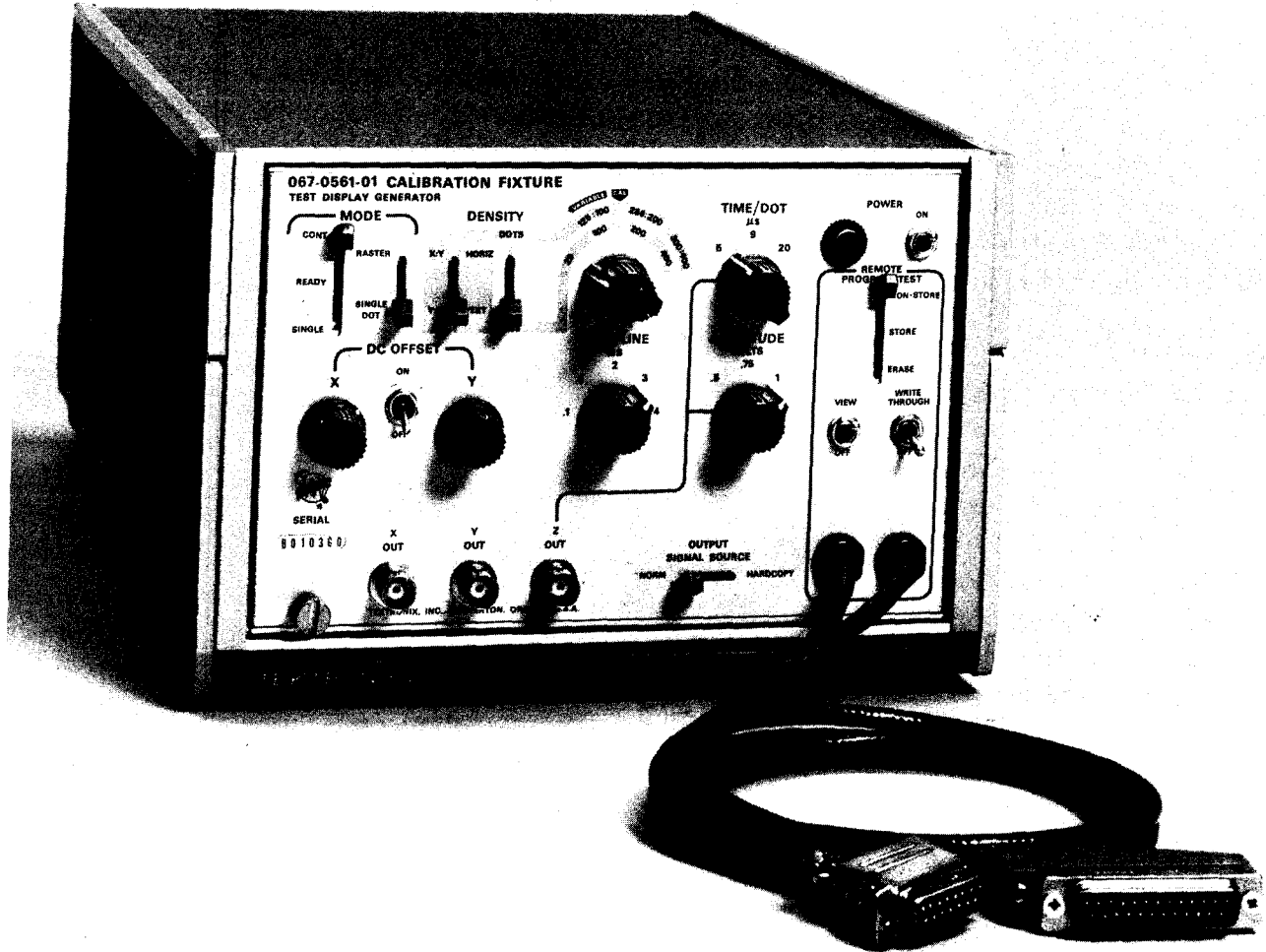


067-0561-01 CALIBRATION FIXTURE Test Display Generator



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SECTION 1

CHARACTERISTICS

General Information

The TEKTRONIX Type 067-0561-01 CALIBRATION FIXTURE TEST DISPLAY GENERATOR is a ramp/staircase generator used for testing storage monitors such as the Tektronix Type 601, 611, and 613.

X, Y, and Z output connectors on the front panel of the Generator provide horizontal, vertical, and blanking signals to the respective inputs of the Storage Monitor under test. When operated in the raster mode, the signal at the X output consists of either a zero-to-one-volt linear ramp or a zero-to-one-volt linear staircase depending upon whether lines or dots are selected. The signal at the Y output consists of a linear staircase. The Z output provides the unblanking signal that allows the display to be presented (X and Y signals are blanked during retrace and step shifting).

A CONT-READY-SINGLE switch selects either continuous or single-display operation. The RASTER-SINGLE DOT switch selects either a raster or a single dot. When this switch is in the SINGLE DOT position, all DENSITY controls are inoperative. Four switches are grouped under the DENSITY heading. These include DOTS--LINES, X:Y or HORIZONTAL -- Y:X or VERTICAL, DENSITY (selector), and VARIABLE.

When the DOTS-LINES switch is in the LINES position, the X:Y or HORIZ -- Y:X or VERT switch selects either a horizontal or vertical display. The density selector switch provides 25, 100, 200, or 400 calibrated lines.

When the DOTS-LINES switch is in the DOTS position, the X:Y or HORIZ--Y:X or VERT switch selects either X:Y or Y:X, with X representing the number of dots along the X axis and Y representing the number of dots along the Y axis.

The density selector switch provides either 125 by 100, 266 X 200 or 300 by 400 calibrated dots. A VARIABLE control continuously varies the number of dots or lines to less than 60% of their calibrated value. Continuously variable DC offset signals of -1 volt to +1 volt are added to the X and Y signal independently when the DC OFFSET switch is on.

When the DOTS-LINES switch is in the DOTS position, Z-output pulse widths of 5, 9, or 20 μ s/dot can be selected using the TIME/DOT switch. Pulse amplitudes of 0.5, 0.75, or 1.0 volt are selected using the AMP-LITUDE switch. When the DOTS-LINES switch is in the LINES position, a TIME/LINE switch provides 0.1, 0.6, 2, 3, or 4, ms/line.

Normal or HARDCOPY signals are selected using the OUTPUT SIGNAL SOURCE switch. In the Normal position the switch couples the internally generated X, Y, and Z signals to the appropriate output connectors on the front panel. In the HARDCOPY position the X, Y, and Z signals to the output connectors on the front panel are disabled and are channeled thru the 4-foot cable with the 15-pin male connector, attached to the front panel. This cable is attached to the HARDCOPY input jack (J-705) at the 613 and is used to calibrate the output amplifiers at the 613. STORE, ERASE, VIEW, and WRITE THROUGH signals for testing the remote control functions at the storage monitor are connected to a 25-pin male connector at the end of a 4-foot cable attached to the front panel. This cable also supplies the same X, Y, and Z signals available at the front panel output connectors. A 115/230 VAC switch on the rear panel selects either 115 VAC or 230 VAC LINE operation.

Y (Vertical) and X (Horizontal) Outputs

Characteristic	Performance Requirement	Supplemental Information
Number of Dots per Line		
Calibrated	Within 2% of selected value	
Variable	Continuously variable to less than 60% of calibrated value	
First Step Level	0 volts within 20 mV	
Last Step Level	1 volt within 20 mV	
DC Offset	At least +1 V to -1 V, continuously variable	
Time per line	Within 10% of indicated value	

Z (Blanking) Output

Characteristic	Performance Requirement	Supplemental Information
Time per dot	Within 10% of indicated value	
Amplitude	Within 5% of indicated value	

HARDCOPY OUTPUTS

Characteristic	Performance Requirement	Supplemental Information
Fast Ramp	+ & - 4.77 Volts \pm 50 mV	
Slow Ramp	+ & - 4.77 Volts \pm 50 mV	

Power Requirements

Characterisite	Performance Requirement	Supplemental Information
Line voltage		Selector switch on rear panel
115 VAC	103.5 to 126.5 volts, RMS AC line voltage	
230 VAC	207 to 253 volts, RMS AC line voltage	
Fuse	115 VAC: 1/2 A Fast Blo 230 VAC: 1/4 A Fast Blo	
Line Frequency	55 to 65 Hz	
Power Consumption	4 watts maximum	

Mechanical

Characteristic	Information	
Construction		
Chassis	Aluminum Alloy	
Cabinet	Aluminum Alloy with Blue-vinyl finish	
Panel	Aluminum Alloy with anodized finish	
Circuit Board	Glass-Epoxy Laminate	
Overall Dimensions		
Height	6 inches	
Width	9 inches	
Depth	14-3/4 inches	
Weight	10 pounds	
Connectors		
Front & Rear Panel BNC		
Remote Program Cable (Norm)	4 feet, 25 pin Cannon Connector	
Hard Copy Cable	4 feet, 15 pin ITT Connector	

Environmental

Characteristic	Performance Requirement	Supplemental Information
Temperature	The performance requirements listed apply over a temperature range of $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$	
Warm Up Time	5 min at 25°C	

SECTION 2

OPERATION

Front Panel Controls, Connectors, and Switches

MODE

CONT/READY/SINGLE

Selects either a continuous or a single display.

RASTER/SINGLE DOT

Selects either a raster or a single dot.

DENSITY

HORIZ/VERT or X:Y/Y:X

Selects either a horizontal or a vertical display, By switching the signals to the X & Y output Connections

DOTS/LINES

Selects either dots or lines.

DENSITY (Switch)

Selects the number of lines when DOTS/LINES switch is at LINES.
Selects the X:Y number of dots when DOTS/LINES switch is at DOTS.

DENSITY (Variable)

Varies the number of dots or lines to less than 60% of the calibrated value.

TIME/DOT

Varies the Z output unblanking pulse width when the DOTS/LINES switch is at DOTS.

AMPLITUDE

Varies the Z output unblanking pulse amplitude when the DOTS/LINES switch is at DOTS.

TIME/LINE

Varies the time per line when the DOTS/LINES switch is at LINES.

DC OFFSET

Applies a continuously variable -1 volt to +1 volt DC level to the X and Y output when the DC offset switch is ON.

X OUT, Y OUT, Z OUT

BNC connectors for the X, Y, and Z output signals.

OUTPUT SIGNAL SOURCE

Couples the generated signals to either the front panel BNC connectors or to the Hard Copy Connector.

REMOTE PROGRAM TEST

An auxiliary provision for testing the remote controls on the Type 611, Type 613 storage monitors.

NON-STORE/STORE/ERASE

Selects either the store mode or the non-store mode of operation. When in the store position, the remaining spring loaded position of the switch allows erasing.

VIEW/OFF

Selects either view or non-view.

WRITE THROUGH/OFF

Selects either write-through or write-through off.

A 25-pin male connector at the end of a 4-foot cable connects the REMOTE PROGRAM TEST signals to the Storage Monitor. It may also be used to connect to the X, Y, and Z output signals, thus eliminating the need to connect the X out, Y out, and Z out to the corresponding inputs on the Storage Monitor. A 15-pin male connector at the end of a 4-foot cable connects the HARDCOPY output signals to the 613.

Rear Panel Connectors and Switches

GATE OUTPUT

BNC connector for the gate output signal used to calibrate and trouble shoot the Test Display Generator.

FAST/SLOW

Selects the gate signals generated after every line when at fast, or the gate signal generated after every frame when at slow.

FUSE Data: Silk screened on rear panel.

115 VAC operation: 1/2 A

230 VAC operation: 1/4 A

Power Switch

Connects the AC line voltage to the Display Generator power supply when positioned to ON.

115-230 V Switch

Selects the proper internal wiring configuration for either 115 or 230 VAC line operation.

To operate the Test Display Generator, connect the instrument to a suitable power source.

CAUTION

Before turning the instrument on, make sure the rear-panel line selector switch is in the correct position for the line voltage used. The instrument is shipped from the factory with the switch in the 115 VAC position, unless otherwise requested.

Turn power switch to ON and allow the unit approximately five minutes to warm up. The instrument is now ready for use.

SECTION 3

CIRCUIT DESCRIPTION

Introduction

The signals provided by the Test Display Generator consist of a zero-to-one-volt Linear staircase at the X output and the Y output, an unblanking signal at the Z output, a plus 4.77 volts to minus 4.77 Linear staircase at pins one and three at the fifteen pin male connector and an unblanking signal at pin five at the fifteen pin male connector.

The staircase signal is generated in the following manner, Clock U4, a slaved multivibrator, generates a train of pulses which are fed through a pulse shaper, Q12. Each pulse then charges the ladder capacitor C18 through the bucket capacitor, C71. Diode D22 provides the discharge path for C18, with diode D23 preventing the discharge of capacitor C71. The high input impedance of Q33 and high gain of U40 are combined to provide a very linear integrator circuit. Each time C18 charges through C71, the output of U40 changes by the amount of charge stored in C71. When the output of U40 reaches the negative potential determined by an internal adjustment R85, Q85 of the one shot multivibrator is turned off and Q75 turns on for a duration determined by the time constant of capacitor C74 and resistor R75. During this duration, the bucket capacitor C71 is discharged through diodes D71 and D72, and the clock U4 is disabled so it will synchronize with the start of the next staircase. The output of U40 is fed through U56 and Q62 where it is inverted and reduced to a 1 V, low-impedance output signal.

An identical group of signal processing blocks consisting of a pulse shaper Q112, a ladder capacitor C118, an integrator Q140, U140, C171, and a gain stage U156, Q162, perform the same functions described above. However, in this case the pulse shaper gets its signal from the collector of Q75, and not from a clock as before. Again, every pulse charges a ladder capacitor, C118 through a bucket capacitor C171. When the output of U140 reaches the negative potential determined by R185, Q185 turns off and Q175 on for a duration determined by the value of C174 and R175.

When this happens, the bucket capacitor C171 is discharged through D171, D172, and Q85 is turned off through D86, D87. Q75 is now on, disabling the clock.

