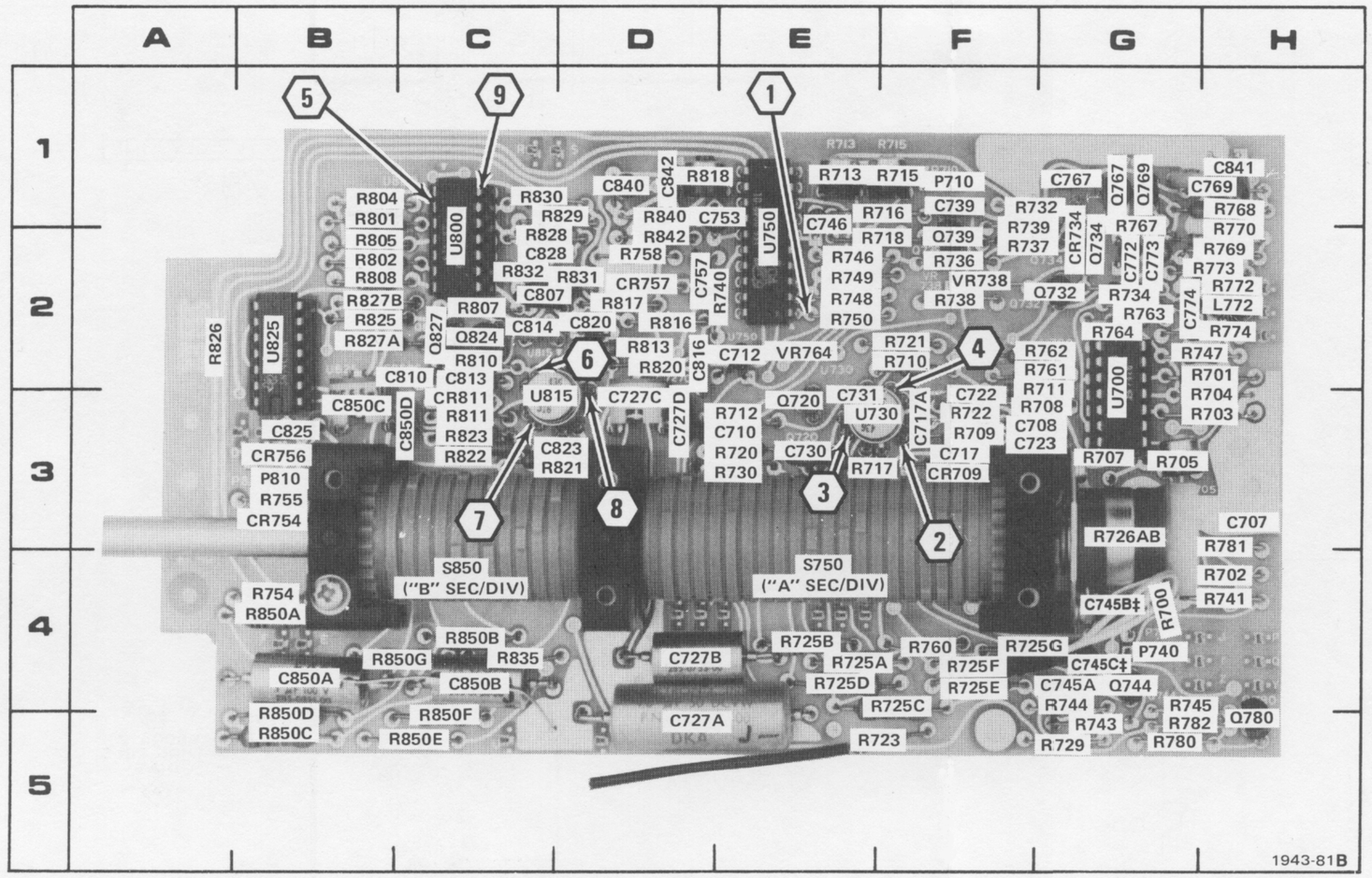
335 Controls

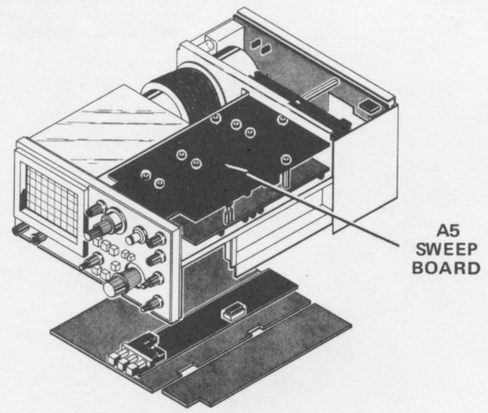
Trigger Mode	Single Sweep (READY light off)
HORIZ DISPLAY	A



1943-114

VERY SHORT-DURATION PULSE. DIFFICULT TO SEE UNLESS TEST OSCILLOSCOPE INTENSITY IS TURNED UP.





†Located on back of board.

Fig. 8-11. A5 Sweep board component locations.

‡C745B and C745C exchanged places at SN .310391.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C707	1H	C769	1H	CR743	3B	R700	4G	R725B	4E	R748	2E	R802	2B	R831	2D
C708	3G	C772	2G	CR754	3B	R701	2H	R725C	4F	R749	2E	R804	1B	R832	2C
C710	3E	C773	2G	CR756	3B	R702	4H	R725D	4E	R750	2E	R805	2B	R835	4C
C712	2E	C774	2G	CR757	2D	R703	3H	R725E	4F	R754	4B	R807	2C	R840	1D
C717A†	F3	C807	2C	CR811	3C	R704	3H	R725F	4F	R755	3B	R808	2B	R842	2D
C717	3F	C810	2C			R705	3G	R725G	4F	R758	2D	R810	2C	R850D	5B
C722	3F	C813	2C	L772	2H	R707	3G	R726AB	3G	R760	4F	R811	3C	R850E	5C
C723	3G	C814	2C			R708	3F	R729	5G	R761	2F	R813	2D	R850F	5C
C727A	5D	C816	2D	P710	1F	R709	3F	R730	3E	R762	2F	R816	2D	R850G	4C
C727B	4D	C820	2D	P740	4G	R710	2F	R732	1G	R763	2G	R817	2D		
C727C	3D	C823	3D	P810	3B	R711	2F	R734	2G	R764	2G	R818	1D	S750	4E
C727D	3D	C825	3B			R712	3E	R736	2F	R767	2G	R820	2D	S850	4C
C730	3E	C828	1C	Q720	3E	R713	1E	R737	2F	R768	1H	R821	3C		
C731†	3E	C840	1D	Q732	2G	R715	1F	R738	2F	R769	2H	R822	3C	U700	3G
C739	1F	C842	1D	Q734	2G	R716	1F	R739	1F	R770	2H	R823	3C	U730	3E
C746	1E	C850A	4B	Q739	2F	R717	3E	R740	2E	R772	2H	R825	2B	U750	2E
C753	1E	C850B	4C	Q744	4G	R718	2F	R741	4H	R773	2H	R826	2A	U800	2C
C757	2D	C850C	3C	Q767	1G	R720	3E	R743	5G	R774	2H	R827A	2B	U815	3D
C767	1G	C850D	3C	Q769	1G	R721	2F	R744	4G	R780	5G	R827B	2B	U825	2B
C745A	4G			Q824	2C	R722	3F	R745	4G	R781	3H	R828	2C		
C745B	4G	CR709	3F	Q827	2C	R723	5F	R746	2E	R782	5G	R829	1D	VR738	2F
C745C	4G	CR734	2G			R725A	4E	R747	2H	R801	1B	R830	1C	VR764	2E

PARTIAL A5 SWEEP BOARD

VOLTAGE & WAVEFORM CONDITIONS

S700A S700B IN: SINGLE AUTO NORM

S700C RESET

PARTIAL A4 HORIZ BOARD

HOLDOFF TIME FROM Q744 DIAG 11

U750 SWEEP CONTROL

HOLDOFF TIMING · READY LIGHT · SINGLE SWEEP MODE · AUTO TIMING · AUTO MODE · SWEEP DISABLE · RESET START · RESET TIMING · SWEEP GATE IN · AUTO GATE OUT · LOCKOUT IN · HOLDOFF START · SWEEP GATE IN

READY CR752 R752 150 +5V9

PART A4 HORIZ BD

'A' HOLDOFF TO J1600-C DIAG 13

U700E 1/5 3046 · U700D 1/5 3046 · U700C 1/5 3046 · U700B 1/5 3046 · U700A 1/5 3046

VR764 3V · CR754 · CR756 · CR757 · CR709 · CR811

U730A MILLER INTEGRATOR

FREQ COMPEN · MILLER NULL · MILLER OUT · SWEEP GATE IN

U730B DELAY PICKOFF

DELAY CONTROL · DELAYED GATE OUT · DELAYED GATE IN

Q720 · Q827 · Q780 · Q824 · Q739 · Q732 · Q734 · Q769 · Q767

SEE DIAG 11 S750

DELAY TIME POSITION P710

SWEEP STOP · SWEEP START

'A' GATE FROM J1600-B DIAG 13

'B' SWEEP LOCKOUT FROM R1401 THRU PIN L DIAG 10

'A' SWEEP TO S900 THRU PIN Y DIAG 9

ALTERNATE SYNC TO J1600-H DIAG 13

'A' UNBLANKING TO U1405A-4 THRU PIN G DIAG 10

'B' HOLDOFF TO R628 THRU PIN T DIAG 7

U800D 1/5 3046 · U800E 1/5 3046 · U825A 1/4 74L00 · U825B 1/4 74L00 · U825C 1/4 74L00 · U825D 1/4 74L00

'B' SWEEP STOP LEVEL · 'B' SWEEP STOP OUT

U815B SWEEP STOP COMPARATOR

U815A MILLER INTEGRATOR

SWEEP GATE IN · MILLER OUT · FREQ COMPEN · MILLER NULL · DELAYED GATE IN

'B' GATE FROM CR630 THRU PIN U DIAG 7

'B' SWEEP TO S900 THRU PIN X DIAG 9

'B' UNBLANKING TO R1405 THRU P1400-1 DIAG 10

P810

SEE DIAG 9 +15V +5V

SEE DIAG 9 -8V

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

NOTES:

△ READY LIGHT ON.

△△ READY LIGHT OFF.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

1943-126 REV JUL 1987

335

A & B SWEEP GENERATORS 8

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

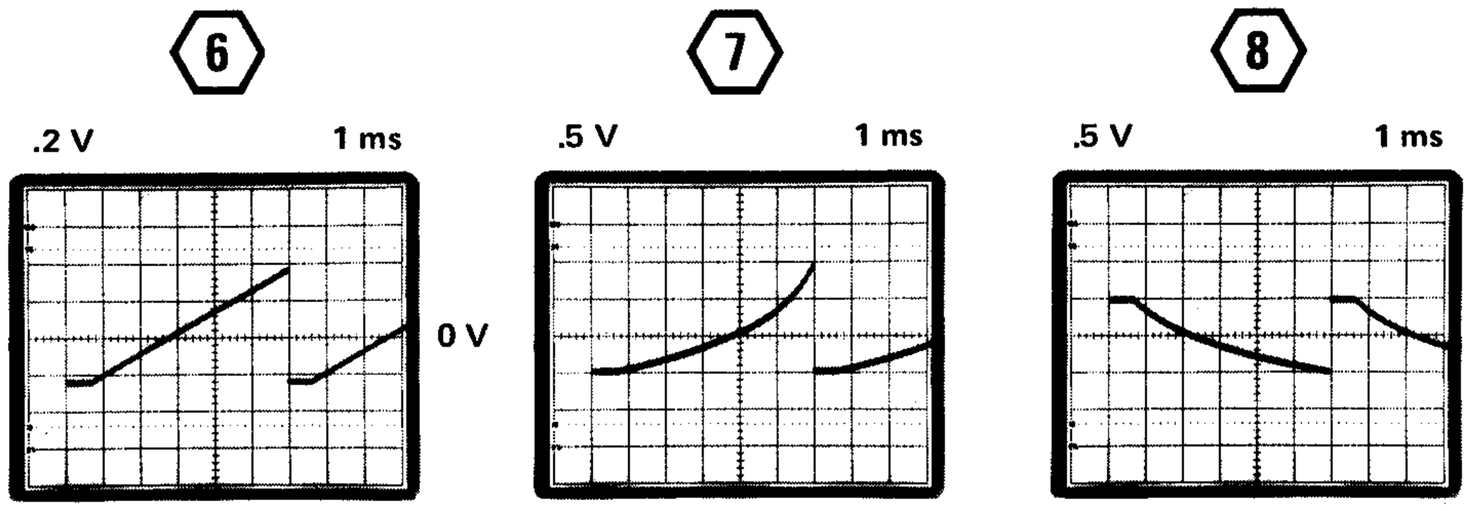
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

VOLTAGE CONDITIONS

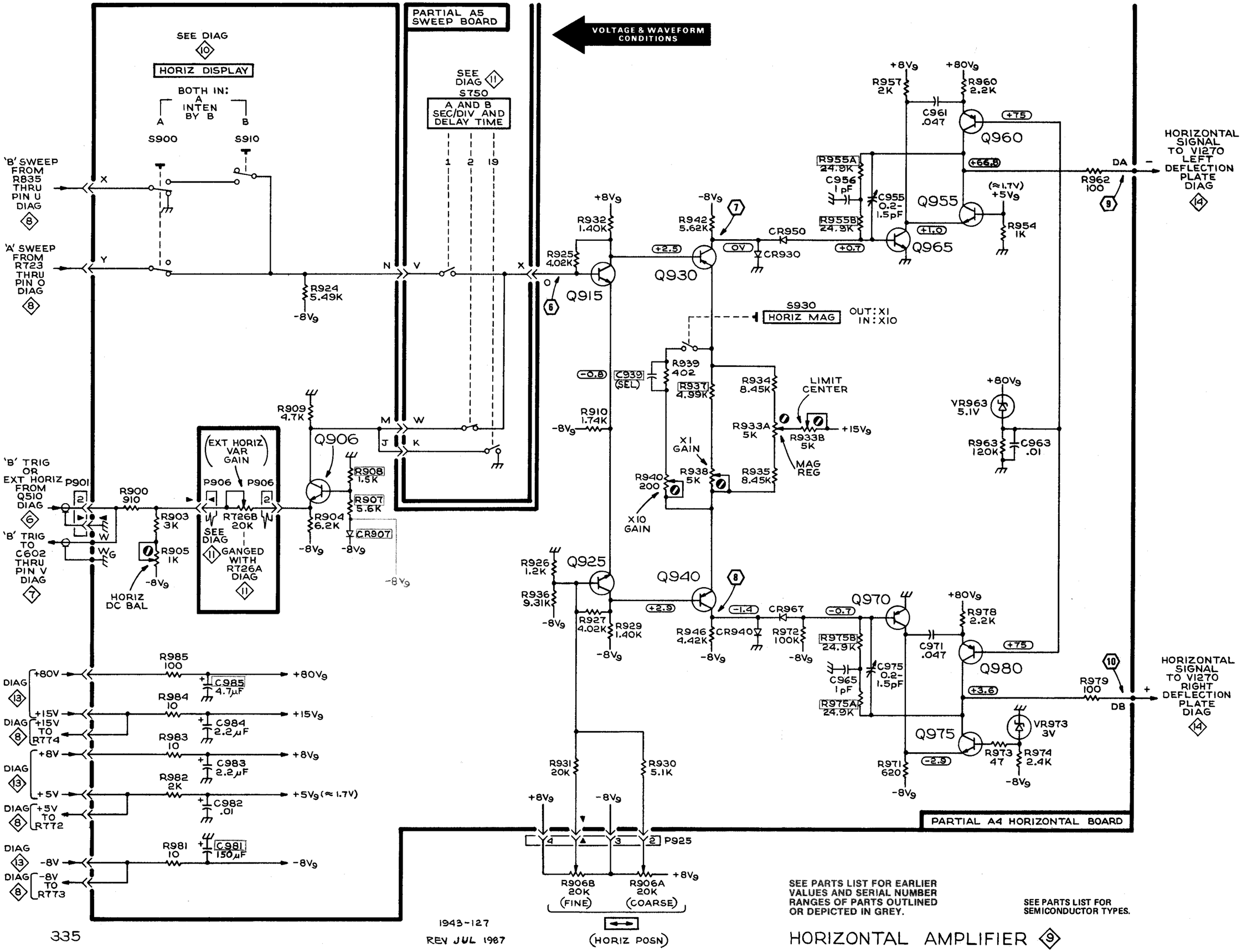
These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		



1943-115



SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

HORIZONTAL AMPLIFIER 9

1943-127
REV JUL 1987

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

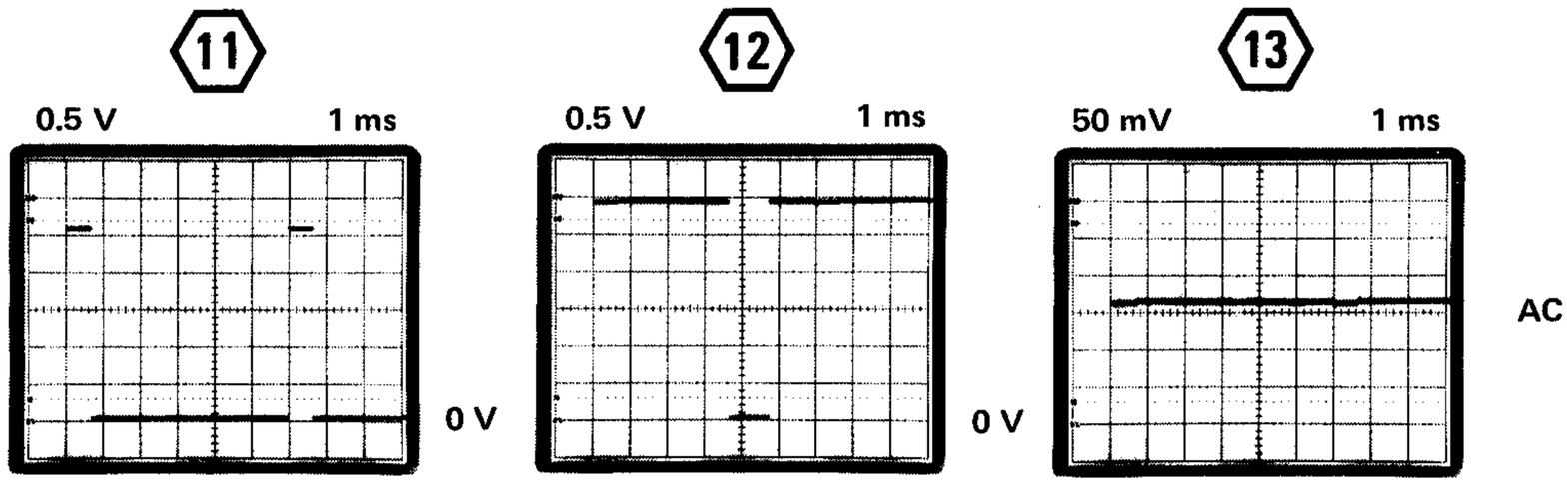
Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.

