

INSTRUCTION MANUAL

Serial Number _____



Tektronix, Inc.

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

Tektronix International A.G.

Terrassenweg 1A ● Zug, Switzerland ● PH. 042-49192 ● Cable: Tekintag, Zug Switzerland ● Telex 53.574



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.

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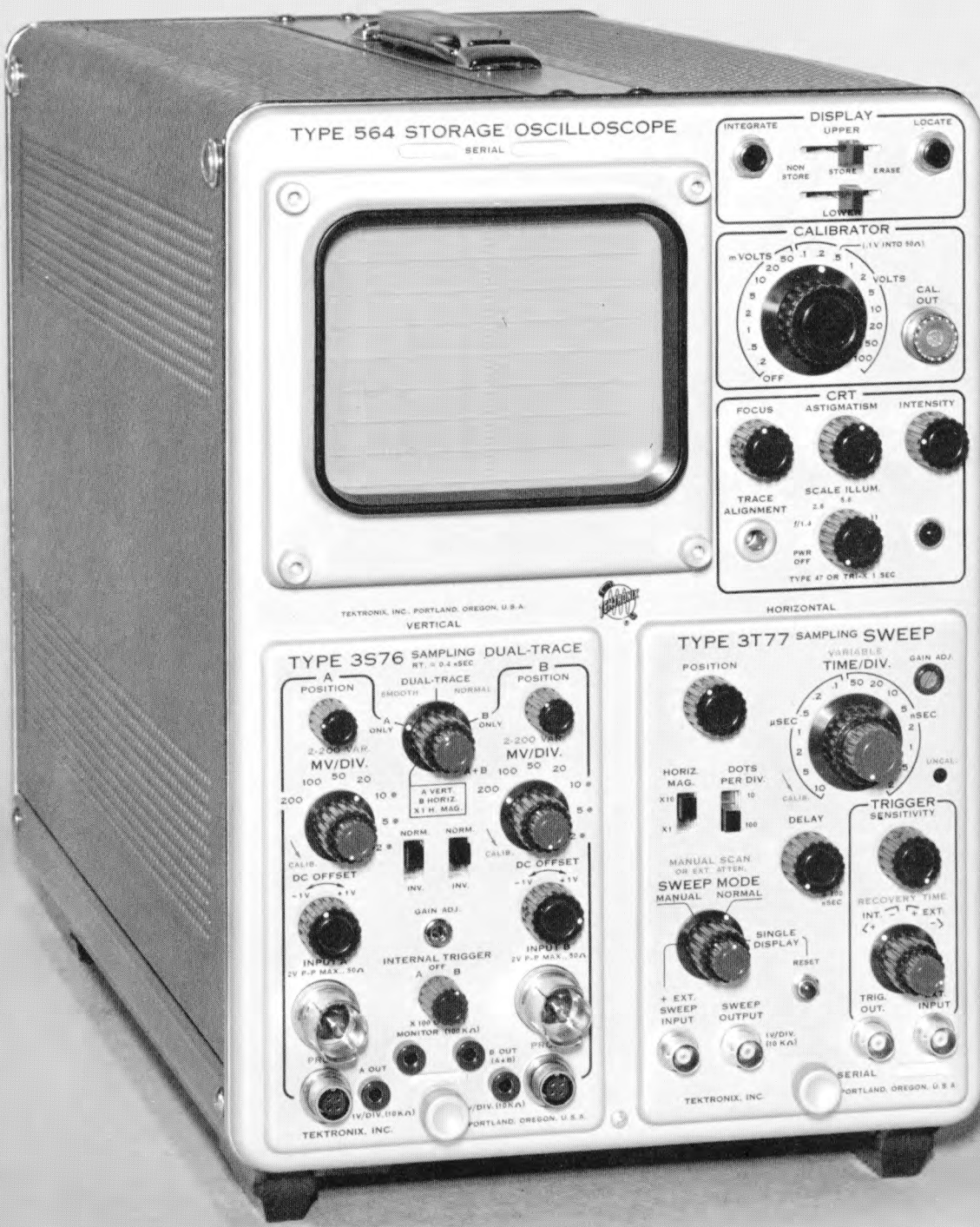
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TYPE 564 STORAGE OSCILLOSCOPE
SERIAL



INTEGRATE DISPLAY LOCATE
UPPER
NON STORE STORE ERASE
LOWER

CALIBRATOR
m VOLTS 50 1 2 5 10 20 50 100
1V INTO 50A
2 VOLTS
CAL OUT

CRT
FOCUS ASTIGMATISM INTENSITY
TRACE ALIGNMENT SCALE ILLUM. 2.5 5.0
PWR OFF
TYPE 47 OR TRICK 1 SEC

TEKTRONIX, INC. PORTLAND, OREGON, U.S.A.
VERTICAL

TYPE 3S76 SAMPLING DUAL-TRACE
RT = 0.4-SEC

A POSITION DUAL-TRACE B POSITION
SMOOTH NORMAL
2-200 VAR MV/DIV. 2-200 VAR MV/DIV.
100 50 20 100 50 20
CALIB. DC OFFSET DC OFFSET
-1V +1V -1V +1V
GAIN ADJ. INTERNAL TRIGGER
A OFF B
X 100 V MONITOR (100 K Ω)
A OUT B OUT (A+B)
1V/DIV. (10 K Ω) 1V/DIV. (10 K Ω)
TEKTRONIX, INC. PORTLAND, OREGON, U.S.A.

TYPE 3T77 SAMPLING SWEEP

POSITION VARIABLE TIME/DIV. GAIN ADJ.
1 2 5 10 20 50 100
100 50 20 10 5 2 1
100 50 20 10 5 2 1
HORIZ. MAG. DOTS PER DIV. CALIB. DELAY TRIGGER SENSITIVITY
X10 X1 100 1000 10000
MANUAL SCAN OR EXT. ATTEN. SWEEP MODE SINGLE DISPLAY RECOVERY TIME
MANUAL NORMAL INT. EXT.
+ EXT. SWEEP INPUT SWEEP OUTPUT TRIG. OUT. TRIG. INPUT
1V/DIV. (10 K Ω)
TEKTRONIX, INC. PORTLAND, OREGON, U.S.A.

SECTION 1

CHARACTERISTICS

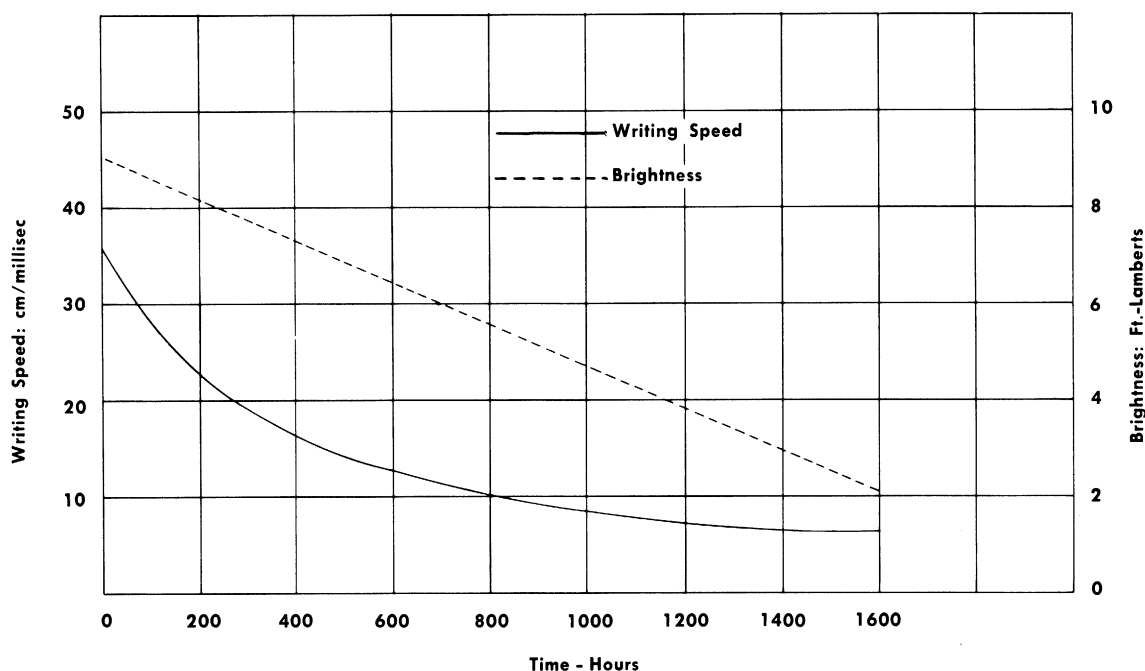


Fig. 1-1. Typical Life Characteristics of T5640

General

The Tektronix Type 564 is a storage oscilloscope that also operates as a conventional oscilloscope (such as the Tektronix Type 561A). Since all Tektronix Series '2' and '3' plug-in units fit the instrument, it can be used for differential, multi-trace, wide-band, sampling, and delayed sweep applications.

The split screen (store on either half, non-store on the other) provides the operator with new techniques for waveform comparison and analysis.

Cathode-Ray Storage Tube (Patents Pending)

Type—Tektronix manufactured T5640 or T5641, a 4" x 5" rectangular flat-faced crt using a ceramic envelope. Uses electrostatic focus and deflection.

Unblinking—Deflection type, dc-coupled.

Intensification—Internal: grid. External: cathode.

Accelerating Voltage—3.5 kv.

Deflection Plate Sensitivity—Horizontal: 17.5 to 19.3 volts/centimeter. Vertical: 18.5 to 20.5 volts/centimeter.

Storage Time—Up to one hour.

Writing Rate—T5640: initially 40 microseconds/centimeter minimum. T5641: initially 10 microseconds/centimeter minimum. See life charts, Figs. 1-1 and 1-2.

Contrast Ratio—2 to 1 minimum.

Erase Time—Approximately 0.25 second.

Graticule

Edge lighted with variable light control.

Replaceable plastic, marked with 8 vertical and 10 horizontal divisions.

Each major division is divided into 5 minor divisions on the centerlines.

Calibrator

Waveform—Square waves at power-line frequency.

Output Voltage—0.2 millivolt to 100 volts peak-to-peak, in 18 steps. Within 3% of control setting.

Risetime—About 5 microseconds.

Power Required

Regulation— $\pm 2\%$ over the applicable line-voltage range.

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

Characteristics — Type 564

Fuse—3-amp slow-blowing type for 117 volts. 1.6-amp slow-blowing type for 234 volts.

Ventilation

Convection air cooled. Thermal cutout interrupts instrument power if temperature inside the cabinet exceeds a safe level. Restores power when temperature returns to a safe level.

Construction

Aluminum-alloy chassis and two-piece cabinet.

Photo-etched anodized panel. Blue vinyl paint over textured aluminum on cabinet.

Dimensions—Height 13½ inches, width 9¾ inches, and depth 21½ inches.

Weight—30½ pounds without plug-in units.

TYPICAL LIFE CHARACTERISTICS

Figs. 1-1 and 1-2 show the typical stored brightness and writing speed performance expected on T5640 and T5641 cathode-ray storage tubes during life. The hours shown are the actual hours crts have experienced in the storage mode with repetitive writing, storing, and erasing.

Writing rate was measured at a beam current of 30 micro-amperes. At maximum beam current, the writing speed would be higher. Writing rate, specified on Page 1-1, is the reciprocal of writing speed.

The brightness was measured with a Spectra Brightness Spot Meter at operating level, with the entire screen faded positive. The brightness of a single line will be higher. These curves should **not** be extrapolated to determine performance beyond the times shown as data is not available. To obtain maximum performance and service, the instrument should be left in the non-storage mode when storage is not needed.

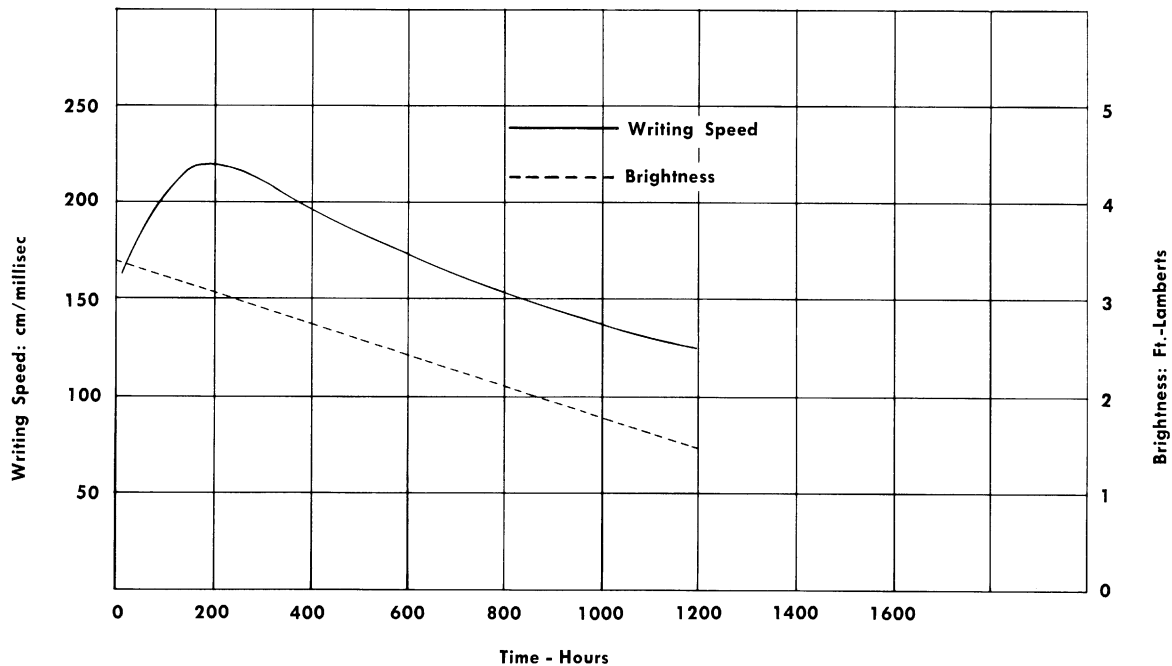


Fig. 1-2. Typical Life Characteristics of T5641

SECTION 2

OPERATING INSTRUCTIONS

FUNCTIONS OF CONTROLS AND TERMINALS Front Panel

POWER	This switch is part of the SCALE ILLUM. control. Turns power off in the PWR. OFF position.
TRACE ALIGNMENT	Screwdriver adjustment that tilts the crt trace to align it with the horizontal graticule lines. Check this adjustment each time the instrument is moved since the alignment is affected by the earth's magnetic field.
FOCUS and ASTIGMATISM	These controls together produce an evenly focused display.
INTENSITY	Sets the crt trace brightness in the non-storage mode. Sets the writing speed but not the brightness in the storage mode. If set too high, the trace cannot be focused.
CALIBRATOR	An 18-position switch that sets the peak-to-peak voltage at the CAL. OUT connector and turns the calibrator off in the fully counterclockwise position.
INTEGRATE	Push-button used to store repetitive displays that are faster than the instrument's single transient stored writing rate.
LOCATE	Push-button used to locate the vertical position of the display before storing.
UPPER	NON STORE: Upper half of crt will not store. STORE: Upper half of crt stores. ERASE: Upper half of crt erases when switch is pressed and released.
LOWER	NON STORE: Lower half of crt will not store. STORE: Lower half of crt stores. ERASE: Lower half of crt erases when switch is pressed and released.

Back Panel

CRT CATHODE SELECTOR	CHOPPED BLANKING: Removes switching transients when vertical channel is used in dual-trace chopped mode. EXT. CRT CATHODE: Z-axis intensity modulation.
EXT. CRT CATHODE and GND Binding Posts	Metal strap should be across binding posts for normal operation. Remove strap and inject signal at EXT. CRT CATHODE post for Z-axis intensity modulation.

FIRST-TIME OPERATION

Before Turn-On

1. Be sure the instrument is wired to match your line voltage.

NOTE

If the instrument is wired for 117 volts, it will operate properly from 105 to 125 volts. When wired for 234 volts, it will operate from 220 to 248 volts. If your line voltage is not the same as shown on the plate attached to the instrument back panel, refer to Fig. 2-1 for the necessary changes.

2. Turn INTENSITY control fully counterclockwise.
3. Set the instrument so air can circulate upward through the holes in the bottom of the cabinet.
4. Install an amplifier plug-in unit in the vertical compartment and a time-base plug-in unit in the horizontal compartment. Tighten the plug-in lock knobs.

Obtaining a Display

The steps that follow will help you become familiar with the instrument.

1. Preset the controls as follows:

DISPLAY (UPPER and LOWER)	NON STORE
CALIBRATOR	OFF
FOCUS	Midrange
ASTIGMATISM	Midrange
INTENSITY	Fully counterclockwise
SCALE ILLUM.	PWR. OFF

2. Set the horizontal plug-in unit for a 5 msec/div. sweep rate with internal triggering, and the vertical plug-in unit for 1 volt/div. sensitivity.
3. Turn the power on.
4. Connect a jumper cable from the CAL. OUT connector to the vertical plug-in unit input connector. Set the CALIBRATOR switch to 1 volt.
5. Turn the SCALE ILLUM. control throughout its range; notice the graticule light up.
6. Turn the INTENSITY control clockwise until the trace appears. It may be necessary to adjust the time-base level control to get a stable display.
7. Alternately adjust the FOCUS and ASTIGMATISM controls for a sharp, well focused display.