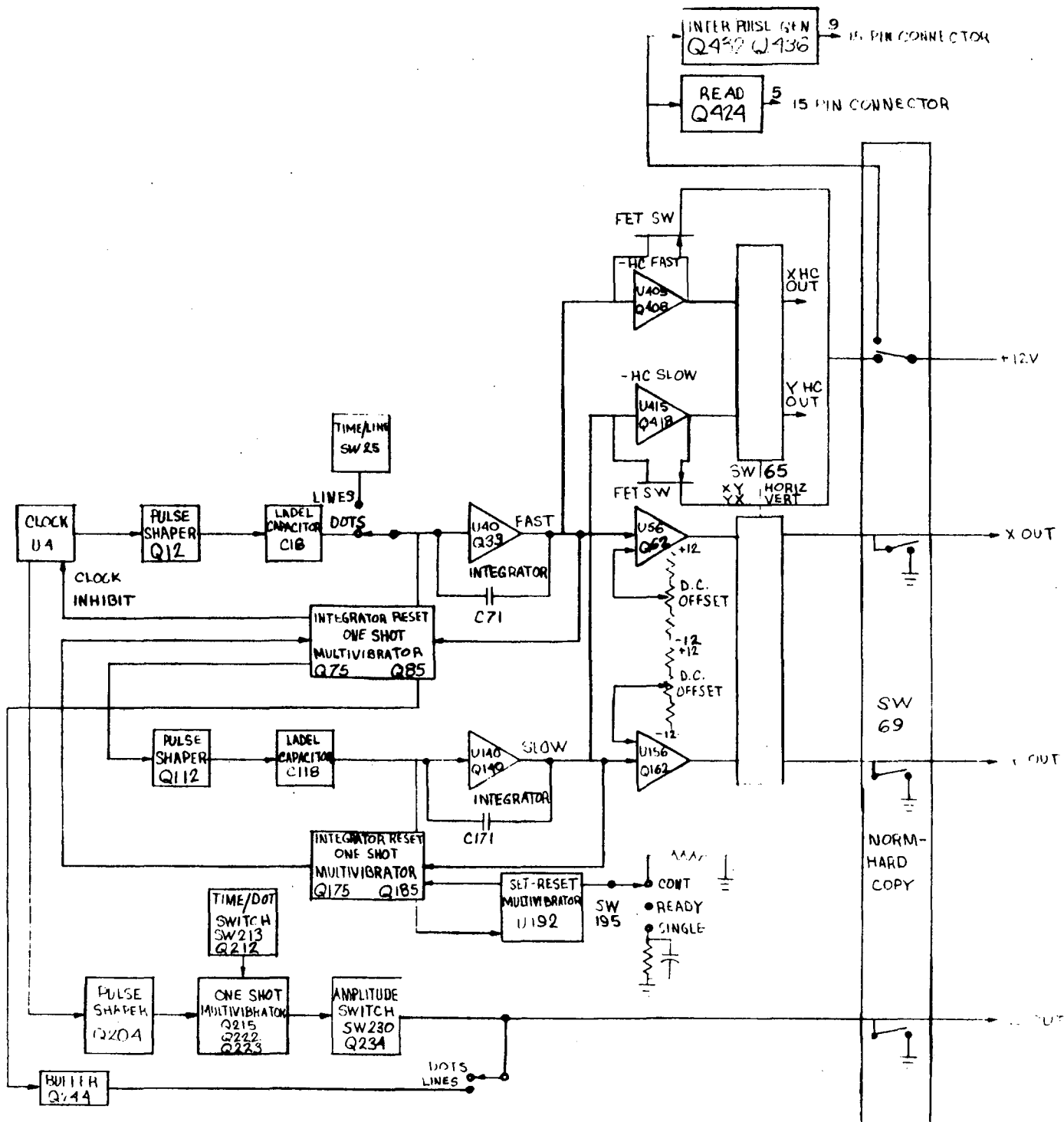
This entire sequence is continually repeated whenever the CONT-READY-SINGLE switch is at CONT. When the switch is in the READY position, the output of the set-reset multivibrator U192 is low, biasing Q185 of the one-shot multivibrator off. This turns Q175 on, turning Q85 off. Q75 is now on, disabling the clock, and no signal is generated. When the CONT-READY-SINGLE control is momentarily switched to SINGLE, the set-reset multivibrator U192 is set, freeing Q185, and one complete sequence takes place. At end of the sequence, Q185 is turned off resetting U192 through C189. This keeps Q185 off and no signal is generated.

The unblanking signal is generated from the clock pulse, The pulse is fed through a pulse shaper Q204 to a one-shot multivibrator Q125, Q222 and Q225. The unblanking duration is selected by the TIME/DOT SWITCH. The amplitude of this signal is determined by the value of resistor R230 as selected by the AMPLITUDE switch.

The linear ramp used to display lines is generated in the following manner. When the DOTS-LINES switch is at LINES, the bucket capacitor C71 is charged continuously through R25 rather than being charged in steps as noted previously for the staircase generator. In addition, the clock is disabled and the Z OUT unblanking signal is taken from the collector of Q85 instead for the clock.

When the OUTPUT SIGNAL SOURCE is switched to the Hardcopy position +12 V is applied to the Test Board and the normal X, Y, and Z output signals are disabled. The negative going staircase from pin 6 of U40 is applied to the negative input of U405. The output of U405 is + and - 4.77 volts centered around 0 volts after the position and gain controls have been properly set. This output is coupled thru the X:Y HORIZ- Y:X Vert switch to pin 3 of the 15 pin connector, the output of U140 goes thru U405 to pin 1 of the 15 pin connector. It also goes thru the X:Y switch. When the +12 volts is applied to the Test Board it goes thru the voltage divider of R422, R423 and R424 so that approximately 0.6 V is applied to the base of Q424 turning it on. The collector will be low all the time unless it is pulled up to some positive voltage. When this happens the collector will then go low when the base goes to about 0.6 volts. Q432 and Q436 form a freerunning multivibrator when +12 volts is applied to R433 and R435. Since the RC time constant of R433 and C432 equals that at R435 and C437 the pulse duty cycle will be about equal. Since the base of Q436 is coupled to the collector of Q75 the pulse train will have the same period as the X ramp and will depend on the setting of the Density controls.

BLOCK DIAGRAM



SECTION 4

MAINTENANCE

Visual Inspection

The instrument should be visually inspected occasionally for such defects as poor connections, broken or damaged ceramic strips, improperly seated transistors, and heat damaged parts. The remedy for most of these defects is obvious. But a heat damaged part is usually the symptom of some defect that is not obvious. The cause of overheating should be determined and corrected before the part is replaced, otherwise the damage may be repeated.

Transistor Checks

Periodic preventive maintenance checks on the transistors in the Type 067-0561-01 Calibration Fixture are not recommended. Satisfactory operation of the instrument in all respects is adequate assurance that the transistors are performing properly.

Recalibration

To insure that the 067-0561-01 maintains its accuracy, check the calibration after each 500 hours of operation or every six months if used intermittently. Complete calibration instructions appear later in this section.

The calibration procedure can also be helpful in isolating troubles in the instrument. Also, minor troubles in the instrument that may not be apparent during normal operation may be revealed and corrected during calibration.

Ordering Parts

Many of the components in the Type 067-0561-01 Calibration Fixture are standard electronic parts that may be purchased locally. However, all standard parts in the instrument can be obtained from Tektronix through your local Tektronix Field Engineer or Field Office. Before ordering, consult the parts list of this manual to determine the value, tolerance, and rating required. Some of the parts used in the Type 067-0561-00 Calibration Fixture are not standard parts and may or may not be available for replacement. Consult any particular replacement with your local Tektronix Field Engineer or Field Office.

SECTION 5

CALIBRATION

Introduction

This portion of the manual contains a complete calibration procedure for the 067-0561-01 Calibration Fixture. The instrument will not often require a complete, start-from-scratch calibration, but will need occasional adjustments as components age or are replaced.

Calibration is a valuable part of preventive maintenance, since many types of minor troubles may be discovered and corrected before they become serious enough to disable the instrument. Also, certain troubles can be easily isolated to a particular section of the instrument by attempting calibration.

This section includes a list of all instruments required to calibrate the Type 067-0561-01 Calibration Fixture, a check out list, and a step-by-step calibration procedure.

It will be assumed in this manual that appropriate interconnections and necessary adapters are available.

It will also be assumed that a control will be left in the position indicated on the previous step unless otherwise indicated.

All front-panel control labels of the 067-0561-01 Calibration Fixture or test instruments are in capital letters (TIME/LINE), etc. Internal adjustment labels are identified by an R or C number (R335).

Equipment Required

1. Oscilloscope, Calibrated Tektronix Type 547 or 7403
2. Plug-In Unit, Calibrated Tektronix Type W, or 7A13, 7B52
3. Cable 50 Ω BNC, Tektronix PN 012-0057-01, two required.
4. Probe, Tektronix P6006 10X Passive PN 010-0128-00
5. Universal Counter-Timer, Computer Measurements Company Model 226BN or equivalent Such as TEK DC503
6. Adjustable Autotransformer, General Radio Model W20MT3A or equivalent
7. Multimeter, 20,000 Ω/V Triplet 630A or equivalent

CHECK OUT LIST

1. Check Power Supply Resistance to ground.

Supply	Approx. Resistance
+12 V	240 Ω
-12 V	60 Ω
+3.6 V	1.2 K Ω
-3.6 V	320 Ω

2. (a) Check Accuracy, Regulation and Ripple of power supplies:

Supply	Accuracy and Regulation	Ripple
+12 V	1% (11.88 to 12.12)	5 mV
-12 V	3% (11.64 to 12.36)	5 mV
+3.6 V	5% (3.42 to 3.78)	5 mV
-3.6 V	5% (3.42 to 3.78)	5 mV

(b) Check Line Voltage Selector Switch for 230 V operation.

3. Check the Clock Period for 35 μ sec within 10%.

4. Check the X:Y Staircase Levels

(a) Check the First Step Level for 0 V, within 20 mV.

(b) Check the Last Step Level for 1 V, within 20 mV.

CHECK OUT LIST (cont)

- 5. (a) Check the Dots/Line settings to within 2% of the selected value.

Lines	Accuracy	Variable
25	23-25	L15
100	98-102	L60
200	196-204	L120
400	392-408	L240

- (b) Check the VARIABLE control for at least 60% of the calibrated Dots/Line setting.

- 6. Check the X:Y HORIZ-Y:X VERT switching for proper operation.
- 7. Check the DC OFFSET range for at least +1 V to -1 V and no oscillation.
- 8. Check the TIME/LINE setting for the indicated time, within 10%.
- 9. Check to TIME/DOT setting for the indicated time, within 10%.
- 10. Check the AMPLITUDE setting for the indicated voltage, within 5%.
- 11. Check the HARD COPY Ramps for the indicated values - within 50 m volts.
- 12. Check INTER for proper operation.
- 13. Check the Remote and Norm Program Test circuits for correct resistance and continuity.

CALIBRATION PROCEDURE



1. Preset the Controls

a. Set the Test Display Generator controls as follows:

MODE	
CONT-READY-SINGLE	CONT
RASTER-SINGLE DOT	RASTER
DENSITY	
X:Y HORIZ - Y:X VERT	X:Y HORIZ
DOTS-LINES	DOTS 300:400
VARIABLE	CAL
TIME/DOT μ s	20
AMPLITUDE VOLTS	1
TIME/LINE ms	3
DC OFFSET	OFF
OUTPUT SIGNAL SOURCE	
NORM-HARDCOPY	NORM
REMOTE PROGRAM TEST	
NON STORE-STORE-ERASE	NON STORE
VIEW	OFF
WRITE THROUGH	OFF
GATE OUTPUT (at rear)	
FAST-SLOW	FAST
Line Voltage Selector	115 V
SW7 (internal switch)	611 position (slide toward rear)
R39, R139	cw
Variable Mica Caps	CLOSED

b. Set the Type 547 Oscilloscope controls as follows:

HORIZONTAL DISPLAY	B
MAIN TIME BASE	
TRIGGERING LEVEL	cw
TRIGGERING MODE	AUTO
TRIGGERING SLOPE	+
TRIGGERING COUPLING	AC
TRIGGERING SOURCE	NORM
TIME/CM	1 mSEC

c. With the Type W Plug-In Unit installed in the Type 547 Oscilloscope, set the control as follows.

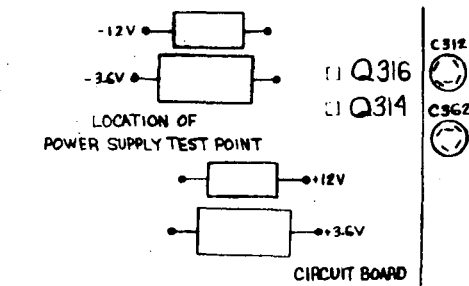
VC RANGE	0
COMPARISON VOLTAGE	1.20
INPUT ATTEN	1
DISPLAY	A-Vc
MILLIVOLTS/CM	2
VARIABLE	CALIB

2. Power Supplies

a. Resistance

Check power supply resistance to ground (-polarity meter lead grounded)
Set Meter to RX100 Scale

<u>Supply</u>	<u>Approx Resistance</u>
+12	240 Ω
-12	60 Ω
+3.6	1.2 K
-3.6	320 Ω



b. +12 V Supply

Connect the X10 probe to the TYPE W A input. Connect the probe to the +12 V supply and set the TYPE W Vc control to +11. Adjust R335 for 12 V (within 1%).

c. Supply Accuracy, Regulation and Ripple

Using the Type W at appropriate settings, check accuracy, regulation and ripple of supplies as indicated below while varying the Auto-transformer from 104 VAC to 126 VAC.

<u>Supply</u>	<u>Accuracy & Regulation</u>	<u>Ripple</u>
+12	±1%	5 mV
-12	±3%	5 mV
+3.6	±5%	5 mV
-3.6	±5%	5 mV

d. Line Voltage Selector Switch

Connect a multimeter across pins 6 and 7 of the power transformer and note meter reading (approx 16 VAC with Autotransformer set at 115 VAC). Set the Line Voltage Selector switch to 230 V. The meter reading should be approximately half of that noted previously. Return the Line Voltage Selector to 115 V.

3. Clock Period

a. Setup

Set the TYPE W Vc RANGE to 0, Input ATTN to 10, MILLIVOLTS/CM to 50. Set the test scope B TIME/CM to 10 μ SEC. Connect the X10 probe to the collector of Q12, set the test scope B TRIGGERING MODE to TRIG and adjust the TRIGGERING LEVEL for a stable display.

- b. Adjust clock for a period of 35 μs (within 10%)

While observing the test scope display adjust R5 for a period of 35 μs (3.5 cm). Set the B TIME/CM to 5 μSEC and note the period. Set SW7 to the 601 position. The period should be approximately half. Return SW7 to the 611 position. Remove the probe.

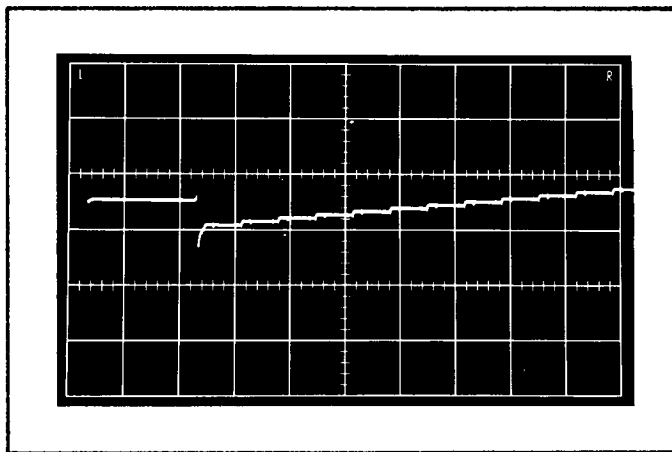


Fig. 6a

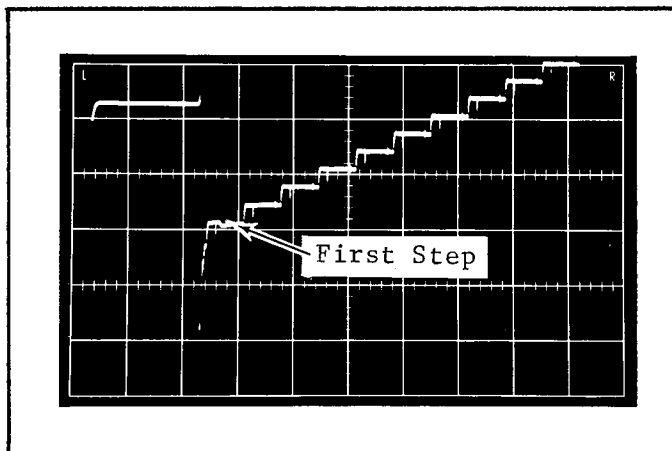


Fig. 6b

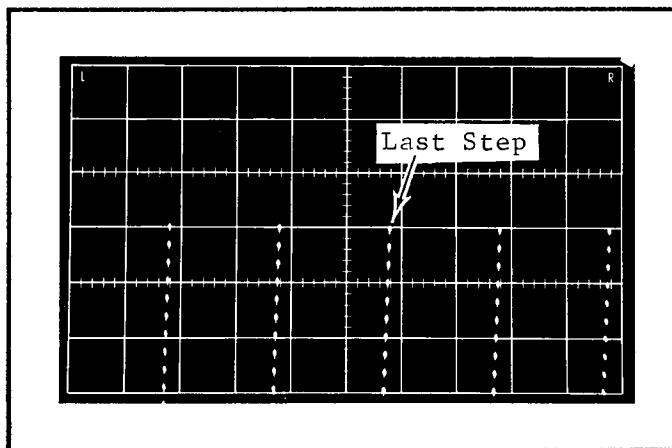


Fig. 6c

4. X:Y Staircase Levels

a. Setup

Remove the X10 probe from the TYPE W A input. Connect a 50 Ω cable from the A input to the X OUT connector on the Test Display Generator. Set the INPUT ATTEN to 1. Connect a 50 Ω cable from the test scope B TRIGGER INPUT to the Test Display Generator GATE OUTPUT. Set the B TRIGGERING SOURCE to EXT and set TIME/CM to 50 μ sec. A staircase display like that shown in Fig. 6a should be obtained. (R39 and R85 may have to be adjusted to bring the display on screen).

b. Adjust First Step Level to 0 V (within 20 mV)

Set the TYPE W A AC-DC-GND to GND and set MILLIVOLTS/CM to 10. Position the trace to center graticule line. Return the switch to DC. Adjusting R39, place the first step of the staircase to the center graticule line (see Fig. 6b).

c. Adjust Last Step Level to 1 V (within 20 mV)

Set the TYPE W COMPARISON VOLTAGE control to 10.00 and the Vc RANGE to +1.1. Set B TIME/CM to 5 mSEC. Adjust R85 to place the last step to the center graticule line as shown in Fig. 6c.

