

INSTRUCTION MANUAL

Serial Number _____

TYPE
568/R568
OSCILLOSCOPE

Tektronix, Inc.

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WARRANTY

All Tektronix instruments are warranted against defective materials and workmanship for one year. Tektronix transformers, manufactured in our own plant, are warranted for the life of the instrument.

Any questions with respect to the warranty mentioned above should be taken up with your Tektronix Field Engineer.

Tektronix repair and replacement-part service is geared directly to the field, therefore all requests for repairs and replacement parts should be directed to the Tektronix Field Office or representative in your area. This procedure will assure you the fastest possible service. Please include the instrument Type and Serial or Model Number with all requests for parts or service.

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Abbreviations and symbols used in this manual are based on or taken directly from IEEE Standard 260 "Standard Symbols for Units", MIL-STD-12B and other standards of the electronics industry. Change information, if any, is located at the rear of this manual.

SEE PARTS LIST FOR SEMICONDUCTOR TYPES

SERIES M MODEL 1, 2, 3



Fig. 1-1. The Type 568 Oscilloscope

Type 568/R568

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SECTION 1

CHARACTERISTICS

General Information

The Tektronix Type 568 is a bench-mount/rack-mount oscilloscope designed for use either as a part of a digital readout system or as a conventional oscilloscope. When used as a conventional oscilloscope, any of the Tektronix 2-Series or 3-Series plug-in units can provide vertical and horizontal deflection of the CRT beam. In order to operate in a digital readout system, only those plug-in units that provide digital information to the readout unit can be used.

An output connector on the rear panel of the Type 568 provides all signal and logic information required by the digital readout unit (such as a Tektronix Type 230). Several power supply outputs are available through rear-panel connectors for operation of external equipment such as auxiliary program devices. A calibrator circuit provides square-wave outputs through front-panel connectors for adjusting compensation of probes and for setting the vertical and horizontal gain of the plug-in units.

Information given in this instruction manual also applies to the Type R568 unless otherwise noted. The Type R568 is electrically identical to the Type 568 but is equipped with

slide-out tracks and pull handles for rackmounting in a standard 19-inch rack. Rackmounting instructions, a mechanical parts list and a dimensional drawing of the Type R568 are provided in Section 10 of this manual.

Electrical Characteristics

The characteristics given in Tables 1-1 through 1-3 apply over an ambient temperature range from 0°C to +60°C following a 5-minute warm-up period if the instrument has been calibrated at $+25^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Under these conditions, the Type 568 will meet or exceed the specifications given in the Description column of the table. Performance of the instrument is checked to these specifications in the Performance Check and Calibration sections of this manual.

Additional operational information about some of the characteristics is included in a third column of the table where needed. Any characteristics given under Operational Information are not specifications in themselves and are not necessarily checked in the performance check or calibration procedure.

TABLE 1-1
ELECTRICAL CHARACTERISTICS
CATHODE-RAY TUBE AND DISPLAY

Characteristics	Description
Tube Type	Glass envelope, rectangular face. Tektronix T5032-2-1.
Phosphor	P2 standard. Others available on special order.
Accelerating Potential	Approximately 3.5 kV.
Graticule Type	Internal.
Area	8 divisions vertically by 10 divisions horizontally; each division equals 1 cm.
Illumination	Variable edge lighting.
Focus	Adjusted by means of front-panel control.
Astigmatism	Adjusted by means of front-panel screw-driver adjustment.
Trace Alignment	Electrically adjusted by means of internal screw-driver adjustment.
Sweep Unblanking	Deflection-type, DC coupled.
Blanking (Chopped Mode)	Internal from dual-trace unit.
Intensity Modulation	Internal from delayed-sweep unit or digital readout unit; external through CRT cathode.
Geometry Raster Distortion	Less than 0.5 minor division of bowing in either the vertical or horizontal plane.

TABLE 1-2
ELECTRICAL CHARACTERISTICS CALIBRATOR

Characteristics	Description	Operational Information
Output Waveform Waveshape	Square wave.	100 kHz output may be used for calibrating horizontal gain of timing unit; 1 kHz output may be used for compensating attenuator probes.
Polarity	Positive-going from zero volts (baseline).	
Frequency	1 kHz or 100 kHz* from either (5 V or .5 V) output.	
Frequency Accuracy	Within -50% / $+100\%$ of 1 kHz; within 0.05% of 100 kHz.	
Amplitude	0.5 volt or 5 volts peak to peak into $\geq 100\text{-k}\Omega$ load; 50 mV or 500 mV peak to peak into 50-ohm load; separate output connectors for the two amplitudes.	May be used for calibrating gain of vertical unit; both outputs may be used simultaneously when loaded with $\geq 100\text{ k}\Omega$, but not when loaded with 50 Ω ; outputs are not damaged if shorted to ground; outputs appear as current sources to low-impedance loads.
Amplitude Accuracy	Within 2% of indicated value into $\geq 100\text{-k}\Omega$ load; within 2% of indicated value into 50-ohm load when tolerance of load is $\pm 1\%$.	
Output Resistance	Approximately 450 Ω from either output.	
Duty Cycle	48% to 52% at either 1 kHz or 100 kHz frequency.	Used for externally triggering time-base unit; output not damaged if shorted to ground.
+ Pretrigger Frequency Lead Time	Same as square-wave output. Approximately $\frac{1}{4}$ cycle before positive-going transition of square wave.	
Amplitude	Approximately 1 volt into 1-M Ω load; approximately 200 mV into 50-ohm load.	
Output Resistance	Approximately 320 Ω .	

*For serial numbers B150629 and below, the calibrator frequencies are 20 kHz and ≈ 1 kHz.

TABLE 1-3
ELECTRICAL CHARACTERISTICS
POWER SOURCE REQUIREMENTS

Characteristics	AC RMS Operating Range	Operational Information
Line Voltage Low		Power connections changed by means of rear-panel line-selector assembly; normally set for 115 VAC Medium operating range when shipped from factory; electronic regulation permits correct operation over indicated range when ratio of peak line voltage to RMS line voltage is between 1.3:1 and 1.414:1.
100 VAC Nominal	90 volts to 110 volts	
200 VAC Nominal	180 volts to 220 volts	
Medium		
115 VAC Nominal	104 volts to 126 volts	
230 VAC Nominal	208 volts to 252 volts	
High		
124 VAC Nominal	112 volts to 136 volts	
248 VAC Nominal	224 volts to 272 volts	
Line Frequency	48 to 66 Hz	
Power Consumption		210 W maximum

TABLE 1-4
ENVIRONMENTAL CHARACTERISTICS

Characteristics	Description
Ambient Temperature Range	
Operating	0°C to +60°C
Non-Operating	−40°C to +65°C
Maximum Altitude	
Operating	15,000 feet.
Non-Operating	50,000 feet.
Vibration (Non-Operating)	Performs within specification after being vibrated for 15 minutes along each major axis at frequencies from 10 c/s to 50 c/s and accelerations up to 1.9 g.
Transportation (Non-Operating)	Performs within specifications after transportation package has been vibrated for 1 hour at accelerations up to 1 g and dropped 30 inches on one corner, on each edge radiating from that corner and on each flat side of the package (total of 12 drops).

TABLE 1-5
MECHANICAL CHARACTERISTICS

Characteristics	Description
Construction	
Chassis	Aluminum alloy with epoxy laminate circuit boards for component mounting.
Cabinet	Aluminum alloy coated with blue vinyl paint.
Front Panel	Anodized aluminum alloy.
Approximate Dimensions	
Type 568	
Height	8 inches, including feet.
Width	16 ⁷ / ₈ inches
Depth	21 ⁷ / ₈ inches, including CRT bezel and rear-panel feet.
Type R568	
Height	7 inches
Width	17 ⁵ / ₈ inches; fits into standard 19-inch rack.
Depth	22 ³ / ₄ inches; including handles and rear-panel feet.
Connectors	
Calibrator outputs	(3) BNC type.
Programming and readout (rear panel)	(3) 36-terminal Amphenol Micro-Ribbon.
Plug-in receptacles	24-terminal ribbon-type for interconnecting and digital readout (4 total); 30-terminal edge-board with male/male adapters for optional programming connections (2 total).
Ventilation	Forced filtered air; overheat protection by means of thermal relay.
Accessories	
Standard	Listed on Type 568 and Type R568 Accessories fold-out pages in Mechanical Parts List.
Optional	Illustrations section. See current Tektronix, Inc. catalog.

SECTION 2

OPERATING INSTRUCTIONS

General Information

This section of the manual provides the basic information required for operation of the Type 568. Instructions are included for installing the instrument and its plug-in units, using the front-panel controls, setting up the CRT display and using the calibrator output signals. For specific information concerning the operation of the amplifier and time-base units, see the instruction manuals for those units.

In addition to its use as a conventional oscilloscope, the Type 568 contains all the wiring connections required for use with a companion digital readout unit. The digital system can be made to display either voltage or time, and may be used for such applications as measuring the peak-to-peak amplitude or the risetime of a waveform. If a dual trace amplifier unit is used with the Type 568, the digital readout system can be used to obtain time or voltage measurements on either trace or to make time measurements between signals displayed on the two traces.

INSTALLATION

Rackmounting

Complete information for rackmounting installation of the Type R568 is given on the Rackmounting fold-out pages at the rear of this manual.

Cooling

A fan at the rear of the Type 568 provides forced-air cooling of the instrument. For proper circulation of air, the oscilloscope should normally be operated with the top and bottom covers in place. If the internal temperature of the instrument becomes too high, a thermal cutout will open and disconnect the power until the temperature has returned to normal. If this occurs, check that the air circulation and ventilation are adequate. For a rackmount installation, some method of ventilation should be provided for removal or cooling of the heated air.

Operating Voltage

The Type 568 may be operated from either a 115-volt or a 230-volt nominal line voltage source. The manually-operated switches, located inside the Line Voltage Selector assembly on the rear panel, convert the instrument from one operating range to the other (115 or 230 volts) and selects one of three regulating ranges.

1. Disconnect the instrument from the power source.
2. Unscrew the two captive screws which hold the cover onto the assembly and remove the cover.

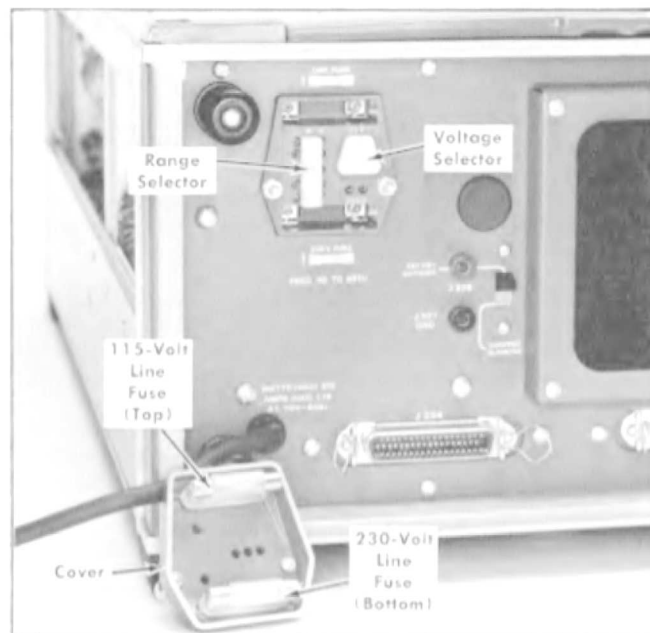


Fig. 2-1. Line voltage selector assembly with cover removed. Shown set for 115-volt medium-range operation.

3. To convert to a different line voltage, pull out the Voltage Selector switch bar (see Fig. 2-1), rotate it 180° and plug it into the opposite set of holes. The Voltage Selector switch bar is in the upper position for 115-volt operation and in the lower position for 230-volt operation.

4. To change regulating ranges, pull out the Range Selector switch bar (see Fig. 2-1), slide it to the desired range and plug it back in. Select a range which is centered about the average line voltage to be applied (see Table 2-1).

5. Re-install the cover with the two captive screws. Be sure the cover fits firmly against the rear panel. This indicates that the line fuses are seated correctly.

6. Before applying power to the instrument, check that the indicating tabs on the switch bars protrude through the proper holes of the cover for the correct line voltage and regulating range.

CAUTION

The Type 568 should not be operated when the Voltage Selector and/or Range Selector switches are not in the correct position for the line voltage to be applied. Operation of the instrument with either switch in the wrong position may cause incorrect operation or damage the the instrument.

TABLE 2-1
Regulating Ranges

Range Selector Switch Positions	Regulating Ranges
LO (switch bar in left position)	90 to 110 volts (180 to 220 volts)
M (switch bar in center position)	104 to 126 volts (208 to 252 volts)
HI (switch bar in right position)	112 to 136 volts (224 to 272 volts)

It may be necessary to use a 115-volt to 230-volt adapter to match the power plug to the power-source receptacle, or the power cord and plug may be changed. Use the following procedure to change the power cord:

- Disconnect the power plug from the power source.
- Unsolder the ground wire (green) from the solder lug located near the front of the power transformer (see Fig. 2-2).
- Unsolder the black wire and the white wire from the ceramic strip. If you are not familiar with soldering techniques used on ceramic strips see "Soldering Techniques" in the Maintenance section of this manual.
- Compress the strain relief and pull the power cord out through the rear panel.
- Trim the leads on the new power cord to the same lengths as those on the old cord.
- Install the power cord through the hole in the rear panel and solder the leads to the terminals from which the previous power cord was removed (see Fig. 2-2).

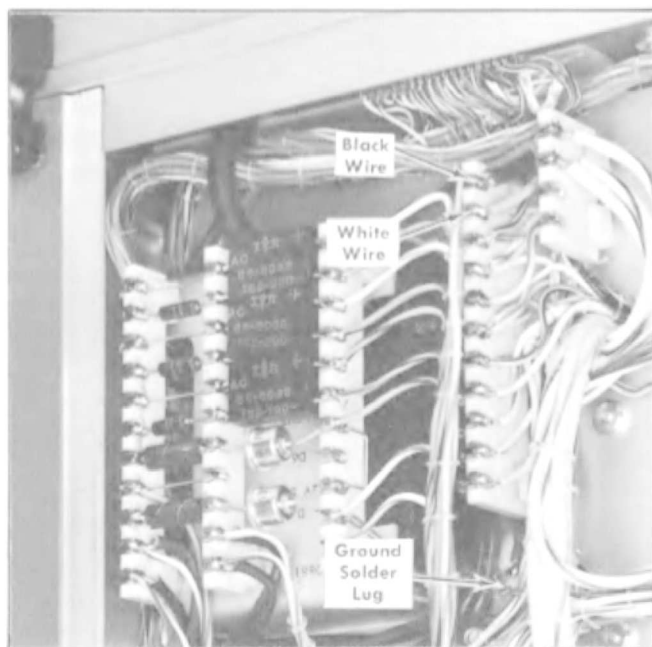


Fig. 2-2. Bottom view of the Type 568 showing the location of the ground lug and input connections required for changing the power cord.

Selection of Plug-In Units

The Type 568 Oscilloscope is designed to use Tektronix 2-Series and 3-Series amplifier and time-base plug-in units. The plug-in unit in the left plug-in compartment controls the vertical (Y-axis) deflection of the CRT beam and the unit in the right plug-in compartment controls the horizontal (X-axis) deflection. If the Type 568 is to be used as a conventional oscilloscope, any of the 2-Series or 3-Series plug-in units may be used, permitting the selection of display modes, bandwidth and sensitivity for your particular application. To produce a normal time-base display, an amplifier plug-in unit is used in the Vertical plug-in compartment and a time-base plug-in unit is used in the Horizontal plug-in compartment. For use with a digital readout unit, only plug-in units that provide digital outputs may be used.

For special applications, the Type 568 can be operated with only one plug-in unit installed. When this is done, the set of deflection plates that is not connected to a plug-in unit must have DC voltages of approximately +180 volts applied to them from a low-impedance source (20 k Ω or less) to permit proper focusing of the display.

Either or both plug-in units may be operated on special extension cables (Tektronix part no. 012-0066-00) for circuit checking. Two extension cables are required for each plug-in unit for digital readout operation. For normal operation of the oscilloscope, the units should be installed directly in the oscilloscope so that the high-frequency response and fast sweep rates will not be affected.

Changing Plug-In Units

To install a plug-in unit in the Type 568, push it all the way into the plug-in compartment, then turn the locking knob (at the bottom of the front panel) clockwise until it is tight. To remove the unit, turn the knob counterclockwise until the latch releases, then pull the unit out of the oscilloscope. It is recommended that the oscilloscope power be turned off whenever exchanging plug-in units to protect the units from transient voltage surges, and as a precaution against burning the CRT phosphor.

CAUTION

Always turn the INTEN control fully counterclockwise while exchanging plug-in units, whether the power is left on or turned off. Increase the intensity only after the plug-in unit has had about 1/2 minute to warm up.

Checking Accuracy of Digital and Plug-In Units

The accuracy of measurements made with the Type 568 depends on the calibration of the digital and plug-in units used. Since the plug-in units drive the deflection plates directly, each unit must be adjusted to match the deflection sensitivity of the particular set of deflection plates that it drives. Therefore, the gain or sweep timing adjustment must be checked each time a plug-in unit is changed. If the associated digital unit is changed, check the calibration of the start and stop voltages and the rate of the rise of the voltmeter ramp before relying on either time or voltage readout.

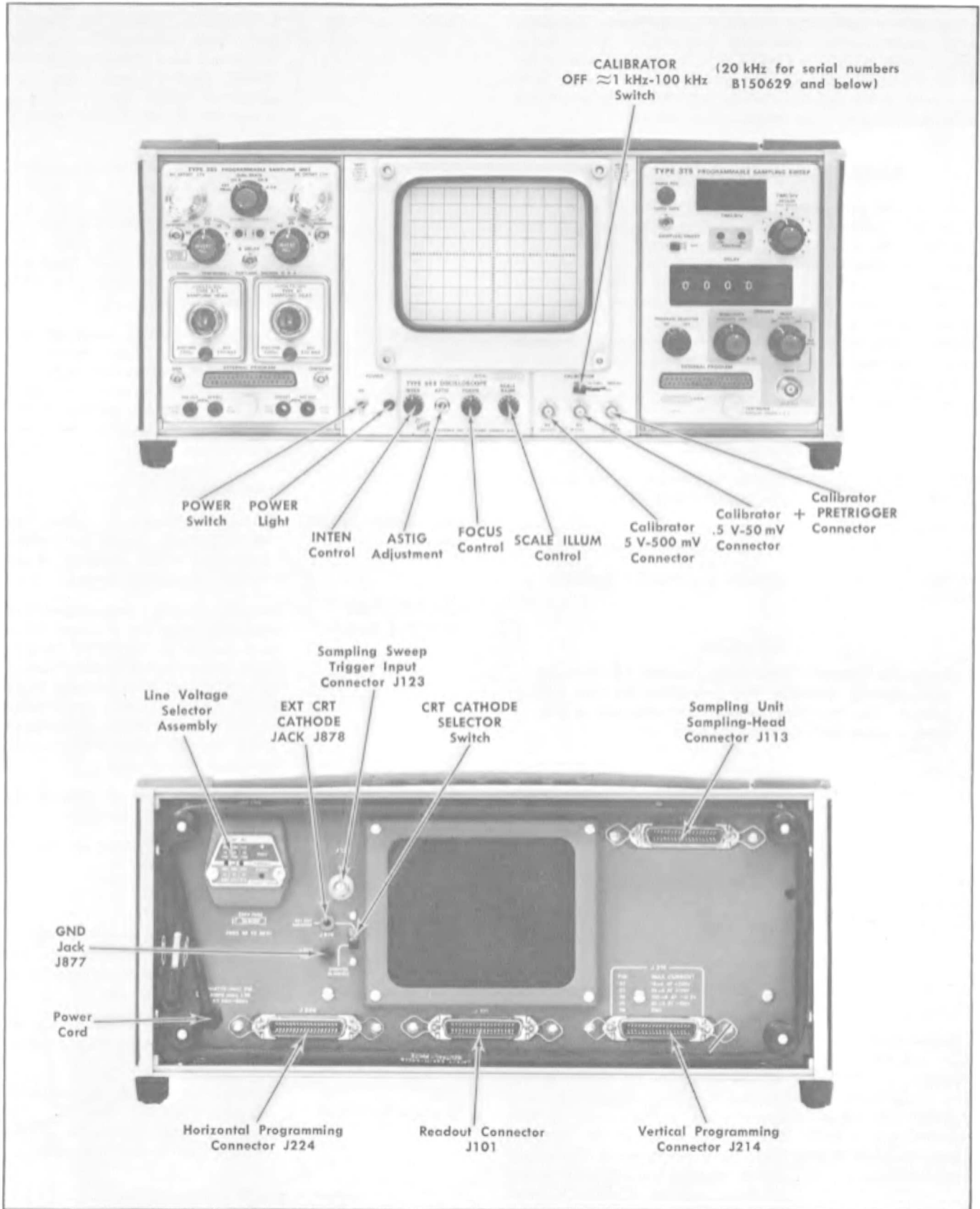


Fig. 2-3. Front and rear-panel controls and connectors of the Type 568 Oscilloscope.

Operating Instructions—Type 568/R568

On most of the plug-in units, gain or timing calibration is made with a front-panel screwdriver adjustment. (Sampling units require special adjustment procedures.) Refer to the plug-in unit instruction manual for the required procedure. Since the various plug-in units present different output voltage levels to the deflection plates, the ASTIG adjustment and FOCUS control will also require readjustment.

CONTROLS AND CONNECTORS

All controls and connections required for operation of the Type 568 Oscilloscope are located on the front and rear panels of the oscilloscope and front panels of the plug-in units. The operator should be familiar with the function or operation of each of these to make full use of the capabilities of the instrument. All front and rear-panel controls and connectors of the Type 568 are shown in Fig. 2-3 and described briefly in the following table. Further information, if necessary, is included later in this section of the manual. Refer to the plug-in unit instruction manuals for the functions of controls and connectors on those units.

FRONT PANEL

POWER ON Switch	Applies line power to the low-voltage power transformer.
POWER Light	Indicates that the AC line voltage is applied to the power transformer.
INTEN Control	Controls brightness of display.

CAUTION

Excessive intensity over long periods of time can permanently damage the phosphor on the CRT screen. Use the minimum intensity required to produce a clear well-defined display.

ASTIG adjustment	Screwdriver adjustment used in conjunction with FOCUS control to obtain a well-defined display. Does not require readjustment for most displays.
FOCUS Control	Used in conjunction with ASTIG adjustment to obtain a well-defined display. For most displays, only adjustment of the FOCUS control is required.
SCALE ILLUM Control	Controls graticule illumination.
CALIBRATOR OFF ≈ 1 kHz-100 kHz Switch (For Serial numbers B150629 and below, the calibrator output frequencies are 20 kHz and ≈ 1 kHz).	Sets frequency of the square-wave signal available at both the 5 V-500 mV and the .5 V-50 mV output connectors. Two frequencies are available; a crystal-controlled 100-kHz square wave or an approximate 1-kHz square wave. Turns Calibrator squarewave off when in the left hand position. (Output DC level may be either zero volts or the maximum selected amplitude when the Calibrator is off.)

5 V-500 mV
Output Connector

Provides two amplitude-calibrated square-wave signals: 5 V peak to peak when connected to a high-impedance load (100 k Ω or greater); 500 mV peak to peak when connected to a 50 Ω load. Frequency is selected by the OFF- ≈ 1 kHz-100 kHz switch.

.5 V-50 mV
Output Connector

Provides two amplitude-calibrated square-wave signals: .5 V peak to peak when connected to a high impedance load (100 k Ω or greater); 50 mV peak to peak when connected to a 50 Ω load. Frequency is selected by the OFF- ≈ 1 kHz-100 kHz switch.

+PRETRIGGER
Output Connector

Provides a positive pulse approximately 2.5 μ s or 12.5 μ s respectively before each positive step of the 100 kHz or 20 kHz square-wave signal and approximately 125 μ s before each positive step of the 1 kHz square-wave signal.

REAR PANEL

Line Voltage Selector Assembly

Converts instrument for either 115-volt or 230-volt nominal line voltage source and allows selection of one of three regulating ranges.

CRT CATHODE SELECTOR Switch

Selects intensity modulation from dual-trace amplifier chopped circuit (with switch at CHOPPED BLANKING) or from signal applied through EXT CRT CATHODE jack (with switch at EXT CRT CATHODE). Leave switch at EXT CRT CATHODE except when using chopped mode or when using sampling plug-in units.

EXT CRT CATHODE Jack J878

Permits application of external signal for intensity modulation.

GND Jack J877

Provides chassis ground for intensity modulation input.

J12 Vertical Programming Connector

Provides external program capability for the vertical plug-in unit. Also makes power supply voltages available for external use.

J22 Horizontal Programming Connector

Provides external program capability for the horizontal plug-in unit.

J101 Readout Connector

Provides signals to the Digital Readout Unit from J12, and J22. Also applies signals from the Digital Readout Unit to the Type 568.

FIRST-TIME OPERATION

The Type 568 Oscilloscope is ready to be operated when received. The following procedure, using normal single-chan-

nel time-base mode, illustrates the basic operation of the Type 568 and its plug-in units. Use of the Type 3A1 amplifier unit and a Type 3B4 time-base unit is assumed in the procedure. If other plug-in units are used, some of the given control settings may not correspond directly to those of the units used.

1. Install a 2-Series or 3-Series amplifier plug-in unit in the vertical (left) plug-in compartment and a 2-Series or 3-Series time-base plug-in unit in the horizontal (right) plug-in compartment. Lock the plug-in units in place with their locking screws.

2. Set the POWER switch to the off position (down).

3. Connect the power cord from the Type 568 to the proper line voltage.

NOTE

The LINE VOLTAGE SELECTOR assembly on the rear panel should be checked to be sure the Voltage Selector and Range Selector switch bars are in the proper positions from the line voltage applied.

4. Set the instrument controls as follows:

Type 568

CALIBRATOR	≈1 kHz
FOCUS	Centered
ASTIGMATISM	As is
INTENSITY	Counterclockwise
SCALE ILLUM	Counterclockwise
CRT CATHODE SELECTOR	EXT CRT CATHODE

Amplifier Unit

Position	Centered
Mode	Normal (Channel 1)
Volts/Div	.2
Variable	Calibrated
Input Coupling	DC

Time-Base Unit

Position	Centered
Time/Div	.5 mS
Variable	Calibrated
Magnifier	Off
Sweep Mode	Normal
Level	Free Run
Triggering Source	Internal
Slope	+
Coupling	AC

5. Connect a coaxial cable from the CALIBRATOR .5 V connector to the input connector of the amplifier plug-in unit (Channel 1).

6. Turn on the POWER Switch and allow a few minutes for warm up.

7. Adjust the INTEN control to obtain a display of moderate brightness. The amplifier unit Position control may have to be readjusted to position the free-running trace on the CRT screen. Do not turn the intensity higher than is necessary for adequate observation of the display.

8. Trigger the display with the time-base Level control.

9. Set the SCALE ILLUM control so the graticule illumination is approximately equal to the intensity of the display.

10. Adjust the time-base Position control to position the start of the trace at the left edge of the graticule.

11. Adjust the FOCUS control for a sharp well-defined display over the entire trace length. (If a focused display cannot be obtained, see Astigmatism Adjustment later in this section under General Operating Information).

12. Check the gain and DC balance of the amplifier unit and the timing adjustment of the time-base unit as given in the instruction manuals for those units before making any voltage or time measurements.

GENERAL OPERATION INFORMATION

Scale Illumination Control

The CRT graticule is edge-lighted by two small lamps at the bottom. The lighting can be adjusted to suit the ambient light conditions by means of the SCALE ILLUM control. Rotating the control clockwise increases the brightness of the graticule scale markings.

Intensity Control

The setting of the INTEN control may affect the correct focus of the display. Slight readjustment of the FOCUS control may be necessary when the intensity level is changed.

Do not leave a bright, sharply focused spot on the CRT screen for a prolonged period. An excessively bright stationary spot may damage the CRT phosphor.

Astigmatism Adjustment

For most displays, the trace can be adequately focused using only the front-panel FOCUS control. However, whenever a large change is made in the beam intensity (to offset large changes in sweep rates or triggering repetition rates), or when plug-in units are changed, adjustment of the ASTIG control may also be required for a sharp display.

NOTE

To check for proper setting of the ASTIG adjustment, slowly turn the FOCUS control through the optimum setting with a signal displayed on the CRT screen. If the ASTIG adjustment is correctly set, the vertical and horizontal portions of the trace will come into sharpest focus at the same position of the FOCUS control.

Operating Instructions—Type 568/R568

To set the ASTIG adjustment, use the following procedure:

1. Connect the 100 kHz CALIBRATOR signal to the Channel 1 vertical input and set the Volts/Div switch of that channel to present 2.5 divisions of vertical deflection.
2. Set the Time/Div switch to 2 μ s.
3. Adjust the INTEN control so that the rising portion of the display can be seen.
4. Adjust the FOCUS control so that the vertical and horizontal portions of the display are equally focused, but not necessarily well focused.
5. With a screwdriver, adjust the ASTIG control for the best overall focus of the display.
6. Repeat steps 4 and 5 to be sure the adjustment is correct.
7. Make a final check with the INTEN control set for normal display intensity.

Trace Alignment

An internal screwdriver adjustment located on the chassis at the left side of the CRT provides electrical adjustment of the CRT trace alignment. Access to this adjustment is easily obtained by removing the top panel of the oscilloscope (see Fig. 2-4). Any time the oscilloscope is moved with respect to the earth's magnetic field, the TRACE ALIGNMENT should be adjusted so that the CRT trace is aligned with the horizontal lines of the graticule.

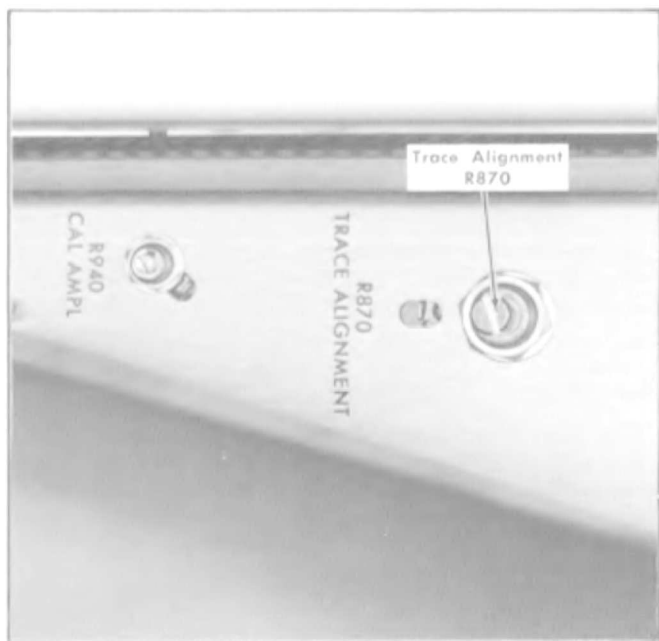


Fig. 2-4. Location of the TRACE ALIGNMENT control in the Type 568.

Use of Calibrator Outputs

The Calibrator outputs provide a choice of two square-wave frequencies at both the 5 V-500 mV output connector

and the .5 V-50 mV output connector. Either an approximate 1-kHz square-wave signal or a 100 kHz ($\pm 2\%$) crystal-controlled square-wave signal may be selected with the front-panel OFF- \approx 1 kHz-100 kHz switch. Two square-wave voltages with amplitude tolerances of 2.0% are available at each of the output connectors; 5 volts at the 5 V-500 mV connector and 0.5 volts at the .5 V-500 mV connector, when either one or both of the output connectors are connected to a high impedance of 100 k Ω or more. The lower square-wave voltages (500 mV at the 5 V-500 mV output connector and 50 mV at the .5 V-50 mV output connector) are available when one or the other (one at a time) is connected to a 50 Ω $\pm 1\%$ load.

Front-panel BNC connectors permit convenient 50 Ω cable connections of calibrator signals to the plug-in unit input terminals or to external equipment. If the vertical plug-in unit has a high-impedance input, the two higher square-wave voltages will apply. Addition of an external 50 Ω termination (Tektronix Part No. 067-0515-00) at the plug-in unit input connector will provide the two lower voltages. If the plug-in unit has an internal 50 Ω termination, do not add the external termination. The Calibrator outputs are short-circuit proof, so any load is permissible, but accurate voltages are obtainable only as described above.

The voltage levels mentioned above are also available as DC voltage levels when the calibrator is turned off. The output of the calibrator is bistable, so it may be necessary to set the calibrator switch to 1 kHz and back to OFF to catch the output at the selected high level.

The Calibrator output signals are valuable for adjusting the front-panel Calib controls of both vertical and horizontal real-time or sampling plug-in units. The 100 kHz frequency (and the ability to make one of the output voltages very accurate) permits checking the system operation digital unit time and voltage readout. The 1-kHz frequency is valuable for compensating low-frequency attenuator probes.

The + PRETRIGGER output delivers a positive pulse of approximately one volt in amplitude into a 1 M Ω load or approximately a 0.2 volt pulse into a 50 Ω load. The pulse occurs approximately $\frac{1}{4}$ cycle before each positive step of both the 1-kHz and 100-kHz square-wave signals. The 100-kHz pulse can be used for externally triggering Sampling plug-in time base units. A positive step of the square-wave signal will then appear near the beginning of the sweep without an external delay cable in the signal path.

Intensity Modulation

Intensity (Z-axis) modulation can be used to relate other voltage information to the displayed signal without changing the shape of the waveform. The modulation signal is applied to the CRT cathode through the rear-panel EXT CRT CATHODE jack. With the INTEN control set correctly, positive pulses between 5 and 50 volts in amplitude will dim or blank the CRT beam, and negative pulses between 5 and 50 volts in amplitude will brighten the beam.

Time markers may be applied for direct time reference of the display or for establishing the sweep rate when uncalibrated deflection is used. Fast-rise pulses of short duration provide best resolution with respect to time. If the markers are not time-related to the displayed waveform, a single-sweep display is required. If sine waves are used for Z-axis

modulation, the minimum usable frequency is about 250 Hz, due to AC coupling at the input. Be sure to ground the EXT CRT CATHODE jack when it is not in use, to avoid random intensity modulation from stray signals.

Operation with Digital Readout Unit

The Type 568 is specifically designed for use in a digital readout system consisting of the Type 568, a Type 230 Readout Unit and vertical and horizontal plug-in units that provide digital information to the readout unit. All Tektronix sampling plug-in units that are compatible with the Type 568 do provide the required digital information outputs. Some of these sampling units are also programmed for use with external programmers for automatic or remotely-controlled operation. In addition to the sampling units, some real-time plug-in units (such as the Types 3A2 and 3B2) are specially designed with an internal clock to provide such information. Most of the other conventional and special-purpose plug-in units can be operated in the Type 568 do not provide digital output information.

If remote control of the plug-in units is desired, cables and connectors are available from Tektronix. Order Tektronix Part No. 131-0293-06 (connectors only), or 012-0132-00 (5-ft. cable with one connector).

If any special-purpose function (such as a spectrum analyzer application) is required with digital readout, it is necessary to operate the special-purpose plug-in unit externally and apply its output to the sampling or real-time digital system. The Tektronix Type 132 or Type 129 can be used for externally powering the plug-in unit.

CUSTOM-MADE PLUG-IN UNITS

Blank-chassis plug-in units can be purchased through your local Tektronix Field Office as Modification Kit number 040-0245-00. These blank chassis permit you to build your own plug-in circuitry for use in the Type 568. The power drawn from any of the regulated supplies should not exceed that of standard plug-in units.

Current that may be drawn by a plug-in is limited by the amount used externally through the rear panel outputs. If no current is used externally by other devices, the current limits given on the rear panel (in addition to the normal plug-in load) may be used by the custom plug-in unit. (Maximum plug-in unit load is normally 75 mA on the +300-volt supply, 75 mA on the +125-volt supply, 750 mA on the -12.2 volt supply and 70 mA on the -100-volt supply.) Any current not drawn from the +300-volt supply may be drawn from the +125-volt supply in addition to 75 mA previously mentioned.

SECTION 3

CIRCUIT DESCRIPTION

General Information

The circuitry of the Type 568 oscilloscope consists of three major sections: The low-voltage power supply, the CRT circuit and the calibrator. In addition to these, the instrument contains the wiring connections required for operation required with a digital readout unit.

The Type 568 is essentially an indicator unit for the digital and plug-in units, and also serves as a power source for the plug-in units. While reading the following circuit analysis, refer to the block diagram accompanying the text and to the schematics at the rear of this manual.

LOW-VOLTAGE POWER SUPPLY

General

The low-voltage power supply circuit provides the operating power for this instrument from four regulated supplies. Electronic regulation is used to provide stable, low-ripple output voltages. Each regulated supply is properly fused or contains a short-protection circuit to prevent instrument damage if a supply is inadvertently shorted to ground. The power input stage includes the Voltage Selector Assembly which allows selection of the nominal operating voltage and regulating range for the instrument. Fig. 3-1 shows a detailed block diagram of the power supply circuit. A schematic of this circuit is given at the rear of this manual.

Power Input

Power is applied to the primary of transformer T601 through the 115-volt line fuse F601, POWER switch SW601, thermal cutout TK601, Voltage Selector switch SW602 and Range Selector switch SW603. The Voltage Selector switch connects the split primaries of T601 in parallel for 115-volt nominal operation, or in series for 230-volt nominal operation. A second line fuse, F602, is connected into the circuit when the Voltage Selector switch is set to the 230 V position to provide the correct protection for 230-volt operation. The current rating for F602 is one-half that of F601 and although F601 is still in series with the primary, F602 takes precedence over F601 and will blow if the current exceeds the specified level. The fan is connected across one half of the split primary winding so that it always has approximately 115 volts applied to it.

The Range Selector switch, SW603, allows the instrument to regulate correctly on higher or lower than normal line voltages. Each half of the primary has taps above and below the 115-volt (or 230-volt) nominal point. As Range Selector switch SW603 is switched from LO to M to HI, more turns are added, in effect, to the primary of T601, decreasing the primary to secondary ratio. This provides the correct voltage level in the secondary when the input voltage to the primary has been changed.

Thermal cutout TK601 provides thermal protection for the instrument. If the internal temperature of the instrument exceeds a safe operating level, TK601 opens to interrupt the applied power. When the temperature returns to a safe level, TK601 automatically closes to re-apply the power.

—100-Volt Power Supply

The —100-volt supply is the prime reference supply which provides the reference voltage for the remaining supplies. The output from the secondary of T601 is rectified by bridge rectifier D612. This voltage is filtered by C612, then applied to the —100-volt series regulator stage to provide a stable output voltage. The series regulator can be compared to a variable resistance which is increased or decreased to control the output current. Current through the Series Regulator stage is controlled by the error amplifier to provide the correct regulated output voltage.

Reference voltage for the error amplifier is provided by zener diode D613 which sets the base of Q613 at about —9 volts. The base level of Q624 is determined by voltage divider R621-R623-R624-R625 between the output of this supply and ground. The output voltage of the supply is regulated to provide a constant voltage to the load by feeding a sample of the output back through the voltage divider to the base of Q624.

For example, assume that the output voltage increases (becomes more negative) because of a change in load or an increase in line voltage. This negative-going level at the output is applied across voltage divider R621-R623-R624-R625, causing the base of Q624 to go negative. This reduces current flow through Q624, allowing its collector to go positive. This collector voltage change increases forward bias on Q634, resulting in increased current through R631 and allowing the base of Q633 to go more negative. Reduced current through Q637 decreases current through the load, causing the output voltage to decrease (become less negative). The —100 VOLTS adjustment, R625, sets the output voltage of the supply at —100 volts by determining the amount of feedback that is applied to the error amplifier. In a similar manner the series regulator and error amplifier stages compensate for output changes due to ripple.

When the power switch is activated, neon B633 allows the —100-volt Supply to turn on first because all the other supplies are dependent on the —100-Volt Supply.

The short-protection amplifier stage, Q639, protects the —100-volt supply if the output is shorted. For normal operation, R638-R639 sets the emitter-base bias voltage of Q639, which is too low to turn on the transistor. When the load current thru R639 increases due to an overload or short circuit, the voltage drop across R639 increases and adds an increase in base to emitter voltage of Q639, allowing it to come into conduction. When too much current has been

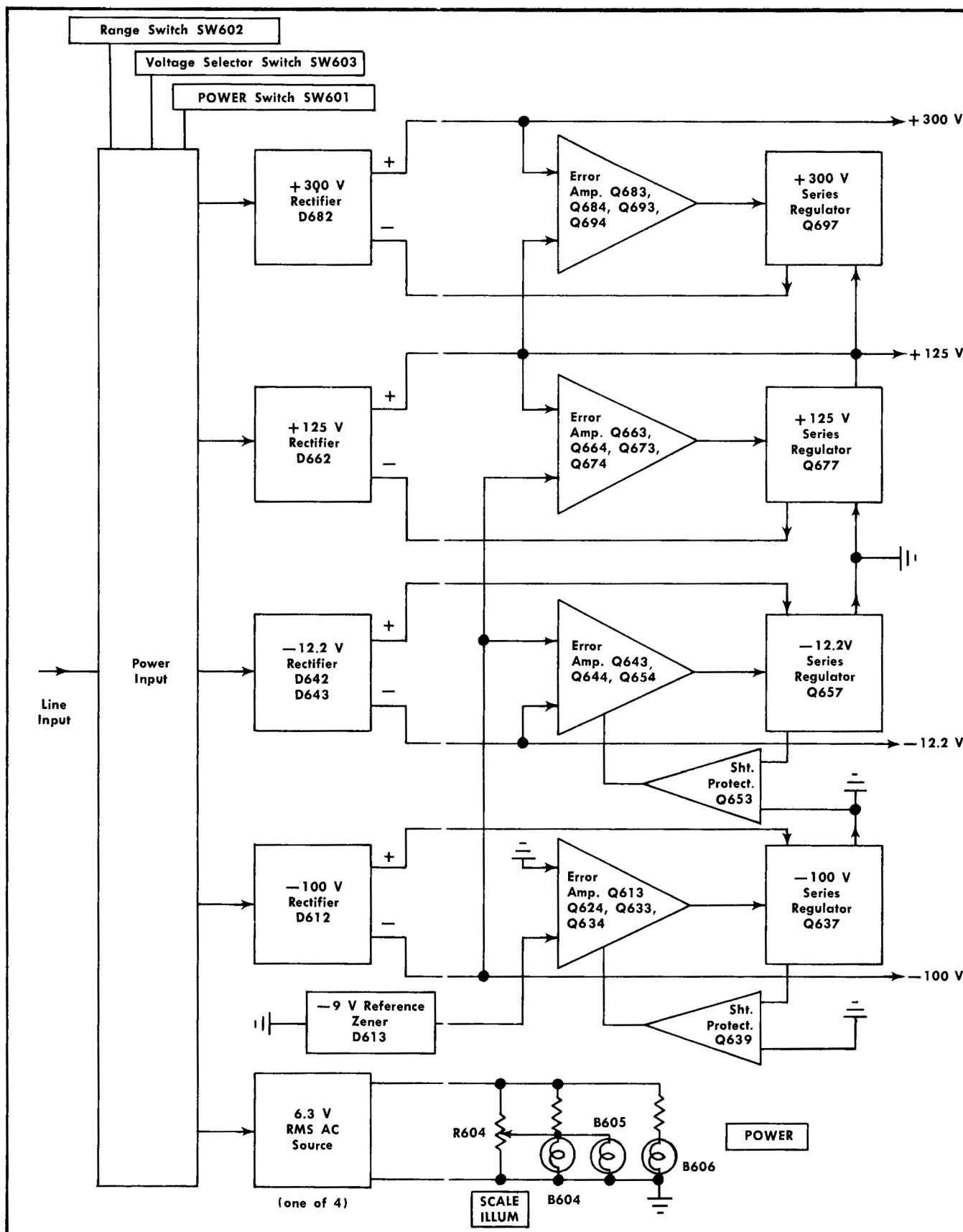


Fig. 3-1. Block diagram of low-voltage power supply circuit.

drawn from the -100 -Volt Supply, Q639 decreases the voltage at the base of Q633 and Q637; resulting in an increase of voltage across Q637 and a decrease of the -100 -Volt Supply. R637 senses the increase in unregulated voltage across Q637, and adds to the increasing base current of Q639. This results in a further decrease of current thru R639 and Q637. D622, R623 and R621 provide protection to the -12.2 -volt supply in the event the -100 -volt supply is shorted to the -12.2 -volt supply.

—12.2-Volt Supply

Rectified voltage for operation of the -12.2 -Volt Supply is provided by D642-D643. The voltage is filtered by C643 and connected to the -12.2 -volt series regulator stage, Q657, in a similar manner to that described for the -100 -volt supply. The -12.2 -VOLTS adjustment, R645, sets the output level at -12.2 volts.

Shorting protection is provided by Q653 and R644. If the -12.2 -volts output of this supply is shorted, Q653 is biased on to clamp the current conduction of the series regulator to a fixed value. This action assures that no component will be required to exceed its maximum rating.

+125-Volt Supply

Bridge rectifier D662 provides the rectified voltage which is connected to the $+125$ -volt series regulator. Reference

voltage for this supply is provided by voltage-divider R671-R672 between the regulated -100 -volt and ground. Since the -100 volts is held stable by the -100 -volt regulator circuit, any change at the base of error amplifier Q663 is due to a change at the output of the $+125$ -volt supply. Regulation of the output voltage is controlled by error amplifier Q633-Q664-Q673-Q674 and series regulator Q677 in a manner similar to that described for the -100 -volt supply. The $+125$ VOLTS adjustment, R665, sets the quiescent conduction level of the error amplifier stage to provide an output level of $+125$ volts.

Series transistors Q673-Q674 are used to equalize the voltage drop and power dissipation, which could possibly exceed the maximum rating of a single transistor at high-line and low-load condition.

Fuse F675 is used to protect the power supply in event the output is accidentally shorted. C675 is used to present an instantaneous discharge of stored energy thru the fuse under shorted output conditions, thereby by-passing all components of the power supply. Capacitor C674 reduces instantaneous voltage surges at the output of the regulator circuit.

+300-Volt Supply

Bridge rectifier D682 provides the rectified unregulated output for the $+300$ -volt supply. The output of the $+125$ -volt supply is connected to the negative side of the $+300$ -volt supply through series regulator Q697 to elevate the output

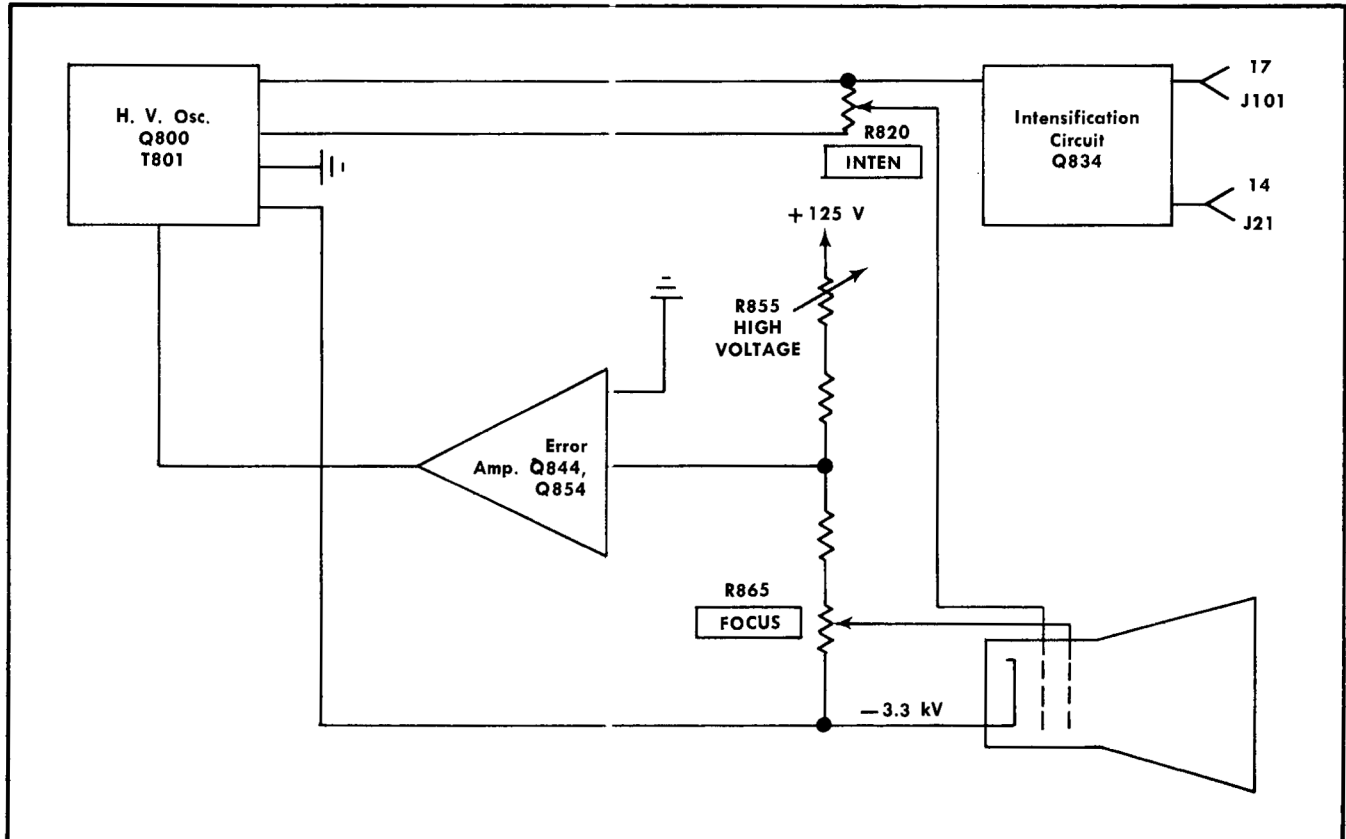


Fig. 3-2. Block diagram of the CRT circuit.

Circuit Description—Type 568/R568

level to +300 volts. The operation of the +300-volt supply is similar to that of the +125-volt supply, except that it is referenced to and dependent upon the +125-volt supply.

Fuse F695 and C699 protect this supply in the same manner as explained in the +125-volt supply.

6.3-Volt RMS AC Source

The four 6.3-volt RMS secondary windings of T601 provide power for the CRT heater, terminals 1 and 2 of J11, terminals 1 and 2 of J21, the POWER light B606, and the scale illumination lights, B604 and B605. Current through the scale illumination lights is controlled by the SCALE ILLUM control, R604, to change the brightness of the graticule lines.

CRT CIRCUIT

High-Voltage Power Supply

Transistor Q800 and its associated circuitry is a resonant feedback oscillator which operates at approximately 45 kHz. Transformer T801 provides the high voltage for the rectifiers.

One secondary winding of T801 and rectifier D482 form a half-wave rectifier circuit which supplies approximately -3.3 kV to the cathode of the CRT. A separate secondary winding of T801 and rectifier D812 supply a floating negative voltage for the control grid of the CRT.

A voltage divider between the -3.3-kV output of D482 and the +125-volt supply provides voltage to the focusing grid of the CRT and also supplies a sample of the power-supply output to the high-voltage regulator circuit. The HIGH VOLTAGE adjustment, R855, sets the high-voltage by adjusting the feedback loop. If the output voltage changes from the set value, a portion of the change appears at the gate of the FET, Q854, as an error signal. The error is amplified by Q854 and Q844 and applied to the base of Q800 through one of the windings in the primary of the high-voltage transformer. The voltage change at the base of Q800 causes either an increase or a decrease in the amplitude of the oscillations. This amplitude change is always in a direction to compensate for the error in the output voltage. The resulting voltage change in the secondary of T801 tends to keep the 3.3 kV constant in relation to its fixed setting.