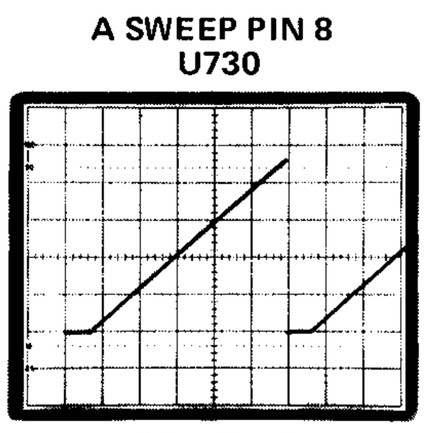
VOLTAGE CONDITIONS

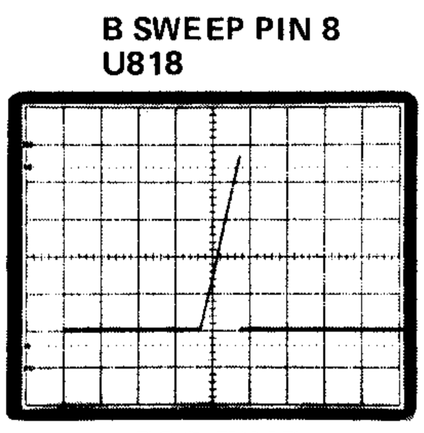
These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		







1943-116

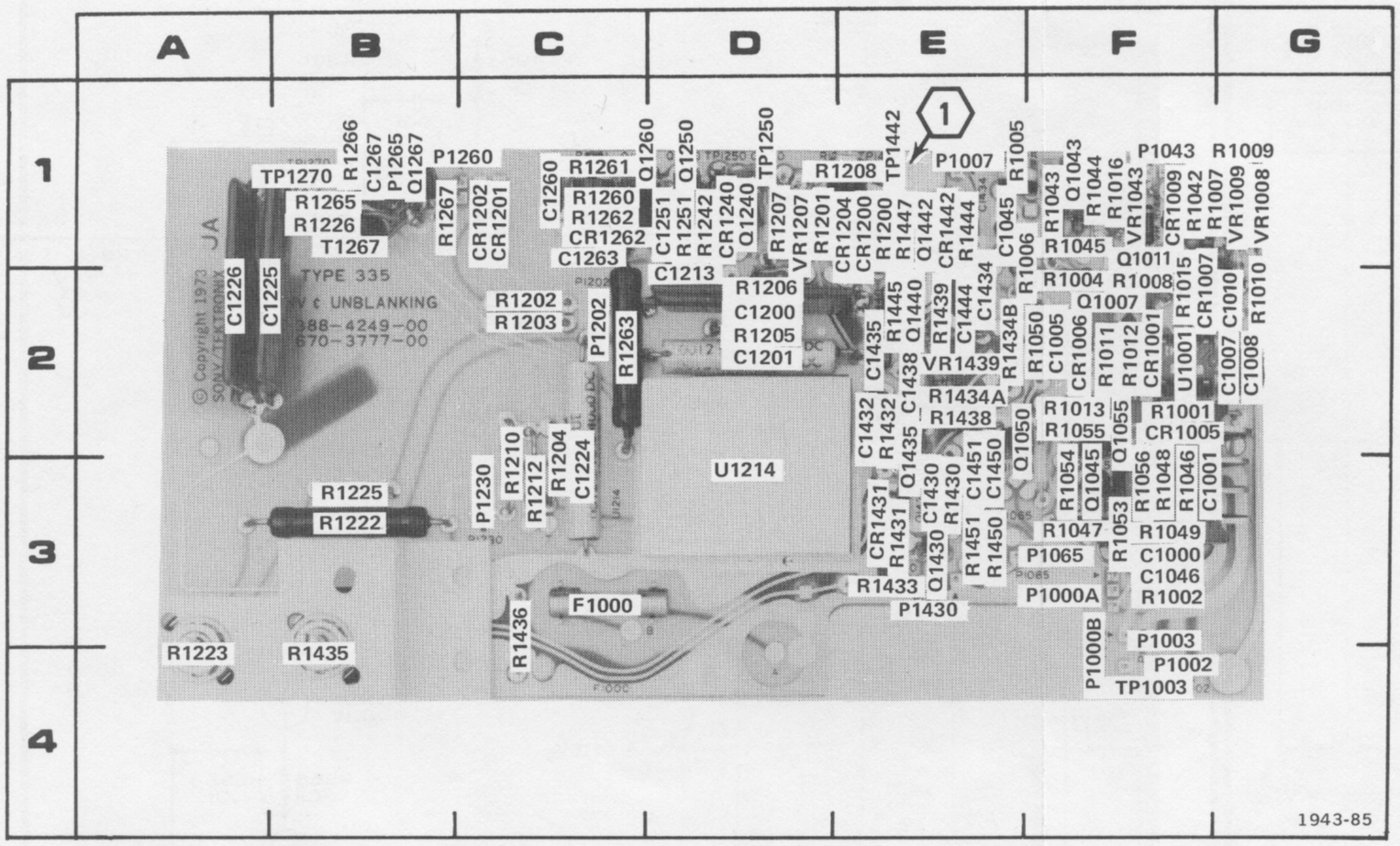
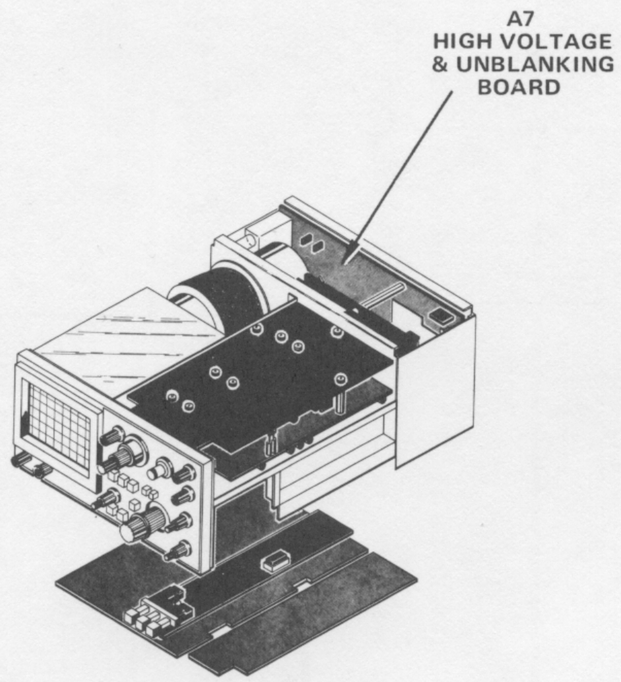


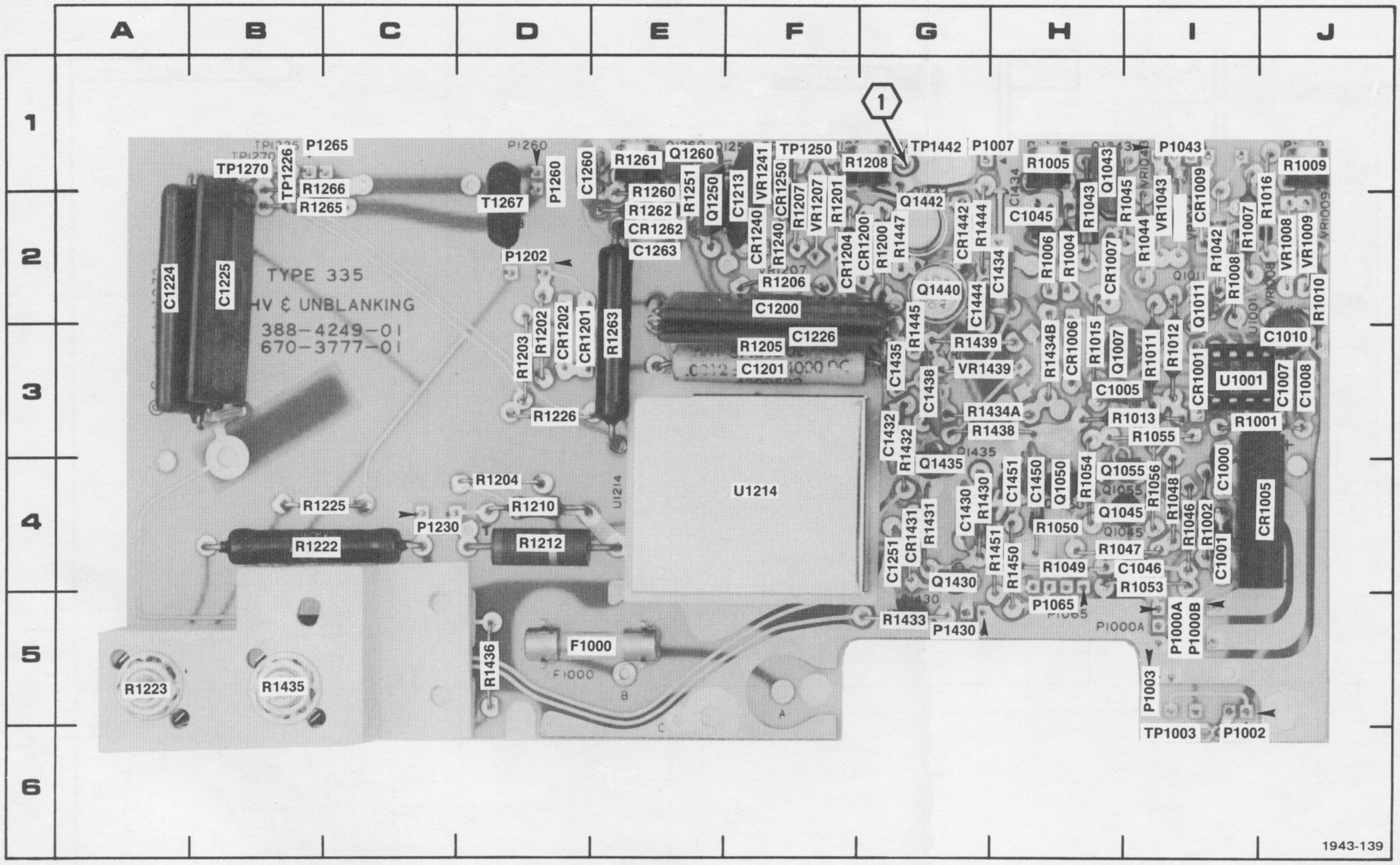
Fig. 8-13. A7 High-Voltage and Unblanking board component locations, below SN 300121.

*See Parts List for serial number ranges.

[1]Located on back of board.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1000	3F	CR1000*[1]		P1260	1C	R1011	2F	R1210	3C	R1444	1E
C1001	3F	CR1001	2F	P1265	1B	R1012	2F	R1212	3C	R1445	2E
C1005	2F	CR1005	2F			R1013	2F	R1222	3B	R1447	1E
C1007	2G	CR1006	2F	Q1007	2F	R1015	2F	R1223	4A	R1450	3E
C1008	2G	CR1007	2F	Q1011	1F	R1016	1F	R1225	3B	R1451	3E
C1009[1]		CR1009	1F	Q1043	1F	R1042	1F	R1226	1B		
C1010	2G	CR1011*		Q1045	3F	R1043	1F	R1240*		T1267	1B
C1045	1E	CR1200	1E	Q1050	2E	R1044	1F	R1241*			
C1046	3F	CR1201	1C	Q1055	2F	R1045	1F	R1242	1D	TP1250	1D
C1200	2D	CR1202	1C	Q1240	1D	R1046	3F	R1251	1D	TP1270	1B
C1201	2D	CR1204	1E	Q1250	1D	R1047	3F	R1260	1C		
C1213	2D	CR1240	1D	Q1260	1C	R1048	3F	R1261	1C	U1001	2F
C1224	3C	CR1262	1C	Q1267	1B	R1049	3F	R1262	1C	U1214	3D
C1225	2A	CR1431	3E	Q1430	3E	R1050	2F	R1263	2C		
C1226	2A	CR1442	1E	Q1435	2E	R1053	3F	R1265	1B	VR1008	1G
C1251	1D			Q1440	2E	R1054	3F	R1266	1B	VR1009	1G
C1260	1D	F1000	3C	Q1442	1E	R1055	2F	R1267	1B	VR1043	1F
C1263	1C					R1056	3F	R1430	3E	VR1207	1D
C1267	1B	P1000A	3F	R1001	2F	R1200	1E	R1431	3E	VR1439	2E
C1430	3E	P1000B	4F	R1002	3F	R1201	1D	R1432	2E		
C1432	2E	P1002	4F	R1004	2F	R1202	2C	R1433	3E		
C1434	2E	P1003	3F	R1005	1E	R1203	2C	R1434A	2E		
C1435	2E	P1007	1E	R1006	1F	R1204	3C	R1434B	2E		
C1438	2E	P1043	1F	R1007	1F	R1205	2D	R1435	4B		
C1444	2E	P1065	3F	R1008	2F	R1206	2D	R1436	3C		
C1450	3E	R1202	2C	R1009	1G	R1207	1D	R1438	2E		
C1451	3E	P1230	3C	R1010	2G	R1208	1E	R1439	2E		





[1]Located on back of board.

Fig. 8-12. A7 High-Voltage and Unblanking board component locations, SN 300121-up.

[2]C1224 moved from front of board to back at SN 307521.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1000	4I	C1263	2E	CR1201	3D	P1065	5H	Q1440	2G	R1042	2I	R1204	4D	R1265	2B	T1267	2D
C1001	4I	C1430	4G	CR1202	3D	P1202	2D	Q1442	2G	R1043	2H	R1205	3F	R1266	1B		
C1005	3H	C1432	3G	CR1204	2F	P1230	4C			R1044	2I	R1206	2F	R1430	4G	TP1003	6I
C1007	3J	C1434	2H	CR1240	2F	P1260	1D	R1001	3I	R1045	2I	R1207	2F	R1431	4G	TP1226	1B
C1008	3J	C1435	3G	CR1250	2F	P1265	1C	R1002	4I	R1046	4I	R1208	1G	R1432	3G	TP1250	1F
C1009[1]		C1438	3G	CR1262	2E	P1430	5G	R1004	2H	R1047	4H	R1210	4D	R1233	5G	TP1270	1B
C1010	3J	C1444	2G	CR1431	4G			R1005	1H	R1048	4I	R1212	4D	R1434A	3H	TP1442	1G
C1045	2H	C1450	4H	CR1442	2G	Q1007	3H	R1006	2H	R1049	4H	R1222	4B	R1434B	3H		
C1046	4I	C1451	4H			Q1011	2I	R1007	2I	R1050	4H	R1223	5A	R1435	5B	U1001	3I
C1200	2F			F1000	5E	Q1043	1H	R1008	2I	R1053	4I	R1225	4C	R1436	5D	U1214	4F
C1201	3F	CR1000[1]				Q1045	4H	R1009	1J	R1054	4H	R1226	3D	R1438	3H		
C1213	2F	CR1001	3I	P1000A	5H	Q1050	4H	R1010	2J	R1055	3I	R1240	2F	R1439	3G	VR1008	2J
C1224[2]	2A	CR1005	4J	P1000B	5I	Q1055	4H	R1011	3I	R1056	4I	R1251	1E	R1444	2G	VR1009	2J
C1225	2B	CR1006	3H	P1002	6I	Q1250	2E	R1012	3I	R1200	2G	R1260	1E	R1445	3G	VR1043	2I
C1226	3F	CR1007	2H	P1003	5I	Q1260	1E	R1013	3I	R1201	2F	R1261	1E	R1447	2G	VR1207	2F
C1251	4C	CR1009	2I	P1007	1G	Q1430	4G	R1015	3H	R1202	3D	R1262	2E	R1450	4H	VR1241	1F
C1260	1D	CR1200	2G	P1043	1I	Q1435	4G	R1016	2J	R1203	3D	R1263	3E	R1451	4H	VR1439	3G

VOLTAGE & WAVEFORM CONDITIONS

HORIZ DISPLAY

SEE DIAG 9

S900 A

BOTH IN: A INTEN BY B

S910 B

+5V10

R1400 2.0K

+5V10

+5V10

+5V10

R1401 2K

'B' SWEEP LOCK OUT TO R721 THRU PIN N DIAG 8

L

R1403 4.02K

'B' UNBLANKING FROM U800C-7 THRU P810-1 DIAG 8

P1400

R1405 2K

9

10

8

CR1413

Q1420

U1405B 1/4 74L00

12

R1413 5.90K

-8V10

+5V10

R1414 4.7K

-2.5

CR1401

CR1414

CR1415

'A' UNBLANKING FROM U700C-7 THRU PIN-P DIAG 8

G

U1405A 1/4 74L00

5

4

6

CR1407

R1407 5.90K

-8V10

Q1410

R1415 10K

11

13

E

5

PART A6 INTFC & LV RGLTR BD

SEE DIAG 13

P1601

P1430

4

2

3

PARTIAL A5 SWEEP BOARD

H

K

SEE DIAG 11

20

S750

CR1405

CR1400

+5V10

R1404 9.1K

CR1410

R1411 1.33K

CHOP BLANKING FROM J1600-A DIAG 13

+5V10

R1421 2.4K

13

12

11

+5V10

R1417 1.1K

CR1417

U1405C 1/4 74L00

EXT BLANK INPUT FROM J1600-D DIAG 13

R1419 10K

CR1419

1

2

3

+5V10

R1418 8.2K

CR1418

+5V10

U1405D 1/4 74L00

L1425 270µH

R1425 10

+5V

+5V10

C1425 2.2µF

C1426 2.2µF

-8V

R1426 10

-8V10

PARTIAL A4 HORIZONTAL BOARD

INTENSITY

+8V11

R1435 1K

R1433 910

R1436 3.9K

+80V11

R1444 2.2K

C1444 0.1

+80V11

R1445 5.1K

Q1442

R1447 91K

C1435 0.1

C1434 0.25-1.5pF

R1434A 22K

R1434B 20K

+8V11

R1432 47

C1432 .01

UNBLANKING TO C1200 DIAG 14

CR1442

+80V11

VR1439 5.1V

Q1430

CR1431

†Q1435

Q1440

C1430 .01

+8V11

R1430 5.6K

R1431 3.9K

R1438 2.0K

C1438 0.1

R1439 100

SEE DIAG 14

P1065

+80V FROM P1605-2 DIAG 13

3

R1450 10

C1450 .01

+80V11 10 14

+8V FROM P1605-1 DIAG 13

4

R1451 10

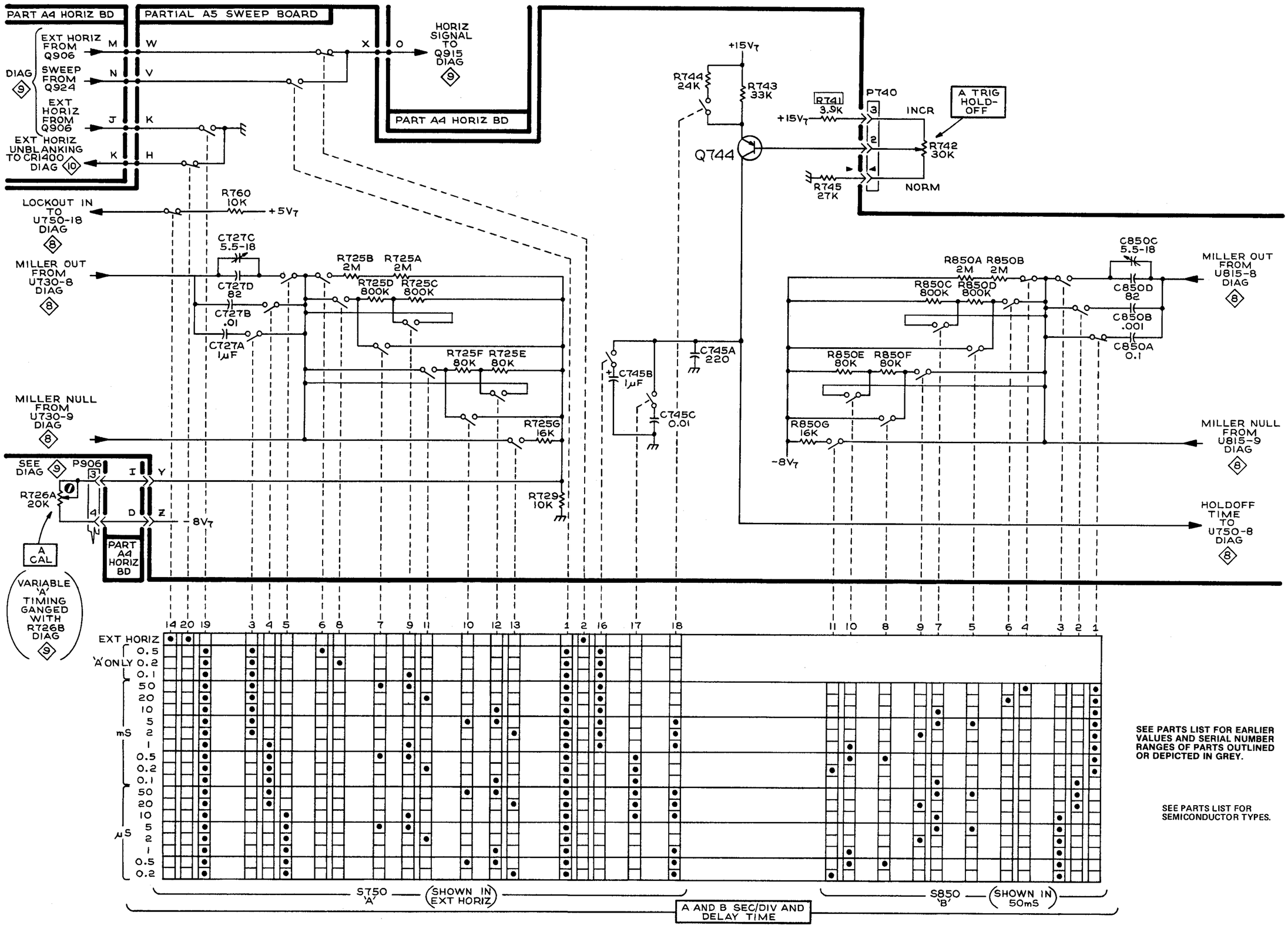
C1451 2.2µF

+8V11 10

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

TYPE	+5V	GND
74L00	14	7

PARTIAL A7 HIGH VOLTAGE & UNBLANKING BOARD



SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

1943-129
REV B, SEP 1977

A & B TIMING SWITCH 11

WAVEFORM CONDITIONS

(Any deviation from the following setup is noted under the waveform to which it applies)
The waveforms were taken from a Tektronix 465 oscilloscope.