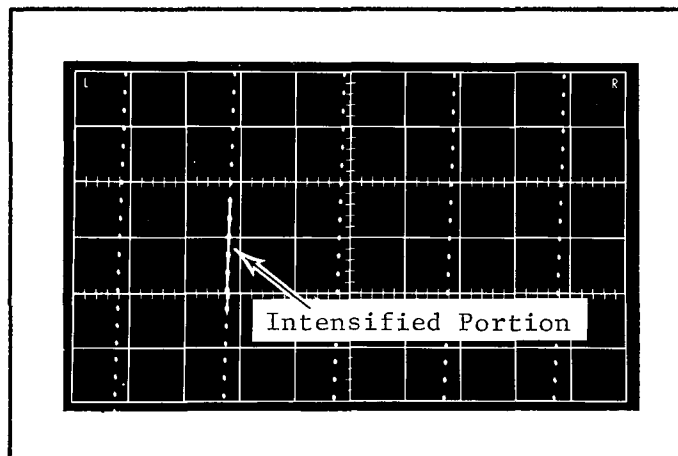


Fig. 7a The display will vary slightly depending upon the preset settings of the frequency compensations.

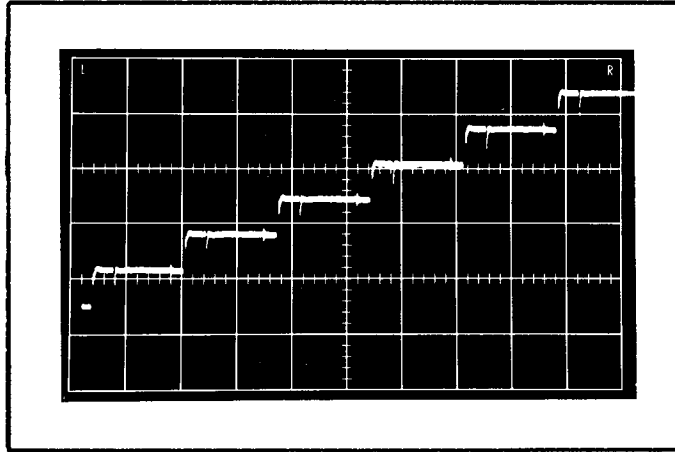


Fig. 7b

5. X:Y Staircase Frequency Compensation

a. Setup

Set the TYPE W COMPARISON VOLTAGE to 5.00. Set the test scope HORIZONTAL DISPLAY to B INTENS by "A".

Set the A TRIGGERING MODE to AUTO STABILITY and A TIME/CM to 20 μ SEC. Adjust the DELAY TIME MULTIPLIER to obtain an intensified portion of the display (see figure 7a). Set the HORIZONTAL DISPLAY to A DLY'D and the TYPE W MILLIVOLTS/CM to 5 to obtain a display as shown in figure 7b.

b. Adjust X:Y Frequency Compensation

Adjust C43, C57 and C58 for minimum aberration of the leading edge of the step waveform. See figure 7b.

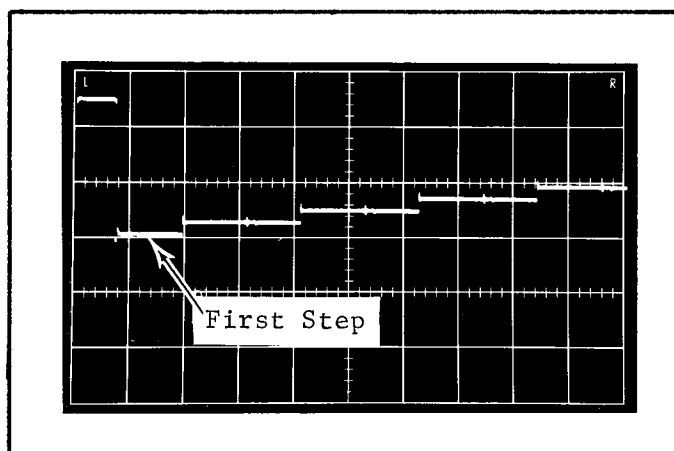


Fig. 8a

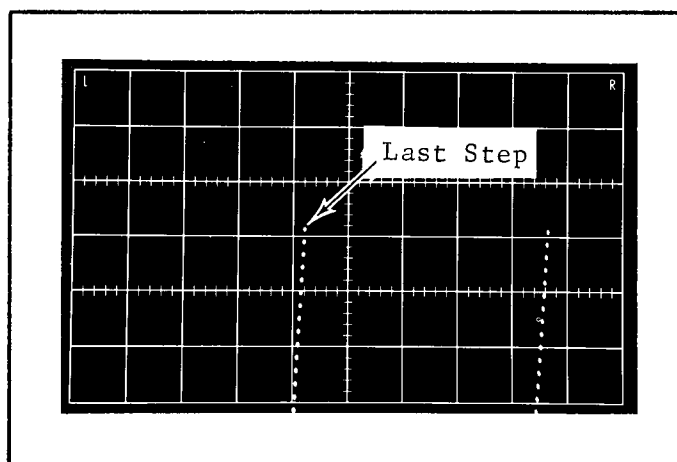


Fig. 8c

6. Y:X Staircase Level

a. Setup

Set the scope HORIZONTAL DISPLAY to B and the B TIME/CM to 0.1 mSEC. Set the TYPE W Vc RANGE to 0 and COMPARISON VOLTAGE to 10.00. Set MILLIVOLTS/CM to 10. Set the Test Display Generator X:Y HORIZ - Y:X VERT to Y:X VERT and the GATE OUTPUT (in rear) to SLOW. Set DOT/LINES to LINES and TIME/LINE ms to 0.1. A display like that shown in Fig. 8a should be obtained (R139 may have to be adjusted to bring the display on screen).

b. Adjust First Step Level to 0 V (within 20 mV)

Set the TYPE W A AC-DC-GND switch to GND and position the

- b. Adjust First Step Level to 0 V (within 20 mV) (cont)

trace to the center graticule line. Return the switch to DC. Adjust R139 to place the first step of the staircase to the center graticule line (see Fig. 8a).

- c. Adjust Last Step Level to 1 V (within 20 mV)

Set the Type W Vc RANGE to +1.1 and the scope B.TIME/CM to 20 mSEC. Adjust R185 to place the last step to the center graticule line (see Fig. 8c).

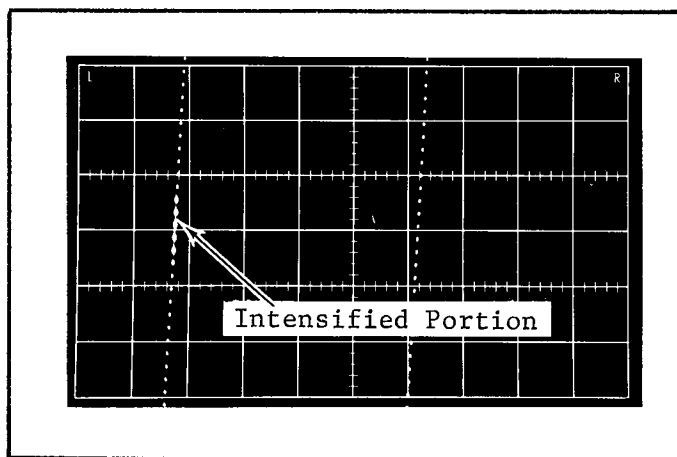


Fig. 9a

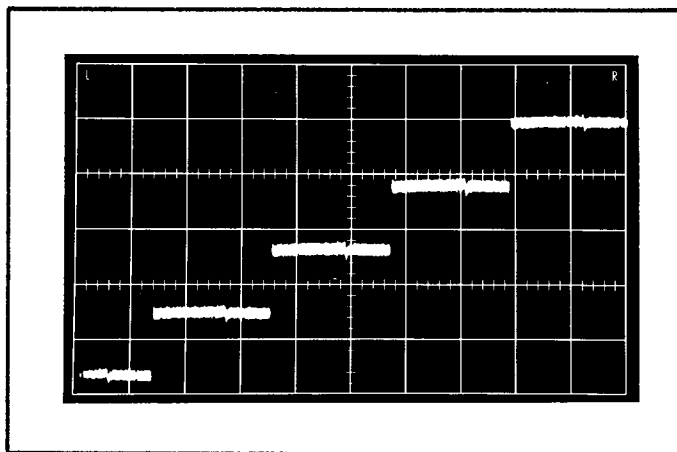


Fig. 9b

7. Y:X Frequency Compensation

a. Setup

Set the Type W COMPARISON VOLTAGE to 5.00. Set the scope HORIZONTAL DISPLAY to B INTENS by "A". Set the A TIME/CM to 0.1 mSEC. Adjust the DELAY-TIME MULTIPLIER to obtain an intensified portion of the display (see Fig. 9a). Set the HORIZONTAL DISPLAY to A DLY'D and the TYPE W MILLIVOLTS/CM to 2 to obtain a display as shown in Fig. 9b.

b. Adjust Y:X Frequency Compensations

Adjust C143, C157 and C158 for minimum aberration of the leading edge of the step waveform (see Fig. 9b). Remove the 50 Ω cable from the TYPE W and Test Display Generator X OUT connector. Remove the GATE OUTPUT from the scope TRIGGER INPUT. Set TIME/LINE ms to 3. Return TYPE W Vc RANGE to 0.

 8. DOTS-LINES DENSITY

a. Setup

Connect a 50 Ω cable from the Test Display Generator Z OUT to the A connector on the Universal Counter-Timer, Connect a 50 Ω cable from the GATE OUTPUT to the B connector. Set DOTS-LINES to LINES and X:Y HORIZ-Y:X VERT to X:Y HORIZ. Set TIME/LINE ms to 3 and DENSITY to 100.

Set the counter controls as follows: TRIGGER LEVEL controls ccw; START B, -50; FREQ A, -50; B SLOPE +-, to -; GATE ON - AUTOMATIC, GATE ON; DISPLAY, midrange; FUNCTION, $\frac{A}{B}$. Rotate the A TRIGGER LEVEL cw until the counter starts counting and note the setting. Continue rotating cw until the counter stops counting. Set the control half-way between the two levels. Set GATE ON - AUTOMATIC TO AUTOMATIC. The counter should stop counting. Rotate the B TRIGGER LEVEL cw until the counter again begins to count. The counter should now count, display for a short duration, reset and repeat.

b. Adjust Dot-Line Density (within 2%)

Adjust C118J for a counter indication of 100. Set DOTS-LINES to DOTS, and GATE OUTPUT to FAST. Adjust C18F for an indication of 125. Set DOTS-LINES to LINES, DENSITY to 200, and GATE OUTPUT to SLOW. Adjust C118F for an indication of 200. Set DOTS-LINES to DOTS, GATE OUTPUT to FAST and adjust C18D for an indication of 266.

Set DOT-LINES to LINES, DENSITY to 400 and GATE OUTPUT to SLOW. Adjust C118A for an indication of 400. Set DOT-LINES to DOTS, GATE OUTPUT to FAST and adjust C18A for an indication of 300.

Set DOTS-LINES to LINES, DENSITY to 25, and GATE OUTPUT to SLOW. Check for an indication of 25 ± 2 counts.

C. Check Variable Density Control

Rotate the VARIABLE DENSITY control full ccw. Check the counter for an indication of equal to or less than 15. Set DENSITY to 100 and check for 60 or less. Set DENSITY to 200 and check for 120 or less. Set DENSITY to 400 and check for 240 or less. Set DOTS-LINES to DOTS and GATE OUTPUT to FAST. Check for an indication of 180 or less. Set DENSITY to 266:200 and check for an indication of 160 or less. Set DENSITY to 125:100 and check for an indication of 75 or less. Return VARIABLE DENSITY to CAL and remove cables.

9. TIME/DOT μ s and TIME/LINE ms.

a. Setup

Set the TYPE W Vc RANGE to 0, INPUT ATTEN to 10 and MILLIVOLTS/CM to 50. Connect a 50 Ω cable from the Test Display Generator Z OUT to the TYPE W A input. Set the scope B TIME/CM to 10 μ SEC, TRIGGERING SOURCE to NORM and adjust TRIGGERING LEVEL for a stable display.

b. Check TIME/DOT μ s (within 10%)

Check the displayed positive pulse width to be 20 μ s (2 cm) \pm 10%. Set TIME/DOT μ s to 9 and the scope B TIME/CM to 5 μ SEC. Check the positive pulse width to be 9 μ s (1.8 cm) \pm 10%. Set TIME/DOT μ s to 5 and the scope B TIME/CM to 1 μ SEC. Check the positive pulse width to be 1 μ s (5 cm) \pm 5%. Set TIME/DOT μ s to 20.

c. Check TIME/LINE ms (within 10%)

Set the Test Display Generator DOTS-LINES to LINES and the test scope B TIME/CM to 1 mSEC. Check for a pulse width of 3 ms (3 cm) \pm 5%. Set TIME/LINE ms to 4 and check for a pulse width of 4 ms (4 cm) \pm 10%.

Set TIME/LINE ms to 2 and TEST SCOPE B TIME/CM to 0.5 mSEC. Check for a pulse width of 2 ms. (4 cm) \pm 10%. Set TIME/LINE ms to 0.6 and TEST SCOPE to 0.1 mSEC.

Check for a pulse width of 0.6 ms (6 cm) $\pm 10\%$. Set TIME/LINE ms to 0.1 and test scope B TIME/CM to 20 μ SEC. Check for a pulse width of 0.1 ms (5cm) $\pm 10\%$. Set TIME/LINE ms to 3.

d. Check Single Sweep

Set RASTER-SINGLE DOT to SINGLE DOT and CONT-READY-SINGLE to READY. Depress to SINGLE and note that display consists of a single positive pulse of approximately 20 μ s. Set RASTER SINGLE DOT to RASTER and CONT-READY-SINGLE to CONT.

10. AMPLITUDE VOLTS

Set DOTS-LINES to DOTS and adjust test scope TRIGGERING LEVEL for a stable display. Using the TYPE W POSITION control, place the bottom of the display to the center graticule line. Set Vc RANGE to +11 and COMPARISON VOLTAGE to 1.00. Set the INPUT ATTEN to 1 and check that top of waveform is within 1 cm of center graticule line.

Set Vc RANGE to 0, COMPARISON VOLTAGE to 0.75 and INPUT ATTEN to 10. Set the Test Display Generator AMPLITUDE VOLTS to 0.75. Set the bottom of the waveform to the center graticule line. Set Vc RANGE to +11 and INPUT ATTEN to 1. Check that top of waveform is within 0.75 cm of graticule center. Set Vc RANGE to 0, COMPARISON VOLTAGE to 0.50, INPUT ATTEN to 10. Set the Test Display Generator AMPLITUDE VOLTS to 0.5. Set the bottom of the waveform to the graticule center. Set Vc RANGE to +11, INPUT ATTEN to 1 and MILLIVOLTS/CM to 10. Check that top of waveform is within 2.5 cm of graticule center, Set Vc RANGE to 0 and AMPLITUDE VOLTS to 1. Remove the cable from the TYPE W and Z OUT connector.

