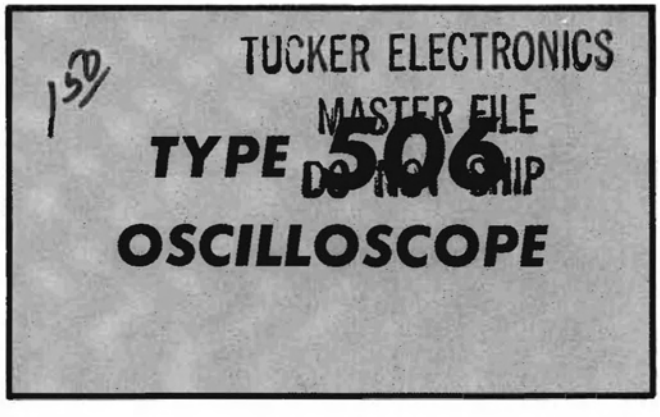
INSTRUCTION MANUAL

Serial Number _____

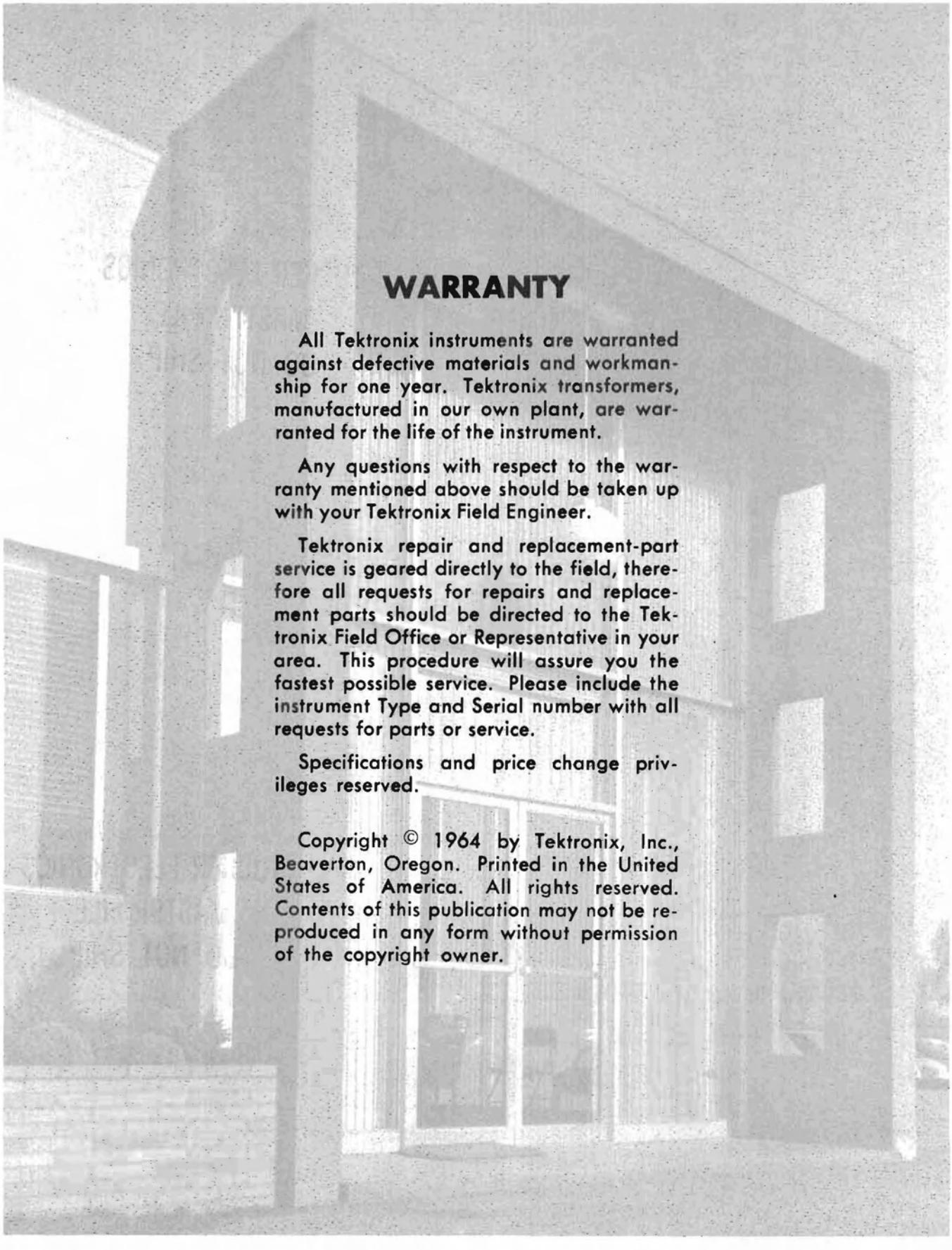
TUCKER ELECTRONICS
MASTER FILE
DO NOT SHIP



Tektronix, Inc.
S.W. Millikan Way • P. O. Box 500 • Beaverton, Oregon • Phone MI 4-0161 • Cables: Tektronix

070-445

864



WARRANTY

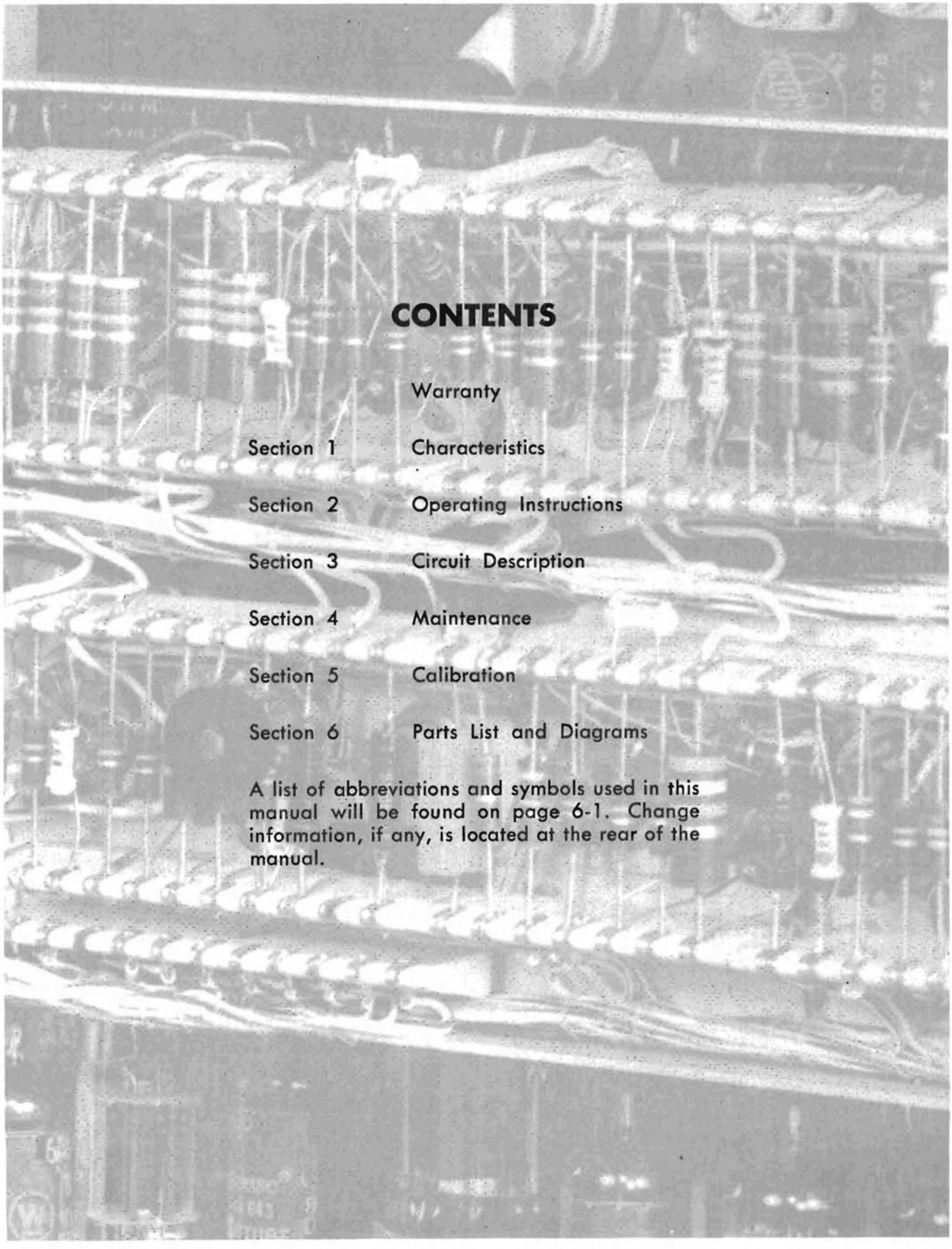
All Tektronix instruments are warranted against defective materials and workmanship for one year. Tektronix transformers, manufactured in our own plant, are warranted for the life of the instrument.

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 number with all requests for parts or service.

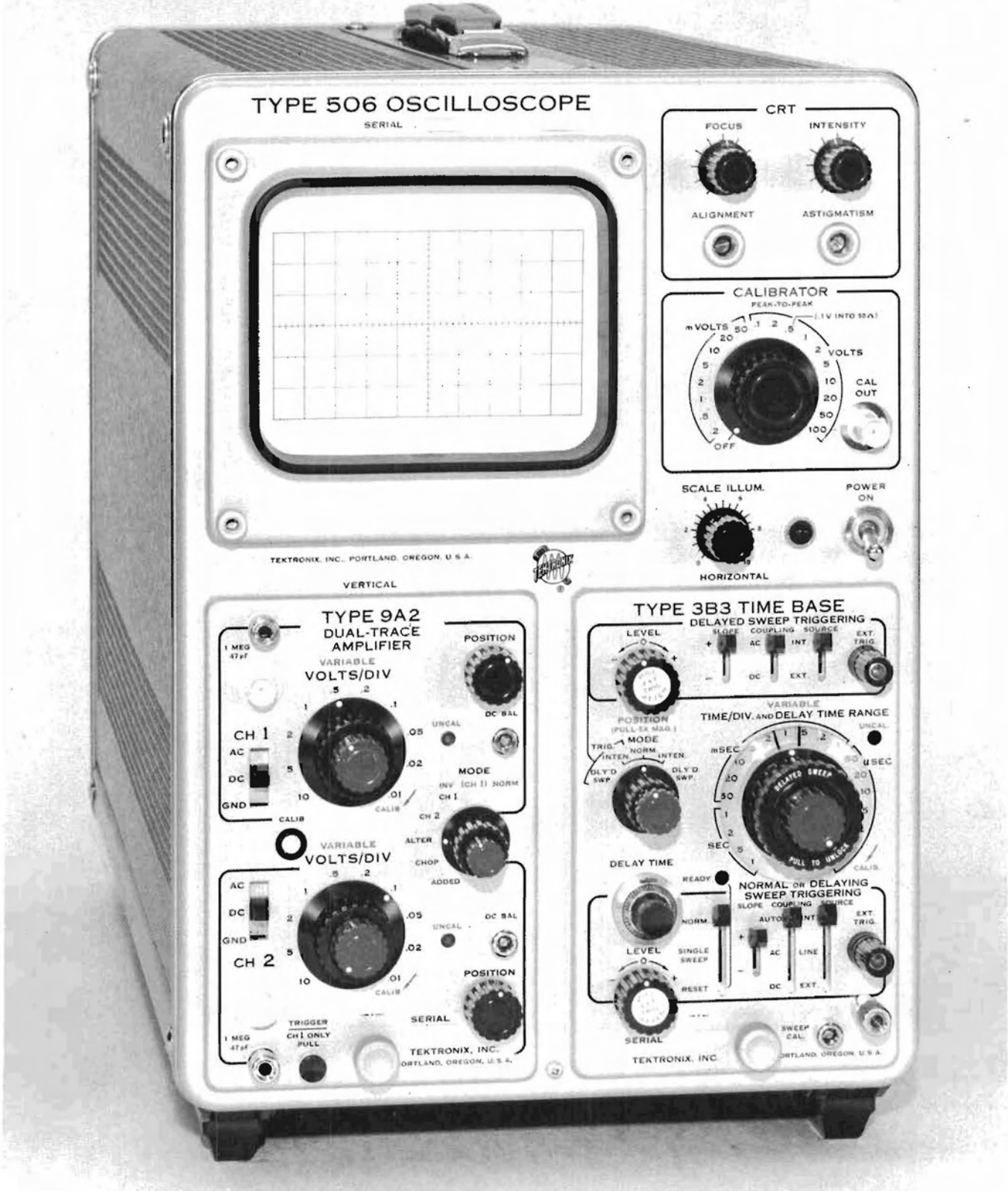
Specifications and price change privileges reserved.

Copyright © 1964 by Tektronix, Inc., Beaverton, Oregon. Printed in the United States of America. All rights reserved. Contents of this publication may not be reproduced in any form without permission of the copyright owner.



CONTENTS

A list of abbreviations and symbols used in this manual will be found on page 6-1. Change information, if any, is located at the rear of the manual.



Type 506 Oscilloscope shown with Type 9A2 Dual-Trace Amplifier and Type 3B3 Time Base.

SECTION 1
CHARACTERISTICS

General Information

The Tektronix Type 506 Oscilloscope is essentially an indicator unit with provision for two plug-in units. The plug-in unit in the left compartment controls the vertical (Y-axis) deflection, and the plug-in unit in the right compartment controls the horizontal (X-axis) deflection. The vertical plug-in can be selected from the Tektronix 9-series plug-ins and the horizontal plug-in from the Tektronix 2-* or 3-series plug-ins.

Bandpass, Risetime, Vertical Deflection Factors, Input Impedance and Sweep Rates are determined by the plug-in units used.

Cathode-Ray Tube (CRT)

Type—T5033-31-1 (rectangular glass-envelope).

Phosphor—P31 standard. Others available on special order.

Unblanking—Deflection type, dc-coupled, with grid intensification.

Graticule—Variable edge lighted "no parallax" internal graticule. Marked in 6 vertical and 10 horizontal 1-centimeter divisions with each major division divided into 5 minor divisions on centerlines.

Accelerating potential—3.5 kv.

Usable viewing area—6 divisions vertical by 10 divisions horizontal.

Deflection plate sensitivities—11.7 to 12.3 volts per centimeter vertical, and 19.4 to 21.4 volts per centimeter horizontal.

Calibrator

Waveform—Positive-going square waves at line frequency.

Output voltage—0.2 millivolt to 100 volts, peak-to-peak, in 18 steps.

Voltage accuracy—Peak-to-peak amplitude within 3% of indicated voltage.

Risetime—Typically 5 microseconds.

***When a 2-series time-base plug-in unit is used, the full frequency response capabilities of the amplifier plug-in unit may not be usable due to the limited sweep rates of the 2-series plug-in units.**

Power Supplies

Regulation—Electronically regulated for stable operation with widely varying line voltages and loads.

Line voltage requirements—105 to 125 volts, or 210 to 250 volts, rms, 50 to 400 cps, single-phase ac.

Power requirements—Typically 225 watts at 117-volt line.

Fuse—3-amp slow-blow for 117 volts, 1.6-amp slow-blow for 234 volts.

Temperature

Cooling—Convection air cooled. Automatic-resetting thermal cutout interrupts instrument power if internal temperature exceeds about 160° F.

Ambient temperature range*— 20°F to 120°F (—7°C to 49°C).

Mechanical

Construction—Aluminum-alloy chassis and 3-piece cabinet.

Finish—Photo-etched, anodized panel; blue vinyl paint on textured aluminum cabinet.

Dimensions—Height 14½ inches, width 10 inches and depth 21⅛ inches.

Net weight—28 pounds, without plug-ins.

Accessories

	Tektronix Part No.
1—Power cord	161-010
1—3- to 2-wire power cord adapter	103-013
1—Light filter	378-525
2—Instruction manuals	070-445

***Measured at sea level with line voltage within specified limits and with maximum plug-in load.**

NOTES

SECTION 2

OPERATING INSTRUCTIONS

General

The Type 506, when used with a 9-series amplifier plug-in unit and a 2- or 3-series time-base plug-in unit, is a complete oscilloscope system. The 9-series plug-in unit can be operated only in the left compartment, and the 2- or 3-series plug-in unit in the right.