335 Setup

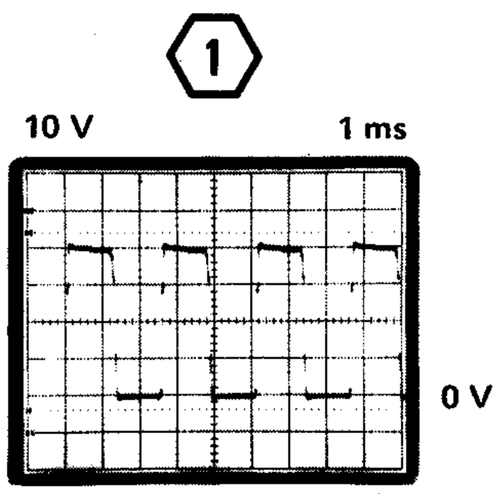
VOLTS/DIV	5 DIV CAL	A SEC/DIV	.5 m	DELAY TIME POSITION	5.00
Trigger Coupling	DC	B SEC/DIV	.1 m	B LEVEL	Out of detent and adjusted for a stable intensified zone.
SLOPE	+	HORIZ DISPLAY	A INTEN		

Test Oscilloscope Setup

Connect a 10X probe from 335 left horizontal deflection plate to the CH 2 vertical input.

Set test oscilloscope:	Trigger Source	CH 2
	Trigger Slope	+
	Vertical Mode	CH 1

Connect a 10X probe from the desired 335 testpoint to the test oscilloscope CH 1 vertical input.
The above setup allows time comparison of the waveforms. The second vertical graticule line is the beginning of A Holdoff.



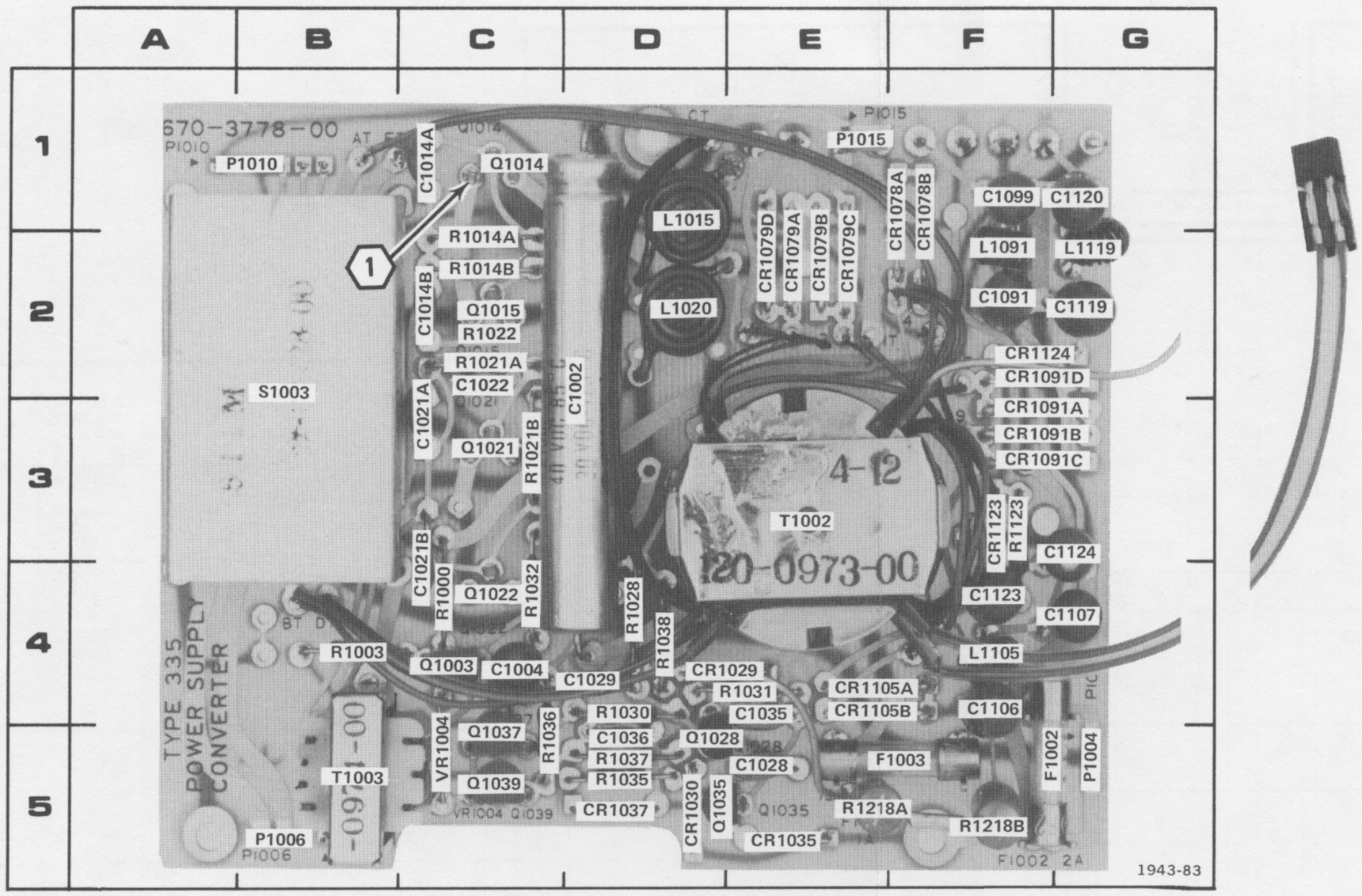


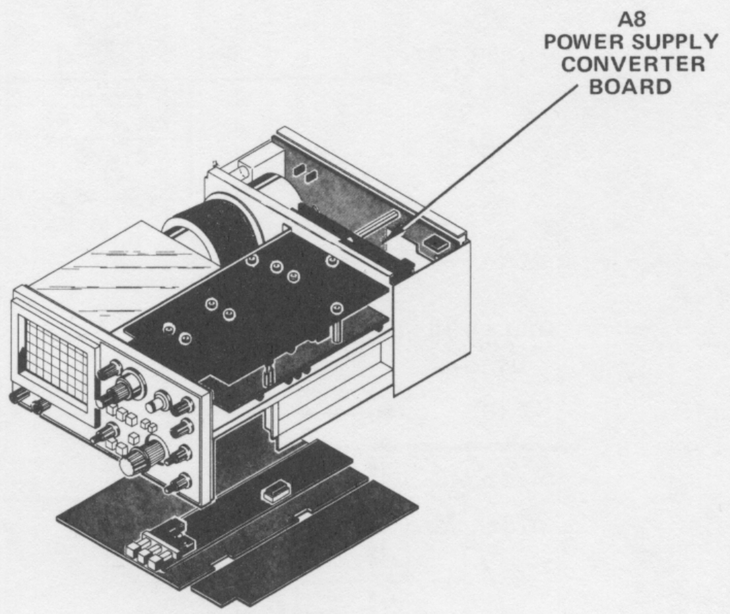
Fig. 8-15. A8 Power Supply Converter board component locations, below SN 300216.

*See Parts List for serial number ranges.

[1]Located on back of board.

[2]Located on chassis.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1002	2D	CR1035	5D	L1119	2G	R1022	2C
C1004	4C	CR1037	5D			R1028	4D
C1014A	1C	CR1078A	1F	P1004	5G	R1030	4D
C1014B	2C	CR1078B	1F	P1006	5B	R1031	4E
C1021A	3C	CR1079A	2E	P1010	1B	R1032	4C
C1021B	4C	CR1079B	2E	P1015	1E	R1035	5D
C1022	2C	CR1079C	2E			R1036	5C
C1028	5E	CR1079D	2E	Q1000[2]		R1037	5D
C1029	4D	CR1091A	3F	Q1003	4C	R1038	4D
C1035	4E	CR1091B	3F	Q1014	1C	R1123	3F
C1036	5D	CR1091C	3F	Q1015	2C	R1218A	5E
C1091	2F	CR1091D	2F	Q1021	3C	R1218B	5F
C1099	1F	CR1105A	4E	Q1022	4C		
C1106	4F	CR1105B	4E	Q1028	5D	S1003	2B
C1107	4G	CR1123	3F	Q1035	5D		
C1119	2G	CR1124	2F	Q1037	5C	T1002	3E
C1120	1G			Q1039	5C	T1003	5B
C1123	4F	F1002	5G				
C1124	3G	F1003	5F	R1000	4C	VR1004	5C
				R1003	4B		
CR1000[2]		L1015	1D	R1014A	2C		
CR1003[1]*		L1020	2D	R1014B	2C		
CR1029	4E	L1091	2F	R1021A	2C		
CR1030	5D	L1105	4F	R1021B	3C		



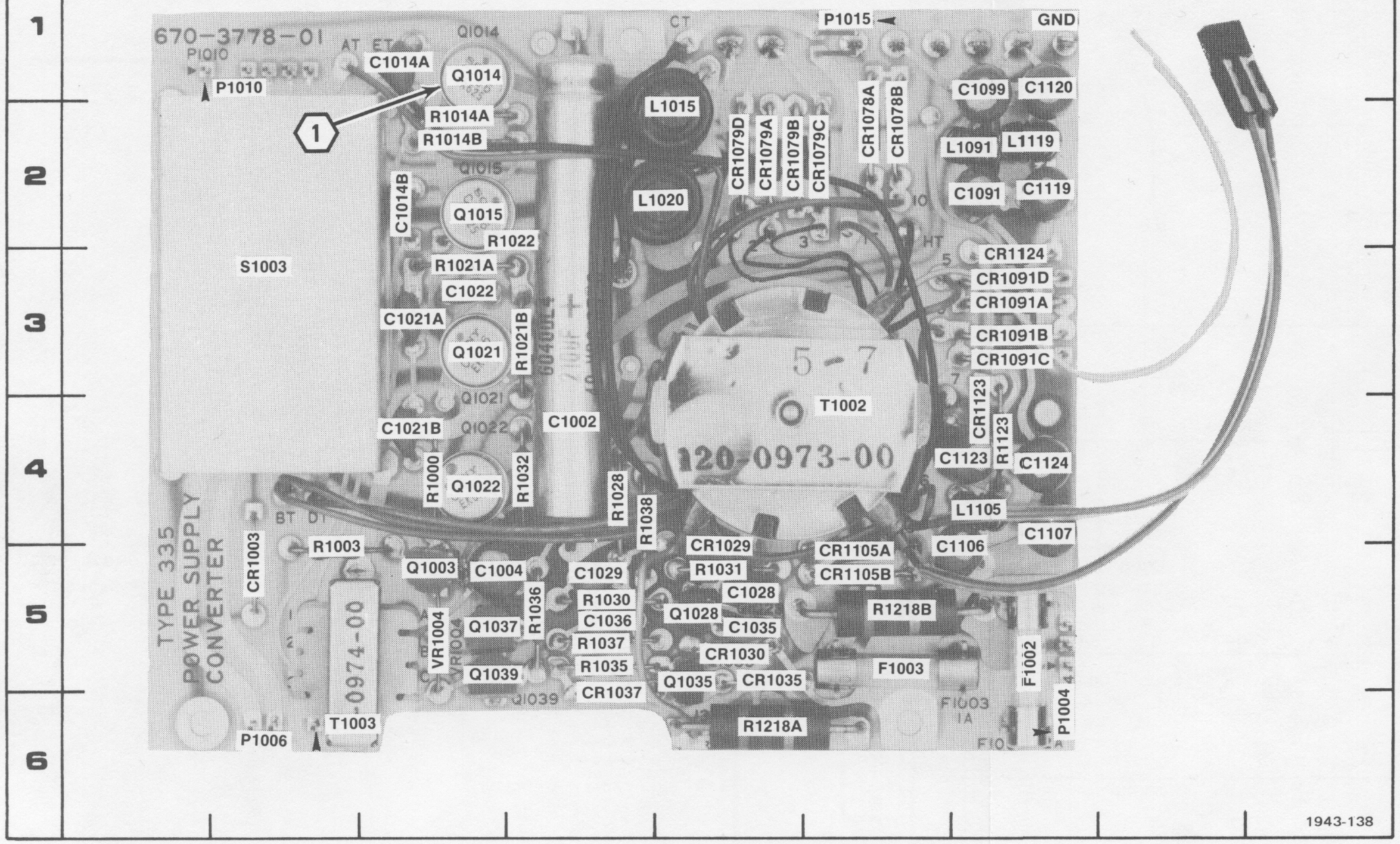


Fig. 8-14. A8 Power Supply Converter board component locations, SN 300216-up.

[2]Located on chassis.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1002	4D	CR1000[2]		CR1124	3G	Q1015	2C	R1035	5D
C1004	5C	CR1003	5B			Q1021	3C	R1036	5D
C1014A	1C	CR1029	5E	F1002	5G	Q1022	4C	R1037	5D
C1014B	2C	CR1030	5E	F1003	5F	Q1028	5E	R1038	4D
C1021A	3C	CR1035	5E			Q1035	5E	R1123	4G
C1021B	4C	CR1037	6D	GND	1G	Q1037	5C	R1218A	6E
C1022	3C	CR1078A	2F			Q1039	5C	R1218B	5F
C1028	5E	CR1078B	2F	L1015	2E				
C1029	5D	CR1079A	2E	L1020	2E	R1000	4C	S1003	3B
C1035	5E	CR1079B	2E	L1091	2G	R1003	5B		
C1036	5D	CR1079C	2F	L1105	4G	R1014A	2C	T1002	4F
C1091	2G	CR1079D	2E	L1119	2G	R1014B	2C	T1003	6B
C1099	1G	CR1091A	3G			R1021A	3C		
C1106	5G	CR1091B	3G	P1004	6G	R1021B	3D	VR1004	5C
C1107	4G	CR1091C	3G	P1006	6B	R1022	2D		
C1119	2G	CR1091D	3G	P1010	1B	R1028	4D		
C1120	1G	CR1105A	5F	P1015	1F	R1030	5D		
C1123	4G	CR1105B	5F			R1031	5E		
C1124	4G	CR1123	4G	Q1000[2]		R1032	4D		
				Q1003	5C				
				Q1014	1C				

VOLTAGE & WAVEFORM CONDITIONS

PARTIAL AT HIGH VOLTAGE & UNBLANKING BOARD

PART A2 VERT AMPL BOARD

+5V* FROM R398 DIAG 3

LOW LINE

R1057 200

CR1055

SEE DIAG 3 P355

P1000A

R1056 240

+5V FROM C1107 THRU P1010-1 THIS DIAG

P1043

R1042 6.04K

R1007 20.0K

C1007 .01

CR1009

C1010 68µF

P1043 P1010

T1002

+80V

+35V

+15.5V AC TO R12188 DIAG 14

+15.5V

+8.5V

TO DIAG 13

-8.5V

-25V

+5V

CR1079D

CR1079A

CR1079B

CR1079C

CR1078A

CR1091D

L1091 270µH

C1091 68µF

C1099 68µF

CR1091A

CR1105A

L1105 270µH

C1106 68µF

C1107 68µF

C1119 68µF

C1120 68µF

L1119 270µH

CR1105B

CR1091B

CR1091C

CR1124

C1123 100µF

C1124 33µF

R1123 47

CR1123

CR1078B

P1010 +5V TO R1042 THRU P1043-6 THIS DIAG

Q1011

VR1009 3V

CR1007

REGULATION LEVEL

R1009 20K

R1010 41.2K

R1016 10K

R1015 15K

R1008 24K

U1001A 1/2 558

Q1007

CR1006

C1008 .01

CR1001

CR1011

VR1008 5.6V

R1004 47K

LOW LINE VOLT

R1005 50K

R1006 91K

C1005 .01

U1001B 1/2 558

R1001 2M

R1046 680K

R1047 33K

R1055 10K

R1054 24K

R1053 10M

R1049 10K

C1046 1µF

R1050 10K

Q1045

Q1055

Q1050

R1048 15K

R1043 1.2

C1045 2.2µF

R1045 1K

Q1043

R1044 1K

VR1043 15V

R1011 12.7K

R1013 4.99K

R1012 30.9K

P1043

P1002 P1006

P1010

PARTIAL POWER SOURCE SELECTOR

P1007

P1002

P1006

PARTIAL POWER SOURCE SELECTOR

S1003B

AC 115V/230V

11V-14V

DC 22V-28V

(PULL ON) POWER

(LINE SELECTOR)

PARTIAL AT H V & UNBLKG BOARD

F1000

S1000A

S1001

P1000B

T1001

CR1005

P1002 P1006

CR1003

S1003A

P1004

F1003

C1006A 0.005 3KV

C1006B 0.005 3KV

P1000

SAFETY EARTH GROUNDED TO MAIN CHASSIS

115V 230V

REGULATING RANGE S1002

LO M HI

C1000 470

R1002 6.2K

C1001 0.1

TP1003

P1002 P1006

P1003

C1009 50µF

C1003 3300 µF

LINE TRIG TO S510 DIAG 5

P1000A

S1000B

P1004

F1002

J1003 (DC) +

(GND) - J1002

R1000 10

R1003 12K

Q1003

VR1004 7.5V

+8.5V

P1015

Q1000

CR1000

P1015

+8.5V

R1028 3.9K

R1030 8.2K

C1028 300

R1032 36K

-8.5V

Q1037

T1003

C1004 68µF

C1014B 470

Q1015

R1014B 150

R1014A 150

Q1014

C1014A 470

L1015 5µH

R1022 100

C1022 .001

C1002 220µF

S1003C

+8.5V

R1038 3.9K

R1037 8.2K

Q1039

C1036 300

R1036 36K

-8.5V

C1021B 470

Q1022

R1021B 150

R1021A 150

Q1021

C1021A 470

L1020 5µH

S1003D

115V/230V AC

11V-14V

22V-28V DC

Q1028

Q1035

CR1029

CR1030

C1028 300

R1031 120K

C1035 300

R1035 120K

CR1035

CR1037

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

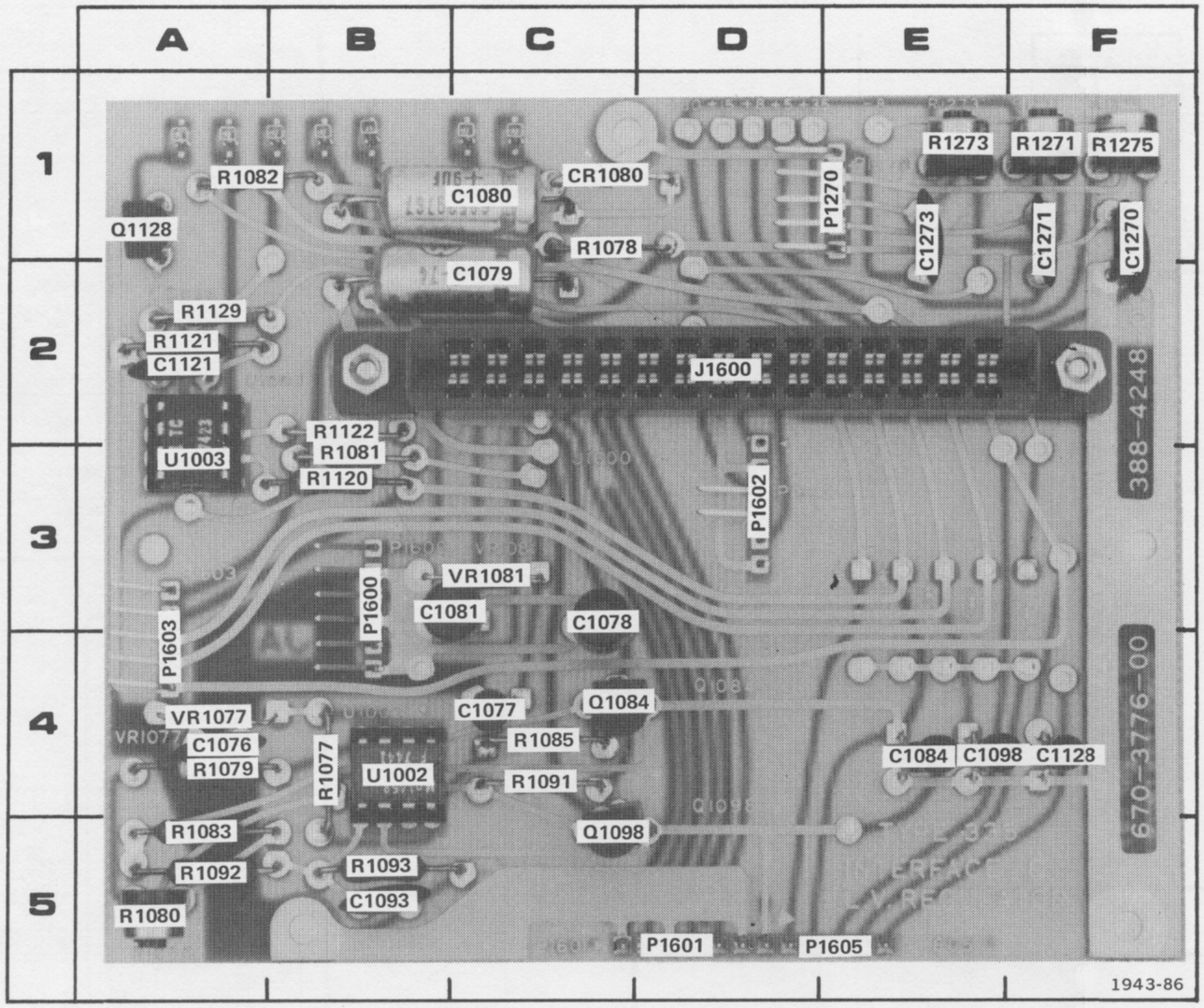
SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