11. X:Y HORIZ - Y:X VERT Switching

a. Setup

Set Test Scope TIME/CM to 1 mSEC/CM. Connect a 50 Ω cable from the TYPE W A input to the Test Display Generator X OUT. Set the TYPE W INPUT ATTEN to 10 and MILLVOLTS/CM to 50. Adjust TRIGGERING LEVEL for a stable display.

b. Check X:Y Horiz - Y:X Vert Switching

Note several cycles of a 1 volt saw tooth display. Set X:Y HORIZ - Y:X VERT to Y:X VERT and set the test scope B TIME/CM to 0.1 SEC. Again note several cycles of a 1 volt saw-tooth display.

Connect the 50 Ω cable to the Y OUT connector and repeat

c. Check Single Sweep

Set X:Y HORIX - Y:X VERT to X:Y HORIZ and CONT-READY-SINGLE to READY. Set scope B TIME/CM to 0.2 SEC and TRIGGERING MODE to AUTO Depress to SINGLE and note a single saw tooth display.

12. DC OFFSET

a. Setup

- S Set the test scope B TIME/CM to 1 mSEC and free-run the sweep. Set the TYPE W A AC-DC-GND switch to GND and position the trace to the center graticule line. Turn Display generator DC OFFSET to on.

b. Check DC Offset Range (at least + and -1 V)

Set the TYPE W AC-DC-GND switch to DC. Rotate the Y DC OFFSET control full cw and note that the trace moves in the positive direction a minimum of 2 cm from the graticule center. Rotate the control fully ccw and note that trace moves in the negative direction a minimum of 2 cw from the graticule center.

Connect the 50 Ω cable to the X OUT connector and repeat using the X DC OFFSET control.

c. Check entire staircase for oscillations:

(Note: If any oscillations are encountered in this step, change U56 and/or U156)

On the test display generator, set the CONT-READY-SINGLE switch to CONT. Turn X & Y OFFSET controls full cw. Set DENSITY to 300:400, TIME/LINE to 4 ms. Set TYPE W A INPUT to AC, INPUT ATTEN to 1, MILLIVOLTS/CM to 10. Set scope B TIME/CM to 2 mSEC. Connect a 50 Ω cable from test display generator GATE OUTPUT to B EXT TRIGGER INPUT on test scope and set SOURCE to EXT. Set TYPE W COMPARISON VOLTAGE to 5.00 and Vc RANGE to +1.1. Position top of waveform to top graticule line. Check for no oscillations or smearing of dots on the waveform. Using Vc RANGE, COMPARISON VOLTAGE, and POSITION controls, examine entire staircase for no oscillations or dot smearing. Turn X & Y OFFSET control full ccw and repeat check. Set Vc RANGE to 0, remove cable from X OUT and connect it to Y OUT. Position trace to center of screen. Disregarding the spikes, (caused by resetting of x ramp), and the jump about every four seconds, check the small waveform for no oscillations. Turn X & Y OFFSET controls full cw and again check for no oscillations. Turn DC OFFSET to OFF.

13. FAST RAMP (50 mV)

a. Set up (547, W)

TYPE W		
	VOLTS	4.770
	DISPLAY	A-Vc
	A INPUT	DC
	B INPUT	GND
	MILLIVOLTS/DIV	50
	INPUT ATTEN	100
	Vc RANGE	0
	547	
	TIME/DIV	5mSEC
	TRIGGER	AUTO, AC, INT
	TEST DISPLAY GENERATOR	
	MODE	CONT
	RASTER-Single Dot	RASTER
	X:Y Horiz - Y:X Vert	X:Y Horiz
	DOTS-LINES	Dots
	DENSITY	300:400
	OUTPUT Signal Source	Hard Copy

Connect X1 probe from W and Input to TP-405. (TEST BOARD)
Should have several cycles of Fast Ramp.

b. Adjust Fast Ramp (within 50 mV)

Ground the TYPE W A INPUT and center the trace. Return A INPUT to DC and adjust XHC GAIN (R404) and HXC position (R406) so that the signal is about plus and minus 5 volts-centered around ground.

c. Set TYPE W MILLIVOLTS/CM to 50 and INPUT ATTEN to 1. Ground A INPUT and center trace. Set A INPUT to DC, Vc RANGE to +11 and adjust R404 to bring top of staircase to center line. SWITCH TYPE W Vc RANGE to -11. Note distance between bottom of staircase and center line. (NOTE: LOWER SENSITIVITY TEMPORARILY IF BOTTOM OF STAIRCASE IS OFF THE SCREEN) Adjust R404 to move the bottom of the staircase toward center line exactly 1/2 the distance previously noted. Then adjust R406 to bring bottom of staircase to center line. Check top of staircase by switching TYPE W Vc RANGE to +11. The top must be within 1/2 CM of center line. If it is not, repeat step 13 c. Set TYPE W MILLIVOLTS/CM to 50 and INPUT ATTEN to 100. Set Vc RANGE to 0.

14. SLOW RAMP (within 50 mV)

a. Set up

Change Test Generator Density to 25. Connect X1 probe to TP 415. There should be several cycles of a stepped ramp on the screen.

b. Adjust Slow Ramp (within 50 mV)

Ground the TYPE W A INPUT and center the trace. Return A INPUT to DC and adjust YHC GAIN (R414) and YHC POSITION (R416) so the signal is approximately plus and minus 5 volts around ground.

c. Set TYPE W MILLIVOLTS/CM to 50 and INPUT ATTEN to 1. Ground A INPUT and center trace. Set A INPUT to DC, Vc RANGE to +11 and adjust R414 to bring top of staircase to center line. Switch TYPE W Vc RANGE to -11. Note distance between bottom of staircase and center line. (NOTE: LOWER SENSITIVITY TEMPORARILY IF BOTTOM OF STAIRCASE IS OFF THE SCREEN) Adjust R414 to move bottom of staircase exactly 1/2 the distance previously noted. Then adjust R416 to bring bottom of staircase to center line. Check top of staircase by switching TYPE W Vc RANGE to +11. The top must be within 1/2 CM of center line. If it is not, repeat step 14 c. Return Vc RANGE to 0. Set INPUT ATTEN to 100.

 15. INTER

Connect X1 probe to J101, Pin 5; change Test Scope TIME/DIV to 1 μ SEC, and test Generator Density to 125:100. On the Test Scope, you should have several pulses with a period of about 2 μ SEC, and a pulse width of about 1 μ SEC, and an amplitude of about 4 volts (0.8 cm). On Test Generator, change RASTER-SINGLE DOT to single DOT, Note that the pulses disappears and that the level goes to about +5 volts (1 cm) RASTER-SINGLE DOT back to RASTER; pulse reappear. Change CONT-READY-SINGLE to READY. Note that pulses disappears and level goes to about +5 V. CONT-READY-SINGLE to SINGLE; pulses on screen for a short period of time, then disappears. Change CONT-READY-SINGLE to CONT; pulses reappears. Change OUTPUT SIGNAL SOURCE NORM-HARD COPY to NORM; pulses disappears and level goes to about +12 V (2.4 cm). Change control back to HARD-COPY. Remove X1 probe from J101. Pin 5.

 16. READ

Connect a 10K, 1/4 W, 10% resistor from J101, Pin 8 to +12 V (Pin 5 J102).

Connect X1 probe from TYPE W A INPUT to J101, Pin 8. Should have 0 V on the Test Scope. Change OUTPUT SIGNAL SOURCE NORM-HARDCOPY to NORM; level should go to +12 V (2.4CM). Change OUTPUT SIGNAL SOURCE to HARDCOPY; level should be 0 Volts. Remove 10K resistor and X1 probe.

17. REMOTE PROGRAM TEST

a. Hard Copy Connector (15 pins)

Shut the Test Display Generator power off. With a multimeter check continuity between Pin 3 of the Hardcopy Connector, (smaller of the two), and Pin 1 of J101 (TEST BOARD). Check continuity between Pin 1 of the Hardcopy Connector and Pin 4 of J101. Check continuity between Pin 5 of the Hardcopy Connector and Pin 5 of J101. Check continuity between Pin 9 of the Hardcopy Connector and Pin 8 of J101. Check continuity between ground and Pins 2, 4, 6, and 15 of the Hardcopy Connector. Change X:Y HORIZ - Y:X VERT. Check for continuity between Pin 1 of the Hardcopy Connector and Pin 1 of J101. Check for continuity between Pin 3 of the Hardcopy Connector and Pin 4 of J101. Set NORM-HARDCOPY to NORM.

b. Norm Connector (25 Pins)

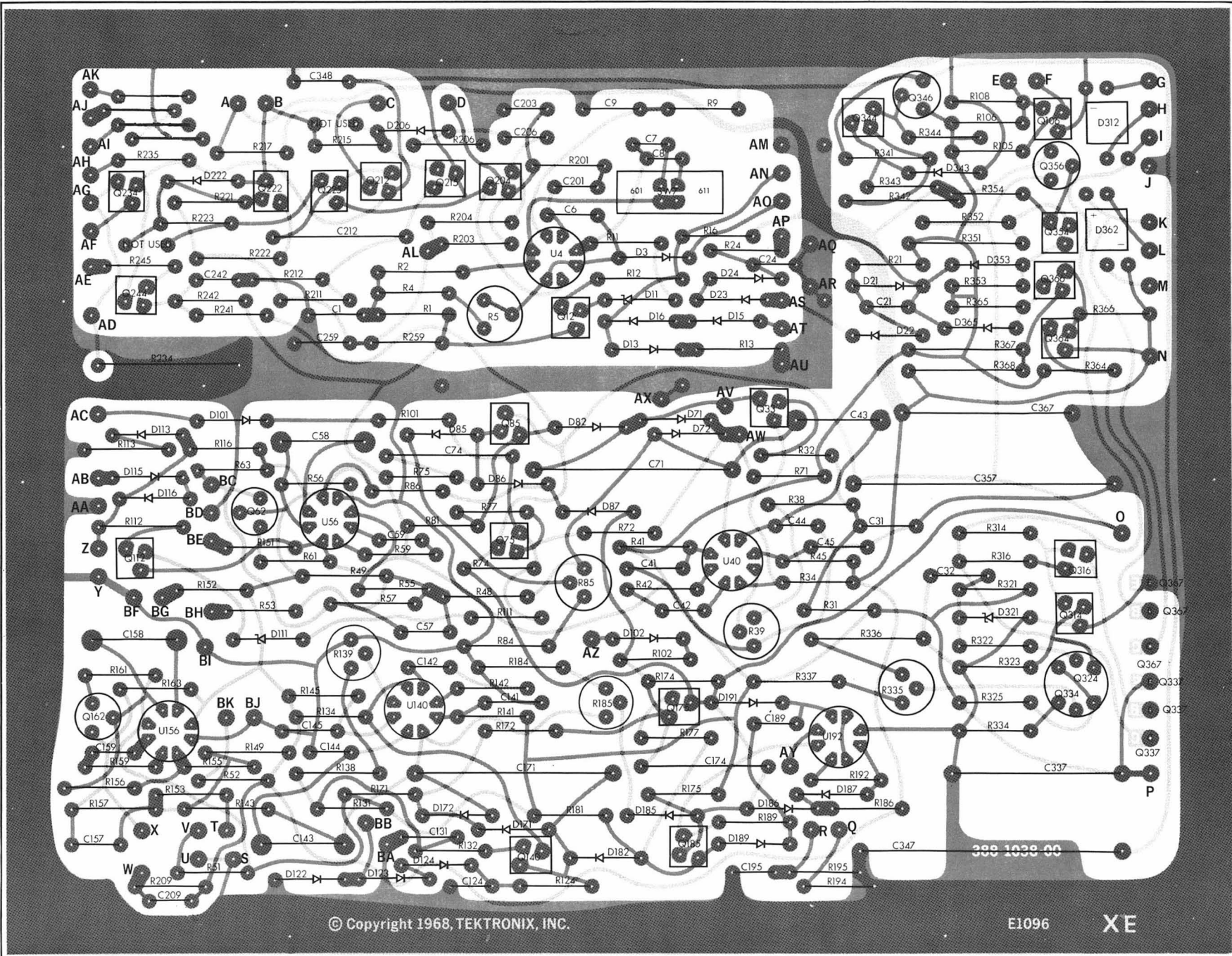
Using the multimeter, check for continuity between Pin 4 of the Remote Program Test Connector and Z OUT. Check continuity between Pin 15 and Y OUT. Check continuity between Pin 1 and X OUT. Check continuity between ground and Pins 2, 3, 5, 14, 16 and 17.

Connect the meter between Pin 6 and ground. Check for a short. Set the NON STORE - STORE ERASE switch to STORE: meter should read an open. Connect the meter between Pin 18 and ground; should read an open. Depress switch to erase and you should read a short. Return the switch to NON STORE.

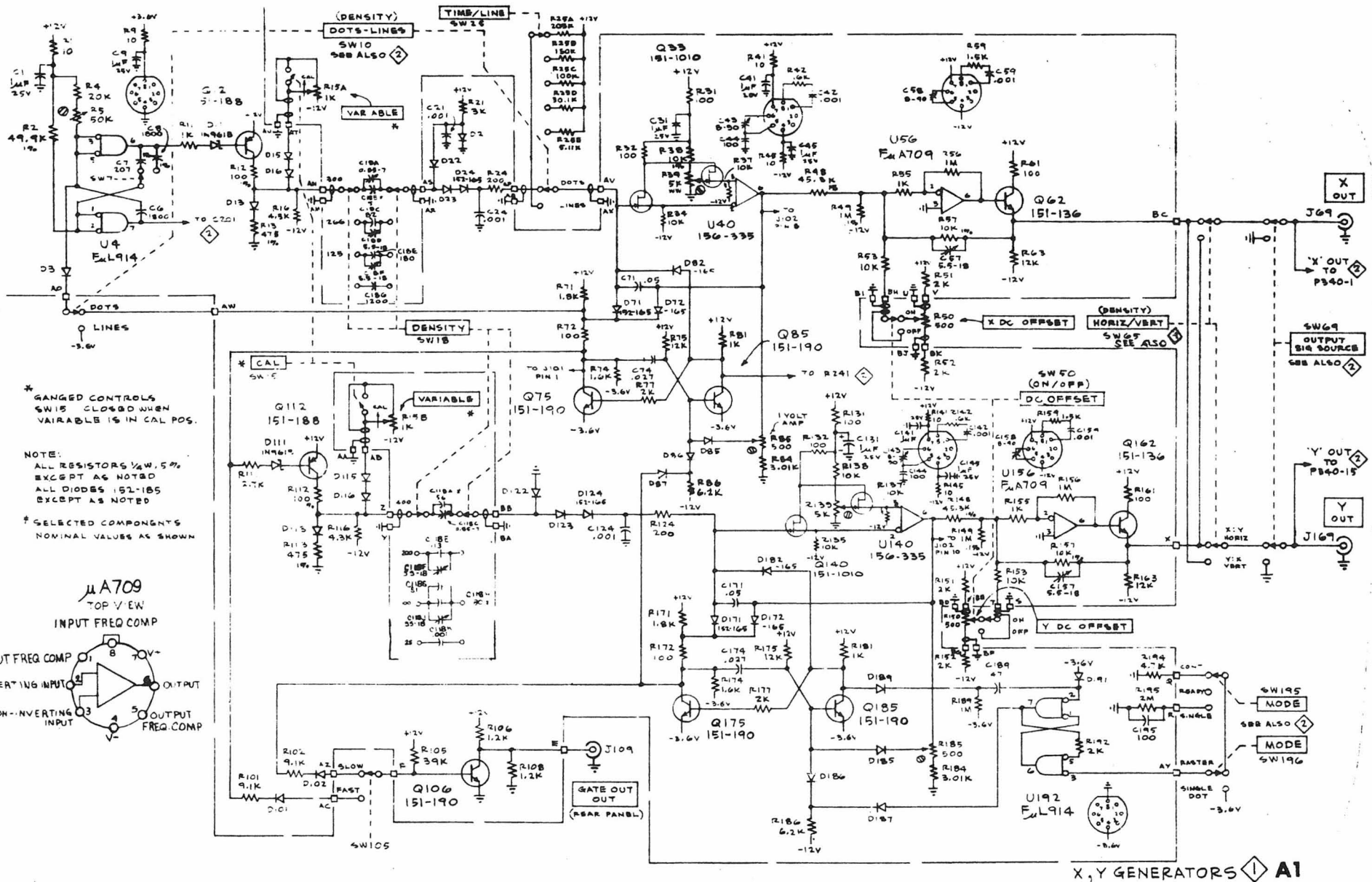
Connect the meter between Pin 20 and ground; should read an open. Set the VIEW-OFF switch to VIEW; the meter should indicate a short. Set VIEW-OFF to OFF.