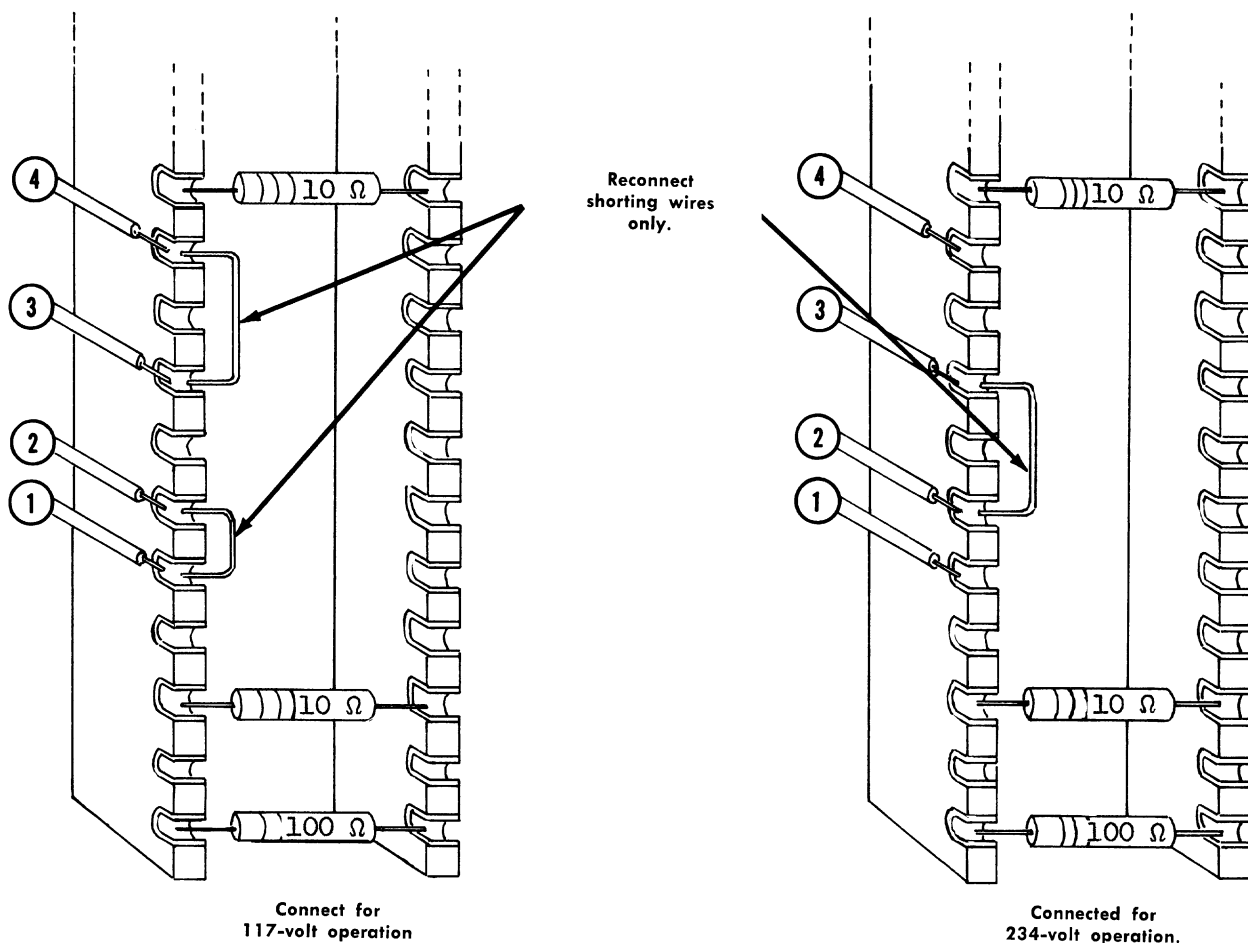


Fig. 2-1. Terminal strips behind horizontal plug-in compartment.

NOTE

Use just enough intensity for a clear, sharp display. Higher intensities may broaden the trace, however, higher intensities will store at a higher writing rate.

8. Use a screwdriver and turn the TRACE ALIGNMENT control throughout its range. Then align the trace with a horizontal graticule line.

This completes the operation of the regular oscilloscope controls. If this is your first use of a Tektronix oscilloscope, repeat these steps several times.

Storing a Single Event

Since the greatest use of the storage oscilloscope is for recording single events, the single sweep technique is described first.

1. Display the calibrator signal in the normal-sweep mode and at normal intensity. Then set the time-base plug-in unit for single-sweep operation with the sweep speed still at about 5 Msec/div.

2. Set both DISPLAY switches to STORE.

3. Trigger the single sweep.

4. If the display does not store, check that the entire screen is not fully stored by pushing both DISPLAY controls to ERASE, then increase the display intensity and trigger again.

Storing a Repetitive Display

1. Set the controls for a calibrator signal display as described under "First-Time Operation".

2. Move both UPPER and LOWER DISPLAY switches to ERASE; then release.

3. Turn the INTENSITY control fully counterclockwise. A moderately bright stored display will remain on the crt.

4. Push both UPPER and LOWER DISPLAY switches to ERASE; then release. The stored image will disappear.

5. Turn the INTENSITY control clockwise until the trace reappears. Adjust the vertical plug-in unit to position the display on the upper half of the crt.

6. Push the LOWER DISPLAY switch to NON STORE and the UPPER DISPLAY switch to ERASE; then release. If you reduce the intensity, the trace will remain stored on the upper half of the crt.

7. Increase the intensity until the trace brightens. Use the vertical amplifier position control to move the trace to the lower half of the crt. Notice that the lower half does not store.

8. Reverse the positions of the UPPER and LOWER DISPLAY switches and move the trace from the bottom to the top. Now the trace stores on the lower half and not on the upper half.

Relocating the Trace

If you have stored a display and want to relocate the trace without disturbing the stored display, use the following procedure:

1. Adjust the time-base plug-in unit to position the start of the sweep to the very left-hand graticule line.

2. Store a display; then turn the sweep off.

3. Push and hold the LOCATE button. A dot (or dots) will appear to the left of the stored display. (Two dots represent the position and amplitude extremes of the quiescent square wave display.) Relocate the display vertically to the new position desired. Release the LOCATE button. The dots will not be stored.

4. Store a second display. The first display will not be disturbed. The second display can be positioned so that it does not cross through the first one.

Integrating the Trace

At high sweep rates and low repetition rates the trace is usually too dim for a good display even at full intensity. Use the following procedure to obtain a bright stored display even when the normal trace is barely visible:

1. Place both DISPLAY switches in NON STORE and set the INTENSITY control for a barely visible trace.

2. Move both DISPLAY switches to ERASE; then release. Notice that the trace does not store.

3. Push and hold the INTEGRATE button for about 10 seconds; then release. A normally defined stored display should appear.

This method works well with repetitive, jitter-free displays. If the trace has jitter, the stored display may blur or thicken since each sweep is not repeating in exactly the same place.

OPERATING NOTES

Changing Plug-In Units

The accuracy of measurements made with the Type 564 depends on the accuracy of the plug-in units used. Therefore, the gain and sweep timing of the plug-in units should be checked when plug-in units are changed in the oscilloscope. Complete procedures for these adjustments will be found in the plug-in unit instruction manual.

Horizontal and vertical plug-in units used in the Type 564 may be changed at any time. However, it is recommended that the instrument be turned off while a change is made. This protects the oscilloscope and other plug-in units against sudden transients and load changes.

Plug-In Combinations

Normally the time-base plug-in unit is used in the right-hand plug-in compartment and the vertical amplifier plug-in unit in the left. However, this order can be reversed for some applications. For X-Y (Lissajous) displays, use a vertical amplifier plug-in unit in both compartments. Plug-in units with equal phase shift will produce accurate X-Y displays.

Intensity Modulation (Z-Axis)

Remove the metal strap from the binding posts on the instrument back panel. Connect a signal of 5 to 25 volts to the posts and push the CRT CATHODE SELECTOR switch up. The crt will not store intensities of less than full stored brightness.

Holes in Back Panel

These holes can be used to connect input and output signals to the instrument through the back panel.

SECTION 3

CIRCUIT DESCRIPTION

Low Voltage Power Supplies

Transformer T601 has two primary windings. These windings are connected in parallel for 117-volt operation and in series for 234-volt operation. The secondary of T601 has many windings to supply ac and dc voltages for the oscilloscope and plug-in units.

Regulated Dc Voltages

There are four regulated voltages: -12.2 , -100 , $+125$, and $+300$ volts. Each of these supplies uses silicon diode rectifiers followed by a series regulator circuit.

The -100 -, $+125$ -, and $+300$ -volt supplies are designed to use shunt resistors to supply current for different plug-in unit loads. These shunts allow some load current to bypass the series regulator tube. If a plug-in unit draws enough current to require a shunt, the current shunt resistance is installed in that plug-in unit. When the unit is plugged into the Type 564, the shunt is connected around the regulator tube. The plug-in portion of the shunt is always in series with a 2 kilohm ($1/2$ of a center-tapped 4 kilohm) resistor located in the power supply.

-100 -Volt Supply

Reference voltage for the -100 -volt supply is established by gas diode V609. The constant voltage drop across V609 establishes a fixed voltage of about -85 volts at the grid of V634B. Voltage at the grid of V634A is established by divider R616, R617, and R618. The voltage difference between the two grids of V634 determines the plate current of V634A. Plate current of V634A determines the base voltage of transistor Q624 which, in turn, determines the grid voltage of series tube V627. The series tube plate resistance changes to hold the load voltage constant. R616 (-100 VOLTS adjustment) determines the percentage of the total divider voltage applied to the grid of V634A and thus controls the output voltage. When this control is properly adjusted, the output is exactly -100 volts.

Should the output voltage tend to change because of a change in input voltage or a change in load current, the voltage at the grid of V634A will change a proportional amount. Any change at this grid is amplified by V634A and V624 and applied to the grid of V627. The resulting grid change at V627 will cause its plate resistance to change in the direction that will bring the output back to -100 volts. C616 improves the response of the regulator to sudden changes in output voltage. R628 is part of the series-tube shunt, connected by some plug-in units.

$+125$ -Volt Supply

The -100 -volt supply serves as a reference for the $+125$ -volt supply. With the R651 end of divider R650 and 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 applied to the grid of series

regulator V667A. The change at the grid of V667A changes its plate resistance to bring the output voltage back to $+125$ volts. R656 ($+125$ VOLTS control) sets the percentage of total divider voltage applied to the grid of V654 and permits adjustment of the output voltage. When this control is properly adjusted, the output is exactly $+125$ volts. C650 improves the response of the regulator to sudden changes in output voltage. R666 is part of the series-tube shunt.

$+300$ -Volt Supply

The $+300$ -volt supply works the same as the $+125$ -volt supply. To supply the voltage for the $+300$ -volt regulator, rectified voltage from terminals 19 and 20 of transformer T601 is added to the voltage supplying the $+125$ -volt regulator. R676 ($+300$ VOLTS control) adjusts the output voltage.

The $+300$ -volt supply provides an unregulated $+420$ volts for the crt circuit.

-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 and 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 collector resistance of Q757 which is in series with the load. R730 (-12.2 VOLTS control) adjusts the voltage applied to the base of Q734. When this control is properly adjusted, the output is exactly -12.2 volts. F720 protects Q757 in case of an overload on the -12.2 -volt supply.

$+475$ -Volt Supply (Unregulated)

The half-wave rectified voltage from terminals 21 and 22 of T601 is added to the $+300$ -volt supply producing a $+475$ -volt storage system supply. C646 filters the voltage rectified by D646.

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 LOCATE (trace) button plus controls and signal input connections.

Cathode-Ray Tube

A Tektronix T5640 or T5641 ceramic-envelope cathode-ray tube is used in the Type 564. The accelerating potential is about 3500 volts, developed by about -3300 volts

Circuit Description — Type 564

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 19 and 17 volts per centimeter respectively.

Deflection blanking of the crt beam is used in the Type 564. The crt contains a special set of deflection plates (pins 5 and 7) for this purpose. Both plates are connected to +125 volts; however, pin 5 is also driven by the horizontal plug-in unit.

During sweep time, or if no plug-in unit is installed, both plates rest at +125 volts and permit the electron beam to pass on to the crt phosphor. During sweep retrace, however, pin 5 is driven considerably away from +125 volts. This deflects the beam off screen and prevents a display. The LOCATE button is described with other storage controls.

High-Voltage Supplies

Energy for both high-voltage supplies is furnished by T801. V800, the primary of T801, and the stray circuit capacitance form a Hartley oscillator that operates at about 45 kc.

The output of one secondary winding of T801 rectified by V822, provides voltage for the crt cathode and focus element. This voltage is about -3300 volts at the crt 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 by R851.

The output of the other secondary winding of T801 is rectified by V832 for the control grid. The grid voltage ranges from about -3300 to about -3425 volts, and depends 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 non-stored display, and the storage writing rate.

Neon bulbs B856 and B857 keep the voltage between the crt grid and cathode within safe limits. If the voltage exceeds about 140 volts, the neons fire and the voltage reduces to about 120 volts.

Regulation of the -3300-volt supply is accomplished through feedback from the arm of R841. The -3550-volt supply is regulated indirectly by mutual coupling in T801. If, due to loading or a change in input voltage, the output of the -3300-volt supply changes, a proportionate change occurs at the arm of R841. This change is amplified by V814 and is coupled to the screen of V800 which increases or decreases the amplitude of oscillations in V800, changing the output voltage of T801 in the direction that will return the high voltage to the correct level. R841 (HIGH VOLTAGE control) adjusts the output voltage by setting the bias on V814B.

Deflection Signals

Push-pull signals for the deflection plate appear at pins 17 and 21 of the plug-in unit connector. The effective deflection circuit capacitance these signals see at the con-

ector affects the bandpass and phase shift of each plug-in unit. C760 and C761 (Interconnecting Socket diagram) are set at the factory.

Intensifying Signals

Two signals may be used to modulate the intensity of the crt display. First, intensifying signals from a two-sweep (delaying-sweep) time-base plug-in unit are applied to the grid supply through terminal 14 of the right-hand Interconnecting Socket. When the overall display intensity is reduced with the INTENSITY control, positive intensifying pulses from a two-sweep time-base plug-in unit will brighten any desired portion of the display.

The ground return for the crt grid supply can be either through D838 in the case where the plug-in unit does not supply intensifying signals, or through D839 to a negative voltage in the intensifying circuit of the plug-in unit. In the second case, D838 is back-biased and the junction of D838 and D839 is at a low negative voltage. With the same setting of the INTENSITY control, the first case will provide a brighter display. The second case provides a slightly dimmer display due to the plug-in unit negative voltage. Intensification results when the plug-in unit positive pulse turns D839 off and the crt grid supply return again becomes D838. R837 and C837 then couple the leading edge of the intensifying pulse directly to the crt grid.

Other external intensifying signals can be fed to the crt cathode through the EXT. CRT CATHODE jack. Depending on the setting of the INTENSITY control, a negative pulse of 5 volts or more will intensify the crt display.

Crt Controls

INTENSITY control R833 has a range of about 150 volts to control the crt bias and change 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 a 300-volt adjustment range.

GEOMETRY control R940 diagrammed on the STORAGE SYSTEM schematic, adjusts the geometry by varying the voltage of the crt isolation shield from +155 to +250 volts.

The TRACE ALIGNMENT control R860 turns the display for alignment with the graticule.

Calibrator

The calibrator for the Type 564 produces line-frequency amplitude-calibrated square waves.

The 6.3-volt (about 18 volts peak-to-peak) ac heater voltage is coupled through C876 to the cathode of V884A. The signal at the plate of V884A is coupled to the grid of V884B to turn that tube on and off. Regenerative feedback from the plate of V884B to the grid of V884A speeds up the switching action, and drives V884A into and out of cutoff.

The voltage present at the cathode of V884B during the time V884B is conducting is adjusted 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 at least 3% at the various settings of the CALIBRATOR control.

When the CALIBRATOR control is set to the .5 VOLTS position, there will be a 0.1-volt output when the CAL. OUT connector is terminated in 50 ohms.

Storage System

The flood guns, wall band, storage target backplate, and the storage target in the crt make stored displays possible (see Fig. 3-1). When the correct voltage is applied to each of these elements, the crt becomes a storage tube. These voltages are changed to revert the crt to a conventional type.

Storage Target (Viewing Screen)

The storage target is a special, insulated layer containing phosphor.

Flood Guns

The flood guns are a high current source of low-velocity electrons. When the target- and wall-band voltages are properly adjusted, the electrons from these flood guns are focused on the crt face, and cover it evenly. This appears as a slight background illumination.

Wall Bands

The voltages applied to the wall bands control and shape the flood-gun electron beam for even illumination of the storage target.

Integrate Pushbutton

Two things happen when the INTEGRATE button is pushed. First, the flood gun cathodes are ungrounded, and second, R848 in the crt high-voltage circuit is grounded.

This causes the flood guns to cut off and also adjusts the voltages in the crt circuit to maintain proper deflection sensitivity.

Storage Tube Circuits

Almost all of the circuits that control the storage tube are voltage dividers that need no description. The exception is the upper- and lower-screen voltage. Since the target current changes as the crt is written (stored), the voltage to the crt must be stabilized. Two cathode followers serve as constant voltage sources for both upper and lower screens.

The grid-driving voltage for both cathode followers comes from R904 (STORAGE LEVEL control) which is connected between +125- and +355-volt sources.

When the display switch is moved to NON STORE, the grid driving voltages for the cathode followers comes from R906 (NON STORAGE LEVEL control) which is connected between a +250-volt source and ground.

When either DISPLAY switch is moved to ERASE, a large positive pulse couples through C916 or C918 and drives the upper or lower screen via the cathode followers. At the same time, voltage to wall bands 6 and 7 is raised to +300 volts. The result is that the flood guns are kept focused while the crt becomes fully written. When either DISPLAY level is released from the ERASE position, a negative-going pulse is applied to the appropriate screen, and the screen returns to a condition where storage is possible (operating level). At the same time the correct voltage is returned to the wall bands.

Locate Pushbutton

This button (diagrammed on Crt Circuit schematic) connects +355 volts to the left-hand crt deflection plate (viewed from the front). This pulls the electron beam a little to the left of the point at which the sweep starts. Thus, without sweep and with the intensity adjusted correctly, the LOCATE button will show a small dot or dots to the left of where the next sweep will start, marking the vertical position and amplitude of the next display.