PARTIAL A8 POWER SUPPLY CONVERTER BOARD

POWER SUPPLY CONVERTER 12

1943-130

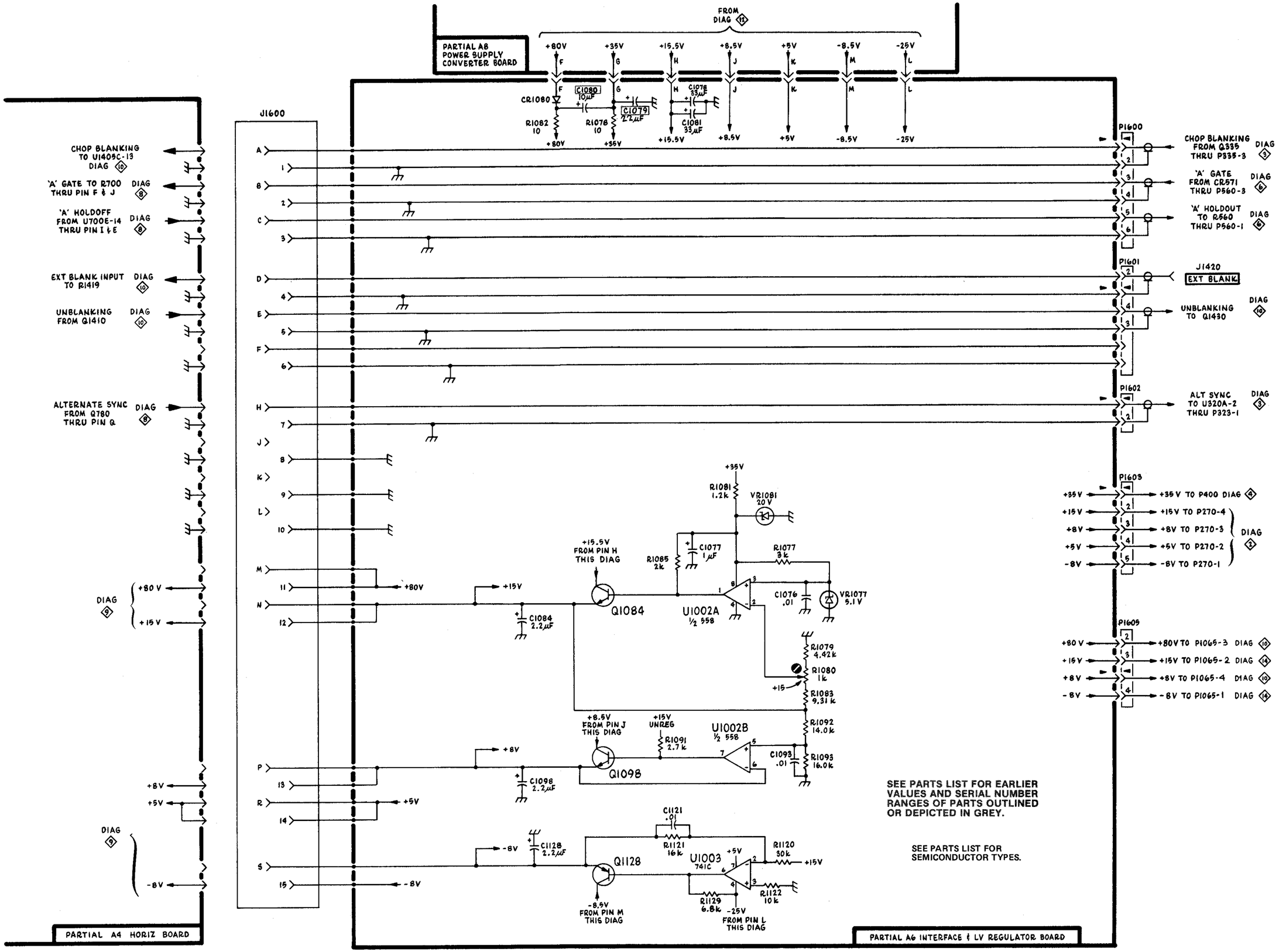
REV DEC 1983



A6
INTERFACE AND
LOW-VOLTAGE
REGULATOR
BOARD

Fig. 8-16. A6 Interface and Low-Voltage Regulator board component locations.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC
C1076	4A	P1270	1E	Q1128	1A	R1092	5A	U1002	4B
C1077	4C	P1600	3B			R1093	5B	U1003	3A
C1084	4E	P1601	5D	R1077	4B	R1120	3B		
C1093	5B	P1602	3D	R1079	4A	R1121	2B	VR1077	4A
C1098	4E	P1603	4A	R1080	5A	R1129	2A	VR1081	3C
C1121	2A	P1605	5E	R1081	3B	R1271	1F		
C1128	4F			R1083	5A	R1273	1E		
C1270	1F	Q1084	4C	R1085	4C	R1275	1F		
C1271	1F	Q1098	5C	R1091	4C				
C1273	1E								



1943-131
REV DEC 1983

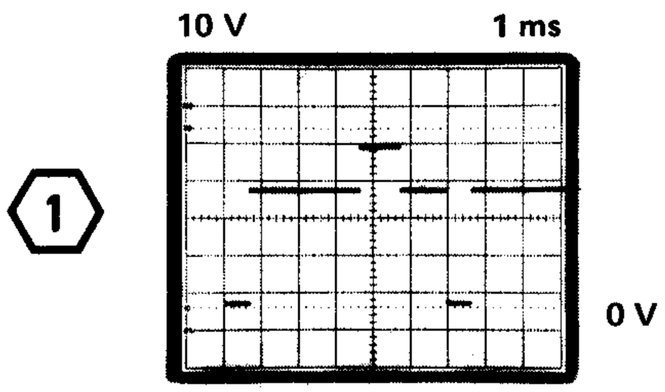
INTERFACE & LOW VOLTAGE REGULATOR 13

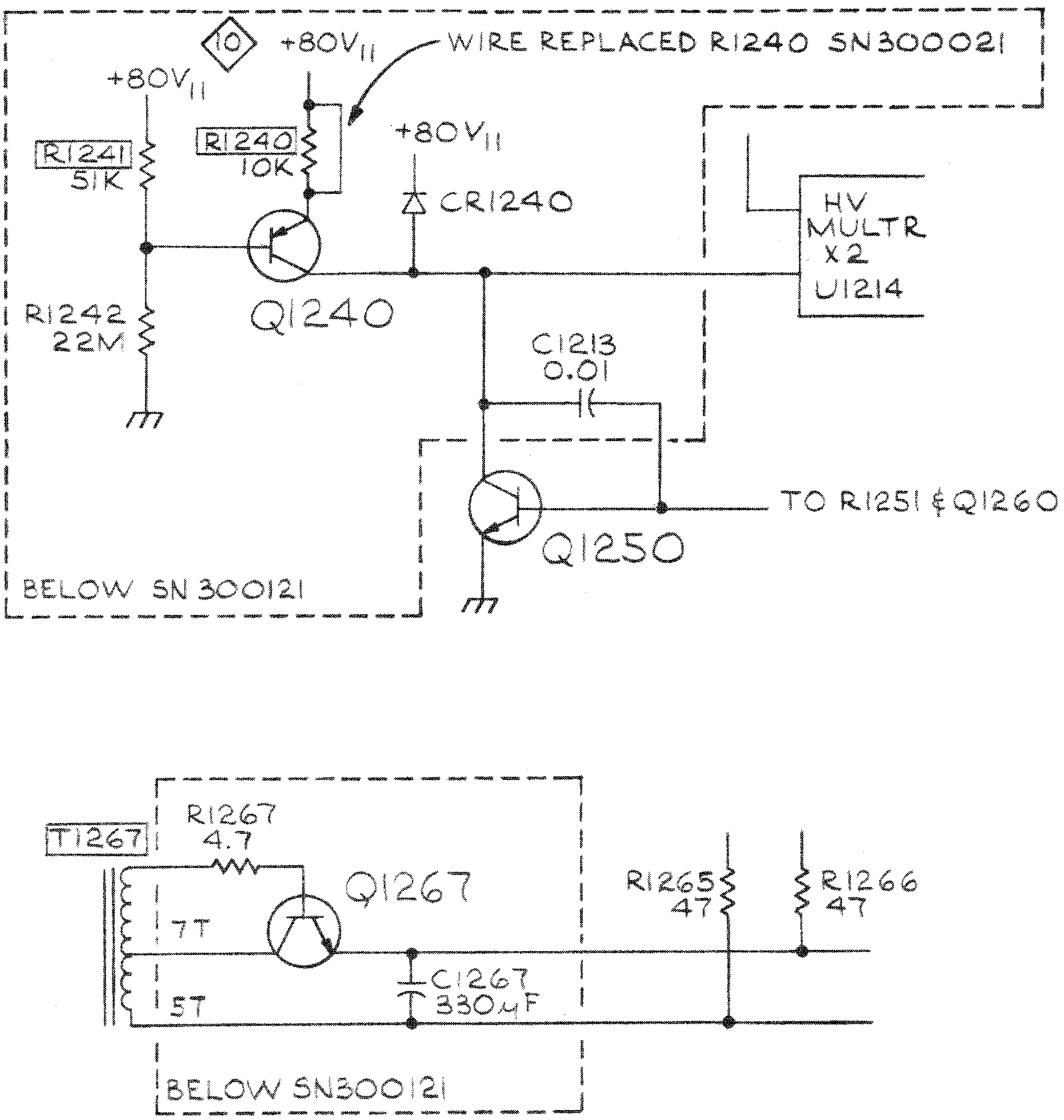
VOLTAGE CONDITIONS

These voltages are typical values; actual values may vary as much as 20%.

335 Controls

SEC/DIV	EXT HORIZ	Trigger Mode	AUTO	DISPLAY	CH 1
VOLTS/DIV	10	All variables	Calibrated positions	CH 1 POSITION and Horizontal Position	Move dot to crt center.
HORIZ DISPLAY	A	FOCUS	ccw		





VOLTAGE & WAVEFORM CONDITIONS

P1230 — GREY INDICATES PIN NUMBERING BELOW SN300121

HIGH VOLTAGE MULTIPLIER X10 U1230

V1270

L1270

P1270

TRACE ROTATION

+8V — R1275 10K — -8V

UNBLANKING FROM Q1440 DIAG 10

TP1442

C1200 .015

R1200 1.0K

CR1200

R1204 1.8M — R1205 1.8M — R1206 1.8M

T1002 — T — R1212 8.2K

+80V — R1208 100K — R1207 10K — VR1207 75V — CR1204 — R1201 1K — C1201 .0012 — CR1201

CRT BIAS

HISTORY INFORMATION BELOW SN300121

CR1202

R1202 22M

MESH — 6 — 3

+80V — R1273 100K — -25V — GEOMETRY

C1273 .01

L — R — HORIZONTAL SIGNAL FROM DIAG 9

UPR — LWR — VERTICAL SIGNAL FROM DIAG 4

R1218A SEL — R1218B 5.6K

+15.5V AC FROM T1002-4 DIAG 12

VR1241 33V — CR1240 — +80V 10

CR1250 — R1240 39K — C1213 .03

HIGH VOLTAGE MULTIPLIER X2 U1214

C1226 .015

TP1226

R1203 10K

R1226 1K

+78 — TP1250

TP1270 — -1960V

C1225 .015

9 — 5 — +35V — C1270 .01

+15V — R1260 100 — Q1260 — Q1250 — R1251 8.2K — -8V

-8V — CR1262 — C1263 300

R1263 40M — R1262 294K — R1261 50K — -1960V — +15V

R1222 40M — R1223 5M — R1225 1.5M — FOCUS — C1224 .0068

P1202

7 — 4 — +80V — R1271 100K — C1271 .01 — -25V — ASTIGMATISM

3 — 2 — 1

HISTORY INFORMATION BELOW SN300121

P1260 — T1267

25T (13T SN300121 - 300926)

12T (6T SN300121-300926)

R1265 47 — R1266 47

P1265

14 — 12

GREY INDICATES PIN NUMBERING BELOW SN300121

SEE DIAG 10 P1065

+15V FROM P1605-3 DIAG 13 — C1260 .01 — +15V

-8V FROM P1605-4 DIAG 13 — C1251 .01 — -8V

P/O A8 POWER SUPPLY CONVERTER BRD

PARTIAL A7 HIGH VOLTAGE & UNBLANKING BOARD

PARTIAL A6 INTERFACE & LOW VOLTAGE REGULATOR BOARD

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES.

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

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL PO BOX 3608	HARRISBURG PA 17105
01536	TEXTRON INC CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
05129	KILO ENGINEERING CO	2118 D ST	LA VERNE CA 91750-5422
05820	EG AND G WAKEFIELD ENGINEERING	60 AUDUBON RD	WAKEFIELD MA 01880-1203
06383	PANDUIT CORP	17301 RIDGELAND	TINLEY PARK IL 07094-2917
07416	NELSON NAME PLATE CO	3191 CASITAS	LOS ANGELES CA 90039-2410
08261	SPECTRA-STRIP AN ELTRA CO	7100 LAMPSON AVE	GARDEN GROVE CA 92642
09922	BURNDY CORP	RICHARDS AVE	NORWALK CT 06852
12327	FREEWAY CORP	9301 ALLEN DR	CLEVELAND OH 44125-4632
16428	COOPER BELDEN ELECTRONIC WIRE AND CA SUB OF COOPER INDUSTRIES INC	NW N ST	RICHMOND IN 47374
18632	NORTON CHEMPLAST DBA NORTON PERFORMANCE PLASTICS	150 DEY RD	WAYNE NJ 07470-4670
22526	DU PONT E I DE NEMOURS AND CO INC DU PONT CONNECTOR SYSTEMS DIV MILITARY PRODUCTS GROUP	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
24546	CORNING GLASS WORKS	550 HIGH ST	BRADFORD PA 16701-3737
24931	SPECIALTY CONNECTOR CO INC	2100 EARLYWOOD DR PO BOX 547	FRANKLIN IN 46131
26233	NYLOK FASTENER CORP	1161 E SANDHILL AVE SUITE D PO BOX 5228	CARSON CA 90749
26365	GRIES DYNACAST CO DIV OF COATS AND CLARK INC	125 BEECHWOOD AVE	NEW ROCHELLE NY 10802
27264	MOLEX INC	2222 WELLINGTON COURT	LISLE IL 60532-1613
42838	NATIONAL RIVET AND MFG CO	1-21 EAST JEFFERSON ST	WAUPUN WI 53963-2028
56878	SPS TECHNOLOGIES INC AEROSPACE & INDUSTRIAL PRODUCTS DIV	HIGHLAND AVE	JENKINTOWN PA 19046
70485	ATLANTIC INDIA RUBBER WORKS INC	571 W POLK ST	CHICAGO IL 60607
70903	COOPER BELDEN ELECTRONICS WIRE AND C SUB OF COOPER INDUSTRIES INC	2000 S BATAVIA AVE	GENEVA IL 60134-3325
71159	BRISTOL SOCKET SCREW CO		WATERBURY CT
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD	COLD SPRING KY 41076-9749
74445	HOLO-KROME CO	31 BROOK ST	ELMWOOD CT 06110-2350
74868	AMPHENOL CORP R F CONNECTORS (OPNS)	1 KENNEDY AVE	DANBURY CT 06810-5803
75915	LITTELFUSE INC SUB TRACOR INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
77900	ILLINOIS TOOL WORKS SHAKEPROOF DIV	ST CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
79136	WALDES KOHINOOR INC	47-16 AUSTEL PLACE	LONG ISLAND CITY NY 11101-4402
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97707-0001
83309	ELECTRICAL SPECIALITY CO SUB OF BELDEN CORP	345 SWIFT AVE	SOUTH SAN FRANCISCO CA 94080-6206
83385	MICRODOT MFG INC GREER-CENTRAL DIV	3221 W BIG BEAVER RD	TROY MI 48098
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201-2431
88245	WINCHESTER ELECTRONICS LITTON SYSTEMS-USECO DIV	13536 SATICOY ST	VAN NUYS CA 91409
91260	CONNOR SPRING AND MFG CO A SLOSS AND BRITTAN INC CO	1729 JUNCTION AVE	SAN JOSE CA 95112
93907	TEXTRON INC CAMCAR DIV	600 18TH AVE	ROCKFORD IL 61108-5181
98278	MALCO A MICRODOT CO	306 PASADENA AVE	SOUTH PASADENA CA 91030-2905
98291	SEALECTRO CORP BICC ELECTRONICS	40 LINDEMAN DR	TURNBULL CT 06611-4739
TK0191	SONY TEKTRONIX	PO BOX 14 HANEDA AIRPORT	TOKYO JAPAN

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip Code
TK0392	NORTHWEST FASTENER SALES INC	7923 SW CIRRUS DRIVE	BEAVERTON OR 97005-6448
TK0433	PORTLAND SCREW CO	6520 N BASIN	PORTLAND OR 97217-3920
TK0435	LEWIS SCREW CO	4300 S RACINE AVE	CHICAGO IL 60609-3320
TK0507	O HARA METAL PRODUCTS CO	542 BRANNAN ST	SAN FRANCISCO CA 94107
TK0DV	KORYO JUSHI CO LTD	1-6-8 KITASENZOKU OHTA-KU	TOKYO JAPAN
TK1684	TECHNICAL IMAGES INC	2206 MOUNTAIN VIEW DR	NEWBURG OR 97132-9265

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-	016-0380-00	300592	302595	1	COVER,PROT:FRONT PANEL	80009	016-0380-00
	016-0380-01	302596		1	COVER,PROT:FRONT PANEL	80009	016-0380-01
-1	200-1775-00			1	BEZEL:	80009	200-1775-00
					ATTACHING PARTS		
-2	211-0644-00			2	SCREW,MACHINE:4-40,7.9MM LG,PH,SST,NP,POZ	80009	211-0644-00
					END ATTACHING PARTS		
-3	331-0394-00	300000	303657	1	WINDOW,CRT:CLEAR,POLYCARBONATE.MOLDED	80009	331-0394-00
	331-0394-01	303658		1	WINDOW,CRT:CLEAR,PLASTIC	80009	331-0394-01
-4	366-1023-01			1	KNOB:GY,0.127 ID X 0.392 OD X 0.531 H	80009	366-1023-01
	213-0246-00			1	.SETSCREW:5-40 X 0.094,STL	71159	ORDER BY DESCR
-5	366-1379-00			1	KNOB:V/H POS	80009	366-1379-00
	213-0725-00			1	SETSCREW:3-48 X 0.094,STL	56878	ORDER BY DESCR
-6	366-1557-29			1	PUSH BUTTON:SIL GY,AC HF	80009	366-1557-29
-7	366-1557-30			1	PUSH BUTTON:SIL GY,REJ DC	80009	366-1557-30
-8	366-1557-17			1	PUSH BUTTON:SIL GY,INT	80009	366-1557-17
-9	366-1391-00			1	KNOB:GY,0.081 ID X 0.28 OD X 0.32 H	80009	366-1391-00
	213-0140-00			1	.SETSCREW:2-56 X 0.094,STL	TK0433	ORDER BY DESCR
-10	366-1077-00			1	KNOB:GRAY W/SETSCREW	80009	366-1077-00
	213-0153-00			1	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-11	366-1402-37			1	PUSH BUTTON:SIL GY,CHOP	80009	366-1402-37
-12	366-1402-36			1	PUSH BUTTON:SIL GY,ALT	80009	366-1402-36
-13	366-1328-39			1	PUSH BUTTON:CHARCOAL,CH 1	80009	366-1328-39
-14	366-1257-20			1	PUSH BUTTON:SIL GY,CH 2	80009	366-1257-20
-15	366-1559-00			1	PUSH BUTTON:SIL GY,0.18 SQ X 0.43	80009	366-1559-00
-16	366-1597-00	300000	303280	1	KNOB:VOLTS/DIV	80009	366-1597-00
	366-1597-01	303281		1	KNOB:SIL GY,5.15MM ID X 28MM OD X 47.6MM H	80009	366-1597-01
	213-0048-00	300000	303280	2	.SETSCREW:4-40 X 0.125,STL	TK0392	ORDER BY DESCR
	213-0020-00	303281		2	.SETSCREW:6-32 X 0.125,STL	TK0433	ORDER BY DESCR
					ATTACHING PARTS		
-17	211-0159-00			2	SCREW,MACHINE:2-56 X 0.375,PNH,STL	TK0435	1183-302
-18	210-0001-00	300000	303280	2	WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
-19	354-0551-00	300000	303280	2	RING,RETAINING:28.4MM X 31.5 X 8.3,AL	80009	354-0551-00
	354-0551-01	303281		1	RING,RETAINING:28.4MM X 31.5 X 8.3,AL	80009	354-0551-01
					END ATTACHING PARTS		
-20	131-1682-00	300000	303280	1	CONTACT,ELEC:GROUNDING,0.4MM THK W/	80009	131-1682-00
	131-2242-00	303281		1	CONTACT,ELEC:GROUNDING	80009	131-2242-00
					ATTACHING PARTS		
-21	211-0180-00	300000	303280	2	SCR,ASSEM WSHR:2-56 X 0.25,PNH,BRS,NP,POZ	TK0435	ORDER BY DESCR
	210-3081-00	303281		2	RIVET,BLIND:5.1MM L X 6.0MM OD,AL	80009	210-3081-00
					END ATTACHING PARTS		
-22	377-0438-00			1	INSERT,KNOB:6.35MM ID X 7.MM THK,AL,25 OD	80009	377-0438-00
	213-0153-00			2	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-23	354-0549-00			1	PACKING,PREFMD:27.7MM ID X 34.7MM OD	80009	354-0549-00
-24	366-1602-00			1	KNOB:RED,0.081 ID X 0.03 OD X 0.3 H	80009	366-1602-00
	213-0239-00			1	.SETSCREW:3-48 X 0.062,STL	80009	213-0239-00
-25	366-1077-00			1	KNOB:GRAY W/SETSCREW	80009	366-1077-00
	213-0153-00			1	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-26	366-1602-00			1	KNOB:RED,0.081 ID X 0.03 OD X 0.3 H	80009	366-1602-00
	213-0239-00			1	.SETSCREW:3-48 X 0.062,STL	80009	213-0239-00
-27	366-1603-00			1	KNOB:SIL GY,0.127 ID X 0.5 OD X 0.531 H	80009	366-1603-00
	213-0153-00			1	.SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-28	----- -----			1	RES.,VAR:LEVEL/SLOPE(SEE R540/S550 REPL)		
					ATTACHING PARTS		
-29	220-0740-00	300000	308435	1	NUT,PLAIN,HEX:0.25-32 X 4.6MM X 8.0MM,BRS	80009	220-0740-00
	220-0739-00	308436		1	NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	80009	220-0739-00
-30	210-3035-00			1	WASHER,FLAT:7.6MM ID X 11.0MM OD X 0.5MM	80009	210-3035-00
					END ATTACHING PARTS		
-31	----- -----			2	RES.,VAR:POS,CH1 & CH2(SEE R122AB,R222AB)		
					ATTACHING PARTS		
-32	220-0739-00			2	NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	80009	220-0739-00
-33	210-3035-00			2	WASHER,FLAT:7.6MM ID X 11.0MM OD X 0.5MM	80009	210-3035-00
-34	210-0046-00			4	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-35	426-0681-00			7	FRAME,PUSH BTN:	80009	426-0681-00
-36	426-1072-00			1	FRAME,PUSH BTN:SILVER GRAY PLSTC	80009	426-1072-00
-37	333-2053-00			1	PANEL,FRONT:	TK1684	ORDER BY DESCR
					ATTACHING PARTS		
-38	358-0542-00			1	BSHG,MACH THD:0.25-32 X 11.88MM,BRASS	80009	358-0542-00