This section of the manual describes the function of the Type 506 controls and connectors, and gives first-time and general operating information.

FUNCTION OF CONTROLS AND CONNECTORS

FRONT PANEL

FOCUS	Provides adjustment for a well-defined display.
INTENSITY	Controls brightness of the display.
ALIGNMENT	Aligns the trace with the horizontal graticule markings.
ASTIGMATISM	Used in conjunction with the FOCUS control to obtain a well-defined display.
CALIBRATOR	Rotary 19-position switch that selects the calibrator voltage at the CAL OUT connector.
CAL OUT	BNC jack for making connection to the calibrator.
SCALE ILLUM.	Controls graticule illumination.
POWER ON	Toggle switch for turning the instrument on and off.

REAR PANEL

CRT CATHODE SELECTOR	Switch should be in the down position when the vertical plug-in unit is operated in the dual-trace chopped mode. Switch should be in the up position when an external blanking signal is applied to the EXT CRT CATHODE binding post.
EXT CRT CATHODE	Binding post that is ac coupled to the crt cathode.
GND	Binding post ground connection.

FIRST TIME OPERATION

The following steps will demonstrate the function of the controls and connectors of the Type 506.

1. Insert a 9-series amplifier plug-in unit in the left compartment. Insert a 2- or 3-series time-base plug-in unit in the right compartment.

2. Check that the ventilation and power source meet the specified requirements. More information on both ventilation and power source is given in this section.

3. Turn the INTENSITY control fully counterclockwise to protect the crt during warm up.

4. Connect the instrument to the power source and turn the POWER switch ON. Allow several minutes for warm up.

5. Set the time-base plug-in unit controls for a free-running or automatically triggered trace. Center the amplifier plug-in unit Position controls.

6. Advance the INTENSITY control until the trace is at the desired viewing level.

7. Set the FOCUS and ASTIGMATISM controls to mid-range. Then, adjust these controls for the sharpest, best-defined display over the entire trace length.

NOTE

If the setting of the INTENSITY control is changed, the FOCUS and ASTIGMATISM controls may need resetting. At high-intensity settings a sharp, well-defined trace may not be obtainable. The FOCUS and ASTIGMATISM controls may also need re-adjusting when plug-in units are changed.

8. Position the trace vertically so it coincides with one of the horizontal graticule lines. If the trace is not parallel with the graticule line, adjust the ALIGNMENT control until they are aligned.

9. Connect the CALIBRATOR output signal to the input of the 9-series plug-in unit. Adjust the CALIBRATOR step switch to produce a two- or three-division display. Recheck the FOCUS and ASTIGMATISM settings. Notice that the frequency of the CALIBRATOR output signal is the same as the frequency of the line voltage applied. Disconnect the CALIBRATOR signal.

10. If the 9-series plug-in unit has a dual-trace feature, set the controls for chopped mode operation. Adjust the Position controls so the traces are about three divisions apart.

11. Set the time-base plug-in unit timing controls for a sweep rate that shows a segmented trace (about 5 microseconds/division).

12. Set the rear-panel CRT CATHODE SELECTOR switch to CHOPPED BLANKING (down). Notice that the switching transient between the trace segments is blanked out. This switch should be left in the down position except when external intensity modulation is used.

13. Use of the EXT CRT CATHODE connector will be explained under "Intensity Modulation" in this section. The shorting bar should be left between the EXT CRT CATHODE and GND binding posts unless intensity modulation is used.

Cooling

The Type 506 is cooled by convection air flow through the instrument. The instrument should not be operated for long periods of time with the air holes in the bottom or

side panels obstructed. Allow at least one inch clearance for air circulation both on the sides and the bottom. A thermal cutout in the instrument will disconnect the instrument power if the internal temperature exceeds about 160°F Power will be restored automatically when the temperature returns to a safe operating level. If the thermal cutout opens frequently, check that air flow into the instrument is not restricted.

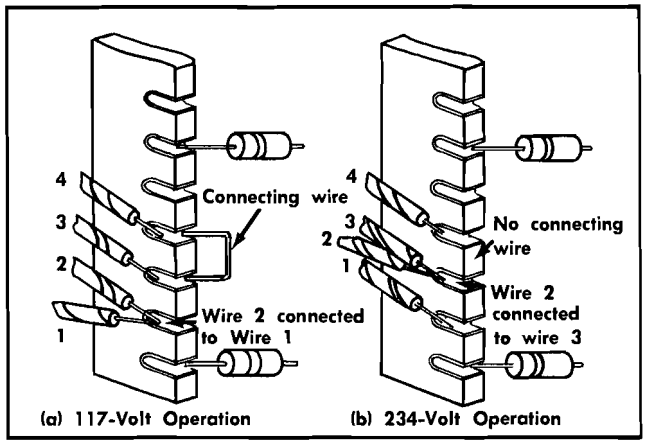


Fig. 2-1. Power transformer connections for 117- or 234-volt operation.

Voltage Conversion

The Type 506 can be connected to operate from either a 117- or 234-volt line. The metal tag on the rear of the instrument near the power plug indicates the voltage for which it was wired at the factory. To convert the instrument to a different operating voltage, use the following procedure.

1. Refer to Fig. 2-1 for connection of the transformer primary leads and jumpers for the desired line voltage. This ceramic terminal strip is located on the right side of the instrument at the rear of the plug-in compartment.

2. Change the line cord power plug to match the power source receptacle.

3. Change the line fuse as follows: 3-amp slow-blow for 117-volt or 1.6-amp slow-blow for 234-volt operation.

Changing Plug-In Units

The plug-in units are held in the plug-in compartment by a latching bar located behind the front panel of the plug-in unit. This bar must be turned to the side before the plug-in can be removed from or inserted into the compartment. The aluminum knob at the bottom of the front panel loosens or tightens the latching bar.

When either plug-in unit is changed, check the gain or sweep timing of both plug-in units. Also, the Type 506 FOCUS and ASTIGMATISM controls may need slight readjustment.

CAUTION

Although most plug-in units can be inserted or removed without damage when the power is on, best protection is provided for all units by turning the power off before changing units.

X-Y Displays

Although the Type 506 is primarily designed for normal displays with a time-base unit in the right plug-in compartment, it can be used for X-Y displays if a 3-series amplifier unit is substituted for the time-base unit. Because of the difference in gain, bandwidth and signal transfer time of the 9-series and 3-series plug-in units, some errors will be apparent in the display. This will be particularly noticeable at higher frequencies. These differences can be minimized by selecting a 3-series amplifier plug-in unit with characteristics similar to the 9-series plug-in used in the left compartment.

Intensity Modulation

The ac-coupled EXT CRT CATHODE input permits intensity (Z-axis) modulation of the crt display. A positive pulse will turn off the crt beam and a negative pulse will turn it on. The setting of the INTENSITY control will determine the signal amplitude necessary to modulate the display.

To apply the intensity modulation signal, remove the shorting strap from between the EXT CRT CATHODE and GND jacks. Set the CRT CATHODE SELECTOR switch to the up position and apply the signal to the EXT CRT CATHODE jack.

SECTION 3

CIRCUIT DESCRIPTION

Introduction

The Tektronix Type 506 Oscilloscope contains a low-voltage power-supply circuit, a cathode-ray tube circuit and a calibrator circuit.

The low-voltage power-supply circuit provides the regulated and unregulated power used by the instrument and the plug-in units.

The crt circuit contains the necessary controls and input facilities to present a sharp trace of desired intensity for displaying a signal. Two negative high-voltage power supplies provide the voltages for the crt cathode, focus element and control grid.

Amplitude-calibrated square waves at line frequency are produced by the calibrator circuit.

Low-Voltage Power Supply

Power for the Type 506 Oscilloscope and the plug-in units is supplied through power transformer T601. The two primary windings of T601 are connected in parallel for 117-volt operation, or in series for 234-volt operation. See the Power Supply schematic diagram.

The low-voltage power supply provides regulated outputs of —100, —12.2, +125 and +300 volts. A series regulator tube controls the current through the load to maintain a constant voltage drop across the load. For example, if the load increases (resistance of load decreases) the series tube allows more current to flow; if the load decreases it allows less current to flow.

—100-Volt Supply. Reference voltage for the —100-volt supply is established by voltage-reference tube V609. The constant voltage drop across V609 establishes a fixed potential of about —85 volts at the grid of V634B. Voltage at the grid of V634A is established by divider R616, R617 and R618. The difference in voltage between the two grids of V634 determines the plate current of V634A. Plate current of V634A determines the base current of transistor Q624 which in turn determines the grid voltage of series tube V627. The series tube controls current through the load to hold the load voltage constant. R616 (—100-volt adjustment) determines the percentage of the total divider voltage applied to the grid of V634A and thus determines the output voltage.

Should the output voltage tend to change because of a change in input voltage or a change in load current, the potential at the grid of V634A will change a proportional amount. Any change at the grid of V634A is amplified by V634A and Q624, and applied to the grid of V627. The resultant grid change at V627 will cause the load current to change in the direction needed to bring the output voltage back to —100 volts. C616 improves the ac response of the regulator to sudden changes in output voltage. The —100-volt supply provides the reference voltage for the remaining regulated supplies.

+125-Volt Supply. With the lower end of R651 fixed at —100 volts, any change in the +125-volt output produces a proportional change at the grid of V654. This change is amplified and supplied to the grid of series regulator tube V667A. The change at the grid of V667A changes the load current in the manner needed to bring the output voltage back to a nominal +125 volts. C650 improves the ac response of the regulator to sudden changes in output voltage. R656 (+125-volt adjustment) determines the grid bias of V654 and thus determines the output voltage level.

A small sample of the unregulated ripple appears at the screen of V654 through R657. The ripple at the screen (which acts as an injector grid) produces a ripple at the grid of V667A which is opposite in polarity to the ripple at the plate of V667A. This tends to cancel ripple in the output. This same circuit also improves the regulation of the circuit in the presence of line-voltage variations.

+300-Volt Supply. The +300-volt supply functions in the same manner as the +125-volt supply. To provide the voltage for the +300-volt regulator, rectified voltage from transformer terminals 21 and 22 is added to the voltage supplying the +125-volt regulator. R676 (+300-volt adjustment) determines the grid bias of V674 and thus determines the output voltage level.

The unregulated +420 volts provides power for the high-voltage circuits.

—12.2-Volt Supply. Operation of the —12.2-volt regulating circuit is essentially the same as that of the other regulating circuits, except that transistors are used instead of vacuum tubes. The base of Q734 is fixed near —12 volts by voltage divider R731-R732 between —100 volts and ground. Any variation of the —12.2-volt output at the emitter of Q734 is amplified by Q734 and Q744 to change the emitter-collector current of Q757 which is in series with the supply load. R730 (—12.2-volt adjustment) determines the base current of Q734 and thus determines the output voltage level. F720 protects the transistors in case of an overload on the —12.2-volt supply.

The collector of Q757 is connected to pin 5 of the interconnecting socket. This provides a ground return separate from the chassis and prevents large chassis currents.

Crt Circuit

The crt circuit contains the cathode-ray tube and two high-voltage supplies (one for the crt cathode and focus element, the other for the control grid). The circuit also contains the necessary controls and signal input facilities.

Cathode-Ray Tube. A Tektronix glass-envelope cathode-ray tube is used in the Type 506. The accelerating potential is approximately 3500 volts, developed by about —3300 volts at the cathode and an average deflection-plate voltage of about +200 volts. With this accelerating potential, the nominal vertical and horizontal deflection factors are 11.7 and 20.4 volts/centimeter respectively.

Deflection blanking of the crt is employed in the Type 506. The crt contains a special set of deflection plates (pins 6 and 7) for this purpose. Both plates are connected to +125 volts; however, pin 6 is also driven by the right plug-in unit.

During sweep time, or if no sweep unit is installed, both plates rest at +125 volts and permit the beam to pass to the crt face. During sweep retrace, however, pin 6 is driven considerably away from +125 volts. This deflects the beam and prevents it from reaching the crt face.

High-Voltage Supplies. Energy for both high-voltage supplies is furnished by T801. V800, the primary of T801 and the circuit capacitance (shown by the dotted capacitor symbol on the schematic) form a Hartley oscillator which operates at about 45 kc.

One secondary winding of T801 provides voltage for the crt cathode and focus element. This voltage, rectified by V822, is about —3300 volts at the cathode, and between about —2000 and —3000 volts at the focusing element, depending on the setting of the FOCUS control. The 6.3-volt crt heater is also elevated to the cathode potential.

The output of the other secondary winding of T801 is rectified by V832 for the control grid. The grid voltage ranges from —3300 to —3400 volts, depending on the setting of the INTENSITY control. The reference to ground for this supply is determined by the voltage at the junction of diodes D838 and D839. The voltage at this junction, plus the setting of the INTENSITY control, determines the crt bias and therefore the intensity of the display.

Regulation of the high-voltage supplies is accomplished through feedback from the arm of R841. If the crt-cathode voltage changes due to loading or a change in input voltage, a proportionate change occurs at the arm of R841. This change is amplified by V814 and is coupled to the screen grid of V800. A change at the screen of V800 *will* increase or decrease the amplitude of oscillations in V800. Thus the output voltage of T801 changes in the direction needed to return the dc voltage to the desired level. HIGH VOLTAGE control R841 controls the output voltage by setting the bias on V814B.

Deflection Signals. Signals for the deflection plates are equal in amplitude but opposite in polarity (push-pull) and are applied at pins 17 and 21 of both interconnecting plugs.

Intensifying Signals. Two types of signals may be used to modulate the intensity of the crt display. First, a direct-coupled intensifying signal from some time-base plug-in units can be applied to the grid circuit through pin 14 of the right interconnecting plug. When the overall display intensity is reduced with the INTENSITY control, positive intensifying pulses will brighten any desired portion of the display.

Other intensifying signals can be capacitively coupled to the crt cathode from either the EXT CRT CATHODE binding post or pin 24 of the left interconnecting plug. A negative pulse will increase crt beam current and a positive pulse will decrease beam current.

Crt Controls. INTENSITY control R835 has a range of about 200 volts to control the crt bias and permit changing the intensity of the display.

FOCUS control R844 adjusts the focus of the crt by varying the voltage at the focusing anode from about —2000 to —3000 volts.

ASTIGMATISM control R864 has about a 300-volt adjustment range.

GEOMETRY control R865 adjusts the geometry by varying the voltage of the crt isolation shield from +180 to +246 volts.

Calibrator

The calibrator of the Type 506 Oscilloscope produces amplitude-calibrated square waves at line frequency.

The 6.3-volt (approximately 18 volts peak-to-peak) ac heater voltage for V884 is applied thorugh C876 to the cathode of V884A, driving the tube into and out of cutoff at the line-frequency rate. The signal at the plate of V884A is then coupled to the grid of V884B to turn it on and off. Regenerative feedback from the plate of V884B to the grid of V884A speeds up the switching action of V884A.

The voltage present at the cathode of V884B during the time that V884B is conducting can be set to exactly +100 volts with CAL. AMPL. adjustment R871. The voltage divider in the cathode circuit of V884B contains precision resistors to provide an output accuracy of 3% or better at each setting of the CALIBRATOR control.

SECTION 4

MAINTENANCE

PREVENTIVE MAINTENANCE

Panel Removal

The side panels of the Type 506 are held in place with coin-slotted fasteners. To remove the panels, turn each fastener a quarter turn counterclockwise.

Recalibration

To assure accurate measurements check the calibration of this instrument after each 500 hours of operation or every six months if used intermittently. Complete calibration instructions are given in Section 5.

The calibration procedure can also be helpful in localizing certain troubles in the instrument. In some cases, minor troubles, not apparent during normal use, may be revealed and/or corrected by recalibration.