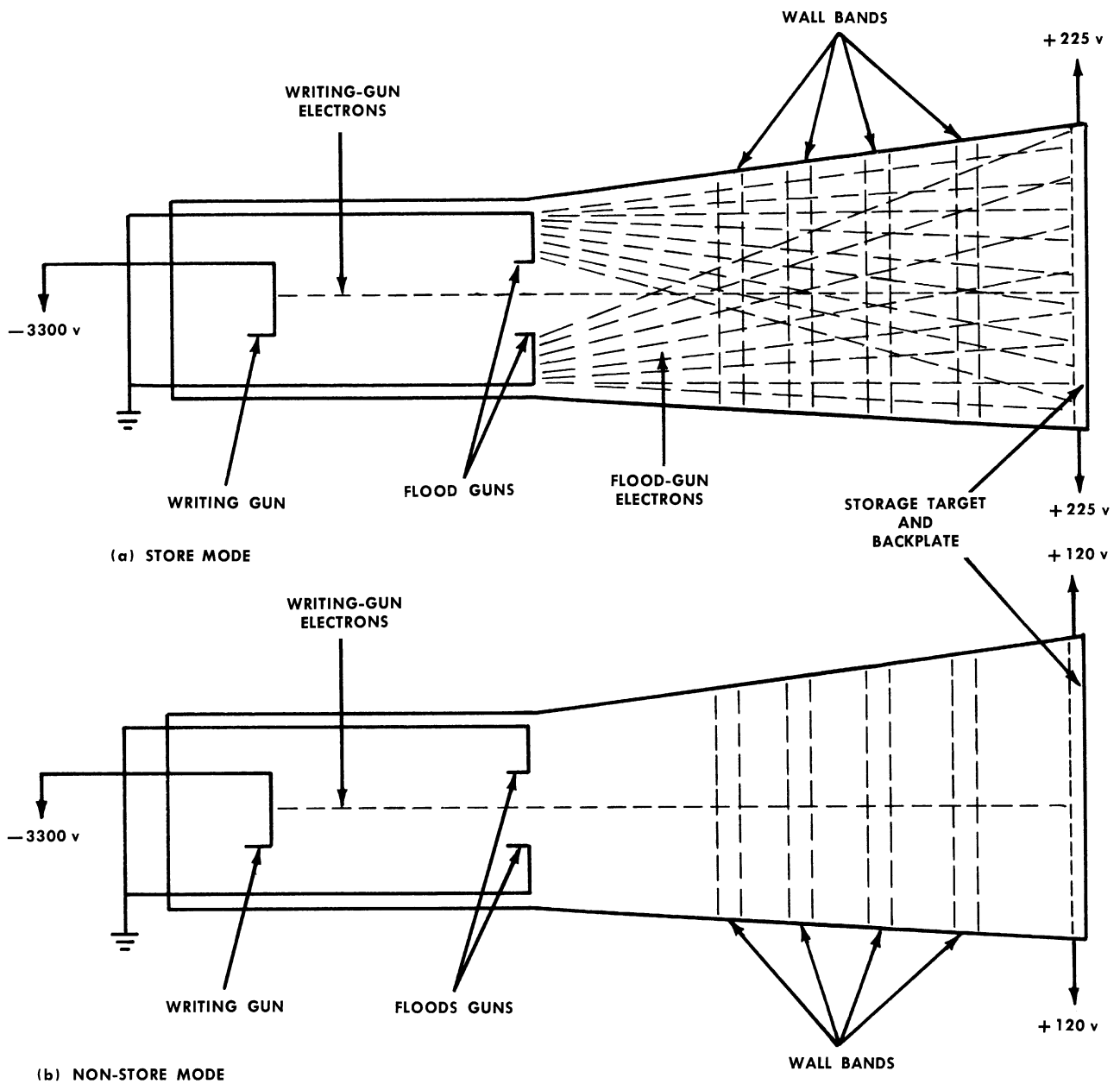


Fig. 3-1. (a) Store mode with electrons from flood guns and writing gun. (b) Non-store mode with electrons only from writing gun.

SECTION 4

CALIBRATION

General

The Type 564 should be calibrated after each 500 hours of operation, or every six months, whichever comes first. Recalibrate any section that may be affected by parts replacement.

Always calibrate with two plug-in units in place. If you do a complete calibration, use this order: indicator unit, vertical plug-in unit, then horizontal plug-in unit. Either plug-in unit can be calibrated separately, but in all cases, check the indicator unit power-supply voltages.

Equipment Required

1. Dc voltmeter: at least 5000 ohms per volt. 1% from 0 to 300 volts (use 0.5% accuracy meter when the Type 564 is used with sampling-type plug-in units), $\pm 3\%$ at 4000 volts.
2. Variable autotransformer: 250-watt minimum output.

3. Ac voltmeter (rms): $\pm 3\%$ from 0 to 250 volts.

4. Test oscilloscope: vertical sensitivity of at least 50 millivolts/division (for ripple measurement).

Preliminary

The following preliminary procedure must be performed before beginning the calibration.

1. Remove both side-covers from the instrument cabinet.
2. Connect the instrument through the autotransformers to a line-voltage source.
3. Turn on the instrument and allow a ten-minute warm-up.
4. Monitor the transformer output with the ac voltmeter and set the transformer for the correct operating voltage (117 or 234 volts).

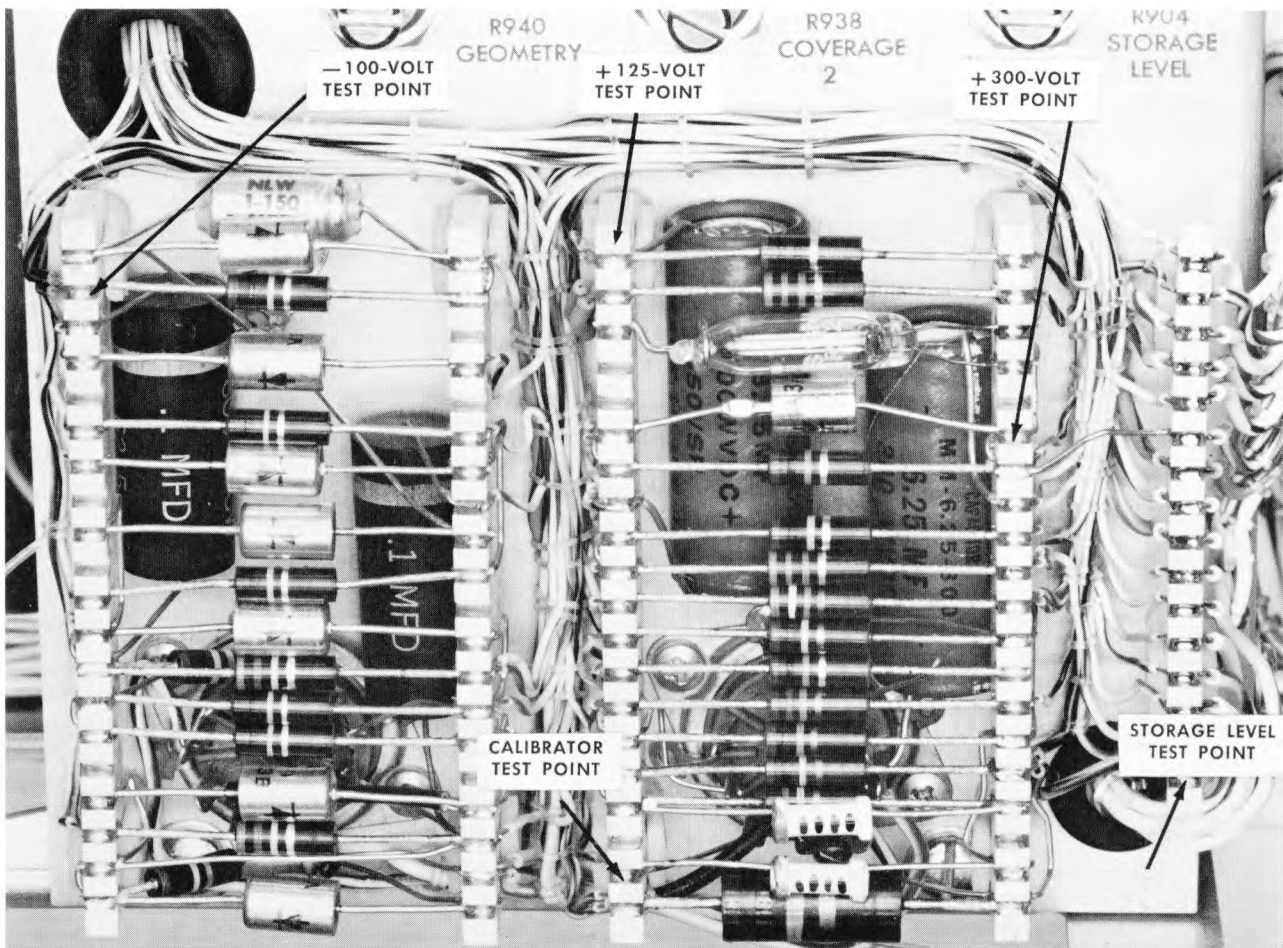


Fig. 4-1. Voltage test points on sub-chassis directly over horizontal plug-in compartment.

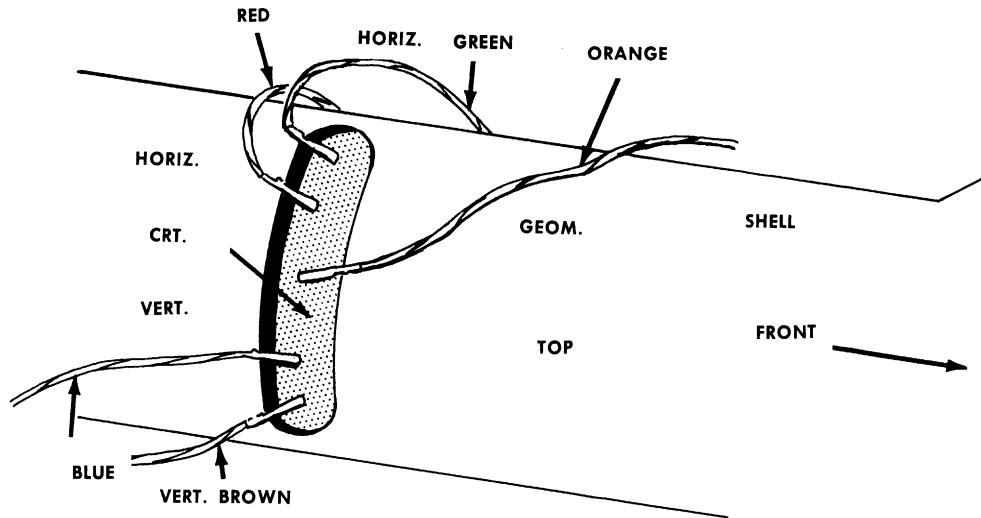


Fig. 4-2. Left-side view of crt showing neck pin connections.

Power Supply Adjustment

If sampling type plug-in units are to be used in the Type 564, the power supply tolerances are $\pm 1\%$. If not, the tolerances are $\pm 2\%$. Power supplies are within 1% when shipped from the factory.

The -100 -volt supply is the reference for the other supplies, therefore, it must be adjusted first.

1. Connect the dc meter to the -100 -volt test point (see Fig. 4-1). Adjust R616 (-100 -VOLT control) for exactly -100 volts. Check regulation by varying the autotransformer from 105 to 125 volts (or 210 or 250 volts). The -100 volts should stay within 1%. Return the autotransformer output to 117 (or 234) volts.

2. Connect the meter to the $+125$ -volt test point. Adjust R656 ($+125$ VOLTS control) for exactly $+125$ volts, and check regulation as in step 1 (within 1%).

3. Connect the meter to the $+300$ -volt test point. Adjust R676 ($+300$ VOLTS control) and check regulation (within 1%).

4. Connect the meter to the negative lead of C757 (100 μ fd, 25 W.V. capacitor on the terminal strip just below and to the right of fuse F720). Adjust R730 (-12.2 VOLTS control) for -12.2 volts, and check regulation (within 1%).

5. Switch the meter to the 4000-volt range, and connect it to the junction of R846, R851, and R852 (on the terminal strip just below the high-voltage shield). Adjust R841 (HIGH VOLTAGE control) for -3300 volts.

Power Supply Ripple Check

With the test oscilloscope, measure the power supply ripple at each of the test points described in steps 1 through 4 of the preceding "Power Supply Adjustment" procedure. Do not measure ripple on the -3300 -volt supply. Maximum allowable ripple for each supply is shown on the Power Supply schematic diagram.

Calibrator Adjustment

Turn the CALIBRATOR switch to OFF, and connect the dc meter to the calibrator test point (see Fig. 4-1). Adjust R871 (CAL AMPL control) for exactly $+100$ volts. A check of each step of the CALIBRATOR switch can be made by using the following procedure. Unsolder the white with black stripe wire from the rear wafer of the CALIBRATOR switch. Turning the CALIBRATOR switch will now leave the cathode of V884B at $+100$ volts (no output square-wave), and the ratio voltage of each cathode resistor will appear at the front panel CAL. OUT connector. Connect a non-loading dc meter to the CAL. OUT connector, and check the voltage at each position of the CALIBRATOR switch. All voltages should be within 3%. Reconnect the white-black lead.

Trace Alignment

Set the horizontal plug-in unit for a free-running sweep (no signal). Adjust the FOCUS and ASTIGMATISM controls for the narrowest trace width; then position the trace vertically to one of the horizontal graticule lines. Adjust the TRACE ALIGNMENT control to align the trace with the graticule line.

Geometry

Center the trace with the vertical plug-in unit POSITION control. Connect a jumper across the two vertical deflection plate pins on the neck of the crt (see Fig. 4-2) and measure the voltage from these pins to ground. Then move the meter to the Geometry pin and adjust R940 (GEOMETRY control) for the same voltage.

Storage Adjustments

The method described below uses the crt display to show correct adjustment. The objective of these adjustments is a clear storage display with best contrast.

1. Preset the internal adjustments as follows:

A FLOOD GUN BIAS R946	Clockwise
B FLOOD GUN BIAS R944	Clockwise
COVERAGE 1 R930	Midrange
COVERAGE 2 R938	Midrange
STORAGE LEVEL R904	Midrange
NON STORAGE LEVEL R906	Counterclockwise

Always erase the crt after making adjustments.

2. Push both DISPLAY switches to ERASE and hold. Then:

(a) Adjust A FLOOD GUN BIAS R946 for an even glow over the entire crt.

(2) Repeat step (a) for the B FLOOD GUN BIAS R944.

(c) Adjust COVERAGE 2 R938 until the crt brightens and faint shadows move toward the center of the crt; then back off until the shadows just disappear.

(d) Release DISPLAY switches.

3. Connect a dc voltmeter (0-300 volts) to the storage level test point (see Fig. 4-1).

(a) Set the vertical and horizontal plug-in units for a trace (no signal) on the crt. Use normal intensity and a 1 msec/division horizontal sweep rate. Then set the horizontal plug-in unit for a single sweep.

(b) Set R904 (STORAGE LEVEL control) fully counterclockwise. Erase the crt.

(c) Alternately trigger the single sweep and advance the STORAGE LEVEL control in 5-volt steps (erase between each advance) until the trace stores at several locations on the screen with maximum breaks of 1 minor graticule division. Wait about 10 seconds after each change before writing. Record the voltage at the storage level test point.

(d) Continue the procedure in step (c) above until the stored trace thickens and starts to spread into the background. Again record the voltage at the storage level test point. Subtract the voltage reading of step (c) from this reading and add one-half the difference to the lower reading. For example:

2nd reading	210 vdc
1st reading	<u>150 vdc</u>
Difference	60 vdc

Add one-half to lower reading:
 $150 + 30 = 180$ volts

Set STORAGE LEVEL control for 180 volts at the storage level test point.

4. Adjust R930 (COVERAGE 1 control) until the illuminated part of the display covers the full crt with equal brightness at the center and edges. Check to see that the crt is still fully covered in about 5 minutes. If not, readjust R930. Incomplete coverage occurs if R930 is set either too high or too low. If full coverage cannot be obtained by adjusting R930, Repeat step 2, then step 4.

5. Set the UPPER DISPLAY switch to NON STORE. Adjust R906 (NON STORAGE LEVEL control) just to the point where no glow is seen on the upper screen, and no storage is possible.

SECTION 5

PARTS LIST AND DIAGRAMS

PARTS ORDERING INFORMATION

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


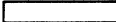
Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information 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.