Connect the meter between Pin 8 and ground. Meter should indicate an open. Place the WRITE THROUGH-OFF switch to WRITE THROUGH; meter should indicate a short. Set WRITE THROUGH-OFF to OFF.

SECTION 6
DIAGRAMS



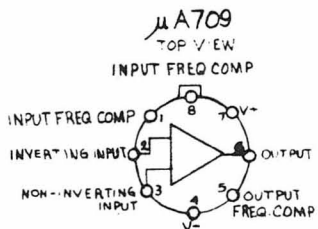
388 1038 00



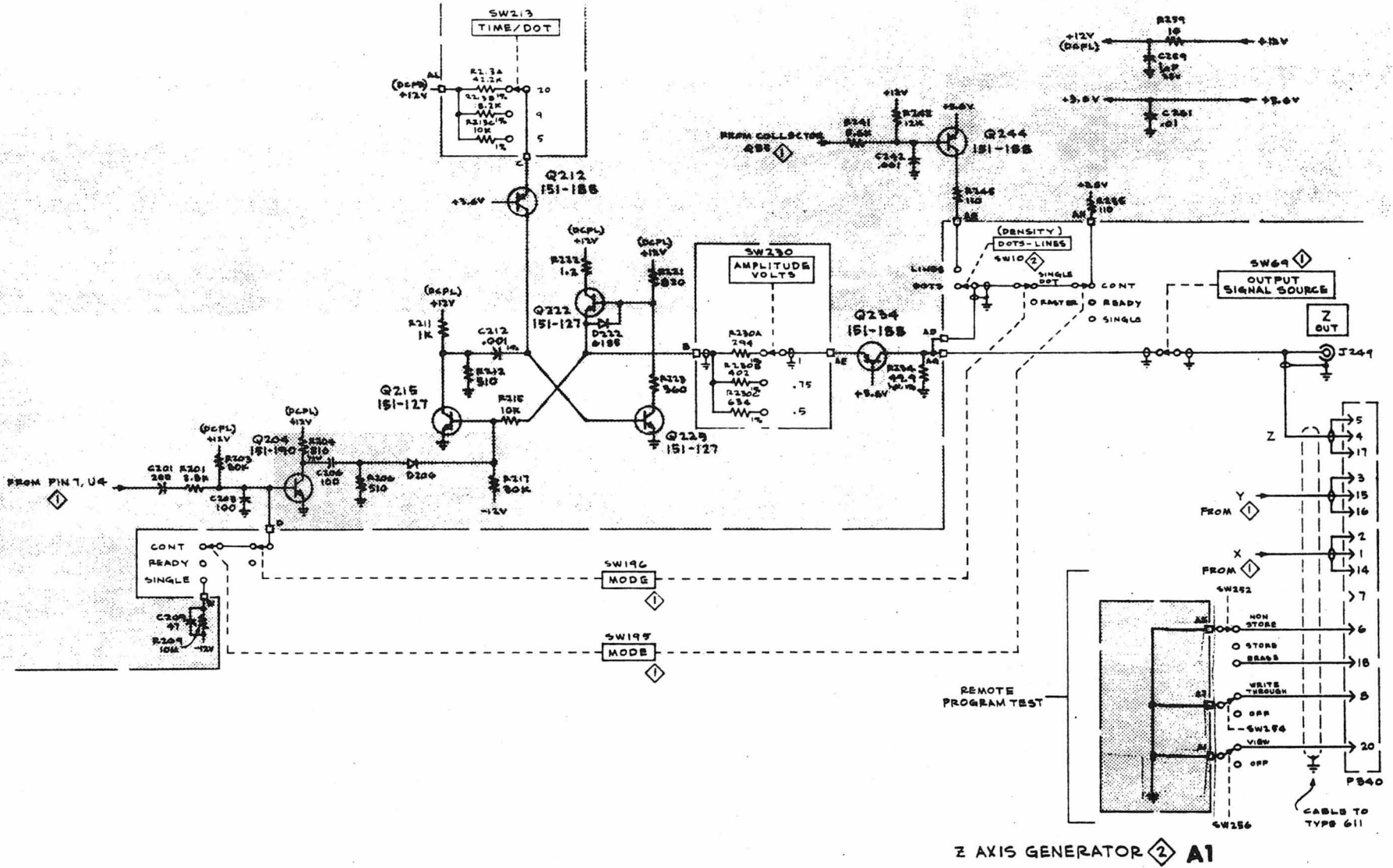
* GANGED CONTROLS SW18 CLOSED WHEN VARIABLE IS IN CAL POS.

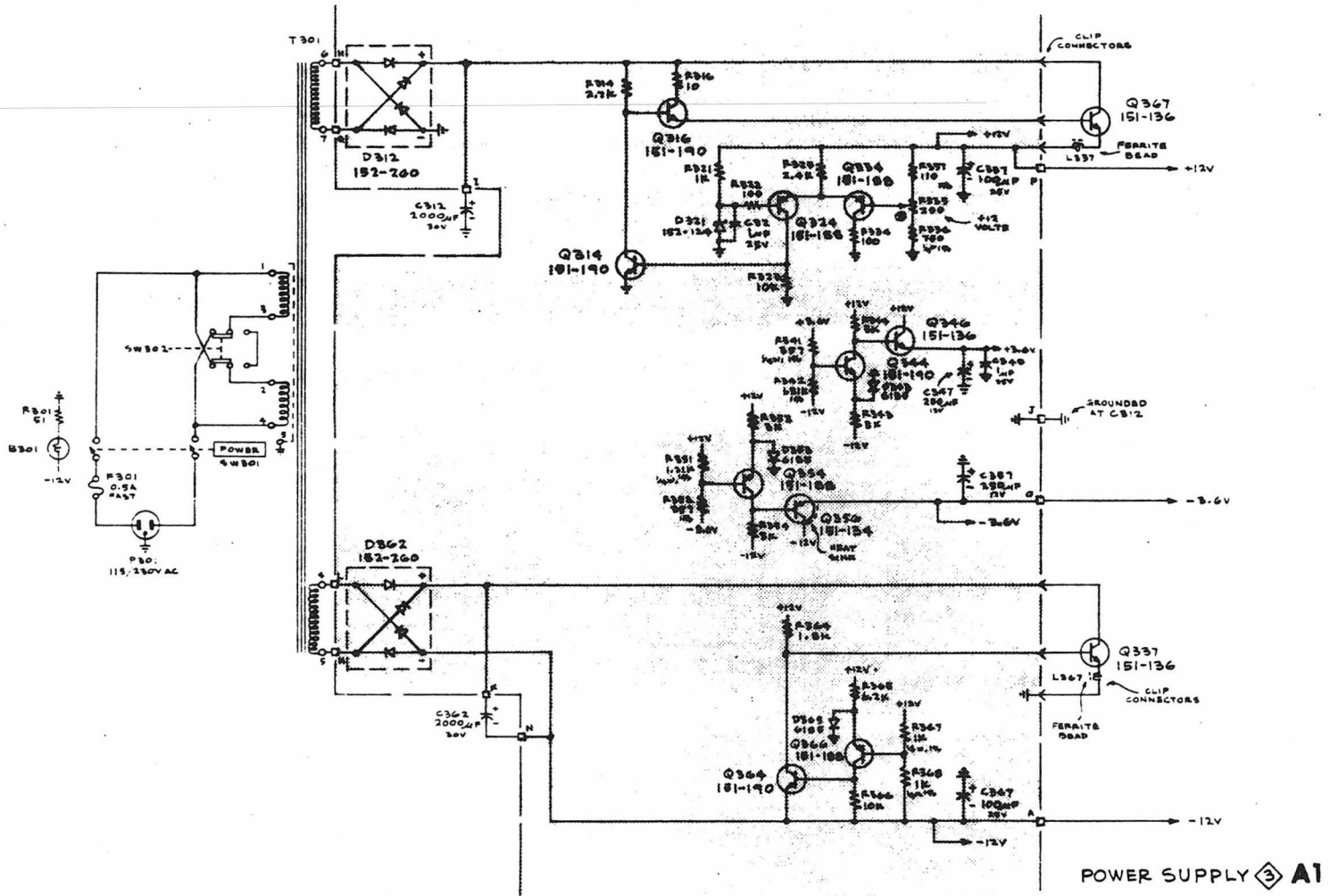
NOTE: ALL RESISTORS 1/4W, 5% EXCEPT AS NOTED ALL DIODES 151-185 EXCEPT AS NOTED

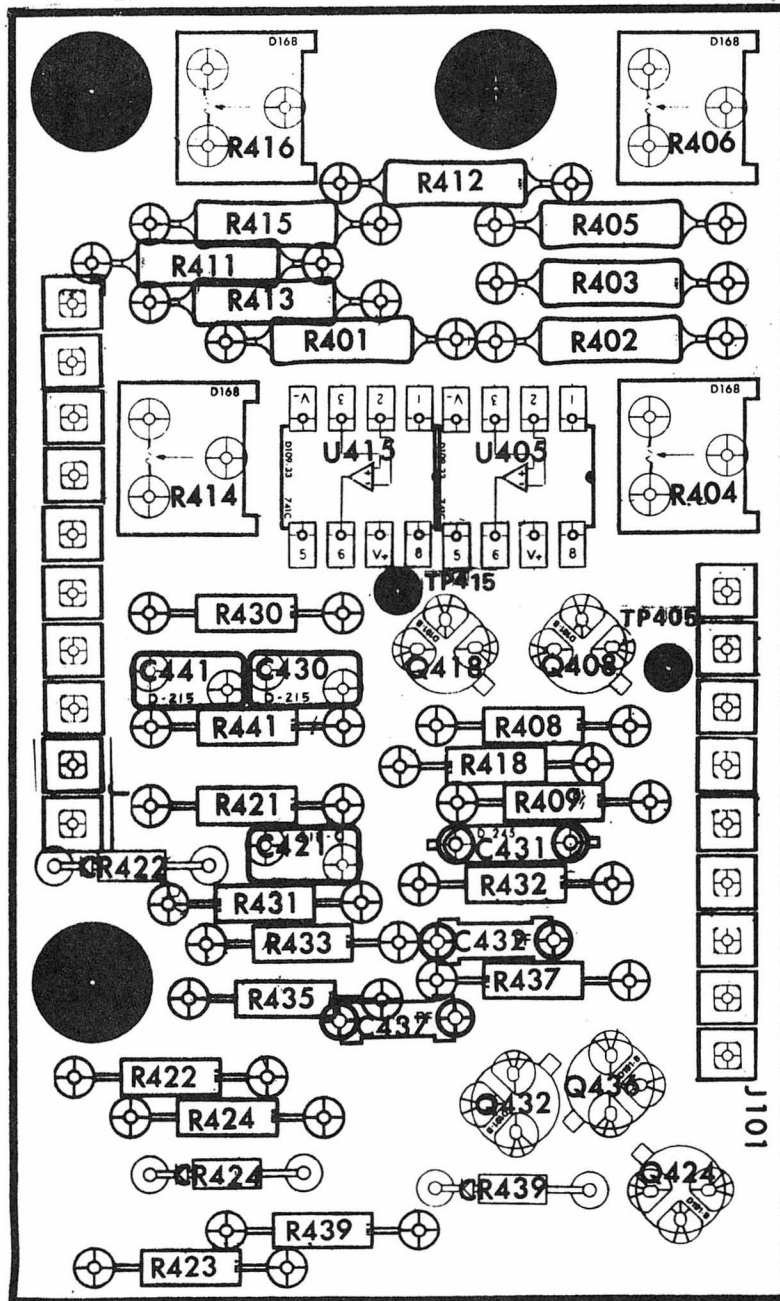
* SELECTED COMPONENTS NOMINAL VALUES AS SHOWN