Visual Inspection

The Type 506 should be inspected occasionally for such defects as broken connections, broken or damaged ceramic strips, improperly seated tubes or transistors and heat-damaged parts.

The remedy for most visible defects is obvious; however, particular care must be taken if heat-damaged parts are located. Overheating is usually only a symptom of trouble. For this reason, it is essential to determine the actual cause of overheating before the heat-damaged parts are replaced; otherwise, the damage may be repeated.

Cleaning

The Type 506 should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause overheating and component breakdown. Dirt on components acts as an insulating blanket and prevents efficient heat dissipation. It also provides an electrical conduction path.

Loose dust accumulated on the outside of the Type 506 can be removed with a cloth or small paint brush. The paint brush is particularly useful for dislodging dust 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 face of the crt with a soft, lint-free cloth dampened with denatured alcohol.

CAUTION

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

Dust in the interior of the instrument should be removed occasionally due to its conductivity under high-humidity conditions. The best way to clean the interior of the instrument is to first carefully vacuum all accessible areas and then blow away the remaining dust with dry, low-pressure air. Avoid the use of high-velocity air which might damage some of the components. Remove any dirt which remains with a soft paint brush or a colth 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.

The high-voltage circuits, including parts located under the high-voltage shield, should receive special attention. Excessive dust and dirt in these areas may cause high-voltage arcing and result in improper instrument operation.

CORRECTIVE MAINTENANCE

Soldering

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 1/8" wide chisel-shaped tip. If ordinary solder is used repeatedly or if excessive heat is applied, the solder-to-ceramic bond can be broken.

A small supply of solder containing about 3% silver is included on a spool mounted inside this instrument. Additional solder should be available locally or it can be purchased from Tektronix in one-pound rolls; order by Tektronix Part Number 251-514.

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.

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

Observe the following precautions when soldering metal terminals:

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

2. If a wire extends beyond the solder joint, clip the excess close to the joint.

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

Component Replacement

Certain parts in the instrument are easier to replace if a definite procedure is followed. The procedures for re-

placing these parts are outlined in the following paragraphs.

Many electrical components are mounted in a particular manner to reduce or control stray capacitance. Duplicate the orignal location and mounting when replacing components. When selecting replacement parts, remember that the physical nature of a component can affect its performance at high frequencies. After repair, check the instrument calibration.

NOTE

Turn off the power before replacing any components.

Standard Parts

All electrical and mechanical part replacements for the Type 506 can be obtained through your local Tektronix Field Office or representative. However, since many of the electronic components are standard parts, they can generally be obtained locally in less time than is required to order them from the factory. Before purchasing replacement parts, consult the Parts List for value, tolerance, rating and Tektronix Part Number.

Special Parts

In addition to the standard electronic components, some special parts are used in the production of the Type 506. These parts are manufactured or selected by Tektronix to meet specific performance requirements, or are manufactured for Tektronix in accordance with our specifications. Most of the mechanical parts used in this instrument have been manufactured by Tektronix. These special parts are indicated in the Parts List by an asterisk preceding the part number. Order all special parts directly from your Tektronix Field Office or representative.

Ceramic Terminal Strip Replacement

A complete ceramic terminal strip assembly is shown in Fig. 4-1. Replacement strips (including studs) and spacers are supplied under separate part numbers. The old spacers may be reused unless they are damaged.

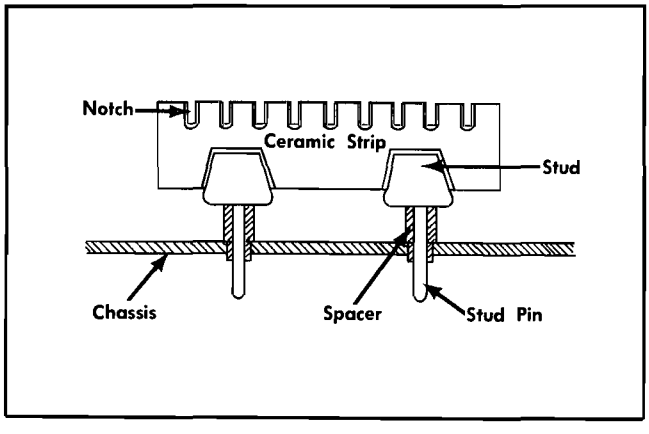


Fig. 4-1. Ceramic terminal strip assembly.

After the damaged strip has been removed, place the undamaged spacers in the chassis holes. Then, carefully press the studs into the spacers until they are completely seated. If necessary, use a soft mallet and tap lightly, directly over the stud area of the strip.

Tubes and Transistors

Do not replace tubes or transistors unless they are actually defective. If tubes or transistors are removed during routine maintenance, return them to their original sockets.

Static tube- or transistor-testers are not recommended for locating a defective tube or transistor. These testers often indicate a defective component when it is operating satisfactorily in a circuit, or may fail to indicate a characteristic which affects circuit performance. Since dynamic testers check operation under simulated circuit conditions, they provide a better check of component operation. However, the best overall test of tube or transistor performance is to substitute a new component or one which has been previously checked.

If a tube or transistor performs satisfactorily, do not replace it. Unnecessary replacement of components may require recalibration of the instrument. If tubes or transistors are replaced, check the operation of the unit.

Rotary Switches

Individual wafers or mechanical parts of rotary switches are normally not replaced. If a switch is defective, replace the entire assembly. Replacement switches can be ordered either wired or unwired; refer to the Parts List for part number.

Cathode-Ray Tube

Use the following procedure for removal and replacement of the crt:

WARNING

Use care when handling a crt. Avoid striking it on any object that might cause it to crack and implode. Flying glass from an imploding crt can cause serious injury. Wear safety glasses or a plastic face mask.

1. Disconnect the instrument power.

2. Remove the graticule cover, eyebrow and retaining spring.

3. Remove the left side panel of the Type 506.

4. Loosen the crt socket clamp with a screwdriver.

5. Disconnect the crt socket and the four deflection-plate leads.

6. Remove the crt through the front of the instrument. Be careful not to bend the crt deflection-plate pins.

7. Replace the crt by reversing the order of removal.

8. After replacing the crt, adjust the ALIGNMENT, FOCUS and ASTIGMATISM controls. The gain or sweep timing of both plug-in units should be checked.

TROUBLESHOOTING

Introduction

The following information is provided to facilitate troubleshooting of the Type 506 if trouble develops. During troubleshooting, information contained in this section of the manual should be used along with information obtained from other sections (e.g., Diagrams, Operating Instructions, etc.).

Troubleshooting Aids

Schematic Diagrams. Circuit diagrams are given on pull-out pages in Section 6. The circuit numbers for each electronic component in this unit along with important voltages are shown on these diagrams.

Switch wafers shown on the diagrams are coded to indicate the position of the wafer in the complete switch assembly. The number portion of the code refers to the wafer number counting from the front or mounting end of the switch toward the rear. The letters "F" and "R" indicate whether the front or rear of the wafer is used to perform the particular switching function.

Wiring Color-Code. All insulated wire used in the Type 506 is color-coded to facilitate circuit tracing. The widest color stripe identifies the first color of the code. Regulated voltages can be identified by three color stripes and the following background color-code: white, positive voltage; tan, negative voltage.

+300 volts.....Orange-black-brown on white

+125 volts.....Brown-red-brown on white

—12.2 volts..... Brown-red-black on tan

—100 volts.....Brown-black-brown on tan

Tube heater wiring is indicated by a white background with a blue first stripe and unregulated dc voltage by a gray background. The remainder of the wiring in the Type 506 is color-coded to facilitate point-to-point circuit tracing.

Test Equipment

The following equipment will be useful in troubleshooting the Type 506.

1. Dynamic Transistor Tester

Purpose: To test transistors and diodes used in the Type 506.

Description: Tektronix Type 575 Transistor-Curve Tracer, or equivalent.

2. Test Oscilloscope

Purpose: To check circuit operation.

Description: Tektronix Type 561A with Type 3A75 and Type 2B67 plug-in units or equivalent.

3. DC Voltmeter

Purpose: To check operating voltages in the unit.

Description: 20,000 ohms/volt.

Check Front-Panel Controls

Before proceeding with extensive troubleshooting, check the Type 506 and plug-in unit front-panel control settings. In addition, check the front-panel screwdriver adjustments for proper adjustment. An incorrect control setting can produce an apparent trouble. If in doubt as to the proper setting of a control or adjustment, see the Operating Instructions section of the applicable manual.

Check Plug-In Units

The plug-in units can be checked for proper operation by substituting other plug-in units—preferably of the same types—which are known to be operating properly. If the trouble persists even after plug-in unit substitution, the trouble is located in the Type 506.

If other plug-in units are not available, the trouble can often be located by observing the crt display. Trouble normally shows up as an erroneous crt display or no display at all. The following trouble symptoms are given to determine whether the trouble is in the plug-in units or in the Type 506.

No trace or spot. If no trace can be obtained on the crt, remove both plug-in units and vary the INTENSITY control. A spot should appear. If no spot appears, the trouble is in the Type 506. If a spot does appear when both plug-in units are removed, reinsert each unit separately. After warm up, vary the POSITION control. If the spot or trace cannot be returned to the approximate center of the crt when a single plug-in unit is in the indicator, the trouble is probably in that unit. (If a time-base unit is installed, set it for free-running operation to unblank the crt.)

Insufficient vertical deflection or improper sweep timing. If the plug-in unit front-panel gain controls do not permit adequate vertical deflection or proper sweep timing, check the low-voltage and high-voltage power-supply voltages (see schematic diagrams).

If the power supply voltages are incorrect, remove both plug-in units and check the voltages again. If they are still incorrect, trouble is indicated in the Type 506. If the voltages read correctly with the plug-ins removed, try reinserting the plug-ins one at a time. This should isolate power-supply troubles to either the indicator unit or one of the plug-ins.

Trouble Location

If the trouble is located in the Type 506, first make a careful operational check of the unit to isolate the trouble to the power-supply circuit, the crt circuit or to the calibrator circuit. Note the effect that each front-panel control has on the symptom. Also check the effect of the calibration adjustments. The normal or abnormal operation of each control or adjustment may help isolate the trouble to the defective circuit.

Refer to Table 4-1 for aid in locating the defective components. This table does not contain all possible troubles which may occur in the Type 506, but is useful as a guide in locating the trouble.

TABLE 4-1
Type 506 Troubleshooting Table

Symptom	Check
—100-Volt Supply Any change in this supply may change instrument calibration. If all regulated supply voltages are incorrect, check the —100-volt supply first.	
1. Incorrect output level, ripple or regulation.	A. Check line voltage. B. Check setting of —100 V adjustment (see Calibration Procedure). C. Check V609, V634, V627 and Q624 by substitution. D. If output still incorrect, go to whichever symptoms apply of steps 2 through 7.
2. Output voltage high (too negative).	A. Check voltage at pin 7 of V634: about —80 vdc. (If incorrect: check V634B grid circuit components.) B. Measure V634 bias, between pin 7 of V609 and pin 8 of V634: about 2 v. Use meter that can be elevated. (If bias is excessive, check R618 and R616.) C. Check R618, R616, R635, R633 and R624.
3. Output voltage low (too positive).	A. Check voltage between terminals 17 and 18 of T601: 137 vac ±10% at 117 (or 234) volt line. (If incorrect: check T601 primary circuit.) B. Check voltage between C640A terminals: about 175 vdc ±10%. (If incorrect: check C640A, C640B, R640 and D640.) C. Check pin 7 of V634: about —80 vdc. (If incorrect: check V609.) D. Check R617, R616, C616, C640B.
4. Poor regulation at high, low or normal line voltage. (Supply should hold regulation within ±1% throughout normal line voltage range.)	A. Check for correct output voltage before checking regulation—also, check output voltage after regulation trouble is fixed. B. Check voltage at pin 3 of V627: about +85 vdc. (If voltage low: check D640 and make checks 2A, 2B and 2C.) C. Check for excessive loading by either the plug-in units or Type 506 circuits.
5. Poor regulation at low line voltage.	Check R635, R628 and shunt resistors in plug-in units.
6. Poor regulation at high line voltage.	Substitute another plug-in unit. (Symptom occurs if load is reduced while shunt resistor remains the same in plug-in unit.)
7. Excessive ripple.	A. Check for correct output voltage and regulation before checking ripple—also check output voltage and regulation after ripple trouble is fixed. B. Check voltage at pin 3 of V627: about +85 vdc. C. Check ripple at pin 3 of V627: should be less than 3.5 v peak-to-peak with load. (If excessive: check C640A and D640.) D. Check tubes. E. Check C616, C611, C640A and C640B.
+125-Volt Supply Any change in this supply may change instrument calibration.	
8. Incorrect output level, ripple or regulation.	A. Check line voltage. B. Check —100-volt supply voltage and ripple. C. Check setting of +125 VOLTS adjustment (see Calibration Procedure). D. Check V654, V667. E. If output still incorrect, go to whatever symptoms apply of steps 9 through 14.
9. Output voltage high.	A. Check voltage at pin 6 of V654: about +68 vdc. (If incorrect: check R657, R658 and V654.) B. Check R650.
10. Output voltage low.	A. Check voltage between terminals 19 and 20 of T601: 160 vac ±10%. (If incorrect: check primary circuit.) B. Check voltage at pin 2 of V667: +215 vdc. (If incorrect: check C642A, R642, D642.) C. Check pin 6 of V654: about +68 vdc. (If incorrect: check R659, V654.) D. Check C650, R651.

11. Poor regulation at high, low or normal line. (Supply should hold regulation within 1% throughout normal line voltage range.)	A. Check for correct output voltage before checking regulation—also, check output voltage after regulation trouble is fixed. B. Check tubes. C. Check voltage at pin 2 of V667: about +215 vdc. (If incorrect: make checks 10A and 10B.)
12. Poor regulation at low line voltage.	Check R653, C650, R666 and shunt resistor in plug-in units.
13. Poor regulation at high line voltage.	A. Check C650. B. Substitute another plug-in unit. (Symptom occurs if load is reduced while shunt resistor remains the same in plug-in unit.)
14. Excessive ripple.	A. Check for correct output voltage and regulation before checking ripple—also, check output voltage and regulation after trouble is fixed. B. Check tubes. C. Check voltage at pin 2 of V667: about +215 vdc. (If incorrect: make checks 10A and 10B.) D. Check ripple at pin 2 of V667: should be less than 8 v peak-to-peak. (If incorrect: check R657, R658, R659.) E. Check C652A and B, C650, D642.
+300-Volt Supply Symptoms and checks similar to those described for the +125-Volt Supply. Use corresponding test points with voltages shown on schematic diagrams.	
—12.2-Volt Supply Any change in this supply may change instrument calibration.	
15. Incorrect output level, ripple or regulation.	A. Check line voltage. B. Check —100-volt supply output. C. Check settings of —12.2 VOLTS adjustment (see Calibration Procedure). D. Check Q734, Q744, Q757 and F720. E. If output still incorrect, go to whichever symptoms apply of steps 16 through 20.
16. Output voltage high (too negative).	A. Check base of Q734: about —12 vdc. (If incorrect: check C732, R732.) B. Check base of Q744: about +7.9 vdc. (If incorrect: check R734, C737.) C. Check C737, R734, R744.
17. Output voltage low or zero (too positive).	A. Check voltage between terminals 14 and 15, then 15 and 16 of T601: 15 vac ±10% with 117 (or 234) vac line. (If incorrect: check transformer primary circuit.) B. Check voltage between C720 terminals: about 18 vdc. (If incorrect: check C720, C721, D720, D721.) C. Check voltage at fuse F720: about +8.2 vdc. (If incorrect: check C757 and F720.) D. Check base of Q734: about —12 vdc. (If incorrect: check R731.) E. Check base of Q744: about +7.9 vdc. (If incorrect: check R735.) F. Check C757.
18. Poor regulation at high, low or normal line voltage. (Supply should hold regulation within ±1% throughout normal line voltage range.)	A. Check for correct output voltage before checking regulation—also, check output voltage after regulation trouble is fixed. B. Check for excessive loading by either the plug-in units or Type 506 circuits.
19. Poor regulation at low or high line voltage.	Check R734, R735, R744 and C737.
20. Excessive ripple.	A. Check for correct output voltage and regulation before checking ripple—also, check output voltage and regulation after ripple trouble is fixed. B. Check ripple at emitter of Q744: should be less than 1.5 v peak-to-peak with load. (If excessive: make checks 17A and B.) C. Check D720, D721, C720, C732, C757.