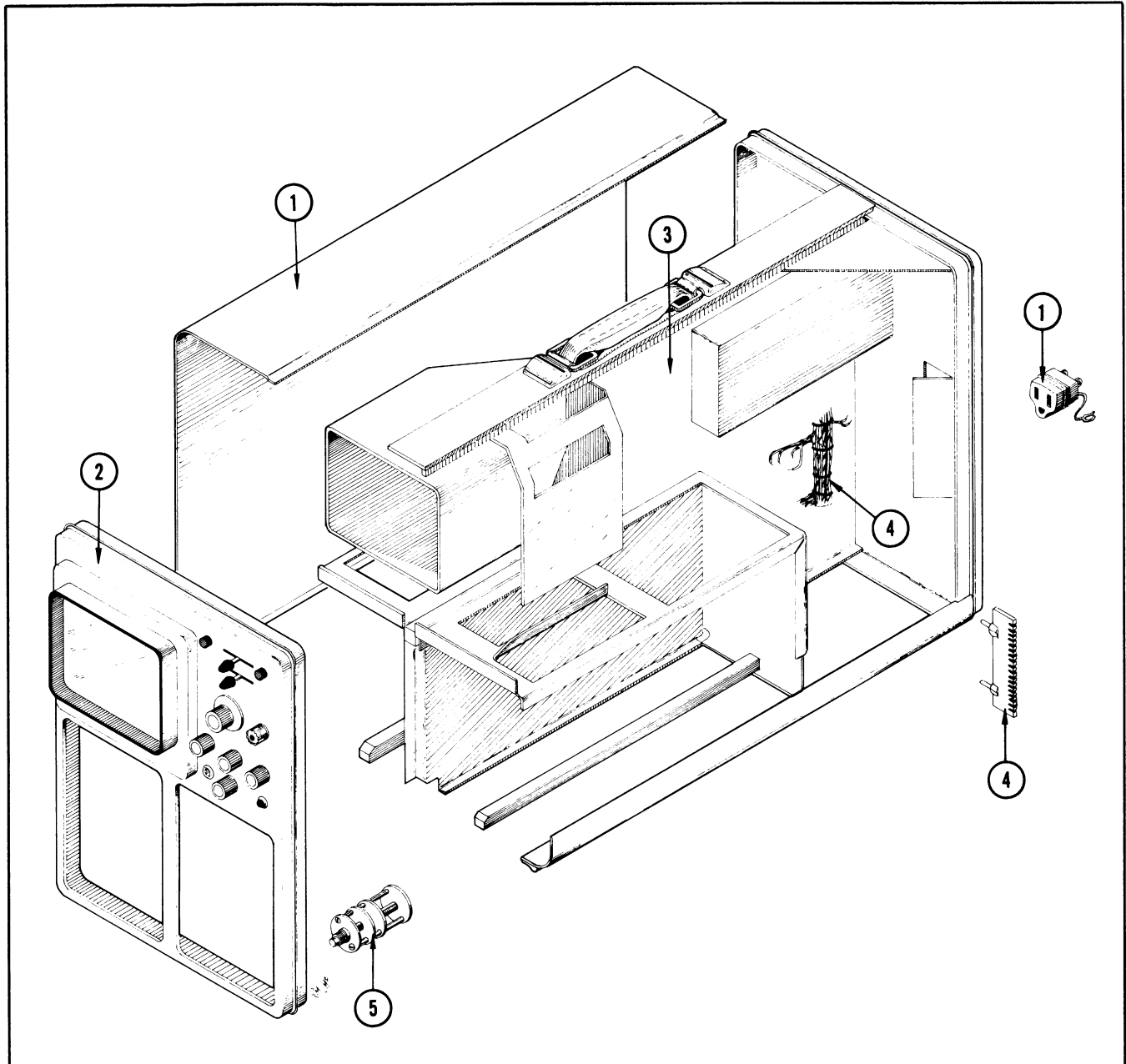
ABBREVIATIONS AND SYMBOLS

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

SPECIAL NOTES AND SYMBOLS

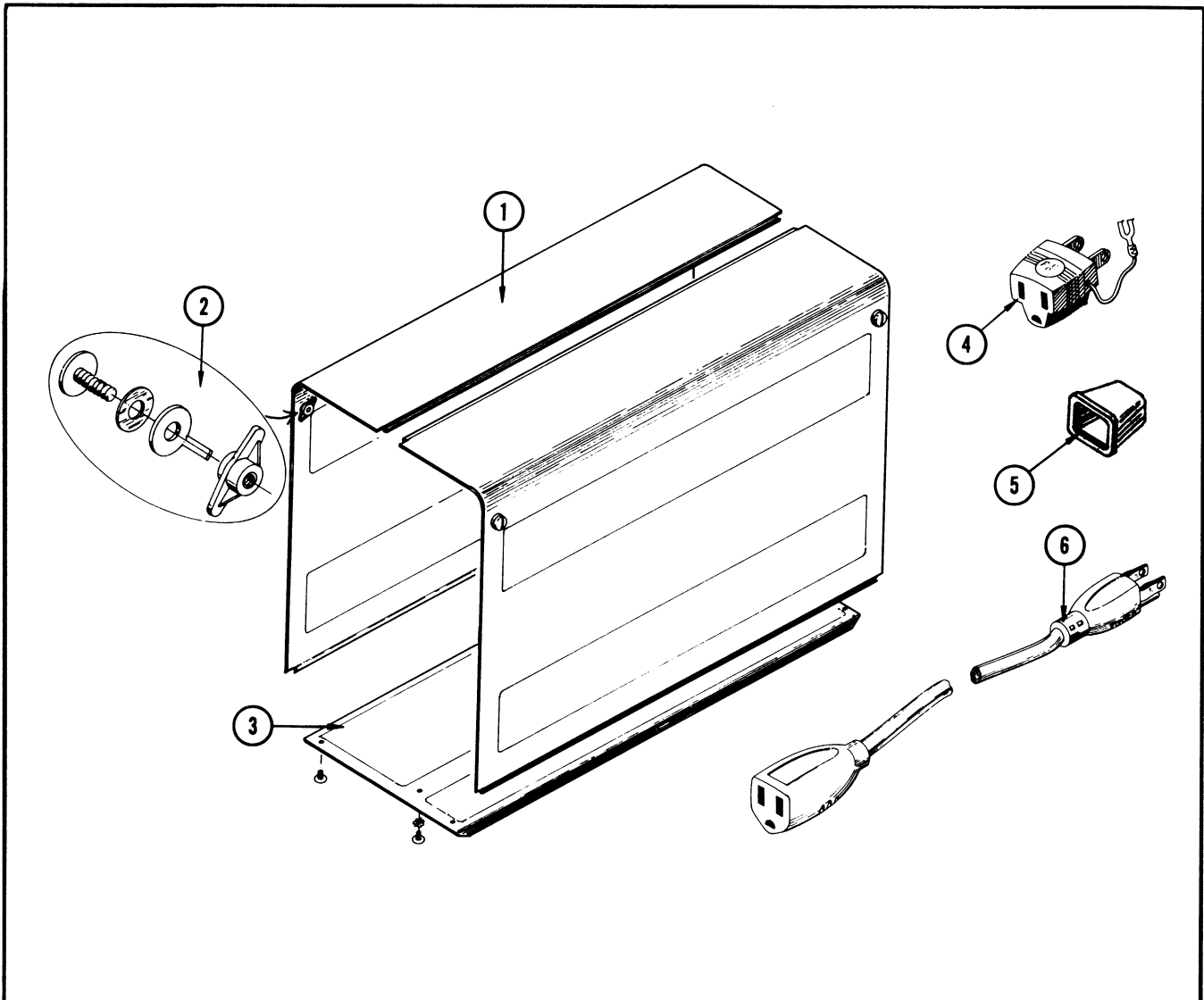
X000	Part first added at this serial number.
000X	Part removed after this serial number.
*000-000	Asterisk preceding Tektronix Part Number indicates manufactured by or for Tektronix, or reworked or checked components.
Use 000-000	Part number indicated is direct replacement.
	Internal screwdriver adjustment.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

LOCATOR



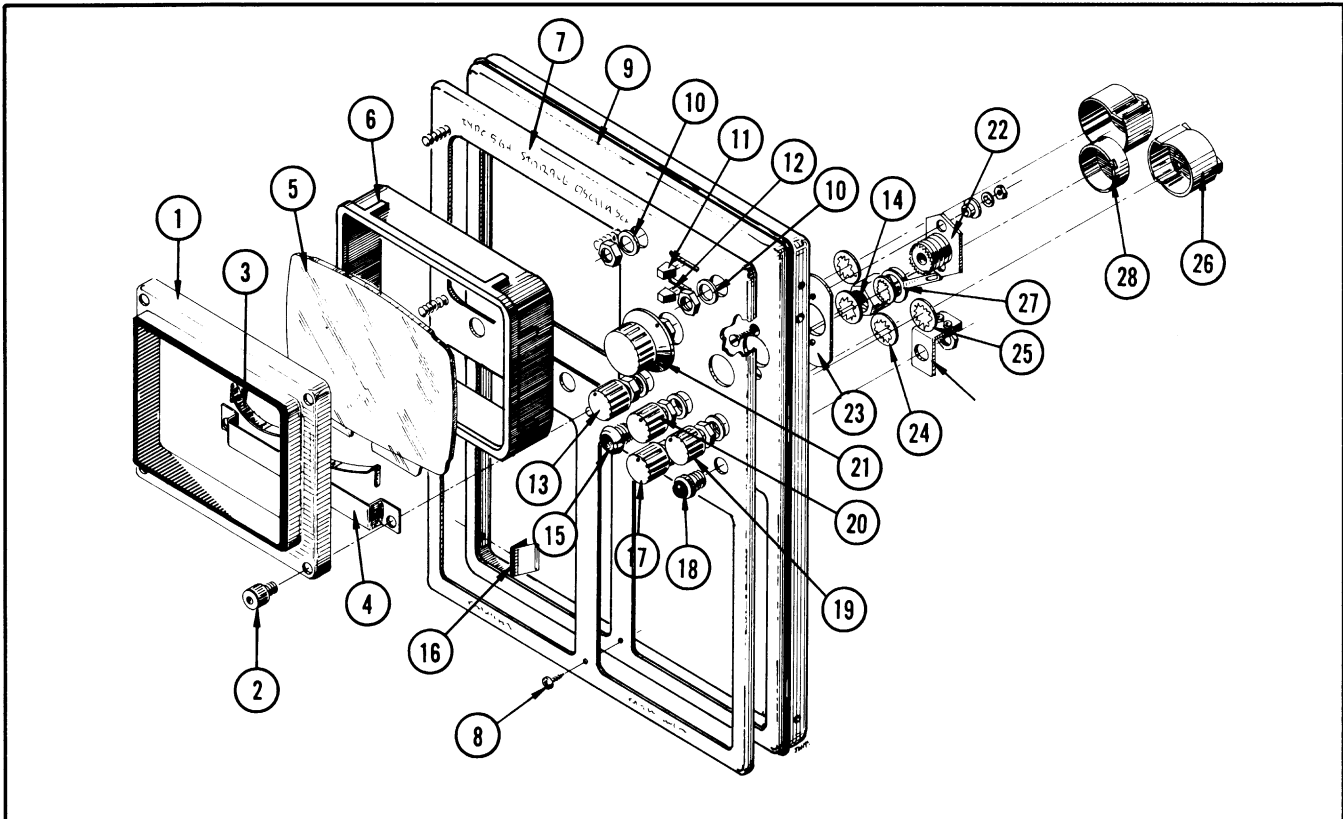
REF. NO.	PART NO	SERIAL NO.*		QTY.	DESCRIPTION
		EFF.	DISC.		
1	Pg. 5-3				Cabinet and Accessories
2	Pg. 5-4				Front Group
3	Pg. 5-7				Main Group
4	Pg. 5-11				Cable Harness and Ceramic Strip Detail
5	Pg. 5-12				Switches

CABINET AND ACCESSORIES



REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
1	387-725			2	PLATE, cabinet side, blue vinyl Each Includes:
2	214-057			2	FASTENER, cabinet latch assembly Consisting of:
	105-007			1	STOP, steel, 7/32 ID x 2 1/32 in. OD
	210-840			1	NUT, latch, nylon
	210-847			1	WASHER, nylon, .164 ID x .500 in. OD
	213-033			1	SCREW, fastening, steel, 1/2 x 1/2 x 8-32 in.
3	387-723			1	PLATE, bottom, blue vinyl Mounting Hardware: (not included)
	210-007			4	LOCKWASHER, steel, external #8
	212-039			9	SCREW, 8-32 x 3/8 in. THS, phillips
4	103-013			1	ADAPTER, power cord, 3 to 2 wire
5	016-039			1	HOOD, viewing, rectangular polarized
6	161-010			1	CORD, power, 16 gauge, 8 ft., 3 wire

FRONT GROUP

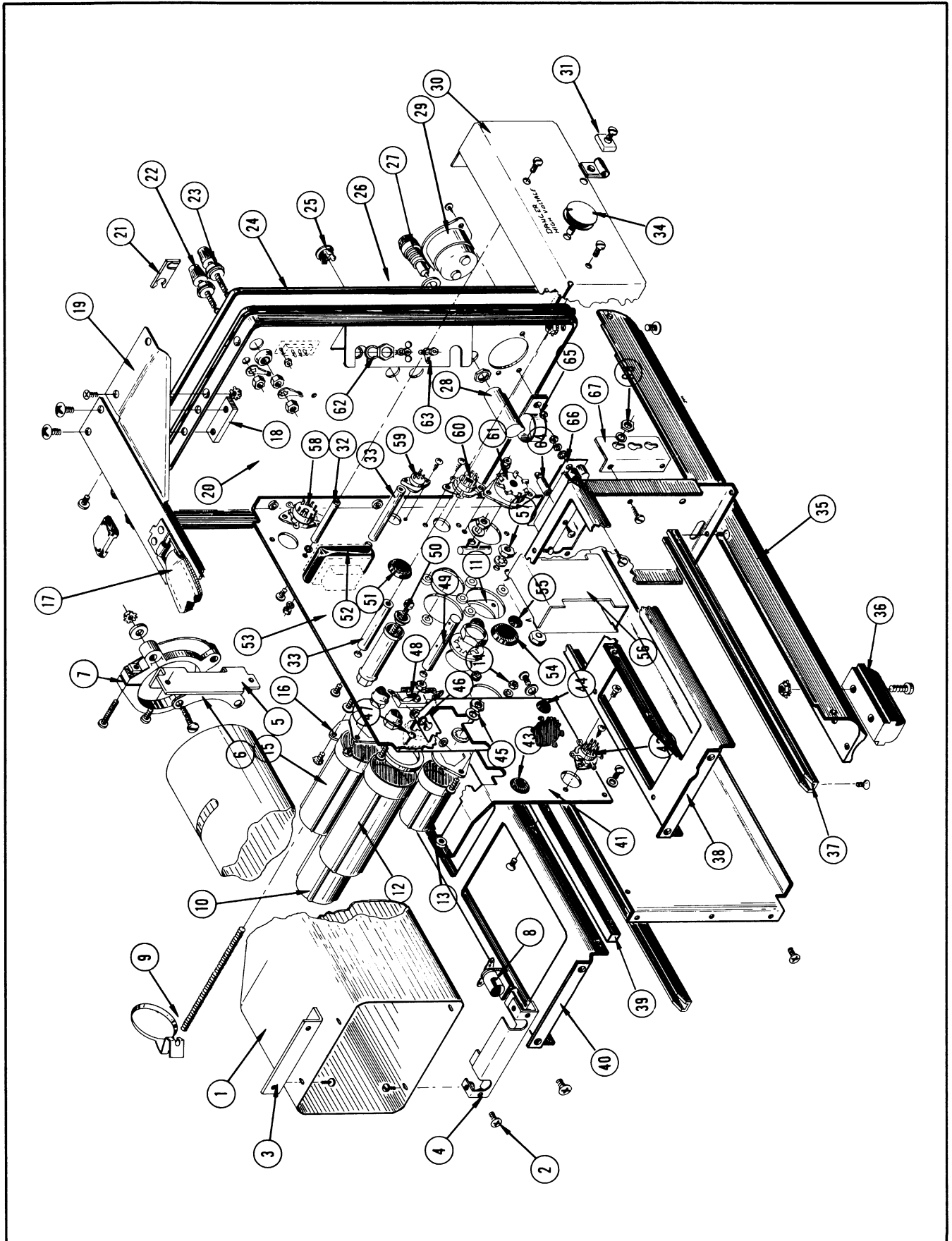


REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
1	200-426			1	COVER, trim and graticule assembly Mounting Hardware: (not included)
2	210-571			1	NUT, graticule cover, $\frac{3}{8}$ in. alum. bar x $\frac{15}{32}$ in.
3	337-540			1	SHIELD, reflector, $4\frac{7}{32}$ x $.290$ x $1\frac{19}{32}$ in.
4	352-049			1	HOLDER, reflector shield, 5.400 in. long x .607 in. wide
5	331-097			1	GRATICULE, plexiglas, $4\frac{1}{16}$ x $4\frac{1}{4}$ in.
6	354-181			1	RING, CRT shockmount, black neoprene, $4\frac{7}{64}$ x $3\frac{13}{16}$ x $1\frac{11}{64}$ in.
7	333-720			1	PANEL, front Mounting Hardware: (not included)
8	213-088			1	SCREW, thread forming #4 x $\frac{1}{4}$ in. PHS, phillips
9	387-724			1	PLATE, subpanel
10	.....			.	Switch Mounting Hardware for each: (not included)
	210-012			1	LOCKWASHER, steel, pot internal $\frac{3}{8}$ x $\frac{1}{2}$ in.
	210-840			1	WASHER, steel, .390 ID x $\frac{9}{16}$ in. OD
	210-413			1	NUT, hex, brass, $\frac{3}{8}$ -32 x $\frac{1}{2}$ in.
11	366-215			1	KNOB, DISPLAY STORE, UPPER, charcoal, lever
12	366-215			1	KNOB, DISPLAY STORE, LOWER, charcoal, lever
13	366-148			1	KNOB, FOCUS, charcoal
	213-004			1	Includes: SCREW, set, 6-32 x $\frac{3}{16}$ in. HSS
14	.....			.	Pot Mounting Hardware:
	210-494			1	NUT, hex, alum. $\frac{3}{8}$ -32 x $\frac{1}{2}$ x $1\frac{1}{16}$ in.
	210-013			1	LOCKWASHER, steel, internal $\frac{3}{8}$ x $1\frac{1}{16}$ in.
15	358-010			1	BUSHING, alum. $\frac{3}{8}$ -32 x $\frac{9}{16}$ in.
16	344-095			2	CLIP, grounding