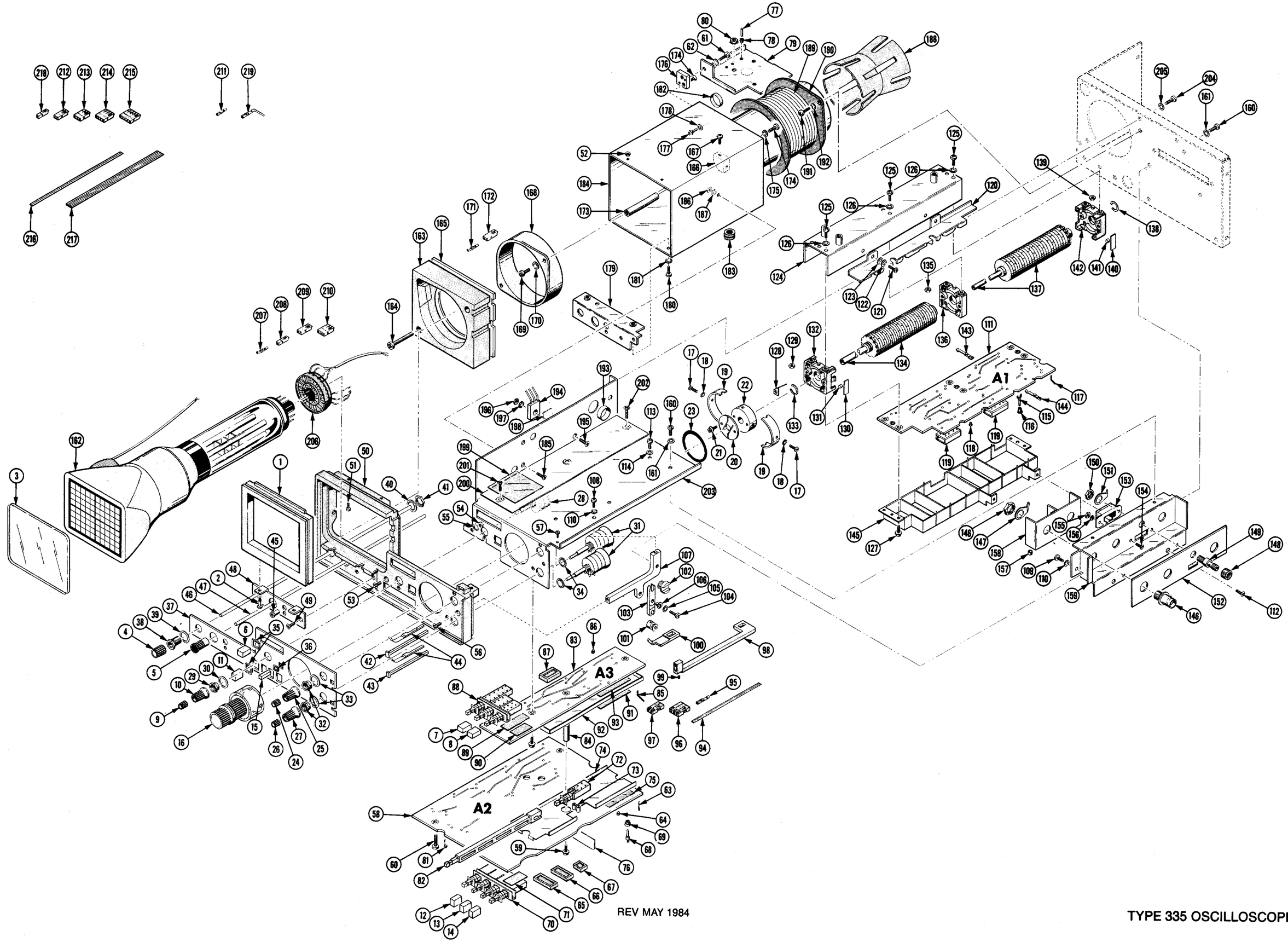
Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-39	210-0940-00			1	WASHER,FLAT:0.25 ID X 0.375 OD X 0.02,STL	12327	ORDER BY DESCR
-40	210-0046-00			1	WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
-41	210-0583-00			1	NUT,PLAIN,HEX:0.25-32 X 0.312,BRS CD PL	73743	2X-20319-402
					END ATTACHING PARTS		
-42	366-1598-00			1	PUSH BUTTON:GRAY,AC-DC-GND CH1	80009	366-1598-00
-43	366-1599-00			1	PUSH BUTTON:SIL GY,AC-DC-GND CA2	80009	366-1599-00
-44	334-2390-00	300000	303045	2	PLATE,IDENT:MKD AC GND DC	80009	334-2390-00
	334-2390-01	303046		2	PLATE,IDENT:MKD AC GND DC	80009	334-2390-01
-45	131-0251-00			1	JACK,TIP:U/W 0.08 OD TIP,RED	98291	016-8010-2
-46	384-1331-00			1	EXTENSION SHAFT:9.35 L X 0.124 OD EPOXY GL	80009	384-1331-00
-47	384-1330-00			1	EXTENSION SHAFT:9.26 L X 0.124 OD EPOXY GL GLASS LAMINATE	80009	384-1330-00
-48	407-1618-00			1	BRACKET,BEZEL:STAINLESS STEEL	80009	407-1618-00
					ATTACHING PARTS		
-49	211-0038-00			1	SCREW,MACHINE:4-40 X 0.312,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-50	386-3200-00			1	SUBPANEL,FRONT:	80009	386-3200-00
					ATTACHING PARTS		
-51	211-0649-00			4	SCREW,MACHINE:2-56 X 4.1MM,FLH,STL,NP,POZ	80009	211-0649-00
-52	210-0405-00			4	NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
-53	211-0038-00			1	SCREW,MACHINE:4-40 X 0.312,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-54	210-0406-00			1	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-55	210-0003-00			1	WASHER,LOCK:#4 EXT,0.015 THK,STL	78189	1104-00-00-0541C
-56	211-0101-00			1	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-57	213-0055-00			1	SCREW,TPG,TF:2-32 X 0.188,TYPE B,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-58	----- -----			1	CKT BOARD ASSY:VERTICAL AMPL(SEE A2 REPL)		
					ATTACHING PARTS		
-59	211-0116-00			3	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
-60	211-0040-00	300100	300120	1	SCREW,MACHINE:4-40 X 0.25,BDGH,NYL	26365	ORDER BY DESCR
	210-1011-00	300100		1	WASHER,FLAT:0.13 ID X 0.375 OD X 0.01,NYLON	83309	ORDER BY DESCR
	211-0116-00	300121	310075	1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		1	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-61	211-0008-00	300000	310075	2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-62	210-0004-00	300000	310075	2	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
					CKT BOARD ASSY INCLUDES:		
-63	131-0589-00	300000	306710	29	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0589-00	306711		31	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0787-00	300000	306710	2	.TERMINAL,PIN:0.64 L X 0.025 SQ PH BRZ	22526	47359-000
-64	136-0252-04	300000	303390	78	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-04	303391	304285	88	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-07	307286	308690	40	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	308691		10	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-65	136-0260-02	300000	300120	5	.SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP	09922	DILB16P-108T
	136-0260-02	300121	308690	4	.SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP	09922	DILB16P-108T
	136-0260-02	308691	312365	2	.SKT,PL-IN ELEK:MICROCIRCUIT,16 DIP	09922	DILB16P-108T
	136-0729-00	312366		2	.SKT,PL-IN ELEK:MICROCKT,16 CONTACT	09922	DILB16P-108T
-66	136-0269-02	300000	300120	3	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
	136-0269-02	300121	308690	4	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
-67	136-0514-00	300000	312365	1	.SKT,PL-IN ELEK:MICROCIRCUIT,8 DIP	09922	DILB8P-108
	136-0727-00	312366		1	.SKT,PL-IN ELEK:MICROCKT,8 CONTACT	09922	DILB8P-108
-68	131-0433-00	300000	303860	2	.TERMINAL,STUD:0.4 L,BIFURCATED	88245	421572-9
	131-0344-00	303861		2	.TERMINAL,STUD:0.538 L,BIFURCATED	88245	421837-01-9
-69	358-0135-00			2	.INSULATOR,BSHG:0.062-0.075 ID X 0.148 L,	18632	ORDER BY DESCR
-70	----- -----			1	.SW,PUSH:DISPLAY (SEE S300 REPL)		
-71	361-0726-00			8	SPACER,PB SW:0.5MM X 21.5MM X 9.5MM,TEFLON	80009	361-0726-00
-72	----- -----			1	.SW,PUSH:CH2 INVERT (SEE S220 REPL)		
-73	361-0385-00			2	SPACER,PB SW:0.164 L,GREEN POLYCARBONATE	80009	361-0385-00
-74	337-2244-00	300000	303390	1	.SHIELD,ELEC:VERTICAL PREAMPLIFIER	80009	337-2244-00
	337-2245-00	303391		1	.SHIELD,ELEC:ASSEMBLY (2)VERT PREAMP	80009	337-2245-00
-75	342-0300-00			1	.INSULATOR,FILM:CKT BOARD,MYLAR	80009	342-0300-00
-76	337-2245-00	300000	303390	1	.SHIELD,ELEC:ASSEMBLY (2)VERT PREAMP	80009	337-2245-00
-77	131-0433-00			4	.TERMINAL,STUD:0.4 L,BIFURCATED	88245	421572-9
-78	358-0241-00			4	.INSULATOR,BSHG:0.05 ID X 0.156 OD X 0.09	88245	421565
-79	407-1684-00	300000	303390	1	.BRACKET,INTCON:ALUMINUM	80009	407-1684-00
	407-1684-01	303391		1	.BRACKET,INTCON:ALUMINUM	80009	407-1684-01
					ATTACHING PARTS		

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-	211-0116-00	300000	310075	2	.SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		2	.SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-80	210-0457-00			1	.NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	78189	511-061800-00
					END ATTACHING PARTS		
	342-0306-00	300000	303390	1	.INSULATOR,FILM:0.3MM THK,MYLAR	80009	342-0306-00
-81	214-0579-00	300000	300120	4	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	214-0579-00	300121	303390	3	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	214-0579-00	303391		2	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-82	384-1101-00			1	EXTENSION SHAFT:4.14 L X 0.187 SQ,PLASTIC	80009	384-1101-00
-83	----- -----			1	CKT BOARD ASSY:TRIGGER (SEE A3 REPL)		
					ATTACHING PARTS		
-84	361-0703-00			3	SPACER,CKT BD:0.984 L X 0.188 HEX,BRS	80009	361-0703-00
					END ATTACHING PARTS		
					CKT BOARD ASSY INCLUDES:		
-85	131-0589-00			5	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0608-00	300000	300351	4	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
	131-0566-00	302596		1	.BUS,CONDUCTOR:DUMMY RES,0.094 OD X 0.225 L	24546	OMA 07
-86	136-0252-07	300000	308690	27	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	308691	312435	6	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-87	136-0269-02	300000	312365	1	.SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
	136-0728-00	312366		1	.SKT,PL-IN ELEK:MICROCKT,14 CONTACT	09922	DILB14P-108
-88	----- -----			1	.SW,PUSH:TRIG CPLNG/SOURCE (SEE S500 REPL)		
-89	361-0725-00			1	.SPACER,PB SW:0.5MM X 33.5MM X 9.5MM,TEFLON	80009	361-0725-00
-90	361-0726-00			2	.SPACER,PB SW:0.5MM X 21.5MM X 9.5MM,TEFLON	80009	361-0726-00
-91	342-0302-00			1	.INSULATOR,FILM:CHASSIS,MYLAR	80009	342-0302-00
-92	337-2247-00			1	.SHIELD,ELEC:TRIGGER BOARD	80009	337-2247-00
-93	342-0303-00			1	.INSULATOR,FILM:CKT BOARD,MYLAR	80009	342-0303-00
-94	175-0826-00			AR	.CABLE,SP,ELEC:3,26 AWG,STRD,PVC JKT,RBN	80009	175-0826-00
-95	131-0707-00			5	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-96	352-0829-00			1	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00
-97	352-0828-00			1	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
-98	384-1325-00	300000	311530	1	EXTENSION SHAFT:BLACK DURACON MOLDED	80009	384-1325-00
	384-1325-01	311531		1	EXTENSION SHAFT:BLACK DURANEX MOLDED	80009	384-1325-01
-99	213-0195-00			1	.SETSCREW:2-56 X 0.188,STL	TK0392	ORDER BY DESCR
-100	384-1324-00	300000	311530	1	EXTENSION SHAFT:BLACK DURACON MOLDED	80009	384-1324-00
	384-1324-01	311531		1	EXTENSION SHAFT:BLACK DURANEX MOLDED	80009	384-1324-01
-101	213-0140-00			1	.SETSCREW:2-56 X 0.094,STL	TK0433	ORDER BY DESCR
	376-0169-00			1	COUPLING,SWITCH:AC-DC-GND SW,8.3MMLG X 6.5	80009	376-0169-00
					MM OD BRS W/2-56 THD		
-102	213-0140-00			1	.SETSCREW:2-56 X 0.094,STL	TK0433	ORDER BY DESCR
	376-0170-00			1	COUPLING,SWITCH:AC-DC-GND SW,8.6MMLG X 10MM	80009	376-0170-00
					OD BRASS		
-103	343-0537-00			1	RETAINER,SHAFT:DELRIN	80009	343-0537-00
					ATTACHING PARTS		
-104	211-0012-00			1	SCREW,MACHINE:4-40 X 0.375,PNH,STL	TK0435	ORDER BY DESCR
-105	210-0004-00			1	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
-106	361-0709-00			1	SPACER,SLEEVE:4.8MM L X 3MM ID	80009	361-0709-00
					END ATTACHING PARTS		
-107	386-3203-00			1	SPT,FRONT PANEL:	80009	386-3203-00
					ATTACHING PARTS		
-108	211-0008-00	300000	310075	1	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		1	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-109	211-0097-00			1	SCREW,MACHINE:4-40 X 0.312,PNH,STL	TK0435	ORDER BY DESCR
-110	210-0004-00	300000	310075	2	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
	334-3448-00			1	MARKER,IDENT:MARKED NOTICE	07416	ORDER BY DESCR
-111	----- -----			1	CKT BOARD ASSY:ATTENUATOR (SEE A1 REPL)		
					ATTACHING PARTS		
-112	211-0087-01			2	SCREW,MACHINE:2-56 X 0.188,FLH,82 DEG,STL	TK0435	ORDER BY DESCR
-113	211-0008-00	300000	310075	3	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		3	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-114	210-0004-00	300000	310075	3	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
					CKT BOARD ASSY INCLUDES:		
-115	131-0433-00	300000	303860	4	.TERMINAL,STUD:0.4 L,BIFURCATED	88245	421572-9
	131-0433-00	300861		2	.TERMINAL,STUD:0.4 L,BIFURCATED	88245	421572-9
	131-0344-00	300861	311271	2	.TERMINAL,STUD:0.538 L,BIFURCATED	88245	421837-01-9
-116	358-0135-00	300000	302935	4	.INSULATOR,BSHG:0.062-0.075 ID X 0.148 L,	18632	ORDER BY DESCR