Crt Circuit **Any change in this circuit may change vertical and horizontal calibration.**	
21. Any incorrect operation of crt circuit.	A. Check line voltage. B. Check HIGH VOLTAGE adjustment (—3300 volts at high-voltage test point, see Calibration Procedure). If minor adjustment restores operation, circuit may be normal. C. Check V822 and V832 heaters for color: dull orange—normal bright—heavy load on either tube either dim—poor tube (replace) both dark—oscillator inoperative D. If operation still incorrect, go to whichever symptoms apply of steps 22 through 29.
22. Low intensity.	A. Check INTENSITY control setting. B. Check V822 and R832. C. Unblanking pulse does not return pin 5 of crt fully to +125 v. D. Check crt.
23. High intensity.	A. Check INTENSITY control setting. B. Check R833, C837, C830 and C832.
24. No intensity.	A. Check INTENSITY control setting. B. Make sure spot or trace is not deflected off screen. (Spot should appear near center with both plug-in units removed.) C. V822 heater open, (B856 and B857 glowing brightly show V822 open). If V822 is not open check V814A. D. Check V800 and circuit, including T801. E. Check C822, C842 and crt.
25. Poor astigmatism and/or focus.	A. Check FOCUS and ASTIGMATISM control settings. B. Check high voltage at pin 2 of crt: —3300 vdc. (If incorrect: check R852.) C. Check voltage at pin 9 of crt: 0 to +300 vdc when ASTIGMATISM control is rotated. (If incorrect: check R864 and +300 vdc to R864.)
26. Blooming (size of display increases with intensity increase).	Check V800 and V822 (either may be weak).
27. No intensifying pulse.	A. D838 shorted, D839 open. B. C837 or R837 open (leading edge of long intensifying pulse missing).
28. No Z-axis modulation or no chopped blanking.	C853 or R853 open. If R853 open, check for shorted C853.
29. Intensity varies (unwanted Z-axis modulation).	D838 and/or D839 open.
Calibrator	
30. Incorrect outputs.	A. Check CAL. AMPL. adjustment (see Calibration Procedure). B. Check V884. C. Check voltages throughout calibrator circuit. D. Check output voltage at each step to indicate defective resistor.

SECTION 5

CALIBRATION

Introduction

The Type 506 should be calibrated every 500 hours of operation or every six months if used intermittently. If transistors, tubes or other components are replaced, the calibration of the repaired circuit should be checked.

When calibrating both the Type 506 and the plug-in units, always calibrate the Type 506 first. The plug-in units used to calibrate the Type 506 need not be calibrated, but must be working properly.

The location of the calibration adjustments in the Type 506 is shown in Fig. 5-1.

EQUIPMENT REQUIRED

The following equipment, or equivalent, is required for a complete calibration of the Type 506.

1. Tektronix 9-series amplifier plug-in unit.

2. Tektronix 2- or 3-series time-base plug-in unit such as a Type 3B3.

3. Variable autotransformer. Must be capable of supplying at least 350 volt-amperes. If autotransformer does not have an ac voltmeter to indicate voltage, monitor output with an ac voltmeter (rms) with range of at least 125 volts if Type 506 is wired for 117-volt operation (250 volts if wired for 234-volt operation).

4. Dc voltmeter. Minimum sensitivity of 20,000 Ω/volt and accuracy of 1% or better up to 300 volts and at least 3% at 4 kv.

5. 1× probe, BNC connector. Tektronix P6028.

PRELIMINARY PROCEDURE

1. Remove both side panels from the Type 506.

2. Insert the 9-series amplifier plug-in unit in the left plug-in compartment.

3. Insert the 2- or 3-series time-base plug-in unit in the right plug-in compartment.

4. Preset the Type 506 controls as follows:

INTENSITY	Midrange
CALIBRATOR	OFF
POWER	Off
CRT CATHODE SELECTOR	Up

5. Preset the amplifier unit Ch 1 controls as follows: (Control settings given for a Type 9A1 or 9A2. Use equivalent settings with other amplifier units.)

Position	Midrange
Ac Dc Gnd	Ac
Volts/Div	.1
Variable	Calib
Mode	Ch 1
Inv (Ch 1) Norm	Norm
Trigger	Pushed in

6. Preset the time-base unit controls as follows: (Control settings given for a Type 3B3. Use equivalent settings with other time-base units.)

Mode	Norm.
Position	Midrange
Pull 5× Mag.	In
Time/Div.	10 mSec
Variable	Calib.
Triggering Controls	Set for auto or free-run

7. Connect the autotransformer to a suitable power source.

8. Connect the Type 506 power cord to the autotransformer output.

9. Set the autotransformer output voltage for the nominal operating voltage of the Type 506 (117 or 234 volts).

10. Turn the Type 506 POWER switch ON. Allow about 15 minutes warm up before making any adjustments.

CALIBRATION PROCEDURE

1. Adjust —100-Volt Power Supply

a. Connect the dc voltmeter between pin 23 of either interconnecting plug and ground.

b. Adjust —100 V control R616 for exactly —100 volts.

2. Adjust +125-Volt Power Supply

a. Connect the dc voltmeter between pin 15 of either interconnecting plug and ground.

b. Adjust +125 VOLTS control R656 for exactly +125 volts.

3. Adjust +300-Volt Power Supply

a. Connect the dc voltmeter between pin 10 of either interconnecting plug and ground.

b. Adjust +300 VOLTS control R676 for exactly +300 volts.

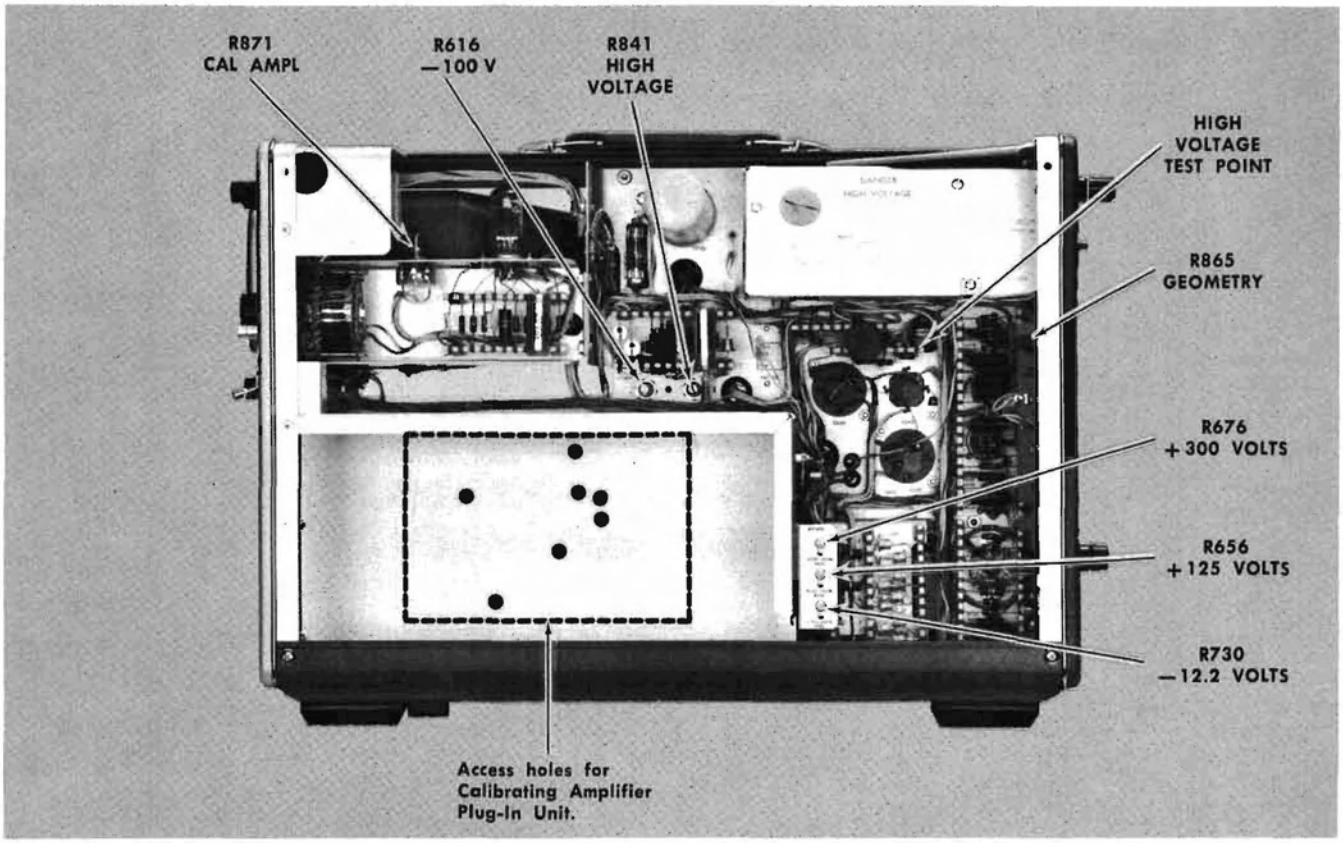


Fig. 5-1. Calibration adjustments in Type 506 (right-side view).

4. Adjust —12.2-Volt Power Supply

a. Connect the dc voltmeter between pin 16 of either interconnecting plug and ground.

b. Adjust —12.2 VOLTS control R730 for exactly —12.2 volts.

5. Adjust High-Voltage Power Supply

a. Connect the dc voltmeter between the HV TEST POINT (see Fig. 5-1) and ground.

b. Set the HIGH VOLTAGE control R841 for —3300 volts.

6. Check Power-Supply Ripple

NOTE

The gain of the amplifier plug-in unit should be checked before proceeding with this step. See the plug-in unit instruction manual.

a. Connect the P6028 to Ch 1 input of the amplifier plug-in unit.

b. +300-volt supply—Connect the probe tip to pin 10 of either interconnecting plug. Peak-to-peak ripple voltage should not exceed 80 millivolts (0.8 division).

c. —100-volt supply—Connect the probe tip to pin 23 of either interconnecting plug. Set the amplifier unit Volts/Div switch to .01. Peak-to-peak ripple voltage should not exceed 5 millivolts (0.5 division).

d. +125-volt supply—Connect the probe tip to pin 15 of either interconnecting plug. Peak-to-peak ripple voltage should not exceed 10 millivolts (1 division).

e. —12.2-volt supply—Connect the probe tip to pin 16 of either interconnecting plug. Peak-to-peak ripple voltage should not exceed 3 millivolts (0.3 division).

CAUTION

Do not attempt to measure ripple of the —3300-volt supply.

7. Check Power-Supply Regulation

a. Vary the autotransformer output voltage between 105 and 125 volts (210 and 250 volts if wired for 234-volt operation).

b. Check each power supply at both voltage extremes to see that it stays within ±3% of regulated value.

8. Adjust Calibrator Amplitude

a. Connect the dc voltmeter between pin 7 of V884 and ground.

b. Be sure the CALIBRATOR switch is set to OFF.

c. Adjust CAL. AMPL. control R871 for exactly +100 volts.

9. Adjust Trace Alignment

a. Adjust the time-base plug-in unit controls for a free-running or automatically triggered trace.

b. Align the trace with the graticule horizontal centerline with the amplifier plug-in unit Position control.

c. Adjust the Type 506 INTENSITY, FOCUS and ASTIGMATISM controls for the best display.

d. Adjust the ALIGNMENT control R860 so the trace is parallel with the horizontal graticule lines.

10. Adjust Cathode-Ray Tube Geometry

a. Move the trace to the horizontal centerline of the crt.

b. Connect a jumper lead between the horizontal deflection pins on the neck of the crt.

c. Measure the voltage between the horizontal deflection pins and ground.

d. Connect the meter to the variable arm of GEOMETRY control R865.

e. Adjust the GEOMETRY control for the same meter reading as in step 'c'.

NOTES

SECTION 6
PARTS LIST and DIAGRAMS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix Field Office.

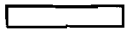
Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number including any suffix, instrument type, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix Field Office will contact you concerning any change in part number.

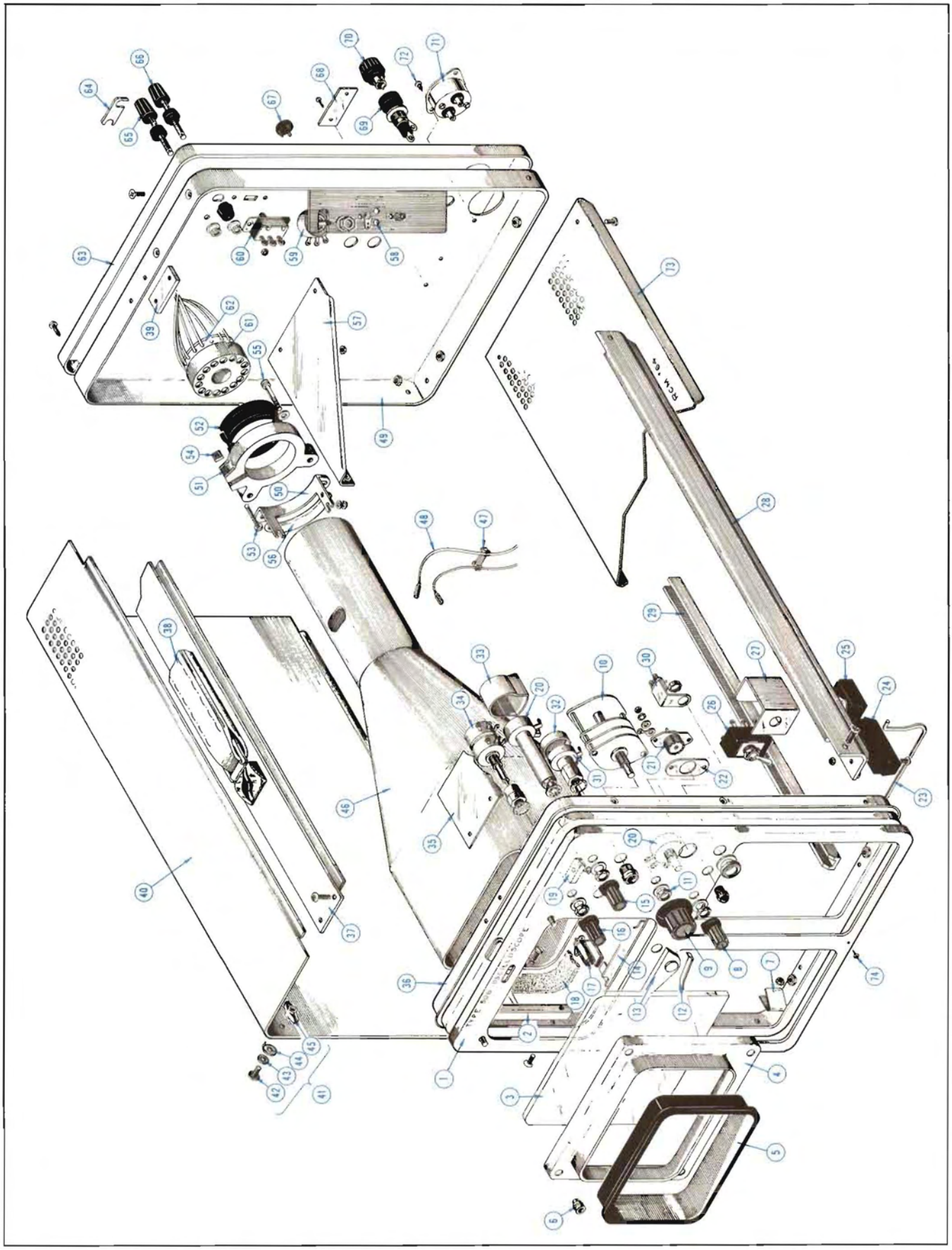
ABBREVIATIONS AND SYMBOLS

a or amp	amperes
BHS	binding head steel
C	carbon
cer	ceramic
cm	centimeter
comp	composition
cps	cycles per second
crt	cathode-ray tube
CSK	counter sunk
dia	diameter
div	division
EMC	electrolytic, metal cased
EMT	electroyltic, metal tubular
ext	external
f	farad
F & I	focus and intensity
FHS	flat head steel
Fil HS	fillister head steel
g or G	giga, or 10^9
Ge	germanium
GMV	guaranteed minimum value
h	henry
hex	hexagonal
HHS	hex head steel
HSS	hex socket steel
HV	high voltage
ID	inside diameter
incd	incandescent
int	internal
k or K	kilohms or kilo (10^3)
kc	kilocycle
m	milli, or 10^{-3}
mc	megacycle
mm	millimeter
meg or M	megohms or mega (10^6)
met.	metal
μ	micro, or 10^{-6}
n	nano, or 10^{-9}
Ω	ohm
OD	outside diameter
OHS	oval head steel
p	pico, or 10^{-12}
PHS	pan head steel
piv	peak inverse voltage
plstc	plastic
PMC	paper, metal cased
poly	polystyrene
Prec	precision
PT	paper tubular
PTM	paper or plastic, tubular, molded
RHS	round head steel
rms	root mean square
sec	second
Si	silicon
S/N	serial number
t or T	tera, or 10^{12}
TD	toroid
THS	truss head steel
tub.	tubular
v or V	volt
Var	variable
w	watt
w/	with
w/o	without
WW	wire-wound

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number.
000X	Part removed after this serial number.
*000-000	Asterisk preceding Tektronix Part Number indicates manufactured by or for Tektronix, or reworked or checked components.
Use 000-000	Part number indicated is direct replacement.
	Internal screwdriver adjustment.
	Front-panel adjustment or connector.