FRONT GROUP

REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
17	366-148			1	KNOB, SCALE ILLUM. charcoal Includes: SCREW, set, 6-32 x $\frac{3}{16}$ in. HSS
	213-004			1	
18	136-047			1	SOCKET, light, with red jewel
19	366-148			1	KNOB, INTENSITY, charcoal Includes: SCREW, set, 6-32 x $\frac{3}{16}$ in. HSS
	213-004			1	
20	366-148			1	KNOB, ASTIGMATISM, charcoal Includes: SCREW, set, 6-32 x $\frac{3}{16}$ in. HSS
	213-004			1	
21	366-117			1	KNOB, CALIBRATOR, charcoal Includes: SCREW, set, 6-32 x $\frac{3}{16}$ in. HSS
	213-004			1	
22	131-064			1	CONNECTOR, chassis mount, coax Mounting Hardware: (not included)
	210-004			2	LOCKWASHER, steel, internal #4
	210-406			2	NUT, hex, brass, 4-40 x $\frac{3}{16}$ in.
	210-224			1	LUG, solder, #10 non-locking, $\frac{7}{8}$ in long
	210-812			2	WASHER, fiber #10
23	406-244			1	BRACKET, nylon molded, $\frac{3}{4}$ x $1\frac{3}{4}$ in. coax insulation
24	.....			.	Pot Mounting Hardware: (not included)
	210-013			1	LOCKWASHER, steel, internal $\frac{3}{8}$ x $1\frac{1}{16}$ in.
	210-413			1	NUT, hex, brass, $\frac{3}{8}$ -32 x $\frac{1}{2}$ in.
	210-840			1	WASHER, steel, .390 ID x $\frac{9}{16}$ in. OD
25	.....			.	Pot Mounting Hardware for each: (not included)
	210-013			1	LOCKWASHER, steel, internal $\frac{3}{8}$ x $1\frac{1}{16}$ in.
	210-413			1	NUT, hex, brass, $\frac{3}{8}$ -32 x $\frac{1}{2}$ in.
	210-840			1	WASHER, steel, .390 ID x $\frac{9}{16}$ in. OD
26	200-269			1	COVER, pot, polypropylene, 1.115 diameter x $1\frac{5}{16}$ in. high
27	.....			.	Pot Mounting Hardware:
	210-013			1	LOCKWASHER, steel, internal $\frac{3}{8}$ x $1\frac{1}{16}$ in.
	210-207			1	LUG, solder, pot, plain, $\frac{3}{8}$ in.
	210-413			1	NUT, hex, brass, $\frac{3}{8}$ -32 x $\frac{1}{2}$ in.
	210-840			1	WASHER, steel, .390 ID x $\frac{9}{16}$ in. OD
28	200-247			1	CAP, pot, polyethylene, 1 in. diameter x .390 in. high

MAIN GROUP



MAIN GROUP

REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
1	337-551			1	SHIELD, CRT Mounting Hardware: (not included)
2	211-538			4	SCREW, 6-32 x 5/16 in. FHS, 100° CSK, phillips
3	406-877			1	BRACKET, top, CRT Shield Mounting Hardware: (not included)
4	211-510			2	SCREW, 6-32 x 3/8 in. BHS
4	406-875			1	BRACKET, bottom, CRT Shield Mounting Hardware: (not included)
5	211-510			2	SCREW, 6-32 x 3/8 in BHS
5	406-878			1	BRACKET, CRT Mounting Hardware: (not included)
6	211-507			2	SCREW, 6-32 x 5/16 in. BHS
6	214-207			1	NUT, adjusting, securing Mounting Hardware: (not included)
	210-803			2	WASHER, steel, 6L x 3/8 in.
	210-457			2	NUT, keps, steel, 6-32 x 5/16 in.
	211-517			2	SCREW, 6-32 x 1 in. BHS
7	354-147			1	RING, clamping, delrin, 1/2 x 2 1/4 in. ID Clamping Hardware: (not included)
	210-407			1	NUT, hex, brass, 6-32 x 1/4 in.
	211-560			1	SCREW, 6-32 x 1 in. RHS
8	136-152			2	SOCKET, lamp
9	.....			.	Tube Securing Hardware:
	210-008			1	LOCKWASHER, steel, internal #8
	210-409			1	NUT, hex, brass, 8-32 x 5/16 in.
	343-074			1	CLAMP, tube, top hat
	355-070			1	STUD, stainless steel, 8-32 x 4 3/4 in. long
10	200-259			1	COVER, capacitor, polyethylene, 3 9/16 x 1.365 in. dia.
	200-363			1	COVER, capacitor, black plastic, 3 9/16 x 1.365 in. dia.
	386-254			1	PLATE, fiber, large Mounting Hardware: (not included)
11	211-532			2	SCREW, 6-32 x 3/4 in. Fil HS
	432-044			1	BASE, capacitor mounting, large, delrin
12	200-261			1	COVER, capacitor, polyethylene, 4 1/16 x 1.365 in. dia.
	200-364			1	COVER, capacitor, black plastic, 4 1/16 x 1.365 in. dia.
	210-952			1	WASHER, insulating, 1.440 OD x .900 ID
13	200-256			1	COVER, capacitor, polyethylene, 2 1/32 x 1 in. dia.
	200-356			1	COVER, capacitor, black plastic, 2 1/16 x 1 in. dia.
	386-252			1	PLATE, fiber, small Mounting Hardware: (not included)
14	210-006			2	LOCKWASHER, steel, internal #6
	210-407			2	NUT, hex, brass, 6-32 x 1/4 in.
	211-534			2	SCREW, 6-32 x 5/16 in. PHS, with lockwasher
15	200-258			1	COVER, capacitor, polyethylene, 3 1/32 x 1.365 in. dia.
	200-362			1	COVER, capacitor, black plastic, 3 1/16 x 1.365 in. dia.
	386-254			1	PLATE, fiber, large Mounting Hardware: (not included)
	211-534			2	SCREW, 6-32 x 5/16 in. PHS, with lockwasher
16	386-255			1	PLATE, metal large Mounting Hardware: (not included)
	211-534			2	SCREW, 6-32 x 5/16 in. PHS, with lockwasher
17	381-213			1	BAR, alum. ext. top support, with handles, blue vinyl Includes:
	343-073			2	CLAMP, cover, chrome plate for handle Mounting Hardware for each: (not included)
18	381-073			2	BAR, alum. 3/16 x 1/2 x 3/4 in.
	212-039			4	SCREW, 8-32 x 3/8 in. THS, phillips

MAIN GROUP

REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
19	387-726			1	PLATE, gusset, rear subpanel Mounting Hardware: (not included)
	210-457			2	NUT, keps, steel, 6-32 x $\frac{5}{16}$ in.
	211-538			2	SCREW, 6-32 x $\frac{5}{16}$ in. FHS, 100° CSK, phillips
	212-023			2	SCREW, 8-32 x $\frac{3}{8}$ in. BHS
20	387-727			1	PLATE, subpanel, rear
21	386-427			1	PLATE, brass, $\frac{9}{16}$ x 1-9/32 in. ground
22	129-063			1	POST, binding, 5 way, charcoal Mounting Hardware: (not included)
	210-206			1	LUG, solder, SE10 long
	210-445			1	NUT, hex, steel, 10-32 x $\frac{3}{8}$ x $\frac{1}{8}$ in. thick
23	129-063			1	POST, binding, 5 way, charcoal Mounting Hardware: (not included)
	210-010			1	LOCKWASHER, steel, internal #10
	210-206			1	LUG, solder, SE10 long
	210-445			1	NUT, hex, steel, 10-32 x $\frac{3}{8}$ x $\frac{3}{8}$ in. thick
	358-169			1	BUSHING, binding post, charcoal
24	387-729			1	PLATE, rear overlay, blue vinyl Mounting Hardware: (not included)
	213-104			1	SCREW, thread forming #6 x $\frac{3}{8}$ in. truss HS, phillips
25	134-067			4	PLUG, "D", hole, nylon, gray TAG, voltage rating
26	334-661			1	Mounting Hardware: (not included)
	213-088			2	SCREW, thread forming #4 x $\frac{1}{4}$ in. PHS, phillips
27	352-002			1	HOLDER, fuse, 3AG Consists of:
	200-015			1	CAP, fuse, 3AG
	210-873			1	WASHER, rubber, $\frac{1}{2}$ ID x $\frac{11}{16}$ OD x $\frac{3}{64}$ in.
				1	NUT, (included with 352-010)
	352-010			1	HOLDER, fuse, 3AG
28	200-237			1	COVER, insulation, polyethylene, $1\frac{5}{8}$ in. long
29	131-150			1	CONNECTOR, chassis mount, 3 wire motor base Mounting Hardware: (not included)
	213-104			2	SCREW, thread forming #6 x $\frac{3}{8}$ in. truss HS, phillips
30	337-529			1	SHIELD, H.V. alum. $\frac{1}{2}$ x $2\frac{1}{8}$ x $3\frac{5}{16}$ x $6\frac{9}{16}$ in. Mounting Hardware: (not included)
31	210-863			1	WASHER, steel, "D"
	211-507			3	SCREW, 6-32 x $\frac{5}{16}$ in. BHS
	343-001			1	CLAMP, cable, $\frac{1}{8}$ in. plastic
32	385-124			1	ROD, alum. $\frac{1}{4}$ x 2 in. Mounting Hardware: (not included)
	210-006			1	LOCKWASHER, steel, internal #6
	211-507			1	SCREW, 6-32 x $\frac{5}{16}$ in. BHS
33	385-097			2	ROD, nylon, $\frac{5}{16}$ x 2 in. Mounting Hardware for each: (not included)
	210-006			1	LOCKWASHER, steel, internal #6
	211-507			1	SCREW, 6-32 x $\frac{5}{16}$ in. BHS
34	214-210			1	SPOOL, solder assembly (with solder)
35	122-107			2	ANGLE, frame, alum. ext. $18\frac{3}{8}$ in. long Mounting Hardware for each: (not included)
	210-458			4	NUT, keps, steel, 8-32 x $1\frac{1}{32}$ in.
	212-039			4	SCREW, 8-32 x $\frac{3}{8}$ in. THS, phillips
36	348-042			4	FOOT, molded gray, $1\frac{3}{16}$ x $2\frac{17}{32}$ in. Mounting Hardware for each: (not included)
	210-458			2	NUT, keps, steel, 8-32 x $1\frac{1}{32}$ in.
	212-071			2	SCREW, 8-32 x 1 in. Fil HS

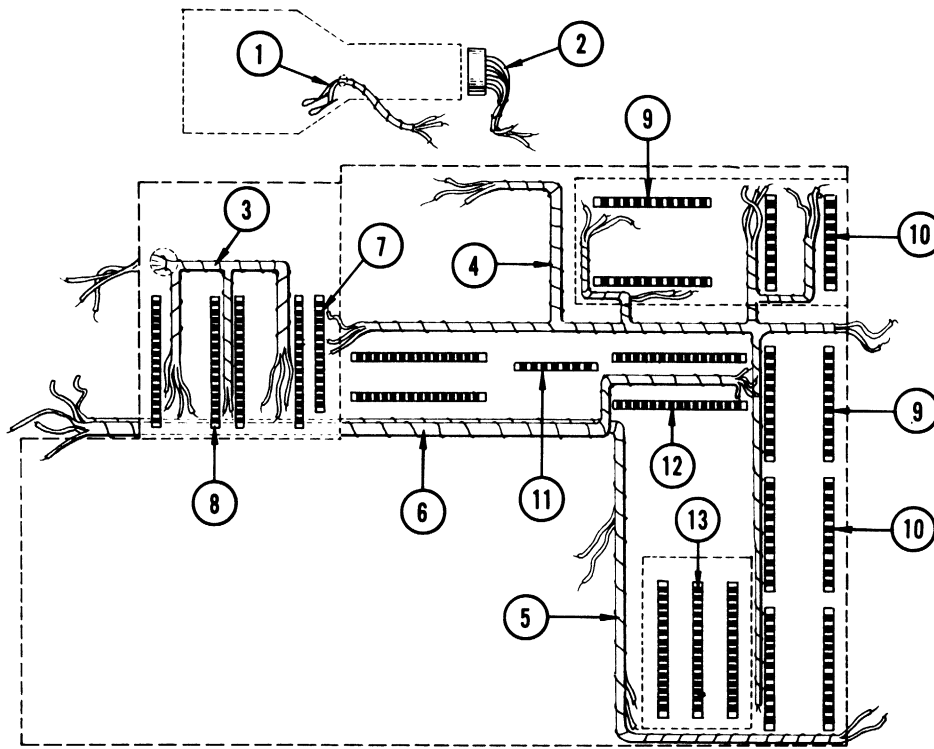
MAIN GROUP

REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
37	351-038			1	GUIDE, rail track, alum. ext. 12-1/32 in. long Mounting Hardware for each: (not included)
	211-541			2	SCREW, 6-32 x 1/4 in. FHS, 100°CSK, phillips
38	406-880			1	BRACKET, plug-in housing, right Mounting Hardware: (not included)
	210-457			3	NUT, keps, steel, 6-32 x 5/16 in.
	210-458			1	NUT, keps, steel, 8-32 x 11/32 in.
	211-538			8	SCREW, 6-32 x 5/16 in. FHS, 100° CSK, phillips
	212-039			1	SCREW, 8-32 x 3/8 in. truss HS, phillips
39	384-611			1	ROD, spacer, 3/8 in. sq. alum. bar, 12-3/32 in. long
40	406-879			1	BRACKET, plug-in housing, left Mounting Hardware: (not included)
	210-458			1	NUT, keps, steel, 8-32 x 11/32 in.
	211-538			2	SCREW, 6-32 x 5/16 in. FHS, 100° CSK, phillips
	211-541			3	SCREW, 6-32 x 1/4 in. FHS, 100°CSK, phillips
	212-039			1	SCREW, 8-32 x 3/8 in. truss HS, phillips
41	441-464			1	CHASSIS, Calibrator Mounting Hardware: (not included)
	210-803			5	WASHER, steel, 6L x 3/8 in.
	211-507			5	SCREW, 6-32 x 5/16 in. BHS
	211-510			1	SCREW, 6-32 x 3/8 BHS
42	136-015			2	SOCKET, STM9G Mounting Hardware for each: (not included)
	213-044			2	SCREW, thread cutting, 5-32 x 3/16 in. Pan head, phillips
43	348-012			1	GROMMET, rubber, 5/8 in.
44	348-004			1	GROMMET, rubber, 3/8 in.
45	.....			.	Pot Mounting Hardware for each: (not included)
	210-013			1	LOCKWASHER, steel, internal 3/8 x 11/16 in.
	210-413			1	NUT, hex, brass, 3/8-32 x 1/2 in.
	210-840			1	WASHER, steel, .390 ID x 9/16 in. OD
46	.....			.	Pot Mounting Hardware for each: (not included)
	210-046			1	LOCKWASHER, steel, internal .400 OD x .261 ID
	210-583			1	NUT, hex, 5/16 in. brass, 1/4-32 in.
	210-940			1	WASHER, steel, 1/4 ID x 3/8 in. OD
47	.....			.	Switch Mounting Hardware: (not included)
	213-044			2	SCREW, thread cutting, 5-32 x 3/16 in. Pan head, phillips
48	352-031			1	HOLDER, fuse, single, 3AG Mounting Hardware: (not included)
	210-006			1	LOCKWASHER, steel, internal #6
	210-407			1	NUT, hex, brass, 6-32 x 1/4 in.
	211-510			1	SCREW, 6-32 x 3/8 in. BHS
49	385-137			1	ROD, delrin, 5/16 x 2-1/4 in. Mounting Hardware: (not included)
	213-041			1	SCREW, thread cutting, 6-32 x 3/8 in truss HS, phillips
50	.....			.	Resistor Mounting Hardware for each: (not included)
	210-808			1	WASHER, brass, centering
	210-462			1	NUT, hex, alum. 8-32 x 1/2 in.
	212-004			1	SCREW, 8-32 x 5/16 in. BHS
	212-037			1	SCREW, 8-32 x 1-3/4 in. Fil HS
51	348-012			1	GROMMET, rubber, 5/8 in.
52	346-001			1	STRAP, mounting, alum. 5/16 x 1/4 in. Mounting Hardware: (not included)
	210-004			2	LOCKWASHER, steel, internal #4
	210-406			2	NUT, hex, brass, 4-40 x 3/16 in.