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-	358-0135-00	302936	311721	2	.INSULATOR,BSHG:0.062-0.075 ID X 0.148 L,	18632	ORDER BY DESCR
-117	131-0589-00			2	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
-118	136-0333-00	300000	309905	11	.SOCKET,PIN TERM:U/W 0.03 DIA PINS	00779	1-331677-4
	136-0252-01	302936		48	.SOCKET,PIN TERM:U/W 0.0.19 DIA PINS	00779	1-332095-2
	131-0589-00	302936		2	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0707-00	302936		2	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-119	----- -----			2	.SW,SLIDE:CH1 & CH2 AC/DC (SEE S2,S12 REPL)		
-120	337-2154-00			1	.SHIELD,ELEC:ATT.BD,1.2MM THK AL	80009	337-2154-00
					ATTACHING PARTS		
-121	211-0007-00			2	.SCREW,MACHINE:4-40 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-122	210-0004-00	300000	310075	2	.WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
-123	210-0994-00			2	.WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
					END ATTACHING PARTS		
	334-3448-00			1	.MARKER,IDENT:MARKED NOTICE	07416	ORDER BY DESCR
-124	200-1776-00			1	.COVER,CAM SW:	80009	200-1776-00
					ATTACHING PARTS		
-125	211-0008-00	300000	310075	6	.SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		6	.SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-126	210-0004-00	300000	310075	6	.WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
	210-0201-00	300246		1	.TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373-157-2
					ATTACHING PARTS		
	211-0008-00	300246		1	.SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	210-0586-00	300246		1	.NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	78189	211-041800-00
					END ATTACHING PARTS		
	263-1107-00			1	.SW CAM ACTR AS:VOLTS/DIV	80009	263-1107-00
					ATTACHING PARTS		
-127	211-0116-00	300000	310075	6	.SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		6	.SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
					END ATTACHING PARTS		
					.ACUATOR ASSY INCLUDES:		
-128	131-0963-00			2	..CONTACT,ELEC:GROUNDING,PH BRZ,W/BRACKET	TK0507	ORDER BY DESCR
-129	210-0406-00			2	..NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-130	214-1139-02			1	..SPRING,FLAT:0.885 X 0.156 CU BE GRN CLR	80009	214-1139-02
	214-1139-03			1	..SPRING,FLAT:0.885 X 0.156 CU BE RED CLR	80009	214-1139-03
-131	214-1127-00			2	..ROLLER,DETENT:0.125 DIA X 0.125,SST	80009	214-1127-00
-132	401-0081-02			1	..BEARING,CAM SW:FRONT W/O MOUNTING BOSSES	80009	401-0081-02
					ATTACHING PARTS		
-133	354-0391-00			1	..RING,RETAINING:BASIC EXT,U/O 0.438 DIA SFT	79136	5100-43 MD
					END ATTACHING PARTS		
-134	105-0644-00			1	..ACTUATOR,CAM SW:VOLTS/DIV,CHANNEL 1	80009	105-0644-00
-135	210-0406-00			4	..NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-136	401-0115-00			1	..BEARING,CAM SW:CENTER,0.83 DIA CAM	80009	401-0115-00
-137	105-0645-00			1	..ACTUATOR,CAM SW:VOLTS/DIV,CHANNEL 2	80009	105-0645-00
					ATTACHING PARTS		
-138	354-0391-00			1	..RING,RETAINING:BASIC EXT,U/O 0.438 DIA SFT	79136	5100-43 MD
					END ATTACHING PARTS		
-139	210-0406-00			4	..NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-140	214-1129-02			1	..HEAT SINK,XSTR:(2)TO-3 & (1)TO-66,AL ANDZ	80009	214-1129-02
	214-1139-03			1	..SPRING,FLAT:0.885 X 0.156 CU BE RED CLR	80009	214-1139-03
-141	214-1127-00			2	..ROLLER,DETENT:0.125 DIA X 0.125,SST	80009	214-1127-00
-142	401-0081-02			1	..BEARING,CAM SW:FRONT W/O MOUNTING BOSSES	80009	401-0081-02
-143	131-1030-00			22	.CONT ASSY,ELEC:CAM SWITCH,BOTTOM	80009	131-1030-00
-144	131-1031-00			22	.CONT ASSY,ELEC:CAM SWITCH,TOP	80009	131-1031-00
	210-0779-00			22	.RIVET,TUBULAR:0.115 L X 0.05 OD,DBL END,CU	42838	RA-29952715
					.NKL		
-145	337-2155-00	300000	309905	1	.SHIELD,ELEC:ATTN BD; 0.4MM THK BRS	80009	337-2155-00
	337-2155-01	309906		1	.SHIELD,ELEC:ATTEN BOARD W/CONTACT	80009	337-2155-01
	210-0201-00	300246		1	.TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373-157-2
	176-0045-00	300246		AR	.BRAID,WIRE:24 STRANDS,36 AWG,TINNED COPPER	70903	5112R424/36
	176-0047-00	300246		AR	.BRAID,WIRE:96 STRAND,34 AWG,TINNED COPPER	70903	8660
-146	131-0106-00			3	.CONN,RCPT,ELEC:BNC,FEMALE	24931	28JR158-1
					ATTACHING PARTS		
-147	210-0255-00	300000	301376	3	.TERMINAL,LUG:0.391 ID,LOCKING,BRS CD PL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
	129-0103-00	300000	309905	1	.POST,BDG,ELEC:ASSEMBLY	80009	129-0103-00
-148	200-0103-00			1	.NUT,PLAIN,KNURL:0.25-28 X 0.375"OD BRASS	80009	200-0103-00
-149	129-0077-00			1	.STUD,SHOULDERED:0.938 L X 0.375,0.250-28	80009	129-0077-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-					ATTACHING PARTS		
-150	210-0455-00			1	.NUT,PLAIN,HEX:0.25-28 X 0.375,BRS NP	73743	3089-402
-151	210-0223-00			1	.TERMINAL,LUG:0.26 ID,LOCKING,BRZ TIN PL	86928	5441-37
					END ATTACHING PARTS		
-152	333-2055-00	300000	303045	1	PANEL,SIDE:	80009	333-2055-00
	333-2055-01	303046		1	PANEL,SIDE:	80009	333-2055-01
-153	----- -----			1	SW,SLIDE:EXT ATTEN (SEE S510 REPL)		
					ATTACHING PARTS		
-154	211-0645-00			2	SCREW,MACHINE:2-56 X 3.7 MM,FH,STL NI PL	80009	211-0645-00
-155	210-0405-00	300000	303045	2	NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
	220-0627-00	303046		2	NUT,PLAIN,HEX:2-56 X 0.156 HEX,BRS NP	73743	10002-56-101
-156	210-0001-00			2	WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
					END ATTACHING PARTS		
-157	348-0031-00			2	GROMMET,PLASTIC:0.127 ID,GRAY ACETAL	80009	348-0031-00
-158	337-2156-00			1	SHIELD,ELEC:(INPUT BRKT); 1.2MM THK,AL	80009	337-2156-00
-159	407-1611-00	300000	303045	1	BRACKET,CMPNT:INPUT,ALUMINUM	80009	407-1611-00
	407-1611-01	303046	303280	1	BRACKET,CMPNT:INPUT,ALUMINUM	80009	407-1611-01
	407-1611-02	303281		1	BRACKET,CMPNT:INPUT,ALUMINUM	80009	407-1611-02
					ATTACHING PARTS		
-160	211-0008-00	300000	303280	3	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-161	210-0004-00	300000	303280	3	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
	210-3077-00	303281		3	RIVET,BLIND:5.9MM L X 3.2MM DIA,AL	80009	210-3077-00
					END ATTACHING PARTS		
-162	----- -----			1	ELECTRON TUBE:W/ANODE (SEE V1270 REPL)		
-163	348-0435-00			1	CUSHION,CRT:	80009	348-0435-00
-164	211-0517-00	300000	301440	2	SCREW,MACHINE:6-32 X 1.0,PNH,STL	83385	ORDER BY DESCR
	211-0517-01	301441		1	SCREW,MACHINE:6-32 X 1.0,PNH,STL	TK0392	ORDER BY DESCR
-165	386-3377-00			1	SUPPORT,CRT:	80009	386-3377-00
-166	343-0550-00			2	RETAINER,CUSH:CRT	80009	343-0550-00
					ATTACHING PARTS		
-167	211-0022-00			4	SCREW,MACHINE:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-168	----- -----			1	COIL,RF:TRACE ROTATION (SEE 1270 REPL)		
					ATTACHING PARTS		
-169	211-0008-00	300000	310075	2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		2	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-170	210-0004-00	300000	310075	2	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
					COIL INCLUDES:		
-171	131-0707-00			2	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-172	352-0828-00			1	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
-173	129-0537-00			2	SPACER,POST:40.3 MM L,W/4-40 X 11 MM DPTHD	80009	129-0537-00
					ENDS,6 MM OD		
					ATTACHING PARTS		
-174	211-0008-00	300000	310075	1	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		1	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
	211-0025-00			1	SCREW,MACHINE:4-40 X 0.375,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-175	210-0004-00	300000	310075	1	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
-176	391-0136-00			1	BLOCK,MOUNTING:CRT SHIELD,STL,3.0MM THK	80009	391-0136-00
					ATTACHING PARTS		
-177	211-0108-00			2	SCREW,MACHINE:2-56 X 0.156,PNH,STL,POZ	TK0435	ORDER BY DESCR
-178	210-0001-00			2	WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
					END ATTACHING PARTS		
-179	407-1613-00			1	BRKT,CRT SHIELD:ALUMINUM	80009	407-1613-00
					ATTACHING PARTS		
-180	211-0022-00			2	SCREW,MACHINE:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-181	210-0001-00			2	WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
					END ATTACHING PARTS		
	348-0063-00			1	GROMMET,PLASTIC:GRAY,ROUND,0.0457 ID	80009	348-0063-00
-183	348-0003-00			1	GROMMET,RUBBER:BLACK,ROUND,0.219 ID	70485	1411B6040
-184	337-2149-00			1	SHIELD,CRT:0.5MM THK MVMETAL	80009	337-2149-00
					ATTACHING PARTS		
-185	211-0645-00			2	SCREW,MACHINE:2-56 X 3.7 MM,FH,STL NI PL	80009	211-0645-00
-186	210-0405-00			2	NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
-187	210-0001-00			2	WASHER,LOCK:#2 INTL,0.013 THK,STL	77900	1202-00-00-0541C
					END ATTACHING PARTS		
-188	386-3201-00			1	SUPPORT,CRT:REAR	80009	386-3201-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-189	----- -----			1	DELAY LINE,ELEC: (SEE DL370 REPL)		
-190	276-0680-00			1	FORM,COIL:DELAY LINE,PLASTIC	80009	276-0680-00
					ATTACHING PARTS		
-191	211-0008-00	300000	310075	2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		2	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-192	210-0004-00	300000	310075	2	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
-193	348-0063-00			1	GROMMET,PLASTIC:GRAY,ROUND,0.0457 ID	80009	348-0063-00
-194	----- -----			1	TRANSISTOR: (SEE Q1000 REPL)		
					ATTACHING PARTS		
-195	211-0025-00			1	SCREW,MACHINE:4-40 X 0.375,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-196	210-0406-00			1	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-197	210-0071-00			1	WASHER,SPR TNSN:0.148 ID X 0.025 THK,STL	78189	4706-05-01-0531
					END ATTACHING PARTS		
-198	342-0163-00			1	INSULATOR,PLATE:TRANSISTOR,MICA	80009	342-0163-00
-199	342-0302-00			1	INSULATOR,FILM:CHASSIS,MYLAR	80009	342-0302-00
-200	200-1872-00			1	COVER,PLATE:	80009	200-1872-00
					ATTACHING PARTS		
-201	211-0105-00			1	SCREW,MACHINE:4-40 X 0.188,FLH,100 DEG	TK0435	ORDER BY DESCR
-202	211-0101-00			3	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-203	441-1295-00	300000	303280	1	CHASSIS,SCOPE:MAIN	80009	441-1295-00
	441-1295-01	303281		1	CHASSIS,SCOPE:MAIN	80009	441-1295-01
					ATTACHING PARTS		
-204	211-0008-00	300000	303280	3	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-205	210-0004-00	300000	303280	3	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
	210-3077-00	303281		3	RIVET,BLIND:5.9MM L X 3.2MM DIA,AL	80009	210-3077-00
					END ATTACHING PARTS		
	198-3652-00	307921		1	WIRE SET,ELEC:	80009	198-3652-00
-206	136-0266-01			1	.SKT,PL-IN ELEK:ELCTRN TUBE,12 CONT	TK0191	136-0266-01
-207	131-0707-00	300000	312355	10	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-0707-00	312356		12	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-2834-00	300000	312355	52	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	131-2834-00	312356		50	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	343-0549-00	309572		4	.STRAP,TIEDOWN,E:0.091 W X 4.0 L,ZYTEL	06383	PLT1M
-208	352-0171-00			5	.HLDR,TERM CONN:1 WIRE,BLACK	80009	352-0171-00
-209	352-0828-00			5	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
-210	352-0829-00			6	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00
	352-0830-00			1	.HLDR,TERM CONN:1 X 4,0.1 CTR,BLACK	80009	352-0830-00
	352-0722-00			4	.HLDR,TERM CONN:10 WIRE,BLACK,0.1 SPACING	80009	352-0722-00
	352-0831-00			1	.HLDR,TERM CONN:1 X 6,0.1 CTR,BLACK	80009	352-0831-00
	198-3657-00			1	.WIRE SET,ELEC:	80009	198-3657-00
-211	131-0707-00			9	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-2834-00			10	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
-212	352-0171-00			4	.HLDR,TERM CONN:1 WIRE,BLACK	80009	352-0171-00
-213	352-0828-00			3	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
-214	352-0829-00			3	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00
-215	352-0830-00			1	.HLDR,TERM CONN:1 X 4,0.1 CTR,BLACK	80009	352-0830-00
-216	352-0722-00			4	.HLDR,TERM CONN:10 WIRE,BLACK,0.1 SPACING	80009	352-0722-00
-217	352-0831-00			1	.HLDR,TERM CONN:1 X 6,0.1 CTR,BLACK	80009	352-0831-00
-218	175-0826-00			AR	.CABLE,SP,ELEC:3,26 AWG,STRD,PVC JKT,RBN	80009	175-0826-00
-219	175-0828-00			AR	.CABLE,SP,ELEC:5,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-955
-220	175-0829-00			AR	.CABLE,SP,ELEC:6,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-973
	198-3674-00			1	.WIRE SET,ELEC:	80009	198-3674-00
	198-3657-00			1	.WIRE SET,ELEC:	80009	198-3657-00
-221	131-0883-00	300000	308100	4	.CONNECTOR,TERM:22-24 AWG,BRASS TIN PL	98278	101-0001-019
	131-1538-00	308101	309905	4	.CONNECTOR,TERM:22-26 AWG U/O 0.04 SQ PIN	22526	75369-002
	131-0472-01	309906		4	.CONNECTOR,PIN:FEMALE	80009	131-0472-01



REV MAY 1984

TYPE 335 OSCILLOSCOPE

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-	614-0562-00			1	MODULE ASSEMBLY:	80009	614-0562-00
					ATTACHING PARTS		
-1	211-0116-00	300000	310075	1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		1	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
					END ATTACHING PARTS		
					HORIZONTAL ASSY INCLUDES:		
-2	366-1189-00			1	.KNOB:GY,0.127 ID X 0.5 OD X 0.531	80009	366-1189-00
	213-0153-00			1	..SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-3	337-2211-00			1	.SHIELD,ELEC:REAR DUAL SWEEP MODULE	80009	337-2211-00
	366-1557-27			1	.PUSH BUTTON:SIL GY,A INTEN	80009	366-1557-27
-4	366-1557-28			1	.PUSH BUTTON:SIL GY,MKD BY B	80009	366-1557-28
-5	366-1346-00			1	.KNOB:RED,A CAL,0.08ID X 0.392 OD X 0.466 H	80009	366-1346-00
	213-0048-00			1	..SETSCREW:4-40 X 0.125,STL	TK0392	ORDER BY DESCR
-6	366-1625-00			1	.KNOB:GRAY,T/DIV,3.25MM ID,RBR	80009	366-1625-00
-7	213-0048-00			2	..SETSCREW:4-40 X 0.125,STL	TK0392	ORDER BY DESCR
-8	366-1257-07			1	.PUSH BUTTON:SIL GY,AUTO	80009	366-1257-07
-9	366-1257-05			1	.PUSH BUTTON:SIL GY,NORM	80009	366-1257-05
-10	366-1559-00			3	.PUSH BUTTON:SIL GY,0.18 SQ X 0.43	80009	366-1559-00
-11	213-0153-00			2	..SETSCREW:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
	366-1189-00			2	.KNOB:GY,0.127 ID X 0.5 OD X 0.531	80009	366-1189-00
-12	----- -----			1	.RES.,VAR:A TRIG HOLDOFF (SEE R742 REPL)		
					ATTACHING PARTS		
-13	220-0739-00			1	.NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	80009	220-0739-00
-14	210-3035-00			1	.WASHER,FLAT:7.6MM ID X 11.0MM OD X 0.5MM	80009	210-3035-00
-15	210-0046-00			1	.WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-16	----- -----			1	.RES.,VAR:DELAY TIME POS (SEE R714 REPL)		
					ATTACHING PARTS		
-17	210-1042-00			1	.WASHER,LOCK:0.25 ID,INTL,0.03 THK,STL	78189	1216-01-00-0541C
-18	331-0247-00			1	.DIAL,CONTROL:10 TURNS W/O BRAKE	05129	771-S-1
	213-0048-00			1	..SETSCREW:4-40 X 0.125,STL	TK0392	ORDER BY DESCR
					END ATTACHING PARTS		
-19	----- -----			1	.RES.,VAR:HORIZ POSITION (SEE R906A/B REPL)		
					ATTACHING PARTS		
-20	220-0739-00			1	.NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	80009	220-0739-00
-21	210-3035-00			1	.WASHER,FLAT:7.6MM ID X 11.0MM OD X 0.5MM	80009	210-3035-00
-22	210-0046-00			1	.WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-23	----- -----			1	.RES.,VAR;LEVEL,B(DLY D)TRIG(SEE R610 REPL)		
					ATTACHING PARTS		
-24	220-0739-00			1	.NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	80009	220-0739-00
-25	210-3035-00			1	.WASHER,FLAT:7.6MM ID X 11.0MM OD X 0.5MM	80009	210-3035-00
-26	210-0046-00			1	.WASHER,LOCK:0.261 ID,INTL,0.018 THK,STL	77900	1214-05-00-0541C
					END ATTACHING PARTS		
-27	426-0681-00			4	.FRAME,PUSH BTN:	80009	426-0681-00
-28	426-1072-00			3	.FRAME,PUSH BTN:SILVER GRAY PLSTC	80009	426-1072-00
-29	333-2054-00			1	.PANEL,FRONT:MODULE	TK1684	ORDER BY DESCR
-30	386-3347-00			1	.SUBPANEL,FRONT:	80009	386-3347-00
-31	337-2211-00			1	.SHIELD,ELEC:REAR DUAL SWEEP MODULE	80009	337-2211-00
					ATTACHING PARTS		
-32	213-0055-00	300000	301073	4	.SCREW,TPG,TF:2-32 X 0.188,TYPE B,PNH,STL	93907	ORDER BY DESCR
-33	210-0053-00	300000	301073	4	.WASHER,LOCK:#2 SPLIT,0.02 THK STL	78189	ORDER BY DESCR
	210-1042-00	300000	301073	4	.WASHER,LOCK:0.25 ID,INTL,0.03 THK,STL	78189	1216-01-00-0541C
	211-0180-00	301074		4	.SCR,ASSEM WSHR:2-56 X 0.25,PNH,BRS,NP,POZ	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
	672-0530-00			1	.CIRCUIT BD ASSY:HORTZONTAL SWEEP	80009	672-0530-00
-34	----- -----			1	..CKT BOARD ASSY:SWEEP (SEE A5 REPL)		
					ATTACHING PARTS		
-35	211-0116-00	300000	310075	8	..SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		8	..SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
					END ATTACHING PARTS		
					..CKT BOARD ASSY INCLUDES:		
-36	131-0608-00	300000	310910	8	...TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
	131-0608-00	310911		20	...TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
-37	136-0327-01	300000	300245	23	...SOCKET,PIN TERM:0.067 INCH DIA	00779	86281-2
	136-0327-01	300246		22	...SOCKET,PIN TERM:0.067 INCH DIA	00779	86281-2
-38	136-0252-04	300000	304470	70	...SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-07	304471	308690	29	...SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-	136-0252-07	308691		20	...SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0263-04	300000	310390	12	...SOCKET,PIN TERM:U/W 0.025 SQ PIN	22526	75377-001
-39	136-0269-02	300000	308690	3	...SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
	136-0269-02	308691	312365	2	...SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
	136-0728-00	312366		2	...SKT,PL-IN ELEK:MICROCKT,14 CONTACT	09922	DILB14P-108
	136-0634-00	304471		1	...SKT,PL-IN ELEK:MICROCIRCUIT,20 DIP	09922	DILB20P-108
-40	131-0604-00			30	...CONTACT,ELEC:CKT BD SW,SPR,CU BE	80009	131-0604-00
	198-5455-00	310391	310485	1	...WIRE SET,ELEC:	80009	198-5455-00
-41	361-0707-00			2	..SPACER,CKT BD:0.976 L X 0.188 HEX,BRS ATTACHING PARTS	80009	361-0707-00
-42	211-0116-00	300000	310075	2	..SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	210-0661-00	310076		2	..EYELET,METALLIC:0.187 OD,BRASS END ATTACHING PARTS	80009	210-0661-00
	211-0661-00	310076		2	..SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ END ATTACHING PARTS	01536	821-01655-024
-43	384-1374-00			1	..EXTENSION SHAFT:160MM L X 2.057MM OD,SST	80009	384-1374-00
-44	376-0039-00			1	..CPLG,SHAFT,RGD:0.082 & 0.128 ID,AL	80009	376-0039-00
	213-0075-00			2	...SETSCREW:4-40 X 0.094,STL	74445	ORDER BY DESCR
-45	----- -----			1	..RES.,VAR;A CAL/HORIZ GAIN (SEE R726A/B)		
-46	386-1792-00	300000	302305	1	..PL,VAR RES MTG:STEEL CD PL	80009	386-1792-00
	386-1792-00	302306		1	..PL,VAR RES MTG:STEEL CD PL ATTACHING PARTS	80009	386-1792-00
	386-1792-03	302306		1	..PL,VAR RES MTG:STEEL ATTACHING PARTS	80009	386-1792-03
-47	211-0022-00			2	..SCREW,MACHINE:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-48	210-0001-00			2	..WASHER,LOCK:#2 INTL,0.013 THK,STL END ATTACHING PARTS	77900	1202-00-00-0541C
	263-1104-00			1	..SW CAM ACTR AS:TIME/DIV ATTACHING PARTS	80009	263-1104-00
-49	211-0116-00	300000	310075	6	..SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		6	..SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-50	122-0990-00			1	..ANGLE,RAIL:118.22MM L,STL,NI PL END ATTACHING PARTS	80009	122-0990-00
					..ACTUATOR ASSY INCLUDES:		
-51	131-0963-00			2	...CONTACT,ELEC:GROUNDING,PH BRZ,W/BRACKET	TK0507	ORDER BY DESCR
-52	210-0406-00			2	...NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-53	214-1139-02			1	...SPRING,FLAT:0.885 X 0.156 CU BE GRN CLR	80009	214-1139-02
	214-1139-03			1	...SPRING,FLAT:0.885 X 0.156 CU BE RED CLR	80009	214-1139-03
-54	214-1127-00			1	...ROLLER,DETENT:0.125 DIA X 0.125,SST	80009	214-1127-00
-55	401-0081-02			1	...BEARING,CAM SW:FRONT W/O MOUNTING BOSSES ATTACHING PARTS	80009	401-0081-02
-56	354-0391-00			1	...RING,RETAINING:BASIC EXT,U/O 0.438 DIA SFT END ATTACHING PARTS	79136	5100-43 MD
-57	105-0640-00			1	...ACTUATOR,CAM SW:TIME BASE B	80009	105-0640-00
-58	210-0406-00			4	...NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-59	401-0115-00			1	...BEARING,CAM SW:CENTER,0.83 DIA CAM	80009	401-0115-00
-60	105-0639-00			1	...ACTUATOR,CAM SW:TIME BASE A ATTACHING PARTS	80009	105-0639-00
-61	354-0391-00			1	...RING,RETAINING:BASIC EXT,U/O 0.438 DIA SFT END ATTACHING PARTS	79136	5100-43 MD
-62	210-0406-00			4	...NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
-63	214-1139-02			1	...SPRING,FLAT:0.885 X 0.156 CU BE GRN CLR	80009	214-1139-02
	214-1139-03			1	...SPRING,FLAT:0.885 X 0.156 CU BE RED CLR	80009	214-1139-03
-64	214-1127-00			2	...ROLLER,DETENT:0.125 DIA X 0.125,SST	80009	214-1127-00
-65	401-0081-00			1	...BEARING,CAM SW:FRONT 0.83 DIA CAM W/BSHG	80009	401-0081-00
-66	----- -----			1	..CKT BOARD ASSY:HORIZONTAL (SEE A4 REPL)		
-67	384-1099-00			2	...EXTENSION SHAFT:1.58 L X 0.187 SQ,PLSTC	80009	384-1099-00
-68	384-1373-00			1	...EXTENSION SHAFT:55.9MM L,MLD PLSTC,BLACK	80009	384-1373-00
-69	131-0589-00	300000	300120	15	...TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0589-00	300121		17	...TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
-70	131-0593-00	300000	300245	23	...TERMINAL,PIN:1.15 L X 0.025 SQ BRS TIN PL	22526	47334
	131-0593-00	300246	311795	22	...TERMINAL,PIN:1.15 L X 0.025 SQ BRS TIN PL	22526	47334
	131-0593-00	311796		4	...TERMINAL,PIN:1.15 L X 0.025 SQ BRS TIN PL	22526	47334
	131-0593-01	311796		10	...TERMINAL,PIN:1.15 L X 0.025 SQ NP	80009	131-0593-01
-71	352-0274-00	300000	310910	3	...HOLDER,TERMINAL:8 SQUARE PINS	80009	352-0274-00
	352-0274-00	310911		2	...HOLDER,TERMINAL:8 SQUARE PINS	80009	352-0274-00
-72	136-0252-04	300000	304285	60	...SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-07	304286	308690	3	...SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-73	136-0269-02	300000	308690	1	...SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	DILB14P-108T
-74	----- -----			2	...SW,PUSH:TRIG SLP/HORIZ MAG (S600/S930)		
-75	----- -----			1	...SW,PUSH:RESET/AUTO/NORM (SEE S700 REPL)		
-76	361-0726-00			5	...SPACER,PB SW:0.5MM X 21.5MM X 9.5MM,TEFLON	80009	361-0726-00
-77	----- -----			2	...SW,PUSH:HORIZ DSPL A,B (SEE S900,S910)		
-78	361-0725-00			2	...SPACER,PB SW:0.5MM X 33.5MM X 9.5MM,TEFLON	80009	361-0725-00
-79	175-0826-00			AR	.CABLE,SP,ELEC:3,26 AWG,STRD,PVC JKT,RBN	80009	175-0826-00
-80	175-0827-00			AR	.CABLE,SP,ELEC:4,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-954
-81	175-0828-00			AR	.CABLE,SP,ELEC:5,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-955
-82	131-0707-00	300000	300350	23	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-0707-00	300351		19	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-83	352-0828-00			2	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
-84	352-0829-00			2	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00
-85	352-0162-00	300000	300350	2	.HLDR,TERM CONN:4 WIRE,BLACK	80009	352-0162-00
	352-0830-00	300351		1	.HLDR,TERM CONN:1 X 4,0.1 CTR,BLACK	80009	352-0830-00
-86	352-0722-00			1	.HLDR,TERM CONN:10 WIRE,BLACK,0.1 SPACING	80009	352-0722-00
-87	342-0278-00			1	INSULATOR,PLATE:POWER SUPPLY,TOP,SONY/TEK	80009	342-0278-00
-88	342-0279-00			1	INSULATOR,PLATE:POWER SUPPLY,BOT,SONY/TEK	80009	342-0279-00
-89	348-0031-00			2	GROMMET,PLASTIC:0.127 ID,GRAY ACETAL	80009	348-0031-00
-90	348-0063-00			1	GROMMET,PLASTIC:GRAY,ROUND,0.0457 ID	80009	348-0063-00
-91	348-0063-00	300000	303280	1	GROMMET,PLASTIC:GRAY,ROUND,0.0457 ID	80009	348-0063-00
	348-0584-00	303281		1	GROMMET,PLASTIC:BLACK,U-SHAPED,0.48 ID	80009	348-0584-00
-92	----- -----			1	POWER SUPPLY:VOLTAGE MULTR,X10(SEE U1230)		
					ATTACHING PARTS		
-93	211-0102-00			2	SCREW,MACHINE:4-40 X 0.5,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-94	210-0406-00			2	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
					END ATTACHING PARTS		
					POWER SUPPLY INCLUDES:		
-95	200-1920-00			1	.COVER,MULTR:HIGH VOLTAGE,10KV DC OUT	80009	200-1920-00
-96	352-0304-00	300000	300591	1	HOLDER,CKT BD:9.5MM X 12.5MM X 14.8MM	80009	352-0304-00
	407-1836-00	300592	303280	1	BRACKET,CKT BD:	80009	407-1836-00
					ATTACHING PARTS		
-97	211-0008-00	300000	300591	1	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-98	210-0004-00	300000	300591	1	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
	210-0569-00	300592	303280	1	NUT,PRESSMOUNT:4-40 X 0.25 OD,STL CD PL	26233	ORDER BY DESCR
					END ATTACHING PARTS		
-99	337-2208-00	300000	303280	1	SHIELD,ELEC:POWER SUPPLY	80009	337-2208-00
	337-2208-01	303281		1	SHIELD,ELEC:POWER SUPPLY	80009	337-2208-01
					ATTACHING PARTS		
-100	211-0101-00			5	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
-101	211-0008-00	300000	310075	3	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	211-0661-00	310076		3	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-102	211-0007-00	300000	310075	2	SCREW,MACHINE:4-40 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
	211-0661-00	310076		2	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-103	210-0004-00	300000	310075	5	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
-104	210-0261-00			1	TERMINAL,LUG:0.14 ID,PLAIN,BRASS	91260	ORDER BY DESCR
					END ATTACHING PARTS		
-105	----- -----			1	CKT BOARD ASSY:INTERFACE (SEE A6 REPL)		
					ATTACHING PARTS		
-106	361-0704-00			3	SPACER,CKT BD:0.504 L X 0.188 HEX,BRS	80009	361-0704-00
					END ATTACHING PARTS		
					CKT BOARD ASSY INCLUDES:		
-107	131-0589-00	300000	300120	22	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0589-00	300121		20	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0608-00	300000	302596	12	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
	131-0608-00	302596		8	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
-108	131-1662-00			1	.CONN,RCPT,ELEC:15/30 CONTACTS	80009	131-1662-00
					ATTACHING PARTS		
-109	211-0014-00	300000	310075	2	.SCREW,MACHINE:4-40 X 0.5,PNH,STL	TK0435	ORDER BY DESCR
	211-0661-00	310076		2	.SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
-110	210-0004-00	300000	310075	2	.WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
-111	210-0994-00	300000	310075	2	.WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-112	220-0737-00			2	.NUT,PLAIN,HEX:4-40 X 0.188 HEX,BRS NP	80009	220-0737-00
					END ATTACHING PARTS		
-113	136-0252-07	300000	308690	9	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-114	136-0263-03			7	.SOCKET,PIN TERM:U/W 0.025 SQ PINS	00779	85864-2
-115	136-0514-00	300000	312365	2	.SKT,PL-IN ELEK:MICROCIRCUIT,8 DIP	09922	DILB8P-108
	136-0727-00	312366		2	.SKT,PL-IN ELEK:MICROCKT,8 CONTACT	09922	DILB8P-108