Capacitor C862 greatly increases the AC loop gain of the high-voltage regulator circuit. This permits the regulator to operate quickly in response to rapid changes in the output voltage.

CRT Circuit Controls and Connectors

Optimum size and shape of the fluorescent spot on the CRT screen is obtained by adjusting the front-panel FOCUS control and ASTIG adjustment. FOCUS control R865 provides the correct voltage for the second anode (focus ring) in the CRT. Proper voltage for the third anode is obtained by adjusting ASTIG control R867. In order to obtain optimum spot size and shape, both the FOCUS and ASTIGMATIC controls are adjusted to provide the proper electronics lens configuration in the region of the second and third anodes of the CRT.

Spot intensity is adjusted by means of front-panel INTEN control R820. Varying the INTEN control changes the voltage on the CRT grid, which in turn varies the density of the electron beam. Internal GEOM control R873 adjusts the isolation shield voltage in the CRT, and is adjusted to minimize "bowing" or "tilting" of the display. Internal TRACE ALIGNMENT control R870 permits minor adjustments of the orientation. By adjusting the TRACE ALIGNMENT control, the trace can be made parallel with the horizontal lines on the graticule.

The presence and intensity of the CRT beam is controlled by signals from each of the plug-in units with the Type 568. The oscilloscope uses deflection unblanking during the sweep interval. In this method, an additional pair of deflection plates in the CRT electron gun deflects the beam so that it does not emerge from the electron gun structure except during the sweep. When the horizontal sweep is triggered, the unblanking signal then permits the electron beam to pass through to the CRT screen for the duration of the sweep. The beam is then deflected again until time for the next sweep.

When the Type 568 is used with a multi-channel vertical plug-in preamplifier that provides dual-trace chopped blanking pulses, the blanking pulses are applied through rear-panel CRT CATHODE SELECTOR switch SW879. With the vertical plug-in preamplifier operating in the chopped mode and SW879 set to the CHOPPED BLANKING position, a positive pulse of approximately 5 volts amplitude is applied through C878 to the cathode of the CRT. At normal intensity levels, this pulse is sufficient to cut off the CRT beam during the time the amplifier channels in the vertical plug-in preamplifiers are being switched.

An input jack (J878) on the rear panel of the Type 568 provides an input for externally modulating the CRT cathode. The input jack is normally grounded by a grounding link. When it is desired to intensity modulate the display from an external source, the link is removed and the modulating signal is coupled to the CRT cathode through C878.

Intensity brightening of the CRT trace by either the digital unit or a two-sweep time-base unit is accomplished by coupling brightening signals to the reference voltage for the CRT grid-voltage supply. The brightening signal from the digital unit shifts the overall grid supply through terminal 17 of J101. The brightening signal from 9 delayed-sweep timing unit changes the grid supply voltage through terminal 14 of J21. Diode D836 disconnects +125 volts applied to terminal 14 of J21 by some plug-in units.

CALIBRATOR

General Description

The calibrator circuit is a two-frequency signal source that is crystal controlled at 100 kHz and RC time-constant controlled at approximately 1 kHz. An astable multivibrator drives both a divide-by-two bistable multivibrator and a positive-slope differentiator circuit. Square waves of known amplitude at the front-panel connectors come from the $\div 2$ circuit, and positive pretrigger pulses come from the differentiator circuit. The $\div 2$ circuit clamps off the differentiator on alternate cycles of the multivibrator. Thus, the positive pretrigger pulse is generated approximately $\frac{1}{4}$ cycle before each portion of the output square wave.

Selection of output frequency is by the front-panel OFF- ≈ 1 kHz-100 kHz lever switch. The switch is in the open position for 100 kHz operation, but is closed for 1 kHz operation. Operation at 100 kHz places a series-mode 200 kHz crystal in the feedback path. Operation at 1 kHz places a $0.0047 \mu\text{F}$ capacitor across the crystal, making feedback capacitive and the frequency of the multivibrator RC controlled.

Astable Oscillator

Transistors Q900 and Q914 form a common-emitter astable multivibrator. The regenerative feedback paths consist of the common connection of the two transistor emitters and the crystal (Y905) between the collector of Q900 and the base of Q914 for 100-kHz operation, or C904-D904 in parallel with the crystal for 1-kHz operation. Diode D904 is reverse biased for 100 kHz operation by allowing C904 to charge positive at the junction of C904-D904; thus effectively switching C904 out of the circuit. For 1 kHz operation, C904 is forward biased when SW915 connects the -12.2V supply to the junction of C904-D904, effectively connecting C904 in parallel with Y905. Both circuit conditions are shown in simplified form in Fig. 3-3.

$\div 2$ Multivibrator

Transistors Q925 and Q935 form a triggerable bistable multivibrator that divides the astable output frequency by two. This multivibrator drives the output voltage divider and

controls the +Pretrigger emitter follower Q953. The time relationships of several points through the calibrator circuit are shown in Fig. 3-4. The illustration is made up of multiple-exposure photographs obtained by externally triggering the test oscilloscope to show the relative time for each waveform. Voltage amplitudes are uncalibrated.

When the calibrator circuit is turned off by setting SW915 to OFF, the voltage at the output connector may either be high or low, depending on the state of the multivibrator at the instant the circuit was turned off. This voltage is a DC level that corresponds to either the maximum or minimum level of the oscillator waveform.

+ Pretrigger Circuit

Transistor Q953 is an emitter-follower with a differentiator circuit that responds to positive signals from the astable circuit when Q925 in the $\div 2$ circuit is cut off. When Q925 is conducting, the anode of D952 is held at approximately -12 volts, preventing any positive signal from being applied to the base of Q953. Thus a + Pretrigger pulse is formed only when the output signal is at ground and Q925 is cut off, allowing D952 to conduct. Emitter-follower Q953, therefore, only passes one + Pretrigger pulse for every 2 cycles of the astable multivibrator.

The equivalent series circuit of the calibrator is a current generator with a choice of two voltages determined by the load and an equivalent source resistance of approximately 450 ohms. The output voltage is reduced when loaded by

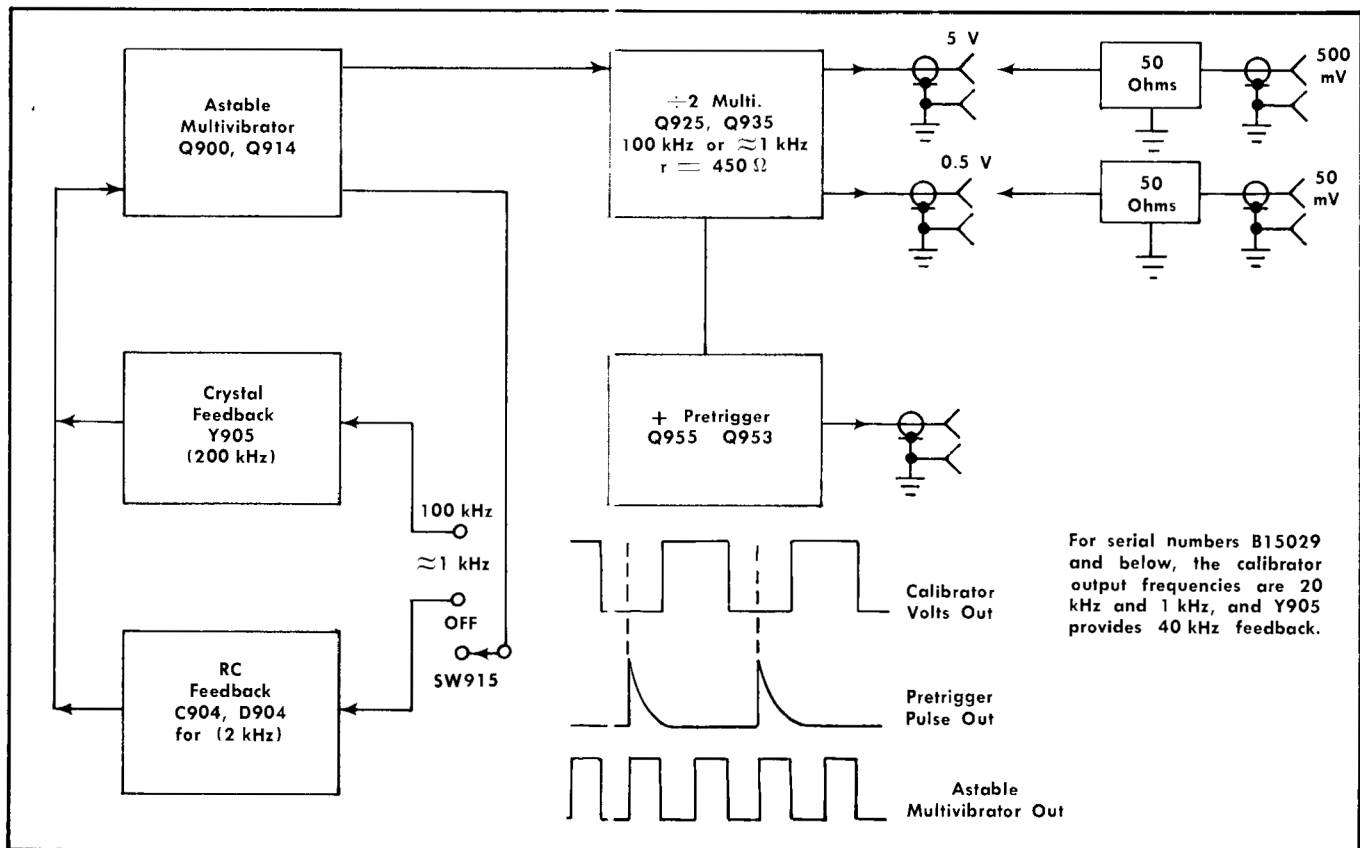


Fig. 3-3. Block diagram of the Calibrator circuit.

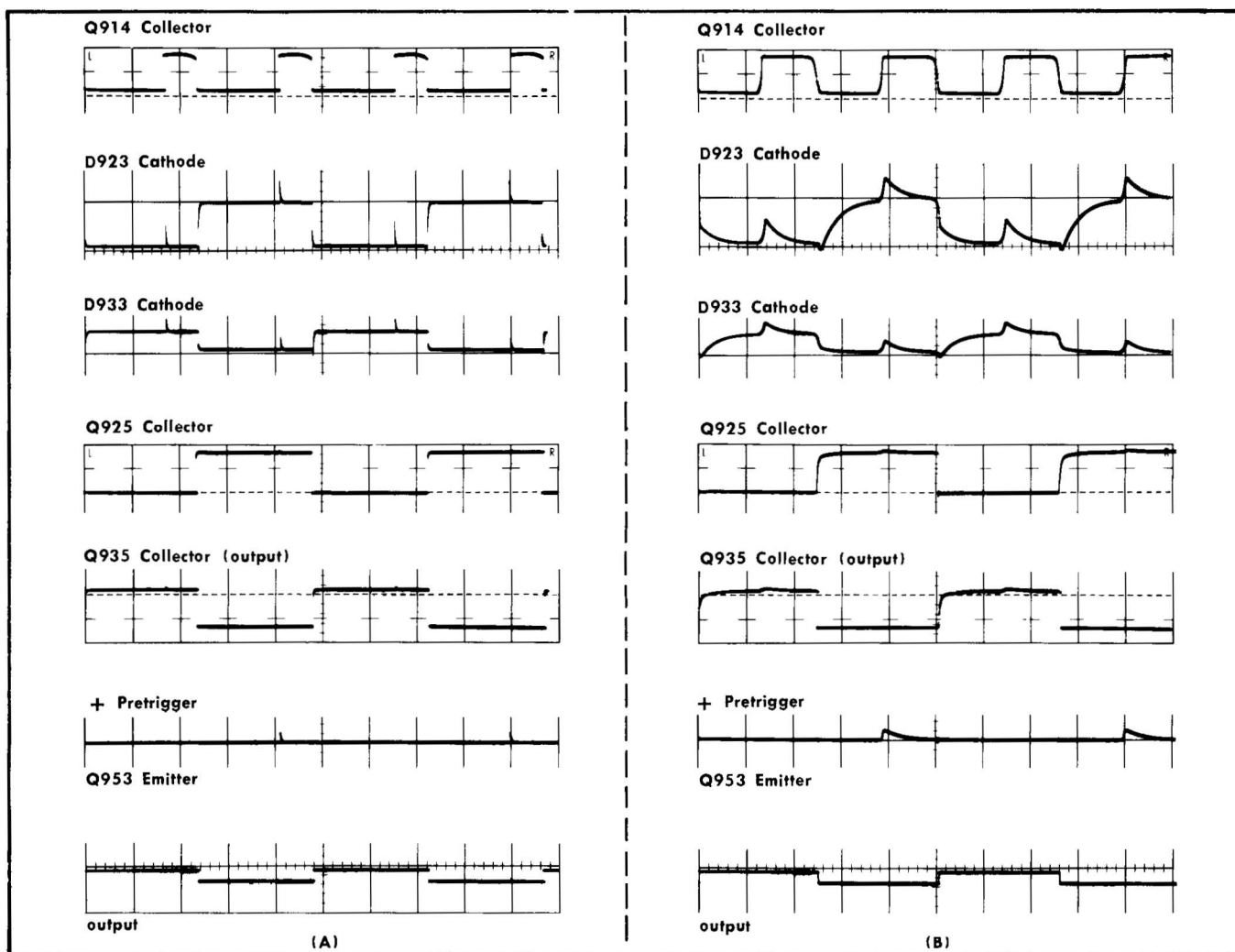


Fig. 3-4. Time relationship of signals appearing in the Calibrator circuit: (A) When set for ~ 1 -kHz operation; (B) When set for 100-kHz operation.

low resistance loads. When the calibrator is terminated with a 50-ohm load, the output voltage is reduced to either 500 mV or 50 mV, depending on which output jack is used.

DIGITAL AND PROGRAM CONNECTIONS

The standard connections in the Type 568 for transferring signals to and from the plug-in units and the digital unit are

shown on the Plug-In Unit connector diagram. Connections for the programming capabilities of the plug-in units are shown on the Program Connectors diagram. These lines connect between rear panel program connectors and special connectors at the rear of each plug-in compartment. In addition to these standard connections the Type 568 also has available connector space on the rear panel for optional input, output and/or program connectors for added programming capability.

SECTION 4

MAINTENANCE

Introduction

This section of the manual contains preventative maintenance information for servicing the Type 568 and corrective maintenance procedures for locating trouble and repairing the instrument. The physical locations of all circuit components located on the circuit boards are shown in illustrations at the end of this section.

PREVENTIVE MAINTENANCE

General

Preventive maintenance consists of cleaning, visual inspection, lubrication, etc. Preventative maintenance performed on a regular basis will help prevent instrument failure and will improve reliability of this instrument. The severity of the environment to which the Type 568 is subjected will determine the frequency of maintenance required.

Cleaning

The Type 568 should be cleaned as often as operating conditions require. Accumulation of dust in the instrument can cause overheating and component breakdown. Dust on components acts as an insulating blanket and prevents efficient heat dissipation and also provides an electrical conduction path under high-humidity conditions.

The top and bottom covers provide partial protection against dust in the interior of the instrument. Operation without the covers in place will require that the instrument be cleaned more frequently. For normal operation, the top and bottom panels should be installed on the instrument for proper air circulation.

CAUTION

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. Some of the chemicals to avoid are benzene, toluene, xylene, acetone or similar solvents.

Exterior. Loose dust accumulated on the outside of the Type 568 can be removed with a soft cloth or small paint

brush. The paint brush is particularly useful for dislodging dirt on and around the front-panel controls. Dirt which remains can be removed with a soft cloth dampened in a mild solution of water and detergent. Abrasive cleaners should not be used.

Clean the light filter, faceplate protector and CRT face with a soft, lint-free cloth dampened with denatured alcohol.

Interior. Any accumulated dust in the interior of the instrument can be removed by blowing it off with dry, low-velocity air. (Avoid the use of a high-velocity air stream that might damage small components.) Remove any dirt which remains with a soft paint brush or a cloth dampened with a mild detergent and water solution. A cotton-tipped applicator is useful for cleaning in narrow spaces or for cleaning ceramic terminal strips and circuit boards. After cleaning the interior, allow it to dry thoroughly before turning on the instrument.

Lubrication

The reliability of rotary switches and other moving parts can be increased if they are kept properly lubricated. Use a cleaning-type lubricant (such as Tektronix Part No. 006-0218-00) on shaft bushings and switch contacts. Lubricate switch detents with a heavier grease (such as Tektronix Part No. 006-0219-00). Potentiometers may be lubricated with a lubricant which will not affect electrical characteristics (such as Tektronix Part No. 006-0220-00). Do not over lubricate. A lubrication kit containing the necessary lubricants and instructions is available from Tektronix. Order Tektronix Part No. 003-0342-00.

Fan Oiling. During periodic servicing, the fan motor should be lubricated with a few drops of light machine oil (Anderol L826 available from Lehigh Company or Rotron Distributors is recommended.) An industrial hypodermic syringe and needle is used to insert the oil through the rubber seal, as shown in Fig. 4-1. With the needle held at a 45° angle, pierce the rubber seal, then insert the needle about 1/4 inch and depress the syringe plunger far enough to inject 3 or 4 drops of oil into the bearing. If a syringe and needle cannot be obtained locally, they may be ordered from Tektronix (Tektronix Part No. 003-0282-00 for the syringe; 003-0285-00 for the needle).

Visual Inspection

The Type 568 should be inspected occasionally for such defects as broken connections, broken or damaged ceramic strips, improperly seated transistors, damaged circuit boards and heat-damaged parts.

The remedy for most visible defects is obvious; however, care must be taken if heat-damaged parts are located. Overheating is usually only a symptom of trouble. For this rea-

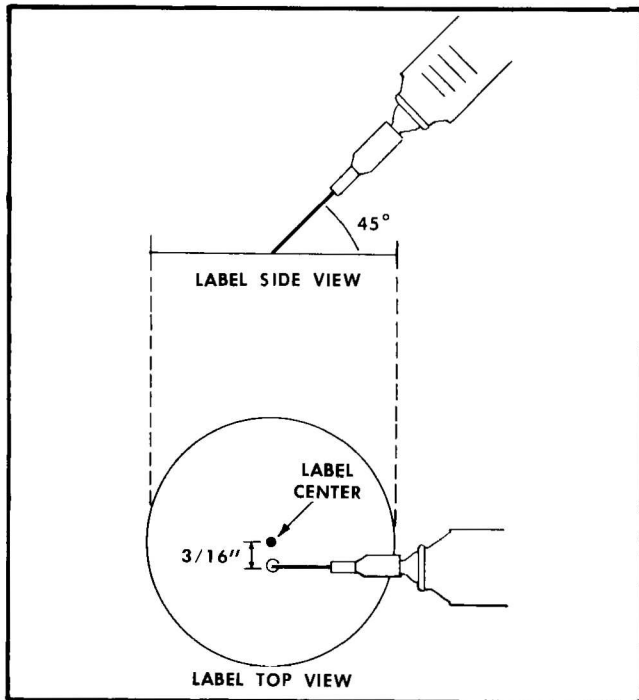


Fig. 4-1. Oiling the fan motor with a hypodermic.

son, it is essential to determine the actual cause of overheating before the heat-damaged part is replaced; otherwise, the damage may be repeated.

Transistor Checks

Periodic checks of the transistors in the Type 568 are not recommended. The best check of transistor performance is its actual operation in the instrument. More details on checking transistor operation are given later in this section under Troubleshooting.

CORRECTIVE MAINTENANCE

General

Corrective maintenance consists of component replacement and instrument repair. Special techniques or procedures required to replace components in this instrument are described here.

Obtaining Replacement Parts

Standard Parts. All electrical and mechanical part replacements for the Type 568 can be obtained through your local Tektronix Field Office or representative. However, many of the standard electronic components can be obtained locally in less time than is required to order them from Tektronix, Inc. Before purchasing or ordering replacement parts, consult the Part List for value, tolerance and rating.

NOTE

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

Special Parts. In addition to the standard electronic components, many special parts are used in the Type 568. These parts are manufactured by or for Tektronix, Inc., or are selected to meet specific performance requirements. These special components are indicated in the Electrical Parts List by an asterisk preceding the part number. In addition to the special electronic components, most of the mechanical parts used in this instrument have been manufactured by Tektronix, Inc. and are not available from other sources. Order all special parts directly from your Tektronix Field Office or representative.

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

1. Instrument Type.
2. Instrument Serial Number.
3. Description of the part (if electrical, include the circuit number).
4. Tektronix Part Number.

Soldering Techniques

WARNING

Disconnect the instrument from the power source before soldering.

Circuit Boards. Use ordinary 60/40 tin-lead solder and a 35- to 40-watt pencil-type soldering iron on the circuit board. The tip of the iron should be clean and properly tinned for best heat transfer to the solder joint. A higher wattage soldering iron may separate the etched wiring from the base material.

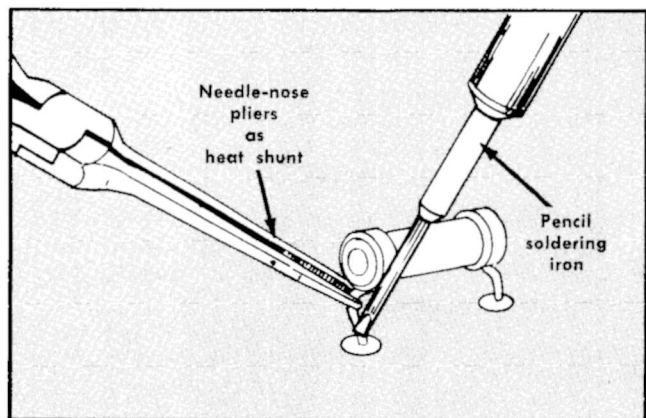


Fig. 4-2. Apply the soldering iron to the heat-shunted lead when removing a component from an etched-wiring card.

The following technique should be used to replace a component on a circuit board. Most components can be replaced without removing the boards from the instrument.

1. Grip the component lead with long-nose pliers. Touch the soldering iron to the lead at the solder connection. Do not lay the iron directly on the board, as it may damage the board.

2. When the solder begins to melt, pull the lead out gently. This should leave a clean hole in the board. If not, the hole can be cleaned by reheating the solder and placing a sharp object such as a toothpick or pointed tool into the hole to clean it out.

3. Bend the leads of the new component to fit the holes in the board. If the component is replaced while the board is mounted in the instrument, cut the leads so they will just protrude through the board. Insert the leads into the board until the component is in the same position as the component that was removed. If it does not seat properly, heat the solder and gently press the component into place.

4. Apply the iron and a small amount of solder to the connection to make a firm solder joint. To protect heat-sensitive components, hold the lead between the component body and the solder joint with a pair of long-nose pliers or other heat sink.

5. Clip the excess lead that protrudes through the board.

6. Clean the area around the soldered connection with a flux-remover solvent to maintain good environmental characteristics. Be careful not to remove information printed on the board.

Ceramic Terminal Strips. Solder used on the ceramic terminal strips should contain about 3% silver. Ordinary tin-lead solder can be used occasionally without damage to the ceramic terminal strips. Use a 40- to 75-watt soldering iron with a $\frac{1}{8}$ -inch wide chisel-shaped tip. If ordinary solder is used repeatedly or if excessive heat is applied, the solder-to-ceramic bond may be broken.

A small roll of 3% silver bearing solder is mounted on the High-Voltage and Calibrator chassis. Additional silver bearing solder should be available locally or it can be purchased directly from Tektronix; order by Tektronix Part No. 251-0514-00.

Observe the following precautions when soldering ceramic terminal strips:

1. Use a hot iron for a short time. Apply only enough heat to make the solder flow freely.

2. Maintain a clean, properly tinned tip.

3. Avoid putting pressure on the ceramic terminal strip.

4. Do not attempt to fill the terminal-strip notch with solder; use only enough solder to cover the wires adequately.

5. Clean the flux from the terminal strip with a flux-remover solvent to maintain good environmental characteristics.

Metal Terminals. When soldering metal terminals (e.g., switch terminals, potentiometers, etc.), ordinary 60/40 solder can be used. The soldering iron should have a 40- to 75-watt rating with a $\frac{1}{8}$ -inch wide chisel-shaped tip.

Observe the following precautions when soldering metal terminals:

1. Apply only enough heat to make the solder flow freely.

2. Apply only enough solder to form a solid connection. Excess solder may impair the function of the part.

3. If a wire extends beyond the finished solder joint, clip off the excess.

4. Clean the flux from the solder joint with a flux-remover solvent to maintain good environmental characteristics.

Ceramic Strip Replacement

To replace a damaged ceramic terminal strip, first unsolder all connections, then pry the mounting studs attached to the strip out of the chassis. If prying is not satisfactory, remove the studs by tapping on the ends protruding from the reverse side of the chassis. Still another way to remove a ceramic strip is to use diagonal cutters and cut off one side of each stud. The remainder of the studs can then be pulled out after the strip has been removed.

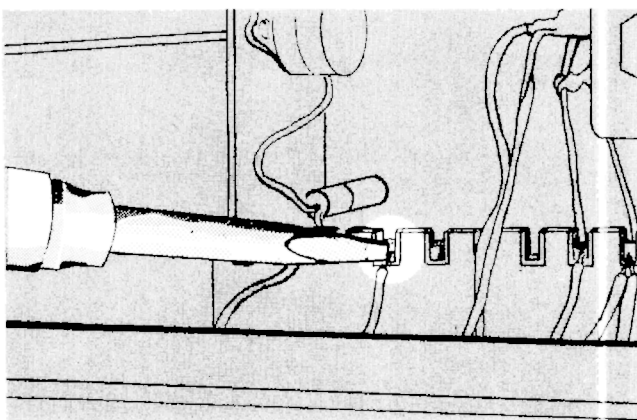


Fig. 4-3. Correct method of applying heat when soldering to a ceramic terminal strip.

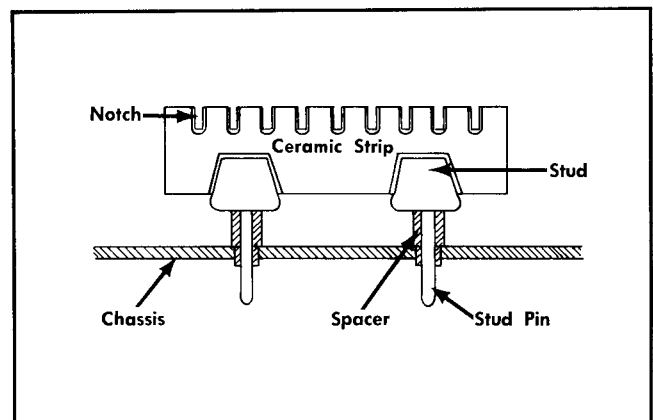


Fig. 4-4. Ceramic terminal strip assembly.

If the nylon spacers do not come out with the studs, they may be left in the chassis or pulled out separately. The spacers, if not damaged, can be used with the new ceramic strip assembly. Replacement strips are supplied with mounting studs attached, so it is not necessary to salvage the old studs.

When the damaged strip and stud assembly have been removed, place the spacers into the mounting holes in the chassis and press the mounting studs of the new strip assembly into the spacers. It may be necessary to tap lightly or apply some pressure to the ceramic strip to make the studs seat all the way down into the spacers. To avoid damage to the terminal strip, use a soft-tipped tool for tapping, and apply force only to the portion of the strip directly above the mounting studs. Fig. 4-4 shows the assembled terminal strip. Cut off the excess length of the mounting studs extending beyond the ends of the spacers. Resolder all components and wires in place as they were previously arranged (note the soldering techniques described earlier).

Component Replacement

Transistor Replacement. Since each transistor has its own individual operating characteristics, transistors should not be replaced unless they are actually defective. If removed during routine maintenance, be sure they are returned to their original sockets. Unnecessary replacement or switching of transistors may affect the calibration of the instrument.

Any replacement transistor should be of the original or an equivalent type and should be mounted in the same manner as the original. Bend the leads to fit the socket correctly and cut off the leads at a length approximately $1\frac{1}{2}$ times the height of the transistor case. Note the three electrode configurations shown in Fig. 4-5.

To gain access to the power transistor mounted on the chassis, the deflection shield (see Fig. 4-6) must be removed. To remove this shield, use the following procedure:

1. Disconnect the power from the instrument.
2. Remove the CRT base socket.
3. Remove the four screws securing the shield to the shield bracket.
4. Remove the shield by lifting it out between the fan and the rear of the CRT.
5. To replace the shield, reverse the procedure of removal.

CAUTION

The instrument should never be operated with the air deflection shield removed.

Some of the power-supply transistors use silicone grease to increase heat transfer. Replace the silicone grease when replacing these transistors.

WARNING

Silicone grease should be handled with care and should be kept out of the eyes. Wash your hands thoroughly after using it.

After any transistor has been replaced, the calibration of the particular circuit should be checked.

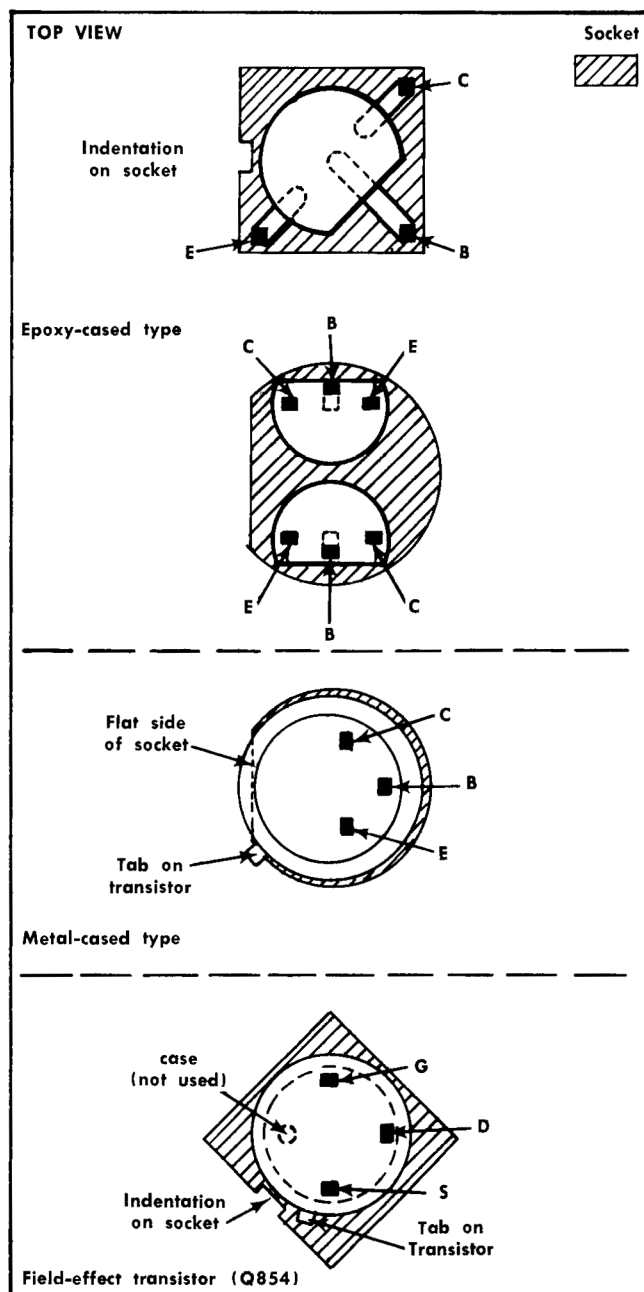


Fig. 4-5. Electrode configuration for socket-mounted transistors as viewed from the top of the transistor.

Fuse Replacement. Table 4-1 shows the ratings of the fuses used in this instrument. Refer to Figs. 2-1 and 4-7 for the locations of the fuses.

TABLE 4-1
Fuse Replacement

Circuit No.	Circuit	Rating
F601	115 VAC	2.0 A Slow
F602	230 VAC	1.0 A Fast
F672	+125 VDC	0.3 A Fast
F695	+300 VDC	0.25 A Fast

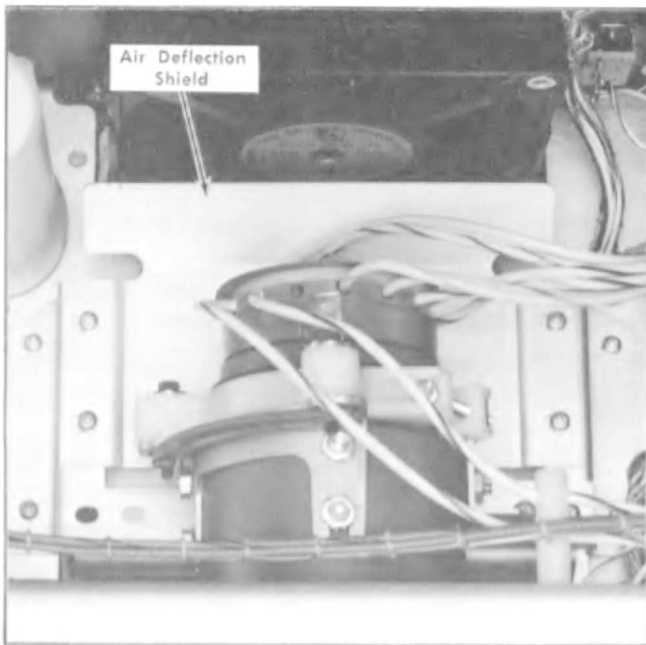


Fig. 4-6. Location of the air deflection shield covering the chassis-mounted power transistors.

CAUTION

Use only the correct value replacement fuses. A larger value will not provide adequate protection for the instrument; a smaller value will tend to blow out.

Circuit Board Replacement

If a circuit board is damaged and cannot be repaired, it should be replaced with a new assembly. Replacement boards may be ordered either with or without circuit components wired in place. The Tektronix part numbers are given in the Mechanical Parts List. To obtain a replacement board with the soldered-on components in place, be sure to order the replacement assembly. (An assembly does not include the socket-mounted transistors.)

All electrical connections to the circuit boards are made with push-on pin connectors, which are easily removed and replaced by reference to the illustrations and wiring color code at the end of this section. Once the wires are disconnected, removal of the board is only a matter of removing the mounting screws and lifting the board out of the instrument.

Most of the components mounted on the circuit boards can be replaced without removing the boards from the instrument. Observe soldering precautions given under 'Soldering Techniques' in this section. However, if the underside of the board must be reached or if the board must be moved to gain access to other areas of the instrument, only the mounting screws need be removed. The interconnecting wires allow the board to be moved out of the way or turned over without disconnecting the pin connectors.

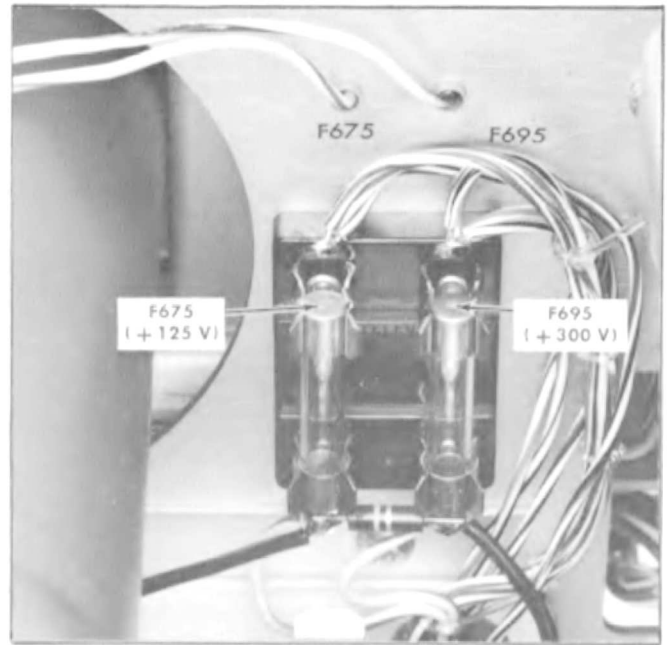


Fig. 4-7. Location of the series fuses in the outputs of the +125-volt and +300-volt supplies.

Cathode-Ray Tube Replacement

Use care when handling the CRT. Protective clothing and safety glasses should be worn. Avoid striking the CRT on any object which might cause it to crack or implode. When storing a CRT, place it face down on a smooth surface with a protective cover or a soft mat under the face plate to protect it from scratches.

Use the following procedure for removal and replacement the CRT.

A. Removal:

1. Disconnect the deflection-plate connectors on the neck of the CRT, being careful not to bend the deflection-plate pins.
2. Remove the base socket and loosen the clamp at the base of the CRT.

NOTE

Do not disconnect the trace alignment coil at the bottom of the CRT shield.

3. At the front of the instrument, remove the four nuts securing the graticule cover. Remove the graticule cover, the light filter (if used), the light guide, and retainer spring.
4. Slide the CRT forward and out of the instrument being careful not to bend the deflection-plate pins.

B. Replacement:

1. Insert the CRT into the instrument. The CRT and shock-mount ring should seat firmly against the front panel.

Maintenance—Type 568/R568

2. Tighten the base clamp and reconnect the CRT socket.
3. Reconnect the deflection-plate connectors. Correct wiring connections are given on the CRT shield.
4. Replace the light guide and retainer spring.
5. Replace the light filter (if used), the graticule cover, and the four nuts securing the graticule cover.

After a new CRT has been installed, it will be necessary to adjust the deflection plate capacitance and to recalibrate the GEOMETRY, TRACE ALIGNMENT, and ASTIG adjustments. In addition to these adjustments, checks should be made of the vertical and horizontal sensitivity, the horizontal and vertical center and the horizontal resolution of the CRT to insure proper operation. Refer to the Calibration section of this manual for the GEOMETRY, TRACE ALIGNMENT and ASTIG adjustments. The remainder of the adjustments and checks are given in the following paragraph.

The gain of the Vertical and Time Base plug-in units should also be checked and readjusted to match the sensitivity of the CRT, since the sensitivity of each CRT varies slightly within limits. Refer to the instruction manuals of the plug-in units for these adjustments.

Check/Adjust Deflection Plate Capacitance

This step should be performed if real-time displays over 3 MHz are to be observed at any time. If only sampling plug-in units are to be used in the Type 568, this step can be omitted.

Equipment Required

CRT Deflection Capacitance Normalizer: Tektronix Part No. 067-0500-00.

Square-wave Generator capable of delivering a 100-kHz positive-going square-wave signal with a peak-to-peak amplitude of 50 to 100 volts. Tektronix Type 106 Square-Wave Generator with a Tektronix Type TU-5/105 Adapter (output inverter) recommended. The TU-5/105 Adapter is Tektronix Part No. 013-0075-00.

1. Remove the vertical plug-in unit from the Type 568 and install the Capacitance Normalizer in the left plug-in compartment.

2. Set the Type 568 controls as follows:

POWER	ON
INTEN	Normal brightness
FOCUS	Well focused display
SCALE ILLUM	As desired
CALIBRATOR	OFF

3. Set the Time-base unit controls as follows:

Triggering	+, AC, Int
Trigger mode	Normal
Time/Div	20 μ SEC

4. Set the Type 106 controls as follows:

Repetition Rate	100 kHz
Multiplier	1
Symmetry	Midrange
Amplitude	Midrange
High Amplitude-Fast Rise	High Amplitude

5. Connect the Type 106 High Amplitude output to the Capacitance Normalizer through a GR to BNC adapter, the TU-5/105 Adapter, and a 50 Ω coaxial cable.

6. Trigger the display with the time-base trigger level control. The Type 106 Amplitude control may have to be turned slightly clockwise to obtain a display.

7. Check—Display of the square-wave signal with a flat top on the waveform (see Fig. 4-8B).

8. Adjust—C760 (see Fig. 4-8A) for optimum flat top of the square-wave display.

9. Turn the INTEN control fully counterclockwise, then interchange the positions of the Time-Base unit and the Capacitance Normalizer, i.e. Time-Base unit in the left plug-in compartment and Capacitance Normalizer in the right compartment.

10. Readjust the INTEN, FOCUS and ASTIG controls to obtain a well defined display.

11. Check—Display of the square-wave signal with a flat top on the waveform (see Fig. 4-8C).

12. Adjust—C761 (see Fig. 4-8A) for optimum flat top of the square-wave display.

13. Turn the INTEN control fully counterclockwise, disconnect the Type 106, remove the Capacitance Normalizer from the Type 568, and replace the vertical and time-base units in their proper compartment.

14. Readjust the INTEN, FOCUS and ASTIG controls for a normal trace.

Check CRT Vertical Sensitivity

1. Connect the DC voltmeter between the CRT vertical deflection plate pins (see Fig. 4-9) with the minus lead on the upper deflection plate pin.

2. Position the trace to the top horizontal graticule line.

3. Note the reading of the DC voltmeter.

4. Position the trace to the center horizontal graticule line.

5. Reverse polarity of the DC voltmeter.

6. Position the trace at the bottom horizontal graticule line.

7. Note the reading of the DC voltmeter and add this reading to the one noted in step 3. The total voltage should be between 148 and 164 volts.

8. Divide this number by 8 to determine the deflection voltage/division sensitivity. The sensitivity should be between 18.5 and 20.5 volts/division.

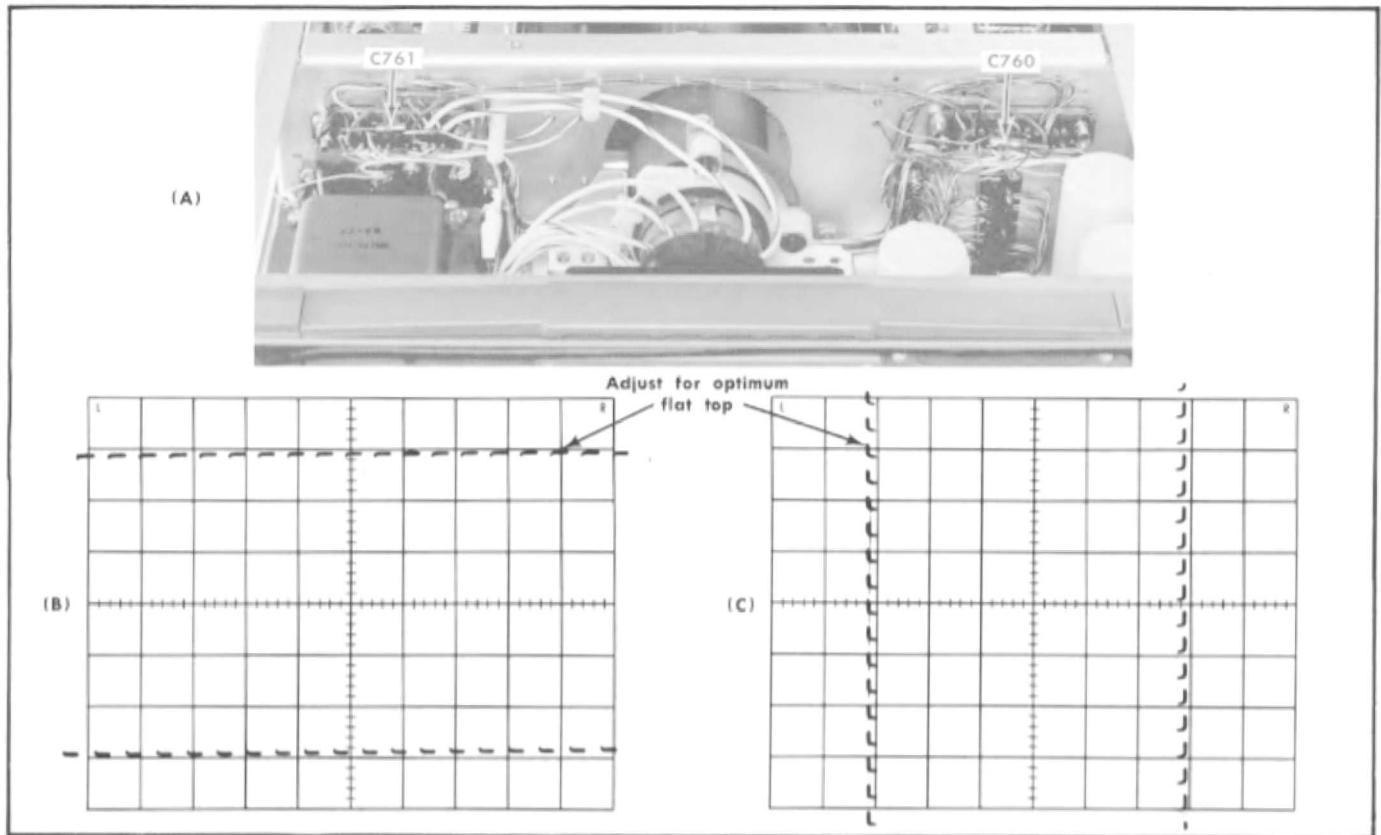


Fig. 4-8. (A) Location of the CRT deflection plate capacitance adjustments; (B) Display with C760 adjusted correctly; (C) Display with C761 adjusted correctly.

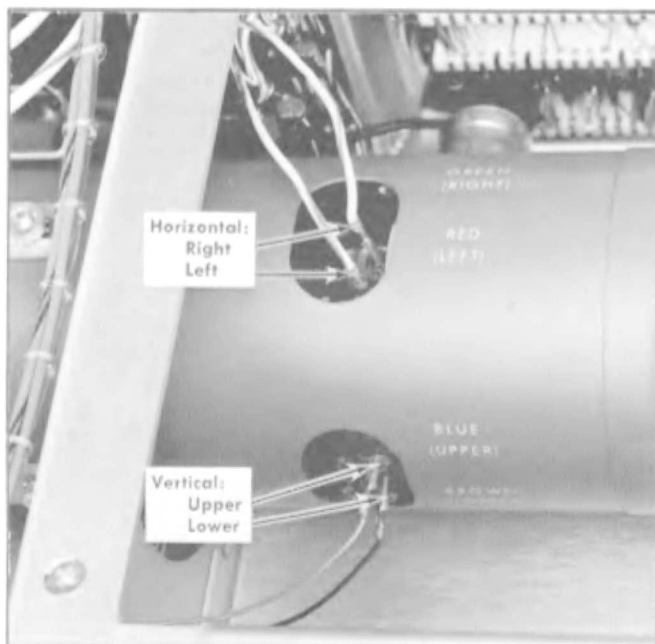


Fig. 4-9. CRT deflection plate pins for checking deflection factor and electrical center of the CRT.

Check CRT Horizontal Sensitivity

1. Turn the INTEN control fully counterclockwise and interchange the plug-in units so the time-base unit is in the left compartment and the vertical unit is in the right compartment.
2. Connect the DC voltmeter between the CRT horizontal deflection plate pins (see Fig. 4-9), with the minus lead on the left deflection plate pin.
3. Increase the intensity and adjust the time-base triggering control for a free running (or automatic) trace.
4. Position the trace to the extreme left vertical graticule line with the vertical unit position control.
5. Note the reading of the DC voltmeter.
6. Position the trace to the extreme right vertical graticule line with the vertical unit position control.
7. Note the reading of the meter and add it to the reading noted in step 5. The total voltage should be between 175 and 193 volts.
8. Divide this number by 10 to determine the deflection voltage/divisions. The sensitivity should be between 17.5 and 19.3 volts/div.

Check Vertical and Horizontal Electrical Center

Equipment Required: Shorting strap; approximately 4 inches in length and with an alligator clip at each end.

1. Allow the Type 568 to warm up for approximately 20 minutes.
2. Obtain a free running trace on the CRT with the triggering and position controls.
3. Connect the shorting strap between the two vertical deflection plate pins on the neck of the CRT (see Fig. 4-10A).
4. Check—Trace on the CRT must be within 0.5 cm of the center horizontal graticule line.
5. Remove the shorting strap from the vertical deflection plate pins and connect it between the two horizontal deflection plate pins (see Fig. 4-10B).
6. Check—Dot on the CRT must be within 0.8 cm of the center vertical graticule line.
7. Remove the shorting strap.

Check Horizontal Resolution

Equipment Required: Real-time (non-sampling) plug-in units must be used in the Type 568.

Time-Mark Generator with marker outputs of 1 mS and .1 mS, such as a Tektronix Type 184.

1. Set the Type 568 controls as follows:

POWER	ON
INTEN	Normal brightness
FOCUS	Well focused display
SCALE ILLUM	As desired
CALIBRATOR	OFF
2. Set the Vertical Unit controls as follows:

Mode	Ch 1
Input coupling	AC
Volts/Div	.5
Position	Centered
Polarity	Normal
3. Set the Time-Base Unit controls as follows:

Triggering	+ AC, Int
Trigger mode	Normal
Time/Div	1 mSEC
Position	Centered
4. Set the Time-Mark Generator controls as follows:

Marker Selector	1 mS and .1 mS
-----------------	----------------
5. Connect the Time-Mark Generator marker output to the channel 1 vertical input with a 50 Ω coaxial cable.
6. Trigger the display with the time-base trigger level control.

7. Set the Volts/Div switch and Variable control so the markers overscan the graticule area.

8. Check—Markers should be well defined and should have no overlap with optimum setting of the FOCUS control.

9. Disconnect the Time-Mark Generator.

Power Transformer Replacement

If a complete check of the instrument shows that the power transformer requires replacement, notify your local Tektronix Field Office. The Tektronix Field Engineer will verify the transformer failure for a warranty replacement. (See the Warranty note in the front of this manual.)

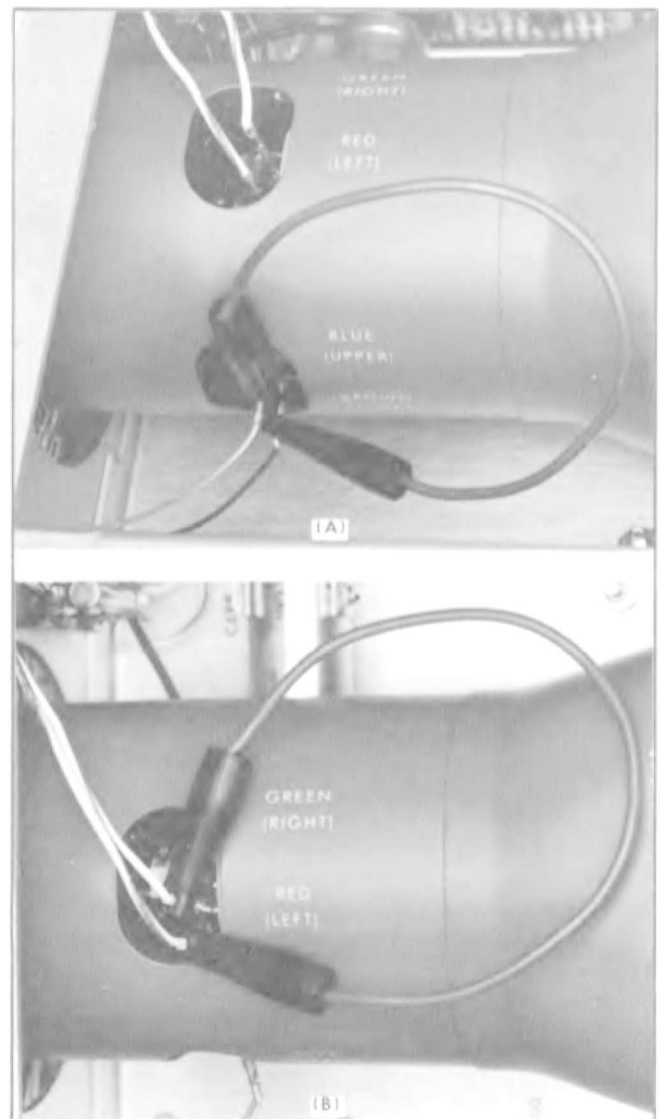


Fig. 4-10. Shorting strap connections for checking the CRT electrical center: (A) For checking the vertical center; (B) For checking the horizontal center.