MAIN GROUP

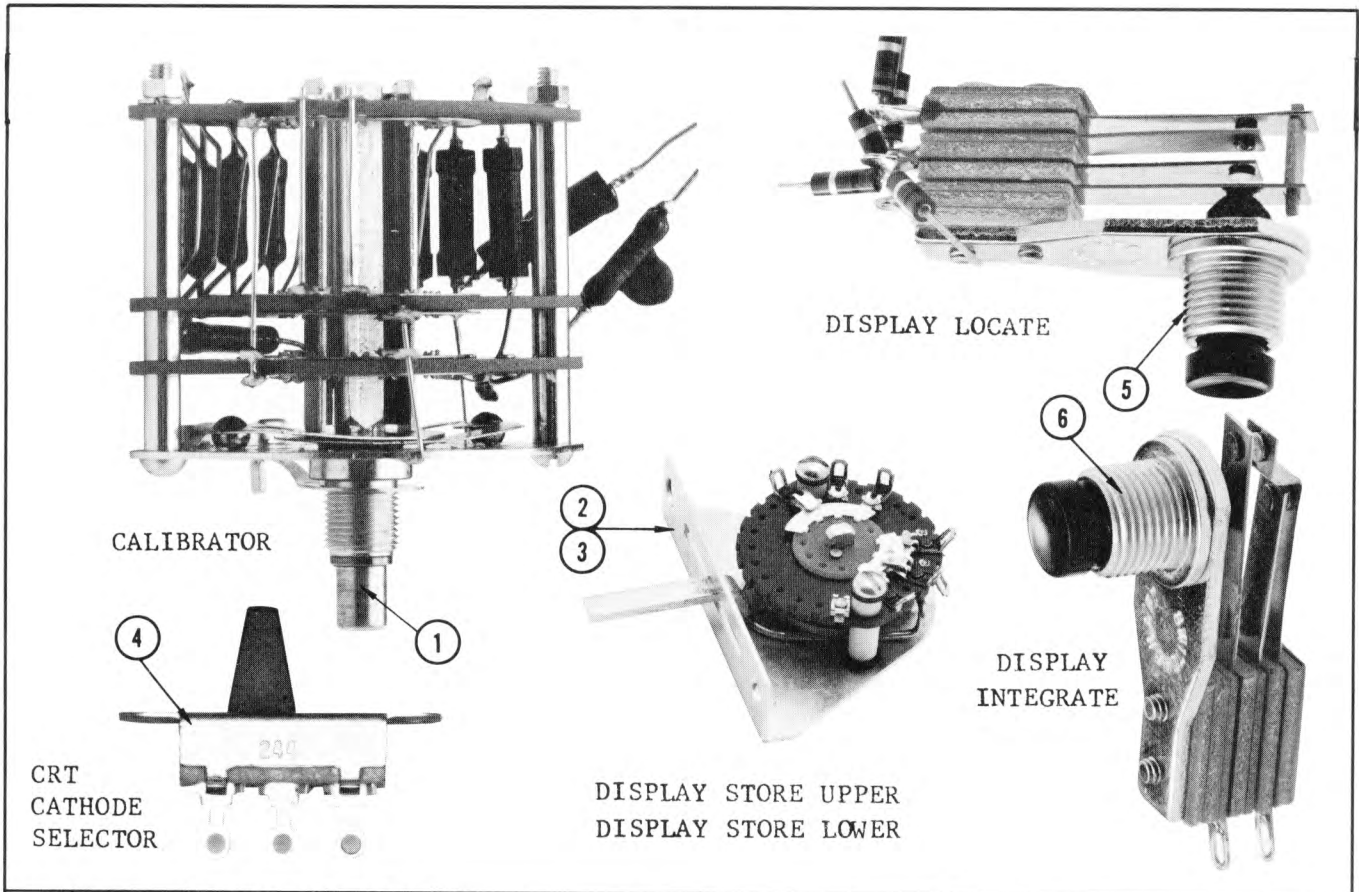
REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
53	441-463			1	CHASSIS, Indicator Mounting Hardware: (not included)
	211-559			3	SCREW, steel, 6-32 x $\frac{3}{8}$ in. FHS, 100° CSK, phillips
	212-023			3	SCREW, 8-32 x $\frac{3}{8}$ in. BHS
	212-040			4	SCREW, 8-32 x $\frac{3}{8}$ in. 100° FHS, phillips
54	348-006			1	GROMMET, rubber, $\frac{3}{4}$ in.
55	348-003			2	GROMMET, rubber, $\frac{5}{16}$ in.
56	406-881			1	BRACKET, transformer, strip mounting
57	.....			.	Transformer Mounting Hardware: (not included)
	210-010			4	LOCKWASHER, steel, internal #10
	210-564			4	NUT, hex, stainless, 10-32 x $\frac{3}{8}$ x $\frac{1}{8}$ in. thick
	210-812			4	WASHER, fiber #10
	212-522			4	SCREW, 10-32 x 2- $\frac{1}{2}$ in. hex, HS
58	136-015			4	SOCKET, STM9G Mounting Hardware for each: (not included)
	213-044			2	SCREW, thread cutting, 5-32 x $\frac{3}{16}$ in. Pan H steel, phillips
59	136-095			3	SOCKET, 4 pin transistor Mounting Hardware for each: (not included)
	213-113			2	SCREW thread forming 2-32 x $\frac{5}{16}$ in. RHS, phillips
60	136-008			3	SOCKET, STM7G Mounting Hardware for each: (not included)
	213-044				SCREW, thread cutting 5-32 x $\frac{3}{16}$ in. Pan H steel, phillips
61	136-013			1	SOCKET, STM8 Mounting Hardware: (not included)
	210-006			2	LOCKWASHER, steel, internal #6
	210-407			2	NUT, hex, brass, 6-32 x $\frac{1}{4}$ in.
	211-538			2	SCREW, 6-32 x $\frac{5}{16}$ in. FHS, 100° CSK, phillips
62	.....			.	Pot Mounting Hardware: (not included)
	210-012			1	LOCKWASHER, steel, pot internal $\frac{3}{8}$ x $\frac{1}{2}$ in.
	210-413			1	NUT, hex, brass, $\frac{3}{8}$ -32 x $\frac{1}{2}$ in.
	210-840			1	WASHER, steel, .390 ID x $\frac{9}{16}$ in. OD
63	.....			.	Transistor Mounting Hardware: (not included)
	210-006			1	LOCKWASHER, steel, internal #6
	210-202			1	LUG, solder, SE6 with 2 wire holes
	210-407			1	NUT, hex brass, 6-32 x $\frac{1}{4}$ in.
	211-510			2	SCREW, 6-32 x 1 in. BHS
64	352-015			2	HOLDER, nylon, $\frac{3}{16}$ x $\frac{3}{4}$ in. long Mounting Hardware for each: (not included)
	213-045			1	SCREW, self tapping, 4-40 x $\frac{5}{16}$ in. Pan Head, phillips
65	343-008			1	CLAMP, cable, $\frac{3}{4}$ in. plastic Mounting Hardware: (not included)
	210-006			1	LOCKWASHER, steel, internal #6
	210-407			1	NUT, hex, brass, 6-32 x $\frac{1}{4}$ in.
	210-863			1	WASHER, steel, "D"
66	131-148			2	CONNECTOR, chassis mount, 24 contact, female Mounting Hardware for each: (not included)
	166-029			2	TUBE, spacer, alum. .180 ID x $\frac{1}{4}$ OD x $\frac{1}{8}$ in. long
	210-004			2	LOCKWASHER, steel, internal #4
	210-406			2	NUT, hex, brass, 4-40 x $\frac{3}{16}$ in.
	211-014			2	SCREW, 4-40 x $\frac{1}{2}$ in. BHS
67	406-893			1	BRACKET, pot mounting Mounting Hardware: (not included)
	211-507			2	SCREW, 6-32 x $\frac{5}{16}$ in. BHS
68	.....			.	Pot Mounting Hardware: (not included)
	210-583			1	NUT, hex, $\frac{5}{16}$ in. brass, $\frac{1}{4}$ -32 in.
	210-940			1	WASHER, steel, $\frac{1}{4}$ ID x $\frac{3}{8}$ in. OD

CABLE HARNESS AND CERAMIC STRIP DETAIL



REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
1	179-105			1	CABLE harness, 5 pin connector
2	179-704			1	CABLE harness, CRT Includes: SOCKET, CRT Consisting of: SCREW, thread cutting, 2-32 x 7/16 in. PHS
	136-147			1	PLATE, back socket, .125 in. thick x 2.185 in. OD
	213-086			2	CABLE harness, Cal.
3	179-692			1	CABLE harness, Power
4	179-689			1	CABLE harness, 110V
5	179-690			1	CABLE harness, F & I
6	179-691			1	STRIP, ceramic, 16 notches, 2-7/16 x 7/16 in. Mounting Hardware: (not included)
7	124-155			1	SPACER, 1/4 in. dia x 1 1/32 in. long
	361-039			2	STRIP, ceramic, 20 notches, 3 in. long x 7/16 in. Mounting Hardware: (not included)
8	124-154			1	SPACER, 1/4 dia. x 1 1/32 in. long
	361-039			2	STRIP, ceramic, 11 notches x 3/4 in. Mounting Hardware for each: (not included)
9	124-091			4	SPACER, nylon molded
	361-009			2	STRIP, ceramic, 9 notches x 3/4 in. Mounting Hardware for each: (not included)
10	124-090			6	SPACER, nylon molded
	361-009			2	STRIP, ceramic, 7 notches, 1-5/32 x 7/16 in. Mounting Hardware for each: (not included)
11	124-158			1	SPACER, 1/4 dia. x 1 1/32 in. long
	361-039			2	STRIP, ceramic 20 notches 3 in. long x 7/16 in. Mounting Hardware for each: (not included)
12	124-154			4	SPACER, 1/4 dia. x 1 1/32 in. long
	361-039			2	STRIP, ceramic 20 notches 3 in. long x 7/16 in. Mounting Hardware for each: (not included)
13	124-145			3	SPACER, 1/4 dia. x 1 1/32 in. long
	361-009			2	STRIP, ceramic 20 notches 3 in. long x 7/16 in. Mounting Hardware for each: (not included)
				2	SPACER, nylon molded

SWITCHES



REF. NO.	PART NO.	SERIAL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
1	262-497			1	SWITCH, CALIBRATOR, wired
	260-253			1	SWITCH, CALIBRATOR, unwired
	210-012			1	Mounting Hardware: (not included)
	210-413			1	LOCKWASHER, steel, pot, internal, 3/8 x 1/2 in.
	210-840			1	NUT, hex, brass, 3/8-32 x 1/2 in.
2	260-510			1	WASHER, steel, .390 ID x 9/16 in. OD
	260-510			1	SWITCH, DISPLAY STORE, UPPER, unwired
	210-004			2	Mounting Hardware: (not included)
3	210-406			2	LOCKWASHER, steel, internal #4
	210-004			2	NUT, hex, brass, 4-40 x 3/16 in.
	210-406			2	SWITCH, DISPLAY STORE, LOWER unwired
4	260-449			1	Mounting Hardware: (not included)
	210-004			2	LOCKWASHER, steel, internal #4
	210-406			2	NUT, hex, brass 4-40 x 3/16 in.
5	260-508			1	SWITCH, CRT CATHODE SLECTOR, unwired
	210-012			1	Mounting Hardware: (not included)
	210-413			1	LOCKWASHER, steel, pot, internal, 3/8 x 1/2 in.
	210-408			1	NUT, hex, brass, 3/8-32 x 1/2 in.
6	260-507			1	WASHER, steel, .390 ID x 9/16 in. OD
	210-012			1	SWITCH, DISPLAY INTEGRATE, unwired
	210-413			1	Mounting Hardware: (not included)
	210-840			1	LOCKWASHER, steel, pot, internal, 3/8 x 1/2 in.
				1	NUT, hex, brass, 3/8-32 x 1/2 in.
				1	WASHER, steel, .390 ID x 9/16 in. OD

ELECTRICAL PARTS LIST

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Description	S/N Range
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BULBS

B601	150-001	Incandescent, G.E. #47	Graticule Light
B602	150-001	Incandescent, G.E. #47	Graticule Light
B603	150-018	Incandescent, G.E. #12	Pilot Light
B856	150-025	Neon, NE-2E	
B857	150-025	Neon, NE-2E	
B903	150-028	Neon, RT 2-32-1A	

CAPACITORS

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

Tolerance of all electrolytic capacitors are as follows (with exceptions):

3 V — 50 V = -10% , $+250\%$ 51 V — 350 V = -10% , $+100\%$ 351 V — 450 V = -10% , $+ 50\%$

C611	285-510	.01 μf	MT	400 v
C616	285-510	.01 μf	MT	400 v
C640A,B	*290-060	160 $\mu f \times 10 \mu f$	EMC	350 v
C642A,B	*290-061	160 $\mu f \times 10 \mu f$	EMC	350 v
C644	*290-133	2 x 125 μf	EMC	350 v
C646	*290-040	2 x 40 μf	EMC	250 v
C650	285-510	.01 μf	MT	400 v
C667	290-002	8 μf	EMT	450 v
C670	285-510	.01 μf	MT	400 v
C720	290-166	2 x 2000 μf	EMC	25 v
C732	Use 290-201	100 μf	EMT	15 v
C737	283-026	.2 μf	Disc Type	25 v
C757	290-015	100 μf	EMT	25 v
C760	281-027	.7-3 pf	Tub.	Var.
C761	281-027	.7-3 pf	Tub.	Var.
C762	283-003	.01 μf	Disc Type	150 v
C801	283-006	.02 μf	Disc Type	600 v
C803	283-000	.001 μf	Disc Type	500 v
C807	285-502	.001 μf	MT	1000 v
C822	283-071	.0068 μf	Disc Type	5000 v
C830	283-036	.0025 μf	Disc Type	6000 v
C832	283-036	.0025 μf	Disc Type	6000 v
C837	283-036	.0025 μf	Disc Type	6000 v
C841	285-519	.047 μf	MT	400 v
C842	283-071	.0068 μf	Disc Type	5000 v

CAPACITORS (Cont'd)

Ckt. No.	Tektronix Part No.		Description	S/N Range
C849	285-501	.001 μ f	PTM	600 v
C853	283-036	.0025 μ f	Disc Type	6000 v
C876	290-025	6.25 μ f	EMT	300 v
C878	281-523	100 pf	Cer.	350 v
C884	281-524	150 pf	Cer.	500 v
C897	283-000	.001 μ f	Disc Type	500 v
C904	290-025	6.25 μ f	EMT	500 v
C913	283-002	.01 μ f	Disc Type	500 v
C916	285-527	.1 μ f	MPT	600 v
C918	285-527	.1 μ f	MPT	600 v
C935	290-164	1 μ f	EMT	150 v

DIODES

D640A,B,C,D,	152-066	Silicon	1N3194	
D642A,B,C,D	152-066	Silicon	1N3194	
D644A,B,C,D,	152-066	Silicon	1N3194	
D646	152-066	Silicon	1N3194	
D720	152-035	Silicon	1N1563A	
D721	152-035	Silicon	1N1563A	
D762	152-008	Germanium	T12G	
D763	152-061	Silicon	6061	
D838	152-066	Silicon	1N3194	
D839	152-066	Silicon	1N3194	
D849	152-066	Silicon	1N3194	
D908	152-066	Silicon	1N3194	
D911	152-066	Silicon	1N3194	
D916	152-066	Silicon	1N3194	
D918	152-066	Silicon	1N3194	
D920	152-066	Silicon	1N3194	
D926	152-066	Silicon	1N3194	
D935	152-066	Silicon	1N3194	
D937	152-094	Zener	50 v $\frac{3}{4}$ w 10%	

FUSES

F601	159-005	3 Amp	3AG Slo-Blo	117 v oper. 50 & 60 cycle
F601	159-034	1.6 Amp	3AG Slo-Blo	234 v oper. 50 & 60 cycle
F720	159-023	2 Amp.	3AG Slo-Blo	

INDUCTORS

L860	Use *108-285	Beam Rotator
L948	*108-054	6.4 μ h

RESISTORS

Ckt. No.	Tektronix Part No.	Description		S/N Range
Resistors are fixed, composition, $\pm 10\%$ unless otherwise indicated.				
R601†	311-340	50 Ω		
R602	308-142	30 Ω	3 w	
R609	302-106	10 meg	$\frac{1}{2}$ w	
R610	302-104	100 k	$\frac{1}{2}$ w	
R611	302-102	1 k	$\frac{1}{2}$ w	
R612	302-272	2.7 k	$\frac{1}{2}$ w	
R616	311-015	10 k		
R617	308-186	80 k	$\frac{1}{2}$ w	
R618	308-226	10 k	$\frac{1}{2}$ w	
R619	302-224	220 k	$\frac{1}{2}$ w	
R624	302-473	47 k	$\frac{1}{2}$ w	
R625	302-222	2.2 k	$\frac{1}{2}$ w	
R626	302-184	180 k	$\frac{1}{2}$ w	
R627	302-102	1 k	$\frac{1}{2}$ w	
R628	308-176	4 k	20 w	
R632	302-102	1 k	$\frac{1}{2}$ w	
R633	302-473	47 k	$\frac{1}{2}$ w	
R635	301-302	3 k	$\frac{1}{2}$ w	
R640	304-100	10 Ω	1 w	
R642	304-100	10 Ω	1 w	
R644	304-100	10 Ω	1 w	
R646	304-101	100 Ω	1 w	
R650	309-101	330 k	$\frac{1}{2}$ w	
R651	309-162	250 k	$\frac{1}{2}$ w	
R652	302-102	1 k	$\frac{1}{2}$ w	
R653	302-225	2.2 meg	$\frac{1}{2}$ w	
R654	302-474	470 k	$\frac{1}{2}$ w	
R655	302-685	6.8 meg	$\frac{1}{2}$ w	
R656	311-068	500 k	.2 w	
R657	302-684	680 k	$\frac{1}{2}$ w	
R658	302-273	27 k	$\frac{1}{2}$ w	
R659	302-333	33 k	$\frac{1}{2}$ w	
R663	302-102	1 k	$\frac{1}{2}$ w	
R664	302-102	1 k	$\frac{1}{2}$ w	
R666	308-176	4 k	20 w	
R667	308-176	4 k	20 w	
R670	309-156	1.024 meg	$\frac{1}{2}$ w	
R671	309-053	333 k	$\frac{1}{2}$ w	
R672	302-102	1 k	$\frac{1}{2}$ w	
R673	302-105	1 meg	$\frac{1}{2}$ w	
R675	302-825	8.2 meg	$\frac{1}{2}$ w	
R676	311-068	500 k	.2 w	

†Ganged with SW601. Furnished as a unit.