FRONT — REAR



FRONT & REAR

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
1	333-870			1	PANEL, front
2	385-163			1	ROD, spacer, bar
	- - - -			-	mounting hardware: (not included w/rod)
	211-538			2	SCREW, 6-32 x 5/16 inch FHS phillips
3	378-544			1	FILTER, light
4	200-426			1	COVER, graticule and trim assembly (See Ref. #6)
	- - - -			-	cover includes:
5	101-006			1	TRIM, graticule cover
	- - - -			-	mounting hardware: (not included w/cover)
6	210-571			4	NUT, knurled, graticule cover
7	344-095			2	CLIP, grounding
	- - - -			-	mounting hardware for each: (not included w/clip)
	212-039			1	SCREW, 8-32 x 3/8 inch THS phillips
	210-458			1	NUT, keps, 8-32 x 11/32 inch
8	366-220			1	KNOB, small charcoal—SCALE ILLUM.
	- - - -			-	knob includes:
	213-020			1	SCREW, set 6-32 x 1/8 inch HSS
9	366-117			1	KNOB, large charcoal—CALIBRATOR
	- - - -			-	knob includes:
	213-004			1	SCREW, set, 6-32 x 3/16 inch HSS
10	262-497			1	SWITCH, wired—CALIBRATOR (See Ref. #11)
	- - - -			-	switch includes:
	260-253			1	SWITCH, unwired—CALIBRATOR
	210-207			1	LUG, solder, 3/8 inch
11	- - - -			-	mounting hardware: (not included w/switch)
	210-013			1	LOCKWASHER, internal, 3/8 x 11/16 inch
	210-840			1	WASHER, .390 ID x 9/16 inch OD
	210-413			1	NUT, hex, 3/8-32 x 1/2 inch
12	214-442			1	SPRING, eyebrow
13	387-934			1	PLATE, light reflector
14	406-939			1	BRACKET, graticule light mounting
	- - - -			-	mounting hardware: (not included w/bracket)
	211-538			2	SCREW, 6-32 x 5/16 inch FHS phillips
15	366-220			1	KNOB, small charcoal—INTENSITY
	- - - -			-	knob includes:
	213-020			1	SCREW, set, 6-32 x 1/8 inch HSS
16	366-220			1	KNOB, small charcoal—FOCUS
	- - - -			-	knob includes:
	213-020			1	SCREW, set, 6-32 x 1/8 inch HSS
17	136-152			2	SOCKET, lamp
18	124-167			1	STRIP, felt
19	352-044			1	HOLDER, form, coil, crt
	- - - -			-	mounting hardware: (not included w/holder)
	211-011			1	SCREW, 4-40 x 5/16 inch BHS
	210-004			1	LOCKWASHER, internal, #4
	210-406			1	NUT, hex, 4-40 x 3/16 inch

FRONT & REAR (Cont'd)

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
20	- - - -			3	POT
	- - - -			-	mounting hardware for each: (not included w/pot)
	210-013			1	LOCKWASHER, internal, $^{3}/_{8}$ x $^{11}/_{16}$ inch
	210-978			1	WASHER, $^{3}/_{8}$ ID x $^{1}/_{2}$ inch OD
	210-590			1	NUT, hex, $^{3}/_{8}$-32 x $^{7}/_{16}$ inch
21	131-279			1	CONNECTOR, chassis mounted, female, BNC
	- - - -			-	mounting hardware: (not included w/connector)
	210-224			1	LUG, solder, $^{1}/_{4}$ inch
	210-812			2	WASHER, fiber, #10
	210-004			2	LOCKWASHER, internal, #4
	210-406			2	NUT, hex, 4-40 x $^{3}/_{16}$ inch
22	406-244			1	BRACKET, nylon, insulating
23	348-057			1	FOOT, flip stand bail
24	348-042			4	FOOT, molded
	- - - -			-	mounting hardware for each: (not included w/foot)
	212-071			2	SCREW, 8-32 x 1 inch FHS
	210-458			2	NUT, keps, 8-32 x $^{11}/_{32}$ inch
25	391-057			1	BLOCK, flip stand pivot, left
	- - - -			-	mounting hardware: (not included w/block)
	212-023			1	SCREW, 8-32 x $^{3}/_{8}$ inch BHS
	214-408			1	NUT, cam locking
	391-058			1	BLOCK, flip stand pivot, right
	- - - -			-	mounting hardware: (not included w/block)
	212-023			1	SCREW, 8-32 x $^{3}/_{8}$ inch BHS
	214-408			1	NUT, cam locking
26	260-014			1	SWITCH, toggle—POWER ON
	- - - -			-	mounting hardware: (not included w/switch)
	210-414			1	NUT, hex, $^{15}/_{32}$-32 x $^{9}/_{16}$ inch
	354-055			1	RING, locking, switch
	210-902			1	WASHER, .470 ID x $^{21}/_{32}$ inch OD
	210-473			1	NUT, switch, $^{15}/_{32}$-32 x $^{5}/_{64}$ inch, 12 sided
27	337-398			1	SHIELD, power switch
28	122-118			2	ANGLE, rail, bottom
	- - - -			-	mounting hardware for each: (not included w/angle)
	212-039			4	SCREW, 8-32 x $^{3}/_{8}$ inch THS phillips
	210-458			4	NUT, keps, 8-32 x $^{11}/_{32}$ inch
29	351-038			2	GUIDE, rail track
	- - - -			-	mounting hardware for each: (not included w/guide)
	211-541			2	SCREW, 6-32 x $^{1}/_{4}$ inch FHS phillips
30	136-047			1	SOCKET, light, w/red jewel

FRONT & REAR *(Cont'd)*

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
31	- - - -			1	POT
	- - - -			-	mounting hardware: (not included w/pot)
	210-207			1	LUG, solder, $^3/_8$ inch
	210-012			1	LOCKWASHER, internal, $^3/_8$ x $^1/_2$ inch
	210-494			1	NUT, hex, $^3/_8$-32 x $^1/_2$ x $^{11}/_{16}$ inch
	210-013			1	LOCKWASHER, internal, $^3/_8$ x $^{11}/_{16}$ inch
	358-010			1	BUSHING, $^3/_8$-32 x $^9/_{16}$ inch
32	200-247			1	CAP, pot
33	200-269			2	COVER, pot
34	- - - -			1	POT
	- - - -			-	mounting hardware: (not included w/pot)
	210-207			1	LUG, solder, $^3/_8$ inch
	210-012			1	LOCKWASHER, internal, $^3/_8$ x $^1/_2$ inch
	210-421			1	NUT, hex, $^3/_8$-32 x $^1/_2$ x $^7/_{16}$ inch
	210-013			1	LOCKWASHER, internal, $^3/_8$ x $^{11}/_{16}$ inch
	358-010			1	BUSHING, $^3/_8$-32 x $^9/_{16}$ inch
35	337-528			1	SHIELD, focus and intensity
	- - - -			-	mounting hardware: (not included w/shield)
	211-541			3	SCREW, 6-32 x $^1/_4$ inch FHS phillips
36	387-681			1	PLATE, front sub-panel
	- - - -			-	plate includes:
	354-057			1	RING, ornamental
37	381-213			1	BAR, top support, w/handle (See Ref. #39)
	- - - -			-	bar includes:
38	367-040			1	HANDLE, assembly
	- - - -			-	handle includes:
	367-011			1	HANDLE
	343-073			2	CLAMP, cover, handle
	211-507			4	SCREW, 6-32 x $^5/_{16}$ inch BHS
	210-457			4	NUT, keps, 6-32 x $^5/_{16}$ inch
39	- - - -			-	mounting hardware: (not included w/bar)
	212-039			4	SCREW, 8-32 x $^3/_8$ inch THS phillips
	381-073			2	BAR, retaining
40	387-725			2	PLATE, cabinet side
	- - - -			-	each plate includes:
41	214-057			2	FASTENER, cabinet latch assembly
	- - - -			-	each fastener includes:
42	213-033			1	SCREW, fastening
43	210-847			1	WASHER, nylon, .164 ID x .500 inch OD
44	105-007			1	STOP
45	210-480			1	NUT, latch, nylon
46	337-530			1	SHIELD, crt
	- - - -			-	mounting hardware: (not included w/shield)
	211-504			5	SCREW, 6-32 x $^1/_4$ inch BHS
47	344-111			2	CLIP, deflection

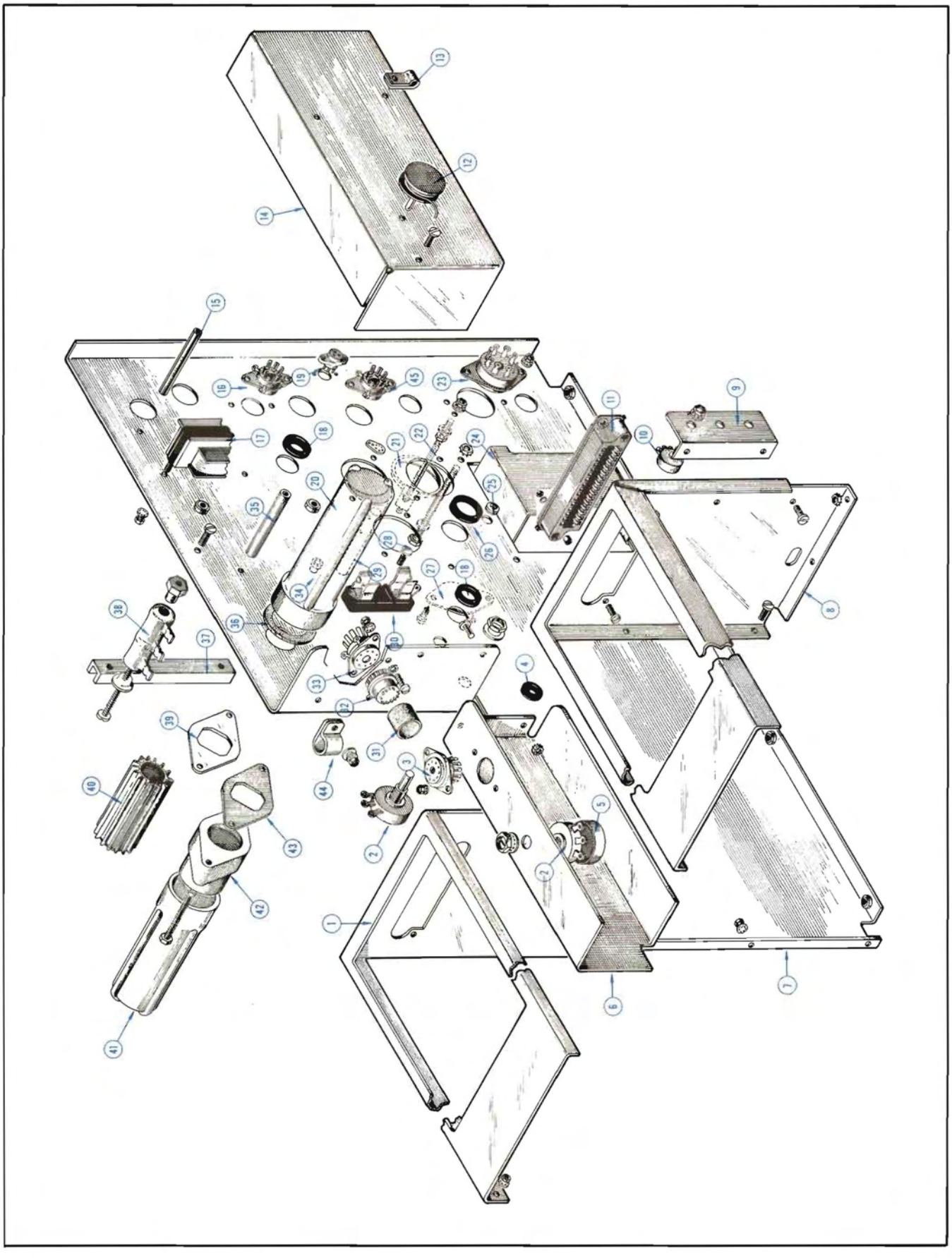
FRONT & REAR *(Cont'd)*

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
48	175-583			1	WIRE, crt lead, .960 foot, striped red, w/connector
	175-584			1	WIRE, crt lead, .960 foot, striped green, w/connector
	175-641			1	WIRE, crt lead, .458 foot, striped brown, w/connector
	175-642			1	WIRE, crt lead, .417 foot, striped blue, w/connector
49	387-682			1	PLATE, rear sub-panel
	- - - -			-	plate includes:
	354-057			1	RING, ornamental
50	406-730			1	BRACKET, adjusting
	- - - -			-	mounting hardware: (not included w/bracket)
	211-507			4	SCREW, 6-32 x 5/16 inch BHS
	210-803			4	WASHER, 6L x 3/8 inch
	210-457			4	NUT, keps, 6-32 x 5/16 inch
51	354-215			1	RING, clamping screw assembly (See Ref. #55 & #56)
	- - - -			-	ring includes:
	354-211			1	RING, clamping
52	124-160			1	STRIP, liner, crt clamp
53	211-585			1	SCREW, 6-32 x 1 inch RHS phillips
54	220-419			1	NUT, square, 6-32 x 5/16 inch
	- - - -			-	mounting hardware: (not included w/ring)
55	211-576			2	SCREW, 6-32 x 7/8 inch socket head
	210-949			2	WASHER, 9/64 ID x 1/2 inch OD
56	214-207			1	NUT, adjusting, securing
57	387-352			1	PLATE, gusset
	- - - -			-	mounting hardware: (not included w/plate)
	211-559			2	SCREW, 6-32 x 3/8 inch FHS phillips
	210-457			2	NUT, keps, 6-32 x 5/16 inch
58	- - - -			1	TRANSISTOR (not shown)
	- - - -			-	mounting hardware: (not included w/transistor)
	211-510			2	SCREW, 6-32 x 3/8 inch BHS
	210-006			1	LOCKWASHER, internal, #6
	210-202			1	LUG, solder, SE #6
	210-407			2	NUT, hex, 6-32 x 1/4 inch
59	- - - -			1	POT
	- - - -			-	mounting hardware: (not included w/pot)
	210-013			1	LOCKWASHER, internal, 3/8 x 11/16 inch
	210-840			1	WASHER, .390 ID x 9/16 inch OD
	210-413			1	NUT, hex, 3/8-32 x 1/2 inch
60	260-449			1	SWITCH, slide—CRT CATHODE SELECTOR
	- - - -			-	mounting hardware: (not included w/switch)
	210-406			2	NUT, hex, 4-40 x 3/16 inch