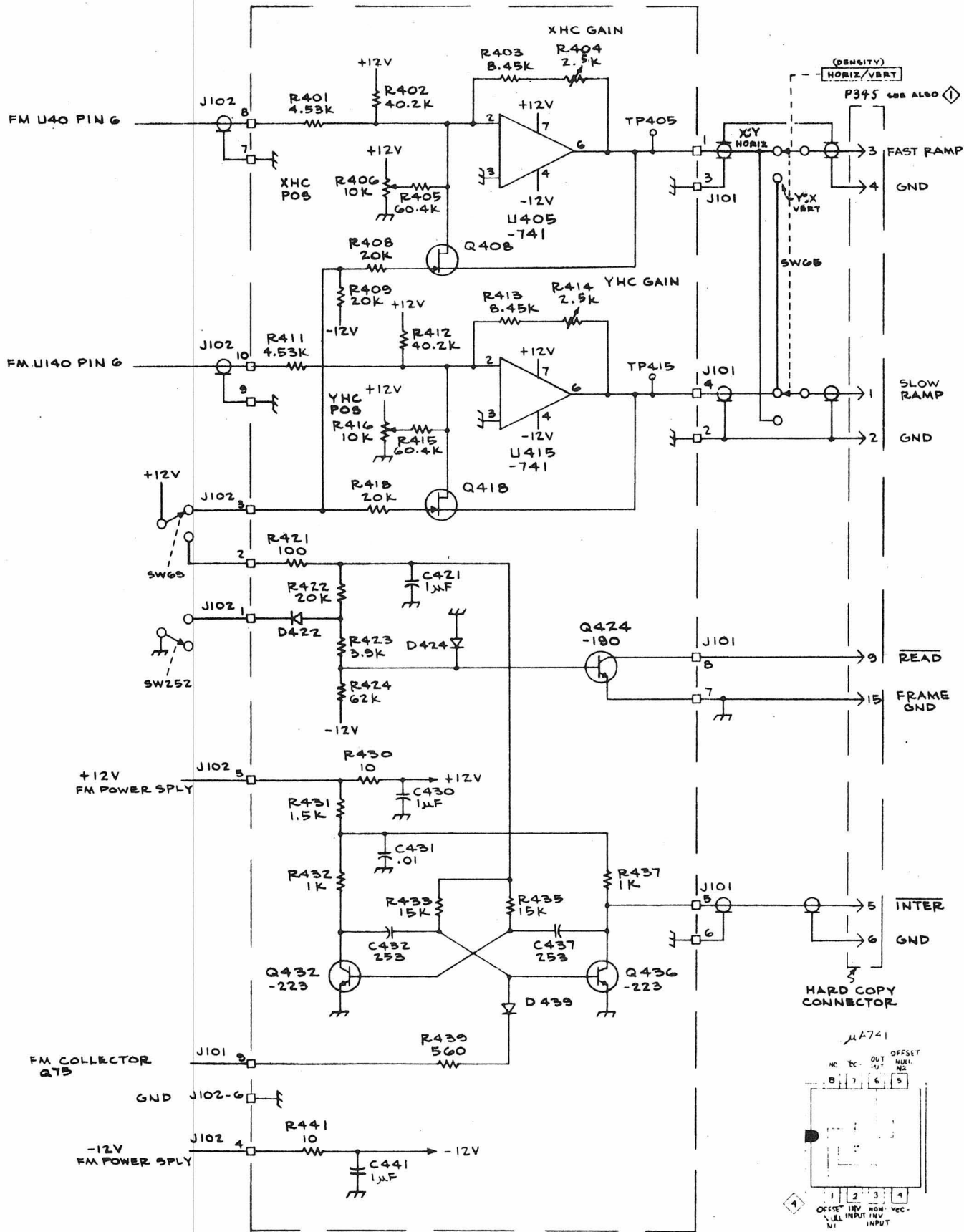
X, Y GENERATORS \diamond A1



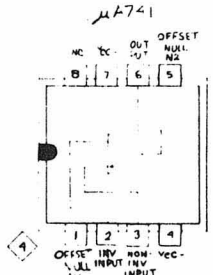




TEST BOARD A2



TEST BOARD A2



SECTION 7

Electrical Parts List

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff Disc	Description
ASSEMBLIES			
A1	670-0612-01		Circuit Board Assembly--RASTOR GENERATOR
A2	670-2735-00		Circuit Board Assembly--TEST
BULB			
B301	150-0065-00		Incandescent, 10 V, 40 mA, green lens
CAPACITORS			
Tolerance $\pm 20\%$ unless otherwise indicated.			
C1	283-0059-00	1 μF	Cer 25 V +80%-20%
C6	283-0626-00	1800 pF	(Nominal Value Selected)
C7	283-0604-00	304 pF	Mica 300 V 2%
C8	283-0626-00	1800 pF	Mica 5%
C9	283-0059-00	1 μF	Cer 25 V +80%-20%
C18A	281-0121-00	0.85-7 pF	Var
C18B	283-0616-00	75 pF	Mica 100 V 1%
C18C	283-0534-00	82 pF	Mica 100 V 1%
C18D	281-0061-00	5.5-18 pF	Var
C18E	283-0641-00	180 pF	Mica 100 V 1%
C18F	281-0061-00	5.5-18 pF	Var Cer
C18G	283-0623-00	1200 pF	Mica 100 V 1%
C21	283-0000-00	0.001 μF	Cer 500 V
C24	283-0000-00	0.001 μF	Cer 500 V
C31	283-0059-00	1 μF	Cer 25 V +80%-20%
C41	283-0059-00	1 μF	Cer 25 V +80%-20%
C42	283-0000-00	0.001 μF	Cer 500 V
C43	281-0118-00	8-90 pF	Var Mica
C44	281-0523-00	100 pF	Cer 350 V
C45	283-0059-00	1 μF	Cer 25 V +80%-20%
C57	281-0093-00	5.5-18 pF	Var Cer
C58	281-0118-00	8-90 pF	Var Mica

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff Disc	Description
CAPACITORS (CONT)			
C59	283-0000-00	0.001 μ F	Cer 500 V
C71	285-0689-00	0.05 μ F	MT 25 V 3 1/2%
C74	285-0624-00	0.027 μ F	PTM 100 V 10%
C118A	283-0639-00	56 pF	Mica 100 V 1%
C118C	281-0121-00	0.85-7 pF	Var
C118E	283-0063-00	113 pF	Mica 100 V 1%
C118F	283-0061-00	5.5-18 pF	Var Cer
C118G	283-0635-00	51 pF	Mica 100 V 1%
C118H	283-0641-00	180 pF	(Nominal Value Selected)
C118J	281-0061-00	5.5-18 pF	Var Cer
C118K	283-0594-00	0.001 μ F	Mica 100 V 1%
C124	283-0000-00	0.001 μ F	Cer 500 V 1%
C131	283-0059-00	1 μ F	Cer 25 V +80%-20%
C141	283-0059-00	1 μ F	Cer 25 V +80%-20%
C142	283-0000-00	0.001 μ F	Cer 500 V
C143	281-0118-00	8-90 pF	Var Mica
C144	281-0523-00	100 pF	Cer 350 V
C145	283-0059-00	1 μ F	Cer 25 V +80%-20%
C157	281-0093-00	5.5-18 pF	Var Cer
C158	281-0118-00	8-90 pF	Var Mica
C159	283-0000-00	0.001 μ F	Cer 500 V
C171	285-0689-00	0.05 μ F	MT 25 V 3 1/2%
C174	285-0624-00	0.027 μ F	PTM 100 V 10%
C189	283-0115-00	47 μ F	Cer 200 V 5%
C195	281-0523-00	100 pF	Cer 350 V
C201	281-0605-00	200 pF	Cer 500 V
C203	281-0523-00	100 pF	Cer 350 V
C206	281-0523-00	100 pF	Cer 350 V
C209	283-0115-00	47 pF	Cer 200 V 5%
C212	285-0597-00	0.001 μ F	PTM 100 V 1%
C242	283-0000-00	0.001 μ F	Cer 500 V
C259	283-0059-00	1 μ F	Cer 25 V +80%-20%

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
CAPACITORS (CONT)						
C261	283-0072-01		0.01 μ F	Cer		
C312	290-0086-00		2000 μ F	Elect.	30 V	
C321	283-0059-00		1 μ F	Cer	25 V	+80%-20%
C337	290-0215-00		100 μ F	Elect.	25 V	
C347	290-0217-00		250 μ F	Elect.	12 V	
C348	283-0059-00		1 μ F	Cer	25 V	+80%-20%
C357	290-0217-00		250 μ F	Elect.	12 V	
C362	290-0086-00		2000 μ F	Elect.	30 V	
C367	290-0215-00		100 μ F	Elect.	25 V	
C421	283-0177-00		1 μ F	Cer	25 V	+80%-20%
C430	283-0177-00		1 μ F	Cer	25 V	+80%-20%
C431	283-0003-00		0.01 μ F	Cer	150 V	+80%-20%
C432	283-0598-00		253 pF	Mica	300 V	5%
C437	283-0598-00		253 pF	Mica	300 V	5%
C441	283-0177-00		1 μ F	Cer	25 V	+80%-20%

SEMICONDUCTOR DEVICE, DIODES

D3	152-0185-00	Silicon	Replaceable by 1N4152
D11	152-0149-00	Zener	1N961B 400 mW, 10 V, 5%
D15	152-0185-00	Silicon	Replaceable by 1N4152
D16	152-0185-00	Silicon	Replaceable by 1N4152
D21	152-0185-00	Silicon	Replaceable by 1N4152
D22	152-0185-00	Silicon	Replaceable by 1N4152
D23	152-0185-00	Silicon	Replaceable by 1N4152
D24	152-0165-00	Silicon	Tek Spec
D71	152-0165-00	Silicon	Tek Spec
D72	152-0185-00	Silicon	Replaceable by 1N4152
D82	152-0165-00	Silicon	Tek Spec
D85	152-0185-00	Silicon	Replaceable by 1N4152
D86	152-0185-00	Silicon	Replaceable by 1N4152
D87	152-0185-00	Silicon	Replaceable by 1N4152
D101	152-0185-00	Silicon	Replaceable by 1N4152
D102	152-0165-00	Silicon	Replaceable by 1N4152
D111	152-0149-00	Zener	1N961B 400mW, 10 V, 5%
D113	152-0185-00	Silicon	Replaceable by 1N4152
D115	152-0185-00	Silicon	Replaceable by 1N4152
D116	152-0185-00	Silicon	Replaceable by 1N4152

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
SEMICONDUCTOR DEVICE, DIODES (CONT)				
D122	152-0185-00		Silicon	Replaceable by 1N4152
D123	152-0185-00		Silicon	Replaceable by 1N4152
D124	152-0165-00		Silicon	Tek Spec
D171	152-0165-00		Silicon	Tek Spec
D172	152-0165-00		Silicon	Tek Spec
D182	152-0165-00		Silicon	Tek Spec
D185	152-0185-00		Silicon	Replaceable by 1N4152
D186	152-0185-00		Silicon	Replaceable by 1N4152
D187	152-0185-00		Silicon	Replaceable by 1N4152
D189	152-0185-00		Silicon	Replaceable by 1N4152
D191	152-0185-00		Silicon	Replaceable by 1N4152
D206	152-0185-00		Silicon	Replaceable by 1N4152
D222	152-0185-00		Silicon	Replaceable by 1N4152
D312	152-0260-00		Silicon	Tek Spec
D321	152-0124-00		Zener	1N938A 500mW, 9.1 V, 5%, TC
D343	152-0185-00		Silicon	Replaceable by 1N4152
D353	152-0185-00		Silicon	Replaceable by 1N4152
D362	152-0260-00		Silicon	Tek Spec
D365	152-0185-00		Silicon	Replaceable by 1N4152
D422	152-0141-02		Silicon	1N4152
D424	152-0141-02		Silicon	1N4152
D439	152-0141-02		Silicon	1N4152
FUSE				
F301	159-0025-00		1/2 A	3AG Fast-Blo
CONNECTORS				
J69	131-0106-00		Coax, 1 contact, female	
J109	131-0106-00		Coax, 1 contact, female	
J169	131-0106-00		Coax, 1 contact, female	
J249	131-0106-00		Coax, 1 contact, female	

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
INDUCTORS				
L337	276-0507-00			Core, ferramic suppressor
L367	276-0507-00			Core, ferramic suppressor
TRANSISTORS				
Q12	151-0188-00		Silicon	2N3906
Q33	151-1010-00		FET	DUAL
Q62	151-0136-00		Silicon	Replaceable by 2N3053
Q75	151-0190-00		Silicon	2N3904
Q85	151-0190-00		Silicon	2N3904
Q106	151-0190-00		Silicon	2N3904
Q112	151-0188-00		Silicon	2N3906
Q140	151-1010-00		FET	DUAL
Q162	151-0136-00		Silicon	Replaceable by 2N3053
Q175	151-0190-00		Silicon	2N3904
Q185	151-0190-00		Silicon	2N3904
Q204	151-0190-00		Silicon	2N3904
Q212	151-0188-00		Silicon	2N3906
Q215	151-0127-00		Silicon	Selected from 2N2369
Q222	151-0127-00		Silicon	Selected from 2N2369
Q225	151-0127-00		Silicon	Selected from 2N2369
Q234	151-0188-00		Silicon	2N3906
Q244	151-0188-00		Silicon	2N3906
Q314	151-0190-00		Silicon	2N3904
Q316	151-0190-00		Silicon	2N3904
Q324	151-0188-00		Silicon	2N3906
Q334	151-0188-00		Silicon	2N3906
Q337	151-0136-00		Silicon	Replaceable by 2N3053
Q344	151-0190-00		Silicon	2N3904
Q346	151-0136-00		Silicon	Replaceable by 2N3053

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
TRANSISTORS (CONT)				
Q354	151-0188-00		Silicon	2N3906
Q356	151-0134-00		Silicon	Selected from 2N2905
Q364	151-0190-00		Silicon	2N3904
Q366	151-0188-00		Silicon	2N3906
Q367	151-0136-00		Silicon	Replaceable by 2N3053
Q408	151-1004-00		Silicon, FE	Selected from 2N4302
Q418	151-1004-00		Silicon, FE	Selected from 2N4302
Q424	151-0190-00		Silicon	2N3904
Q432	151-0223-00		Silicon, NPN,	2N4275
Q436	151-0223-00		Silicon, NPN,	2N4275

RESISTORS

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

R1	315-0100-00	10 Ω	1/4 W		5%
R2	321-0356-00	49.9 k Ω	1/8 W	Prec	1%
R4	315-0203-00	20 k Ω	1/4 W		5%
R5	311-0497-00	50 k Ω	Var		
R9	315-0100-00	10 Ω	1/4 W		5%
R11	315-0102-00	1 k Ω	1/4 W		5%
R12	321-0097-00	100 Ω	1/8 W	Prec	1%
R13	321-0162-00	475 Ω	1/8 W	Prec	1%
R15A,B ¹	311-0876-00	2 X 1 k Ω	Var		
R16	315-0432-00	4.3 k Ω	1/4 W		5%
R21	315-0302-00	3 k Ω	1/4 W		5%
R24	315-0201-00	200 Ω	1/4 W		5%
R25A	321-0415-00	205 k Ω	1/8 W	Prec	1%
R25B	321-0402-00	150 k Ω	1/8 W	Prec	1%
R25C	321-0385-00	100 k Ω	1/8 W	Prec	1%
R25D	321-0335-00	30.1 k Ω	1/8 W	Prec	1%
R25E	321-0261-00	5.11 k Ω	1/8 W	Prec	1%
R31	315-0101-00	100 Ω	1/4 W		5%
R32	315-0101-00	100 Ω	1/4 W		5%
R34	315-0103-00	10 k Ω	1/4 W		5%
R37	315-0103-00	10 k Ω	1/4 W		5%

¹Furnished as a unit with SW15.

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
RESISTORS (CONT)						
R38	321-0289-00		10 k Ω	1/8 W	Prec	1%
R39	311-0601-00		5 k Ω , Var			
R41	315-0100-00		10 Ω	1/4 W		5%
R42	315-0162-00		1.6 k Ω	1/4 W		5%
R45	315-0100-00		10 Ω	1/4 W		5%
R48	321-0352-00		45.3 k Ω	1/8 W	Prec	1%
R49	321-0481-00		1 M Ω	1/8 W	Prec	1%
R50	311-0332-00		500 Ω , Var			
R51	315-0202-00		2 k Ω	1/4 W		5%
R52	315-0202-00		2 k Ω	1/4 W		5%
R53	315-0103-00		10 k Ω	1/4 W		5%
R55	315-0102-00		1 k Ω	1/4 W		5%
R56	315-0105-00		1 M Ω	1/4 W		5%
R57	321-0289-00		10 k Ω	1/8 W	Prec	1%
R59	315-0152-00		1.5 k Ω	1/4 W		5%
R61	315-0101-00		100 Ω	1/4 W		5%
R63	315-0123-00		12 k Ω	1/4 W		5%
R71	315-0182-00		1.8 k Ω	1/4 W		5%
R72	315-0101-00		100 Ω	1/4 W		5%
R74	315-0162-00		1.6 k Ω	1/4 W		5%
R75	315-0123-00		12 k Ω	1/4 W		5%
R77	315-0202-00		2 k Ω	1/4 W		5%
R81	315-0102-00		1 k Ω	1/4 W		5%
R84	321-0239-00		3.01 k Ω	1/8 W	Prec	1%
R85	311-0658-00		500 Ω , Var			
R86	315-0622-00		6.2 k Ω	1/4 W		5%
R101	315-0912-00		9.1 k Ω	1/4 W		5%
R102	315-0912-00		9.1 k Ω	1/4 W		5%
R105	315-0393-00		39 k Ω	1/4 W		5%
R106	315-0122-00		1.2 k Ω	1/4 W		5%

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description	
RESISTORS (cont)					
R108	315-0122-00		1.2 k Ω	1/4 W	5%
R111	315-0272-00		2.7 k Ω	1/4 W	5%
R112	321-0097-00		100 Ω	1/8 W	Prec 1%
R113	321-0162-00		475 Ω	1/8 W	Prec 1%
R116	315-0432-00		4.3 k Ω	1/4 W	5%
R124	315-0201-00		200 Ω	1/4 W	5%
R131	315-0101-00		100 Ω	1/4 W	5%
R132	315-0101-00		100 Ω	1/4 W	5%
R134	315-0103-00		10 k Ω	1/4 W	5%
R137	321-0103-00		10 k Ω	1/8 W	Prec 5%
R138	321-0289-00		10 k Ω	1/8 W	Prec 1%
R139	311-0601-00		5 k Ω , Var		
R141	315-0100-00		10 Ω	1/4 W	5%
R142	315-0162-00		1.6 k Ω ,	1/4 W	5%
R145	315-0100-00		10 Ω	1/4 W	5%
R148	321-0352-00		45.3 k Ω	1/8 W	Prec 1%
R149	321-0481-00		1 m Ω	1/8 W	Prec 1%
R150	311-0332-00		500 Ω , Var		
R151	315-0202-00		2 k Ω	1/4 W	5%
R152	315-0202-00		2 k Ω	1/4 W	5%
R153	315-0103-00		10 k Ω	1/4 W	5%
R155	315-0102-00		1 k Ω	1/4 W	5%
R156	315-0105-00		1 M Ω	1/4 W	5%
R157	321-0289-00		10 k Ω	1/8 W	Prec 1%
R159	315-0152-00		1.5 k Ω	1/4 W	5%
R161	315-0101-00		100 Ω	1/4 W	5%
R163	315-0123-00		12 k Ω	1/4 W	5%
R171	315-0182-00		1.8 k Ω	1/4 W	5%
R172	315-0101-00		100 Ω	1/4 W	5%
R174	315-0162-00		1.6 k Ω	1/4 W	5%
R175	315-0123-00		12 k Ω	1/4 W	5%