Parts List—Type 564

Resistors (Cont'd)

Ckt. No.	Tektronix Part No.		Description		S/N Range
R677	304-224	220 k	1 w		
R678	302-394	390 k	1/2 w		
R679	302-333	33 k	1/2 w		
R729	302-823	82 k	1/2 w		
R730	311-068	500 k	.2 w	Var.	—12.2 VOLTS
R731	309-104	2.05 k	1/2 w		Prec. 1%
R732	310-115	15 k	1 w		1%
R733	301-394	390 k	1/2 w		5%
R734	302-334	330 k	1/2 w		
R735	302-272	2.7 k	1/2 w		
R737	302-151	150 Ω	1/2 w		
R744	308-231	220 Ω	3 w	WW	5%
R754	302-471	470 Ω	1/2 w		
R759	302-104	100 k	1/2 w		
R762	316-473	47 k	1/4 w		
R763	316-105	1 meg	1/4 w		
R764	316-105	1 meg	1/4 w		
R781	316-470	47 Ω	1/4 w		
R782	316-470	47 Ω	1/4 w		
R783	316-470	47 Ω	1/4 w		
R784	316-470	47 Ω	1/4 w		
R801	306-681	680 Ω	2 w		
R802	302-562	5.6 k	1/2 w		
R803	306-273	27 k	2 w		
R806	302-104	100 k	1/2 w		
R807	302-472	4.7 k	1/2 w		
R813	302-101	100 Ω	1/2 w		
R815	302-474	470 k	1/2 w		
R816	302-102	1 k	1/2 w		
R831	302-104	100 k	1/2 w		
R832	302-106	10 meg	1/2 w		
R833	311-043	2 meg		Var.	INTENSITY
R834	302-105	1 meg	1/2 w		
R835	Use *050-115	Replacement Kit			101-581
	(3) 306-565	5.6 meg	2 w		
R835†	(2) 306-685	6.8 meg	2 w		582-up
R836	302-223	22 k	1/2 w		
R837	302-471	470 Ω	1/2 w		
R838	301-242	2.4 k	1/2 w		5%
R839	302-104	100 k	1/2 w		
R840	301-125	1.2 meg	1/2 w		5%
R841	311-042	2 meg		Var.	HIGH VOLTAGE
R842	Use *050-118	Replacement Kit			101-581
R842††	(2) 306-275	2.7 meg	2 w		
	(2) 306-335	3.3 meg	2 w		582-up
R844	311-121	5 meg		Var.	FOCUS
R846	302-225	2.2 meg	1/2 w		
R847	302-103	10 k	1/2 w		

† S/N 582-up *050-115 may be used
 †† S/N 582-up *050-118 may be used

Resistors (Cont'd)

Ckt. No.	Tektronix Part No.		Description		S/N Range
R848	302-334	330 k	1/2 w		
R849	316-336	33 meg	1/4 w		
R850	302-223	22 k	1/2 w		
R851	302-104	100 k	1/2 w		
R852	302-273	27 k	1/2 w		
R853	302-471	470 Ω	1/2 w		
R854	302-105	1 meg	1/2 w		
R860	311-317	2 x 1 k		Var.	TRACE ALIGNMENT
R861	302-680	68 Ω	1/2 w		
R864	311-206	250 k		Var.	ASTIGMATISM
R865	316-472	4.7 k	1/4 w		
R867	316-472	4.7 k	1/4 w		
R868	316-472	4.7 k	1/4 w		
R869	302-564	560 k	1/2 w		
R870	301-393	39 k	1/2 w		5%
R871	311-159	20 k		Var.	CAL. AMPL.
R872	301-154	150 k	1/2 w		5%
R873	302-103	10 k	1/2 w		
R876	301-153	15 k	1/2 w		5%
R877	301-183	18 k	1/2 w		5%
R878	301-564	560 k	1/2 w		5%
R879	Use 301-114	110 k	1/2 w		5%
R883	305-223	22 k	2 w		5%
R885	309-121	9.5 k	1/2 w	Prec.	1%
R886	309-119	6.375 k	1/2 w	Prec.	1%
R887	309-117	2.1 k	1/2 w	Prec.	1%
R888	309-116	1.025 k	1/2 w	Prec.	1%
R889	309-113	610 Ω	1/2 w	Prec.	1%
R890	309-073	200 Ω	1/2 w	Prec.	1%
R891	309-112	100 Ω	1/2 w	Prec.	1%
R892	309-067	60 Ω	1/2 w	Prec.	1%
R893	309-066	40 Ω	1/2 w	Prec.	1%
R896	309-045	100 k	1/2 w	Prec.	1%
R897	309-112	100 Ω	1/2 w	Prec.	1%
R898	309-112	100 Ω	1/2 w	Prec.	1%
R899	*308-090	.25 Ω	1 w	WW	
R903	302-333	33 k	1/2 w		
R904	311-026	100 k		Var.	STORAGE LEVEL
R906	311-374	250 k		Var.	NON-STORAGE LEVEL
R908	302-224	220 k	1/2 w		
R909	302-684	680 k	1/2 w		
R911	302-224	220 k	1/2 w		
R912	302-684	680 k	1/2 w		
R913	316-472	4.7 k	1/4 w		
R914	316-472	4.7 k	1/4 w		

Parts List—Type 564

Resistors (Cont'd)

Ckt. No.	Tektronix Part No.		Description		S/N Range
R915	316-472	4.7 k	1/4 w		
R916	316-103	10 k	1/4 w		
R917	316-472	4.7 k	1/4 w		
R918	316-103	10 k	1/4 w		
R920	302-104	100 k	1/2 w		
R924	302-224	220 k	1/2 w		
R926	302-104	100 k	1/2 w		
R928	302-224	220 k	1/2 w		
R930	Use 311-374	250 k	3/4 w	Var.	COVERAGE 1
R931	Use 302-683	68 k	1/2 w		
R932	302-333	33 k	1/2 w		
R933	316-472	4.7 k	1/4 w		
R934	316-472	4.7 k	1/4 w		
R935	302-154	150 k	1/2 w		
R936	316-472	4.7 k	1/4 w		
R937	302-103	10 k	1/2 w		
R938	311-023	50 k		Var.	COVERAGE 2
R940	311-018	20 k		Var.	GEOMETRY
R941	302-822	8.2 k	1/2 w		
R944	311-068	500 k	.2 w	Var.	FLOOD-GUN BIAS B
R946	311-068	500 k	.2 w	Var.	FLOOD-GUN BIAS A
R948	315-103	10 k	1/4 w		5%

SWITCHES

	Unwired	Wired		
SW601†	311-340			PWR. OFF
SW854	260-449		Slide	CRT CATHODE SELECTOR
SW868	260-508		Push-Button	LOCATE (Trace)
SW870	260-253	*262-497	Rotary	CALIBRATOR
SW910	260-510		Lever	UPPER (Display)
SW911	260-510		Lever	LOWER (Display)
SW948	260-507		Push-Button	INTEGRATE

THERMAL CUTOUTS

TK601	260-157	Thermal Cutout	160°F ±5°
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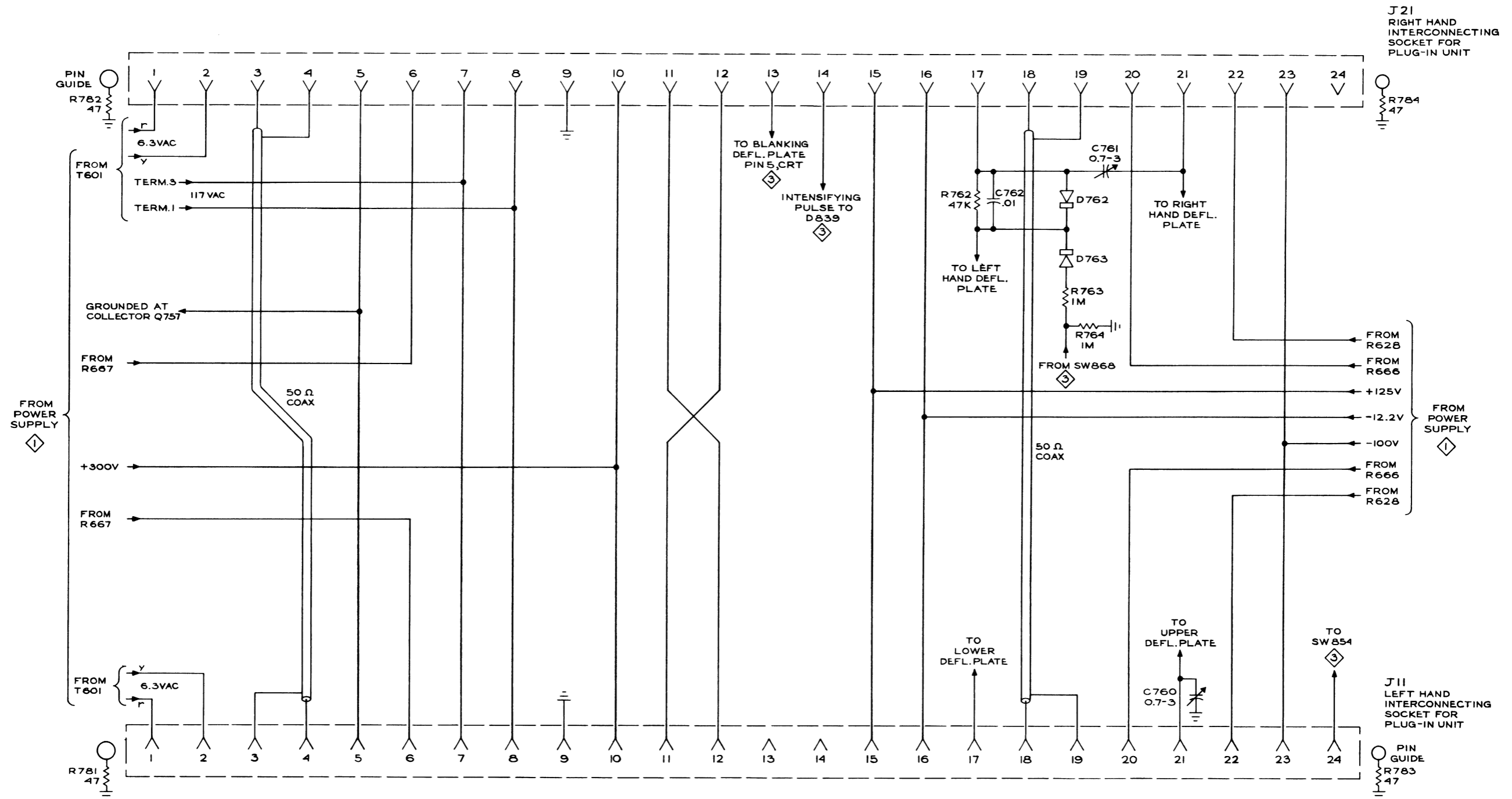
TRANSFORMERS

T601	*120-296	Low Voltage
T801	*120-275	High Voltage

†Ganged with R601. Furnished as a unit.

Ckt. No.	Tektronix Part No.	Description	S/N Range
TRANSISTORS			
Q624	151-087	J3138	
Q734	151-040	2N1302	
Q744	151-042	2N1378	
Q757	151-060	2N1545	
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	
V800	154-167	6CZ5	
V814	154-046	12BH7A	
V822	154-051	5642	
V832	154-051	5642	
V859	*154-410	T5640-200 CRT	
V884	154-278	6BL8	
V913	154-041	12AU7	

+

**IMPORTANT:**

ALL CIRCUIT VOLTAGES WERE OBTAINED WITH A 20,000 Ω /V VOM. ALL READINGS ARE IN VOLTS.

VOLTAGE AMPLITUDE MEASUREMENTS, AS SHOWN, ARE NOT ABSOLUTE. THEY MAY VARY BETWEEN INSTRUMENTS AS WELL AS WITHIN THE INSTRUMENT ITSELF DUE TO NORMAL MANUFACTURING TOLERANCES, AND TRANSISTOR AND VACUUM TUBE CHARACTERISTICS.

REFERENCE DRAWINGS

- ① POWER SUPPLY
- ③ CRT CIRCUIT

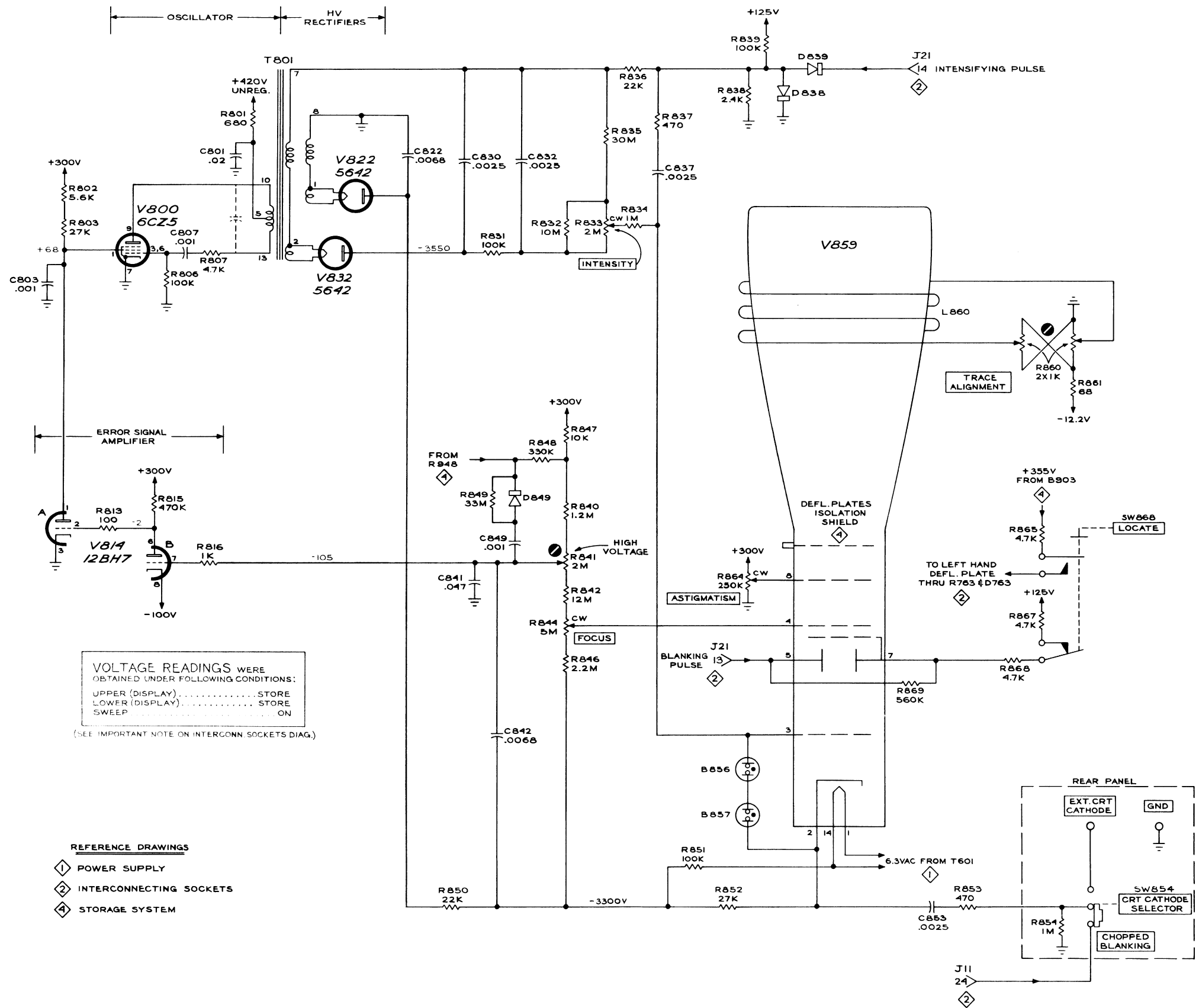
CMD
563

TYPE 564 STORAGE OSCILLOSCOPE

A₁

INTERCONNECTING SOCKETS

+



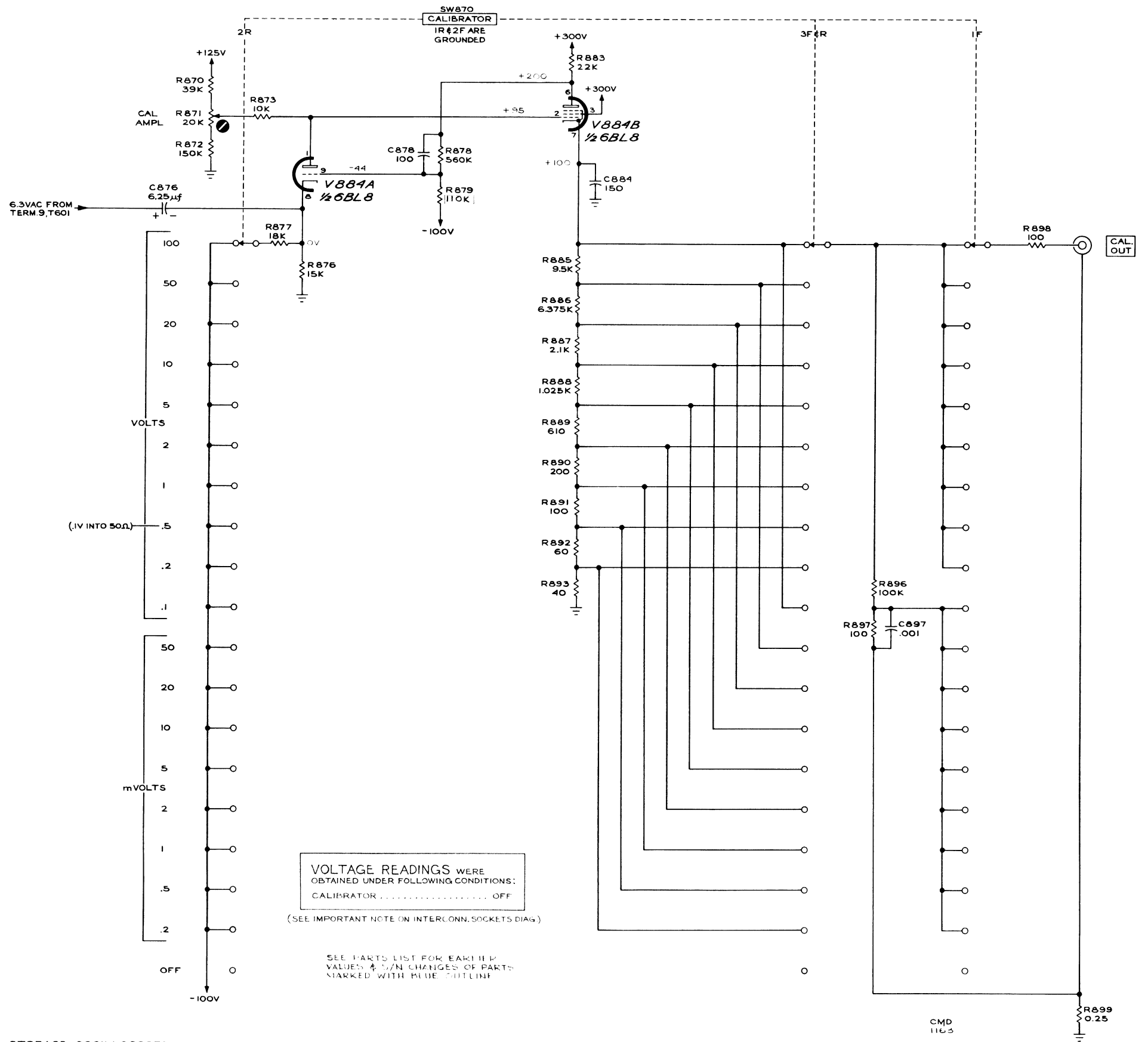
VOLTAGE READINGS WERE OBTAINED UNDER FOLLOWING CONDITIONS:
 UPPER (DISPLAY) STORE
 LOWER (DISPLAY) STORE
 SWEEP ON

(SEE IMPORTANT NOTE ON INTERCONN SOCKETS DIAG.)