FRONT & REAR *(Cont'd)*

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
61	136-176			1	SOCKET, crt, assembly
	- - - -			-	socket includes:
	136-117			1	SOCKET, crt
	131-178			9	CONNECTOR, cable end
62	387-393			1	PLATE, back, crt socket
	- - - -			-	mounting hardware: (not included w/plate alone)
	213-086			2	SCREW, thread cutting, 2-32 x 7/16 inch PHS
63	387-729			1	PLATE, rear overlay
	- - - -			-	mounting hardware: (not included w/plate)
	213-104			2	SCREW, thread forming, 6-32 x 3/8 inch THS phillips
64	386-427			1	PLATE, ground
65	129-063			1	POST, binding
	- - - -			-	mounting hardware: (not included w/post)
	220-410			1	NUT, keps, 10-32 x 3/8 inch
66	129-063			1	POST, binding
	- - - -			-	mounting hardware: (not included w/post)
	358-169			1	BUSHING, binding post
	220-410			1	NUT, keps, 10-32 x 3/8 inch
67	134-067			4	PLUG, "D" hole, nylon
68	334-661			1	TAG, voltage rating
	- - - -			-	mounting hardware: (not included w/tag)
	213-088			2	SCREW, thread forming, 4-40 x 1/4 inch PHS phillips
69	352-002			1	HOLDER, fuse, assembly
	- - - -			-	holder includes:
	352-010			1	HOLDER, fuse
	210-873			1	WASHER, rubber
	NO NUMBER			1	NUT, fuse holder
70	200-582			1	CAP, fuse
71	131-150			1	CONNECTOR, chassis mounted, motor base (See Ref. #72)
	- - - -			-	connector includes:
	129-041			1	POST, ground, 4-40 thread one end
	200-185			1	COVER, 3 wire motor base
	205-014			1	SHELL, mounting
	210-003			2	LOCKWASHER, external, #4
	210-551			2	NUT, hex, 4-40 x 1/4 inch
	211-015			1	SCREW, 4-40 x 1/2 inch RHS
	214-078			2	PIN, connecting
	377-041			1	INSERT, black urea
72	- - - -			-	mounting hardware: (not included w/connector)
	213-104			2	SCREW, thread forming, 6-32 x 3/8 inch THS phillips
73	387-812			1	PLATE, bottom
	- - - -			-	mounting, hardware: (not included w/plate)
	212-069			9	SCREW, 8-32 x 1/4 inch THS phillips
74	213-045			1	SCREW, self-tapping, 4-40 x 5/16 inch PHS phillips

CHASSIS



CHASSIS

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
1	406-941			1	BRACKET, plug-in housing, left
	- - - -			-	mounting hardware: (not included w/bracket)
	211-538			1	SCREW, 6-32 x 5/16 inch FHS phillips
	210-006			1	LOCKWASHER, internal, #6
	210-407			1	NUT, hex, 6-32 x 1/4 inch
	212-039			1	SCREW, 8-32 x 3/8 inch THS phillips
	210-458			1	NUT, keps, 8-32 x 11/32 inch
2	- - - -			3	POT
	- - - -			-	mounting hardware for each: (not included w/pot)
	210-840			1	WASHER, .390 ID x 9/16 inch OD
	210-413			1	NUT, hex, 3/8-32 x 1/2 inch
3	136-014			1	SOCKET, STM9
	- - - -			-	mounting hardware: (not included w/socket)
	211-033			2	SCREW, 4-40 x 5/16 inch PHS, w/lockwasher
	210-201			2	LUG, solder, SE #4
	210-004			2	LOCKWASHER, internal, #4
	210-406			2	NUT, hex, 4-40 x 3/16 inch
4	348-005			1	GROMMET, 1/2 inch
5	200-247			1	CAP, pot
6	441-445			1	CHASSIS, calibrator
	- - - -			-	mounting hardware: (not included w/chassis)
	211-507			2	SCREW, 6-32 x 5/16 inch BHS
	210-457			2	NUT, keps, 6-32 x 5/16 inch
7	441-551			1	CHASSIS, indicator
	- - - -			-	mounting hardware: (not included w/chassis)
	212-070			4	SCREW, 8-32 x 5/16 inch FHS phillips
	212-039			3	SCREW, 8-32 x 3/8 inch THS phillips
	211-559			3	SCREW, 6-32 x 3/8 inch FHS phillips
	210-006			3	LOCKWASHER, internal, #6
	210-407			3	NUT, hex, 6-32 x 1/4 inch
8	406-940			1	BRACKET, plug-in housing, right
	- - - -			-	mounting hardware: (not included w/chassis)
	211-538			1	SCREW, 6-32 x 5/16 inch FHS phillips
	210-006			1	LOCKWASHER, internal, #6
	210-407			1	NUT, hex, 6-32 x 1/4 inch
	212-039			1	SCREW, 8-32 x 3/8 inch THS phillips
	210-458			1	NUT, keps, 8-32 x 11/32 inch
	212-004			5	SCREW, 8-32 x 5/16 inch BHS
	210-008			5	LOCKWASHER, internal, #8
	210-409			5	NUT, hex, 8-32 x 5/16 inch
9	406-893			1	BRACKET, pot
	- - - -			-	mounting hardware: (not included w/bracket)
	211-507			2	SCREW, 6-32 x 5/16 inch BHS

CHASSIS *(Cont'd)*

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
10	- - - -			3	POT, miniature
	- - - -			-	mounting hardware for each: (not included w/pot)
	210-046			1	LOCKWASHER, internal, .400 OD x .261 inch ID
	210-940			1	WASHER, 1/4 ID x 3/8 inch OD
	210-583			1	NUT, hex, 1/4-32 x 5/16 inch
11	131-148			2	CONNECTOR, chassis mounted, 24 contact, female
	- - - -			-	mounting hardware for each: (not included w/connector)
	211-014			2	SCREW, 4-40 x 1/2 inch BHS
	166-029			2	TUBE, spacer
	210-004			2	LOCKWASHER, internal, #4
	210-406			2	NUT, hex, 4-40 x 3/16 inch
12	214-210			1	SPOOL, solder, assembly
	- - - -			-	mounting hardware: (not included w/spool)
	361-007			1	SPACER, nylon, .063 inch
13	343-001			1	CLAMP, cable, 1/8 inch
	- - - -			-	mounting hardware: (not included w/clamp)
	211-510			1	SCREW, 6-32 x 3/8 inch BHS
	210-803			1	WASHER, 6L x 3/8 inch
14	337-529			1	SHIELD, high voltage
	- - - -			-	mounting hardware: (not included w/shield)
	211-507			3	SCREW, 6-32 x 5/16 inch BHS
15	385-124			1	ROD, aluminum
	- - - -			-	mounting hardware: (not included w/rod)
	211-507			1	SCREW, 6-32 x 5/16 inch BHS
16	136-008			3	SOCKET, STM7G
	- - - -			-	mounting hardware for each: (not included w/socket)
	213-044			2	SCREW, thread cutting, 5-32 x 3/16 inch PHS phillips
17	346-001			1	STRAP, high voltage transformer
	- - - -			-	mounting hardware: (not included w/strap)
	210-004			2	LOCKWASHER, internal, #4
	210-406			2	NUT, hex, 4-40 x 3/16 inch
18	348-012			2	GROMMET, 5/8 inch
19	136-095			3	SOCKET, 4 pin transistor
	- - - -			-	mounting hardware for each: (not included w/socket)
	213-113			2	SCREW, thread forming, 2-32 x 5/16 inch RHS phillips
20	200-261			1	COVER, capacitor
21	343-074			1	CLAMP, tube
22	355-070			1	STUD, 8-32 x 4 3/4 inches
	- - - -			-	mounting hardware: (not included w/stud)
	210-008			2	LOCKWASHER, internal, #8
	210-409			2	NUT, hex, 8-32 x 5/16 inch

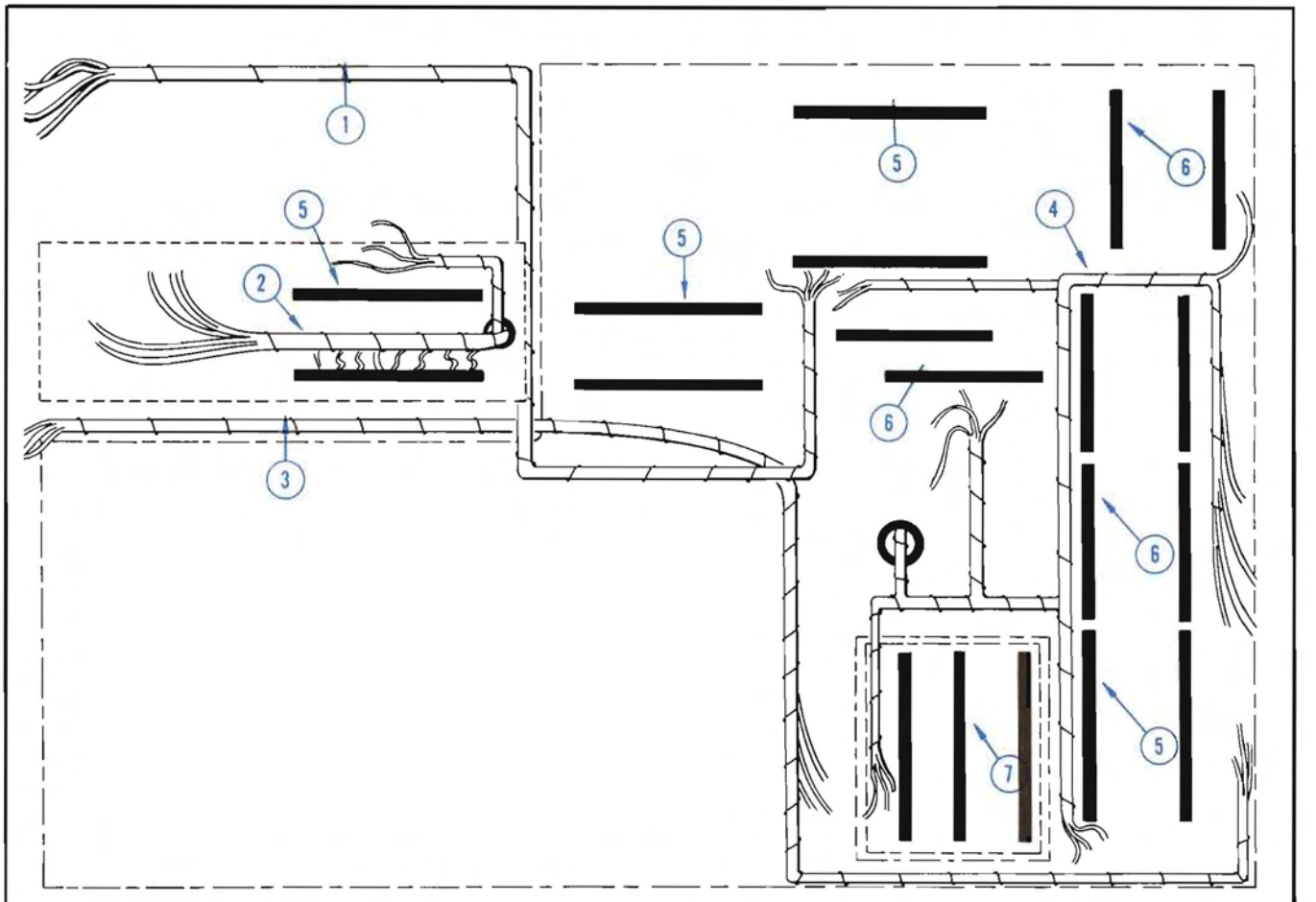
CHASSIS *(Cont'd)*

REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
23	136-013			1	SOCKET, STM8
	- - - -			-	mounting hardware: (not included w/socket)
	211-538			2	SCREW, 6-32 x 5/16 inch FHS phillips
	210-006			2	LOCKWASHER, internal, #6
	210-407			2	NUT, hex, 6-32 x 1/4 inch
24	406-937			1	BRACKET, transformer
25	348-003			2	GROMMET, 5/16 inch
26	348-006			2	GROMMET, 3/4 inch
27	260-157			1	SWITCH, thermal cutout
	- - - -			-	mounting hardware: (not included w/switch)
	213-044			2	SCREW, thread cutting, 5-32 x 3/16 inch PHS phillips
28	212-515			4	SCREW, 10-32 x 2 1/4 inches HHS
	210-812			4	WASHER, fiber, #10
	210-010			4	LOCKWASHER, internal, #10
	210-564			4	NUT, hex, 10-32 x 3/8 inch
29	385-137			1	ROD, delrin
	- - - -			-	mounting hardware: (not included w/rod)
	213-041			1	SCREW, thread cutting, 6-32 x 3/8 inch THS phillips
30	352-031			1	HOLDER, fuse, single
	- - - -			-	mounting hardware: (not included w/holder)
	211-507			1	SCREW, 6-32 x 5/16 inch BHS
	210-006			1	LOCKWASHER, internal, #6
	210-407			1	NUT, hex, 6-32 x 1/4 inch
31	200-249			1	COVER, socket
32	136-099			1	SOCKET, 9 pin, cable end
33	136-015			1	SOCKET, STM9G
	- - - -			-	mounting hardware: (not included w/socket)
	211-033			2	SCREW, 4-40 x 5/16 inch PHS, w/lockwasher
	210-004			2	LOCKWASHER, internal, #4
	210-406			2	NUT, hex, 4-40 x 3/16 inch
34	348-031			2	GROMMET, snap-in
35	385-097			2	ROD, nylon
	- - - -			-	mounting hardware for each: (not included w/rod)
	211-507			1	SCREW, 6-32 x 5/16 inch BHS
36	210-952			1	WASHER, insulating, 1.440 OD x .900 inch ID
37	406-938			1	BRACKET, crt shield support
	- - - -			-	mounting hardware: (not included w/bracket)
	211-513			2	SCREW, 6-32 x 5/8 inch BHS
38	- - - -			3	RESISTOR, 20 watt
	- - - -			-	mounting hardware for each: (not included w/resistor)
	212-037			1	SCREW, 8-32 x 1 3/4 inches Fil HS
	210-808			1	WASHER, resistor centering
	210-462			1	NUT, hex, resistor mounting
	212-001			1	SCREW, 8-32 x 1/4 inch BHS