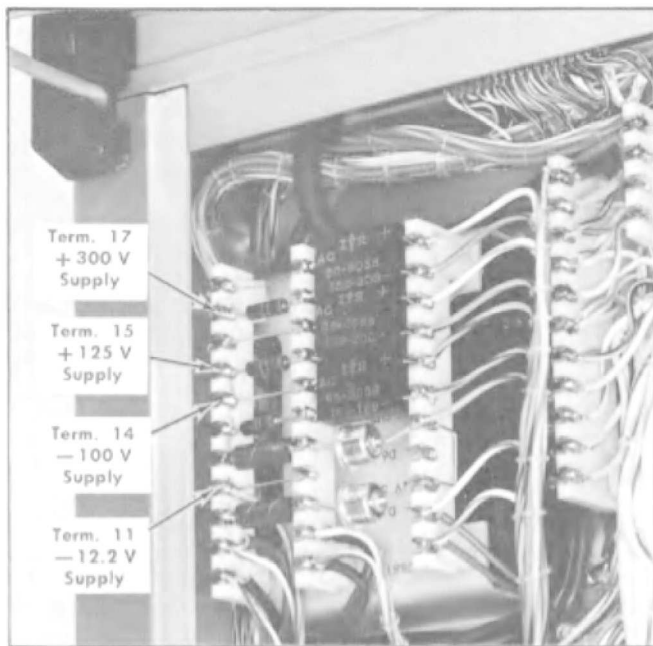


Fig. 4-11. Location of power transformer terminals for checking resistances to ground after transformer replacement.

Be sure to use only the correct replacement for a power transformer. Tag the leads with the terminal numbers as they are unsoldered from the transformer to aid in connecting a new transformer. After replacing the power transformer, check the power supply (to ground) resistance given in Table 4-2, then check the calibration of the entire instrument.

TABLE 4-2

Power Supply Resistance Checks
(Power line disconnected, plug-in units removed)

Supply (see Fig. 4-11)	Approximate Resistance
—100 volts	10 k Ω
+125 volts	5 k Ω
+300 volts	17 k Ω
—12.2 volts	450 Ω (common lead to gnd)

High Voltage Compartment

The components located in the high-voltage compartment can be reached for maintenance or replacement by using the following procedure.

1. Remove the top and bottom covers of the instrument.
2. Remove the high-voltage shield.
3. Remove the three screws holding the cover on the high-voltage compartment and remove the cover.
4. To remove the complete wiring assembly from the high-voltage compartment, unsolder the five insulated wires from the high-voltage transformer, T801 (see Fig. 4-12). The other leads are long enough to allow the assembly to be lifted out of the compartment to reach the components on both circuit boards.

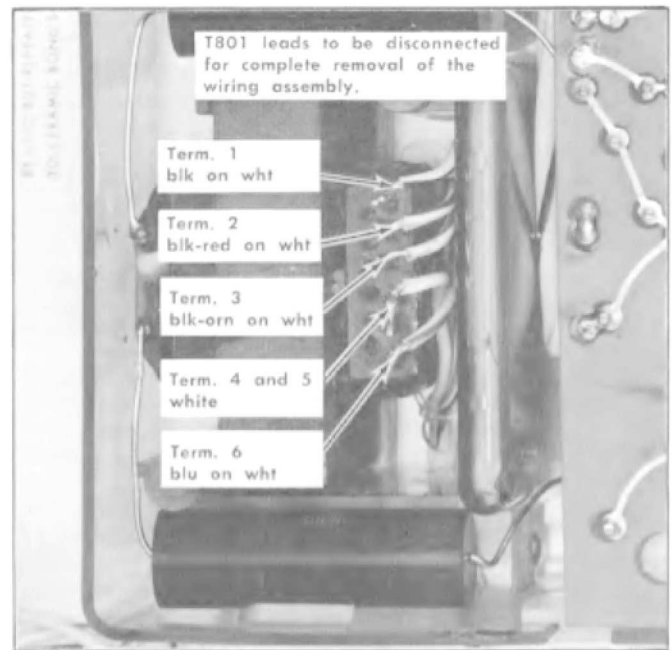


Fig. 4-12. High-voltage compartment on the bottom of the Type 568 with the high-voltage shield and compartment cover removed.

5. To replace the high-voltage assembly, reverse the order of removal.

TROUBLESHOOTING

Introduction

The following information is provided to facilitate troubleshooting of the Type 568. If trouble develops, information in the Circuit Description section of this manual should be used along with the following information to aid in locating the problem.

Troubleshooting Aids

Diagrams. The Circuit numbers and electrical value of all components are shown on the diagrams at the rear of this manual. Important voltages and waveforms are also shown on the diagrams.

Circuit Boards. Figs. 4-14 through 4-16 show the circuit boards used in the Type 568. Each electrical component on the boards is identified by its circuit number. The circuit boards are also outlined on the diagrams with a blue line. These pictures along with the diagrams will aid in locating the components mounted on the circuit boards.

Wiring Color Code. All insulated wire used in the Type 568 is color-coded to aid in circuit tracing. Power-supply voltages can be identified by the background color and three color strips. A white background color indicates a positive voltage; a tan background indicates a negative voltage. Table 4-3 shows the wiring color-code for the power-supply voltages used in the Type 568. Signal carrying leads are identified with two or less colored strips.

TABLE 4-3
Power Supply Wiring Color Code

Supply	Back-ground Color	1st Stripe	2nd Stripe	3rd Stripe
-100 volts	Tan	Brown	Black	Brown
-12.2 volts	Tan	Brown	Red	Black
+125 volts	White	Brown	Red	Brown
+300 volts	White	Orange	Brown	Brown

Resistor Color Code. In addition to the brown composition resistors, some metal film resistors (identifiable by their gray color) and some wire wound resistors (usually light blue or grey-green) are used in the Type 568. The resistance value of composition resistors and metal-film resistors are color-coded on the components with EIA color-code. The color-code is read starting with the stripe nearest the end of the resistor. Composition resistors have four stripes which consist of two significant figures, a multiplier and a tolerance value. Metal-film resistors have five stripes consisting of three significant figures, a multiplier and a tolerance value (see Fig. 4-13).

Capacitor Marking. The capacitance values of common disc capacitors and small electrolytic are marked in micro-

farads on the side of the component body. The white ceramic capacitors used in the Type 568 are color-coded in picofarads using a modified EIA code (see Fig. 4-13).

Diode Color Code. The cathode end of each glass-encased diode is indicated by a stripe, a series of stripes or a dot. For most silicon or germanium diodes with a series of stripes, the color-code also indicates the type of diode and identifies the Tektronix Part Number using the EIA color-code system (e.g., a diode color-code blue-brown-grey-green indicates diode type 6185 with Tektronix Part Number 152-0185-00). The cathode and anode of metal-encased diodes can be identified by the flared end at the anode or the diode marked on the body.

Troubleshooting Checks

If apparent trouble occurs in the Type 568, perform the following preliminary checks before proceeding with extensive troubleshooting. Often apparent malfunction results from the improper use of controls or faulty connections to external equipment.

1. Check control settings. Incorrect control settings can indicate a trouble that does not exist. Make sure the front panel controls are set properly for the desired mode of operation. If there is question about the correct use or func-

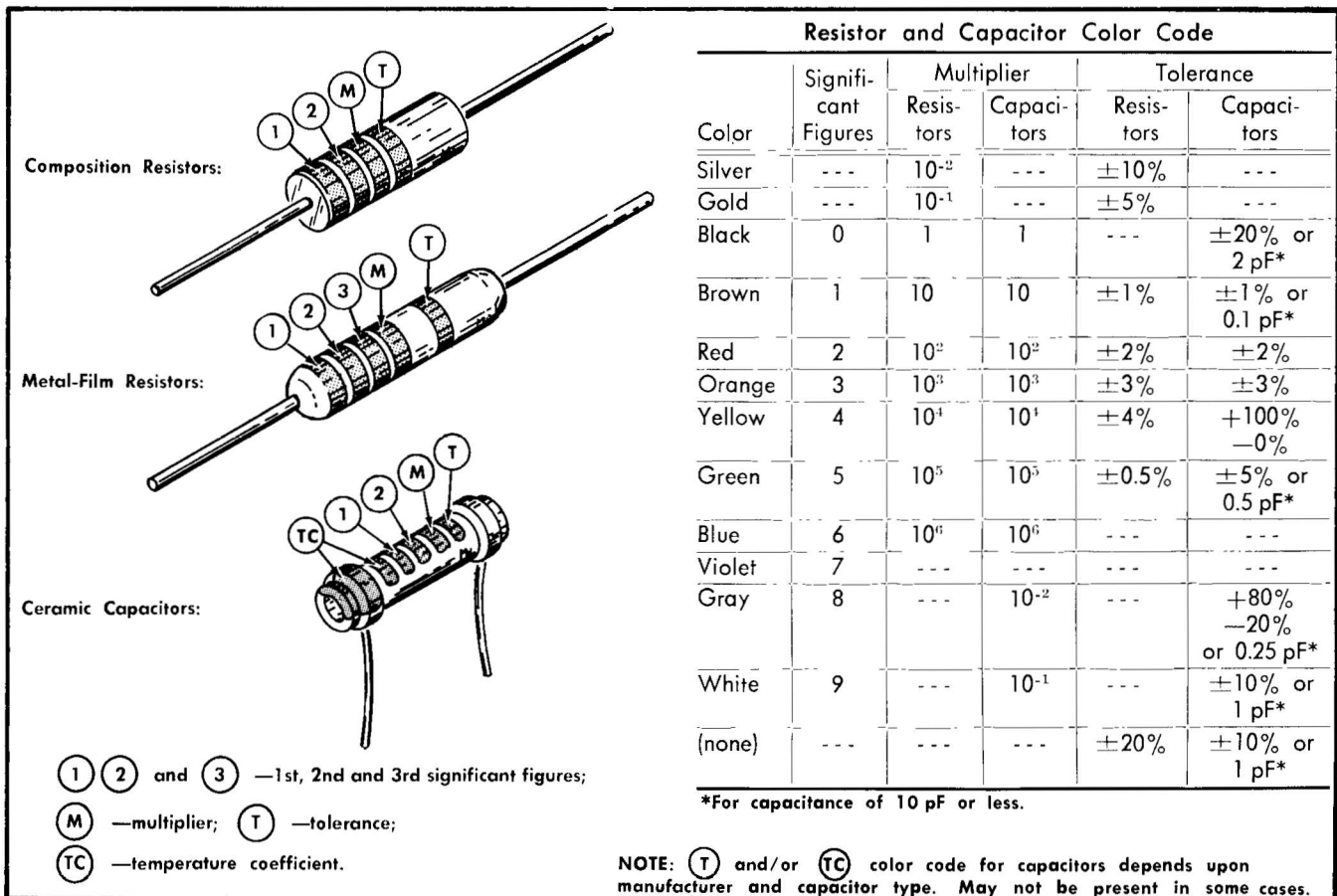


Fig. 4-13. Resistor and ceramic capacitor color code.

tion of any control, see the Operating Instructions of this manual.

2. Check Associated Equipment. Be sure the equipment used with the Type 568 is operating properly. Check for defective input and output cables, and that the cables are connected properly for the desired mode of operation.

If spare plug-in units are available, substitute the spare units, one at a time, for the units in the Type 568. If proper operation is restored when one of the units is replaced, the unit that was replaced is causing the trouble. If proper operation is not restored after substitution of both units, the Type 568 is most likely at fault.

Troubleshooting Procedure

The following procedure is provided to isolate any trouble in the Type 568 to a particular circuit and to locate the trouble within that circuit. If a component is found to be defective, it should be replaced following the replacement procedures given under Corrective Maintenance, and the calibration of that circuit should be checked.

1. Isolate the Trouble to a Circuit. There are three basic circuits in the Type 568; the low-voltage power supplies, the CRT circuit (including the high-voltage power supply); and the calibrator.

TABLE 4-4

Power Supply	Tolerance
—100 volt	± 2.0 volts
+125 volt	± 2.5 volts
+300 volt	± 6.0 volts
—12.2 volt	± 0.24 volt

Incorrect operation of all circuits indicates trouble in the low-voltage power supplies. This can be quickly determined by measuring the output voltage and checking the regulation and ripple as described in the Calibration Procedure. However, a defective component elsewhere in the instrument can appear as a power supply trouble and affect the operation of other circuits. Table 4-4 lists the tolerances of the power-supplies in this instrument. If a power-supply voltage is within the listed tolerance, the supply can be assumed to be working correctly. If outside the tolerance, the supply may be misadjusted or operating incorrectly. Follow the procedure given in the Calibration section to adjust the power-supplies.

Reference voltages for the —12.2-volt and +125-volt power supply are set by the —100-volt power supply. A check of the —100-volt supply should be made first to determine if it is operating properly, as it will effect the other supplies.

A check of the fuses on the output of the +125 volt and +300 volt power supplies (located on the center blukhead) should also be made. A blown fuse will also effect the output voltages of the other supplies.

If the low-voltage power-supplies are within tolerance, the trouble is probably in the CRT circuit. This may be indicated by poor focus, insufficient display brightness, or expansion and contraction of a waveform on the CRT as it is positioned to the top and then moved to the bottom of the CRT screen. If a malfunction in the CRT circuit is suspected, check the voltage at the high-voltage test point (see Calibration procedure).

Troubles in the calibrator will be obvious if only that circuit is malfunctioning.

2. Check The Circuit Visually. After the trouble has been isolated to a particular circuit, check the circuit for poor connections, broken wires, damaged components, etc. A visual inspection may indicate the source of trouble.

Check the square-pin connectors for a tight electrical connection. If the pin connectors have been disconnected many times, it may be necessary to squeeze the connector on the end of the wire slightly with a pair of pliers to insure a snug fit on the pin connector.

3. Check Voltages and Waveforms. Often a problem or a defective component can be located by checking for the correct voltages or waveforms in the circuit. Typical voltages and waveforms are given on the diagrams.

4. Check Semiconductors. Most circuit failures result from the failure of a transistor or diode due to normal aging and use. The best method of checking transistors is by direct substitution. However, be sure the voltage conditions of the circuit are not such that a replacement transistor might also be damaged. If substitution transistors are not available, use a dynamic tester (such as a Tektronix Type 575). Static-type testers are not recommended, since they do not check the device under simulated operating conditions.

Diodes can easily be checked for an open or shorted conditions by measuring the resistance between terminals after unsoldering one end of the component. Use a resistance scale with an internal voltage between 800 mV and 3 volts. The resistance should measure very high in one direction and very low in the other direction.

NOTE

If the meter voltage is below 800 mV, the diode may not be forward biased and the reading will be high in both directions; if the source voltage is too high, it will give an incorrect reading and may damage the diode junction.

5. Repair and Readjust the Circuit. If any defective parts are located, follow the replacement procedures given earlier in this section. Be sure to check the performance of any circuit that has been repaired or has had any electrical components replaced.

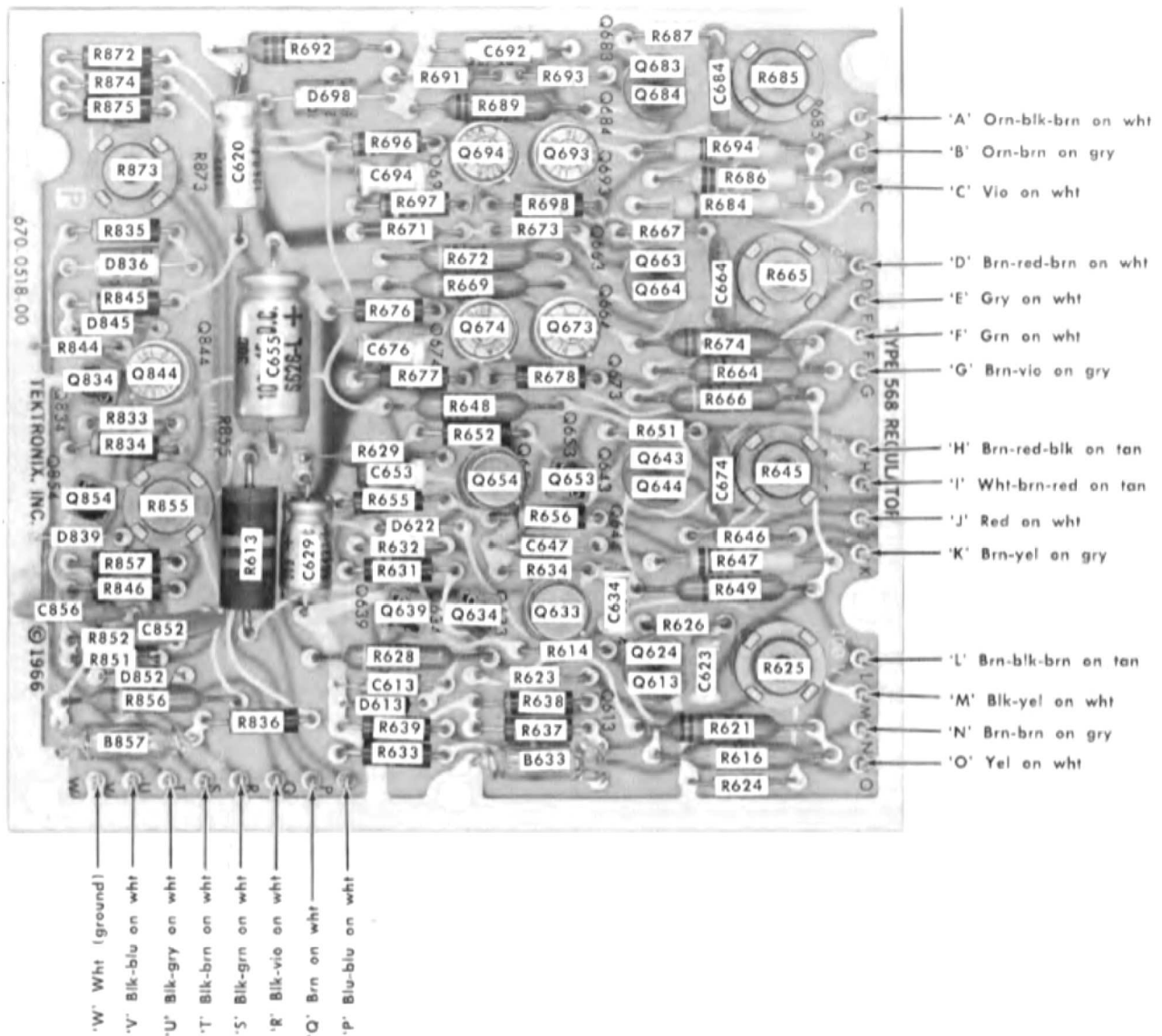


Fig. 4-14. Wiring color code, circuit component locations and connections on the Regulator circuit board.

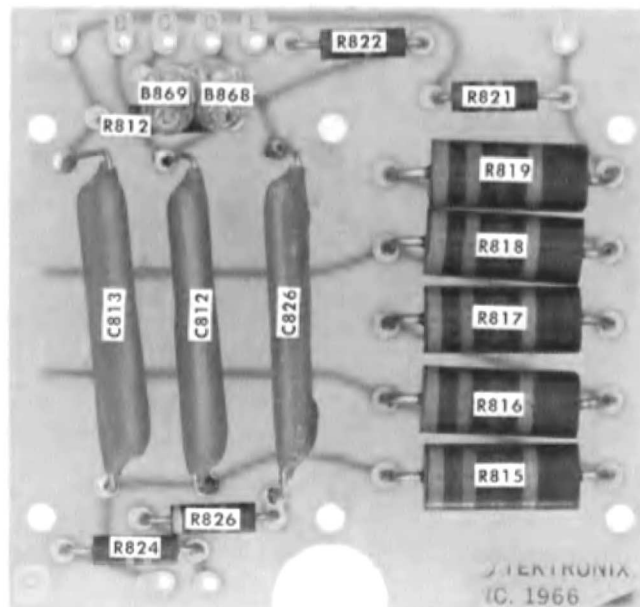
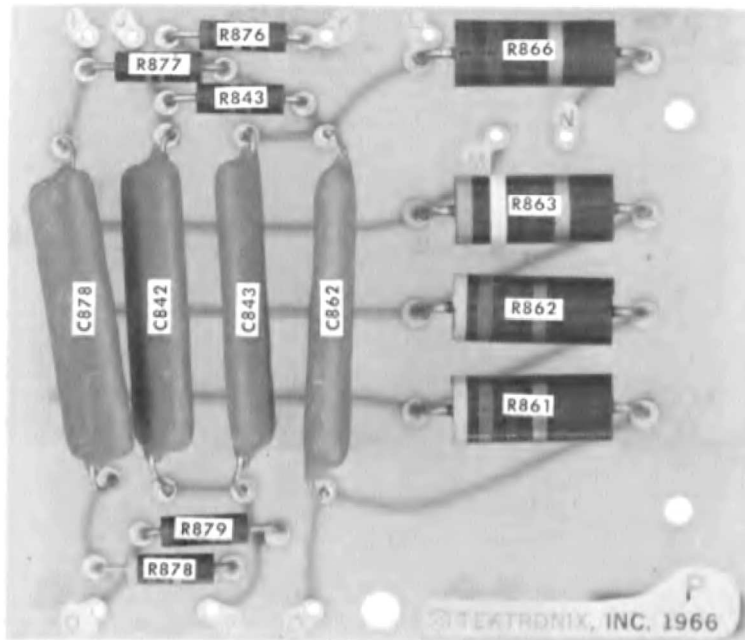


Fig. 4-15. Circuit component locations on the High Voltage circuit boards.

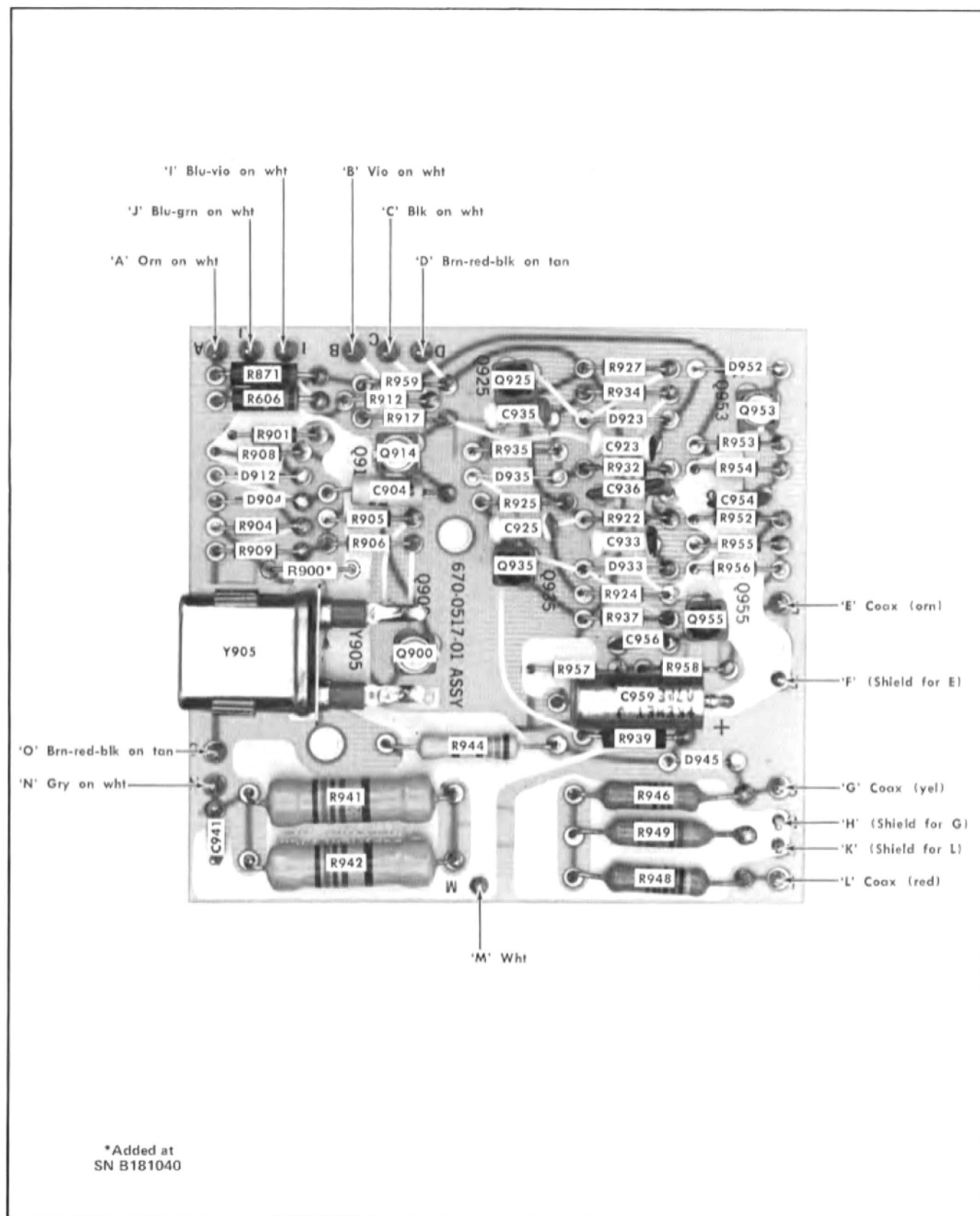


Fig. 4-16. Circuit component locations and wiring color code on the 100 kHz Calibrator circuit board. SN 16030 and above.

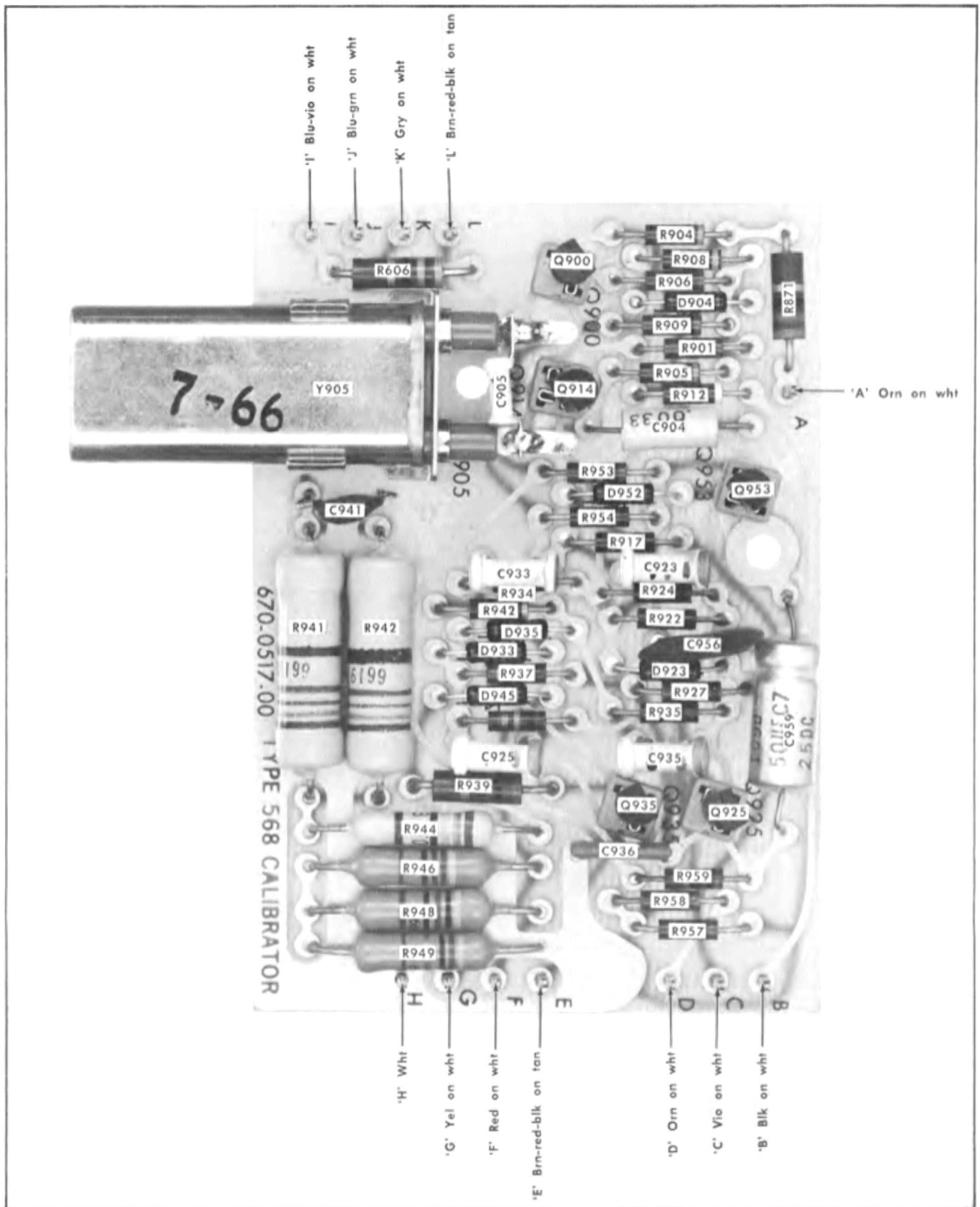


Fig. 4-16. Circuit component locations and wiring color code on the 20 kHz Calibrator circuit board. SN 150629 and below.

SECTION 5

PERFORMANCE CHECK

General Information

This section of the manual provides a procedure for rapidly checking the performance of the Type 568. The procedure is intended to check the operation of the instrument to the requirements given in the Characteristics section without performing a complete calibration procedure and without adjusting any internal controls.

Performance of the Type 568 should be checked after each 1000 hours of operation and at least once every 6 months to assure that it is operating properly and accurately. Failure to meet the performance requirements given in this procedure indicates the need for internal adjustments and checks as given in the Calibration section.

EQUIPMENT REQUIRED

The following (or equivalent) items of equipment are required for a complete performance check of the Type 568. Equipment requirements given here are the minimum requirements for making the sequence of checks. All test instruments are assumed to be calibrated and operating within their rated specifications. If substitute equipment is used, it must equal or exceed the given requirements in order to check the Type 568 to the given accuracy.

1. Test oscilloscope: Bandwidth from DC to at least 1 MHz at -3 dB; minimum deflection factor, 0.001 volts/div. Tektronix 540-Series oscilloscope with a Type W plug-in unit recommended.

2. $1\times$ probe with BNC connector: Tektronix Type P6011 recommended, Part No. 010-0193-00.

3. Tektronix 2-Series or 3-Series Amplifier plug-in unit (non-sampling): Deflection factors from 0.5 to 5 volts/div. Tektronix Type 3A1 recommended.

4. Tektronix 2-Series or 3-Series Time-Base plug in unit (non-sampling): Sweep rates to at least 50 nanoseconds/div. Tektronix Type 3B4 recommended.

5. Tektronix 3-Series Time-Base plug-in unit with delayed sweep feature, required only for checking delayed-sweep intensification. This unit may be used in place of item 4. Tektronix Type 3B3 recommended.

6. (Optional) Tektronix 3-Series (sampling) Amplifier plug-in unit: Deflection factors from 10 to 500 mV/div. This unit may be used in place of item 3 if a sampling Time-Base unit is also used. Tektronix Type 3S76 recommended.

7. (Optional) Tektronix 3-Series (sampling) Time-Base plug-in unit: Sweep rates from 10 μ s to 50 ns/div. This unit may be used in place of item 4 if a sampling Vertical plug-in unit is also used. Tektronix Type 3T4 recommended.

8. Time-Mark Generator: Marker outputs of 1 ms and 1 second; sine-wave output of 100 MHz (10 ns); accuracy within 0.1%. Tektronix Type 184 Time-Mark Generator recommended.

9. (Optional) Real-Time Digital system consisting of a Type 3A2 Amplifier Unit, a Type 3B2 Time-Base Unit and a Type 230 Digital Readout unit. This system is required only for checking digital readout intensification.

10. 50-ohm termination: BNC connectors; accuracy within 1%. Tektronix Part No. 067-0515-00 recommended.

11. Two coaxial cables: Characteristic impedance 50-ohms; BNC connectors; length approximately 42 inches. Tektronix Part No. 012-0057-01 recommended.

12. T connector: BNC. Tektronix Part No. 103-0030-00 recommended.

13. Adapter: GR to BNC Female. Tektronix Part No. 017-0063-00.

14. Adapter: GR to BNC Male. Tektronix Part No. 017-0064-00.

15. Patch cord: BNC to banana plug, length approximately 18 inches. Tektronix Part No. 012-0091-00.

PERFORMANCE CHECK PROCEDURE

Equipment used in the following procedure is that listed under Equipment Required. If substitute equipment is used, connections and control settings may need to be changed to correspond to the characteristics of the equipment used.

This procedure is arranged in a sequence which allows the instrument to be checked with the type of plug-in units installed that are normally used with the Type 568. Steps 1 through 9 can be performed with any of the 2-Series or 3-Series plug-in units that are normally used with the Type 568. Steps 11, 12 and 13 should be performed if Real Time (non-Sampling) units are being used, and steps 14 and 15 should be performed if sampling units are being used. Steps 10, 16 and 17 are optional checks and should be performed if the Type 568 is used with the type of instruments indicated at the beginning of each of the three steps.

Preliminary Procedure

1. Install the plug-in units in the Type 568 that are normally used with the instrument.

2. Connect the Type 568 and other test equipment to a suitable power source and turn on all of the equipment.

3. Set the front panel controls of the Type 568, test oscilloscope and Type W as follows:

CONTROLS SETTINGS

Type 568

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input signal	None
Mode	Normal (Channel 1)
Volts/Div	.5
Input Coupling	AC (only used on Real Time units)
Position	Centered

Time-Base Unit

Input Signal	None
Sweep Rate	50 μ SEC
Triggering	
(Real Time)	Norm, +, line, auto
(Sampling)	Int, +
Position	Centered
Samples per/sweep	1000 (sampling units only)

Test Oscilloscope and Type W

Horizontal Display	A
Time/Cm	5 mSEC (calibrated)
Triggering	Int, +, line, Auto
Display	A-Vc
Input Coupling	Gnd
Input Attenuation	1
Millivolts/Cm	50
Position	Centered
Vc Range	+11
Comparison Voltage	5.000

1. Check Graticule Scale Illumination

a. Requirement—Graticule scale illumination must vary smoothly from maximum to no illumination as the SCALE ILLUM control is rotated throughout its range.

b. Rotate the SCALE ILLUM control fully clockwise and counterclockwise.

c. Check—Maximum brightness with the control fully clockwise and no illumination with the control fully counterclockwise with smooth operation between extremes.

2. Check Trace Rotation

- Requirement—Trace parallel to horizontal graticule lines
- Obtain a free running trace on the Type 568 with the timebase Trigger Level control.
- Position the trace at the center horizontal graticule line with the Vertical Amplifier Position control.
- Check—Trace parallel to the horizontal graticule line.

3. Check Alternate Trace

- Requirement—Two horizontal traces on the CRT screen.
- Set the Vertical unit Mode switch to Alternate (set to dual-trace if sampling plug-in units are being used).
- Check—Two horizontal traces on the CRT screen.

4. Check Calibrator Amplitude

- Requirement—Voltage accuracy within $\pm 2\%$ of selected output.
- Connect a 50 Ω cable from the Type 568 5 V CALIBRATOR output connector to the channel A vertical input of the test oscilloscope.
- The amplitude of the Calibrator is measured with the Calibrator turned off, and the output multivibrator of the Calibrator at its high level. The output multivibrator may stop at either its high level or its low level when the Calibrator is turned off and it may be necessary to set the Calibrator switch to 1 kHz and back to off a few times to catch the output multivibrator at its high level. At its low level the output voltage will be less than 1 mV.
- Position the trace on the test oscilloscope at the center horizontal graticule line.
- Set the Input Coupling switch to DC.
- Check—Test oscilloscope trace within ± 2.0 cm of center horizontal graticule line (see Fig. 5-1).

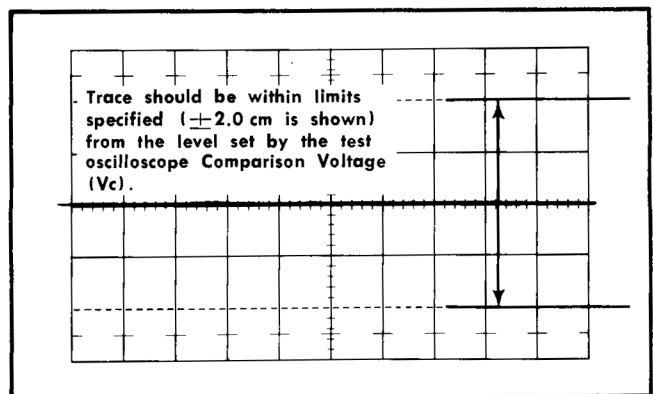


Fig. 5-1. Typical test oscilloscope display when checking Calibrator Amplitude.

- g. Install the 50 Ω termination and the adapters between the coaxial cable and the test oscilloscope vertical input.
- h. Set the Type W Vc Range switch to +1.1.
- i. Set the Type M Millivolts/Cm switch to 5.
- j. Check—Test oscilloscope trace within ± 2.0 cm of center horizontal graticule line.
- k. Remove the 50 Ω termination and the adapters from the signal path.
- l. Move the coaxial cable to .5 V CALIBRATOR output.
- m. Check—Test oscilloscope trace within ± 2.0 cm of center horizontal graticule line.
- n. Install the 50 Ω termination and the adapters between the coaxial cable and the test oscilloscope vertical input.
- o. Set the Type W Comparison Voltage dial to 0.500.
- p. Set the Type W Millivolts/Cm switch to 1.
- q. Set the Type W Input Coupling switch to ground.
- r. Position the trace on the test oscilloscope at the center horizontal graticule line.
- s. Set the Type W Input Coupling switch to DC.
- t. Check—Test oscilloscope trace within ± 1.0 cm of center horizontal graticule line.
- u. Remove the 50 Ω termination and the adapters from the signal path.

5. Check Calibrator Zero Reference

- a. Requirement—Less than 1 mV from chassis ground.
- b. Set the Type W Comparison Voltage dial to 0.000
- c. Set the CALIBRATOR switch to 1 kHz and back to off so the output multivibrator rests at its low level (near ground).
- d. Set the Type W Input Coupling switch to ground.
- e. Position the trace on the test oscilloscope at the center horizontal graticule line.
- f. Set the Type W Input coupling switch to DC.
- g. Check—Test oscilloscope trace within ± 1.0 cm of the center horizontal graticule line.

6a. Check Calibrator 100 kHz Duty Cycle. (For serial numbers B160630 and above).

- a. Requirement—48% to 52%.
- b. Set the Type 568 CALIBRATOR switch to 20 kHz.
- c. Change the following test oscilloscope and Type W controls.

Time/Cm	1 μ SEC
Input Coupling	AC
Input Attenuation	10
Millivolts/Cm	20
Vc Range	0

- d. Adjust the triggering controls if necessary, so the display starts on the leading edge of the waveform.
- e. Position the leading edge of the waveform at the first vertical graticule line with the horizontal position controls.
- f. Adjust the Test oscilloscope Time/Cm Variable control to display one complete cycle of the waveform in exactly 8 cm.
- g. Check—Length of each segment of the square wave. 3.9 to 4.1 cm (see Fig. 5-2).

6b. Check Calibrator 20 kHz Duty Cycle. (For serial numbers B150629 and below).

- a. Requirement—48% to 52%.
- b. Set the Type 568 CALIBRATOR switch to 20 kHz.
- c. Change the following test oscilloscope and Type W controls.

Time/Cm	5 μ SEC
Input Coupling	AC
Input Attenuation	10
Millivolts/Cm	20
Vc Range	0

- d. Adjust the triggering controls if necessary, so the display starts on the leading edge of the waveform.
- e. Position the leading edge of the waveform at the first vertical graticule line with the horizontal position controls.
- f. Adjust the Test oscilloscope Time/Cm Variable control to display one complete cycle of the waveform in exactly 8 cm.
- g. Check—Length of each segment of the square wave, 3.9 to 4.1 cm (see Fig.5-2).

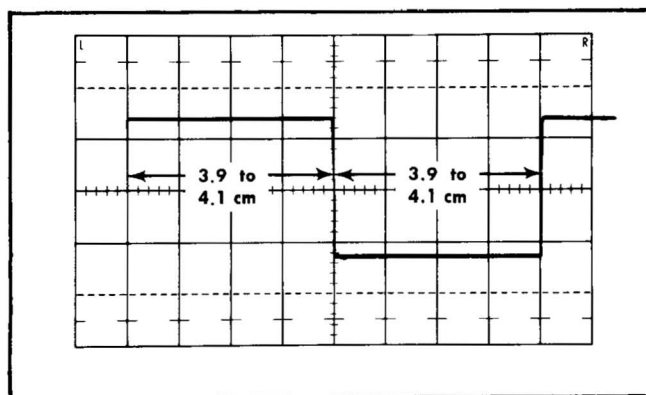


Fig. 5-2. Typical test oscilloscope display when checking Calibrator Duty Cycle.

7. Check Calibrator 1 kHz Duty Cycle

- a. Requirement—48% to 52%.
- b. Set the Type 568 CALIBRATOR switch to 1 kHz.
- c. Set the test oscilloscope Time/Cm switch to .1 mSEC.

Performance Check—Type 568/R568

- Adjust the triggering controls if necessary so the display starts on the leading edge of the waveform.
- Position the leading edge of the waveform at the first vertical graticule line, with the horizontal position controls.
- Adjust the Test oscilloscope Time/Cm Variable control to display one complete cycle of the waveform in exactly 8 cm.
- Check—Length of each segment of the square wave — 3.9 cm to 4.1 cm (see Fig. 5-2).

8. Check Calibrator + Pretrigger Pulse Amplitude

- Requirement—Approximately 1.0 volt into a $1M\Omega$ load; approximately 200 mV into a 50Ω load.
- Move the coaxial cable to the CALIBRATOR + PRE-TRIGGER output connector.
- Set the test oscilloscope and Type W controls as follows:

Time/Cm	.5 mSEC
Millivolts/Cm	50
- Obtain a stable display on the test oscilloscope with the triggering controls.
- Check—Amplitude of the positive going pulse should be approximately 2 cm.
- Install the 50Ω termination and adapters between the coaxial cable and the test oscilloscope vertical input.
- Set the Type W Millivolts/Cm switch to 10.
- Check—Amplitude of the positive going pulse should be approximately 2 cm.

9a. Check Calibrator 100 kHz Repetition Rate. (For serial numbers B160630 and above).

- Requirement—100 kHz; $\pm 0.05\%$.
- Set the following front-panel controls as indicated:

Type 568

CALIBRATOR 100 kHz

Test Oscilloscope and Type W

Time/CM	10 mSEC
Triggering	+, DC, Int
Input Attenuation	10
Millivolts/Cm	50
Display	A-B

Type 184

Markers	10 μ SEC
Marker Amplifier	Off
H-F Selector	Off

- Connect the Time-Mark Generator (Type 184) marker output to the Channel A Vertical input of the test oscilloscope with a 50Ω coaxial cable.

- Connect the Type 568 5 V CALIBRATOR output to the Channel B Vertical Input of the test oscilloscope with a 50Ω coaxial cable.

- Position the trace until DC triggering occurs displaying a stable waveform. Ensure that the triggering causes the difference frequency envelope to remain stable. (See Fig. 5-3).

- Check—less than 5 cycles in 10 cm. (0.05%).

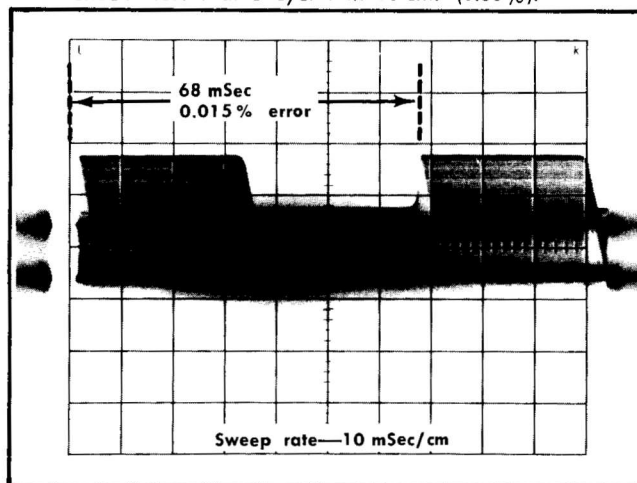


Fig. 5-3. Typical test oscilloscope display when checking Calibrator Repetition Rate.

9b. Check Calibrator 20 kHz Repetition Rate. (For serial numbers B150629 and below).

- Requirement—20 kHz; $\pm 0.05\%$.
- Set the following front-panel controls as indicated;

Type 568

CALIBRATOR 20 kHz

Test Oscilloscope and Type W

Time/CM	50 mSEC
Triggering	+, DC, Int
Input Attenuation	10
Millivolts/Cm	50
Display	A-B

Type 184

Markers	50/SEC
Marker Amplifier	Off
H-F Selector	Off

- Connect the Time-Mark Generator (Type 184) marker output to the Channel A Vertical input of the test oscilloscope with a 50Ω coaxial cable.

- Connect the Type 568 5 V CALIBRATOR output to the Channel B Vertical Input of the test oscilloscope with a 50Ω coaxial cable.

- Position the trace until DC triggering causes the difference frequency envelope to remain stable (See Fig. 5-3).
- Check—less than 5 cycles in 10 cm (0.05%).

10. Check Digital Readout Intensification

This step can be performed only if a Type 230 Digital Readout unit is being used with the Type 568.

- Requirement—Intensity modulation of the trace.
- Obtain a free running trace on channel A of the Type 568.
- Set the Type 230 controls as follows:

Triggered Measurement	Off
Measurement Mode	A Volts
CRT Intensification	
Time Measurement	Off
Ref Zones	100%
Channel A Ref Zones	
0% Position	As desired
100% Position	6 o'clock
0% Level	As desired
100% Level	2 cm
- Check—Intensity modulation of the trace (Fig. 5-4).

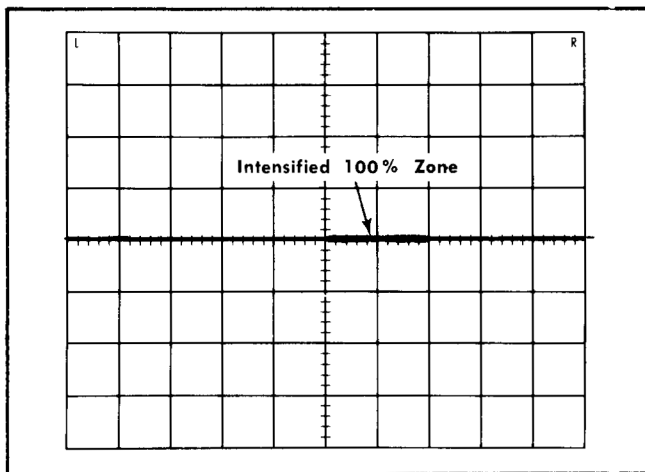


Fig. 5-4. Typical CRT display showing Intensity modulation.

NOTE

If Real Time plug-in units are being used in the Type 568, perform the following 3 steps. If sampling plug-in units are being used, the following 3 steps should be ignored and the procedure continued with step 14.

11. Check Astigmatism (Real Time)

- Requirement—Sharp, well defined display.
- Set the Vertical and Time Base controls as indicated.

Vertical Unit

Mode	Normal (Channel 1)
Volts/Div	2
Input coupling	AC
Position	Centered

Time Base Unit

Sweep Rate	10 μ SEC
Triggering	Norm, +, Line, Auto
Position	Centered

- Connect a 50 Ω cable between the Type 568 Calibrator 5 V output and the Channel 1 vertical input.
- Trigger the display with the time-base triggering controls.
- Check—Display should be sharp and well defined with optimum setting of the FOCUS control.
- If necessary, adjust ASTIG adjustment for a well defined display.

12. Check Geometry (Real Time)

- Requirement—Less than 0.5 minor div of bowing of the vertical portions of the display.
- Set the Channel 1 Volts/Div switch so the display over-scans the viewing area.
- Check—Bowing of the vertical portions of the display not to exceed 0.5 minor div (Fig. 5-5).

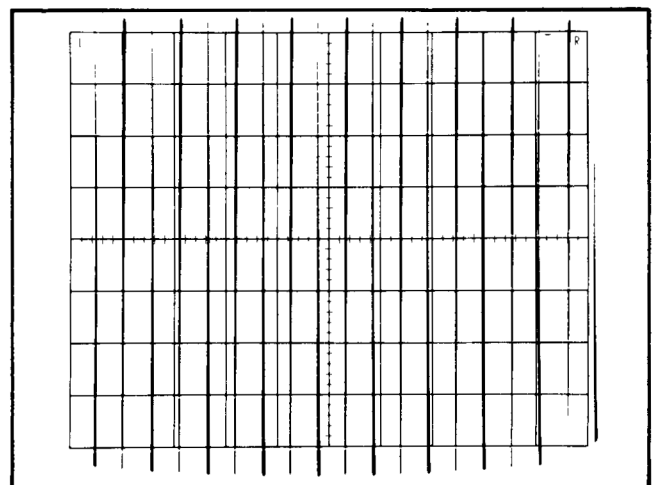


Fig. 5-5. Typical CRT display showing good geometry.

13. Check EXT CRT CATHODE

- Requirement—Noticeable intensity modulation with +5-volt input.
- Set the Channel 1 Volts/Div switch to 2.
- Connect the calibrator 5 V output to the Channel 1 vertical input and to the EXT CRT CATHODE connector using a BNC T connector, two 50 Ω coaxial cables and a BNC to banana plug patch cord.
- Check that the CRT CATHODE SELECTOR switch is set to EXT CRT CATHODE.
- Check—CRT display for noticeable intensity modulation (Fig. 5-6).

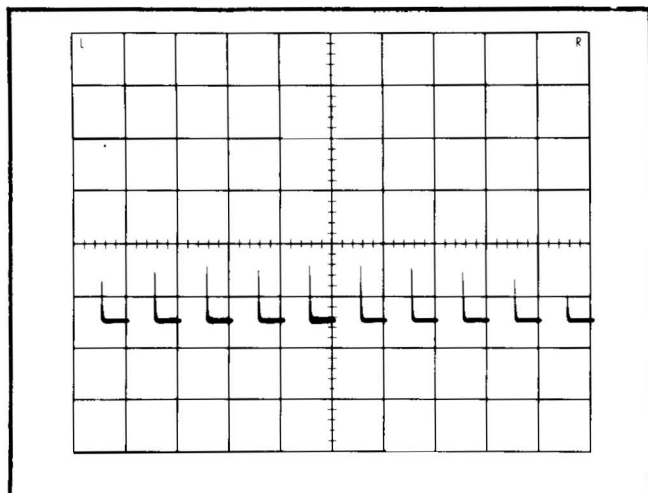


Fig. 5-6. Typical CRT display when checking Ext CRT Cathode for intensity modulation.

- f. Remove the cables, connector, and patch cord.

NOTE

If Sampling plug-in units are being used in the Type 568, the Performance Check should be continued with the following step.

14. Check Astigmatism (Sampling)

- a. Requirement—Dots should be round and well defined.
- b. Set the time base Samples/Sweep switch to display 10 dots/div.
- c. Check—Dots should be round and well defined with optimum setting of the FOCUS control.

15. Check Geometry (Sampling)

- a. Requirement—Trace parallel to vertical and horizontal graticule lines with maximum bowing of 0.5 minor div.
- b. Set the time base Time/Cm switch to 50 μ SEC.
- c. Set the time base Samples/Sweep switch to display 100 dots/div.
- d. Position the horizontal trace at the extreme upper and then the extreme lower horizontal graticule lines with the Vertical Position control.
- e. Check—Bowling of the horizontal trace not to exceed 0.5 minor div.
- f. Connect the Time Mark Generator (Type 184) Marker output to the Channel 1 Vertical Input using a 50 Ω coaxial cable and a BNC to GR adapter.
- g. Set the following controls as indicated.