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-116	214-0579-00			1	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-117	361-0705-00			3	SPACER,CKT BD:6MM L X 6MM OD X 3MM ID	80009	361-0705-00
-118	386-3204-00			1	PLATE,SLIDE SW:	80009	386-3204-00
-119	----- -----			1	CKT BOARD ASSY:PWR SPLY CONVERTER (SEE A8)		
-120	131-0589-00			2	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
-121	131-0608-00			11	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
-122	131-0590-00			7	.TERMINAL,PIN:0.71 L X 0.025 SQ PH BRZ	22526	47331
-123	136-0252-07	300000	308690	27	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	308691		12	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-124	214-0579-00			1	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-125	----- -----			1	.SW,SLIDE:PWR SELECT (SEE S1003A/B REPL)		
-126	344-0255-00			4	.CLIP,ELECTRICAL:FUSE,CKT BD MT,CU BE	80009	344-0255-00
					.XFMR,CONVERTER: (SEE T1002 REPL)		
	342-0295-00			1	.INSULATOR,BSHG:CONVERTER, SONY/TEK	80009	342-0295-00
-127	136-0490-00			1	JACK,TIP:BANANA,RED CAP	80009	136-0490-00
	136-0491-00			1	JACK,TIP:BANANA,CHARCOAL GRAY CAP	80009	136-0491-00
					ATTACHING PARTS FOR EACH		
-128	210-0465-00			1	NUT,PLAIN,HEX:0.25-32 X 0.375,BRS CD PL	73743	3095-402
-129	210-0223-00			1	TERMINAL,LUG:0.26 ID,LOCKING,BRZ TIN PL	86928	5441-37
					END ATTACHING PARTS		
-130	352-0409-00			1	HOLDER,TIP JACK:BLACK DELRIN	80009	352-0409-00
					ATTACHING PARTS		
-131	213-0107-00			1	SCREW,TPG,TF:4-40 X 0.25,TYPE C,FLH,100 DEG	83385	ORDER BY DESCR
					END ATTACHING PARTS		
-132	214-2208-00	300000	302595	4	HEAT SINK,XSTR:TO-5,BE OX,INSULATED	80009	214-2208-00
	214-1611-00	302596	309904	4	HEAT SINK,XSTR:TO-5,CU BE BLK ENAMEL	05820	260-4T5E
	214-1611-00	309905		3	HEAT SINK,XSTR:TO-5,CU BE BLK ENAMEL	05820	260-4T5E
	214-2208-00	309905		1	HEAT SINK,XSTR:TO-5,BE OX,INSULATED	80009	214-2208-00
					ATTACHING PARTS		
-133	211-0007-00			4	SCREW,MACHINE:4-40 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-134	210-0004-00			4	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
-135	407-1686-00			1	BRACKET,HEAT SK:SONY/TEK	80009	407-1686-00
					ATTACHING PARTS		
-136	211-0101-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-137	386-3205-00			1	PLATE,MOUNTING:POWER SUPPLY,AL 1.2MM THK	80009	386-3205-00
					ATTACHING PARTS		
-138	211-0101-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-139	384-1331-00			1	EXTENSION SHAFT:9.35 L X 0.124 OD EPOXY GL	80009	384-1331-00
-140	376-0051-00			1	CPLG,SHAFT,FLEX:0.127 ID X 0.375 OD,DELRIN	80009	376-0051-00
	213-0022-00			4	.SETSCREW:4-40 X 0.188,STL	74445	ORDER BY DESCR
-141	354-0529-00			1	RING,STOPPER:8MM OD X 6.0MM,W/4-40 THRU,AL	80009	354-0529-00
	213-0075-00			1	.SETSCREW:4-40 X 0.094,STL	74445	ORDER BY DESCR
-142	384-1330-00			1	EXTENSION SHAFT:9.26 L X 0.124 OD EPOXY GL	80009	384-1330-00
					GLASS LAMINATE		
-143	214-2227-00			1	ADAPTER,SW ACTR:NATURAL DELRIN MOLDED	80009	214-2227-00
-144	376-0092-01			2	CPLG HALF,SHAFT:0.125 ID,DELRIN	80009	376-0092-01
					EACH COUPLER INCLUDES:		
	213-0048-00			2	.SETSCREW:4-40 X 0.125,STL	TK0392	ORDER BY DESCR
-145	----- -----			1	SW,TOGGLE:POWER,AC (SEE S1000A REPL)		
-146	----- -----			1	SW,TOGGLE:POWER,DC (SEE S1000B REPL)		
-147	407-1705-00			1	BRACKET,ELEC SW:POWER	80009	407-1705-00
					ATTACHING PARTS		
-148	211-0121-00			2	SCR,ASSEM WSHR:4-40 X 0.438,PNH,BRS	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-149	----- -----			1	CKT BOARD ASSY:HV AND UNBLANK (SEE A7 REPL)		
					ATTACHING PARTS		
-150	361-0706-00			3	SPACER,CKT BD:2.382 L X 0.188 HEX,BRS	80009	361-0706-00
-151	211-0116-00	300000	310075	1	SCR,ASSEM WSHR:4-40 X 0.312,PNH,BRS,NP,POZ	77900	ORDER BY DESCR
	211-0661-00	310076		1	SCR,ASSEM WSHR:4-40 X 0.25,PNH,STL,POZ	01536	821-01655-024
					END ATTACHING PARTS		
					CKT BOARD ASSY INCLUDES:		
-152	131-0608-00	300001	310485	25	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
	131-0608-00	310486		13	.TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL	22526	48283-036
	131-0589-00	300000	300120	5	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029
	131-0589-00	300121		3	.TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ	22526	48283-029

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-153	131-0787-00			2	.TERMINAL,PIN:0.64 L X 0.025 SQ PH BRZ	22526	47359-000
	131-0590-00	300000	300120	2	.TERMINAL,PIN:0.71 L X 0.025 SQ PH BRZ	22526	47331
	131-0590-00	300121		3	.TERMINAL,PIN:0.71 L X 0.025 SQ PH BRZ	22526	47331
-154	131-0433-00			2	.TERMINAL,STUD:0.4 L,BIFURCATED	88245	421572-9
-155	358-0241-00			2	.INSULATOR,BSHG:0.05 ID X 0.156 OD X 0.09	88245	421565
-156	136-0252-04	300000	300120	39	.SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-07	300121	308690	36	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	308691	312435	24	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
	136-0252-07	312436		3	.SOCKET,PIN CONN:W/O DIMPLE	22526	75060-012
-157	136-0514-00	300000	312365	1	.SKT,PL-IN ELEK:MICROCIRCUIT,8 DIP	09922	DILB8P-108
	136-0727-00	312366		1	.SKT,PL-IN ELEK:MICROCKT,8 CONTACT	09922	DILB8P-108
-158	214-0579-00	300000	300120	4	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
	214-0579-00	300121		5	.TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-159	344-0255-00			2	.CLIP,ELECTRICAL:FUSE,CKT BD MT,CU BE	80009	344-0255-00
-160	337-2243-00			1	.SHIELD,ELEC:HV BOARD	80009	337-2243-00
-161	----- -----			1	.PWR SUPPLY:VOLTAGE MULTR,2X (SEE U1214)		
	337-2246-00			1	.SHIELD,ELEC:HV BOARD	80009	337-2246-00
-162	342-0301-00			1	.INSULATOR,FILM:CKT BOARD,TEFLON	80009	342-0301-00
-163	343-0088-00	300000	300350	1	.CLAMP,CABLE:0.062 DIA,PLASTIC	80009	343-0088-00
-164	----- -----			2	.RES.,VAR:FOCUS & INTEN (SEE R1223,R1435)		
-165	407-1610-00			1	.BRACKET,VAR RES:DELRIN SONY/TEK	80009	407-1610-00
	198-4438-00	310486		1	.WIRE SET,ELEC:	80009	198-4438-00
	131-0707-00	310486		2	..CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-2834-00	310486		10	..CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	131-2214-00	310486		12	..STRAIN RLF,TERM:CIRCUIT BOARD,22-24 AWG	27264	16-02-0037(4811)
	352-0830-00	310486		2	..HLDR,TERM CONN:1 X 4,0.1 CTR,BLACK	80009	352-0830-00
	352-0831-00	310486		1	..HLDR,TERM CONN:1 X 6,0.1 CTR,BLACK	80009	352-0831-00
-166	348-0425-00			4	FOOT,CABINET:W/CORD WRAP,BLACK	80009	348-0425-00
					ATTACHING PARTS		
-167	211-0530-00			4	SCREW,MACHINE:6-32 X 1.750,PNH,STL	83385	ORDER BY DESCR
-168	210-0802-00			4	WASHER,FLAT:0.15 ID X 0.312 OD X 0.032,STL	12327	ORDER BY DESCR
					END ATTACHING PARTS		
-169	200-1857-00	300000	312375	1	COVER,REAR:GRAY,PHENYLENE OXIDE,MOLDED	80009	200-1857-00
	200-1857-02	312376		1	COVER,REAR:GRAY,PHENYLENE OXIDE,MOLDED	80009	200-1857-02
-170	----- -----			1	SW,SLIDE:LINE SELECTOR (SEE S1001 REPL)		
					ATTACHING PARTS		
-171	211-0565-00			2	SCREW,MACHINE:6-32 X 0.250,TRH,STL	TK0435	ORDER BY DESCR
-172	210-0006-00			2	WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
					END ATTACHING PARTS		
-173	161-0071-04	300000	302595	1	CABLE ASSY,PWR,:3,18 AWG,115V,106.3 L	80009	161-0071-04
	161-0033-24	302596	303650	1	CABLE ASSY,PWR,:3,18 AWG,125V,108.3 L	16428	KH8890
	161-0033-43	303651		1	CABLE ASSY,PWR,:3,18 AWG,125V,105.7 L	16428	CH-9385
					ATTACHING PARTS		
-174	211-0016-00			2	SCREW,MACHINE:4-40 X 0.625,PNH,STL	TK0435	ORDER BY DESCR
-175	210-0994-00			2	WASHER,FLAT:0.125 ID X 0.25 OD X 0.022,STL	86928	A371-283-20
-176	344-0270-00	300000	302595	1	CLIP,POWER CORD:BLACK NYLON MOLDED	80009	344-0270-00
	344-0270-01	302596		1	CLIP,POWER CORD:BLACK NYLON MOLDED	80009	344-0270-01
					END ATTACHING PARTS		
-177	----- -----			1	XFMR,POWER,STU: (SEE T1001 REPL)		
					ATTACHING PARTS		
-178	211-0507-00			4	SCREW,MACHINE:6-32 X 0.312,PNH,STL	83385	ORDER BY DESCR
-179	210-0006-00			4	WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
-180	407-1614-00			2	BRACKET,CMPNT:ALUMINUM	80009	407-1614-00
					END ATTACHING PARTS		
-181	----- -----			1	CAPACITOR:W/HDWR (SEE C1003 REPL)		
					ATTACHING PARTS		
-182	211-0008-00			1	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-183	210-0004-00			1	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
-184	343-0536-00			1	CLAMP,CAPACITOR:0.5MM THK STL	80009	343-0536-00
					END ATTACHING PARTS		
-185	210-0202-00			2	TERMINAL,LUG:0.146 ID,LOCKING,BRZ TIN PL	86928	A-373-158-2
-186	136-0491-00			1	JACK,TIP:BANANA,CHARCOAL GRAY CAP	80009	136-0491-00
					ATTACHING PARTS		
-187	210-0465-00			1	NUT,PLAIN,HEX:0.25-32 X 0.375,BRS CD PL	73743	3095-402
-188	210-0223-00			1	TERMINAL,LUG:0.26 ID,LOCKING,BRZ TIN PL	86928	5441-37
-189	210-0895-00			1	WASHER,SHLDR:0.255X0.375X0.105,NYL	80009	210-0895-00
					END ATTACHING PARTS		
-190	407-1615-00			1	BRACKET,CMPNT:ALUMINUM	80009	407-1615-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-					ATTACHING PARTS		
-191	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-192	210-0004-00			2	WASHER,LOCK:#4 INTL,0.015 THK,STL	77900	1204-00-00-0541C
					END ATTACHING PARTS		
-193	210-0201-00			2	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373-157-2
					ATTACHING PARTS		
-194	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
					END ATTACHING PARTS		
-195	386-3204-00			1	PLATE,SLIDE SW:	80009	386-3204-00
-196	----- -----			1	SWITCH,SLIDE:RANGE REGULATOR (SEE S1002)		
					ATTACHING PARTS		
-197	211-0008-00			2	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-198	210-0054-00			2	WASHER,LOCK:#4 SPLIT,0.025 THK STL	78189	ORDER BY DESCR
					END ATTACHING PARTS		
-199	348-0067-00			3	GROMMET,PLASTIC:GRAY,ROUND,0.252 ID	80009	348-0067-00
-200	210-0201-00	300000	312285	1	TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	A373-157-2
	210-0202-00	312286		1	TERMINAL,LUG:0.146 ID,LOCKING,BRZ TIN PL	86928	A-373-158-2
					ATTACHING PARTS		
-201	211-0105-00	300000	312285	1	SCREW,MACHINE:4-40 X 0.188,FLH,100 DEG	TK0435	ORDER BY DESCR
-202	210-0406-00	300000	312285	1	NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL	73743	12161-50
	210-0407-00	312286		1	NUT,PLAIN,HEX:6-32 X 0.25,BRS CD PL	73743	3038-402
					END ATTACHING PARTS		
-203	220-0738-00			3	NUT,CIRCUIT BD:4-40 X 0.188 HEX,BRS NP	80009	220-0738-00
					ATTACHING PARTS		
-204	211-0101-00			3	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-205	361-0734-00			1	SPACER,CKT BD:	80009	361-0734-00
					ATTACHING PARTS		
-206	211-0101-00			1	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL	TK0435	ORDER BY DESCR
					END ATTACHING PARTS		
-207	441-1271-00	300000	312285	1	CHAS,PWR SUPPLY:AL,1.2MM THK	80009	441-1271-00
	441-1271-02	312286		1	CHAS,PWR SUPPLY:W/GROUND SYMBOL	80009	441-1271-02
	334-3379-00	312286		1	.MARKER,IDENT:MARKED GROUND SYMBOL	07416	ORDER BY DESCR
	198-3659-00	307921		1	WIRE SET,ELEC:	80009	198-3659-00
	352-0164-00	300000	302595	1	.HLDR,TERM CONN:6 WIRE,BLACK	80009	352-0164-00
	352-0830-00	302596		1	.HLDR,TERM CONN:1 X 4,0.1 CTR,BLACK	80009	352-0830-00
-208	131-2834-00			3	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	131-0707-00	300000	300120	40	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-0707-00	300121	300350	42	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-0707-00	300351	310485	35	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-0707-00	310486		8	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
-209	175-0827-00			AR	.CABLE,SP,ELEC:4,26 AWG,STRD,PVC JKT,RBN	08261	111-2699-954
-210	352-0171-00	300000	300120	2	.HLDR,TERM CONN:1 WIRE,BLACK	80009	352-0171-00
-211	352-0169-00	300000	300120	3	.HLDR,TERM CONN:2 WIRE,BLACK	80009	352-0169-00
	352-0828-00	300121		1	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
-212	352-0161-00	300000	300120	2	.HLDR,TERM CONN:3 WIRE,BLACK	80009	352-0161-00
	352-0829-00	300121		2	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00
-213	352-0162-00	300000	300120	1	.HLDR,TERM CONN:4 WIRE,BLACK	80009	352-0162-00
	352-0162-00	300121	300350	4	.HLDR,TERM CONN:4 WIRE,BLACK	80009	352-0162-00
	352-0162-00	300351	310485	3	.HLDR,TERM CONN:4 WIRE,BLACK	80009	352-0162-00
-214	352-0164-00	300000	300120	5	.HLDR,TERM CONN:6 WIRE,BLACK	80009	352-0164-00
	352-0164-00	300121	310485	3	.HLDR,TERM CONN:6 WIRE,BLACK	80009	352-0164-00
	352-0831-00	310486		1	.HLDR,TERM CONN:1 X 6,0.1 CTR,BLACK	80009	352-0831-00
	343-0549-00	309572		2	.STRAP,TIEDOWN,E:0.091 W X 4.0 L,ZYTEL	06383	PLT1M
	198-3679-00	307921		1	WIRE SET,ELEC:	80009	198-3679-00
	131-2834-00			4	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	352-0830-00			1	.HLDR,TERM CONN:1 X 4,0.1 CTR,BLACK	80009	352-0830-00
	198-3676-00	310391		1	WIRE SET,ELEC:	80009	198-3676-00
	131-2834-00			12	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	352-0829-00	310391		3	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00
	352-0828-00	310391		1	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
	352-0171-00	310391		1	.HLDR,TERM CONN:1 WIRE,BLACK	80009	352-0171-00
	198-3661-00			1	WIRE SET,ELEC:	80009	198-3661-00
	131-0707-00			1	.CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL	22526	47439-000
	131-2834-00			3	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	352-0828-00			1	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
	352-0828-00			1	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
	198-3678-00			1	WIRE SET,ELEC:	80009	198-3678-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
2-	131-2834-00			4	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	352-0828-00			2	.HLDR,TERM CONN:1 X 2,0.1 CTR,BLACK	80009	352-0828-00
	198-4437-00			1	WIRE SET,ELEC:	80009	198-4437-00
	131-2214-00			8	.STRAIN RLF,TERM:CIRCUIT BOARD,22-24 AWG	27264	16-02-0037(4811)
	131-2834-00			8	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	352-0833-00			1	.HLDR,TERM CONN:1 X 8,0.1 CTR,BLACK	80009	352-0833-00
	198-3675-00			1	WIRE SET,ELEC:	80009	198-3675-00
	131-2834-00			3	.CONNECTOR,TERM:24-32 AWG,PH BRZ	80009	131-2834-00
	352-0829-00			1	.HLDR,TERM CONN:1 X 3,0.1 CTR,BLACK	80009	352-0829-00