CHASSIS *(Cont'd)*

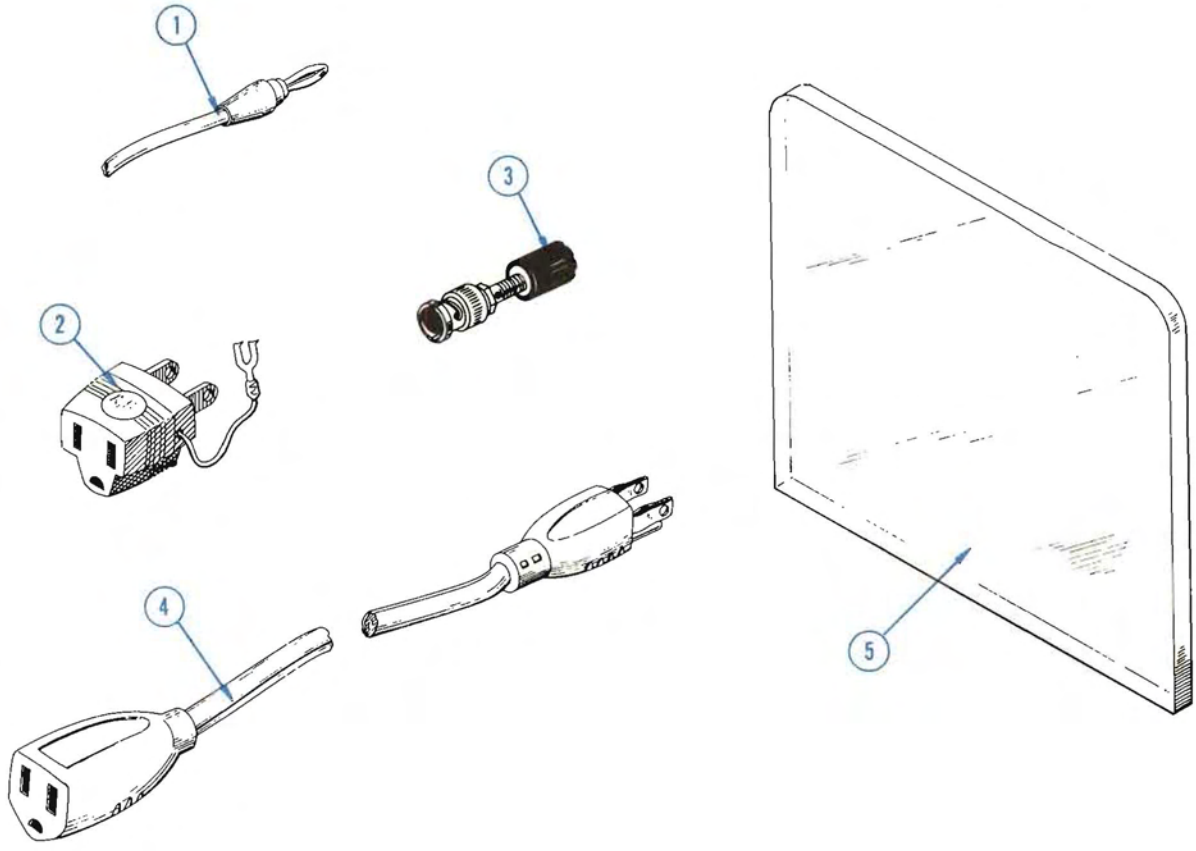
REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
39	386-255			1	PLATE, metal, large capacitor
40	337-649			1	SHIELD, heat dissipating
41	200-258			2	COVER, capacitor
42	432-048			3	BASE, capacitor mounting
	- - - -			-	mounting hardware for each: (not included w/base)
	211-588			2	SCREW, 6-32 x 3/4 inch HHS
	210-006			2	LOCKWASHER, internal, #6
	210-407			2	NUT, hex, 6-32 x 1/4 inch
43	386-254			2	PLATE, fiber, large capacitor
44	343-005			1	CLAMP, cable, 7/16 inch
	- - - -			-	mounting hardware: (not included w/clamp)
	211-510			1	SCREW, 6-32 x 3/8 inch BHS
	210-803			1	WASHER, 6L x 3/8 inch
	210-006			1	LOCKWASHER, internal, #6
	210-407			1	NUT, hex, 6-32 x 1/4 inch
45	136-015			4	SOCKET, STM9G
	- - - -			-	mounting hardware for each: (not included w/socket)
	213-044			2	SCREW, thread cutting, 5-32 x 3/16 inch PHS phillips

CABLE HARNESS & CERAMIC STRIP DETAIL



REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
1	179-664			1	CABLE HARNESS, focus and intensity
2	179-666			1	CABLE HARNESS, calibrator
3	179-665			1	CABLE HARNESS, 110 volt
4	179-727			1	CABLE HARNESS, indicator
5	124-091			8	STRIP, ceramic, 3/4 inch x 11 notches
	- - - -			-	each strip includes:
	355-046			2	STUD, nylon
	- - - -			-	mounting hardware for each: (not included w/strip)
	361-009			2	SPACER, nylon, .313 inch
6	124-090			8	STRIP, ceramic, 3/4 inch x 9 notches
	- - - -			-	each strip includes:
	355-046			2	STUD, nylon
	- - - -			-	mounting hardware for each: (not included w/strip)
	361-009			2	SPACER, nylon, .313 inch
7	124-091			3	STRIP, ceramic, 3/4 inch x 11 notches
	- - - -			-	each strip includes:
	355-046			2	STUD, nylon
	- - - -			-	mounting hardware for each: (not included w/strip)
	361-007			2	SPACER, nylon, .063 inch

ACCESSORIES



REF. NO.	PART NO.	SERIAL/MODEL NO. EFF.	SERIAL/MODEL NO. DISC.	QTY.	DESCRIPTION
1	012-031			1	CORD, patch-banana
2	103-013			1	ADAPTER, power cord
3	103-033			2	ADAPTER, BNC to binding post
4	161-010			1	CORD, power
5	387-935			1	PLATE, protector, light pipe

ELECTRICAL PARTS

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Description			S/N Range
		Bulbs			
B601	150-031	Incandescent, #44	Graticule Light		
B602	150-031	Incandescent, #44	Graticule Light		
B603	150-018	Incandescent, #12	Pilot Light		
B856	150-025	Neon, NE-2E			
B857	150-025	Neon, NE-2E			
		Capacitors			
Tolerance ±20% unless otherwise indicated.					
C611	285-510	0.01 μf	PTM	400 v	
C616	285-510	0.01 μf	PTM	400 v	
C640A,B	*290-228	340 μf x 10 μf	EMC	250 v	—10%, +100%
C642A,B	*290-227	340 μf x 10 μf	EMC	250 v	—10%, +100%
C644A,B	*290-228	340 μf x 10 μf	EMC	250 v	—10%, +100%
C650	285-510	0.01 μf	PTM	400 v	
C667	290-002	8 μf	EMT	450 v	—10%, +50%
C670	285-511	0.01 μf	PTM	600 v	
C720	290-166	2 x 2000 μf	EMC	25 v	—10%, +100%
C732	290-201	100 μf	EMT	15 v	—10%, +75%
C737	283-026	0.2 μf	Cer	25 v	
C757	290-015	100 μf	EMT	25 v	—10%, +150%
C801	283-006	0.02 μf	Cer	500 v	
C803	283-000	0.001 μf	Cer	500 v	
C807	285-502	0.001 μf	PTM	1000 v	
C822	283-071	0.0068 μf	Cer	5000 v	
C830	283-071	0.0068 μf	Cer	5000 v	
C832	283-071	0.0068 μf	Cer	5000 v	
C837	283-036	0.0025 μf	Cer	6000 v	
C841	285-519	0.047 μf	PTM	400 v	
C842	283-071	0.0068 μf	Cer	5000 v	
C853	283-036	0.0025 μf	Cer	6000 v	
C876	290-025	6.25 μf	EMT	300 v	—10%, +100%
C878	281-523	100 pf	Cer	350 v	
C884	281-524	150 pf	Cer	500 v	
C897	283-000	0.001 μf	Cer	500 v	
		Diodes			
D627	*152-107	Silicon	Replaceable by 1N647		
D640A,B,C,D	*152-047	Silicon	Replaceable by 1N2862		
D642A,B,C,D	*152-047	Silicon	Replaceable by 1N2862		
D644A,B,C,D	*152-047	Silicon	Replaceable by 1N2862		
D663	*152-107	Silicon	Replaceable by 1N647		

Ⓐ

Diodes *(Cont'd)*

Ckt. No.	Tektronix Part No.	Description	S/N Range
D664	*152-107	Silicon Replaceable by 1N647	
D720	152-035	Silicon 1N1563A	
D721	152-035	Silicon 1N1563A	
D838	*152-047	Silicon Replaceable by 1N2862	
D839	*152-047	Silicon Replaceable by 1N2862	

Fuses

F601	159-005	3 Amp 3AG Slo-Blo 117 v operation	
	159-034	1.6 Amp 3AG Slo-Blo 234 v operation	
F720	159-023	2 Amp 3AG Slo-Blo	

Inductors

L760	*108-088	3.2 μh	
L770	*108-088	3.2 μh	
L860	*108-285	Beam Rotator	

Transistors

Q624	*151-087	Replaceable by 2N1131	
Q734	151-040	2N1302	
Q744	151-042	2N1378	
Q757	151-046	2N1529	

Resistors

Resistors are fixed, composition, ±10% unless otherwise indicated.

R601	311-377	25 Ω		Var	WW	SCALE ILLUM
R609	302-106	10 meg	½ w			
R610	302-104	100 k	½ w			
R611	302-102	1 k	½ w			
R612	302-272	2.7 k	½ w			
R616	311-015	10 k		Var	WW	—100 VOLTS
R617	308-186	80 k	½ w		WW	1%
R618	308-226	10 k	½ w		WW	1%
R619	302-224	220 k	½ w			
R624	302-473	47 k	½ w			
R625	302-222	2.2 k	½ w			
R626	302-184	180 k	½ w			
R627	302-102	1 k	½ w			
R628	308-176	4 k	20 w		WW	5%
R632	302-102	1 k	½ w			

Resistors *(Cont'd)*

Ckt. No.	Tektronix Part No.		Description			S/N Range
R633	302-473	47 k	½ w			
R635	301-302	3 k	½ w			5%
R640	304-100	10 Ω	1 w			
R642	304-100	10 Ω	1 w			
R644	304-100	10 Ω	1 w			
R650	309-101	330 k	½ w		Prec	1%
R651	309-162	250 k	½ w		Prec	1%
R652	302-102	1 k	½ w			
R653	302-225	2.2 meg	½ w			
R654	302-474	470 k	½ w			
R655	302-685	6.8 meg	½ w			
R656	311-068	500 k	0.2 w	Var		+125 VOLTS
R657	302-684	680 k	½ w			
R658	302-273	27 k	½ w			
R659	302-333	33 k	½ w			
R663	302-102	1 k	½ w			
R664	302-102	1 k	½ w			
R666	308-176	4 k	20 w		WW	5%
R667	308-176	4 k	20 w		WW	5%
R670	309-156	1.024 meg	½ w		Prec	1%
R671	309-053	333 k	½ w		Prec	1%
R672	302-102	1 k	½ w			
R673	302-105	1 meg	½ w			
R675	302-825	8.2 meg	½ w			
R676	311-068	500 k	0.2 w	Var		+300 VOLTS
R677	304-224	220 k	1 w			
R678	302-394	390 k	½ w			
R679	302-333	33 k	½ w			
R729	302-823	82 k	½ w			
R730	311-068	500 k	0.2 w	Var		−12.2 VOLTS
R731	309-104	2.05 k	½ w		Prec	1%
R732	310-115	15 k	1 w		Prec	1%
R733	301-394	390 k	½ w			5%
R734	302-334	330 k	½ w			5%
R735	302-272	2.7 k	½ w			
R737	302-151	150 Ω	½ w			
R744	308-231	220 Ω	3 w		WW	5%
R754	302-471	470 Ω	½ w			
R759	302-104	100 k	½ w			
R770	302-564	560 k	½ w			
R801	306-681	680 Ω	2 w			
R802	302-562	5.6 k	½ w			
R803	306-273	27 k	2 w			
R806	302-104	100 k	½ w			
R807	302-472	4.7 k	½ w			

Ⓐ

Resistors *(Cont'd)*

Ckt. No.	Tektronix Part No.		Description			S/N Range
R813	302-101	100 Ω	½ w			
R815	302-474	470 k	½ w			
R816	302-102	1 k	½ w			
R831	302-104	100 k	½ w			
R832	302-106	10 meg	½ w			
R833	311-314	2 meg		Var		INTENSITY
R834	302-105	1 meg	½ w			
R835A	306-515	5.6 meg	2 w			
R835B	306-515	5.6 meg	2 w			
R835C	306-515	5.6 meg	2 w			
R835D	306-685	6.8 meg	2 w			
R835E	306-685	6.8 meg	2 w			
R836	302-223	22 k	½ w			
R837	302-471	470 Ω	½ w			
R838	301-242	2.4 k	½ w			5%
R839	302-104	100 k	½ w			
R840	301-125	1.2 meg	½ w			5%
R841	311-042	2 meg		Var		HIGH VOLTAGE
R842A	306-335	3.3 meg	2 w			
R842B	306-335	3.3 meg	2 w			
R842C	306-275	2.7 meg	2 w			
R842D	306-275	2.7 meg	2 w			
R844	311-313	5 meg		Var		FOCUS
R846	302-225	2.2 meg	½ w			
R849	302-223	22 k	½ w			
R851	302-104	100 k	½ w			
R852	302-273	27 k	½ w			
R853	302-471	470 Ω	½ w			
R854	302-105	1 meg	½ w			
R860	311-317	2 x 1 k		Var		ALIGNMENT
R861	302-680	68 Ω	½ w			
R862	302-823	82 k	½ w			
R863	302-823	82 k	½ w			
R864	311-206	250 k		Var		ASTIGMATISM
R865	311-026	100 k		Var		GEOMETRY
R870	301-392	39 k	½ w			5%
R871	311-315	20 k		Var		CAL AMPL
R872	301-154	150 k	½ w			5%
R873	302-103	10 k	½ w			
R876	301-153	15 k	½ w			5%
R877	301-183	18 k	½ w			5%
R878	301-564	560 k	½ w			5%
R879	301-114	110 k	½ w			5%
R883	305-223	22 k	2 w			5%
R885	309-121	9.5 k	½ w		Prec	1%

Ⓐ

Resistors *(Cont'd)*

Ckt. No.	Tektronix Part No.	Description			S/N Range
R886	309-119	6.375 k	½ w	Prec 1%	
R887	309-117	2.1 k	½ w	Prec 1%	
R888	309-116	1.025 k	½ w	Prec 1%	
R889	309-113	610 Ω	½ w	Prec 1%	
R890	309-073	200 Ω	½ w	Prec 1%	
R891	309-112	100 Ω	½ w	Prec 1%	
R892	309-067	60 Ω	½ w	Prec 1%	
R893	309-066	40 Ω	½ w	Prec 1%	
R896	309-045	100 k	½ w	Prec 1%	
R897	309-112	100 Ω	½ w	Prec 1%	
R898	309-112	100 Ω	½ w	Prec 1%	
R899	*308-090	¼ Ω	1 w	WW	

Switches

	Unwired-Wired		
SW601	260-014	Toggle	POWER ON
SW854	260-449	Slide	CRT CATHODE SELECTOR
SW870	260-253 *262-497	Rotary	CALIBRATOR
TK601	260-157	Thermal Cutout 160° F ±5° F	

Transformers

T601	*120-280	L.V. Power
T801	*120-275	H.V. Power

Electron Tubes

V609	154-291	OG3
V627	154-307	7233
V634	154-187	6DJ8
V654	154-022	6AU6
V667	154-020	6AS7
V674	154-022	6AU6
V[illegible]00	154-167	6CZ5
V[illegible]14	154-046	12BH7
V822	154-051	5642
V832	154-051	5642
V859	*154-462	T5033-31-1 Crt Standard Phosphor
V884	154-278	6BL8