Vertical Sampling Unit

Mode	A only
Position	centered
mV/Div	10

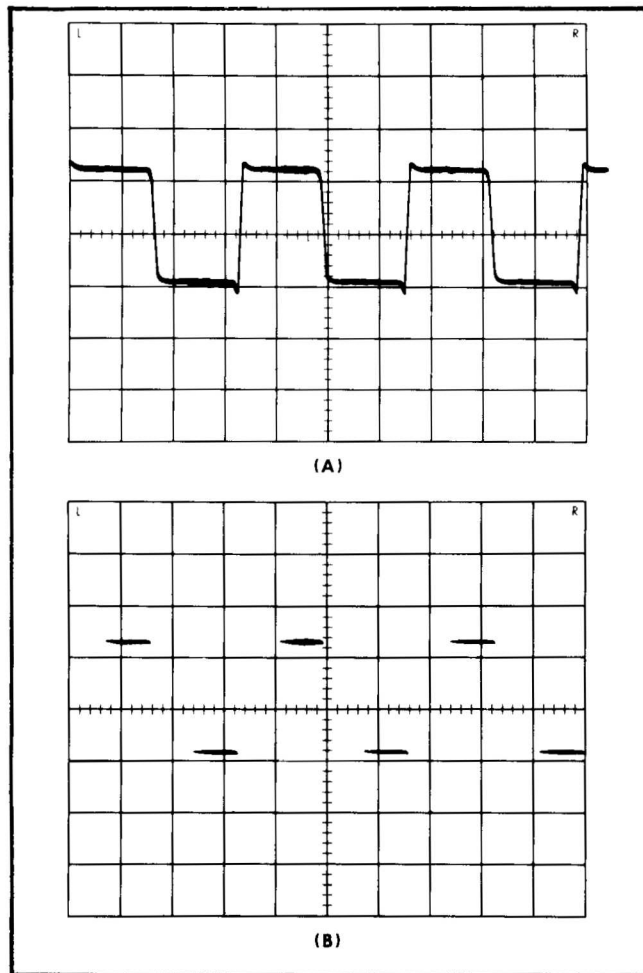


Fig. 5-7. Typical CRT display when checking Chopped Blanking with CRT CATHODE SELECTOR switch set at (A) EXT CRT CATHODE and (B) CHOPPED BLANKING.

DC Offset	midrange
Internal Triggering	A

Time Base Sampling Unit

Time/Cm	50 μ SEC
Samples/Sweep	$\times 1$ (1000)
Delay	0.00
Sweep Mode	Manual
Triggering	+, Int
Triggering level	fully clockwise
Recovery time	midrange

Type 184

Markers	10 ns Sine Wave
Marker Amplifier	Off
HF Selector	2 ns

- h. Connect the Time Mark Generator Marker output to the Channel 1 Vertical Input using a 50 Ω coaxial cable and a BNC to GR adapter.

- i. Position the vertical trace at the extreme left and then the extreme right vertical graticule lines.
- j. Check—Trace should be parallel to the vertical graticule lines with maximum bowing not to exceed 0.5 minor div.
- k. Remove the cable and disconnect the Time Mark Generator.

NOTE

The following two steps are optional and can be performed only with certain types of plug-in units. If plug-in units are to be changed to perform any of these checks, the INTEN control should be turned fully counterclockwise while removing a plug-in unit and while the new plug-in unit is warming up.

16. Check Dual Trace Chopped Blanking

This step must be performed using a Real Time Amplifier plug-in unit featuring the chopped mode of operation.

- a. Requirement—Switching transients completely blanked.
- b. Set the Vertical and Time-Base controls as indicated.

Input Coupling (Channel 1 and 2) AC

Mode Chopped

Time/Div 5 μ SEC

- c. Set the two traces approximately 2 cm apart with the vertical position controls.

- d. Trigger the display with the time-base triggering controls.

- e. Adjust the INTEN control so the vertical portions of the display are barely visible (Fig. 5-7A).

- f. Set the CRT CATHODE SELECTOR switch to CHOPPED BLANKING.

- g. Check—Vertical portions of the display completely blanked (Fig. 5-7B).

- h. Return the CRT CATHODE SELECTOR switch to EXT CRT CATHODE and the Mode switch to Normal (channel 1).

17. Check Delayed Sweep Intensification

This step must be performed using a time-base unit having the delayed sweep feature, such as a Type 3B3.

- a. Requirement—Intensity modulation of the trace.
- b. Set the Time-base controls as indicated.

Mode	Normal
Normal Triggering	Norm, +, Auto, Int
Delayed Triggering	Free run
Normal Sweep Rate	1 mSEC
Delayed Sweep Rate	.1 mSEC
Delay Time	1.00

- c. Check—Intensity modulation of the trace.

This completes the performance check procedure for the Type 568. Disconnect all test equipment. If the instrument has met all performance requirements given in this procedure, it is correctly calibrated and within the specified tolerances.

SECTION 6

CALIBRATION

General Information

Performance and/or calibration of the Type 568 should be checked after each 1000 hours of operation and at least once every 6 months to assure that the instrument is operating correctly and accurately. Recalibration of the instrument may be performed periodically as part of a regular preventive maintenance schedule or may be done whenever the need is indicated by the performance check procedure. In addition, portions of the instrument will require recalibration if components have been replaced or other electrical repairs have been made in the circuitry.

The calibration procedure given in this section of the manual is a combined verification and adjustment procedure that permits the instrument to be checked to the performance requirements given in the Characteristics section and to be adjusted for best performance. The procedure given in the Performance Check section also checks the performance and operation of the instrument, but does not provide for adjustment of internal controls.

A calibration record is included at the beginning of the calibration procedure for use as a checklist to verify correct operation of the Type 568 and as a calibration guide for experienced calibrators.

Always calibrate the Type 568 with two plug-in units installed. When calibrating the entire system, start with the indicator unit, (Type 568), then calibrate the amplifier unit and the time-base unit. Either plug-in unit can also be calibrated separately, but the procedure should always be started by checking the Type 568 power supply voltages.

Any needed maintenance should be performed before proceeding with the calibration. Troubles which become apparent during calibration should be corrected using the techniques given in the Maintenance section of the Instruction Manual.

RECOMMENDED EQUIPMENT

General

The following equipment or its equivalent is recommended for complete calibration of this instrument. The equipment is illustrated in Figs. 6-1 and 6-2. Specifications given are the minimum necessary for accurate calibration of this instrument. All test equipment is assumed to be correctly calibrated and operating within the original specifications. If equipment is substituted, it must meet or exceed the specifications of the original equipment.

1. Test oscilloscope: Bandwidth from DC to at least 1 MHz at -3 dB; minimum deflection factor, 0.001 volts/div. Tektronix Type 540-Series oscilloscope with a Type W plug-in unit recommended.

2. 1× probe with BNC connector: Tektronix Type P6011 recommended, Part No. 010-0192-00.

3. CRT deflection capacitance normalizer. Tektronix Calibration Fixture 067-0500-00 recommended.

4. Tektronix 2-Series or 3-Series Amplifier plug-in unit (non-sampling): Deflection factors from 0.5 to 5 volts/div. Tektronix Type 3A1 recommended.

5. Tektronix 2-Series or 3-Series Time-Base plug-in unit (non-sampling): Sweep rates to at least 50 nanoseconds/div. Tektronix Type 3B4 recommended.

6. Tektronix 3-Series Time-Base plug-in unit with delayed sweep feature, required only for checking delayed-sweep intensification. This unit may be used in place of item 4 for the entire procedure. Tektronix Type 3B3 recommended.

7. (Optional) Tektronix 3-Series (sampling) Amplifier plug-in unit: Deflection factors from 10 to 500 mV/div. This unit may be used in place of item 4 for the entire procedure if a sampling Time-Base unit is also used. Tektronix Type 3S76 recommended.

8. (Optional) Tektronix 3-Series (sampling) Time-Base plug-in unit: Sweep rates from 10 μ s to 50 ns/div. This unit may be used for the entire procedure if a sampling Vertical plug-in unit is also used. Tektronix Type 3T4 recommended.

9. Variable autotransformer. Output voltage variable from 104 to 126 VAC RMS for 115-volt nominal operation, or from 208 to 252 VAC RMS for 230-volt nominal operation; output power 210 watts minimum. If a monitor voltmeter is not included, a separate AC voltmeter is required with an accuracy within 3% over the required range. General Radio W10MT3W metered Variac autotransformer recommended.

10. Time-Mark Generator: Marker outputs of 1 ms and 5 second; sine-wave output of 100 MHz (10 ns); accuracy within 0.1%. Tektronix Type 184 Time-Mark Generator recommended.

11. DC voltmeter: Minimum sensitivity rating 20,000-ohms/volt; range of 3,300 volts full scale with an accuracy of at least 3%.

12. (Optional) Real-Time Digital system consisting of a Type 3A2 Amplifier Unit, a Type 3B2 Time-Base Unit and a Type 230 Digital Readout unit. This system is required only for checking digital readout intensification.

13. 50-ohm termination: GR connectors; accuracy within 1%. Tektronix Part No. 067-0515-00 recommended.

14. Two coaxial cables: Characteristics impedance 50-ohms; BNC connectors: length approximately 42 inches. Tektronix Part No. 012-0057-01 recommended.

15. T connector: BNC. Tektronix Part No. 103-0030-00 recommended.

16. Adapter: GR to BNC Female. Tektronix Part No. 017-0063-00.



Fig. 6-1. Recommended Calibration equipment. Items 1 through 12.

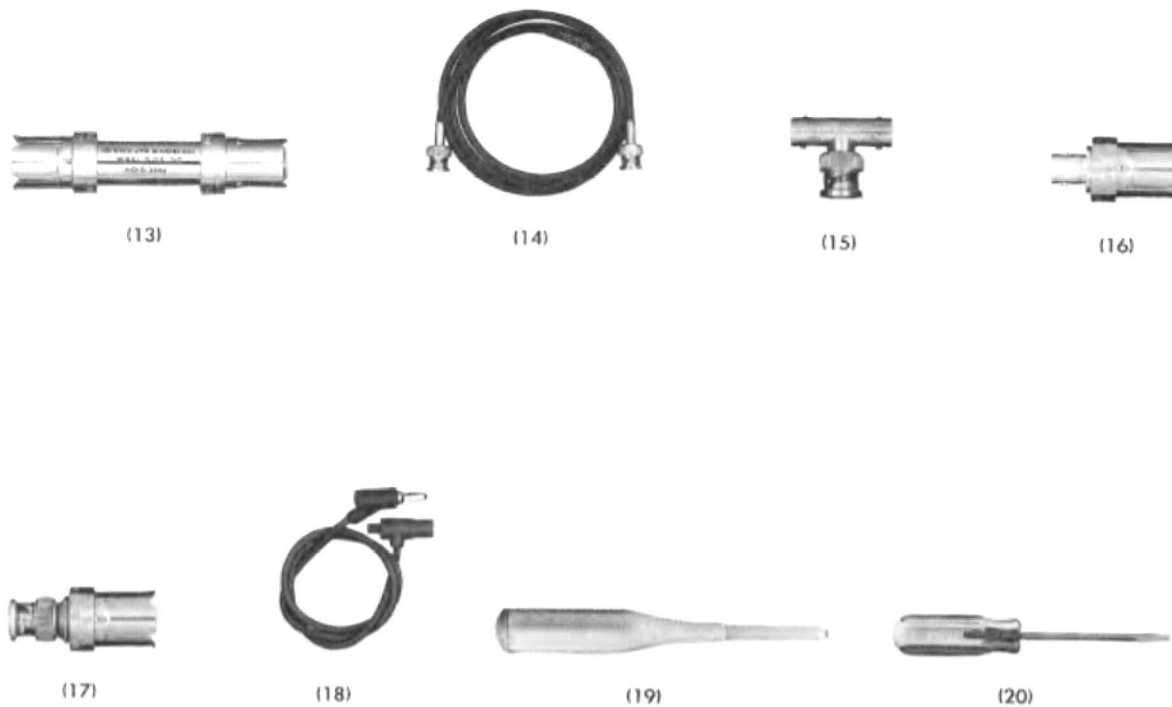


Fig. 6-2. Recommended calibration equipment. Items 13 through 19.

17. Adapter: GR to BNC Male. Tektronix Part No. 017-0064-00.

18. Patch cord: BNC to banana plug, length approximately 18 inches. Tektronix Part No. 012-0091-00.

19. Adjustment tool: Insulated screwdriver, 1½ inch shaft, non-metallic. Tektronix Part No. 003-0000-00.

20. Adjustment tool: Screwdriver, ⅜ bit. Tektronix Part No. 003-0192-00.

CALIBRATION RECORD AND INDEX

This outline is provided to serve as a verification and calibration record. It may be reproduced for that purpose or for use as a calibration guide for calibrators who are familiar with the procedure.

Type 568 Serial Number _____

Calibration Date _____

Test Engineer _____

- ☐ 1. Adjust —100-Volt Power Supply (Page 6-6)
—100 volts, ± 1.0 volt

- ☐ 2. Adjust +125-Volt Power Supply (Page 6-7)
+125 volts, ± 1.25 volts
- ☐ 3. Adjust +300-Volt Power Supply (Page 6-7)
+300 volts, ± 3.0 volts
- ☐ 4. Adjust —12.2-Volt Power Supply (Page 6-7)
—12.2 volts, ± 0.12 volt
- ☐ 5. Check Low-Voltage Power Supply Ripple (Page 6-8)
- ≤ 5 mV on —100 volt supply
 - ≤ 8 mV on +125 volt supply
 - ≤ 8 mV on +300 volt supply
 - ≤ 4 mV on —12.2 volt supply
- ☐ 6. Adjust Calibrator Amplitude (Page 6-9)
- 5 volt - 0.5 volt connector
 - 5 volts, ± 0.1 volt into 100 k Ω or greater
 - 0.5 volt, ± 0.001 volt into 100 k Ω or greater
 - 500 mV - 50 mV connector
 - 500 mV, ± 10 mV into 100 k Ω or greater
 - 50 mV, ± 1 mV into 50 Ω
 - Measured with calibrator turned off and the output at the selected high level.

- ☐ 7. Check Calibrator Zero Reference (Page 6-10)
 ≤ 1 mV

Calibration—Type 568/R568

Measured with calibrator turned off and the output at the low level.

- ☐ 8. Check Calibrator 100 kHz or 20 kHz (Page 6-10)
Duty Cycle 48% to 52%.
- ☐ 9. Check Calibration 1 kHz Duty Cycle (Page 6-10)
48% to 52%
- ☐ 10. Check Calibrator Pretrigger Amplifier (Page 6-11)
 ≥ 1.0 volt into $1\text{ M}\Omega$
 ≥ 0.1 volt into $50\ \Omega$
- ☐ 11. Check Calibrator Repetition Rate (Page 6-12)
100 kHz or 20 kHz, $\pm 0.05\%$. 1 kHz, $+100\%$ -50% .
- ☐ 12. Adjust High Voltage Power Supply (Page 6-14)
 -3300 volts, ± 165 volts
- ☐ 13. Check High Voltage Power Supply Regulation (Page 6-14)
No variation from voltage set in step 12.
- ☐ 14. Adjust Vertical and Horizontal (Page 6-15)
deflection-plate compensation C760 and C761
Optimum square corner.
- ☐ 15. Adjust Trace Alignment, using Real Time Plug-In Units (Page 6-16)
Trace parallel to horizontal graticule lines.
- ☐ 16. Adjust Astigmatism, using Real Time Plug-In Units (Page 6-16)
Sharp, well defined display
- ☐ 17. Adjust Geometry, using Real Time Plug-In Units (Page 6-7)
Markers parallel to left and right vertical graticule lines
- ☐ 18. Check Ext CRT CATHODE, using Real Time Plug-In Units (Page 6-8)
Intensity modulation with $+5$ -volt input.
- ☐ 19. Check Alternate Trace, using Real Time Plug-In Units (Page 6-8)
Two traces on CRT screen
- ☐ 20. Check Dual Trace Chopped Blanking (Page 6-18)
Switching transients completely blanked.
- ☐ 21. Adjust Trace Alignment, using Sampling Plug-In Units (Page 6-17)
Trace parallel with horizontal graticule lines.
- ☐ 22. Adjust Astigmatism, using Sampling Plug-In Units (Page 6-17)
Optimum roundness of dots.

- ☐ 23. Adjust Geometry, using Sampling Plug-In Units (Page 6-20)
Best overall geometry.

- ☐ 24. Check Delayed Sweep Intensification (Page 6-22)

Portion of trace is intensified.

- ☐ 25. Check Digital Readout Intensification, using Real Time Plug-In Units (Page 6-27)

Portion of trace is intensified.

- ☐ 26. Check Digital Readout Intensification, using Sampling Plug-In Units (Page 6-27)

Portion of trace is intensified.

CALIBRATION PROCEDURE

General Information

The following procedure is arranged in a sequence which allows the instrument to be calibrated with the type of plug-in units normally used in the Type 568. Steps 1 through 14 may be performed with any of the 2- or 3-Series plug-in units that are normally used with the Type 568. Steps 15 through 20 should be performed only if Real Time (non-sampling) plug-in units are being used in the Type 568, and should not be performed if Sampling units are being used. Steps 21 through 23 should be performed only if Sampling units are being used. Steps 24, 25 and 26 are optional checks and should be performed if the Type 568 is being used with the type of instruments indicated at the beginning of each of the three steps.

When doing a complete recalibration of the instrument, best overall performance is obtained if each adjustment is made to the exact setting, even if the observed performance is within the allowable tolerance.

In the procedure, a test equipment setup is shown for each major setup change. Complete control settings are listed following the setup picture. As an aid in locating individual controls which have been changed during the previous steps, those control names are printed in bold type. If only a partial calibration is performed, start with the setup preceding the desired portion of the procedure.

Preliminary Procedure

1. If the Type 568 is mounted in a rack, remove the securing screws and extend the instrument fully on the slideout tracks, or remove the instrument from the rack.

2. Remove the top and bottom dust covers.

3. If the instrument is to be calibrated on a bench, position it so that both the top and bottom are accessible, as shown in the setup illustration.

4. Connect the autotransformer and the other test instruments to a suitable power source.
5. Turn on the autotransformer.
6. Set the autotransformer output for the nominal line voltage to be used (115 volts or 230 volts).
7. Set the Voltage Selector and Range Selector switches in the LINE VOLTAGE SELECTOR assembly on the Type 568 rear panel to correspond to the autotransformer output voltage.
8. Install the Vertical and Horizontal Plug-In units that are normally used with the Type 568.
9. Install the Type W Plug-In unit in the test oscilloscope.
10. Connect the autotransformer output to the Type 568.
11. Turn on the Type 568 and the test oscilloscope.
12. Allow at least 20 minutes warm-up at approximately 25°C before making any checks or adjustments.
13. Connect the 1× test probe to the Channel 1 Vertical Input of the test oscilloscope.
14. After the 20-minute warm-up period, check the DC balance of the test oscilloscope.
15. Set the instrument controls as given following Fig. 6-3.

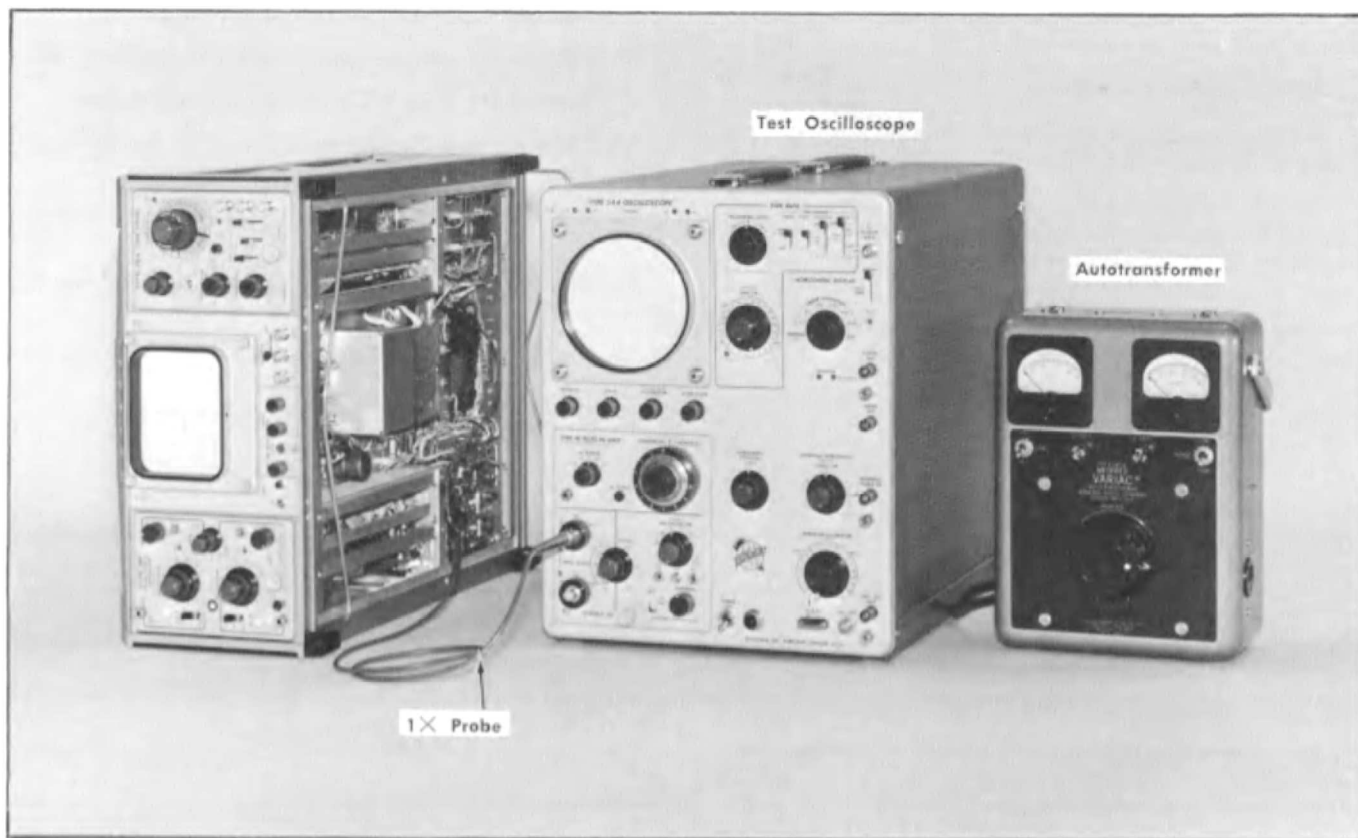


Fig. 6-3. Initial test equipment setup for steps 1 through 5.

CONTROL SETTINGS

Type 568

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input signal	None
Mode	Normal (Channel 1)
Volts/Div	.5
Input Coupling	AC
Position	Centered

Time-Base Unit

Input Signal	None
Sweep Rate	50 μ SEC
Triggering	Norm, +, line, auto
Position	Centered

Test Oscilloscope and Type W

Horizontal Display	A
Time/Cm	5 mSEC (calibrated)
Triggering	+, line, auto
Display	A-Vc
Input Coupling	Ground
Input Attenuation	100
Millivolts/Cm	10 (calibrated)
Position	Centered
Vc Range	0
Comparison Voltage	10.000

1. Adjust —100-Volts (R625) Check Regulation

Test equipment setup is shown in Fig. 6-3.

- Connect the test probe to the —100-volt test point (pin connector 'L', low-voltage regulator board; see Fig. 6-4).
- Connect the test probe ground clip to chassis ground.
- Position the trace on the test oscilloscope at the center horizontal graticule line with the Position control.
- Set the Type W Vc Range switch to —1.1.
- Set the Type W Input Coupling switch to DC.

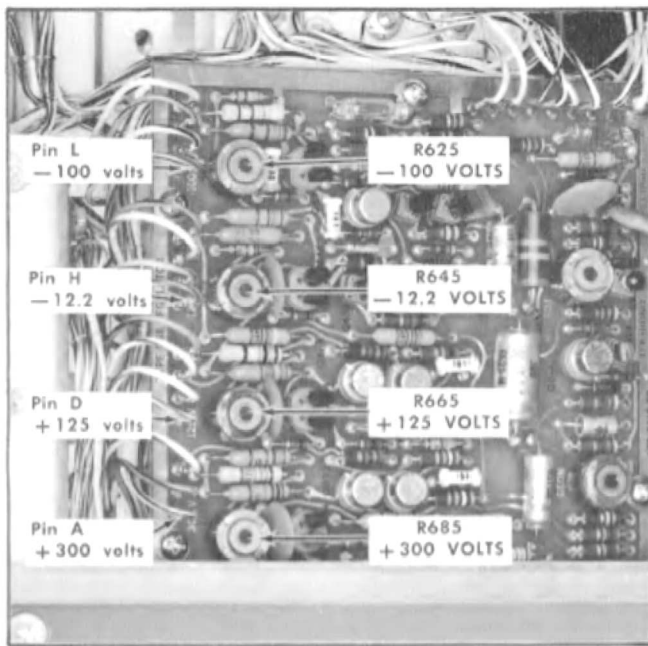


Fig. 6-4. Location of Low Voltage test points and adjustments.

f. Check—Test oscilloscope trace within ± 2.0 cm of the center horizontal graticule line (see Fig. 6-5).

g. Adjust—R625, -100 -volt adjustment (see Fig. 6-4) so the test oscilloscope trace is at the center horizontal graticule line.

h. Observe the test oscilloscope display while varying the autotransformer output between 104 and 126 volts (204 and 252 volts for 230 volt operation).

i. Check—Test oscilloscope trace remains within ± 2.0 cm of the center horizontal graticule line.

j. Set the autotransformer output at 115 volts.

2. Adjust +125-Volts (R665) Check Regulation

Test equipment setup is the same as in Step 1.

a. Connect the test probe to the $+125$ -volt test point (pin connector 'D', see Fig. 6-4).

b. Set the Type W Vc Range switch to $+11$.

c. Set the Type W Comparison Voltage dial to 1.250.

d. Check—Test oscilloscope trace within ± 2.5 cm of the center horizontal graticule line.

e. Adjust—R665, $+125$ -volt adjustment (see Fig. 6-4) so the test oscilloscope trace is at the center horizontal graticule line.

f. Observe the test oscilloscope display while varying the autotransformer output between 104 and 126 volts (208 and 252 volts for 230 volt operation).

g. Check—Test oscilloscope trace remains within ± 2.5 cm of the center horizontal graticule line.

h. Set the autotransformer output at 115 volts.

3. Adjust +300-Volts (R685) Check Regulation

Test equipment setup is the same as in Step 2.

a. Connect the test probe to the $+300$ -volt test point (pin connector 'A', see Fig. 6-4).

b. Set the Type W Comparison Voltage dial to 3.000.

c. Set the Type W Millivolts/Cm switch to 50.

d. Check—Test oscilloscope trace within 1.2 cm of the center horizontal graticule line.

e. Adjust—R865, $+300$ -volt adjustment (see Fig. 6-4) so the test oscilloscope trace is at the center horizontal graticule line.

f. Observe the test oscilloscope display while varying the autotransformer output between 104 and 126 volts (208 and 252 volts for 230-volt operation).

g. Check—Test oscilloscope trace remains within ± 1.2 cm of the center horizontal graticule line.

h. Set the autotransformer output at 115 volts.

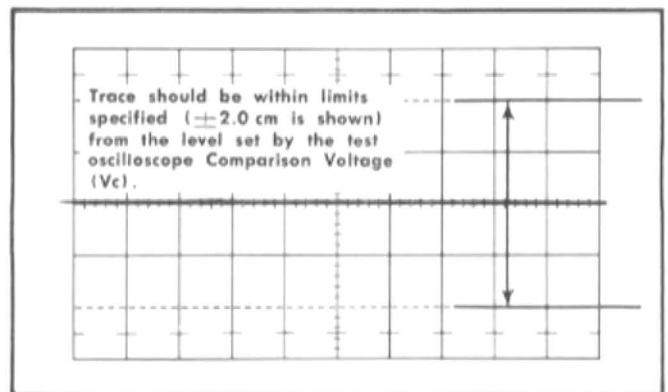


Fig. 6-5. Typical test oscilloscope display when checking Power-Supply voltages.

4. Adjust -12.2-Volts (R645) Check Regulation

Test equipment setup is the same as in Step 3.

a. Connect the test probe to the -12.2 -volt test point (pin connector 'H', see Fig. 6-4).

b. Set the Type W Input Coupling switch to ground.

c. Set the Type W Input Attenuator switch to 10.

d. Set the Type W Vc Range switch to -11 .

e. Set the Type W Comparison Voltage dial to 1.220.

f. Position the trace on the test oscilloscope at the center horizontal graticule line.

Calibration—Type 568/R568

- g. Set the Input Coupling to DC.
- h. Check—Test oscilloscope trace within ± 1.2 cm of the center horizontal graticule line.
- i. Adjust—R645, -12.2 volts adjustment (see Fig. 6-4) so the test oscilloscope trace is at the center horizontal graticule line.
- j. Observe the test oscilloscope display while varying the autotransformer output between 104 and 126 volts (208 and 252 volts for 230 volt operation).
- k. Check—Test oscilloscope trace remains within 1.8 cm of the center horizontal graticule line.
- l. Set the autotransformer output at 115 volts.

5. Check Low-Voltage Power Supply Ripple

Test equipment setup is as shown in Step 4.

- a. Set the Type W Input Coupling switch to AC.
- b. Set the Type W Millivolts/Cm switch to 5.
- c. Set the Type W Input Attenuation switch to 1.
- d. Connect the test probe to each of the test points given in Table 6-1.
- e. With the test probe connected to each test point, observe the test oscilloscope display while varying the autotransformer output between 104 and 126 volts (208 and 252 volts for 230-volt operation).

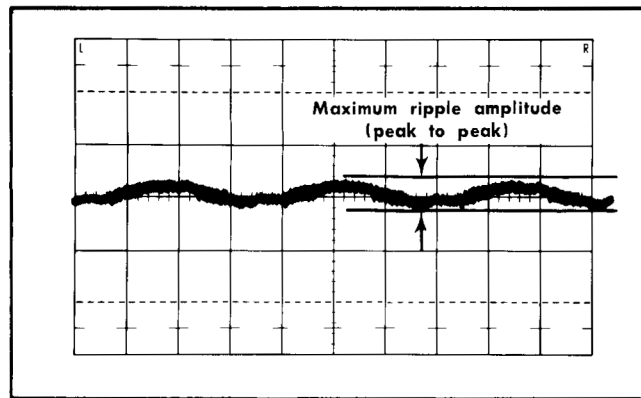


Fig. 6-6. Typical test oscilloscope display checking power supply ripple amplitude.

- f. Check—Test oscilloscope display for Power Supply ripple amplitude (see Fig. 6-6) not exceeding the maximum value given in Table 6-1.

TABLE 6-1
Power Supply Ripple Check

Voltage Test Point (Fig. 6-4)	Maximum Ripple (60 Hz or 120 Hz)	
	Voltage Peak to Peak	Display Amplitude
-12.2 volts	4 mV	0.8 cm
+300 volts	8 mV	1.6 cm
+125 volts	9 mV	1.6 cm
-100 volts	5 mV	1.0 cm

- g. Remove the test probe from the Type 568 and test oscilloscope.

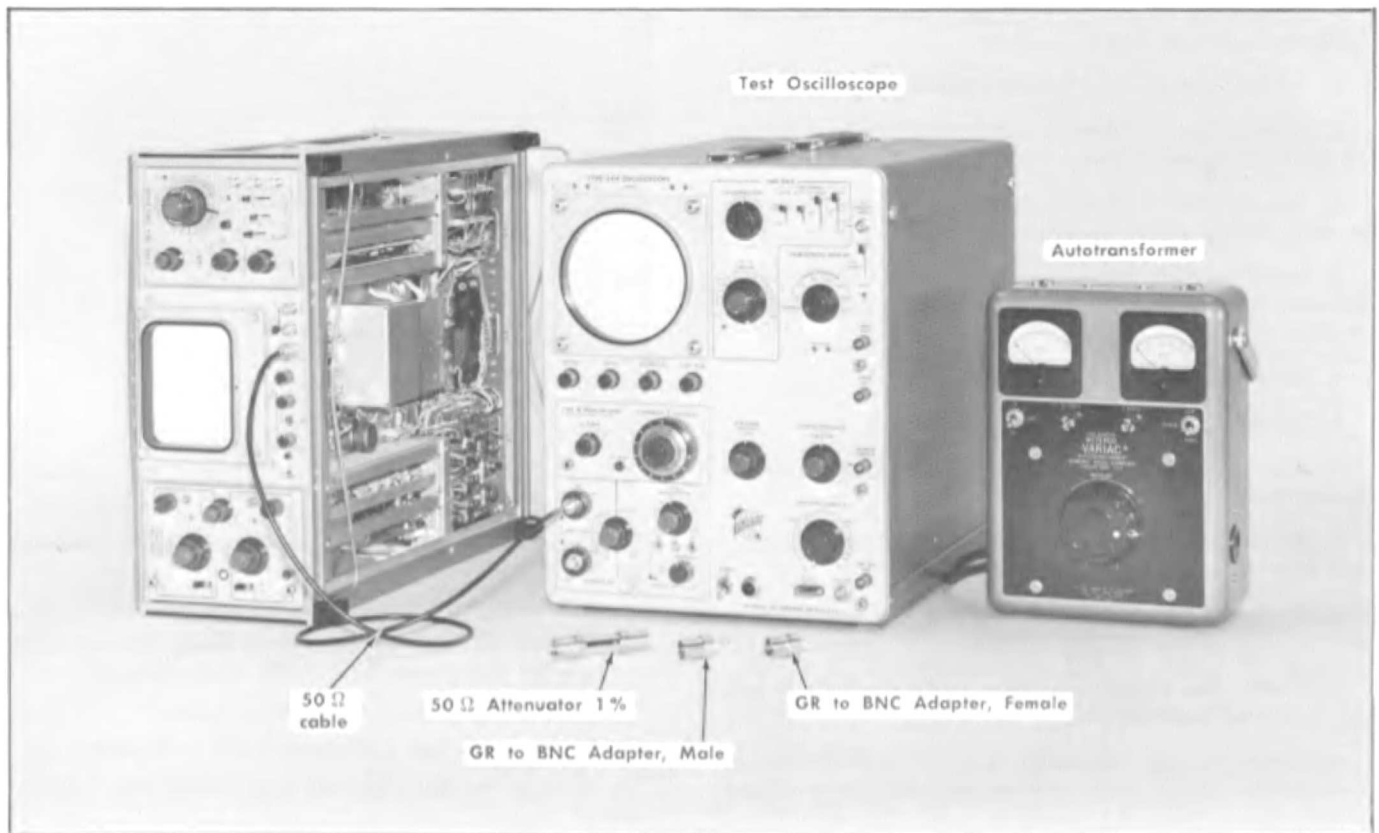


Fig. 6-7. Initial test equipment setup for steps 6 through 10.

CONTROL SETTINGS**Type 568**

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input signal	None
Mode	Normal (Channel 1)
Volts/Div	.5
Input Coupling	AC
Position	Centered

Time-Base Unit

Input Signal	None
Sweep Rate	50 μ SEC
Triggering	Norm, +, line, auto
Position	Centered

Test Oscilloscope

Horizontal Display	A
Time/Cm	5 mSEC (calibrated)
Triggering	+, line, Auto
Display	A-Vc
Input Coupling	Gnd
Input Attenuation	1
Millivolts/Cm	50
Position	Centered
Vc Range	+11
Comparison Voltage	5.000

6. Adjust Calibrator Amplitude (R940)

The amplitude of the calibrator is measured with the calibrator turned off, and the output multivibrator of the calibrator at its high output level. The output multivibrator may stop at either its high level or its low level when the calibrator is turned off and it may be necessary to set the CALIBRATOR switch to 1 kHz and back to off a few times to catch the output multivibrator at its high level. At its low level the output voltage will be less than 1 mV.

Test equipment is shown in Fig. 6-7.

a. Connect a 50 Ω coaxial cable with BNC connectors from the 5 V CALIBRATOR output connector of the Type 568 to the channel A vertical input of the test oscilloscope.

Calibration—Type 568/R568

- b. Position the trace on the test oscilloscope at the center horizontal graticule line.
- c. Set the Type W Input Coupling switch to DC.
- d. Check—Test oscilloscope trace within ± 2.0 cm of center horizontal graticule line.
- e. Adjust—R940, Calibrator Amplitude adjustment, so the trace is at the center horizontal graticule line (Fig. 6-8).
- f. Install the 50 Ω termination and the GR to BNC adapter between the coaxial cable and the test oscilloscope vertical input.
- g. Set the Type W Vc Range switch to +1.1.
- h. Set the Type W Millivolts/cm switch to 5.
- i. Check—Test oscilloscope trace within ± 2.0 cm of center horizontal graticule line.
- j. Remove the 50 Ω termination and the GR to BNC adapters from the signal path.
- k. Move the coaxial cable to the .5 V CALIBRATOR output.
- l. Check—Test oscilloscope trace within ± 1.0 cm of center horizontal graticule line.
- m. Install the 50 Ω termination and GR to BNC adapters between the coaxial cable and the test oscilloscope vertical input.
- n. Set the Type W Comparison Voltage dial to 0.500.
- o. Set the Type W Millivolts/cm switch to 1.
- p. Set the Type W Input Coupling switch to ground.
- q. Position the trace on the test oscilloscope at the center horizontal graticule line.
- r. Set the Type W Input Coupling switch to DC.
- s. Check—Test oscilloscope trace within ± 1.0 cm of center horizontal graticule line.
- t. Remove the 50 Ω termination and the GR to BNC adapters from the signal path.

7. Check Calibrator Zero Reference

Test equipment is the same as in step 6.

- a. Set the Type W Comparison Voltage dial to 0.000.
- b. Set the AMPLITUDE CALIBRATOR switch to 1 kHz and back to off so the output multivibrator rests in its low state (near ground).
- c. Set the Type W Input Coupling switch to ground.
- d. Position the trace on the test oscilloscope at the center horizontal graticule line.
- e. Set the Type W Input coupling switch to DC.
- f. Check—Test oscilloscope trace within ± 1.0 cm of the center horizontal graticule line.

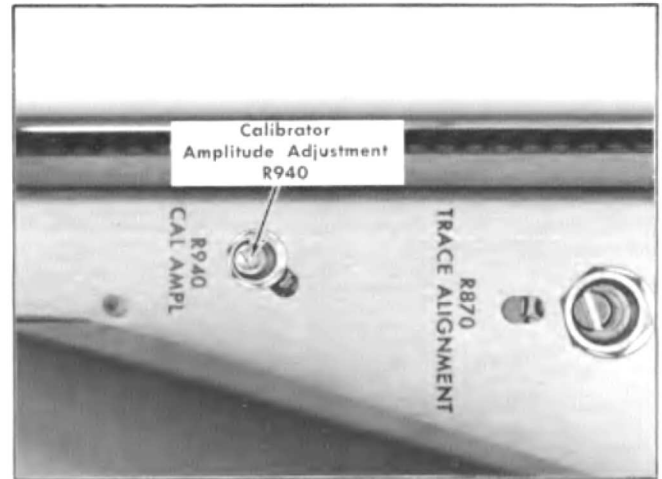


Fig. 6-8. Location of Calibrator Amplitude adjustment (Calibrator and High Voltage chassis).

8a. Check Calibrator 100 kHz Duty Cycle. (For serial numbers B160630 and above).

Test equipment setup is the same as in Step 7.

- a. Set the Type 568 Calibrator switch to 100 kHz.
- b. Change the following test oscilloscope and Type W controls.

Time/Cm	1 μ SEC
Input Coupling	AC
Input Attenuation	10
Millivolts/Cm	20
Vc Range	0

- c. Adjust the triggering controls if necessary, so the display starts on the leading edge of the waveform.

- d. Position the leading edge of the waveform at the first vertical graticule line with the horizontal position controls.

- e. Adjust the test oscilloscope Time/Cm Variable control to display one complete cycle of the waveform in exactly 8 cm.

- f. Check—length of each segment of the square wave, 3.9 to 4.1 cm (see Fig. 6-9).

8b. Check Calibrator 20 kHz Duty Cycle. (For serial numbers B150629 and below).

Test equipment setup is the same as in Step 7.

- a. Set the Type 568 Calibrator switch to 20 kHz.
- b. Change the following test oscilloscope and Type W controls.

Time/Cm	5 μ SEC
Input Coupling	AC
Input Attenuation	10
Millivolts/Cm	20
Vc Range	0

- c. Adjust the triggering controls if necessary, so the display starts on the leading edge of the waveform.

- d. Position the leading edge of the waveform at the first vertical graticule line with the horizontal position controls.
- e. Adjust the test oscilloscope Time/Cm Variable control to display one complete cycle of the waveform in exactly 8 cm.
- f. Check—length of each segment of the square wave, 3.9 to 4.1 cm (see Fig. 6-9).

9. Check Calibrator 1 kHz Duty Cycle

Test equipment setup is the same as in step 8.

- a. Set the Type 568 CALIBRATOR switch to 1 kHz.
- b. Set the test oscilloscope Time/Cm switch to .1 mSEC.
- c. Adjust the triggering controls if necessary so the display starts on the leading edge of the waveform.
- d. Position the leading edge of the waveform at the first vertical graticule line, with the horizontal position controls.
- e. Adjust the test oscilloscope Time/Cm Variable control to display one complete cycle of the waveform in exactly 8 cm.
- f. Check—Length of each segment of the square wave, 3.9 to 4.1 cm (see Fig. 6-9).

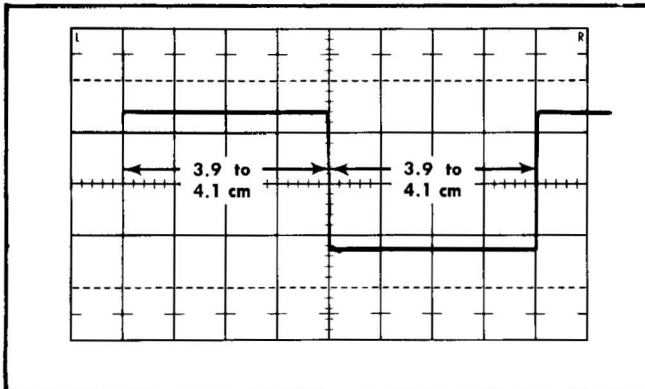


Fig. 6-9. Typical test oscilloscope display when checking Calibrator duty cycle.

10. Check Calibrator + PRETRIGGER Pulse Amplitude

Test equipment is the same as in step 9.

- a. Move the coaxial cable to the Type 568 Calibrator + PRETRIGGER output connector.
- b. Set the test oscilloscope Millivolts/Cm switch to 50.
- c. Set the test oscilloscope Time/Cm switch to .5 mSEC.
- d. Obtain a stable display on the test oscilloscope with the triggering controls.
- e. Check—Amplitude of the positive going pulse should be approximately 2 cm (see Fig. 6-10).
- f. Install the 50 Ω termination and the GR to BNC adapters between the coaxial cable and the test oscilloscope vertical input.
- g. Set the test oscilloscope Millivolts/cm switch to 10.
- h. Adjust the triggering controls if necessary to obtain a stable display.
- i. Check—Amplitude of the positive going pulse should be approximately 2 cm (see Fig. 6-10).
- j. Remove the 50 Ω termination, GR to BNC adapters and the coaxial cable from both instruments.

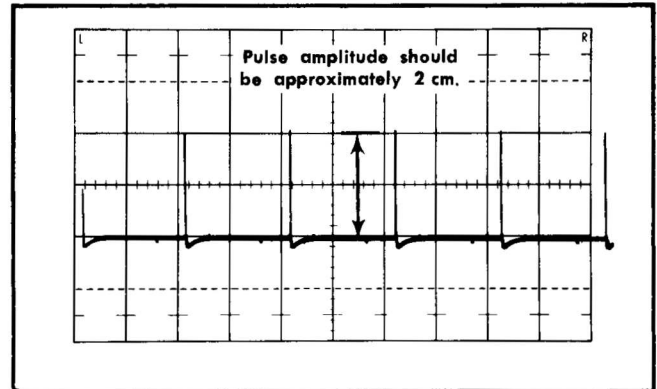


Fig. 6-10. Typical test oscilloscope display when checking Pre Trigger pulse amplitude.

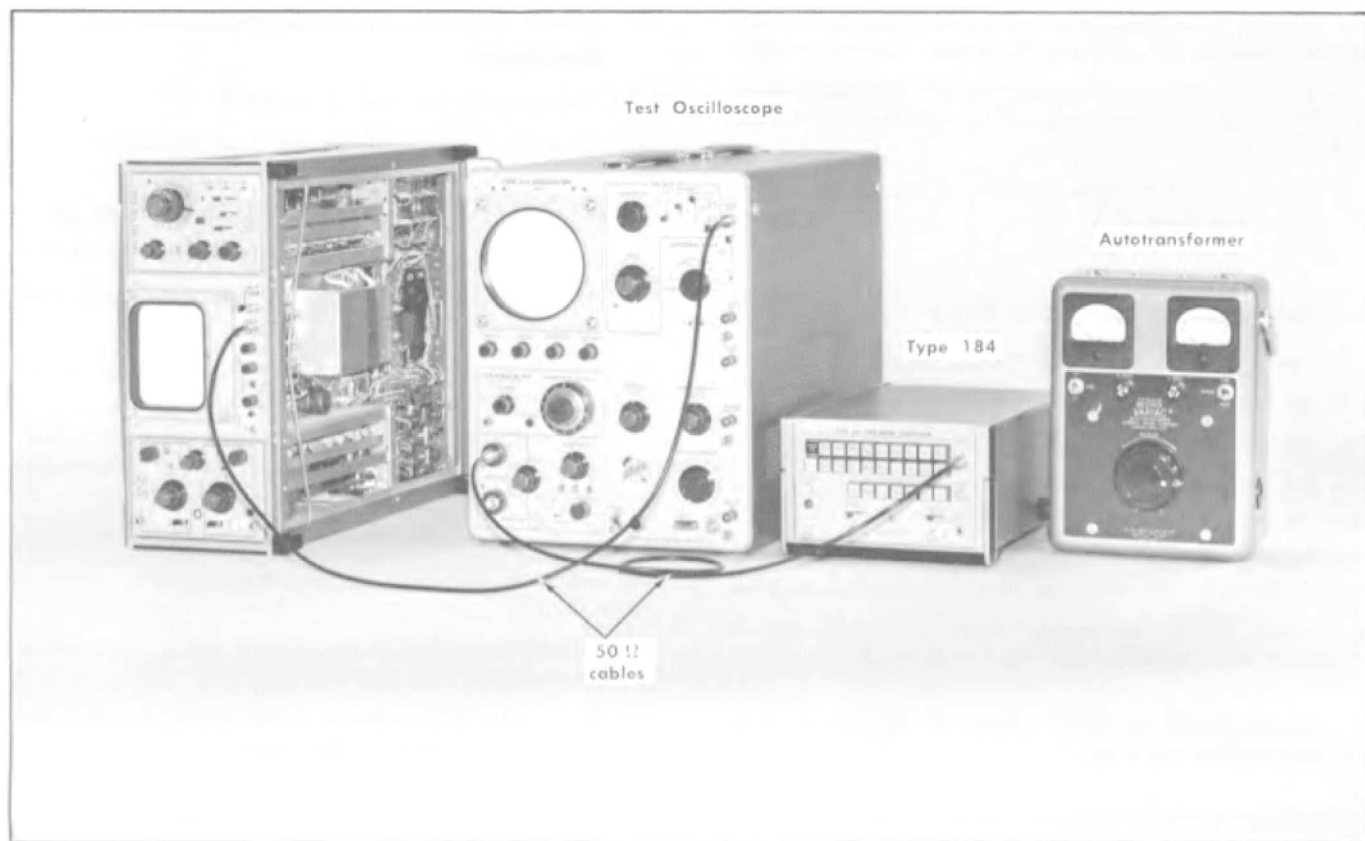


Fig. 6-11. Test equipment setup for step 11.

CONTROL SETTINGS**Type 568**

POWER	ON
INTENSITY	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	100 kHz
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input Signal	None
Mode	Normal (Channel 1)
Volts/Div	.5
Input Coupling	AC
Position	Centered

Time-Base Unit

Input Signal	None
Sweep Rate	50 μ SEC
Triggering	+, line, auto
Position	Centered

Test Oscilloscope

Horizontal Display	A
Time/Cm	10 μSEC
Triggering	+, DC, INT
Display	A-Vc
Input Coupling	DC
Input Attenuator	10
Millivolts/Cm	50
Position	Centered
Vc Range	0
Comparison Voltage	0.000

Type 184

MARKERS	10 μS for 100 kHz calibrator
	50 μS for 20 kHz calibrator
Marker Amplifier	Off
H-F Selector	Off

11a. Check Calibrator 100 kHz Repetition Rate. (For serial numbers B160630 and above).

Test equipment is shown in Fig. 6-11. The Type 568 5V CALIBRATOR output should be connected to the Test Oscil-

illoscope Vertical Channel B Input, rather than to the External Trigger Input as shown.

a. Connect the Time-Mark Generator (Type 184) marker output to the Channel A Vertical Input of the Test Oscilloscope with a $50\ \Omega$ coaxial cable.

b. Connect the Type 568 5 V CALIBRATOR output to the Channel B Vertical Input of the Test Oscilloscope with a $50\ \Omega$ coaxial cable.

c. Set the Stability control to PRESET, Triggering Level to 0 and position the trace until a stable display is obtained.

d. Adjust the Test Oscilloscope Swp Cal control for exact timing with the $10\ \mu\text{sec}$ time markers.

e. Set the Test Oscilloscope Time/Cm to 10 mSEC.

f. Set the Type W Display to A-B.

g. Position the trace until DC triggering occurs at the peak value of the difference frequency envelope.

h. Check—less than 5 cycles in 10 cm.

i. Remove the coaxial cables and disconnect the Test Oscilloscope.

11b. Check Calibrator 20 kHz Repetition Rate. (For serial numbers B150629 and below).

Test equipment is shown in Fig. 6-11. The Type 568 5 V CALIBRATOR output should be connected to the Test Oscilloscope Vertical Channel B Input, rather than to the External Trigger Input as shown.

a. Connect the Time-Mark Generator (Type 184) marker output to the Channel A Vertical Input of the Test Oscilloscope with a $50\ \Omega$ coaxial cable.

b. Connect the Type 568 5 V CALIBRATOR output to the Channel B Vertical Input of the Test Oscilloscope with a $50\ \Omega$ coaxial cable.

c. Set the Stability control to PRESET, Triggering Level to 0 and position the trace until a stable display is obtained.

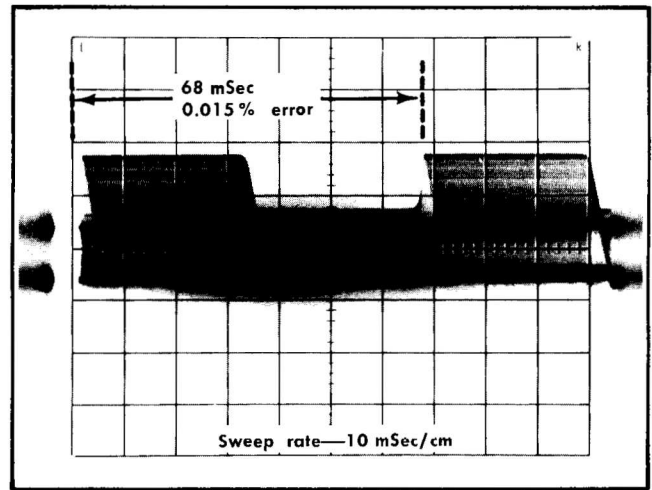


Fig. 6-12. Typical test oscilloscope display when checking Calibrator Repetition Rate.

d. Adjust the Test Oscilloscope Swp Cal control for exact timing with the $50\ \mu\text{sec}$ time markers.

e. Set the Test Oscilloscope Time/Cm to 50 mSEC.

f. Set the Type W Display to A-B.

g. Position the trace until DC triggering occurs at the peak value of the difference frequency envelope.

h. Check—less than 5 cycles in 10 cm.

i. Remove the coaxial cables and disconnect the Test Oscilloscope.