- REFERENCE DRAWINGS
- ① POWER SUPPLY
 - ② INTERCONNECTING SOCKETS
 - ④ STORAGE SYSTEM

TYPE 564 STORAGE OSCILLOSCOPE

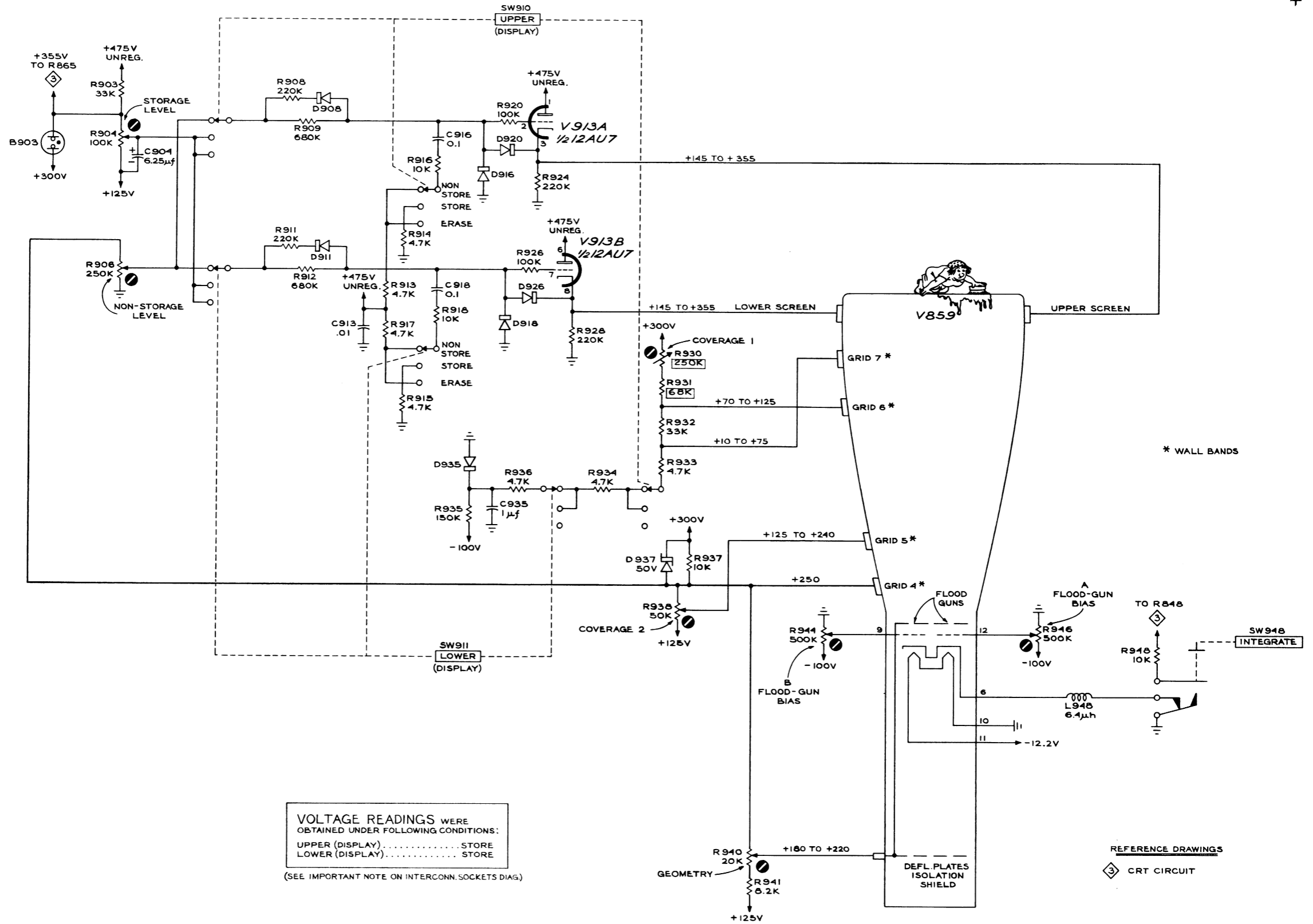
CMD 563
 CRT CIRCUIT
 CIRCUIT NUMBERS 800 THRU 869



TYPE 564 STORAGE OSCILLOSCOPE

B

CMD 1123
CALIBRATOR
 CIRCUIT NUMBERS
 870 THRU 899



VOLTAGE READINGS WERE OBTAINED UNDER FOLLOWING CONDITIONS:
 UPPER (DISPLAY)..... STORE
 LOWER (DISPLAY)..... STORE
 (SEE IMPORTANT NOTE ON INTERCONN. SOCKETS DIAG.)

TYPE 564 STORAGE OSCILLOSCOPE

B

SEE PARTS LIST FOR EARLIER VALUES AND S/N CHANGES OF PARTS MARKED WITH BLUE OUTLINE

CMD 863
 STORAGE SYSTEM
 CIRCUIT NUMBERS 900 THRU 959

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 564 - TENT. S/N 2360

PARTS LIST CORRECTIONS

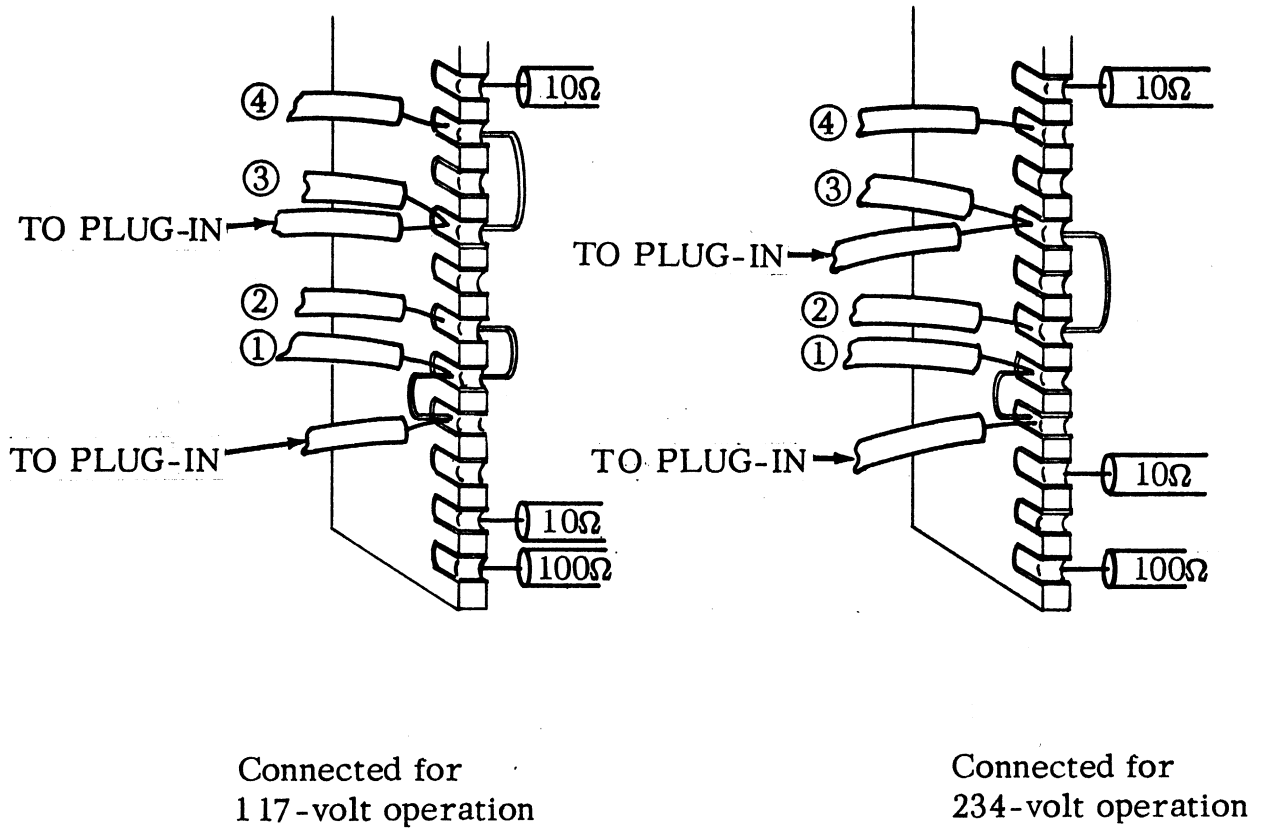
CHANGE TO:

SW948	260-602	Push Button	INTEGRATE
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TYPE 564

CORRECTIONS

PAGE 2-2, Fig. 2-1. Correct terminal strip wiring to agree with the following figure.



TYPE 564

TEXT CORRECTION WRITING RATE INCREASE CONTROL

Operation

At medium and high sweep rates, single-sweep displays are usually too dim to obtain a stored display. Use the following procedure to obtain a readable stored display:

1. Place both DISPLAY switches in NON STORE and set the INTENSITY control for a normally visible trace.
2. Adjust the time-base plug-in controls for single-sweep operation. Move both DISPLAY switches to ERASE; then release.
3. Allow a sweep to occur and notice whether it stores. If it stores, increase the sweep rate of the time-base plug-in until a sweep will not store. Move the DISPLAY switches to ERASE before allowing each sweep to occur.
4. Now pull the WRITING RATE INCREASE control out and turn the knob until the index mark points at about the 12 o'clock position. Then allow a sweep to occur; a normally defined stored display should now appear.

This method should not be used with normal repetitive triggered operation.

Calibration

Pulse Ampl Adjustment. Set the Time-Base Plug-In to 1 msec/cm and adjust the triggering controls for free-running single-sweep operation. A non-sampling type plug-in must be used for this adjustment.

Set the following oscilloscope controls:

PULSE AMPL(R984)	fully counterclockwise
DISPLAY UPPER and LOWER	STORE
WRITING RATE INCREASE	pulled out and turned fully clockwise

Now alternately allow one sweep to occur, advance the PULSE AMPL control a small amount clockwise, then push the DISPLAY UPPER and

LOWER switches to ERASE and release. Repeat the above procedure until one sweep will cause the background of the storage screens to just start glowing.

To check the amount that the WRITING RATE INCREASE control will vary the pulse width, connect a probe from the test oscilloscope to the center arm of the PULSE AMPL control. With the WRITING RATE INCREASE control still fully clockwise, the pulse width of the negative going pulse should be approximately 9 msec in width. Now turn the WRITING RATE INCREASE control to its fully counterclockwise position, the negative going pulse width should now be approximately 1 msec in width.

Correction

Replace the paragraph (in section 3, page 3-3) titled "Integrate Pushbutton" with the following:

Two things happen when the INTEGRATE button is pushed. First, the flood gun cathodes which are normally grounded through D948, are ungrounded, and second, R848 in the CRT high-voltage circuit is grounded. This causes the flood guns to cut off and also adjusts the voltages in the crt circuit to maintain proper deflection sensitivity since the flood guns are cutoff.

Also note that if the WRITING RATE INCREASE switch is on, and the INTEGRATE button is released a pulse is generated which causes a Writing Rate Increase after Integrating.

TYPE 564 - TENT. S/N 2000

PARTS LIST CORRECTION

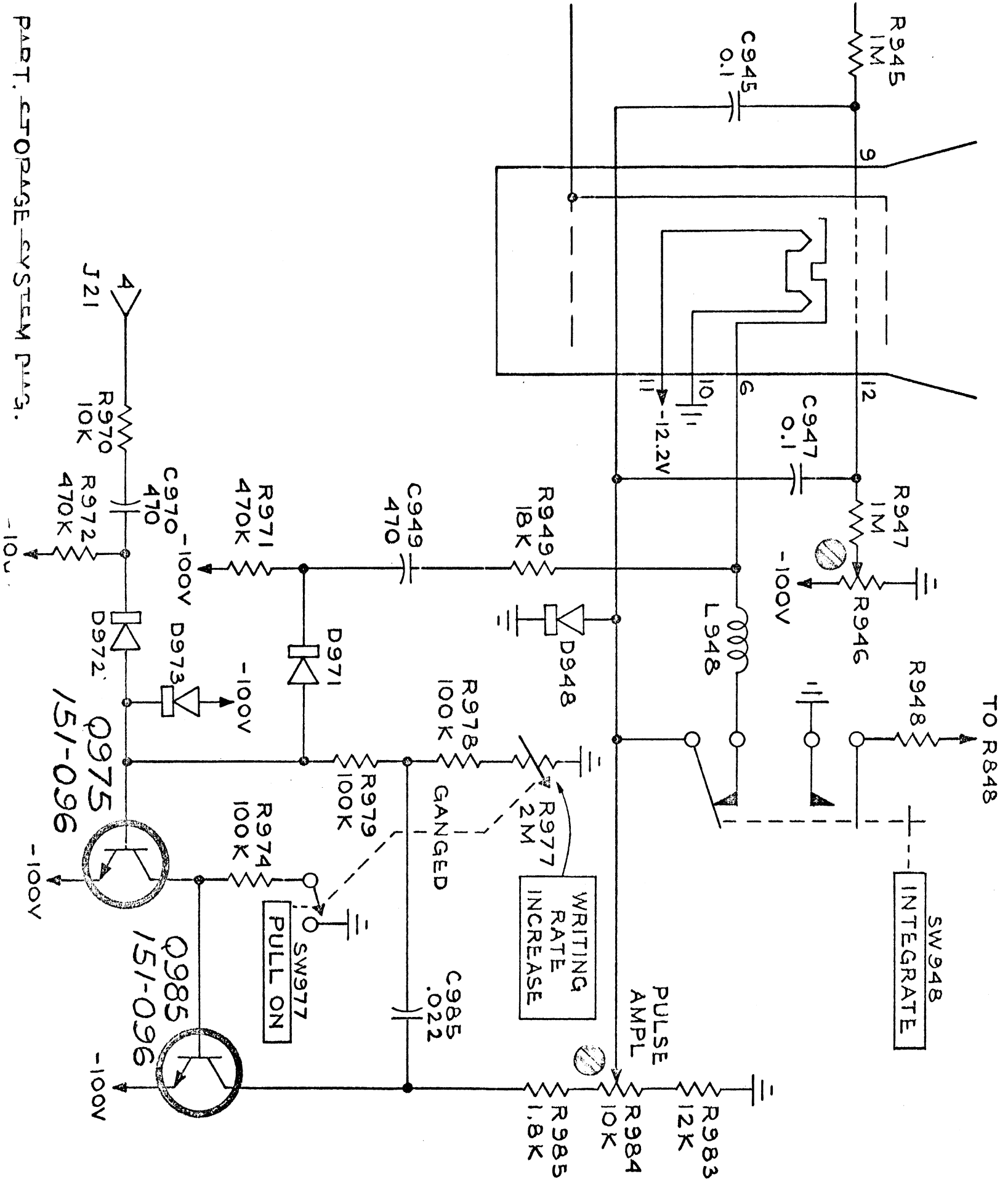
CHANGE TO:

SW868	260-602	Push-Button LOCATE(Trace)
SW948	260-508	Push-Button INTEGRATE

ADD:

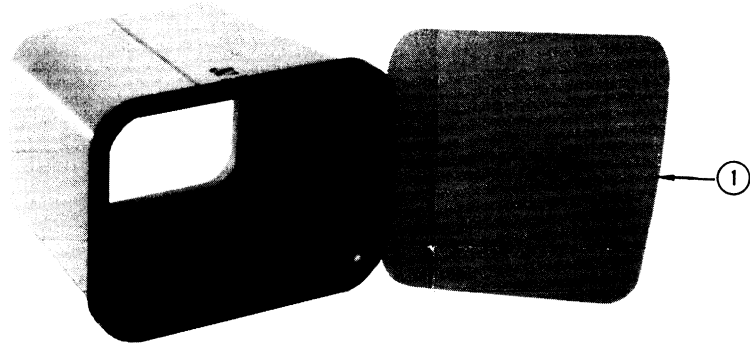
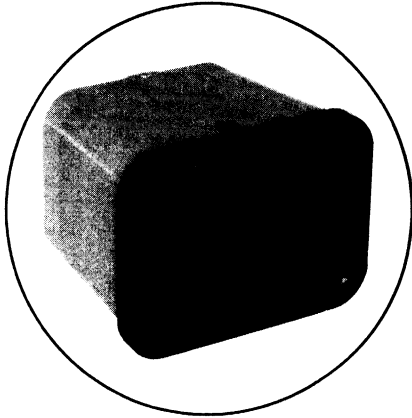
C945	283-057	.1 μ f	Cer.	200v		
C947	283-057	.1 μ f	Cer.	200v		
C949	281-580	470pf	Cer.	500v		
C970	281-525	470pf	Cer.	500v		
C985	285-566	.022 μ f	PMT	200v		
D948	152-008	Germanium	T12G			
D971	152-141	1N3605				
D972	152-141	1N3605				
D973	152-141	1N3605				
Q975	151-096	NPN	, TEK SPEC			
Q985	151-096	NPN	, TEK SPEC			
R945	316-105	1 meg	1/4w			
R947	316-105	1 meg	1/4w			
R949	316-183	18k	1/4w			
R970	316-103	10k	1/4w			
R971	316-474	470k	1/4w			
R972	316-474	470k	1/4w			
R974	316-104	100k	1/4w			
R977*	311-432	2 meg			Var.	
R978	316-104	100k	1/4w			
R979	316-104	100k	1/4w			
R983	302-123	12k	1/2w			
R984	311-405	10k			Var.	WW 5%
R985	302-182	1.8k	1/2w			
SW977*	311-432	SPST				

R977 and SW977 are ganged together.



PART. STORAGE SYSTEM PLUG.

RECTANGULAR POLARIZED VIEWER (Part No. 016-039)



REF. NO.	PART NO.	SERIAL/MODEL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
1	016-039 - - - - 378-538			- 1	<p>RECTANGULAR POLARIZED VIEWER Includes: FILTER, polarized light</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-left: auto;"> <p>PUBLICATION NO. 061-787 January 1964 (Revised)</p> </div>



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