Ⓐ

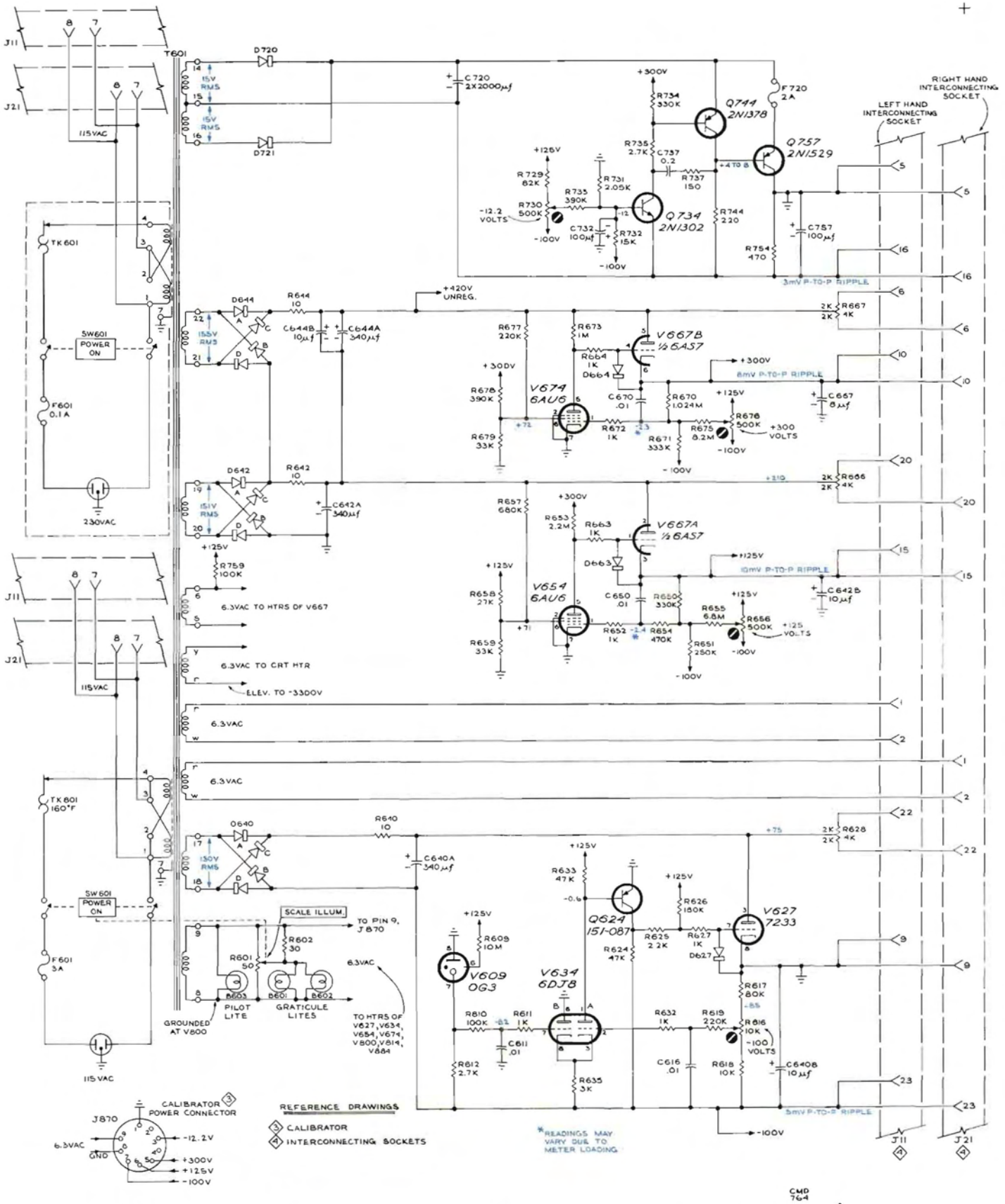
IMPORTANT:

Circuit voltages measured with 20,000 Ω/volt VOM. All readings in VOLTS.

Voltage measurements are not absolute and may vary from instrument to instrument.

VOLTAGE READINGS were obtained under the following conditions:

Plug-In Units	None
Line Voltage	117 v
INTENSITY	Counterclockwise
CALIBRATOR	OFF

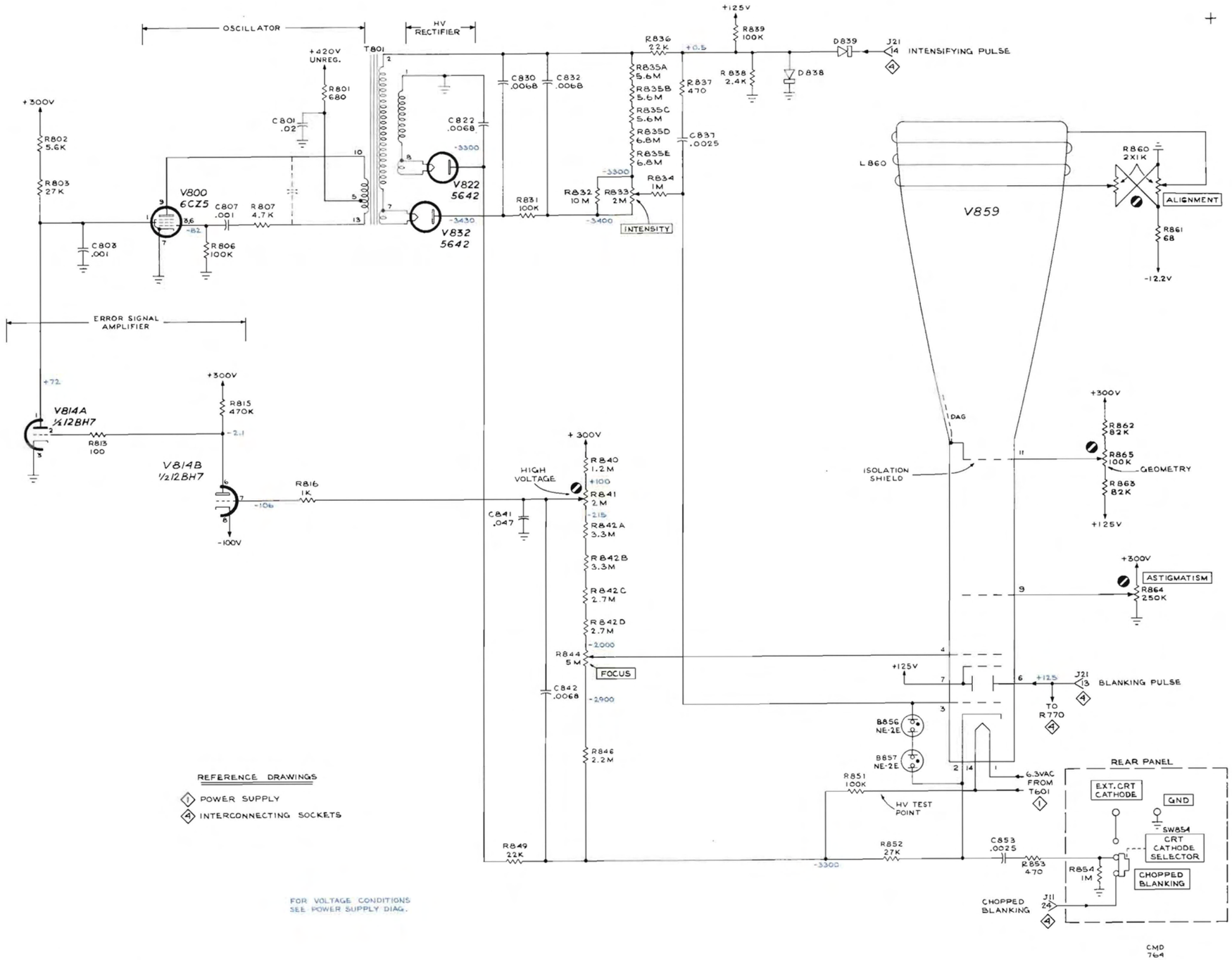


TYPE 506 OSCILLOSCOPE

A

CMD 764

POWER SUPPLY (1)



REFERENCE DRAWINGS

1 POWER SUPPLY

4 INTERCONNECTING SOCKETS

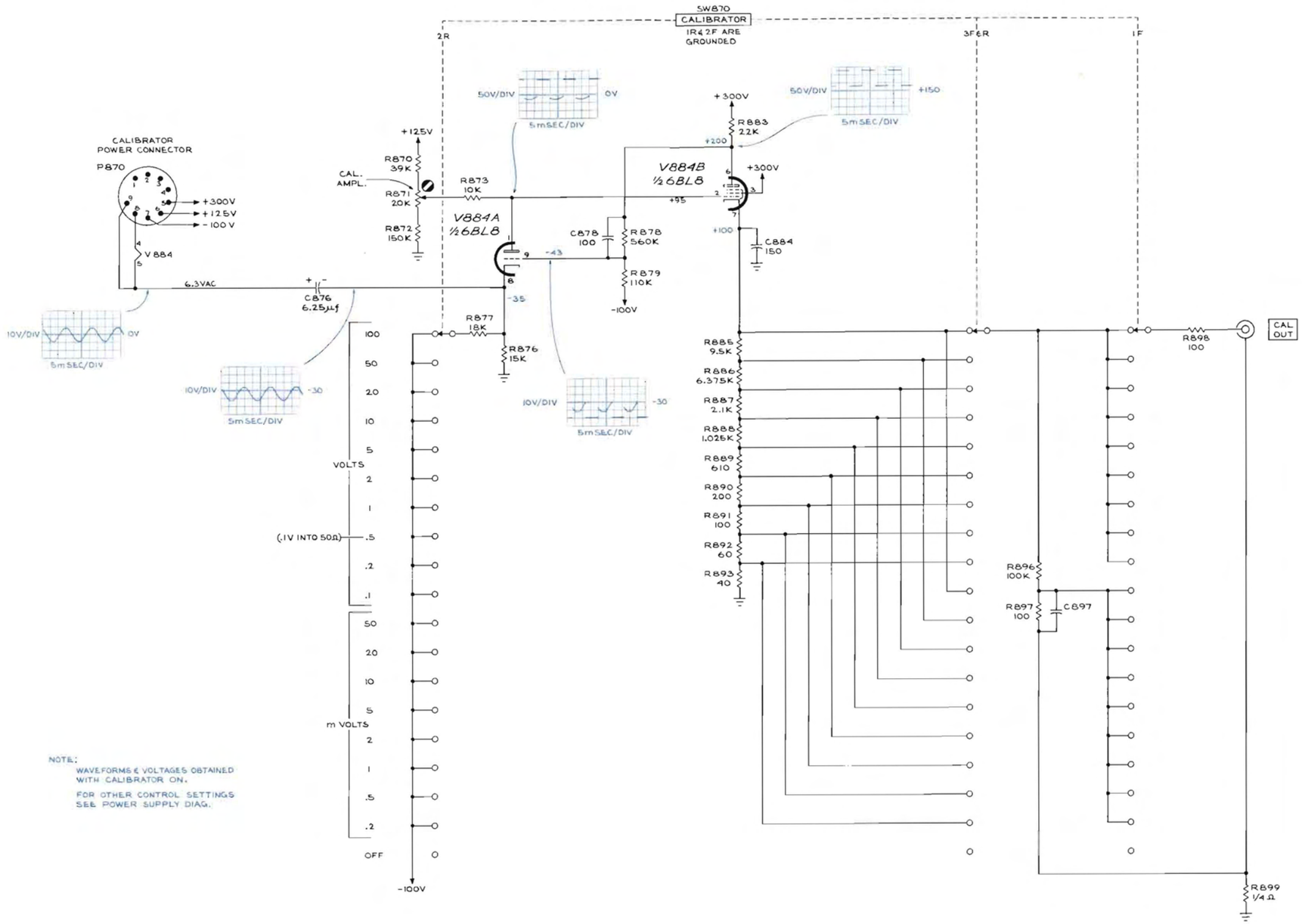
FOR VOLTAGE CONDITIONS SEE POWER SUPPLY DIAG.

CMD 769

CRT CIRCUIT 2

+ TYPE 506 OSCILLOSCOPE

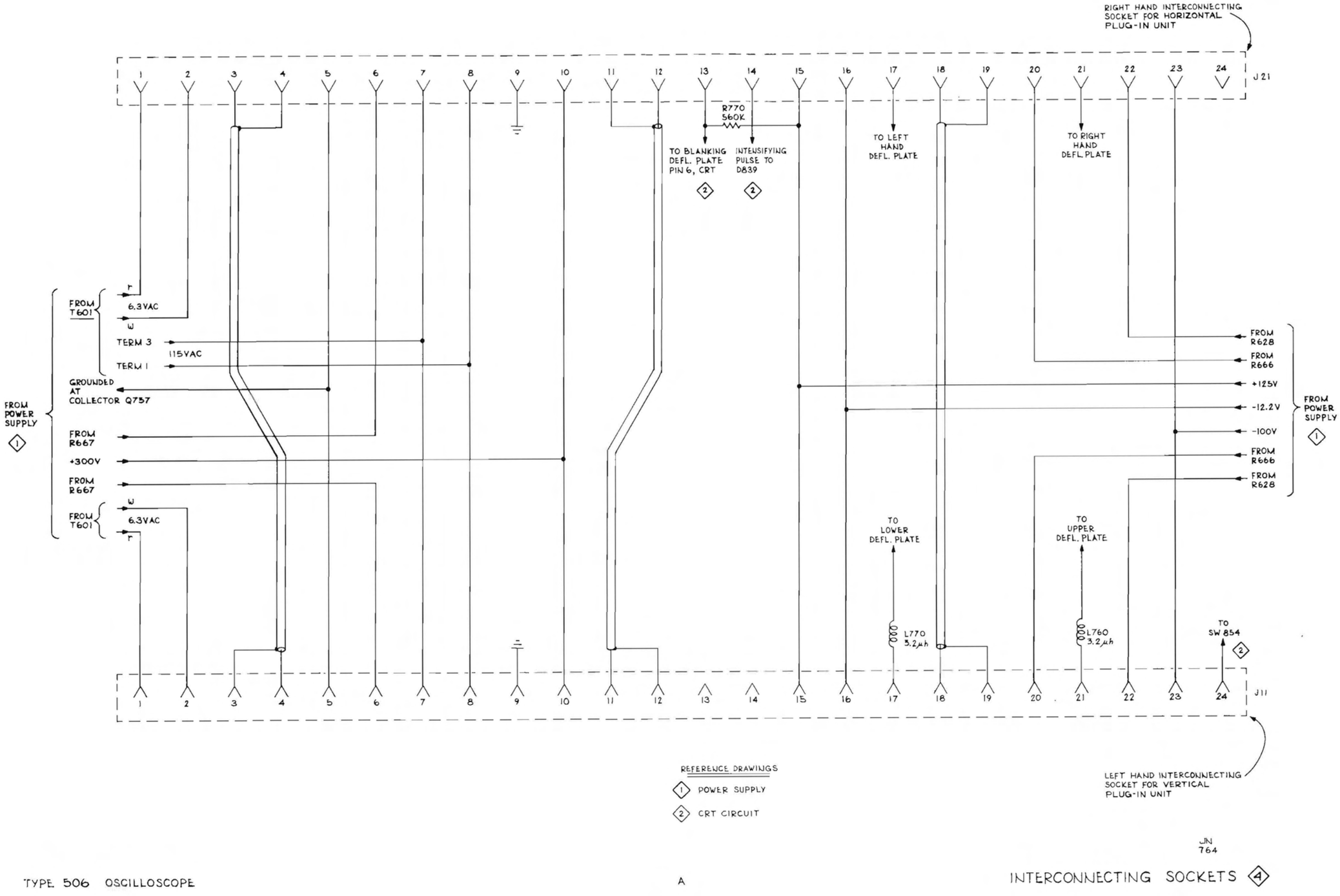
A



NOTE:
WAVEFORMS & VOLTAGES OBTAINED WITH CALIBRATOR ON.
FOR OTHER CONTROL SETTINGS SEE POWER SUPPLY DIAG.

CMD 769

CALIBRATOR ③


RIGHT HAND INTERCONNECTING SOCKET FOR HORIZONTAL PLUG-IN UNIT
J 21
R770 560K
TO BLANKING DEFL. PLATE PIN 6, CRT
INTENSIFYING PULSE TO D839
TO LEFT HAND DEFL. PLATE
TO RIGHT HAND DEFL PLATE
FROM POWER SUPPLY
FROM T601
6.3VAC
115VAC
TERM 3
TERM 1
GROUNDED AT COLLECTOR Q757
FROM R667
+300V
FROM R628
FROM R666
+125V
-12.2V
-100V
TO LOWER DEFL. PLATE
TO UPPER DEFL. PLATE
L770 3.2μh
L760 3.2μh
TO SW 854
J11
LEFT HAND INTERCONNECTING SOCKET FOR VERTICAL PLUG-IN UNIT
REFERENCE DRAWINGS
1 POWER SUPPLY
2 CRT CIRCUIT
JN 764

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. If it does not, your manual is correct as printed.

TYPE 506

PARTS LIST CORRECTION

CHANGE TO:

C837	283-034	0.005 µf	Cer	4000 v
C853	283-034	0.005 µf	Cer	4000 v