NOTE

The waveform displayed is the difference frequency envelope resulting in the algebraic difference of the time-mark generator and calibrator waveform. A maximum of 5 cycles displayed in 10 cm represents an error of $\pm 0.05\%$ (10 cycles in 20 kHz or 50 cycles in 100 kHz).

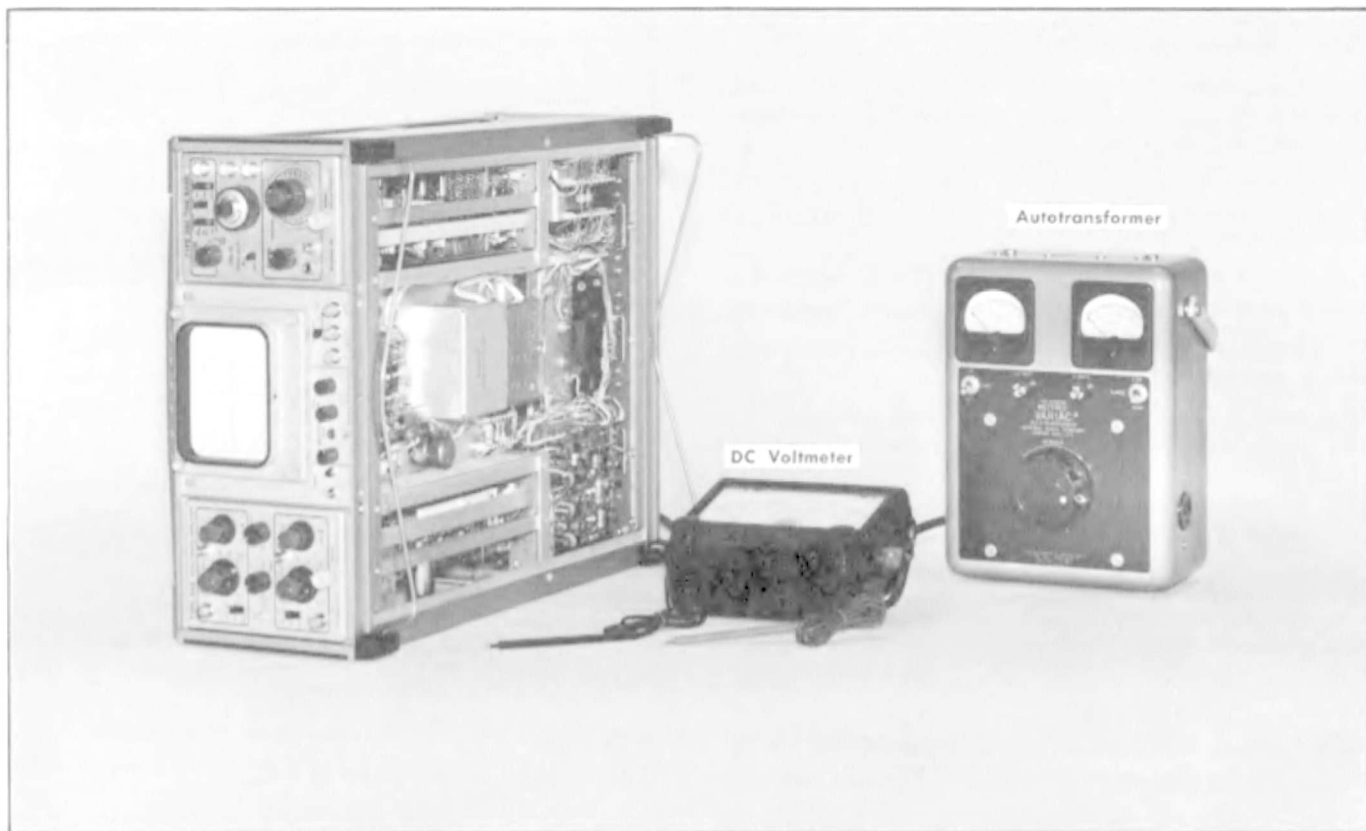


Fig. 6-13. Initial test equipment setup for steps 12 through 14.

CONTROL SETTINGS

Type 568

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input Signal	None
Mode	Normal (Channel 1)
Volts/Div	.5
Input Coupling	AC
Position	Centered

Time-Base Unit

Input Signal	None
Sweep Rate	50 μ SEC
Triggering	Norm, +, line, auto
Position	Centered

12. Adjust High Voltage (R855)

①

Test equipment is shown in Fig. 6-13.

- Connect the DC voltmeter from the -3300 -volt test point (see Fig. 6-14) to chassis ground.
- Check—Meter reading for -3300 volts, $\pm 5\%$ (± 165 volts).
- Adjust—R855 High Voltage adjustment, (see Fig. 6-15) for -3300 volts.

13. Check High Voltage Power-Supply Regulation

Test equipment is shown in Fig. 6-13.

- Turn the Vertical POSITION control fully clockwise so the trace is off the CRT.
- Turn the INTEN control fully clockwise.
- With the DC voltmeter connected from the -3300 -volt test point to chassis ground, and the autotransformer output set at 115 VAC (or 230 VAC), note the meter reading.
- Vary the autotransformer output between 104 volts and 126 volts (208 volts and 252 volts for 230 volt operation).
- Check—Meter reading should remain constant with no variation from the reading noted in step c.

f. Position the trace on the CRT with the Vertical Position control and set the INTEN control for normal intensity.

g. Return the autotransformer output to 115 volts (or 230 volts). If the line voltage is close to 115 volts (or 230 volts), the Type 568 may be connected directly to the line; otherwise leave the instrument connected to the autotransformer for the remainder of the procedure.

14. Check Adjust Vertical and Horizontal Deflection-plate Compensation

This step should be performed if real-time displays over 3 MHz are to be observed at any time. If only sampling plug-in units are to be used in the Type 568, this step can be omitted.

a. Insert the CRT Deflection Capacitance Normalizer into the left plug-in compartment.

b. Connect the 100 volt Calibrator output of the test oscilloscope to the Capacitance Normalizer input connector.

c. Adjust the time-base triggering controls so the leading edge of the waveform is displayed.

d. Check—For optimum square corner.

e. Adjust—C760 (see Fig. 6-15).

f. Interchange the Capacitance Normalizer and the time-base unit. Readjust the FOCUS control and the time-base triggering controls for a stable well-focused display.

g. Check—For optimum square-wave corner.

h. Adjust—C761 for optimum square corner.

i. Remove the Capacitance Normalizer. Replace the amplifier unit in the left compartment and the time-base unit in the right compartment.

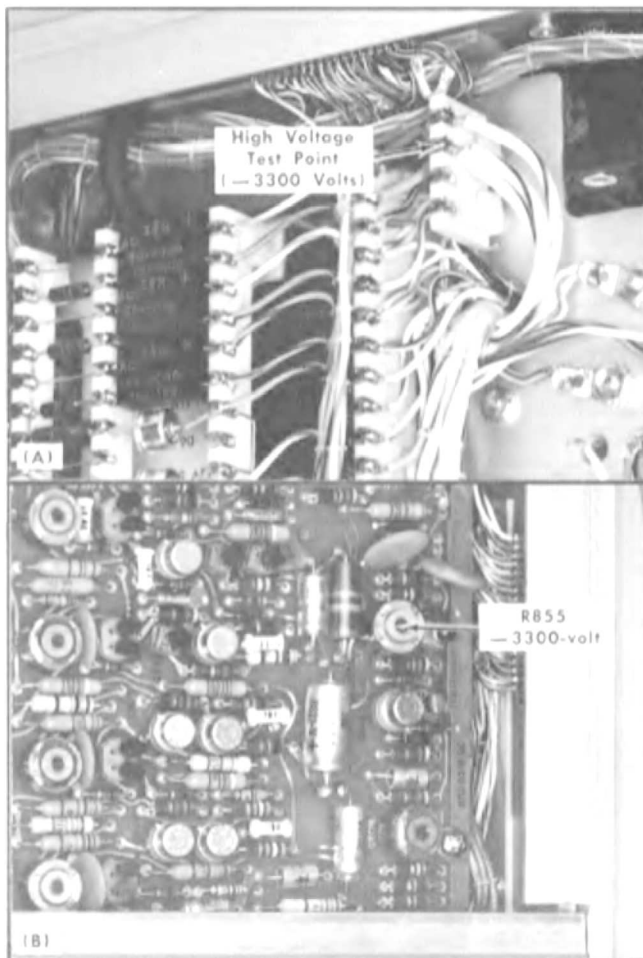


Fig. 6-14. Location of —3300 volt test point and location of —3300 volt adjustment.

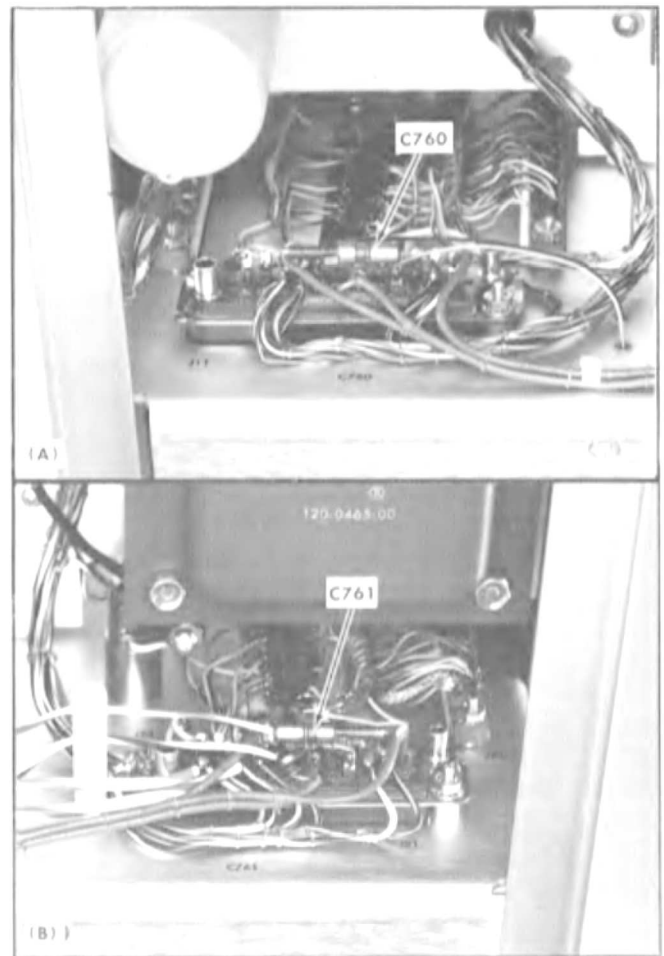


Fig. 6-15. Location of vertical and horizontal compensation adjustments, C760 and C761.

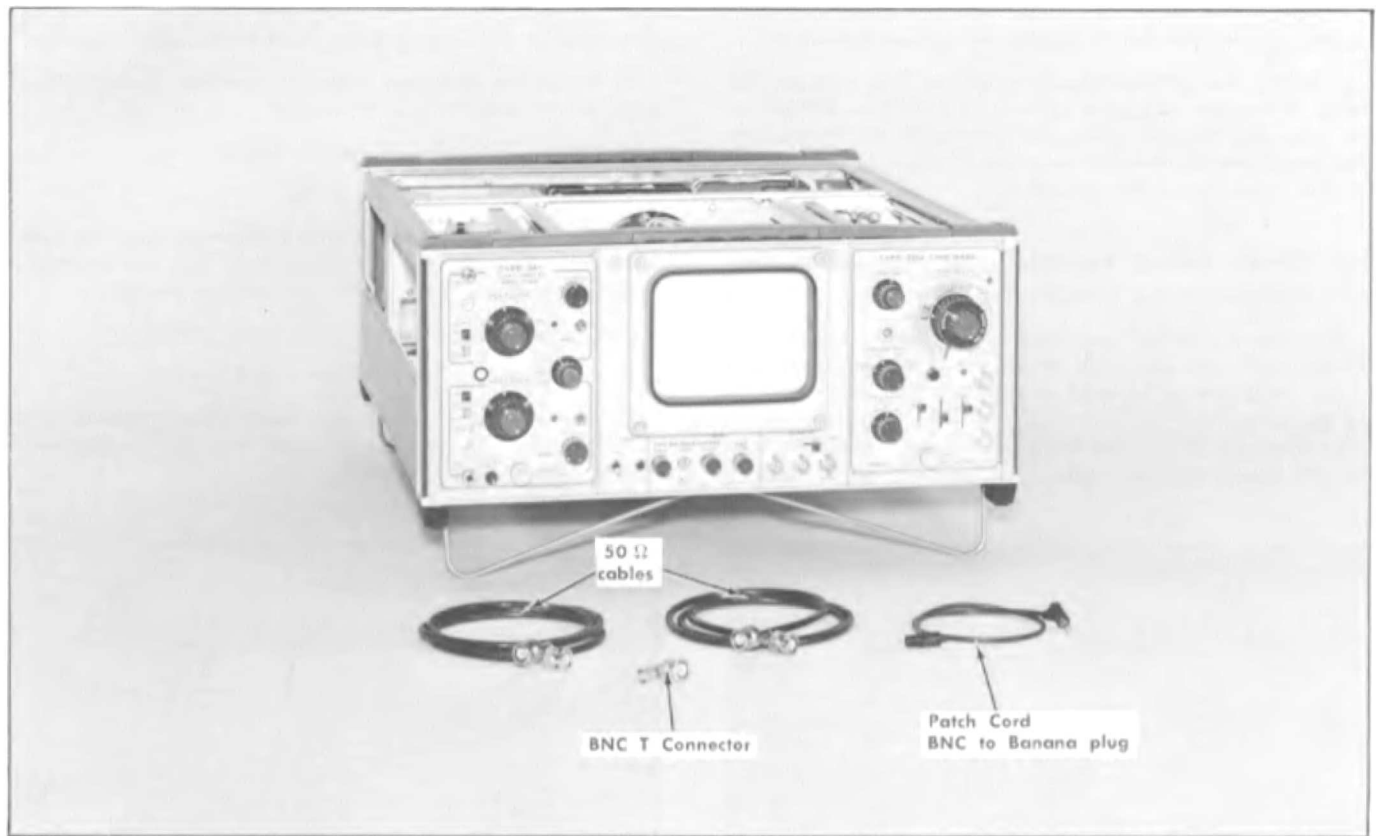


Fig. 6-16. Initial test equipment setup for step 15 through 20.

CONTROL SETTING

Type 568

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input signal	None
Mode	Normal (Channel 1)
Volts/Div	2
Input Coupling	AC
Position	Centered

Time-Base Unit

Input Signal	None
Sweep Rate	50 μ SEC
Triggering	Norm, +, line, auto
Position	Centered

NOTE

If Real-Time Plug-In units are being used in the Type 568, perform the following six steps. If Sam-

pling Plug-In units are being used, the following steps should be omitted and the procedure continued with step 21.

15. Adjust Trace Alignment (R870) ①

Test equipment setup is shown in Fig. 6-16.

- Obtain a free running trace on the Type 568 by turning the Time-base triggering control fully clockwise.
- Position the trace on the center horizontal graticule line with the Vertical Position control.
- Check—Trace should be parallel with the center horizontal graticule line.
- Adjust—R870, Trace alignment (Fig. 6-17) so the trace is parallel with the center horizontal graticule line.

16. Adjust Astigmatism (R867) ①

Test equipment setup remains as in step 15.

- Connect the 5 V CALIBRATOR output to the Channel 1 Vertical Input with a 50 Ω coaxial cable.
- Set the CALIBRATOR switch to 100 kHz.
- Trigger the display with the Time-Base triggering controls.

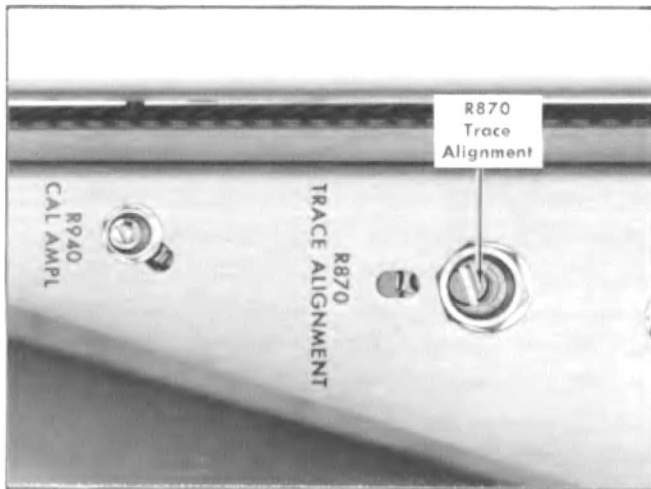


Fig. 6-17. Location of Trace Alignment Adjustment (Calibrator and High Voltage chassis).

d. Check—Display should be well defined with optimum setting of the FOCUS control.

e. Adjust—R867, ASTIG adjustment (Fig. 6-18) and the FOCUS control for a sharp, well defined display over the entire trace length.



Fig. 6-18. Location of Astigmatism Adjustment (front panel).

17. Adjust Geometry (R837)

Test equipment setup is the same as in step 16.

a. Set the Channel 1 Volts/Div switch to .5 Volts/Div.

b. Set the Channel 1 Volts/Div Variable control so the square wave display over-scans the graticule area. The INTEN control may need to be advanced to view the vertical portion of the waveform.

c. Position the display so vertical portions of the waveform coincide with the extreme left and right vertical graticule lines.

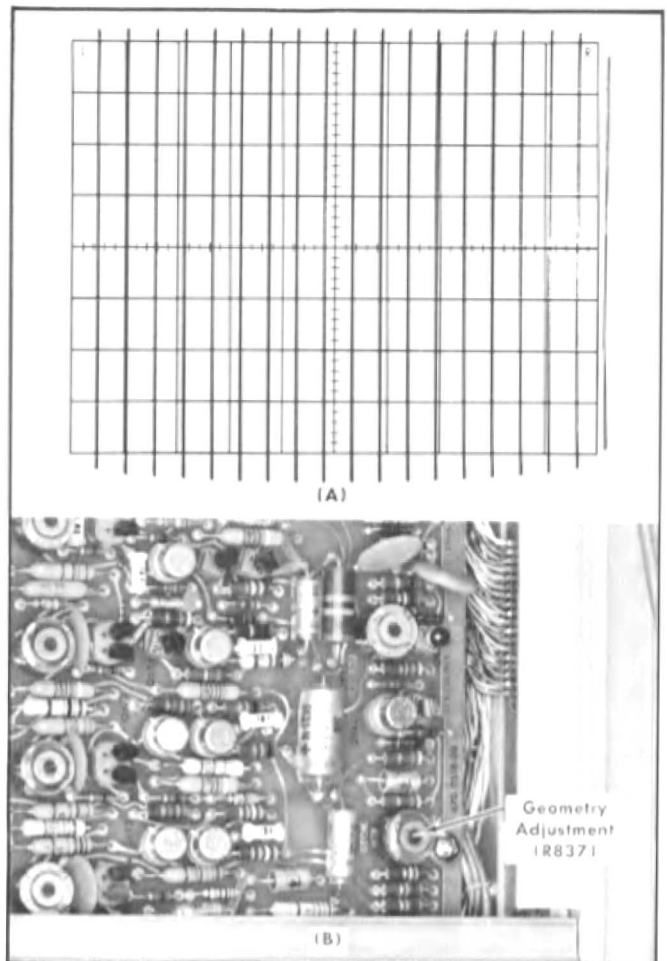


Fig. 6-19. (A) Typical CRT display showing good geometry (B) Location of Geometry adjustment.

d. Check—Vertical portions of the waveform should be parallel with the left and right vertical graticule lines (Fig. 6-19A).

e. Adjust—R873, Geometry adjustment (Fig. 6-19B) for straight vertical portions of the waveform parallel to the left and right vertical graticule lines.

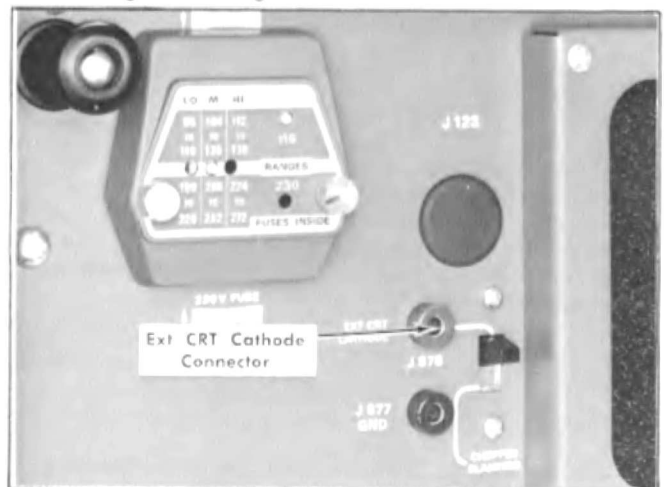


Fig. 6-20. Location of Ext CRT Cathode connector (rear panel)

- f. Return the Channel 1 Volts/Div Variable control to Calibrate.

18. Check EXT CRT CATHODE

Test equipment setup is the same as in Step 17.

- a. Connect a BNC T connector between the 5 V CALIBRATOR output and the coaxial cable to the Vertical Input.
- b. Connect a second coaxial cable and a BNC to Banana Plug patch cord from the T connector to the EXT CRT CATHODE connector (Fig. 6-20).
- c. Decrease the intensity until the trace is barely visible.
- d. Set the CRT CATHODE SELECTOR switch to EXT CRT CATHODE.
- e. Check—For intensity modulation of the waveform (Fig. 6-21).
- f. Remove the coaxial cables, patch cord and T connector.
- g. Set the CALIBRATOR switch to OFF.

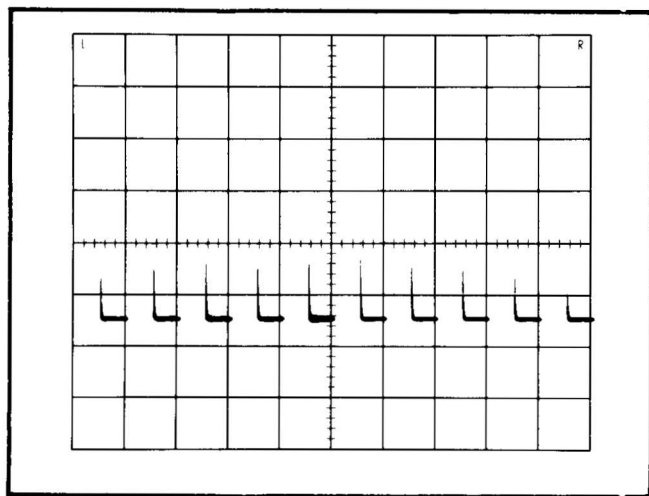


Fig. 6-21. Typical CRT display of intensity modulation.

NOTE

The two following steps can be performed only with a dual trace amplifier unit featuring the alternate and chopped modes of operation. If the plug-in unit is to be changed to perform this step, turn the INTEN control fully counterclockwise before doing so.

19. Check Alternate Trace

- a. Set the Vertical Amplifier Mode switch to Alternate
- b. Set the Channel 2 Input Coupling switch to AC.

- c. Set the Channel 2 Vertical Position control to midrange.
- d. Adjust the Time Base triggering controls for a free running trace.
- e. Check—For two traces on the CRT screen.

20. Check Dual Trace Chopping Blanking

- a. Set the Amplifier Mode switch to Chopped.
- b. Set the Time Base Time/Cm switch to 5 μ SEC.
- c. Position the two traces approximately two centimeters apart with the Vertical Position controls.
- d. Adjust the triggering controls for a stable display.
- e. Adjust the INTEN control so the vertical portions of the display are barely visible (Fig. 6-22A).
- f. Set the CRT CATHODE SELECTOR switch to CHOPPED BLANKING.

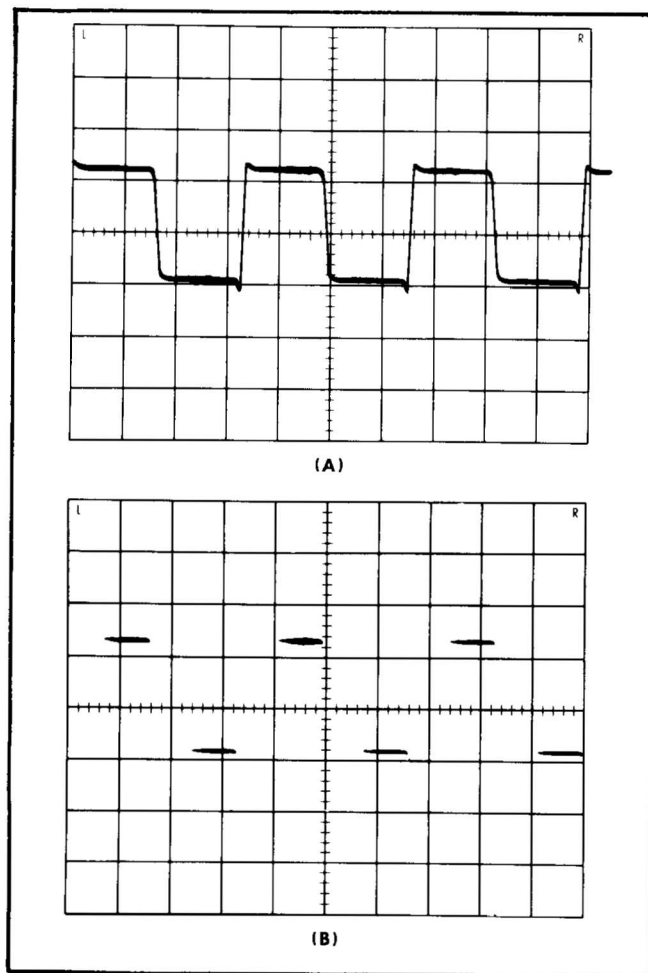


Fig. 6-22. Typical CRT display when checking Chopped Blanking with CRT CATHODE SELECTOR switch set at (A) EXT CRT CATHODE and (B) CHOPPED BLANKING.

- g. Check—Vertical portions of the display should be blanked and the horizontal portions should be intensified (Fig. 6-22B).

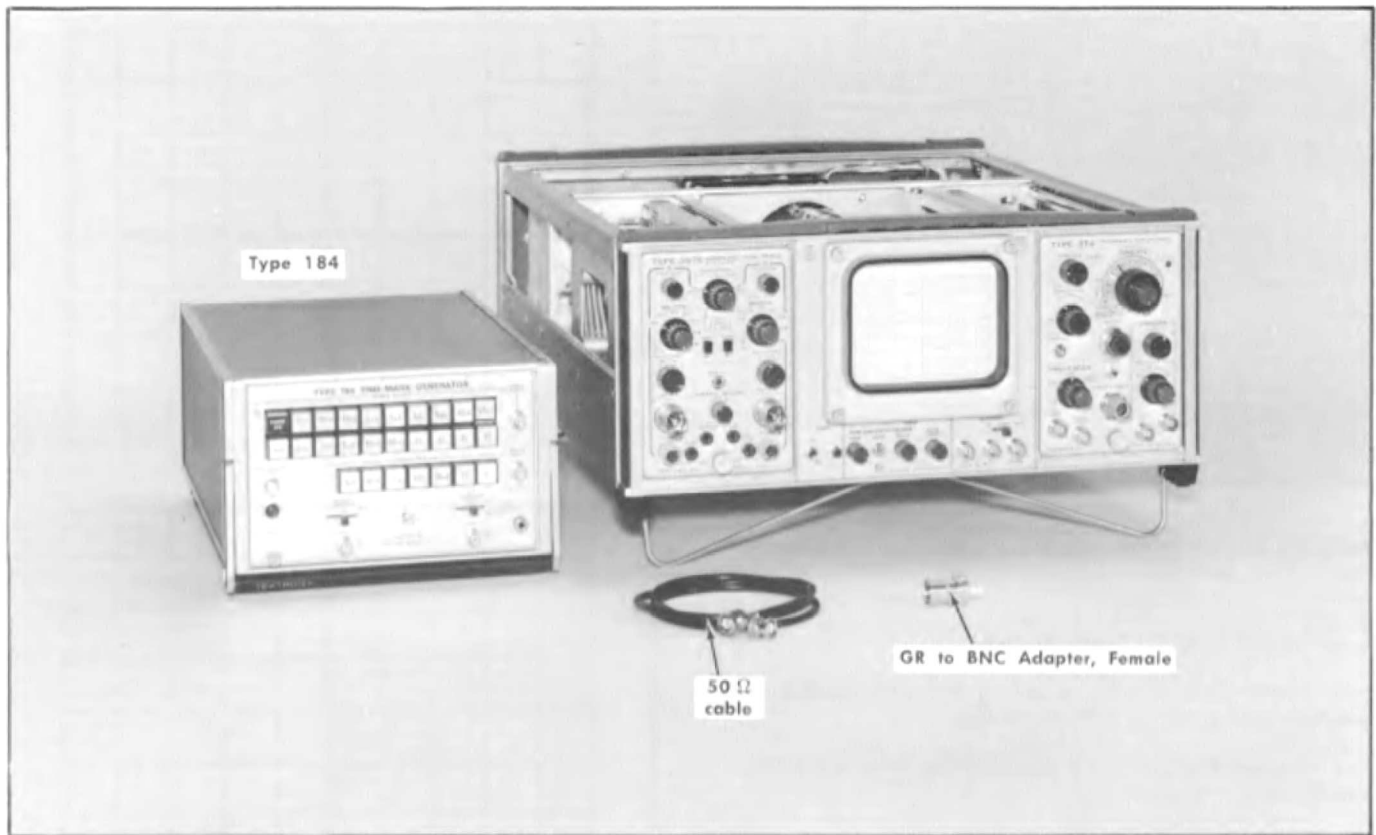


Fig. 6-23. Initial test equipment setup for step 21 through 23.

CONTROL SETTINGS**Type 568**

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	CHOPPED BLANKING

Vertical Sampling Unit

Input Signal	None
Mode	A Only
Position	Centered
mV/Div	500
DC Offset	Midrange
Norm-Inv	Norm
Internal Triggering	A

Time-Base Sampling Unit

Input Signal	None
Time/Cm	50 μ SEC
Position	Centered
Samples/Sweep	$\times 1$
Delay	0.00
Sweep Mode	Norm
Manual Scan	Midrange

Triggering
Trigger Level
Recovery Time+, Int
Fully clockwise
Midrange**Type 184**

Marker	10 nS Sine Wave
Marker Amplifier	Off
HF Selector	2 ns

NOTE

If Sampling Plug-In units are being used in the Type 568, the Calibration procedure should be continued on the following step; step 21.

21. Adjust Trace Alignment (R870)

①

Test equipment setup is shown in Fig. 6-23.

a. Position the trace at the center horizontal graticule line with the Vertical Position control.

b. Check—Trace should be parallel to the center horizontal graticule line.

c. Adjust—R870, Trace alignment adjustment (Fig. 6-24) so the trace is parallel to the center horizontal graticule line.

22. Adjust Astigmatism (R867)

①

Test equipment setup remains as in Step 21.

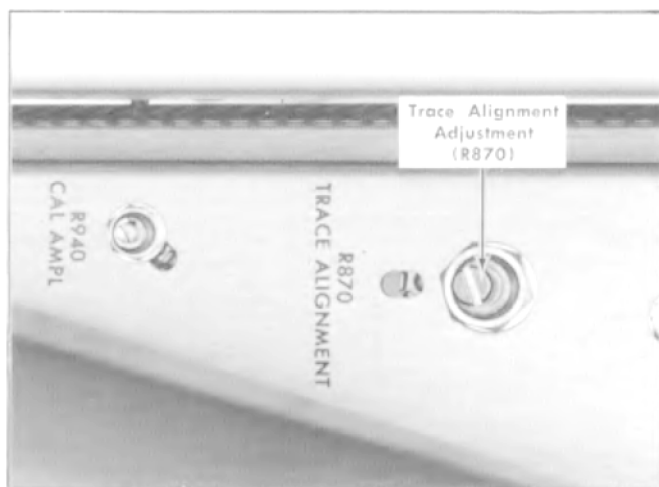


Fig. 6-24. Location of trace alignment adjustment (Calibrator and High Voltage chassis).

- a. Set the Samples/Sweep to 100.
- b. Check—Dots should be round and well defined with optimum setting of the FOCUS control.
- c. Adjust—R867, ASTIG adjustment (Fig. 6-25) for optimum roundness of the dots.



Fig. 6-25. Location of Astigmatism adjustment (front panel).

23. Adjust Geometry (R837)

①

Test equipment setup remains as in Step 22.

- a. Connect the Time-Mark Generator (Type 184) Marker output to the Channel 1 Vertical Input through a 50 Ω coaxial cable and a BNC to GR adapter.
- b. Set the mV/Div switch to 10.
- c. Set the Samples/Sweep to $\times 1$.
- d. Set the Sweep Mode switch to Manual.

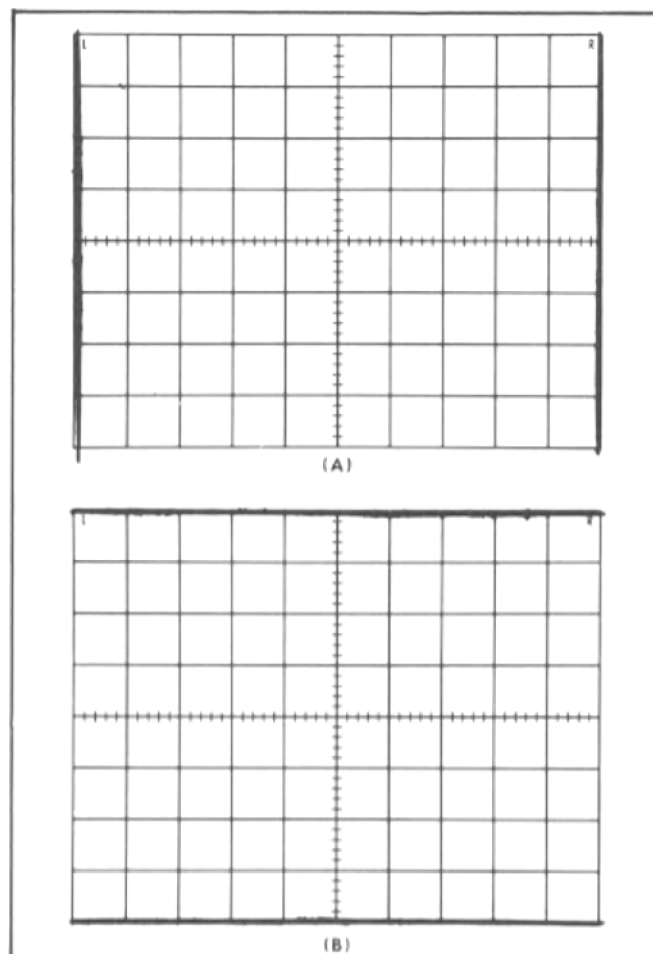


Fig. 6-26. Dual exposure. (A) Vertical trace positioned at the extreme left and right graticule lines; (B) Horizontal trace positioned at the extreme upper and lower graticule lines.

- e. Position the vertical trace at the extreme left and then at the extreme right vertical graticule line with the Manual Scan control.
- f. Check—Vertical trace should be parallel with the left and right vertical graticule lines. Maximum bowing ± 0.5 minor div (Fig. 6-26A).

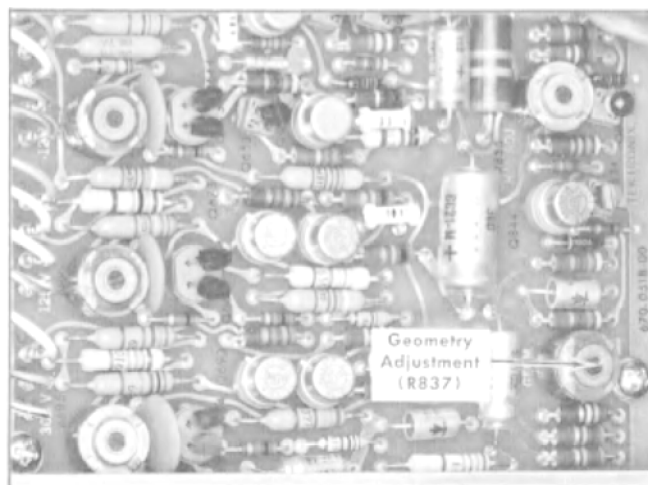


Fig. 6-27. Location of Geometry Adjustment (Regulator Board).

- g. Set the Sweep Mode switch to Normal.
- h. Remove the coaxial cable from the Channel 1 Vertical Input connector.
- i. Position the horizontal trace at the extreme upper and the extreme lower horizontal graticule lines with the Channel 1 Vertical Position control.
- j. Check—Trace should be parallel with the upper and lower horizontal graticule lines. Maximum bowing ± 0.5 minor div (Fig. 6-26B).
- k. Adjust—R837, Geometry adjustment (Fig. 6-27), for minimum bowing of the vertical and horizontal trace if parts e and i of this step are out of tolerance.

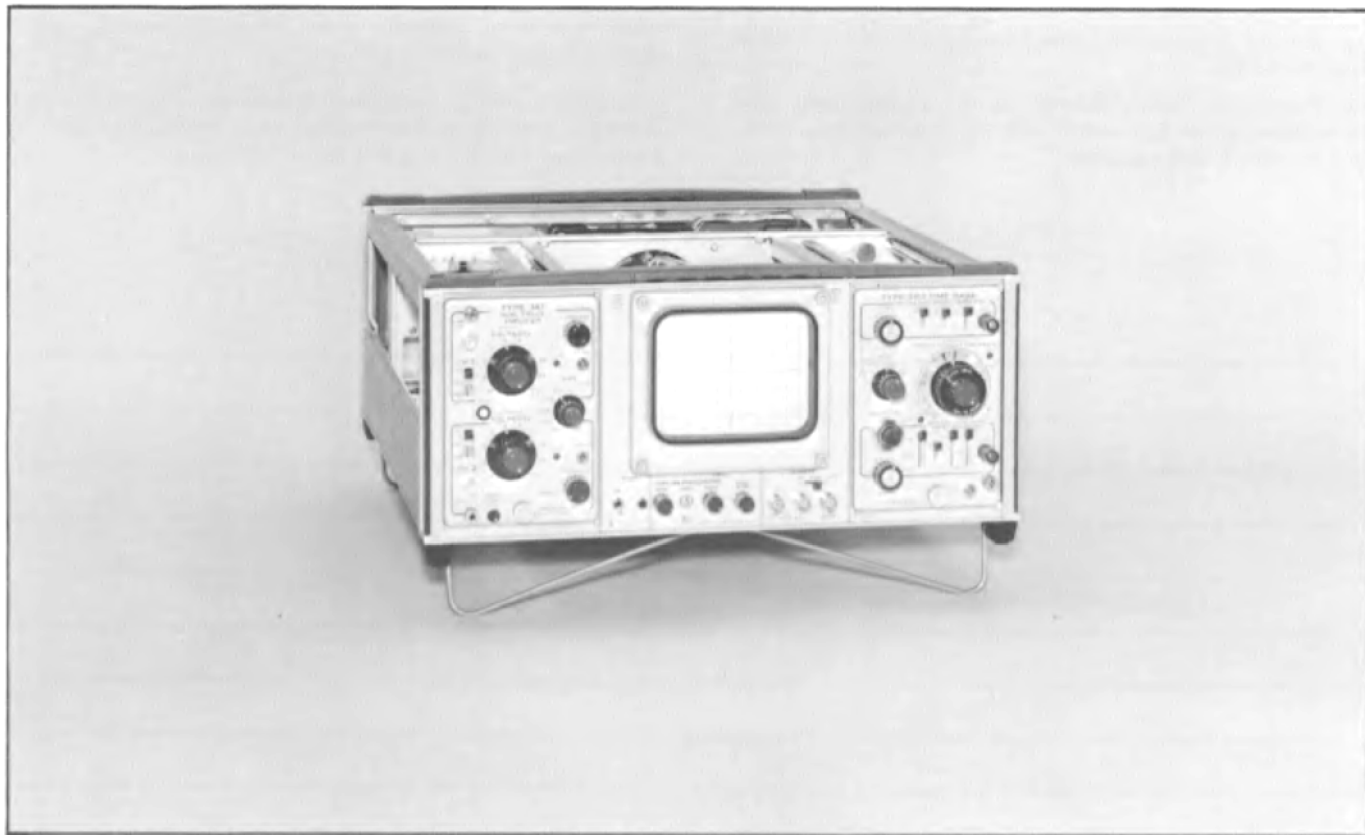


Fig. 6-28. Test equipment setup for step 24.

CONTROL SETTINGS

Type 568

POWER	ON
INTEN	Normal Brightness
ASTIG	As is
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF
CRT CATHODE SELECTOR	EXT CRT CATHODE

Vertical Unit

Input Signal	None
Mode	Normal (Channel 1)
Volts/Div	.5
Input Coupling	AC
Position	Centered

Time-Base Unit

Input Signal	None
Mode	Normal
Normal Triggering	Norm, +, Auto, Int
Delayed Triggering	Free run
Normal Sweep Rate	1 mSEC
Delayed Sweep Rate	.1 mSEC
Delay Time	1.00

24. Check Delay Sweep Intensification

This check can be made only with a time-base unit having the delayed sweep feature, such as the Type 383. If the Plug-In units are to be changed to perform this check, turn the INTENSITY control fully counterclockwise before removing the plug-in unit.

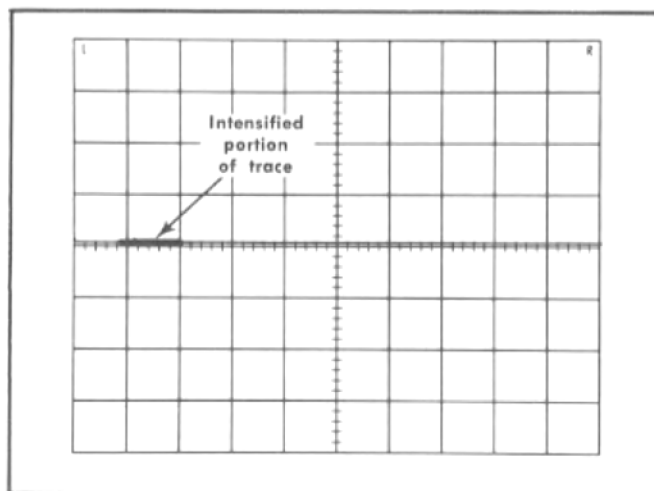


Fig. 6-29. Typical CRT display of delayed sweep intensification.

- a. Set the INTEN control so the trace is barely visible.
- b. Set the Time-Base Mode switch to Intensified (not triggered).
- c. Check—For an intensified portion of the display (fig. 6-29).
- d. If the Plug-In units are to be replaced by the original units, turn the INTEN control fully counterclockwise before doing so.

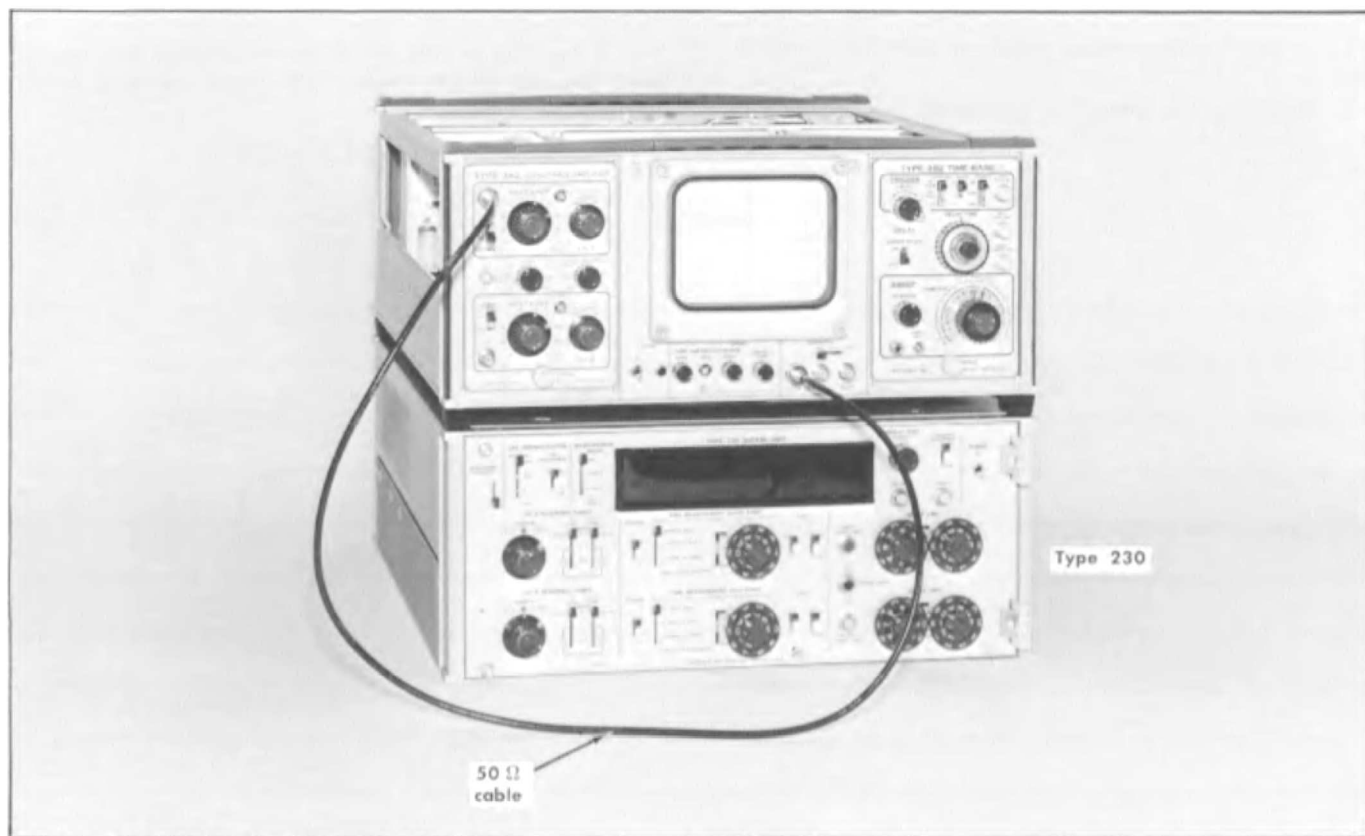


Fig. 6-30. Test equipment setup for step 25.

CONTROL SETTINGS**Type 568**

POWER ON
 INTEN Trace barely visible
 FOCUS Adjust for a well focused trace
 SCALE ILLUM As desired
 CALIBRATOR 1 kHz

Vertical Unit

Input Signal 5 V CALIBRATOR
 Mode Channel 1
 Trigger Source Channel 1
 Volts/Div 2
 Polarity Normal
 Position Centered

Time-Base Unit

Trigger Centered
 Level AC Slow
 Coupling +
 Slope Int
 Source
 Delay
 Sweep Delay Out

Sweep

Position Centered
 Time/Div .2 mSEC
 Digital Resolution Normal

Type 230

Power On
 Triggered Measurement Off
 Display Time As desired
 Measurement Mode A Volts
 CRT Intensification
 Time Measurement Off
 Ref Zones 100 %
 Measurement 1
 Averaging

Channel A Ref Zones

0 % Position As desired
 100 % Position 12 o'clock
 0 % Level As desired
 100 % Level 2 cm

25. Check Digital Readout Intensification (Real Time)

This check can only be made if a Type 230 Digital Readout unit and Real-Time Digital Plug-In units such as the Type 3A2

and Type 3B2 are being used with the Type 568.

Test equipment setup is shown in Fig. 6-30.

- a. Connect the 5 V CALIBRATOR output to the channel 1 Vertical Input connector with a 50 Ω coaxial cable.
- b. Trigger the display with the time-base triggering controls.
- c. Check—For an intensified portion of the display (Fig. 6-31).
- d. Turn the Type 230 100% Position control and check that the intensified portion of the sweep steps across the CRT.
- e. Set the CALIBRATOR switch to OFF.
- f. Disconnect the coaxial cable.

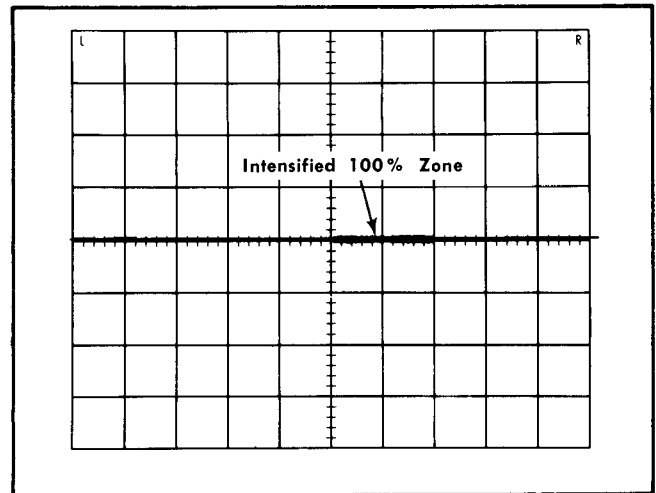


Fig. 6-31. Typical CRT display of Digital Readout Intensification with real time Plug-In Units.

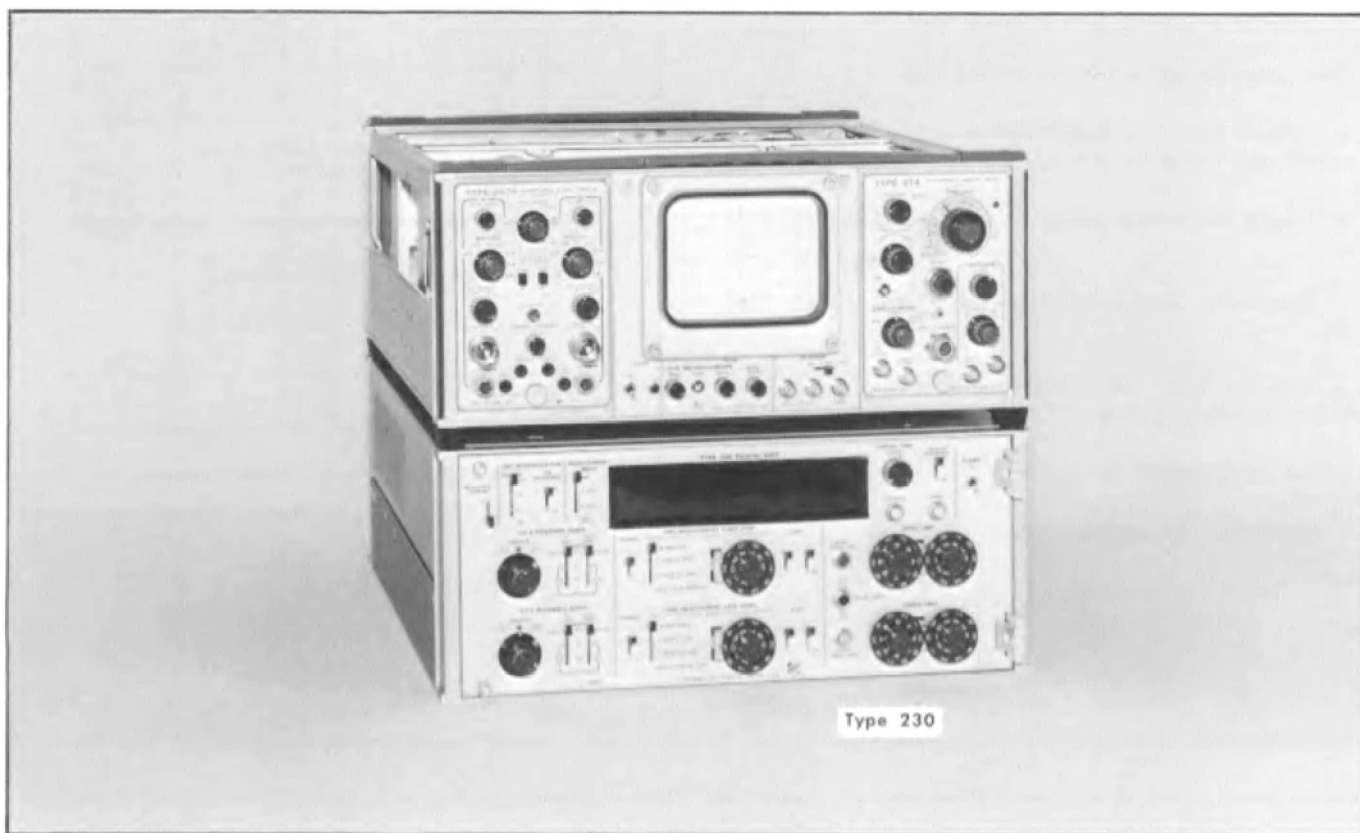


Fig. 6-32. Test equipment setup for step 26.