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description	
RESISTORS (CONT)					
R177	315-0202-00	2 k Ω	1/4 W		5%
R181	315-0102-00	1 k Ω	1/4 W		5%
R184	321-0239-00	3.01 k Ω	1/8 W	Prec	1%
R185	311-0658-00	500 Ω , Var			
R186	315-0622-00	6.2 k Ω	1/4 W		5%
R189	315-0105-00	1 M Ω	1/4 W		5%
R192	315-0202-00	2 k Ω	1/4 W		5%
R194	315-0472-00	4.7 k Ω	1/4 W		5%
R195	315-0205-00	2 M Ω	1/4 W		5%
R201	315-0332-00	3.3 k Ω	1/4 W		5%
R203	315-0303-00	30 k Ω	1/4 W		5%
R204	301-0511-00	510 Ω	1/2 W		5%
R206	315-0511-00	510 Ω	1/4 W		5%
R209	315-0106-00	10 M Ω	1/4 W		5%
R211	315-0102-00	1 k Ω	1/4 W		5%
R212	315-0511-00	510 Ω	1/4 W		5%
R213A	321-0349-00	42.2 k Ω	1/8 W	Prec	1%
R213B	321-0314-00	18.2 k Ω	1/8 W	Prec	1%
R213C	321-0289-00	10 k Ω	1/8 W	Prec	1%
R215	315-0103-00	10 k Ω	1/4 W		5%
R217	315-0303-00	30 k Ω	1/4 W		5%
R221	315-0821-00	820 Ω	1/4 W		5%
R222	307-0093-00	1.2 Ω	1/2 W		5%
R223	315-0361-00	360 Ω	1/4 W		5%
R230A	321-0142-00	294 Ω	1/8 W	Prec	1%
R230B	321-0155-00	402 Ω	1/8 W	Prec	1%
R230C	321-0174-00	634 Ω	1/8 W	Prec	1%
R234	323-0068-00	49.9 Ω	1/2 W	Prec	1%
R235	315-0111-00	110 Ω	1/4 W		5%
R241	315-0562-00	5.6 k Ω	1/4 W		5%

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
RESISTORS (CONT)						
R242	315-0123-00		12 k Ω	1/4 W		5%
R245	315-0111-00		110 Ω	1/4 W		5%
R259	315-0100-00		10 Ω	1/4 W		5%
R301	315-0510-00		51 Ω	1/4 W		5%
R314	315-0272-00		2.7 k Ω	1/4 W		5%
R316	315-0100-00		10 Ω	1/4 W		5%
R321	315-0102-00		1 k Ω	1/4 W		5%
R322	315-0101-00		100 Ω	1/4 W		5%
R323	315-0103-00		10 k Ω	1/4 W		5%
R325	315-0242-00		2.4 k Ω	1/4 W		5%
R334	315-0101-00		100 Ω	1/4 W		5%
R335	311-0515-00		250 Ω , Var			
R336	322-0181-00		750 Ω	1/4 W	Prec	1%
R337	321-0101-00		110 Ω	1/8 W	Prec	1%
R341	321-0150-00		357 Ω	1/8 W	Prec	1%
R342	322-0201-00		1.21 k Ω	1/4 W	Prec	1%
R343	315-0302-00		3 k Ω	1/4 W		5%
R344	315-0302-00		3 k Ω	1/4 W		5%
R351	322-0201-00		1.21 k Ω	1/4 W	Prec	1%
R352	321-0150-00		357 Ω	1/8 W	Prec	1%
R353	315-0302-00		3 k Ω	1/4 W		5%
R354	315-0302-00		3 k Ω	1/4 W		5%
R364	315-0182-00		1.8 k Ω	1/4 W		5%
R365	315-0622-00		6.2 k Ω	1/4 W		5%
R366	315-0103-00		10 k Ω	1/4 W		5%
R367	322-0193-00		1 k Ω	1/4 W	Prec	1%
R368	322-0193-00		1 k Ω	1/4 W	Prec	1%
R401	321-0256-00		4.53 k Ω	1/4 W		1%
R402	321-0347-00		40.2 k Ω	1/4 W		1%
R403	321-0282-00		8.45 k Ω	1/4 W		1%
R404	311-1226-00		2.5 k Ω , Var	1/2 W		20%
R405	321-0364-00		60.4 k Ω	1/4 W		1%

Electrical Parts List--Type 067-0561-01

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff Disc	Description
RESISTORS (CONT)			
R406	311-1228-00	10 k Ω , Var	1/2 W 20%
R408	315-0203-00	20 k Ω	1/4 W 5%
R409	315-0203-00	20 k Ω	1/4 W 5%
R411	321-0256-00	4.53 k Ω	1/4 W 1%
R412	321-0347-00	40.2 k Ω	1/4 W 1%
R413	321-0282-00	8.45 k Ω	1/4 W 1%
R414	311-1226-00	2.5 k Ω , Var	1/2 W 20%
R415	321-0364-00	60.4 k Ω	1/4 W 1%
R416	311-1228-00	10 k Ω , Var	1/2 W 20%
R418	315-0203-00	20 k Ω	1/4 W 5%
R421	315-0101-00	100 Ω	1/4 W 5%
R422	315-0203-00	20 k Ω	1/4 W 5%
R423	315-0392-00	3.9 k Ω	1/4 W 5%
R424	315-0623-00	62 k Ω	1/4 W 5%
R430	315-0100-00	10 k Ω	1/4 W 5%
R431	315-0152-00	1.5 k Ω	1/4 W 5%
R432	315-0102-00	1 k Ω	1/4 W 5%
R433	315-0153-00	15 k Ω	1/4 W 5%
R435	315-0153-00	15 k Ω	1/4 W 5%
R437	315-0102-00	1 k Ω	1/4 W 5%
R439	315-0561-00	560 Ω	1/4 W 5%
R441	315-0100-00	10 Ω	1/4 W 5%
SWITCHES			
	Wired or Unwired		
SW7	260-0960-00	Slide	
SW10	260-0711-00	Lever	DOTS-LINES
SW15 ¹	311-0876-00		
SW18	260-1056-00	Rotary	DENSITY
SW25	260-1058-00	Rotary	TIME/LINE
SW50	260-0511-00	B010100 B019999	Toggle ON-OFF
SW50	260-0834-00	B020000	Toggle ON-OFF
SW65	260-0711-00	Lever	HORIZ/VERT
SW69	260-0711-00	Lever	OUTPUT SIGNAL SOURCE
SW105	260-0449-00	Slide	FAST-SLOW
SW195	260-1057-00	Lever	MODE-CONT READY SINGLE

¹Furnished as a unit with R15A,B.

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
SWITCHES (CONT)				
SW196	260-0711-00		Lever	MODE-RASTER SINGLE DOT
SW213	260-1059-00		Rotary	TIME/DOT
SW230	260-1059-00		Rotary	AMPLITUDE VOLTS
SW252	260-0501-00		Lever	NON STORE-STORE-ERASE
SW254	260-0613-00		Toggle	WRITE THROUGH-OFF
SW256	260-0613-00		Toggle	VIEW-OFF
SW301	260-0834-00		Toggle	POWER ON
SW302	260-0675-01		Slide	115V-230V
TRANSFORMER				
T301	120-0592-00		Power	
INTEGRATED CIRCUITS				
U4	156-0011-00		Dual 2-input nand/nor gate, replaceable by Fairchild μ L914	
U40	156-0015-00		Oper. Ampl. μ A709	
U56	156-0015-00		Oper. Ampl. μ A709	
U140	156-0015-00		Oper. Ampl. μ A709	
U156	156-0015-00		Oper. Ampl. μ A709	
U192	156-0011-00		Dual 2-input nand/nor gate, replaceable by Fairchild μ L914	
U405	156-0067-00		Oper. Ampl. μ A741C	
U415	156-0067-00		Oper. Ampl. μ A741C	

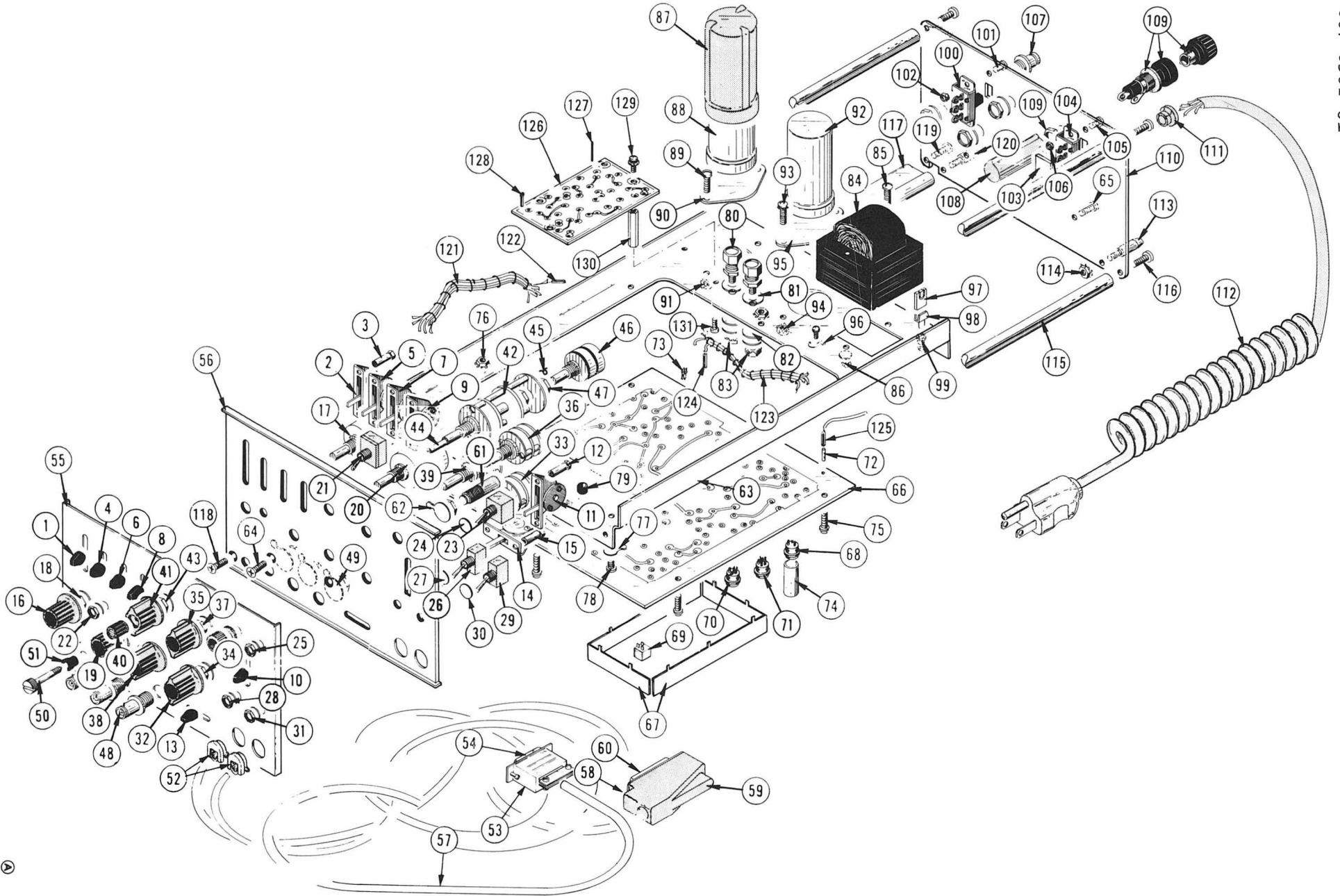


FIG. 1 EXPLODED

FIG. 1 EXPLODED

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description	
				Y	1	2	3	4		5
1-1	366-0215-02			1						1 KNOB, lever -- CONT READY SINGLE
-2	260-1057-00			1						1 SWITCH, lever -- CONT READY SINGLE
	- - - - -			-						mounting hardware: (not included w/switch)
-3	220-0413-00			2						2 NUT, switch mounting
-4	366-0215-02			1						1 KNOB, lever -- RASTER SINGLE DOT
-5	260-0711-00			1						1 SWITCH, lever -- RASTER SINGLE DOT
	- - - - -			-						mounting hardware: (not included w/switch)
	220-0413-00			2						2 NUT, switch mounting
-6	366-0215-02			1						1 KNOB, lever -- X:Y HORIZ Y:X VERT
-7	260-0711-00			1						1 SWITCH, lever -- X:Y HORIZ Y:X VERT
	- - - - -			-						mounting hardware: (not included w/switch)
	220-0413-00			2						2 NUT, switch mounting
-8	366-0215-02			1						1 KNOB, lever -- DOTS LINES
-9	260-0711-00			1						1 SWITCH, lever -- DOTS LINES
	- - - - -			-						mounting hardware: (not included w/switch)
	220-0413-00			2						2 NUT, switch mounting
-10	366-0215-02			1						1 KNOB, lever, -- NON-STORE STORE ERASE
-11	260-0501-00			1						1 SWITCH, lever -- NON-STORE STORE ERASE
	- - - - -			-						mounting hardware: (not included w/switch)
-12	220-0413-00			2						2 NUT, switch mounting
-13	366-0215-02			1						1 KNOB, lever -- OUTPUT SIGNAL SOURCE
-14	260-0711-00			1						1 SWITCH, lever -- OUTPUT SIGNAL SOURCE
	- - - - -			-						mounting hardware: (not included w/switch)
-15	220-0413-00			2						2 NUT, switch mounting
-16	366-1024-00			1						1 KNOB, gray -- DC OFFSET X
	- - - - -			-						knob includes:
	213-0153-00			2						2 SCREW, set, 5-40 x 0.125 inch, HSS

FIG. 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q t Y	1 2 3 4 5	Description
		Eff	Disc			
1-17	- - - - -			1		RESISTOR, variable
	- - - - -			-		mounting hardware: (not included w/resistor)
	210-0840-00			1		WASHER, flat, 0.390 ID x 9/16 inch OD
-18	210-0590-00			1		NUT, hex., 3/8-32 x 7/16 inch
-19	366-1024-00			1		KNOB, gray -- DC OFFSET Y
	- - - - -			-		knob includes:
	213-0153-00			2		SCREW, set, 5-40 x 0.125 inch, HSS
-20	- - - - -			1		RESISTOR, variable
	- - - - -			-		mounting hardware: (not included w/resistor)
	210-0840-00			1		WASHER, flat, 0.390 ID x 9/16 inch OD
	210-0590-00			1		NUT, hex., 3/8-32 x 7/16 inch
-21	260-0834-00			1		SWITCH, toggle -- DC OFFSET ON OFF
	- - - - -			-		mounting hardware: (not included w/switch)
	210-0940-00			1		WASHER, flat, 1/4 ID x 3/8 inch OD
-22	210-0583-00			1		NUT, hex., 1/4-32 x 5/16 inch
-23	260-0511-00	B010100	B019999	1		SWITCH, toggle -- POWER
	260-0834-00	B020000		1		SWITCH, toggle -- POWER
	- - - - -			-		mounting hardware: (not included switch)
-24	210-0046-00			1		LOCKWASHER, internal, 0.261 ID
	- - - - -			-		x 0.400 inch OD
	210-0940-00			1		WASHER, flat, 1/4 ID x 3/8 inch OD
-25	210-0583-00			1		NUT, hex., 1/4-32 x 5/16 inch
-26	260-0613-00			1		SWITCH, toggle -- VIEW OFF
	- - - - -			-		mounting hardware: (not included w/switch)
-27	210-0046-00			1		LOCKWASHER, internal, 0.261 ID
	- - - - -			-		x 0.400 inch OD
	210-0940-00			1		WASHER, flat, 1/4 ID x 3/8 inch OD
-28	210-0583-00			1		NUT, hex., 1/4-32 x 5/16 inch
-29	260-0613-00			1		SWITCH, toggle -- WRITE THROUGH OFF
	- - - - -			-		mounting hardware: (not included w/switch)
-30	210-0046-00			1		LOCKWASHER, internal, 0.261 ID
	- - - - -			-		x 0.400 inch OD
	210-0940-00			1		WASHER, flat, 1/4 ID x 3/8 inch OD
-31	210-0583-00			1		NUT, hex., 1/4-32 x 5/16 inch