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
3-1	390-0492-00	300000	305401	1	CABINET,SCOPE:	80009	390-0492-00
	390-0492-02	305402		1	CABINET,SCOPE:	80009	390-0492-02
					ATTACHING PARTS		
-2	211-0008-00	300000	300085	4	SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
	213-0284-00	300086		4	SCREW,CABINET:4-40 X 4.5MM,PH BRZ STL NP	80009	213-0284-00
					END ATTACHING PARTS		
-3	348-0080-01			4	FOOT,CABINET:CHARCOAL GRAY,POLYURETHANE	80009	348-0080-01
-4	334-2435-00			1	PLATE,IDENT:MKD 335 OSCILLOSCOPE	TK1684	ORDER BY DESCR
-5	200-1342-00			2	COVER,HANDLE:35.5MM OD X 14MM H,PLASTIC	80009	200-1342-00
-6	367-0203-00			1	HANDLE,CARRYING:BLACK VINYL	80009	367-0203-00
					ATTACHING PARTS		
-7	212-0004-00			2	SCREW,MACHINE:8-32 X 0.312,PNH,STL	TK0435	ORDER BY DESCR
-8	210-0008-00			2	WASHER,LOCK:#8 INTL,0.02 THK,STL	77900	1208-00-00-0541C
-9	210-1144-00			2	WASHER,FLAT:4.5MM ID X 18MM OD X 0.8MM,STL	80009	210-1144-00
-10	386-2181-00			2	PLATE,RING:	80009	386-2181-00
-11	386-2582-00			4	PLATE,RING:17MM ID X 32MM OD X 0.1 MM,BRASS	80009	386-2582-00
-12	386-2182-00			4	PLATE,FRICTION:17MM ID X 32 OD X 1MM THK	80009	386-2182-00
					END ATTACHING PARTS		
-13	343-0542-00			2	RETAINER,HANDLE:32.5MM OD X 11.7MM L,STL	80009	343-0542-00
					ATTACHING PARTS		
-14	211-0603-00			8	SCREW,MACHINE:6-32 X 0.312,HEX HD,STL	83385	ORDER BY DESCR
-15	210-0006-00			8	WASHER,LOCK:#6 INTL,0.018 THK,STL	77900	1206-00-00-0541C
					END ATTACHING PARTS		
	342-0145-00	300402		1	INSULATOR,FILM:CRT SHLD,BOT,MYLAR	80009	342-0145-00

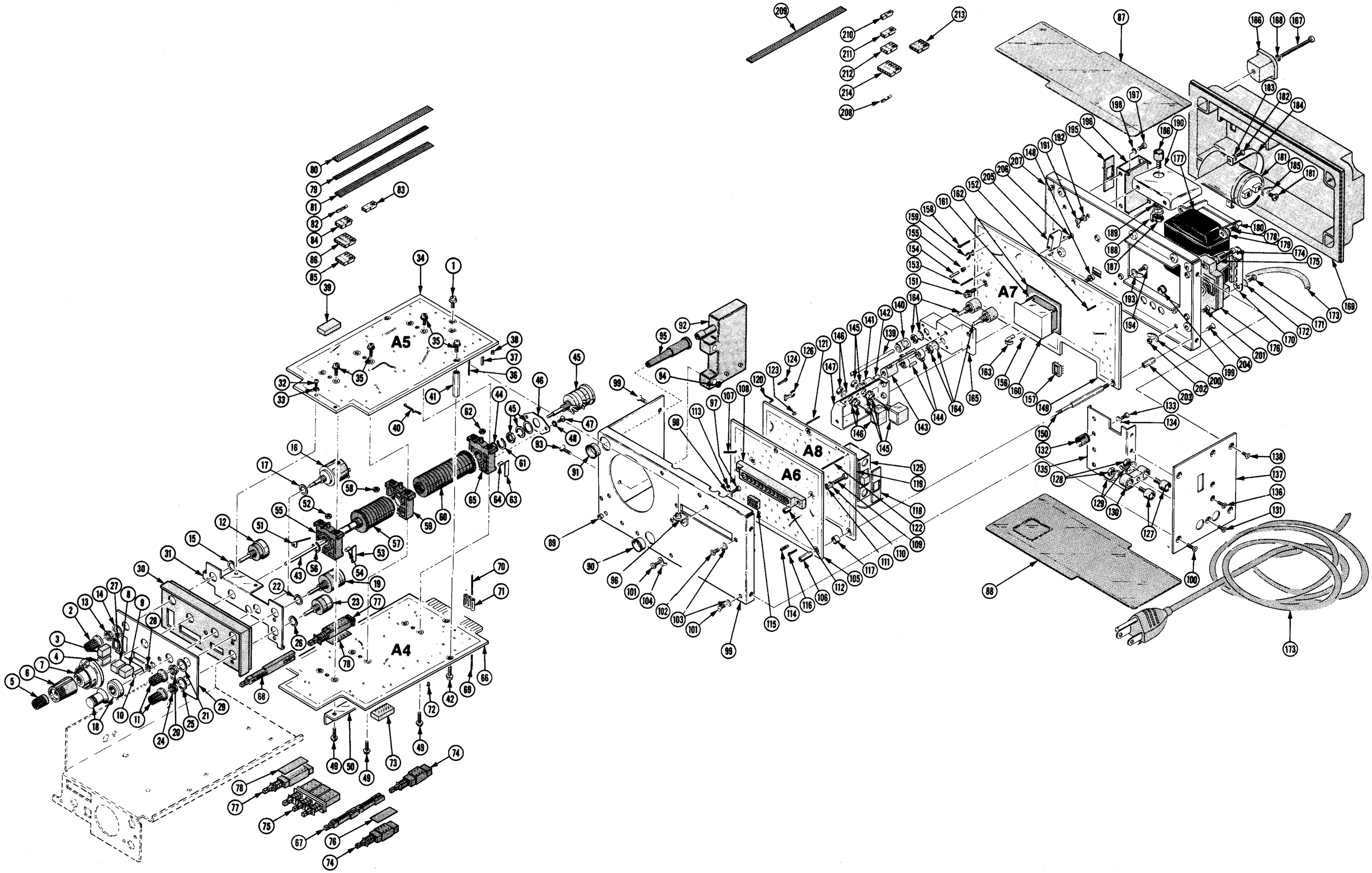

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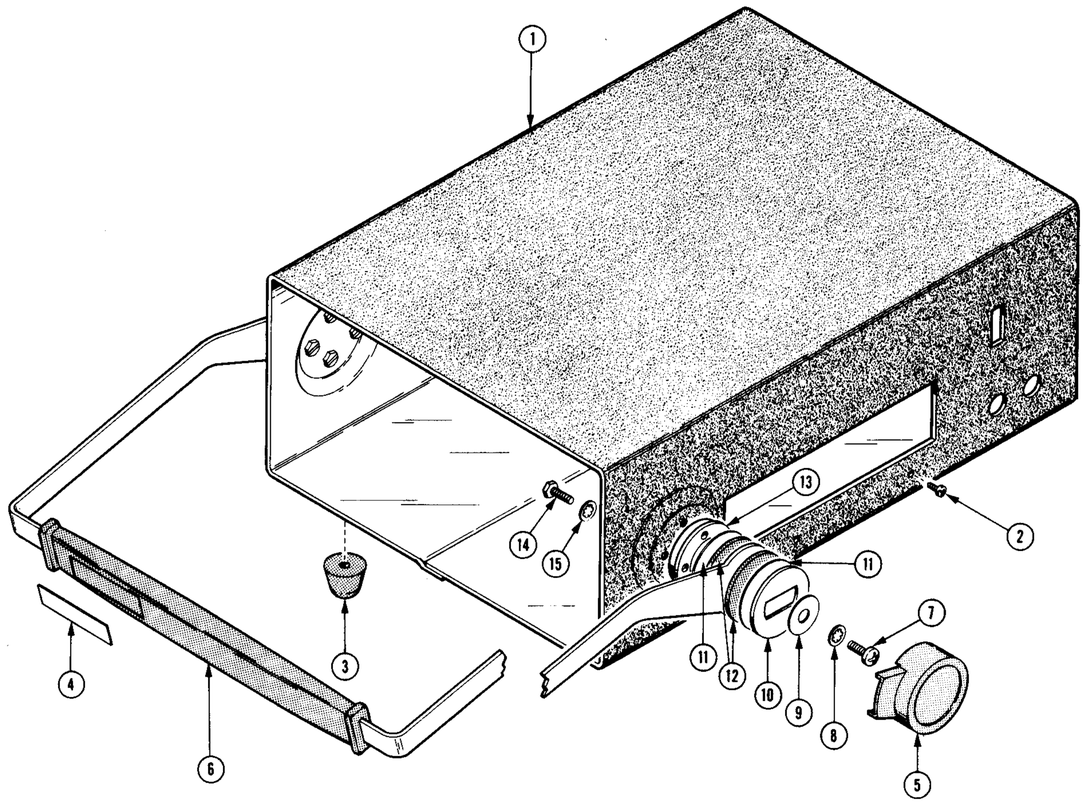
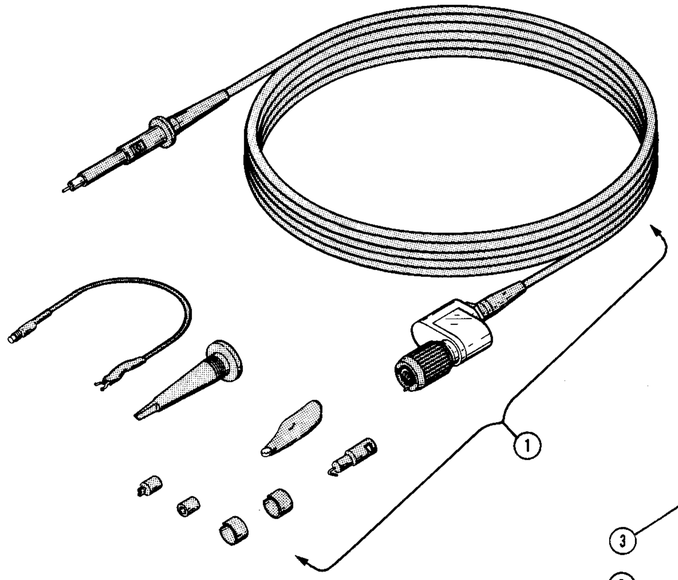
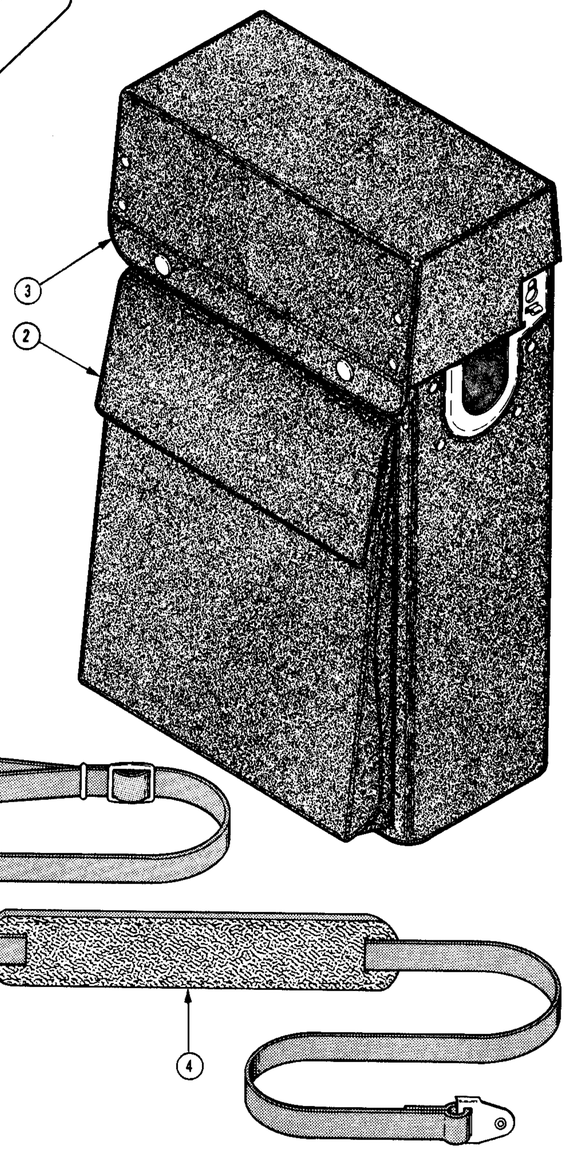
Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
4-							
					STANDARD ACCESSORIES		
-1	010-6065-13	300000	300517	2	PROBE,VOLTAGE:P6065A,72.0 L,10X,W/ACCESS	80009	010-6065-13
	010-6105-03	300518	301151	2	.PROBE,VOLTAGE:P6105,2 METER,10X,W/ACCESS	80009	010-6105-03
	010-6149-03	301152		2	PROBE,VOLTAGE:P6149,2 METER,10X W/ACCESS	80009	010-6149-03
-2	016-0612-00	300000	300724	1	CASE,CARRYING:	80009	016-0612-00
	016-0485-00	300725	305401	1	CASE,CARRYING:	80009	016-0485-00
	016-0485-01	305402		1	CASE,CARRYING:	80009	016-0485-01
-3	200-2260-00			1	COVER,CRYG CASE:	80009	200-2260-00
-4	346-0131-00	300000	311530	1	STRAP ASSY,CRYG:	80009	346-0131-00
	346-0131-01	311531	312200	1	STRAP ASSY,CRYG:	80009	346-0131-01
	346-0131-02	312201		1	STRAP ASSY,CRYG:	80009	346-0131-02
-5	012-0406-00			1	CABLE ASSY,PWR,:DC	80009	012-0406-00
-6	159-0064-00			2	FUSE,CARTRIDGE:DIN,1A,250V,10SEC	75915	212001
	159-0139-00			2	FUSE,CARTRIDGE:400MA,250V,MEDIUM (115V OPERATION)	80009	159-0139-00
	159-0107-00			2	FUSE,CARTRIDGE:DIN,2A,250VAC,TIME LAG	71400	GDC-2A
	159-0080-00			3	FUSE,CARTRIDGE:DIN,0.2A,250V,10SEC (230V OPERATION)	75915	218.200
	070-1943-01			1	MANUAL,TECH:SERVICE	80009	070-1943-01
	070-1942-01			1	MANUAL,TECH:OPERATORS	80009	070-1942-01
					OPTIONAL ACCESSORIES		
-7	103-0033-00			1	ADAPTER,CONN:BNC TO BINDING POST	74868	2048-2
	016-0297-00			1	VISOR,CRT:	TKODV	ORDER BY DESCR
	378-2016-00	300000	303657	1	FILTER,LT,CRT:CRT,BLUE POLYCARBONATE	80009	378-2016-00
	378-2016-01	303658		1	FILTER,LT,CRT:BLUE,PLASTIC	80009	378-2016-01
	378-0843-00	300000	303657	1	FILTER,LT,CRT:AMBER	80009	378-0843-00
	378-0843-01	303658		1	FILTER,LT,CRT:AMBER	80009	378-0843-01
	067-0749-01			1	FIXTURE,CAL:SHIELD	80009	067-0749-01
	378-0063-00			1	FILTER,MESH:W/FRAME & HOLDER	80009	378-0063-00
	067-0742-00			1	FIXTURE,CAL:EXTENSION CABLE	80009	067-0742-00

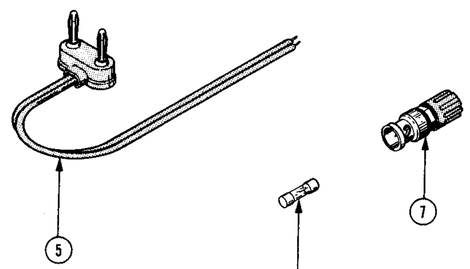
CABINET



ACCESSORIES







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.