CONTROL SETTINGS**Type 568**

POWER	ON
INTEN	Trace barely visible
FOCUS	Adjust for a well focused trace
SCALE ILLUM	As desired
CALIBRATOR	OFF

Vertical Units

Input Signal	None
Mode	Channel 1
mV/Div	500
Smooth-Normal	Normal
Position	Centered
Internal Trigger	A Only
DC Offset	Centered

Time-Base Units

Input Signal	None
Sweep Rate	.1 μ SEC
Mode	Normal
Time Position	As desired

Triggering

Recovery Time	+ Internal
Time Expander	As desired
Dots Per Div	$\times 100$
Position	100
	Centered

Type 230

Measurement Averaging	1
CRT Intensification Ref Zones	100%
Time Measurement	Off
Measurement Mode	A Volts
Display Time	As desired
Triggered Measurement	Off
Channel A Ref Zones	
0% Position	As desired
100% Position	12 o'clock
0% Level	As desired
100% Level	2 cm

26. Check Digital Readout Intensification (Sampling)

This check can only be made if a Type 230 Digital Readout unit and Sampling Plug-In units such as the Type 3S76 and Type 3T4 are being used with the Type 568.

Test equipment setup is shown in Fig. 6-32.

- Position the trace at the center of the CRT with the Vertical and Horizontal Position controls.
- Check—For intensified portion of the sweep (Fig. 6-33).
- Turn the Type 230 100% Position control and check that the intensified portion of the sweep steps across the CRT

This completes the calibration of the Type 568. Disconnect all test equipment and replace the top and bottom covers. If the instrument has been completely calibrated to the tolerances given in this procedure, it will perform to the limits given in the Characteristics section of this manual.

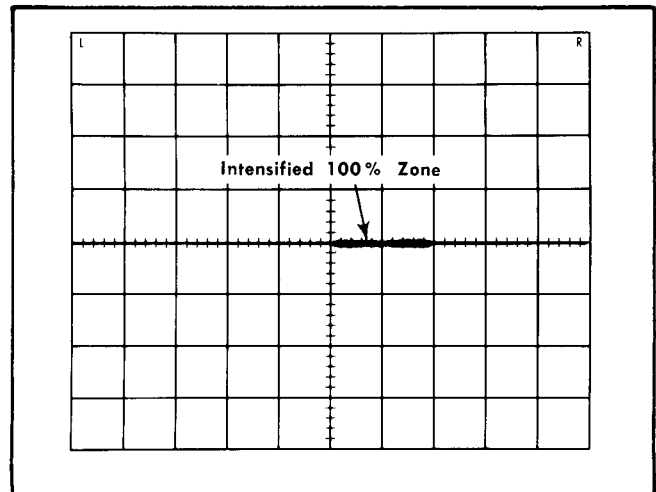


Fig. 6-33. Typical CRT display of Digital Readout Intensification with sampling Plug-In Units.

PARTS LIST ABBREVIATIONS

BHB	binding head brass	int	internal
BHS	binding head steel	lg	length or long
cap.	capacitor	met.	metal
cer	ceramic	mtg hdw	mounting hardware
comp	composition	OD	outside diameter
conn	connector	OHB	oval head brass
CRT	cathode-ray tube	OHS	oval head steel
csk	countersunk	P/O	part of
DE	double end	PHB	pan head brass
dia	diameter	PHS	pan head steel
div	division	plstc	plastic
elect.	electrolytic	PMC	paper, metal cased
EMC	electrolytic, metal cased	poly	polystyrene
EMT	electrolytic, metal tubular	prec	precision
ext	external	PT	paper, tubular
F & I	focus and intensity	PTM	paper or plastic, tubular, molded
FHB	flat head brass	RHB	round head brass
FHS	flat head steel	RHS	round head steel
Fil HB	fillister head brass	SE	single end
Fil HS	fillister head steel	SN or S/N	serial number
h	height or high	S or SW	switch
hex.	hexagonal	TC	temperature compensated
HHB	hex head brass	THB	truss head brass
HHS	hex head steel	thk	thick
HSB	hex socket brass	THS	truss head steel
HSS	hex socket steel	tub.	tubular
ID	inside diameter	var	variable
inc	incandescent	w	wide or width
		WW	wire-wound

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 or model 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.

SPECIAL NOTES AND SYMBOLS

×000	Part first added at this serial number
00×	Part removed after this serial number
*000-0000-00	Asterisk preceding Tektronix Part Number indicates manufactured by or for Tektronix, Inc., or reworked or checked components.
Use 000-0000-00	Part number indicated is direct replacement.

SECTION 7

ELECTRICAL PARTS LIST

Values are fixed unless marked Variable.

Bulbs

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
B604	150-0001-00			Incandescent #47
B605	150-0001-00			Incandescent #47
B606	150-0045-00			Incandescent #685
B633	150-0030-00			Neon, NE-2V
B857	150-0030-00			Neon, NE-2V
B868	150-0030-00			Neon, NE-2V
B869	150-0030-00			Neon, NE-2V

Capacitors

Tolerance $\pm 20\%$ unless otherwise indicated.

C612	290-0319-00			1300 μF	Elect.	150 V	
C613	290-0245-00			1.5 μF	Elect.	10 V	
C620	290-0271-00			9 μF	Elect.	125 V	+20%—15%
C623	281-0523-00			100 pF	Cer	350 V	
C629	290-0164-00			1 μF	Elect.	150 V	
C634	281-0536-00			1000 pF	Cer	500 V	10%
C643	290-0320-00			4500 μF	Elect.	40 V	
C647	290-0267-00			1 μF	Elect.	35 V	
C653	281-0546-00	B010100	B059999	330 pF	Cer	500 V	10%
C653	281-0523-00	B060000		100 pF	Cer	350 V	
C655	290-0201-00			100 μF	Elect.	15 V	
C663	290-0318-00			650 μF	Elect.	250 V	
C664	283-0079-00			0.01 μF	Cer	250 V	
C674	283-0079-00			0.01 μF	Cer	250 V	
C675	290-0260-00			50 μF	Elect.	200 V	
C676	281-0536-00			1000 pF	Cer	500 V	10%
C683	290-0181-00			290 μF	Elect.	350 V	
C684	283-0079-00			0.01 μF	Cer	250 V	
C692	290-0305-00			3 μF	Elect.	150 V	
C694	281-0536-00			1000 pF	Cer	500 V	10%
C699	290-0260-00			50 μF	Elect.	200 V	
C760	281-0027-00			0.7-3 μF , Var	Tub.		
C761	281-0027-00			0.7-3 μF , Var	Tub.		
C801	290-0271-00			9 μF	Elect.	125 V	+20%—15%
C803	285-0629-00			0.047 μF	PTM	100 V	
C812	283-0071-00			0.0068 μF	Cer	5000 V	
C813	283-0071-00			0.0068 μF	Cer	5000 V	
C826	283-0071-00			0.0068 μF	Cer	5000 V	
C842	283-0071-00			0.0068 μF	Cer	5000 V	
C843	283-0071-00			0.0068 μF	Cer	5000 V	
C852	283-0092-00			0.03 μF	Cer	200 V	+80%—20%

Capacitors (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
C856	283-0111-00			0.1 μ F	Cer	50 V
C862	283-0071-00			0.0068 μ F	Cer	5000 V
C878	283-0071-00			0.0068 μ F	Cer	5000 V
C902	281-0510-00	XB240000		22 pF	Cer	500 V
C904	285-0627-00	B010100	B15999 ⁹	0.0033 μ F	PTM	100 V
C904	283-0617-00	B160000		4700 pF	Mica	300 V
C905	281-0615-00	B010100	B159999 ^X	3.9 pF	Cer	200 V
C923	281-0549-00	B010100	B15999 ⁹	68 pF	Cer	500 V
C923	281-0540-00	B160000		51 pF	Cer	500 V
C925	281-0516-00			39 pF	Cer	500 V
C933	281-0518-00	B010100	B15999 ⁹	47 pF	Cer	500 V
C933	281-0540-00	B160000		51 pF	Cer	500 V
C935	281-0516-00			39 pF	Cer	500 V
C936	283-0026-00			0.2 μ F	Cer	25 V
C941	283-0067-00			0.001 μ F	Cer	200 V
C954	283-0023-00	XB160000		0.1 μ F	Cer	10 V
C956	283-0104-00	B010100	B15999 ⁹	2000 pF	Cer	500 V
C956	283-0119-00	B160000		2200 pF	Cer	200 V
C959	290-0158-00	B010100	B15999 ⁹	50 μ F	Elect.	25 V
C959	290-0134-00	B160000		22 μ F	Elect.	15 V

Diodes

D612	152-0199-00			Rectifier Bridge	MDA 962-3 (Motorola)	
D613	152-0212-00			Zener	1N936 9 V, 5%, TC	
D622	*152-0185-00			Silicon	Replaceable by 1N4152	
D642	152-0198-00			Silicon	MR 1032A (Motorola)	
D643	152-0198-00			Silicon	MR 1032A (Motorola)	
D662	152-0200-00			Rectifier Bridge	MDA 962-5 (Motorola)	
D682	152-0200-00			Rectifier Bridge	MDA 962-5 (Motorola)	
D698	152-0066-00			Silicon	1N3194	
D812	152-0218-00	B010100	B13999 ⁹	Silicon	10,000 V	
D812	152-0408-00	B140000		Silicon	10,000 V, 5 mA	
D836	152-0066-00			Silicon	1N3194	
D838	152-0149-00	XB060000		Zener	1N961B 0.4 W, 10 V, 5%	
D839	152-0149-00			Zener	1N961B 0.4 W, 10 V, 5%	
D842	152-0218-00	B010100	B13999 ⁹	Silicon	10,000 V	
D842	152-0408-00	B140000		Silicon	10,000 V, 5 mA	
D845	152-0176-00	B010100	B03999 ⁹	Zener	1N980A 0.4 W, 62 V, 10%	
D845	152-0285-00	B040000		Zener	1N980B 0.4 W, 62 V, 5%	
D852	*152-0185-00			Silicon	Replaceable by 1N4152	
D904	*152-0185-00			Silicon	Replaceable by 1N4152	
D912	*152-0185-00	XB160000		Silicon	Replaceable by 1N4152	
D923	*152-0185-00			Silicon	Replaceable by 1N4152	
D933	*152-0185-00			Silicon	Replaceable by 1N4152	
D935	*152-0185-00			Silicon	Replaceable by 1N4152	
D945	*152-0185-00	B010100	B15999 ⁹	Silicon	Replaceable by 1N4152	
D945	*152-0322-00	B160000		Silicon	Tek Spec	
D952	*152-0185-00			Silicon	Replaceable by 1N4152	

Fuses

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description	
F601	159-0023-00			2A 3AG	Slo-Blo
F602	159-0022-00	B010100	B019999	1A 3AG	Fast-Blo
F602	159-0019-00	B030000		1A 3AG	Slo-Blo
F675	159-0030-00			0.3A 3AG	Fast-Blo
F695	159-0028-00			0.25A 3AG	Fast-Blo

Connectors

J11	131-0148-00			24 contact, female	
J12	131-0148-00			24 contact, female	
J13	131-0327-00	XB110000		30 pin, dual contact	
J14	131-0327-00			30 pin, dual contact	
J21	131-0148-00			24 contact, female	
J22	131-0148-00			30 pin, dual contact	
J23	131-0126-00	XB110000		BNC, single contact	
J24	131-0327-00			30 pin, dual contact	
J101	131-0294-00	B010100	B119999	36 contact, female	
J101	131-0294-01	B140000		36 contact, female	
J113	131-0294-00	XB110000	B119999	36 contact, female	
J113	131-0294-03	B140000		36 contact, female	
J123	*175-1013-00	XB110000		Cable assy, coax w/conn	
J214	131-0294-00	B010100	B119999	36 contact, female	
J214	131-0294-06	B140000		36 contact, female	
J224	131-0294-00	B010100	B119999	36 contact, female	
J224	131-0294-06	B140000		36 contact, female	
J877	*136-0140-00			Socket, banana jack assembly	
J878	*136-0139-00			Socket, banana jack assembly	
J945	131-0106-00			1 contact, female, coaxial	
J949	131-0106-00			1 contact, female, coaxial	
J959	131-0106-00			1 contact, female, coaxial	

Inductors

L803	108-0213-00			2.5 mH	
L870	*108-0285-00			Beam Rotator	

Transistors

Q613	151-0190-00	B010100	B119999	Silicon	2N3904
Q613	*151-0190-01	B130000		Silicon	Tek Spec
Q624	151-0190-00	B010100	B119999	Silicon	2N3904
Q624	*151-0190-01	B130000		Silicon	Tek Spec
Q633	*151-0136-00			Silicon	Replaceable by 2N3053
Q634	151-0190-00	B010100	B119999	Silicon	2N3904
Q634	*151-0190-01	B130000		Silicon	Tek Spec
Q637	*151-0209-00			Silicon	Selected from 2N3442
Q639	151-0190-00	B010100	B119999	Silicon	2N3904
Q639	*151-0190-01	B130000		Silicon	Tek Spec
Q643	151-0190-00	B010100	B119999	Silicon	2N3904
Q643	*151-0190-01	B130000		Silicon	Tek Spec
Q644	151-0190-00	B010100	B119999	Silicon	2N3904
Q644	*151-0190-01	B130000		Silicon	Tek Spec
Q653	151-0190-00	B010100	B119999	Silicon	2N3904
Q653	*151-0190-01	B130000		Silicon	Tek Spec
Q654	*151-0136-00			Silicon	Replaceable by 2N3053

Electrical Parts List—Type 568/R568

Transistors (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc		Description
Q657	151-0165-00			Germanium	2N3614
Q663	151-0190-00	B010100	B129999	Silicon	2N3904
Q663	*151-0190-01	B130000		Silicon	Tek Spec
Q664	151-0190-00	B010100	B129999	Silicon	2N3904
Q664	*151-0190-01	B130000		Silicon	Tek Spec
Q673	151-0208-00			Silicon	2N4036
Q674	151-0208-00			Silicon	2N4036
Q677	*151-0209-00			Silicon	Selected from 2N3442
Q683	151-0190-00	B010100	B129999	Silicon	2N3904
Q683	*151-0190-01	B130000		Silicon	Tek Spec
Q684	151-0190-00	B010100	B129999	Silicon	2N3904
Q684	*151-0190-01	B130000		Silicon	Tek Spec
Q693	151-0208-00			Silicon	2N4036
Q694	151-0208-00			Silicon	2N4036
Q697	*151-0209-00	B010100	B129999	Silicon	Selected from 2N3442
Q697	*151-0256-00	B130000		Silicon	Tek Spec
Q800	151-0201-00			Silicon	2N3739
Q834	151-0190-00	B010100	B129999	Silicon	2N3904
Q834	*151-0190-01	B130000		Silicon	Tek Spec
Q844	151-0208-00			Silicon	2N4036
Q854	151-1005-00			Silicon	FET
Q900	151-0188-00	B010100	B129999	Silicon	2N3906
Q900	*151-0133-00	B130000		Silicon	Tek Spec
Q914	151-0188-00	B010100	B129999	Silicon	2N3906
Q914	*151-0133-00	B130000		Silicon	Tek Spec
Q925	151-0190-00	B010100	B129999	Silicon	2N3904
Q925	*151-0190-01	B130000	B159999	Silicon	Tek Spec
Q925	151-0223-00	B160000		Silicon	2N4275
Q935	151-0190-00	B010100	B129999	Silicon	2N3904
Q935	*151-0190-01	B130000	B159999	Silicon	Tek Spec
Q935	151-0223-00	B160000		Silicon	2N4275
Q953	151-0190-00	B010100	B129999	Silicon	2N3904
Q953	*151-0190-01	B130000	B159999	Silicon	Tek Spec
Q953	*151-0108-00	B160000		Silicon	Replaceable by 2N2501
Q955	151-0221-00	XB160000		Silicon	2N4258

Resistors

Resistors are fixed, composition, $\pm 10\%$ unless otherwise indicated.

R604	311-0055-00			50 Ω , Var			
R605	308-0142-00			30 Ω	3 W	WW	5%
R606	302-0330-00			33 Ω	$\frac{1}{2}$ W		
R611	307-0093-00			1.2 Ω	$\frac{1}{2}$ W		5%
R612	302-0104-00			100 k Ω	$\frac{1}{2}$ W		
R613	305-0123-00			12 k Ω	2 W		5%
R614	316-0101-00			100 Ω	$\frac{1}{4}$ W		
R616	323-0353-00			46.4 k Ω	$\frac{1}{2}$ W	Prec	1%
R621	323-0362-00			57.6 k Ω	$\frac{1}{2}$ W	Prec	1%
R623	321-0235-00			2.74 k Ω	$\frac{1}{8}$ W	Prec	1%
R624	321-0264-00			5.49 k Ω	$\frac{1}{8}$ W	Prec	1%
R625	311-0462-00	B010100	B229999	1 k Ω , Var			
R625	311-1225-00	B230000		1 k Ω , Var			
R626	316-0101-00			100 Ω	$\frac{1}{4}$ W		
R628	323-0382-00			93.1 k Ω	$\frac{1}{2}$ W	Prec	1%
R629	322-0335-00			30.1 k Ω	$\frac{1}{4}$ W	Prec	1%

Resistors (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Description		
R631	301-0244-00			240 k Ω	$\frac{1}{2}$ W	5%
R632	315-0432-00			4.3 k Ω	$\frac{1}{4}$ W	5%
R633	302-0563-00			56 k Ω	$\frac{1}{2}$ W	
R634	315-0181-00			180 Ω	$\frac{1}{4}$ W	5%
R637	302-0104-00			100 k Ω	$\frac{1}{2}$ W	
R638	301-0301-00			300 Ω	$\frac{1}{2}$ W	5%
R639	307-0093-00			1.2 Ω	$\frac{1}{2}$ W	5%
R641	*308-0090-00			0.25 Ω	1 W	WW
R642	*308-0090-00			0.25 Ω	1 W	WW
R643	302-0333-00			33 k Ω	$\frac{1}{2}$ W	
R644	*308-0090-00			0.25 Ω	1 W	WW
R645	311-0462-00	B010100	B229999	1 k Ω , Var		
R645	311-1225-00	B230000		1 k Ω , Var		
R646	321-0296-00			11.8 k Ω	$\frac{1}{8}$ W	Prec 1%
R647	323-0380-00			88.7 k Ω	$\frac{1}{2}$ W	Prec 1%
R648	323-0371-00			71.5 k Ω	$\frac{1}{2}$ W	Prec 1%
R649	323-0333-00			28.7 k Ω	$\frac{1}{2}$ W	Prec 1%
R651	316-0101-00			100 Ω	$\frac{1}{4}$ W	
R652	302-0271-00			270 Ω	$\frac{1}{2}$ W	
R653	315-0101-00	XB040000		100 Ω	$\frac{1}{4}$ W	5%
R655	302-0100-00			10 Ω	$\frac{1}{2}$ W	
R656	302-0470-00			47 Ω	$\frac{1}{2}$ W	
R661	307-0093-00			1.2 Ω	$\frac{1}{2}$ W	5%
R663	302-0124-00			120 k Ω	$\frac{1}{2}$ W	
R664	323-0396-00			130 k Ω	$\frac{1}{2}$ W	Prec 1%
R665	311-0496-00	B010100	B229999	2.5 k Ω , Var		
R665	311-1226-00	B230000		2.5 k Ω , Var		
R666	323-0382-00			93.1 k Ω	$\frac{1}{2}$ W	Prec 1%
R667	316-0101-00			100 Ω	$\frac{1}{4}$ W	
R669	323-0353-00			46.4 k Ω	$\frac{1}{2}$ W	Prec 1%
R671	321-0272-00			6.65 k Ω	$\frac{1}{8}$ W	Prec 1%
R672	323-0382-00			93.1 k Ω	$\frac{1}{2}$ W	Prec 1%
R673	316-0101-00			100 Ω	$\frac{1}{4}$ W	
R674	323-0403-00			154 k Ω	$\frac{1}{2}$ W	Prec 1%
R676	301-0103-00			10 k Ω	$\frac{1}{2}$ W	5%
R677	301-0103-00			10 k Ω	$\frac{1}{2}$ W	5%
R678	302-0181-00			180 Ω	$\frac{1}{2}$ W	
R681	307-0093-00			1.2 Ω	$\frac{1}{2}$ W	5%
R683	301-0244-00			240 k Ω	$\frac{1}{2}$ W	5%
R684	323-0410-00			182 k Ω	$\frac{1}{2}$ W	Prec 1%
R685	311-0463-00	B010100	B229999	5 k Ω , Var		
R685	311-1227-00	B230000		5 k Ω , Var		
R686	323-0390-00			113 k Ω	$\frac{1}{2}$ W	Prec 1%
R687	316-0101-00			100 Ω	$\frac{1}{4}$ W	
R689	323-0362-00			57.6 k Ω	$\frac{1}{2}$ W	Prec 1%
R691	321-0318-00			20 k Ω	$\frac{1}{8}$ W	Prec 1%
R692	323-0420-00			232 k Ω	$\frac{1}{2}$ W	Prec 1%
R693	316-0101-00			100 Ω	$\frac{1}{4}$ W	
R694	323-0415-00			205 k Ω	$\frac{1}{2}$ W	Prec 1%
R696	302-0393-00			39 k Ω	$\frac{1}{2}$ W	
R697	302-0393-00			39 k Ω	$\frac{1}{2}$ W	
R698	301-0181-00			180 Ω	$\frac{1}{2}$ W	5%
R699	302-0124-00			120 k Ω	$\frac{1}{2}$ W	
R762	308-0124-00	B010100	B169999	6 k Ω	10 W	WW 5%
R762	308-0229-00	B170000		4 k Ω	5 W	WW 5%

Electrical Parts List—Type 568/R568

Resistors (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description	
R801	301-0100-00	XB130000		10 Ω	1/2 W 5%
R802	301-0510-00			51 Ω	1/2 W 5%
R803	304-0101-00	X150000		100 Ω	1 W
R812	302-0104-00			100 k Ω	1/2 W
R815	305-0685-00			6.8 M Ω	2 W 5%
R816	305-0685-00			6.8 M Ω	2 W 5%
R817	305-0685-00			6.8 M Ω	2 W 5%
R818	305-0685-00			6.8 M Ω	2 W 5%
R819	305-0685-00			6.8 M Ω	2 W 5%
R820	311-0397-00	8010100	B11999 ¹⁾	2 M Ω , Var	
R820	311-0397-01	B120000		2 M Ω , Var	
R821	302-0106-00			10 M Ω	1/2 W
R822	302-0105-00			1 M Ω	1/2 W
R824	302-0223-00			22 k Ω	1/2 W
R826	302-0471-00			470 Ω	1/2 W
R833	315-0121-00			120 Ω	1/4 W 5%
R834	303-0333-00			33 k Ω	1 W 5%
R835	301-0472-00			4.7 k Ω	1/2 W 5%
R836	303-0363-00			36 k Ω	1 W 5%
R843	302-0223-00			22 k Ω	1/2 W
R844	315-0202-00			2 k Ω	1/4 W 5%
R845	301-0472-00			4.7 k Ω	1/2 W 5%
R846	302-0102-00			1 k Ω	1/2 W
R851	315-0154-00			150 k Ω	1/4 W 5%
R852	301-0103-00			10 k Ω	1/2 W 5%
R855	311-0624-00	B010100	B22999 ¹⁾	200 k Ω , Var	
R855	311-1251-00	B230000		200 k Ω , Var	
R856	323-0466-00			698 k Ω	1/2 W Prec 1%
R857	302-0104-00			100 k Ω	1/2 W
R861	305-0475-00			4.7 M Ω	2 W 5%
R862	305-0475-00			4.7 M Ω	2 W 5%
R863	306-0395-00			3.9 M Ω	2 W
R865	311-0254-00			5 M Ω , Var	
R866	306-0225-00			2.2 M Ω	2 W
R867	311-0374-00			250 k Ω , Var	
R870	311-0007-00			2 \times 1 k Ω , Var	
R871	302-0680-00			68 Ω	1/2 W
R872	302-0823-00			82 k Ω	1/2 W
R873	311-0465-00	B010100	B22999 ¹⁾	100 k Ω , Var	
R873	311-1235-00	B230000		100 k Ω , Var	
R874	302-0823-00			82 k Ω	1/2 W
R875	302-0564-00			560 k Ω	1/2 W
R876	302-0104-00			100 k Ω	1/2 W
R877	302-0273-00			27 k Ω	1/2 W
R878	302-0471-00			470 Ω	1/2 W
R879	302-0105-00			1 M Ω	1/2 W
R900	315-0203-00	XB160000		20 k Ω	1/4 W 5%
R901	315-0102-00			1 k Ω	1/4 W 5%
R904	315-0302-00			3 k Ω	1/4 W 5%
R905	315-0303-00	B010100	B15999 ¹⁾	30 k Ω	1/4 W 5%
R905	315-0223-00	B160000		22 k Ω	1/4 W 5%
R906	315-0752-00			7.5 k Ω	1/4 W 5%
R908	315-0432-00			4.3 k Ω	1/4 W 5%
R909	315-0822-00			8.2 k Ω	1/4 W 5%

Resistors (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Description		
R912	315-0912-00			9.1 k Ω	1/4 W	5%
R917	315-0202-00			2 k Ω	1/4 W	5%
R922	315-0563-00	B010100	B159999	56 k Ω	1/4 W	5%
R922	315-0103-00	B160000		10 k Ω	1/4 W	5%
R924	315-0752-00	B010100	B109999	7.5 k Ω	1/4 W	5%
R924	315-0512-00	B200000		5.1 k Ω	1/4 W	5%
R925	315-0203-00	B010100	B109999	20 k Ω	1/4 W	5%
R925	315-0133-00	B200000		13 k Ω	1/4 W	5%
R927	315-0562-00			5.6 k Ω	1/4 W	5%
R932	315-0473-00	B010100	B159999	47 k Ω	1/4 W	5%
R932	315-0103-00	B160000		10 k Ω	1/4 W	5%
R934	315-0752-00			7.5 k Ω	1/4 W	5%
R935	315-0203-00			20 k Ω	1/4 W	5%
R937	315-0562-00			5.6 k Ω	1/4 W	5%
R939	301-0102-00			1 k Ω	1/2 W	5%
R940	311-0328-00			1 k Ω , Var		
R941	324-0313-00			17.8 k Ω	1 W	Prec 1%
R942	324-0313-00			17.8 k Ω	1 W	Prec 1%
R944	323-0216-00			1.74 k Ω	1/2 W	Prec 1%
R946	323-0690-00			422 Ω	1/2 W	Prec 1/2%
R948	323-0689-00			402 Ω	1/2 W	Prec 1/2%
R949	323-0688-00			47 Ω	1/2 W	Prec 1/2%
R952	315-0103-00	XB160000		10 k Ω	1/4 W	5%
R953	315-0103-00			10 k Ω	1/4 W	5%
R954	315-0202-00			2 k Ω	1/4 W	5%
R955	315-0103-00	XB160000		10 k Ω	1/4 W	5%
R956	315-0112-00	XB160000		1.1 k Ω	1/4 W	5%
R957	315-0121-00			120 Ω	1/4 W	5%
R958	315-0181-00	B010100	B159999	180 Ω	1/4 W	5%
R958	315-0201-00	B160000		200 Ω	1/4 W	5%
R959	315-0100-00			10 Ω	1/4 W	5%

Switches

Unwired

SW214	260-0987-00	XB180000	Slide		
SW601	260-0834-00		Toggle		POWER
SW602 ¹					
SW603 ¹					
SW879	260-0449-00		Slide		CRT CATHODE SELECTOR
SW915	260-0831-00		Lever		

Thermal Cut-Out

TK601	260-0336-00			150 °F \pm 5 °F	
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Transformers

T601	*120-0465-00			L. V. Power	
T801	*120-0466-00	B010100	B209999	H. V. Power	
T801	*120-0466-00	B010100	B209999	H. V. Power	
T801	*120-0466-02	B230000		H. V. Power	

¹See Mechanical Parts List. Line Voltage Selector Body

Electrical Parts List—Type 568/R568**Electron Tube**

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Description
V859	*154-0454-00	B010100	B139999	T5032-2-1 CRT Standard Phosphor
V859	*154-0613-01	B140000		T5611-2-1 CRT Standard Phosphor

Optional Phosphors

*154-0613-02	P7
*154-0613-03	P11
*154-0613-00	P31

Crystal

Y905	158-0016-00	B010100	B159999	40 kHz
Y905	158-0048-00	B160000		200 kHz

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations which appear either on the back of the diagrams or on pullout pages immediately following the diagrams of the instruction manual.

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.

Assembly and/or Component
 Detail Part of Assembly and/or Component
 mounting hardware for Detail Part
 Parts of Detail Part
 mounting hardware for Parts of Detail Part
 mounting hardware for Assembly and/or Component

Mounting hardware 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.

Mounting hardware must be purchased separately, unless otherwise specified.

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 or model 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.

ABBREVIATIONS AND SYMBOLS

For an explanation of the abbreviations and symbols used in this section, please refer to the page immediately preceding the Electrical Parts List in this instruction manual.

INDEX OF MECHANICAL PARTS LIST ILLUSTRATIONS

(Located behind diagrams)

FIG. 1 FRONT

FIG. 2 REAR

FIG. 3 HIGH VOLTAGE CHASSIS & SUPPORT FRAME

FIG. 4 POWER CHASSIS

FIG. 5 CRT SHIELD, CLAMP & SOCKET

FIG. 6 CABINET & FRAMES

FIG. 7 568/R568 STANDARD ACCESSORIES &
OTHER PARTS FURNISHED WITH R568

SECTION 8

MECHANICAL PARTS LIST

FIG. 1 FRONT

Fig. & Index	Tektronix Part No.	Serial/Model Eff	No. Disc	Q ↑ y	1	2	3	4	5	Description
1-1	366-0153-00			1						KNOB, charcoal—INTEN.
	- - - - -			-						knob includes:
	213-0004-00			1						SCREW, set, 6-32 x 3/16 inch, HSS
-2	- - - - -			2						RESISTOR, variable
	- - - - -			-						mounting hardware for each: (not included w/resistor)
-3	210-0046-00			1						LOCKWASHER, internal, 1/4 ID x 0.400 inch OD
-4	210-0940-00			1						WASHER, flat, 1/4 ID x 3/8 inch OD
-5	210-0583-00			1						NUT, hex., 1/4-32 x 5/16 inch
-6	366-0153-00			1						KNOB, charcoal—FOCUS
	- - - - -			-						knob includes:
	213-0004-00			1						SCREW, set, 6-32 x 3/16 inch, HSS
-7	366-0236-00			1						KNOB, charcoal—SCALE ILLUM.
	- - - - -			-						knob includes:
	213-0020-00	B010100	B040249	1						SCREW, set, 6-32 x 1/8 inch, HSS
	213-0075-00	B040250		1						SCREW, set, 6-32 x 3/32 inch, HSS
-8	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware: (not included w/resistor)
-9	210-0978-00			1						WASHER, flat, 3/8 ID x 1/2 inch OD
-10	210-0590-00			1						NUT, hex., 1/4-32 x 5/16 inch
-11	366-0215-00			1						KNOB, charcoal—CALIBRATOR
-12	260-0831-00			1						SWITCH, lever—CALIBRATOR
	- - - - -			-						mounting hardware: (not included w/switch)
-13	220-0413-00			2						NUT, hex., 4-40 x 3/16 x 0.562 inch long
-14	333-0957-01	B010100	B159999	1						PANEL, front
	333-0957-02	B160000		1						PANEL, front
-15	131-0106-00			3						CONNECTOR, coaxial, 1 contact, BNC, w/hardware
	210-0255-00	XB160000		1						LUG, solder
-16	260-0834-00			1						SWITCH, toggle—POWER ON
	- - - - -			-						mounting hardware: (not included w/switch)
-17	210-0046-00			1						LOCKWASHER, internal, 1/4 ID x 0.400 inch OD
-18	210-0940-00			1						WASHER, flat, 1/4 ID x 3/8 inch OD
-19	210-0562-00			2						NUT, hex., 1/4-40 x 5/16 inch
-20	387-0934-00			1						PLATE, light reflector
-21	214-0442-00			1						SPRING, light pipe
-22	200-0426-00			1						COVER, graticule
	- - - - -			-						mounting hardware: (not included w/cover)
-23	210-0571-00			4						NUT, knurled, 10-32 x 3/8 inch
-24	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware: (not included w/resistor)
-25	210-0471-00			1						NUT, hex., 1/4-32 x 19/32 inch long
-26	210-0223-00			1						LUG, solder, 1/4 ID x 7/16 inch OD, SE
-27	358-0054-00			1						BUSHING, 1/4-32 x 3/32 inch

FIG. 1 FRONT (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				1	2	3	4	5	
1-28	136-0223-00			1					SOCKET, light
	- - - - -			-					mounting hardware: (not included w/socket)
-29	210-0562-00			1					NUT, hex., 1/4-40 x 5/16 inch
-30	210-0223-00			1					LUG, solder, 1/4 ID x 7/16 inch OD, SE
-31	210-0940-00			1					WASHER, flat, 1/4 ID x 3/8 inch OD
-32	367-0076-00			2					HANDLE (Type R568 only)
	- - - - -								mounting hardware for each: (not included w/handle)
-33	212-0559-00			2					SCREW, 10-32 x 5/8 inch, FHS (Type R568 only)
-34	124-0189-00			2					STRIP, trim, 0.995 x 6.45 inch (Type 568 only)
-35	200-0608-00			2					COVER, plastic, variable resistor
-36	367-0073-00	B010100	B169999	1					HANDLE (Type 568 only)
	367-0073-01	B170000	B179999	1					HANDLE (Type 568 only)
	367-0073-02	B180000		1					HANDLE (Type 568 only)
	- - - - -								mounting hardware: (not included w/handle)
-37	213-0155-00			4					SCREW, machine, 10-32 x 0.40 inch (Type 568 only)
-38	386-1176-00	B010100	B039999	2					PLATE, (Type 568 only)
	386-1352-00	B040000		2					PLATE, (Type 568 only)
-39	200-0728-00			2					Cover, handle end (Type 568 only)
-40	351-0108-00			2					GUIDE, slide
	- - - - -			-					mounting hardware for each: (not included w/guide)
-41	211-0538-00			2					SCREW, 6-32 x 5/16 inch, 100° csk, FHS
	211-0507-00			1					SCREW, 6-32 x 5/16 inch
-42	378-0560-00			1					FILTER, light, smoke gray
-43	124-0188-00			1					STRIP, trim, 16.3 x 0.876 inch (Type R568 only)
-44	386-1137-00			1					PLATE, front sub-panel
	- - - - -			-					mounting hardware: (not included w/plate)
-45	211-0538-00			6					SCREW, 6-32 x 5/16 inch, 100° csk, FHS
-46	210-0457-00			4					NUT, keps, 6-32 x 5/16 inch
-47	426-0326-01			1					FRAME, section, right front or left rear
	- - - - -			-					mounting hardware: (not included w/frame)
-48	212-0574-00			2					SCREW, 10-32 x 0.434 inch, 100° csk, FHS
-49	377-0151-00			2					INSERT, corner frame section
	- - - - -			-					mounting hardware for each: (not included w/insert)
-50	212-0507-00			2					SCREW, 10-32 x 3/8 inch, PHS
-51	426-0325-01			1					FRAME, section, left front or right rear
	- - - - -			-					mounting hardware: (not included w/frame)
-52	212-0574-00			2					SCREW, 10-32 x 0.434 inch, 100° csk, FHS

FIG. 1 FRONT (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q t Y	Description
		Eff	Disc		
1-53	426-0335-00			2	FRAME, section
	- - - - -			-	mounting hardware for each: (not included w/frame)
-54	211-0512-00			2	SCREW, 6-32 x 1/2 inch, 100° csk, FHS
-55	210-0457-00			2	NUT, keps, 6-32 x 5/16 inch
-56	348-0095-00			1	FLIPSTAND, cabinet (Type 568 only)
-57	426-0331-00			1	FRAME, section, bottom
-58	426-0332-00			1	FRAME, section, top
-59	407-0296-02	B010100	B231609	1	BRACKET, angle, right (Type R568 only)
	407-0296-00	B231610		1	BRACKET, angle
	- - - - -			-	mounting hardware: (not included w/bracket)
60	212-0574-00			2	SCREW, 10-32 x 0.434 inch, 100° csk, FHS (Type R568 only)
-61	407-0296-00			1	BRACKET, angle (Type 568 only)
	- - - - -			-	mounting hardware: (not included w/bracket)
-62	212-0574-00			2	SCREW, 10-32 x 0.434 inch, 100° csk, FHS (Type R568 only)
-63	348-0096-01			1	FOOT, cabinet, right front or left rear (Type 568 only)
	- - - - -			-	mounting hardware: (not included w/foot)
-64	212-0602-00			1	SCREW, 10-32 x 5/8 inch, PHS (Type 568 only)
-65	348-0098-01			1	FOOT, cabinet, left front or right rear (Type 568 only)
	- - - - -			-	mounting hardware: (not included w/foot)
-66	212-0602-00			1	SCREW, 10-32 x 5/8 inch, PHS (Type 568 only)
-67	348-0097-00			2	PAD, cabinet foot (Type 568 only)
-68	214-0846-01			1	RETAINER, flipstand (Type 568 only)
	- - - - -			-	mounting hardware: (not included w/retainer)
-69	212-0509-00			1	SCREW, 10-32 x 5/8 inch, PHS (Type 568 only)
-70	351-0125-00			2	GUIDE, plug-in unit
	- - - - -			-	mounting hardware for each: (not included w/guide)
-71	211-0538-00			2	SCREW, 6-32 x 5/16 inch, 100° csk, FHS
-72	210-0457-00			2	NUT, keps, 6-32 x 5/16 inch

FIG. 2 REAR

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q † y	Description
					1 2 3 4 5
2-1	119-0031-00	B010100	B189999	1	ASSEMBLY, blower
	119-0031-01	B190000	B219999	1	ASSEMBLY, blower
	119-0147-00	B220000		1	ASSEMBLY, blower
	- - - - -			-	mounting hardware: (not included w/assembly)
-2	211-0511-00	B010100	B189999	4	SCREW, 6-32 x 1/2 inch, PHS
	211-0513-00	B190000		4	SCREW, 6-32 x 0.625 inch, PHS
-3	210-0457-00			4	NUT, keps, 6-32 x 5/16 inch
-4	378-0029-00	B010100	B219999X	1	FILTER, air
-5	380-0119-00	B010100	B219999X	1	HOUSING, filter
	- - - - -			-	mounting hardware: (not included w/housing)
-6	211-0516-00	B010100	B219999X	4	SCREW, 6-32 x 7/8 inch, PHS
-7	134-0067-00			1	PLUG, plastic, gray
-8	136-0140-00			1	SOCKET, banana jack, charcoal
	- - - - -			-	mounting hardware: (not included w/socket)
-9	210-0046-00			1	LOCKWASHER, internal, 1/4 ID x 0.400 inch OD
-10	210-0465-00			1	NUT, hex., 1/4-32 x 3/8 x 3/32 inch
-11	348-0078-00	B010100	B169999X	4	FOOT, plastic, cap
-12	348-0079-00	B010100	B169999	4	FOOT, plastic
	348-0191-00	B170000		4	FOOT, plastic
	- - - - -			-	mounting hardware for each: (not included w/foot)
-13	212-0082-00			1	SCREW, 8-32 x 1 1/4 inches, PHS
-14	210-0458-00			1	NUT, keps, 8-32 x 1 1/32 inch
-15	136-0139-00			1	SOCKET, banana jack, red
	- - - - -			-	mounting hardware: (not included w/socket)
-16	210-0898-00			1	WASHER, plastic, insulating, red
-17	210-0465-00			2	NUT, hex., 1/4-32 x 3/8 x 3/32 inch
-18	210-0223-00			1	LUG, solder, 1/4 ID x 7/16 inch OD, SE
-19	260-0449-00			1	SWITCH, slide, CHOPPED BLANKING—EXT CRT CATHODE
	- - - - -			-	mounting hardware: (not included w/switch)
	211-0101-00			2	SCREW, 4-40 x 1/4 inch, 100°, csk, FHS (not shown)
	211-0008-00			2	SCREW, 4-40 x 1/4 inch, PHS (not shown)
-20	161-0033-00	XB1300550		1	CORD, power, 3 conductor
	343-0170-00			1	RETAINER, cable to cable (not shown)
-21	358-0161-00			1	BUSHING, strain relief
-22	200-0729-00			1	COVER
	- - - - -			-	mounting hardware: (not included w/cover)
-23	211-0504-00			2	SCREW, 6-32 x 5/16 inch, PHS
-24	386-1140-00			1	PANEL, rear
	- - - - -			-	mounting hardware: (not included w/panel)
-25	211-0510-00			10	SCREW, 6-32 x 3/8 inch, PHS
-26	212-0507-00			4	SCREW, 10-32 x 3/8 inch, PHS
-27	210-0457-00			10	NUT, keps, 6-32 x 5/16 inch
-28	200-0728-00			2	COVER, handle end (Type 568 only)
-29	204-0279-00			1	ASSEMBLY, line voltage selector
	- - - - -			-	mounting hardware: (not included w/assembly)
-30	210-0006-00			2	LOCKWASHER, internal, #6
-31	210-0407-00			2	NUT, hex., 6-32 x 1/4 inch

FIG. 2 REAR (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q t Y	1 2 3 4 5					Description
2-32	200-0762-00			1						COVER, line voltage selector
-33	352-0102-00			2						cover includes: HOLDER, fuse
-34	213-0035-00			1						mounting hardware for each: (not included w/holder)
-35	124-0188-00			1						SCREW, thread cutting, 4-40 x 1/4 inch, PHS
-36	124-0201-00			1						STRIP, trim, 16.3 x 0.876 inches (Type R568 only)
-37	426-0326-01			2						STRIP, trim, 6.45 x 1.009 inches
-38	212-0574-00			1						FRAME, section, right front or left rear
				-						mounting hardware: (not included w/frame)
				2						SCREW, 10-32 x 0.434 inch, 100° csk, FHS
-39	426-0325-01			1						FRAME, section, left front or right rear
-40	212-0574-00			-						mounting hardware: (not included w/frame)
				2						SCREW, 10-32 x 0.434 inch, 100° csk, FHS
-41	426-0330-00			1						FRAME, section, rear top
-42	367-0073-00	B010100	B169999	1						HANDLE (Type 568 only)
	367-0073-01	B170000	B179999	1						HANDLE (Type 568 only)
	367-0073-02	B180000		1						HANDLE (Type 568 only)
				-						mounting hardware: (not included w/handle)
-43	213-0155-00			2						SCREW, 10-32 x 0.40 inch (Type 568 only)
-44	386-1176-00	B010100	B039999	2						PLATE (Type 568 only)
	386-1352-00	B040000		2						PLATE, (Type 568 only)
-45	131-0294-00	B010100	B139999	4						CONNECTOR, 36 pin
	131-0294-01	B140000		1						CONNECTOR, 36 pin, keyed AB
	131-0294-06	B140000		2						CONNECTOR, 36 pin, keyed CD
	131-0294-03	B140000		1						CONNECTOR, 36 pin, keyed KL
				-						mounting hardware for each: (not included w/connector)
-46	211-0001-00			2						SCREW, 2-56 x 1/4 inch, RHS
-47	210-0001-00			2						LOCKWASHER, internal, #2
-48	210-0405-00			2						NUT, hex., 2-56 x 3/16 inch
-49	386-1141-00			3						PLATE, connector mounting
				-						mounting hardware for each: (not included w/plate)
-50	211-0504-00			2						SCREW, 6-32 x 1/4 inch, PHS
	210-0006-00	XB220000		2						LOCKWASHER, internal, #6
-51	426-0329-00	B010100	B179999	1						FRAME, section, rear bottom
	426-0329-04	B180000		1						FRAME, section, rear bottom
	260-0987-00	XB180000		1						SWITCH, unwired
				-						mounting hardware: (not included w/switch)
	210-0406-00	XB180000		2						NUT, hex., 4-40 x 0.188 inch OD
-52	348-0096-01			1						FOOT, cabinet, right front or left rear (Type 568 only)
				-						mounting hardware: (not included w/foot)
-53	212-0602-00			1						SCREW, 10-32 x 5/8 inch, RHS (Type 568 only)

FIG. 2 REAR (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				1	2	3	4	5	
2-54	348-0098-01			1					FOOT, cabinet, left front or right rear (Type 568 only)
	- - - - -			-					mounting hardware: (not included w/foot)
-55	212-0602-00			1					SCREW, 10-32 x 5/8 inch, RHS (Type 568 only)
-56	348-0097-00			2					PAD, cabinet foot (Type 568 only)
-57	179-1132-00			1					CABLE HARNESS, line voltage selector
	- - - - -			-					cable harness includes:
-58	214-0768-00			3					CONNECTOR, female

FIG. 3 HIGH VOLTAGE CHASSIS & SUPPORT FRAME

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q ↑ y						Description
					1	2	3	4	5	
3-1	131-0148-00			2						CONNECTOR, 24 contact
-2	211-0012-00			-						mounting hardware for each: (not included w/connector)
-3	210-0586-00			2						SCREW, 4-40 x 3/8 inch, PHS
				2						NUT, keps, 4-40 x 1/4 inch
-4	131-0148-00			2						CONNECTOR, 24 contact
-5	211-0016-00			-						mounting hardware for each: (not included w/connector)
-6	166-0030-00			2						SCREW, 4-40 x 5/8 inch, RHS
-7	210-0586-00			2						TUBE, spacer, 0.180 ID x 3/16 inch long
				2						NUT, keps, 4-40 x 1/4 inch
-8	385-0113-00			1						ROD, plastic, 5/16 x 1 1/8 inches
-9	213-0041-00			-						mounting hardware: (not included w/rod)
				1						SCREW, thread cutting, 6-32 x 3/8 inch, THS
-10	385-0136-00			1						ROD, plastic, 5/16 x 1 1/4 inches
-11	211-0507-00			-						mounting hardware: (not included w/rod)
				1						SCREW, 6-32 x 5/16 inch, PHS
-12	131-0327-00			2						CONNECTOR, 30 contact
-13	211-0015-00			-						mounting hardware for each: (not included w/connector)
-14	361-0133-00			2						SCREW, 4-40 x 1/2 inch, RHS
-15	210-0586-00			2						SPACER, sleeve, 0.12
				2						NUT, keps, 4-40 x 1/4 inch
-16	348-0064-00	B010100	B100000X	1						GROMMET, plastic, 5/8 inch diameter
-17	348-0055-00			1						GROMMET, plastic, 1/4 inch diameter
-18	348-0031-00			4						GROMMET, plastic, 3/32 inch diameter
-19	344-0117-00			1						CLIP, capacitor mounting
-20	213-0044-00			-						mounting hardware: (not included w/clip)
				1						SCREW, thread forming, 5-32 x 3/16 inch, PHS
-21	343-0088-00	XB160000		1						CLAMP, plastic, small
-22	343-0149-00			2						CLAMP, cable, loop, plastic (not shown)
-23	213-0044-00			1						THERMAL CUTOUT
				-						mounting hardware: (not included w/thermal cutout)
-24	214-0210-00			2						SCREW, thread forming, 5-32 x 3/16 inch, PHS
	214-0209-00			1						ASSEMBLY, solder spool
-25	361-0007-00			-						assembly includes:
				1						SPOOL, solder
				-						mounting hardware: (not included w/assembly)
				1						SPACER, plastic, 0.188 inch long

FIG. 3 HIGH VOLTAGE CHASSIS & SUPPORT FRAME (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q † Y						Description
					1	2	3	4	5	
3-26	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware: (not included w/resistor)
-27	210-0046-00			1						LOCKWASHER, internal, 1/4 ID x 0.400 inch OD
-28	210-0940-00			1						WASHER, flat, 1/4 ID x 3/8 inch OD
-29	210-0583-00			1						NUT, hex., 1/4-32 x 5/16 inch
-30	210-0201-00			2						LUG, solder, SE #4
	- - - - -			-						mounting hardware for each: (not included w/lug)
-31	213-0044-00			1						SCREW, thread forming, 5-32 x 3/16 inch, PHS
-32	- - - - -			1						TRANSISTOR
	- - - - -			-						mounting hardware: (not included w/transistor)
	407-0475-00	XB100000		1						BRACKET
	213-0104-00	XB100000		2						SCREW, thread forming, #6 x 3/8 inch, THS
	136-0270-00	XB100000		1						SOCKET, transistor
	213-0088-00	XB100000		2						SCREW, thread forming, #4 x 1/4 inch, PHS
-33	211-0510-00	B010100	B099999	2						SCREW, 6-32 x 3/8 inch, PHS
	211-0507-00	B100000		2						SCREW, 6-32 x 5/16 inch, PHS
-34	210-0202-00	B010100	B099999X	1						LUG, solder, SE #6
-35	386-0143-00			1						PLATE, mica insulator
-36	210-0935-00	B010100	B099999X	2						WASHER, fiber, 0.140 ID x 0.375 inch OD
-37	210-0803-00	B010100	B099999X	2						WASHER, flat, 0.150 ID x 3/8 inch OD
-38	210-0457-00			2						NUT, keps, 6-32 x 5/16 inch
-39	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware: (not included w/resistor)
-40	210-0207-00			1						LUG, solder, 3/8 ID x 5/8 inch OD, SE
-41	210-0012-00			1						LOCKWASHER, internal, 3/8 ID x 1/2 inch OD
-42	210-0978-00			1						WASHER, flat, 3/8 ID x 1/2 inch OD
-43	210-0590-00			1						NUT, hex., 1/4-32 x 5/16 inch
-44	386-1148-00	B010100	B079999	1						SUPPORT, frame
	386-1148-01	B080000		1						SUPPORT, frame
	- - - - -			-						mounting hardware: (not included w/support)
	212-0574-00			4						SCREW, 10-32 x 0.434 inch, 100° csk, FHS (not shown)
	220-0410-00			4						NUT, keps, 10-32 x 3/8 inch
-45	441-0698-00			1						CHASSIS, high voltage
	- - - - -			-						mounting hardware: (not included w/chassis)
	211-0542-00			2						SCREW, 6-32 x 5/16 inch, THS (not shown)
	211-0538-00			2						SCREW, 6-32 x 5/16 inch, 100° csk, FHS (not shown)
-46	212-0004-00			2						SCREW, 8-32 x 5/16 inch, PHS
-47	210-0458-00			2						NUT, keps, 8-32 x 11/32 inch
-48	210-0457-00			4						NUT, keps, 6-32 x 5/16 inch
	211-0504-00			2						SCREW, 6-32 x 1/4 inch, PHS

FIG. 3 HIGH VOLTAGE CHASSIS & SUPPORT FRAME (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q † y	Description
		Eff	Disc		1 2 3 4 5
3-49	670-0517-00	B010100	B159999	1	ASSEMBLY, circuit board—CALIBRATOR
	670-0517-01	B160000		1	ASSEMBLY, circuit board—CALIBRATOR
	- - - - -			-	assembly includes:
	388-0818-00	B010100	B159999	1	BOARD, circuit
	388-0818-01	B160000	B181039	1	BOARD, circuit
	388-0818-02	B181040		1	BOARD, circuit
-50	214-0506-00			12	PIN, connector, male
	131-0633-00	XB160000		15	TERMINAL, pin (not shown)
-51	136-0220-00	B010100	B159999	5	SOCKET, transistor, 3 pin
	136-0220-00	B160000		6	SOCKET, transistor, 3 pin
-52	136-0153-00			1	SOCKET, crystal, 2 pin
	- - - - -			-	mounting hardware: (not included w/socket)
-53	211-0022-00			2	SCREW, 2-56 x $\frac{3}{16}$ inch, RHS
-54	210-0001-00			2	LOCKWASHER, internal, #2
-55	210-0405-00			2	NUT, hex., 2-56 x $\frac{3}{16}$ inch
	- - - - -			-	mounting hardware: (not included w/assembly)
-56	211-0116-00			3	SCREW, sems, 4-40 x $\frac{5}{16}$ inch, PHB
-57	220-0449-00			3	NUT, sleeve, 4-40 x 0.500 inch long
-58	352-0025-00			1	HOLDER, fuse
	- - - - -			-	mounting hardware: (not included w/holder)
-59	213-0146-00			2	SCREW, thread forming, 6-32 x $\frac{5}{16}$ inch, PHS
-60	337-0889-00			1	SHIELD, high voltage
	- - - - -			-	mounting hardware: (not included w/shield)
-61	210-0457-00			2	NUT, keps, 6-32 x $\frac{5}{16}$ inch
-62	200-0714-00			1	COVER, high voltage box
	- - - - -			-	mounting hardware: (not included w/cover)
-63	211-0529-00			2	SCREW, 6-32 x $1\frac{1}{4}$ inches, PHS
-64	211-0510-00			1	SCREW, 6-32 x $\frac{3}{8}$ inch, PHS
-65	214-0931-00	B010100	B139999X	2	RETAINER, component
-66	670-0520-00			1	ASSEMBLY, circuit board—HIGH VOLTAGE (large)
	- - - - -			-	assembly includes:
	388-0819-00			1	BOARD, circuit
	- - - - -			-	mounting hardware: (not included w/assembly)
-67	211-0040-00			2	SCREW, 4-40 x $\frac{1}{4}$ inch, plastic BH
-68	670-0521-00			1	ASSEMBLY, circuit board—HIGH VOLTAGE (small)
	- - - - -			-	assembly includes:
	388-0821-00			1	BOARD, circuit
	- - - - -			-	mounting hardware: (not included w/assembly)
-69	361-0137-00			4	SPACER
-70	211-0097-00			4	SCREW, 4-40 x $\frac{5}{16}$ inch, PHS

FIG. 3 HIGH VOLTAGE CHASSIS & SUPPORT FRAME (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				1 y	2	3	4	5	
3-71	166-0319-00			3					SLEEVE, plastic
-72	380-0115-00			1					HOUSING, high voltage
	- - - - -								mounting hardware: (not included w/housing)
-73	337-0888-00			1					SHIELD
-74	210-0803-00			3					WASHER, flat, 0.150 ID x 3/8 inch OD
-75	211-0603-00			3					SCREW, 6-32 x 0.312 inch, HHS
-76	124-0094-00			2					STRIP, ceramic, 7/16 inch h, w/7 notches
	- - - - -								each strip includes:
	355-0046-00			2					STUD, plastic
	- - - - -								mounting hardware for each: (not included w/strip)
	361-0009-00			2					SPACER, plastic, 0.406 inch long
-77	179-1130-00	B010100	B159999	1					CABLE HARNESS, calibrator
	179-1130-01	B160000		1					CABLE HARNESS, calibrator
	- - - - -								cable harness includes:
-78	131-0371-00			6					CONNECTOR, single contact, female
-79	179-1125-00			1					CABLE HARNESS, vertical amplifier
	- - - - -								cable harness includes:
-80	131-0371-00			1					CONNECTOR, single contact, female
-81	179-1126-00			1					CABLE HARNESS, horizontal amplifier
-82	179-1129-00			1					CABLE HARNESS, coaxial

FIG. 4 POWER CHASSIS

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q t y	1	2	3	4	5	Description
		Eff	Disc							
4-1	406-0881-02			1						BRACKET
-2	200-0259-00			3						COVER, capacitor, plastic, 1.365 diameter x $3\frac{1}{32}$ inches
-3	200-0293-00			1						COVER, capacitor, plastic, 1.365 diameter x $3\frac{9}{16}$ inches
-4	344-0117-00			1						CLIP, capacitor mounting
-5	213-0044-00			-						mounting hardware: (not included w/clip)
				1						SCREW, thread forming, 5-32 x $\frac{3}{16}$ inch, PHS
-6	670-0518-00			1						ASSEMBLY, circuit board—REGULATOR
				-						assembly includes:
	388-0820-00	B010100	B059999	1						BOARD, circuit
	388-0820-01	B060000	B089999	1						BOARD, circuit
	388-0820-02	B090000		1						BOARD, circuit
-7	214-0506-00			23						PIN, connector, male
-8	136-0183-00			7						SOCKET, transistor, 3 pin
-9	136-0220-00			5						SOCKET, transistor, 3 pin
-10	136-0235-00			4						SOCKET, transistor, 6 pin
				-						mounting hardware: (not included w/assembly)
-11	211-0601-00			5						SCREW, sems, 6-32 x $\frac{5}{16}$ inch, PHB
-12	385-0168-00			4						ROD, spacer, $\frac{1}{4}$ x 1.168 inches long
-13	343-0089-00			4						CLAMP, cable, plastic, large
-14				4						CAPACITOR
				-						mounting hardware for each: (not included w/capacitor)
-15	211-0516-00			2						SCREW, 6-32 x $\frac{7}{8}$ inch, PHS
-16	432-0048-00			1						BASE, capacitor, plastic, large
-17	386-0254-00			1						PLATE, fiber, large
-18	210-0457-00			2						NUT, keps, 6-32 x $\frac{5}{16}$ inch
-19	348-0063-00			1						GROMMET, plastic, $\frac{1}{2}$ inch diameter
-20	348-0064-00			2						GROMMET, plastic, $\frac{5}{8}$ inch diameter
-21				2						TRANSISTOR
				-						mounting hardware for each: (not included w/transistor)
-22	211-0511-00			2						SCREW, 6-32 x $\frac{1}{2}$ inch, PHS
-23	386-0978-00			1						PLATE, mica, insulator
-24	210-0975-00			2						WASHER, plastic, 0.140 ID x 0.375 inch OD
-25	210-0803-00			2						WASHER, flat, 0.150 ID x $\frac{3}{8}$ inch OD
-26	210-0202-00			1						LUG, solder, SE #6
-27	210-0457-00			2						NUT, keps, 6-32 x $\frac{5}{16}$ inch
-28				1						TRANSISTOR
				-						mounting hardware: (not included w/transistor)
-29	211-0510-00			2						SCREW, 6-32 x $\frac{3}{8}$ inch, PHS
-30	210-0202-00			1						LUG, solder, SE #6
-31	210-0457-00			2						NUT, keps, 6-32 x $\frac{5}{16}$ inch

FIG. 4 POWER CHASSIS (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q t y						Description
					1	2	3	4	5	
4-32	- - - - -			1						TRANSISTOR
	- - - - -			-						mounting hardware: (not included w/transistor)
-33	211-0510-00			2						SCREW, 6-32 x $\frac{3}{8}$ inch, PHS
-34	210-0457-00			2						NUT, keps, 6-32 x $\frac{5}{16}$ inch
-35	- - - - -			1						TRANSFORMER
	- - - - -			-						transformer includes:
-36	212-0522-00			4						SCREW, 10-32 x $2\frac{1}{2}$ inches, HHS
-37	210-0812-00			4						WASHER, fiber, #10
	- - - - -			-						mounting hardware: (not included w/transformer)
-38	220-0410-00			4						NUT, keps, 10-32 x $\frac{3}{8}$ inch
-39	210-0201-00			3						LUG, solder, SE #4
	- - - - -			-						mounting hardware for each: (not included w/lug)
-40	213-0044-00			1						SCREW, thread forming, 5-32 x $\frac{3}{16}$ inch, PHS
-41	441-0699-00			1						CHASSIS, power
	- - - - -			-						mounting hardware: (not included w/chassis)
	212-0585-00			4						SCREW, 10-32 x 0.50 inch, 100° csk, OHM (not shown)
	212-0004-00			4						SCREW, 8-32 x $\frac{5}{16}$ inch, PHS (not shown)
-42	407-0305-00			1						BRACKET
	- - - - -			-						mounting hardware: (not included w/bracket)
-43	211-0097-00			4						SCREW, 4-40 x $\frac{5}{16}$ inch, PHS
	211-0510-00			2						SCREW, 6-32 x $\frac{3}{8}$ inch, PHS (not shown)
-44	386-1147-00			1						PLATE
	- - - - -			-						mounting hardware: (not included w/plate)
-45	211-0097-00			4						SCREW, 4-40 x $\frac{5}{16}$ inch, PHS
-46	179-1123-00	B010100	B159999	1						CABLE HARNESS, regulator
	179-1123-01	B160000		1						CABLE HARNESS, regulator
	- - - - -			-						cable harness includes:
-47	131-0371-00			28						CONNECTOR, single contact, female
-48	124-0088-00			1						STRIP, ceramic, $\frac{3}{4}$ inch h, w/4 notches
	- - - - -			-						strip includes:
	355-0046-00			2						STUD, plastic
	- - - - -			-						mounting hardware: (not included w/strip)
	361-0008-00			2						SPACER, plastic, 0.281 inch long
-49	124-0091-00			1						STRIP, ceramic, $\frac{3}{4}$ inch h, w/11 notches
	- - - - -			-						strip includes:
	355-0046-00			2						STUD, plastic
	- - - - -			-						mounting hardware: (not included w/strip)
	361-0008-00			2						SPACER, plastic, 0.281 inch long

FIG. 4 POWER CHASSIS (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q t y					Description
				1	2	3	4	5	
4-50	124-0106-00			3					STRIP, ceramic, $\frac{7}{16}$ inch h, w/11 notches
	- - - - -			-					each strip includes:
	355-0046-00			2					STUD, plastic
	- - - - -			-					mounting hardware for each: (not included w/strip)
	361-0008-00			2					SPACER, plastic, 0.281 inch long
-51	- - - - -			1					RESISTOR
	- - - - -			-					mounting hardware: (not included w/resistor)
-52	211-0553-00	B010100	B169999	1					EYELET
	211-0544-00	B170000		1					SCREW, 6-32 x $1\frac{1}{2}$ inch, RHS
-53	210-0601-00	B010100	B169999X	1					SCREW, 6-32 x $1\frac{1}{2}$ inch, RHS
-54	210-0478-00			1					NUT, hex., $\frac{5}{16}$ x $2\frac{1}{32}$ inch long
-55	211-0507-00			1					SCREW, 6-32 x $\frac{5}{16}$ inch, PHS

FIG. 5 CRT SHIELD, CLAMP & SOCKET

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q	Description
		Eff	Disc		
5-1	337-0530-00			1	SHIELD, CRT
-2	211-0504-00			1	mounting hardware: (not included w/shield)
-3	210-0457-00			5	SCREW, 6-32 x 1/4 inch, PHS
-4	407-0340-00			5	NUT, keps, 6-32 x 5/16 inch
-5	211-0534-00			1	BRACKET
-6	211-0507-00			1	SCREW, sems, 6-32 x 5/16 inch, PHS
				2	SCREW, 6-32 x 5/16 inch, PHS
-7	- - - - -			1	COIL
	- - - - -			1	mounting hardware: (not included w/coil)
-8	211-0097-00			1	SCREW, 4-40 x 5/16 inch, PHS
-9	352-0044-00			1	HOLDER
-10	210-0586-00			1	NUT, keps, 4-40 x 1/4 inch
-11	136-0035-00			2	SOCKET, graticule light
	- - - - -			1	mounting hardware for each: (not included w/socket)
-12	211-0534-00			1	SCREW, sems, 6-32 x 5/16 inch, PHS
-13	210-0803-00			1	WASHER, flat, 0.150 ID x 3/8 inch OD
-14	210-0457-00			1	NUT, keps, 6-32 x 5/16 inch
-15	348-0090-00	B010100	B139999X	6	CUSHION, sponge
-16	175-0592-00			1	WIRE, CRT lead, green stripe
	175-0595-00			1	WIRE, CRT lead, red stripe
	175-0641-00			1	WIRE, CRT lead, brown stripe
	175-0642-00			1	WIRE, CRT lead, blue stripe
	- - - - -				each wire includes:
-17	131-0049-00			1	CONNECTOR, single contact, female
-18	124-0173-00			1	STRIP, ground
-19	406-0730-00			1	BRACKET, parallax adj.
	- - - - -				mounting hardware: (not included w/bracket)
-20	211-0534-00			4	SCREW, sems, 6-32 x 5/16 inch, PHS
-21	210-0457-00			4	NUT, keps, 6-32 x 5/16 inch
-22	354-0212-00				RING, CRT clamping
	- - - - -				ring includes:
-23	124-0160-00			1	STRIP, liner
	- - - - -				mounting hardware: (not included w/ring)
-24	211-0576-00			2	SCREW, 6-32 x 7/8 inch socket HS
-25	210-0949-00			2	WASHER, flat, 9/64 ID x 1/2 inch OD
-26	214-0207-00			1	NUT, adj. securing
-27	211-0529-00			1	SCREW, 6-32 x 1 1/4 inches, PHS
-28	220-0419-00			1	NUT, square, 6-32 x 5/16 inch
-29	337-0692-00	B010000	B019999	1	SHIELD, CRT extension (R568 only)
	337-0692-01	B020000		1	SHIELD, CRT extension (R568 only)
	162-0592-00	XB050000		1	INSULATION, sheet

FIG. 5 CRT SHIELD, CLAMP & SOCKET (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q t y					Description
				1	2	3	4	5	
5-30	179-1131-00			1					CABLE HARNESS, CRT
	- - - - -			-					cable harness includes:
	136-0248-00			1					ASSEMBLY, CRT socket
	- - - - -			-					assembly includes:
	131-0178-00			9					CONNECTOR, cable end (not shown)
-31	136-0117-00			1					SOCKET, 14 pin
-32	387-0393-00			1					PLATE, socket back
-33	337-0456-00			1					SHIELD, socket
	- - - - -			-					mounting hardware: (not included w/shield)
-34	213-0116-00			2					SCREW, thread cutting, #2 x $\frac{7}{16}$ inch, RHS
-35	210-0938-00			2					WASHER, flat, 0.032 ID x 0.250 inch OD
	210-0849-00			2					WASHER, fiber, #4 shouldered (not shown)

IMPORTANT

VOLTAGE AND WAVEFORM CONDITIONS

Circuit voltages measured with a 20,000 Ω /volt VOM. All readings in volts. Voltages are measured with respect to chassis ground unless otherwise noted.

Waveforms shown are actual waveform photographs taken with a Tektronix Oscilloscope Camera System and Projected Graticule.

Voltages and waveforms on the schematics (shown in blue) are not absolute and may vary between instruments. Any apparent differences between voltage levels measured with the voltmeter and those shown on the waveforms are due to circuit loading of the voltmeter.

The test oscilloscope used had the following characteristics. Minimum deflection factor, .05 volts/division using a 1X probe; frequency response, DC to 40 MHz. DC input coupling was used for all waveforms. To indicate true time relationship between signals, the test oscilloscope was externally triggered.







Voltage readings and waveforms were obtained under the following conditions unless otherwise noted on the individual diagrams:

Control Settings:

INTENSITY	Midrange
FOCUS	Adjust for focused display
CALIBRATOR	OFF
SCALE ILLUM	Midrange
Plug-In Units	Installed
Line Voltage	117 volts
Vertical Input Signal	None
Trace Position	Centered

Schematic Symbols

The following symbols are used on the schematics:

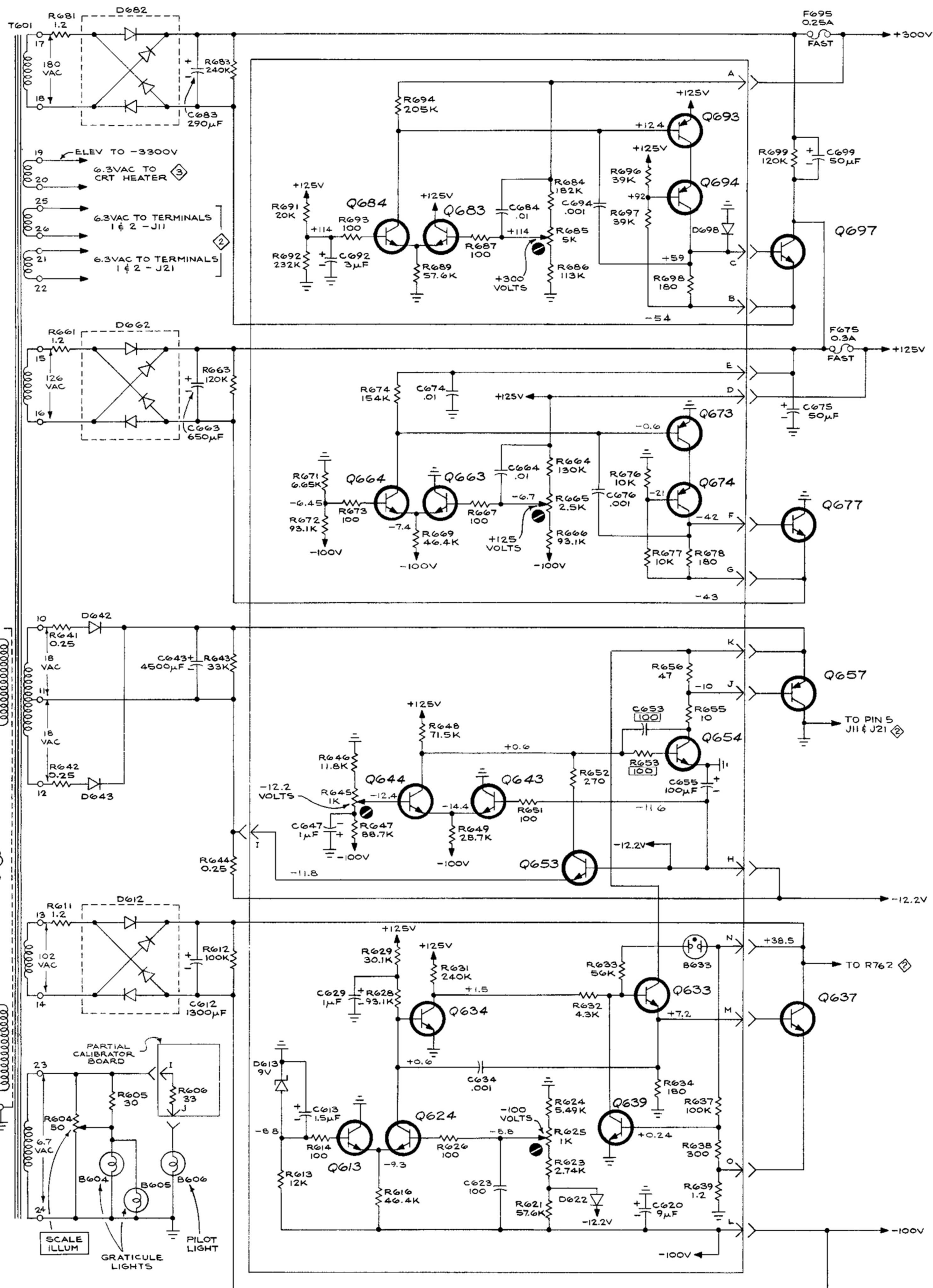
	Screwdriver adjustment
	Front-panel control or connector.
	Connection made at indicated pin on etched-wiring board.
	Connection soldered to etched-wiring board.
	Blue line encloses components located on etched-wiring board.
	Input from, or output to indicated schematic.

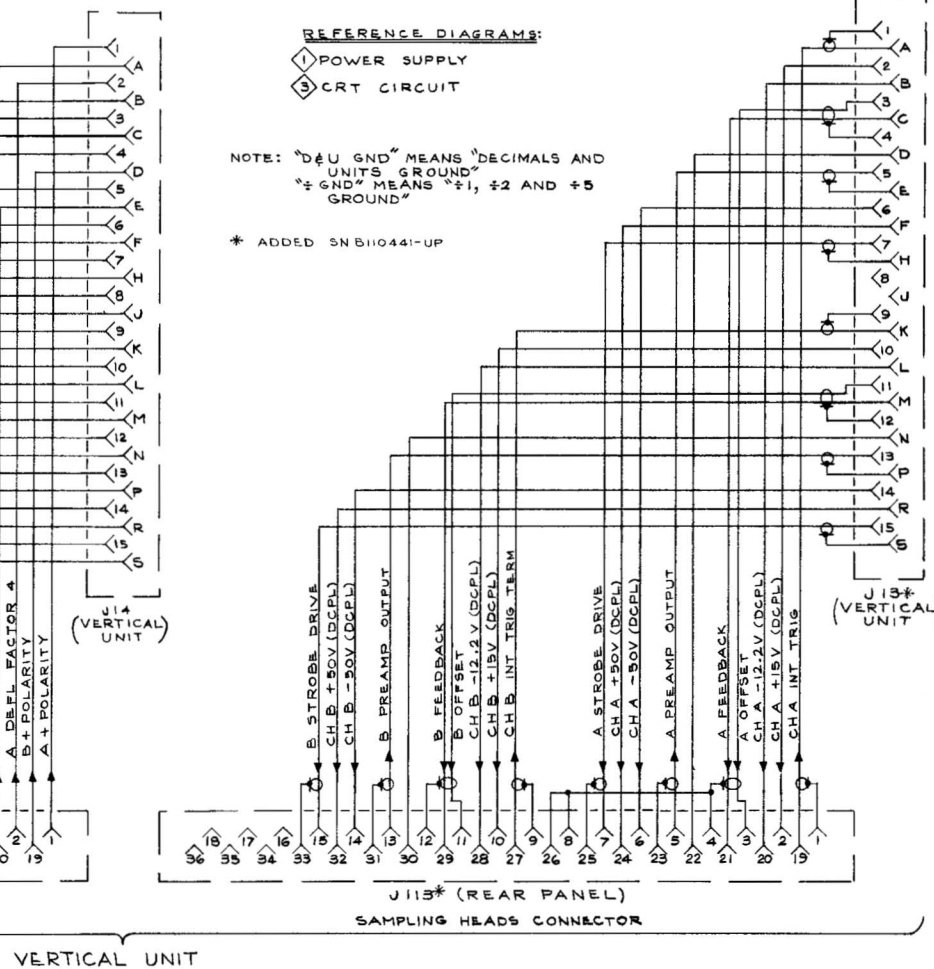
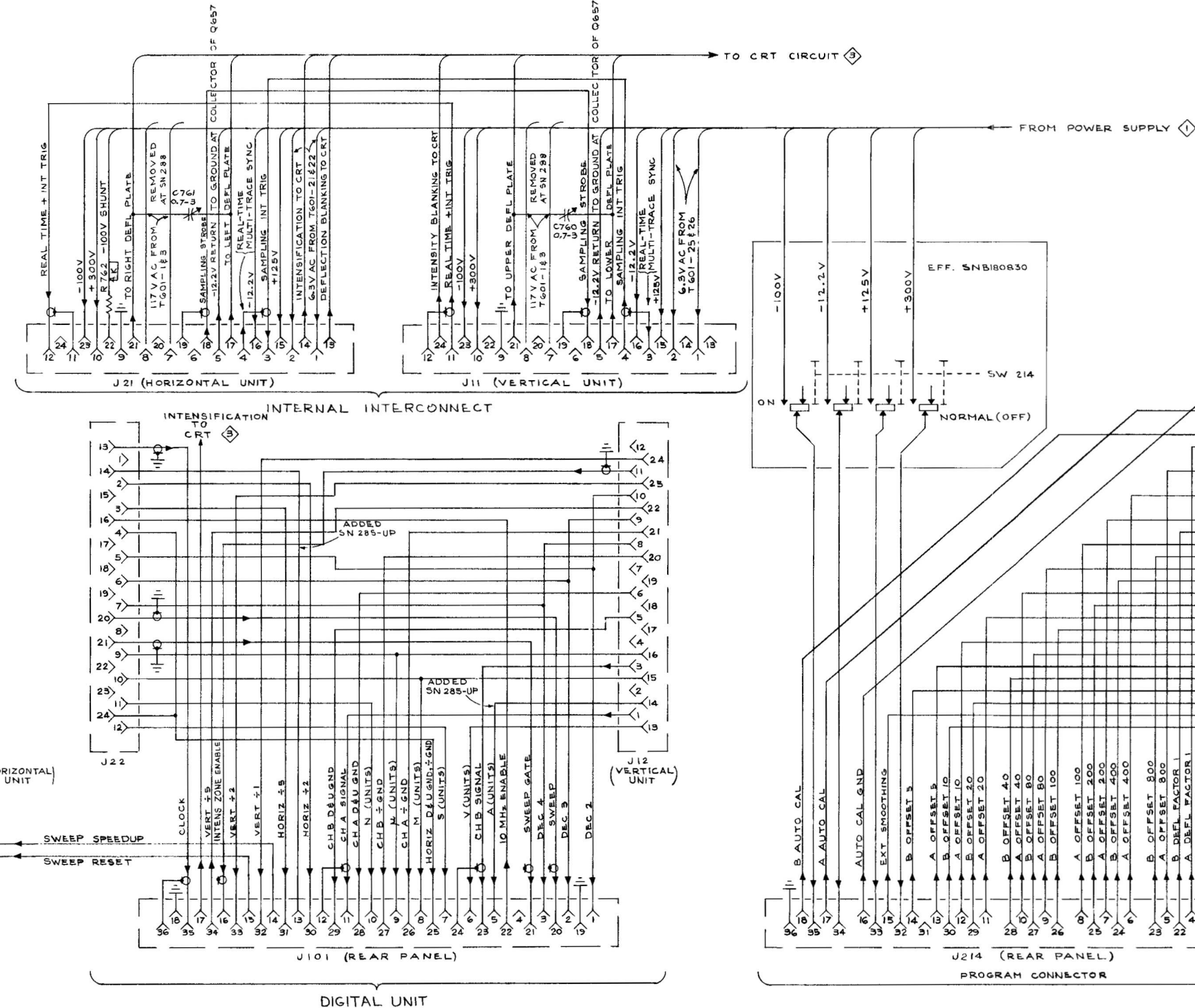
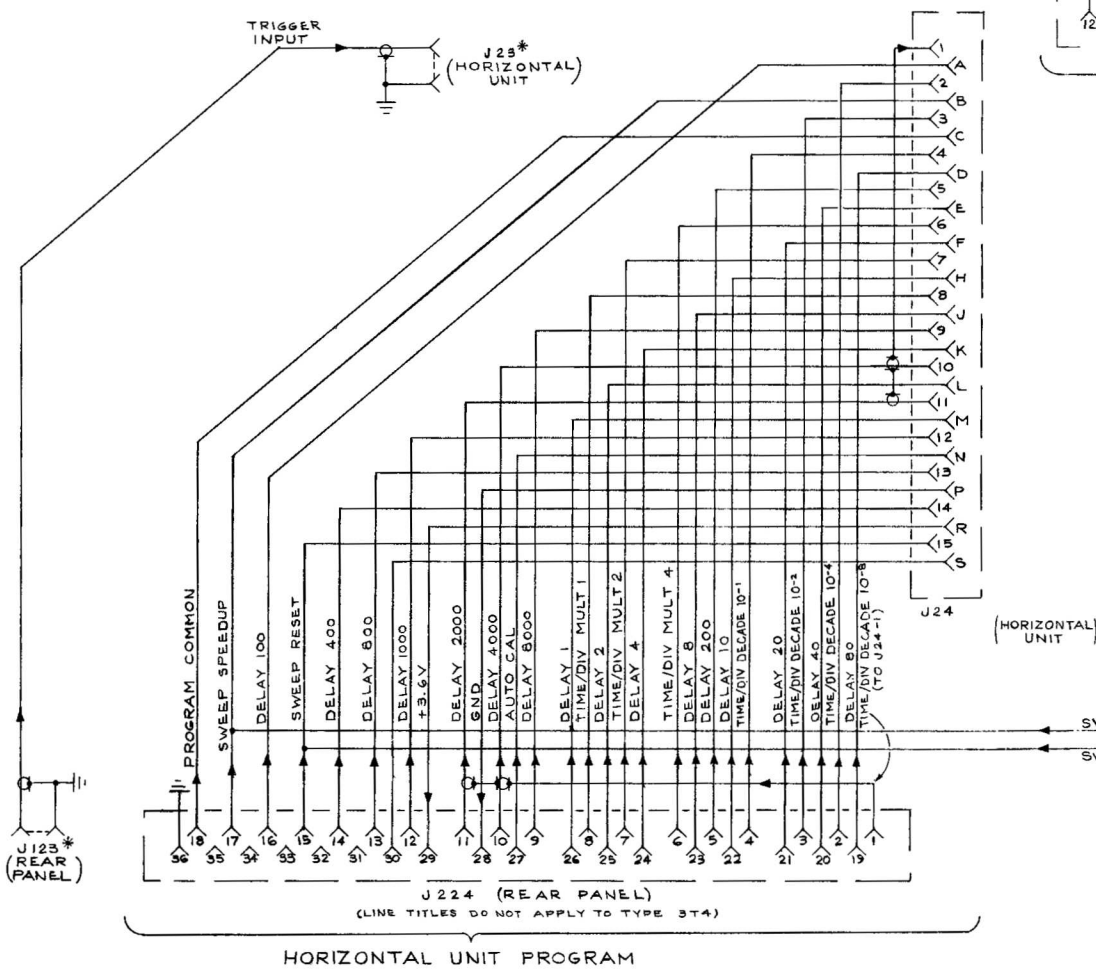
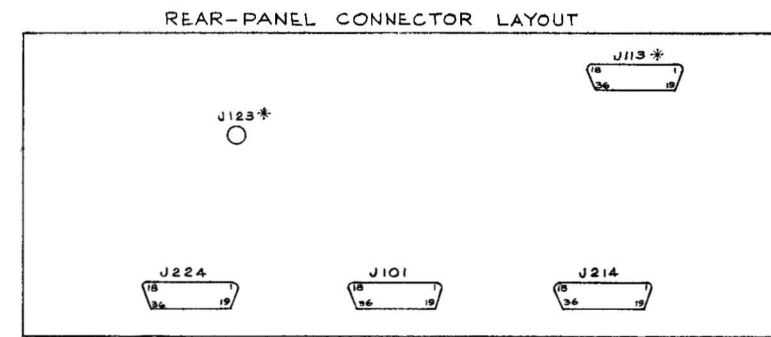
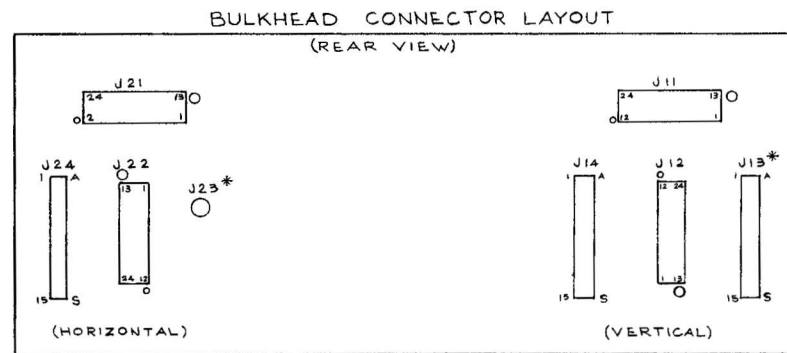
VOLTAGE & WAVEFORM CONDITIONS

REFERENCE DIAGRAMS

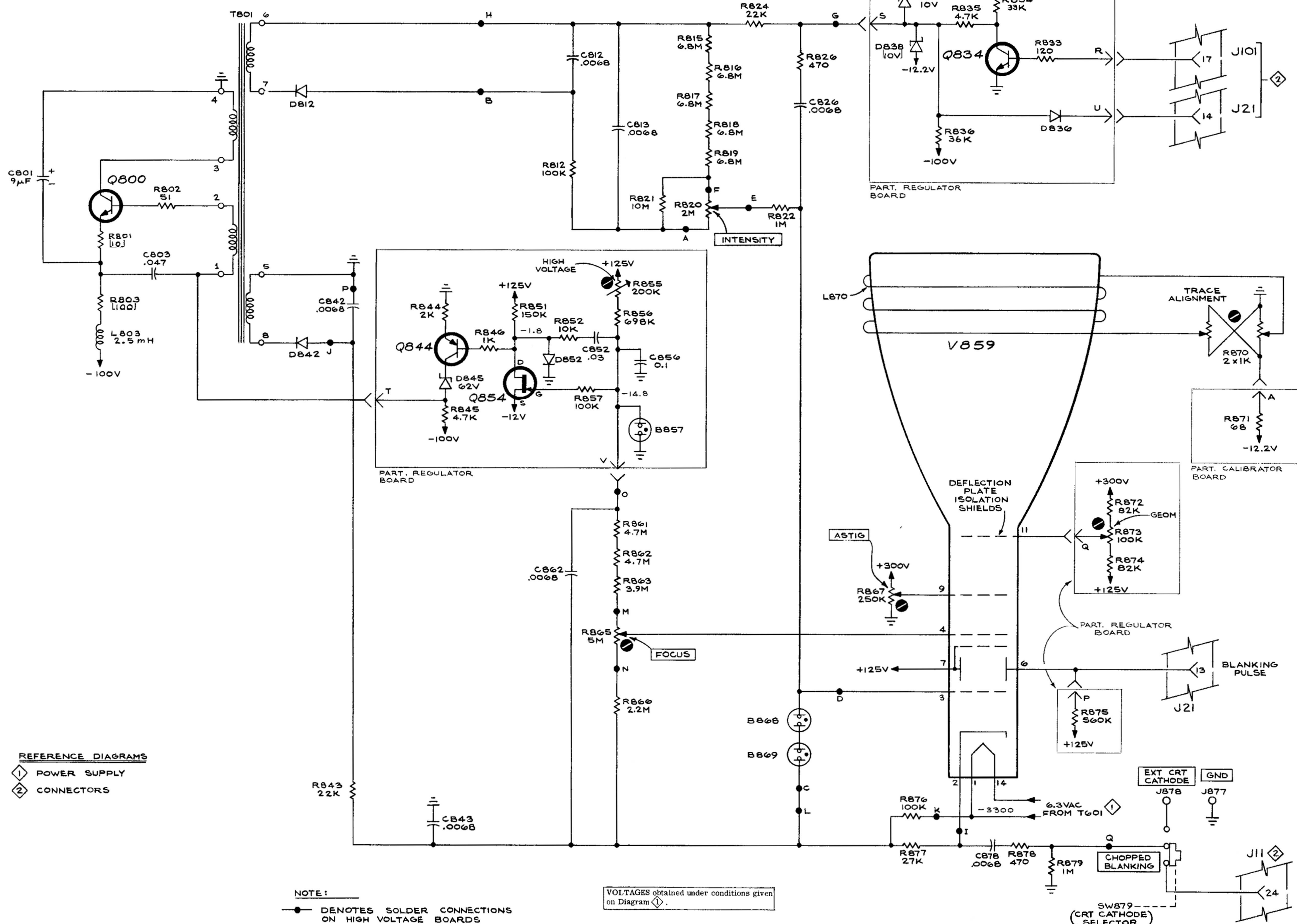
- 2 CONNECTORS
- 3 CRT CIRCUIT

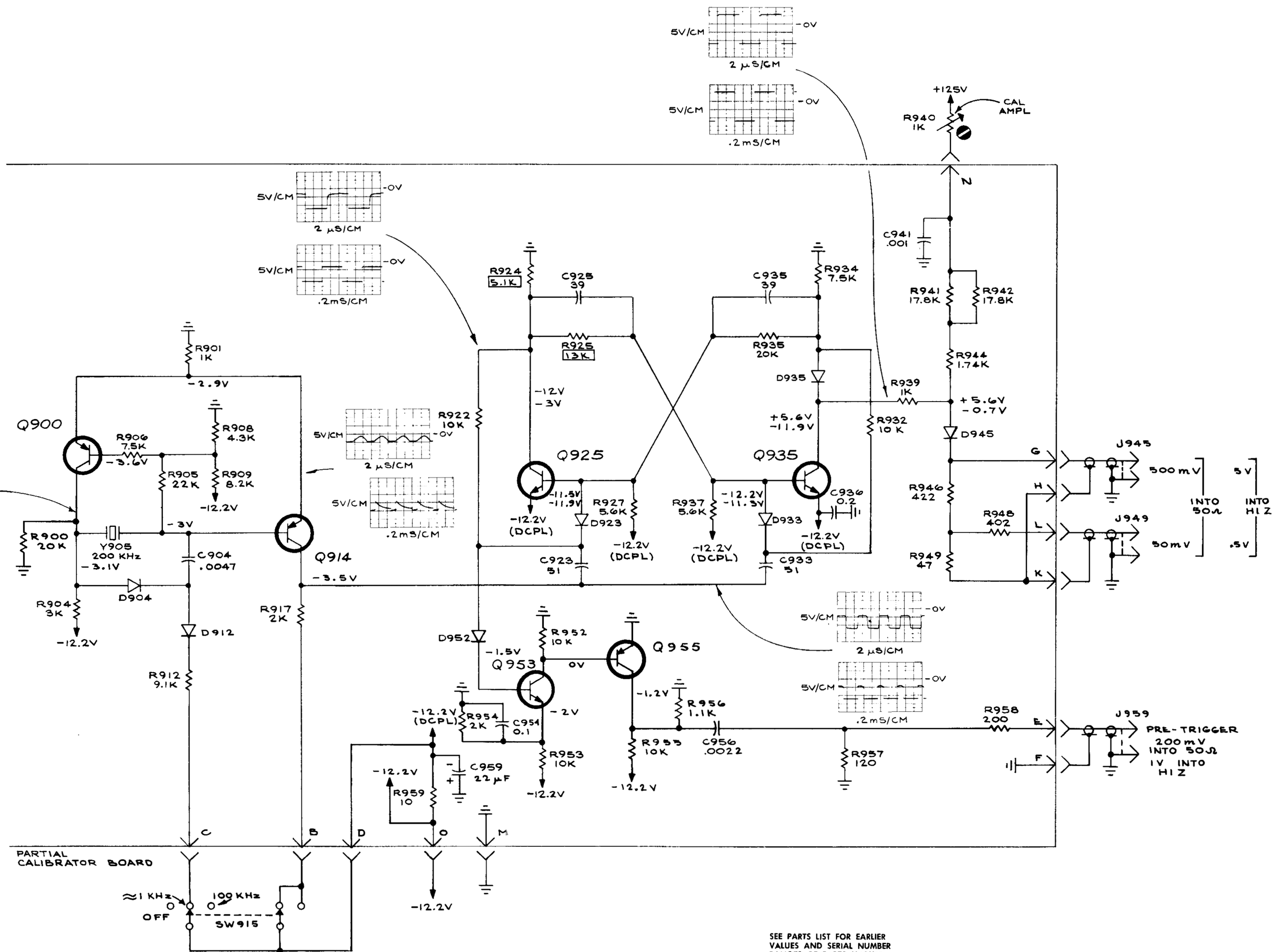
SEE PARTS LIST FOR SEMICONDUCTOR TYPES





SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS MARKED WITH BLUE OUTLINE.

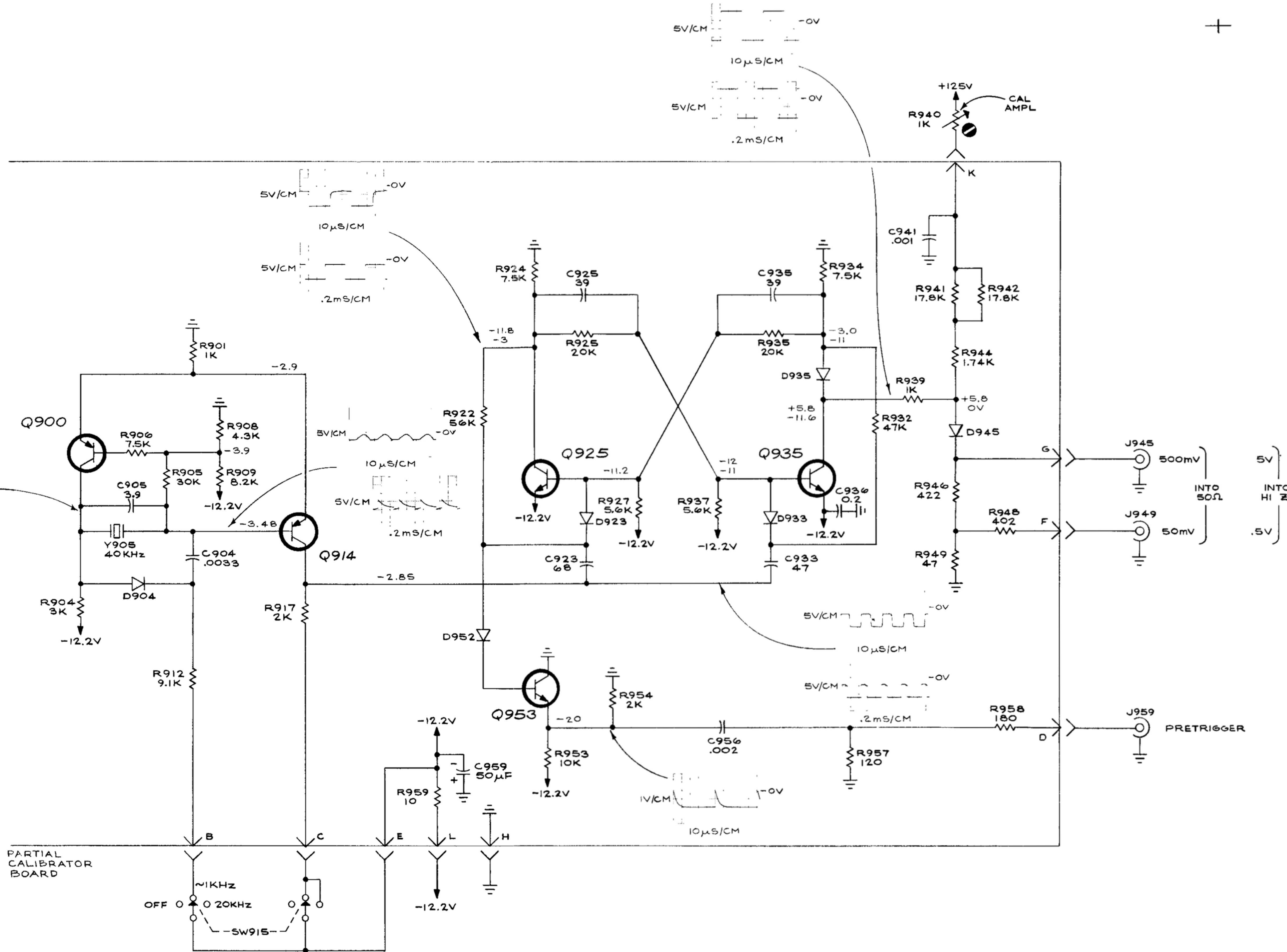
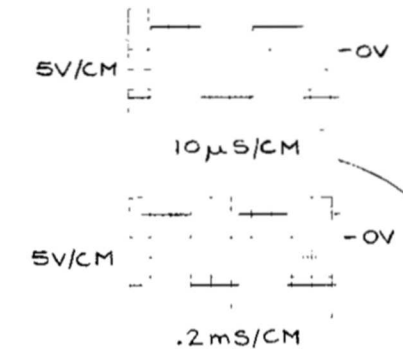
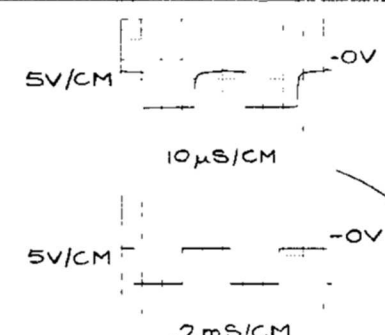
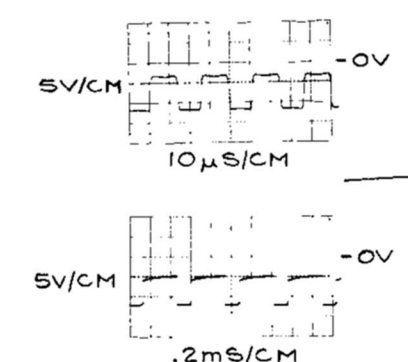




VOLTAGES and WAVEFORMS obtained under conditions given on Diagram ① except as follows:

VOLTAGES
 Upper: Calibrator OFF, output at 5 volts
 Lower: Calibrator OFF, output at 0 volts

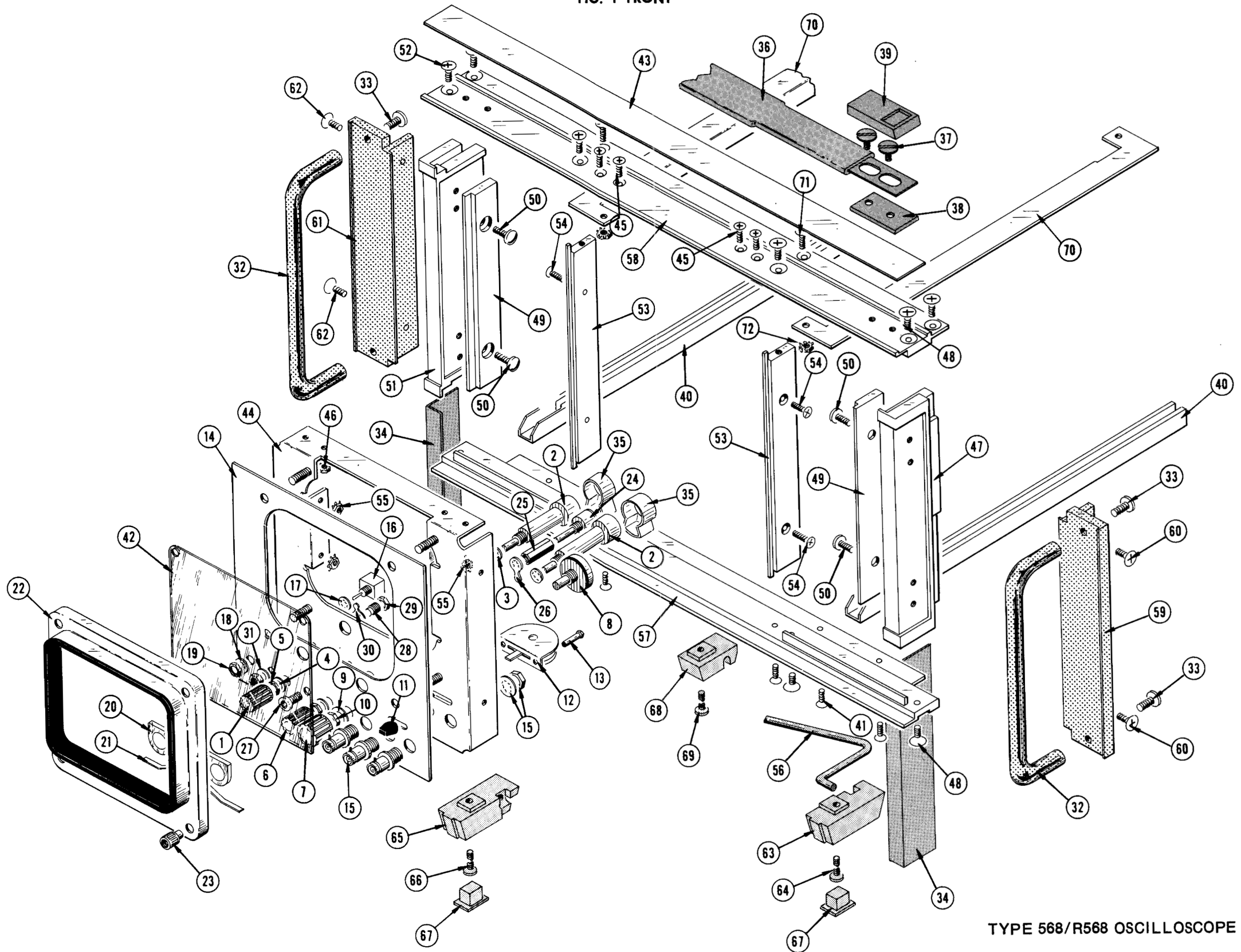
WAVEFORMS
 Upper: Calibrator 100 kHz
 Lower: Calibrator 1 kHz



VOLTAGES and WAVEFORMS obtained under conditions given on Diagram 1, except as follows:
 VOLTAGES
 Upper: Calibrator OFF, output at 5 volts.
 Lower: Calibrator OFF, output at 0 volts.

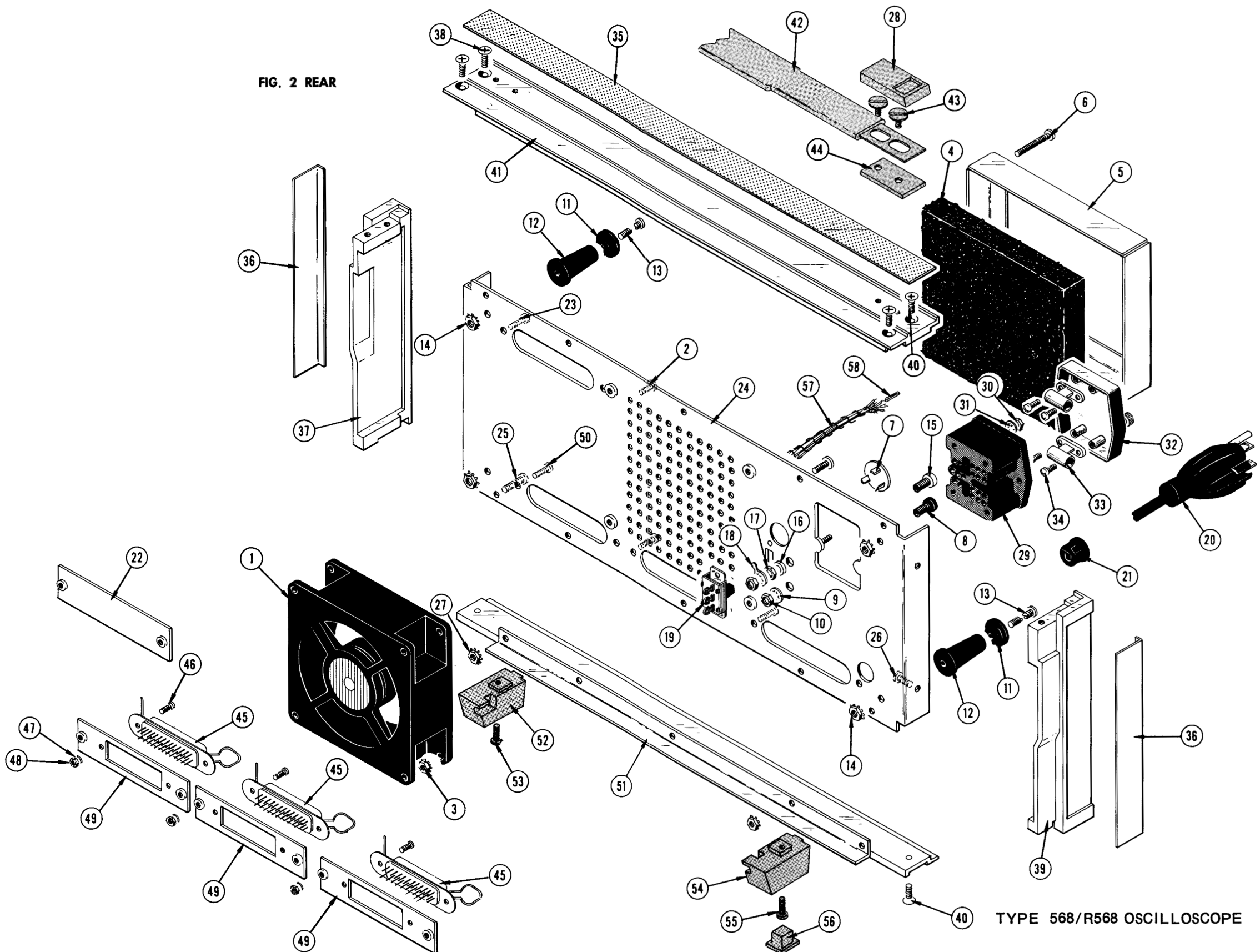
SEE PARTS LIST FOR SEMICONDUCTOR TYPES

FIG. 1 FRONT



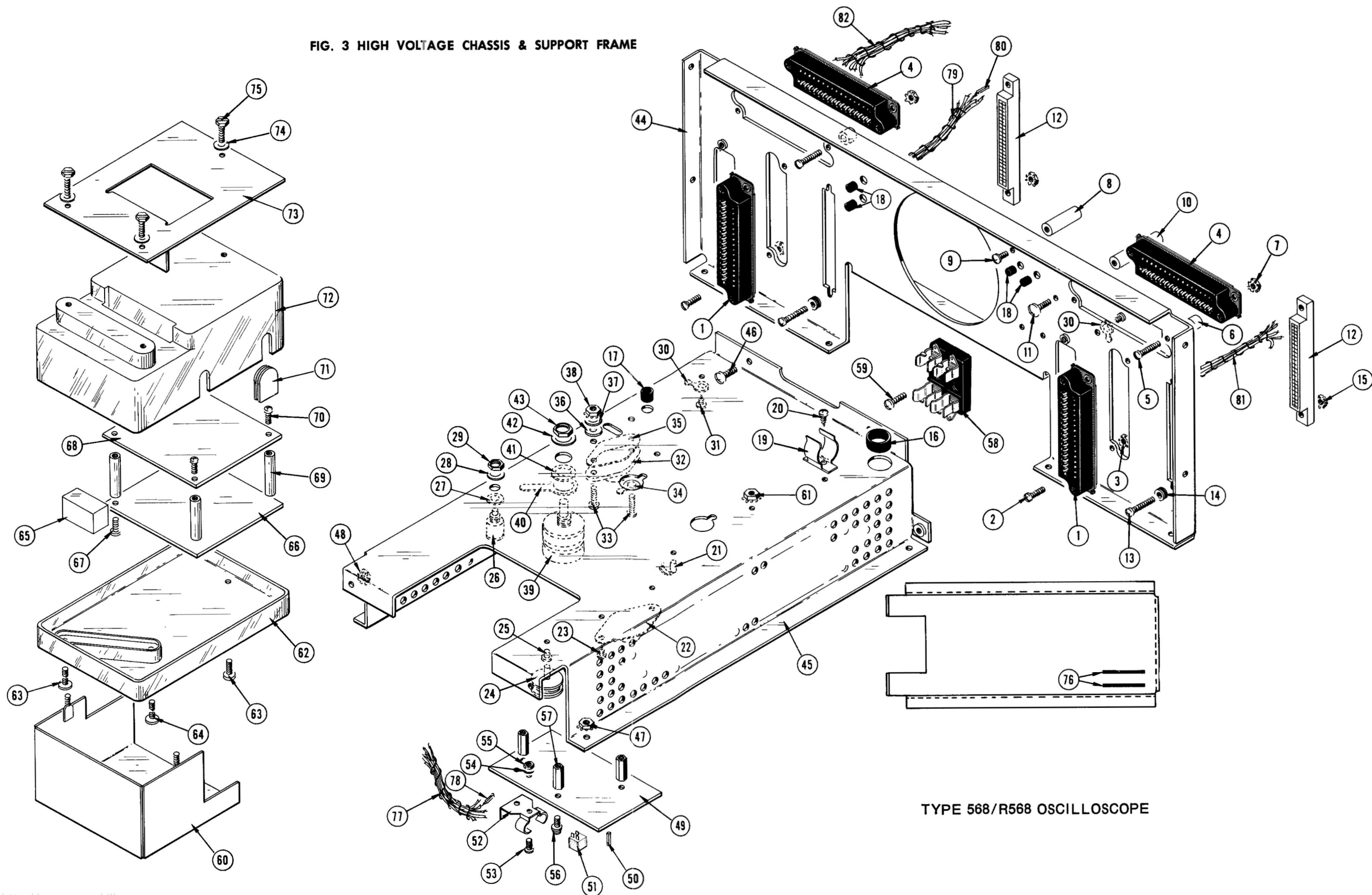
TYPE 568/R568 OSCILLOSCOPE

FIG. 2 REAR



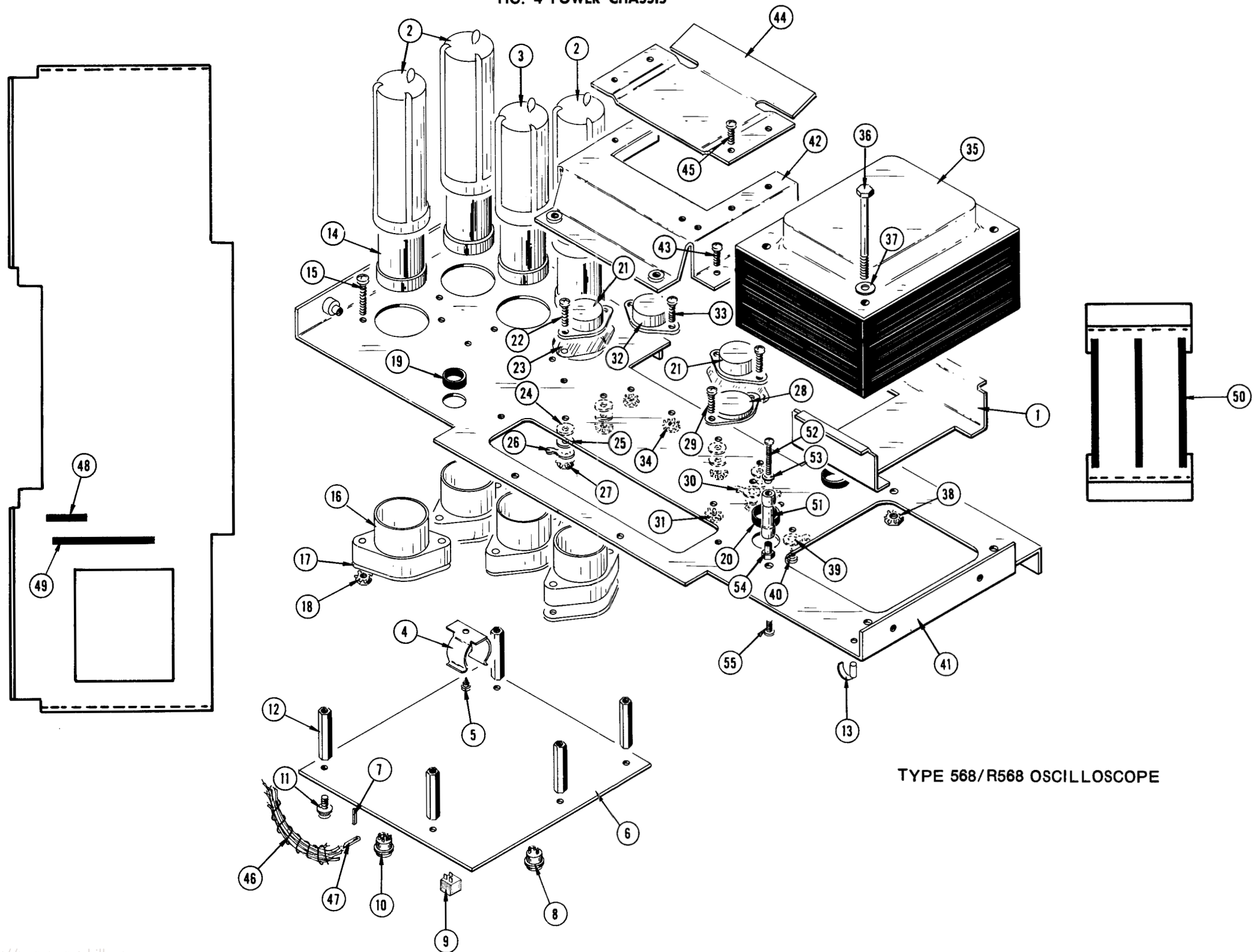
TYPE 568/R568 OSCILLOSCOPE

FIG. 3 HIGH VOLTAGE CHASSIS & SUPPORT FRAME



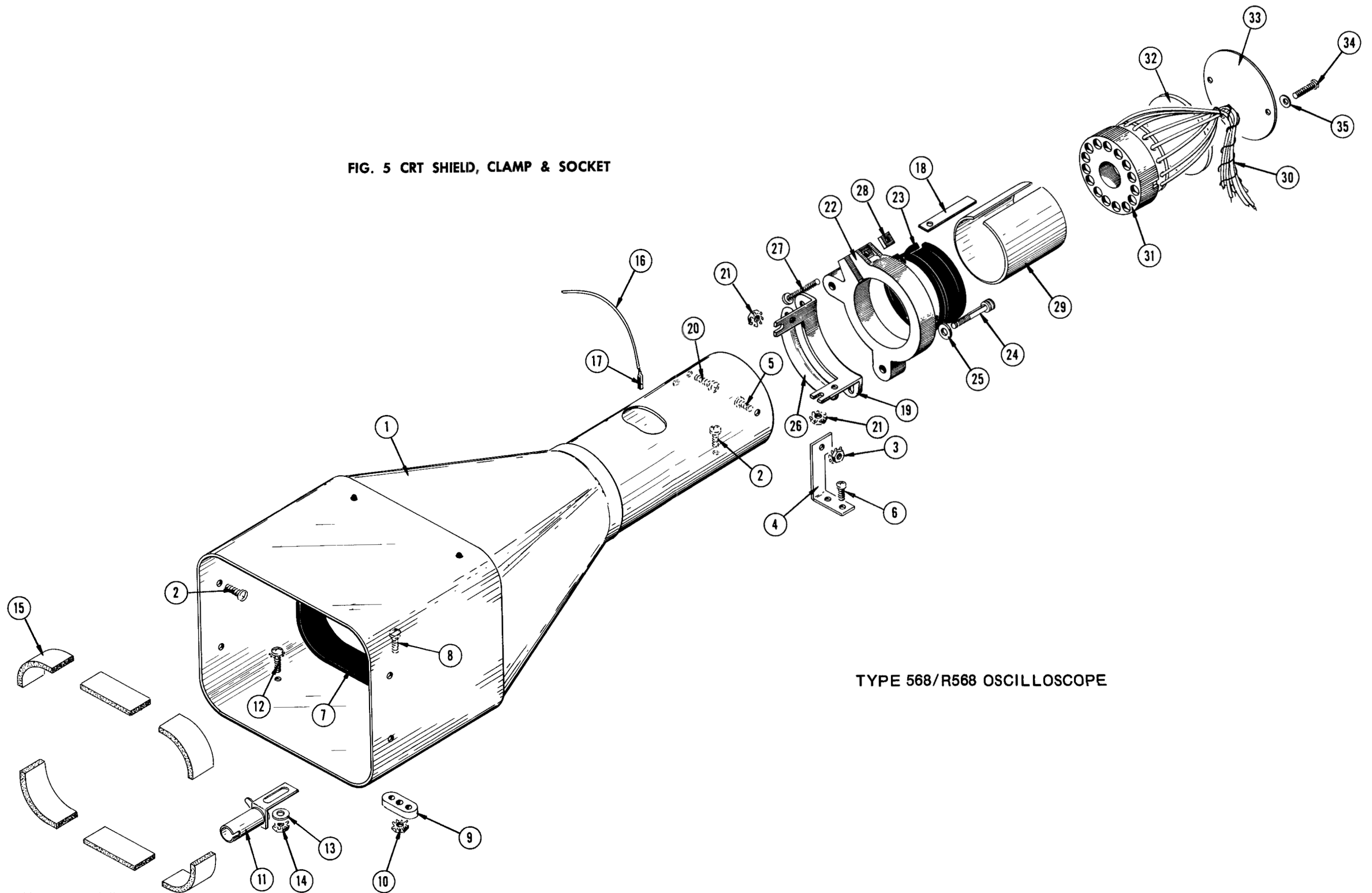
TYPE 568/R568 OSCILLOSCOPE

FIG. 4 POWER CHASSIS



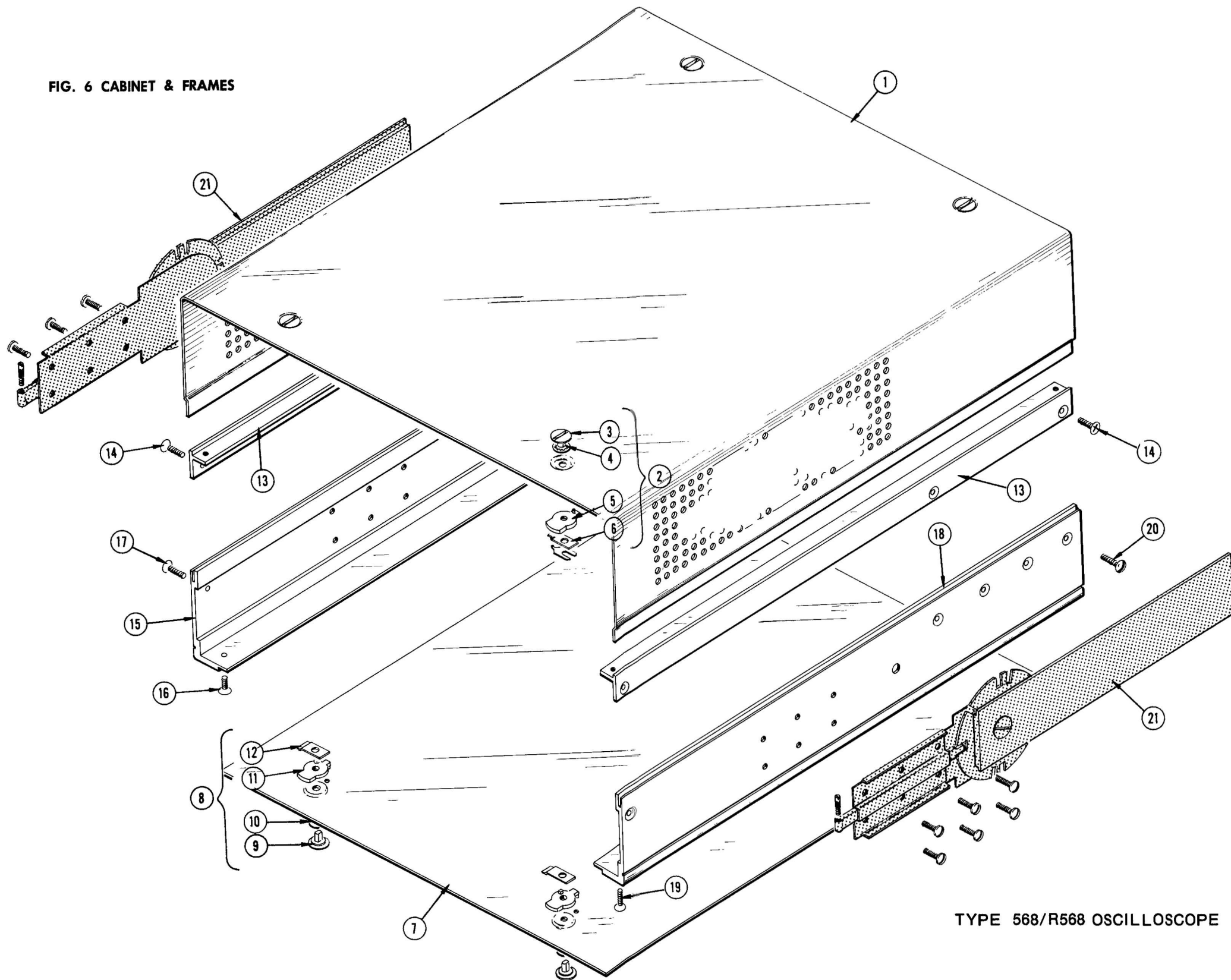
TYPE 568/R568 OSCILLOSCOPE

FIG. 5 CRT SHIELD, CLAMP & SOCKET



TYPE 568/R568 OSCILLOSCOPE

FIG. 6 CABINET & FRAMES



TYPE 568/R568 OSCILLOSCOPE

FIG. 7 568/R568 STANDARD ACCESSORIES & OTHER PARTS FURNISHED WITH R568

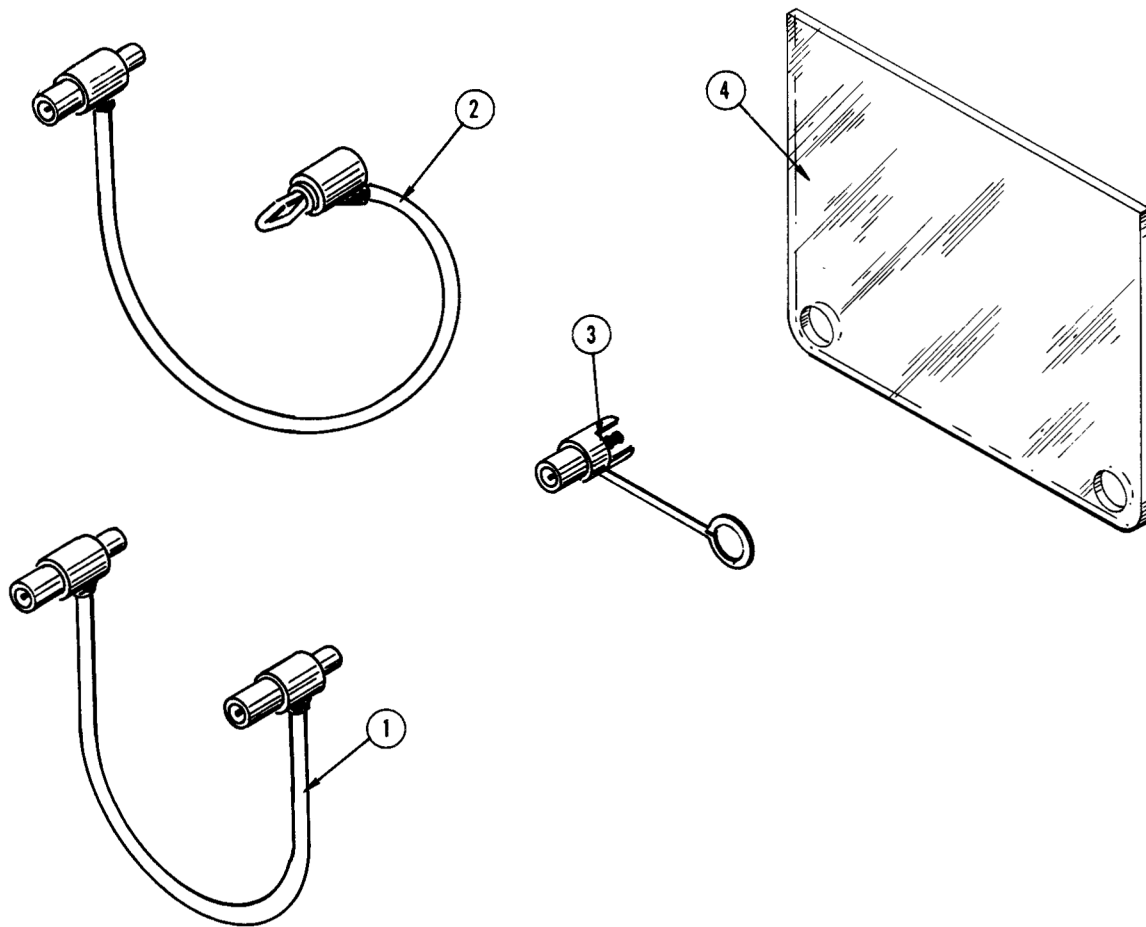


Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description
				t	y	1	2	3	
7-1	012-0087-00			1					CORD, patch, red, BNC, 18 inches
-2	012-0091-00			1					CORD, patch, red, BNC to banana plug, 18 inches
-3	012-0092-00			1					JACK, BNC—post
-4	387-0935-00	B010100	B139999	1					PLATE, protector
	337-0539-00	B140000		1					SHIELD, implosion
	070-0596-00			1					MANUAL, instruction (not shown)

OTHER PARTS FURNISHED with R568:

351-0086-00	B010100	B040253	1	TRACK, slide, stationary & inter-section (pair, not shown)
351-0085-00	B040254	B079999	1	TRACK, slideout, stationary & inter-section (pair, not shown)
351-0086-00	B080000		1	TRACK, slideout, stationary & inter-section (pair, not shown)
016-0097-00			1	KIT, ruggedizing hardware (not shown)
016-0099-00			1	KIT, rackmounting hardware (not shown)

TYPE 568/R568 OSCILLOSCOPE

RACKMOUNTING

General

Tektronix Automated System instruments are designed for installation in a standard 19-inch wide rack that has Universal, EIA, RETMA, or Western Electric hole spacing. The slide-out tracks permit each instrument to be extended out of the rack for troubleshooting or servicing (see Fig. 10-1). When not extended, the instrument is held into the rack with four securing screws.

The chassis sections of the slide-out tracks are installed at the factory. The stationary sections are to be attached to the mounting rails of the racks. When installed, the intermediate sections slide freely between the chassis and stationary sections as the instrument is pulled out or pushed into the rack.

The mounting hardware provided with the slide-out tracks is intended to make them adaptable to a variety of racks and installation methods. Not all of the hardware will be needed for any particular installation, so only the parts that are required for the specific mounting method should be used.

In order to operate an instrument in the extended position, it must be mounted close enough to its companion instruments to permit the interconnecting cables to reach between them, and the input power connection must be located close enough for the power cord to reach.

Mounting Considerations

A wide variety of mounting methods is available for installing the slide-out tracks in the rack. The following factors should be taken into consideration when choosing the mounting method for a particular installation:

1. Depth of the rack.
2. Degree of mechanical stability required.
3. Mounting method used for other instruments in the rack.

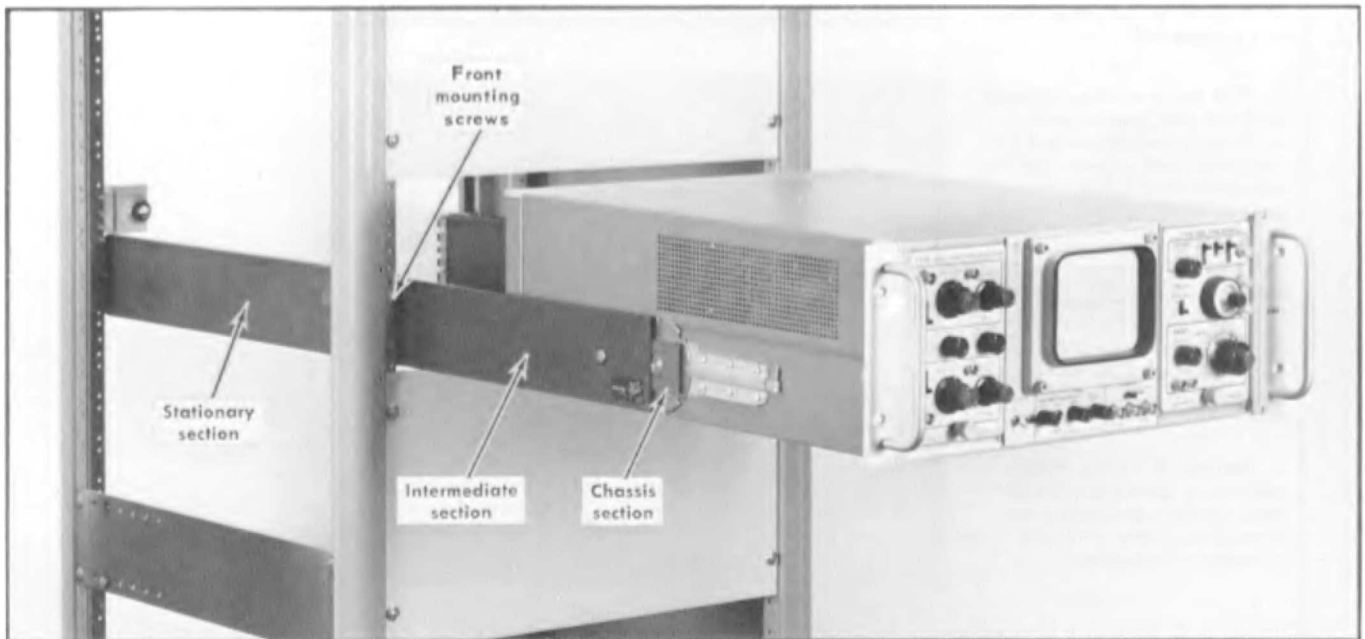


Fig. 10-1. An instrument extended on slide-out tracks; shown with rack sides and instrument panels removed.

Rackmounting—Type R568

4. Type of mounting holes in the supporting rails; that is, whether they are tapped, untapped or countersunk.

5. Whether or not the rear support rails are movable, and if movable, whether they can be positioned at any location or moved only in discrete increments.

6. Relative thicknesses of the front panels of the various instruments in the rack.

7. General appearance desired for the completed rack assembly.

These factors will usually determine whether the front mounting flanges of the stationary sections are to be mounted in front of the front rails or behind them.

Front-End Mounting with Tapped Front Rails. If the mounting holes in the front rails of the rack are tapped for 10-32 screws, the easiest method of attaching the front ends of the stationary sections to the rack is to mount the front flanges in front of the front rails (see Fig. 10-5A and B). When mounted in this position, 10-32 pan-head screws may be used directly to attach the front flanges to the rails, or 10-32 flathead screws may be used with countersunk shim material to clamp the front flanges to the rails.

The use of countersunk shim material provides better support for the front flanges and also permits depth adjustment of the front panel. If the various instruments in the rack have different panel thicknesses, different thicknesses of shim material can be used to make the front surfaces of all panels flush with each other. The shim material should be approximately 1/2-inch wide and have a minimum thickness of approximately 1/8 inch to accommodate the countersunk screw heads. Each strip should be at least as long (vertical dimension in the rack) as the width of the front flanges of the stationary sections (3 1/8 inches). Since the dimensions of the shim material are determined entirely by the dimensions of the rack installation, no shim material is provided with the mounting hardware.

Front-End Mounting with Untapped Front Rails. If the mounting holes in the front rails are not tapped, bar nuts (Fig. 10-2) must be used behind the rails to accommodate the mounting screws. All of the options previously described for tapped front rails also apply to the untapped rails when used with bar nuts. In addition, the untapped front rails (with bar nuts) permit the front mounting flanges to be attached to the rear sides of the front rails if desired (see Fig. 10-5C). When mounted in this position, the flanges are clamped between the bar nuts and the front rails. Either 10-32 pan-head screws or 10-32 flat-head screws with shim material may be used as described for tapped front rails, or 10-32 flat-head mounting screws may be countersunk into the front rails.

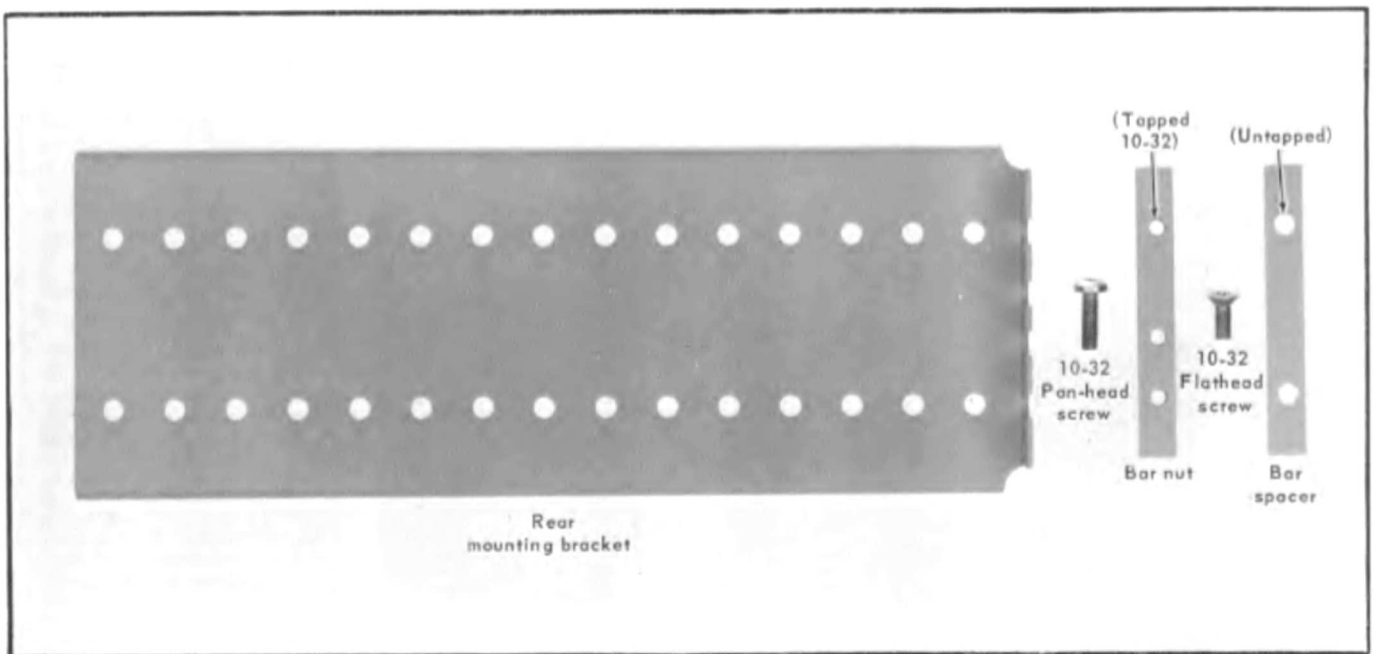


Fig. 10-2. Identification of mounting hardware provided with the stationary/intermediate track sections.

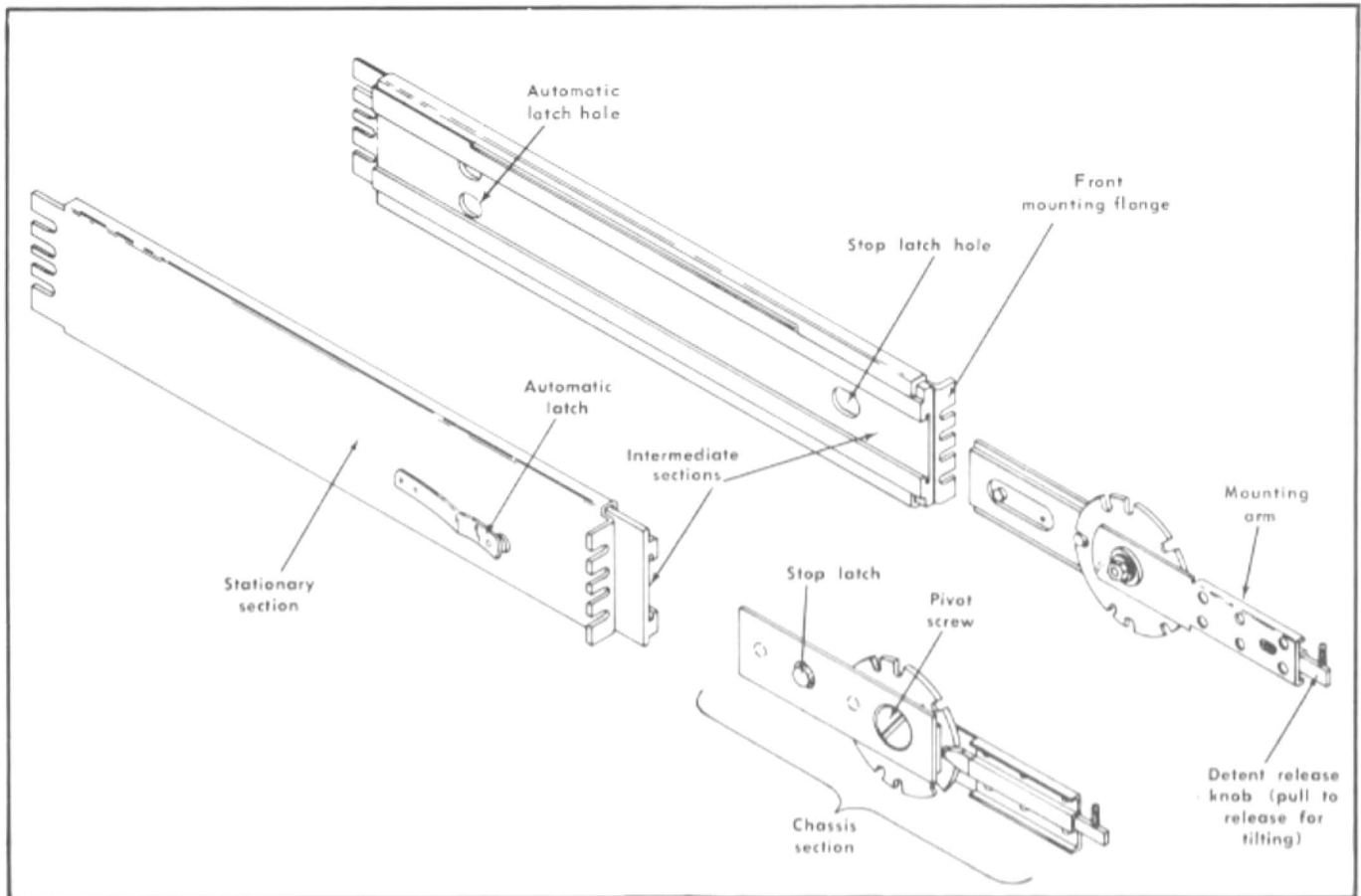


Fig. 10-3. Slide-out track assemblies.

Rear-End Mounting. Fig. 10-6 illustrates two alternative mounting methods using the rear mounting brackets. The depth between the front end rails of the rack will determine which of these configurations should be used.

Mounting Procedure

The stationary and intermediate sections of the slide-out tracks are shipped as matched pairs and should not be separated. To distinguish between the right and left stationary/intermediate assemblies, note the position of the automatic latch (see Fig. 10-3) in each assembly. The automatic latch should be located near the bottom of the assembly when it is installed in the rack.

Use the following procedure to install the stationary sections of the slide-out tracks and the instrument in the rack:

1. Referring to Fig. 10-4, select the proper front-rail mounting holes for the stationary sections.

2a. If the front flanges of the stationary sections are to be mounted in front of the front rails, mount the front of each stationary section as shown in Fig. 10-5A or B.

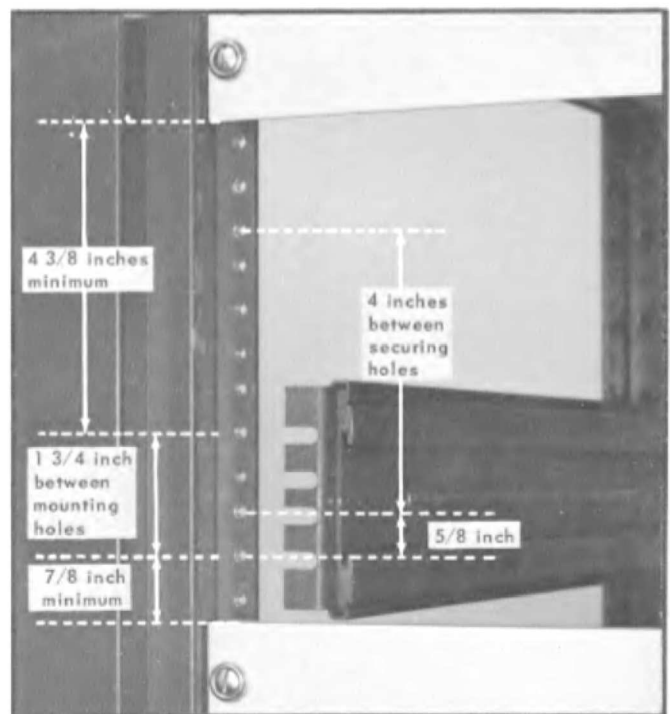


Fig. 10-4. Vertical mounting position for front end of slide-out tracks.

Rackmounting—Type R568

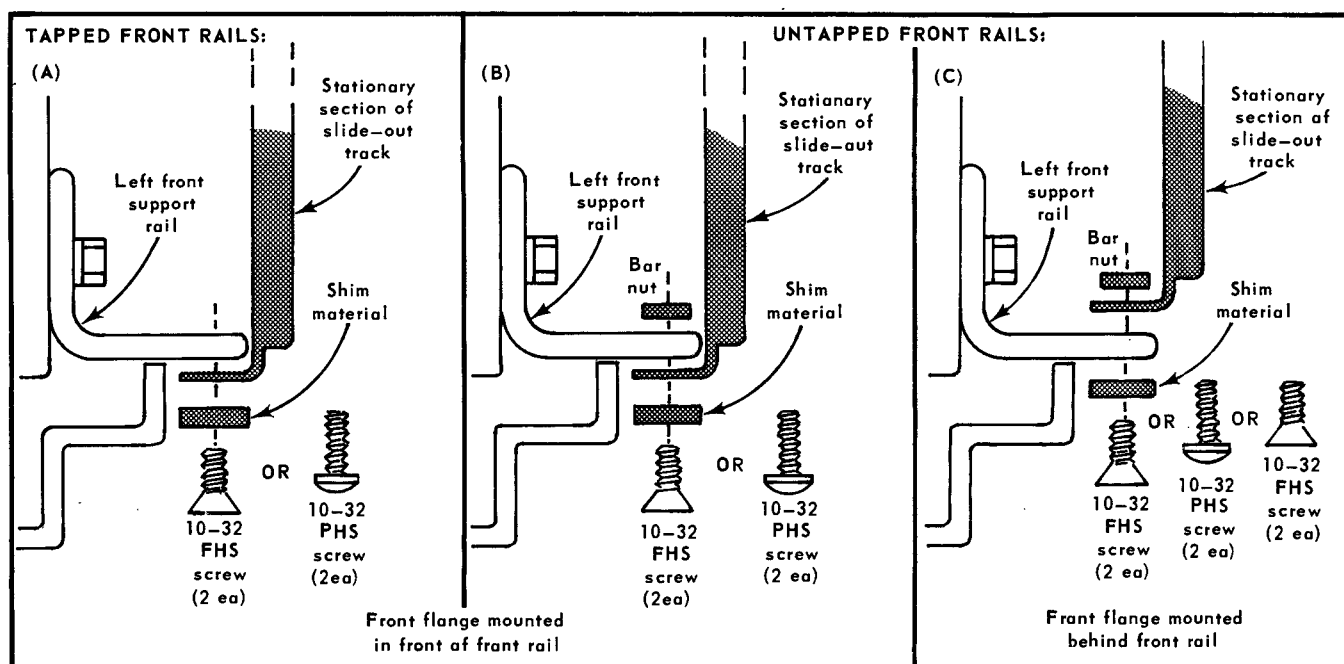


Fig. 10-5. Methods for mounting front end of stationary sections as described in the text. Thickness of optional shim material is selected to compensate for differences in front-panel thickness of various instruments in rack. (Shim material described in the text is not provided.)

2b. If the front flanges are to be mounted behind the front rails, mount the front end of each stationary section as shown in Fig. 10-5C.

3. With the front end of each stationary section attached to the front rail, hold the track in a level position in the rack and locate the proper rear-rail mounting holes.

4. Attach the rear mounting brackets to the rear support rails as shown in Fig. 10-6 and tighten the screws securely.

5. Referring to Fig. 10-7, insert the instrument into the rack. Do not connect the power cord or interconnecting cables yet and do not install the securing screws.

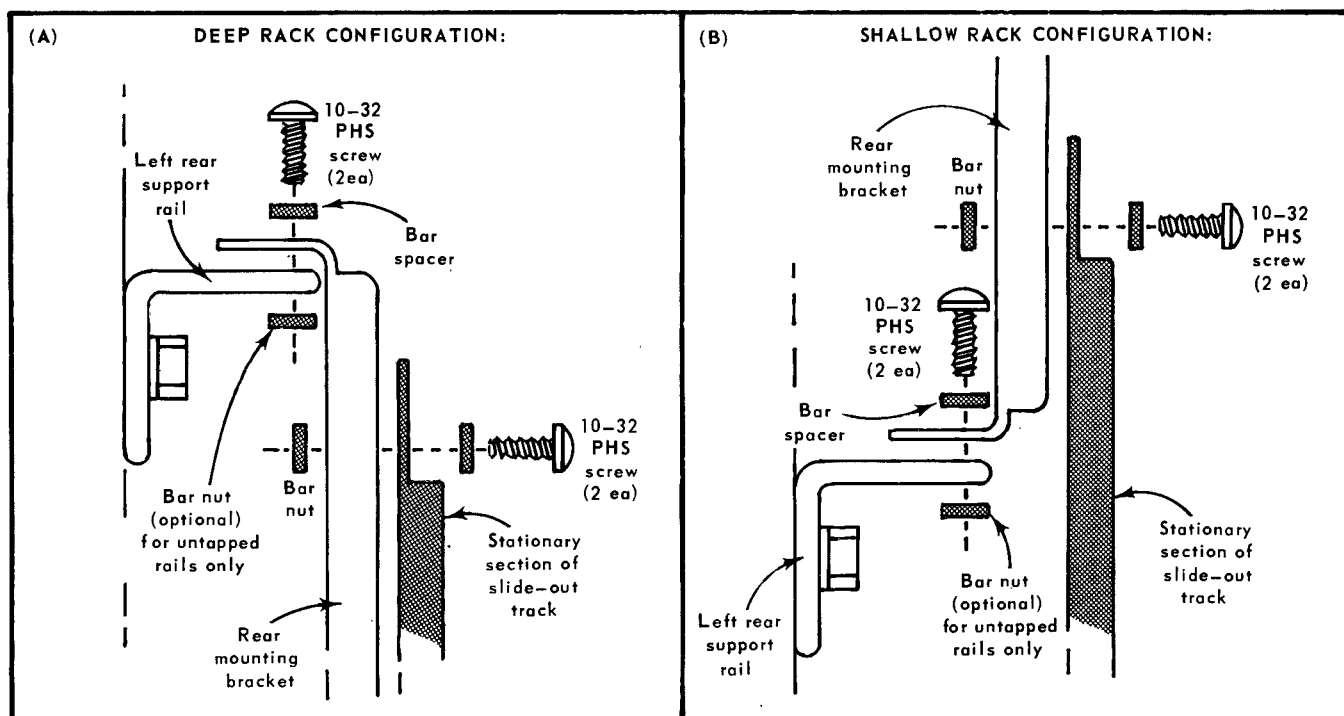


Fig. 10-6. Rack mounting: (A) For use with racks deeper than 21 inches from the front of the front rail to the rear of the rear rail; (B) For use with racks shallower than 21 inches.

Alignment Procedure

Use the following procedure to adjust the instrument alignment in the rack:

1. Position the instrument approximately half-way out of the rack so that the point of rotation on each chassis section is adjacent to the front rail of the rack.

2. Loosen the mounting screws holding the front mounting flanges to the front rails.

3. Hold the instrument in the center of its mounting space and re-tighten the front mounting screws.

4. Push the instrument all the way into the rack and check the vertical and horizontal alignment of the front panel of the instrument. If necessary, readjust the positioning as described in steps 2 and 3.

5. Push the instrument all the way into the rack again and install one securing screw through each handle bracket; using a finishing washer and a plastic washer with each securing screw as shown in Fig. 10-7. If the front rails are not tapped for the 10-32 securing screws, some other means of securing the instrument into the rack must be provided.

6. Loosen the screws that hold the rear mounting brackets to the support rails and allow the rear ends of the stationary sections to seek their normal positions. Tighten the rear mounting bracket screws while holding up on the

rear of the instrument so that the weight is removed from the brackets.

7. Secure the handle brackets to the front rails of the rack with the four securing screws (Fig. 10-7).

NOTE

The securing screws are an important part of the shock-mounted installation.

8. After all adjustments have been made and all hardware has been tightened securely, connect the power cord to a suitable power source and connect the program cables to the proper connectors on the rear panel of the instrument.

Slide-Out Track Lubrication

The special finish on the sliding surfaces of the slide-out tracks provides permanent lubrication. However, if the tracks do not slide smoothly even after being properly adjusted, a thin coating of paraffin may be rubbed onto the sliding surfaces for additional lubrication. It will be necessary to remove the tracks from the rack to do this.

Removal and Re-insertion

After the initial installation and adjustment of the slide-out tracks, the instrument may be removed or re-inserted in the rack by following the instructions given in Fig. 10-7. Under normal circumstances, no further adjustments are required.

TO INSERT THE INSTRUMENT:

1. Pull out the intermediate section (A) of each slide-out track to its fully extended position.

2. Insert the chassis sections (B) into the intermediate sections and push the instrument in until the stop latches (C) hit the intermediate sections.

3. Press both stop latches (C) and push the instrument in until the stop latches snap into the stop latch holes (D).

4. Press both stop latches (D) and push the instrument all the way into the rack. The automatic latches will release as the instrument is pushed in.

5. Insert the 4 securing screws (E) (with finishing washers and plastic washers) through the slots in the handle brackets and screw them into the front rails of the rack.

TO REMOVE THE INSTRUMENT:

1. Disconnect the power cord and remove the interconnecting cables from the rear-panel connectors.

2. Remove the securing screws and washers (E).

3. Pull the instrument outward until the stop latches snap into the stop latch holes and the automatic latches snap into the automatic latch holes.

4. Press both stop latches (D) and pull the instrument out of the rack.

5. Press the automatic latch in each intermediate section and push the track into the rack.

6. Connect the proper interconnecting cables to the rear-panel program connectors and connect the power cord to a suitable power source.

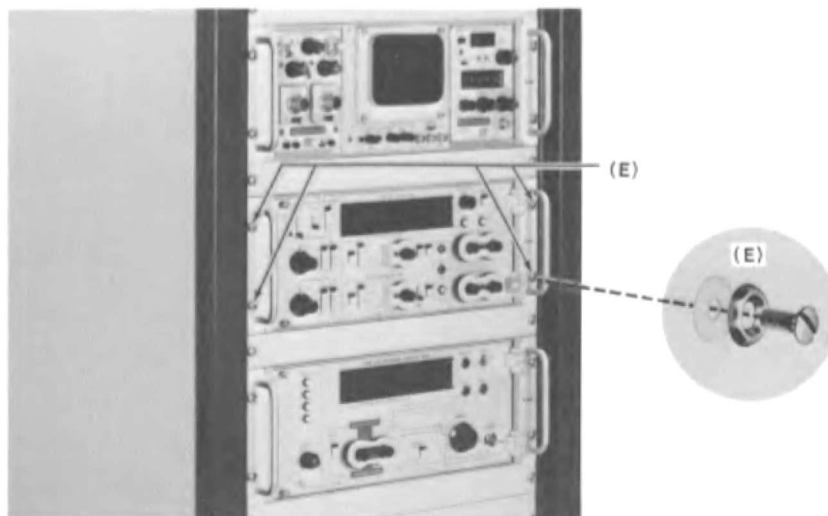
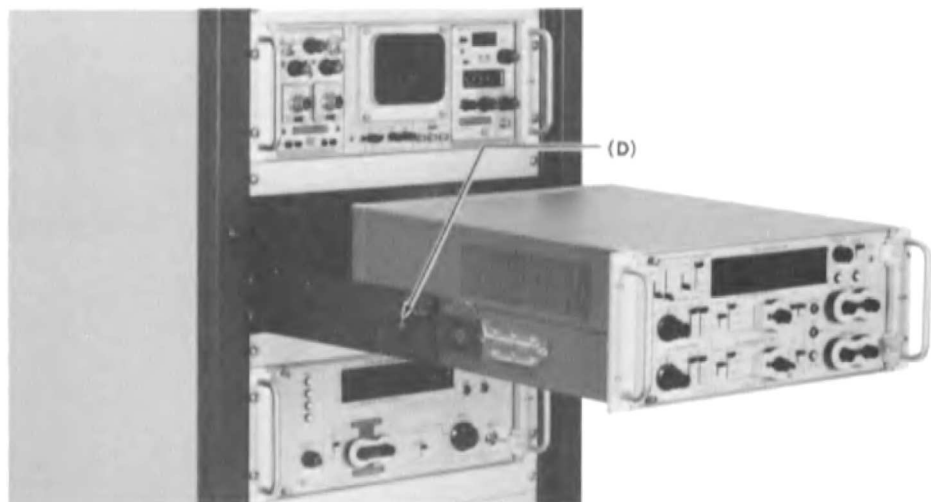
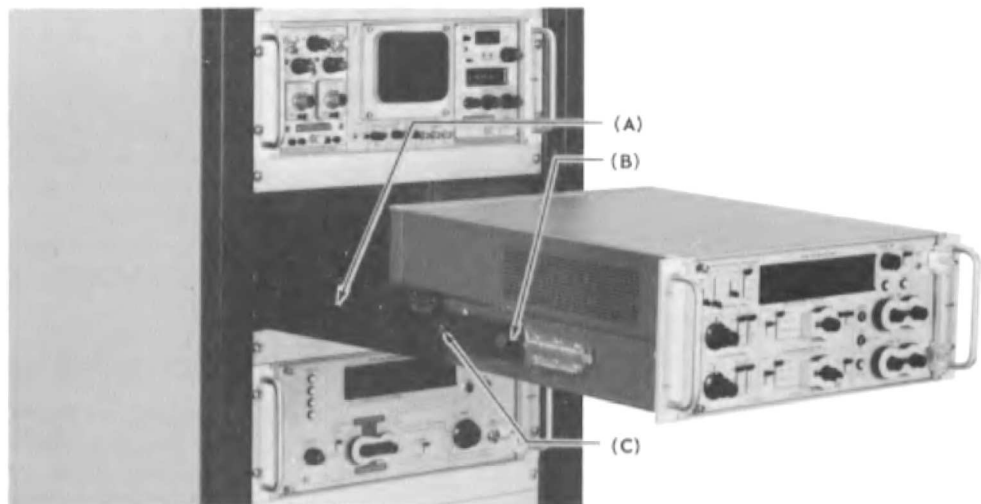


Fig. 10-7. Insertion and removal of a rackmount instrument after the slide-out tracks have been installed.

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. Sections of the manual are often printed at different times, so some of the information on the change pages may already be in your manual. 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 in this section, your manual is correct as printed.

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