FIG. 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description	
				†	Y	1	2	3		4
1-32	366-1028-00			1						1 KNOB, gray -- AMPLITUDE VOLTS
	- - - - -			-						knob includes:
	213-0153-00			2						SCREW, set, 5-40 x 0.125 inch, HSS
-33	260-1059-00			1						SWITCH, unwired -- AMPLITUDE VOLTS
	- - - - -			-						mounting hardware: (not included w/switch)
	210-0840-00			1						WASHER, flat, 0.390 ID x 9/16 inch OD
-34	210-0413-00			1						NUT, hex., 3/8-32 x 1/2 inch
-35	366-1028-00			1						KNOB, gray -- TIME/DOT μ s
	- - - - -			-						knob includes:
	213-0153-00			2						SCREW, set, 5-40 x 0.125 inch, HSS
-36	260-1059-00			1						SWITCH, unwired -- TIME/DOT μ s
	- - - - -			-						mounting hardware: (not included w/switch)
	210-0840-00			1						WASHER, flat, 0.390 ID x 9/16 inch OD
-37	210-0413-00			1						NUT, hex., 3/8-32 x 1/2 inch
-38	366-1028-00			1						KNOB, gray -- TIME/LINE ms
	- - - - -			-						knob includes:
	213-0153-00			2						SCREW, set, 5-40 x 0.125 inch, HSS
-39	260-1058-00			1						SWITCH, unwired -- TIME/LINE ms
	- - - - -			-						mounting hardware: (not included w/switch)
	210-0840-00			1						WASHER, flat, 0.390 ID x 9/16 inch OD
	210-0413-00			1						NUT, hex., 3/8-32 x 1/2 inch
-40	366-1031-00			1						KNOB, red -- CAL
	- - - - -			-						knob includes:
	213-0153-00			1						SCREW, set, 5-40 x 0.125 inch, HSS
-41	366-1029-00			1						KNOB, gray -- DENSITY
	- - - - -			-						knob includes:
	213-0153-00			2						SCREW, set, 5-40 x 0.125 inch, HSS
-42	260-1056-01			1						SWITCH, unwired -- DENSITY
	- - - - -			-						mounting hardware: (not included w/switch)
	210-0840-00			1						WASHER, flat, 0.390 ID x 9/16 inch OD
-43	210-0413-00			1						NUT, hex., 3/8-32 x 1/2 inch

FIG. 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Disc	Q					Description
			Y	1	2	3	4	
1-44	384-0100-00		1					SHAFT, extension, 3.126 inches long
-45	376-0014-00		1					COUPLING
-46	- - - - -		1					RESISTOR, variable
	- - - - -		-					mounting hardware: (not included
	- - - - -		-					w/resistor)
-47	210-0590-00		2					NUT, hex., 3/8-32 x 7/16 inch
-48	131-0106-00		3					CONNECTOR, coaxial, 1 contact, BNC
	- - - - -		-					w/hardware
	- - - - -		-					mounting hardware for each: (not included
	- - - - -		-					w/connector)
-49	210-0255-00		1					LUG, solder, 3/8 inch diameter
-50	214-0553-00		1					LATCH SCREW
-51	358-0255-00		1					BUSHING, latch screw
-52	358-0161-00		2					BUSHING, strain relief
-53	200-1236-00		1					COVER, connector
-54	131-0459-00		1					CONNECTOR, receptacle, 15 pin
	213-0260-00		1					SCREW-LOCK ASSEMBLY
	131-0622-00		3					CONNECTOR, terminal
	131-0621-00		1					CONNECTOR, terminal
-55	333-1103-02		1					PANEL, front
-56	386-1461-01		1					SUB-PANEL, front
-57	175-1030-01		FT					CABLE, special purpose, 8 Ft 10 inches long
-58	131-1351-00		1					CLAMP CABLE
-59	200-0821-00		1					COVER, connector
-60	131-0570-00		1					CONNECTOR, receptacle, 25 pin w/hardware
	211-0038-00		2					SCREW, 4-40 x 3/16 inch, FHS
-61	136-0164-00		1					SOCKET, light, w/hardware
	- - - - -		-					mounting hardware: (not included w/socket)
-62	210-0255-00		1					LUG, solder, 3/8 diameter
-63	441-0809-01		1					CHASSIS
	- - - - -		-					mounting hardware: (not included w/chassi
-64	211-0559-00		3					SCREW, 6-32 x 3/8 inch, 100° csk, FHS
-65	211-0507-00		3					SCREW, 6-32 x 5/16 inch, PHS

FIG. 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description	
				t	y	1	2	3		4
1-66	670-0612-01			1						ASSEMBLY, circuit board
	- - - - -			-						assembly includes:
	388-1038-00			1						BOARD, circuit
-67	337-1090-01			2						SHIELD
-68	136-0183-00			4						SOCKET, transistor, 3 pin
-69	136-0220-00			22						SOCKET, transistor, 3 pin
-70	136-0235-00			1						SOCKET, transistor, 6 pin
-71	136-0237-00			6						SOCKET, transistor, 8 pin
-72	131-0633-00			62						TERMINAL, pin
-73	131-0639-00			6						CONTACT, electrical
-74	214-0269-00			1						HEAT SINK
	- - - - -			-						mounting hardware: (not included w/assembly)
-75	211-0602-00			6						SCREW, sems, 6-32 x 0.438 inch, PHB
-76	210-0457-00			5						NUT, keps, 6-32 x 5/16 inch
	210-0202-00			1						LUG, solder, SE #6
-77	210-0201-00			1						LUG, solder, SE #4
	- - - - -			-						mounting hardware: (not included w/lug)
-78	213-0044-00			1						SCREW, thread forming, 5-32 x 3/16 inch, PHS
-79	348-0056-00 348-0069-00			2						GROMMET, plastic, 3/8 inch diameter
	348-0055-00			1						GROMMET, plastic, 1/4 inch diameter
-80	214-0289-00			2						HEAT SINK
	- - - - -			-						mounting hardware for each:
	- - - - -			-						(not included w/heat sink)
-81	210-0909-00			1						WASHER, mica, 0.196 ID x 0.625 inch OD
-82	210-0813-00			1						WASHER, fiber, shouldered, #10
	210-0805-00			1						WASHER, flat, #10
-83	220-0410-00			1						NUT, keps, 10-32 x 3/8 inch
-84	- - - - -			1						TRANSFORMER
	- - - - -			-						mounting hardware: (not included
	- - - - -			-						w/transformer)
-85	211-0021-00			2						SCREW, 4-40 x 1 1/4 inches, PHS
	210-0004-00			2						LOCKWASHER, internal, #4
-86	210-0406-00			2						NUT, hex., 4-40 x 3/16 inch

FIG. 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description
				Y	1	2	3	4	
1-87	200-0293-00			1					COVER, capacitor, plastic, 1.365 ID
	- - - - -			-					x 2 9/16 inches long
-88	- - - - -			1					Capacitor
	- - - - -			-					mounting hardware: (not included with
	- - - - -			-					capacitor)
-89	211-0543-00 211-0507-00			2					SCREW, 6-32 x 5/16 inch, RHS PHS
-90	386-0254-00			1					PLATE, fiber, large
-91	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch
-92	- - - - -			1					CAPACITOR
	- - - - -			-					mounting hardware: (not included with
	- - - - -			-					capacitor)
-93	211-0534-00			2					SCREW, sems, 6-32 x 5/16 inch, PHS
-94	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch
-95	386-0255-00			1					PLATE, metal, large
-96	210-0405-00 210-0204-00			1					LUG, solder, DE #6
	- - - - -			-					mounting hardware: (not included w/lug)
	210-0507-00			1					SCREW, 6-32 x 5/16 inch, PNH
	210-0457-00			1					NUT, keps, 6-32 x 5/16 inch
-97	124-0118-00			1					STRIP, ceramic, 7/16 inch h, w/ 1 notch
	- - - - -			-					strip includes:
-98	355-0046-00			1					STUD, plastic
	- - - - -			-					mounting hardware: (not included w/strip)
-99	361-0007-00			1					SPACER, plastic, 5/32 inch long
-100	260-0449-00			1					SWITCH, slide -- FAST SLOW
	- - - - -			-					mounting hardware: (not included w/switch)
-101	211-0007-00			2					SCREW, 4-40 x 3/16 inch, PHS
-102	210-0406-00			2					NUT, hex., 4-40 x 3/16 inch
-103	337-1036-00			1					SHIELD, switch
-104	260-0675-01			1					SWITCH, slide -- 115V 230 V
	- - - - -			-					mounting hardware: (not included w/switch)
-105	211-0007-00			2					SCREW, 4-40 x 3/16 inch, PHS
-106	210-0406-00			2					NUT, hex., 4-40 x 3/16 inch
-107	131-0106-00			1					CONNECTOR, coaxial, 1 contact, BNC
	- - - - -			-					with hardware
-108	200-0582-00			1					COVER, fuse holder

FIG. 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				y	1	2	3	4	
1-109	352-0362-00			1					ASSEMBLY, fuse holder, w/hardware
-110	386-1462-01			1					PANEL, rear
-111	358-0161-00			1					BUSHING, strain relief
-112	161-0046-00			1					CABLE ASSEMBLY, power coiled
-113	214-0860-00			1					PIN, guide
	- - - - -			-					mounting hardware: (not included w/pin)
-114	210-0458-00			1					NUT, keps, 8-32 x 11/32 inch
-115	384-0615-00			3					ROD, spacer
	- - - - -			-					mounting hardware for each: (not included
	- - - - -			-					w/rod)
-116	212-0023-00			1					SCREW, 8-32 x 3/8 inch, PHS
-117	351-0096-00			1					GUIDE, rail
	- - - - -			-					mounting hardware: (not included w/guide)
-118	211-0538-00			2					SCREW, 6-32 x 5/16 inch, 100° csk, PHS
-119	212-0023-00			1					SCREW, 8-32 x 3/8 inch, PHS
-120	214-0680-00			1					PIN, guide
-121	179-1347-01			1					CABLE HARNESS, chassis
	- - - - -			-					cable harness includes:
-122	131-0371-00			23					CONNECTOR, single contact
-123	179-1348-01			1					CABLE HARNESS, capacitor
	- - - - -			-					cable harness includes:
-124	131-0371-00			27					CONNECTOR, single contact
	175-1091-00			1					CABLE, special purpose 1.375 ft long.
-125	131-0371-00			8					CONNECTOR, single contact
-126	670-2735-00			1					ASSEMBLY, CIRCUIT BOARD
	- - - - -			-					assembly includes:
-127	131-0589-00			19					TERMINAL PIN, 0.46 inch long
-128	214-0569-00			2					TEST POINT
	- - - - -			-					mounting hardware: (not included
	- - - - -			-					w/assembly)
-129	211-0602-00			3					SCREWS, sems, 6-32 x 7/16 inch, PHB
-130	361-0278-00			3					POSTS, METALLIC, 1.06 inches long
-131	211-0507-00			2					SCREWS, 6-32 x 5/16 inch, PHB

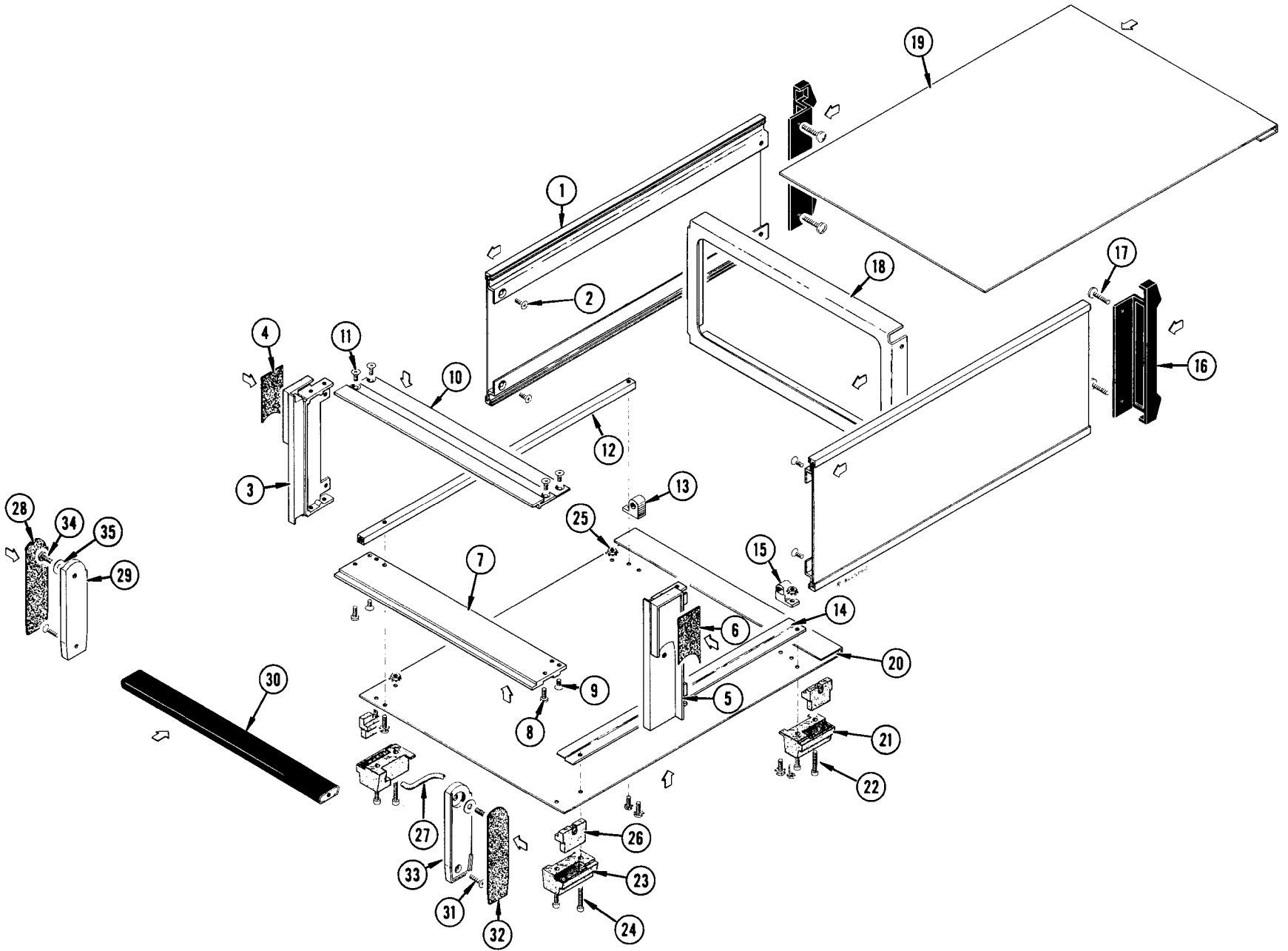


FIG. 2 CABINET

FIG. 2 CABINET

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description	
				Y	1	2	3	4		5
2-	437-0078-00			1						CABINET
	- - - - -			-						cabinet includes:
-1	386-0141-00			2						PLATE, side
	- - - - -			-						mounting hardware for each:
	- - - - -			-						(not included w/plate)
-2	212-0002-00			2						SCREW, 8-32 x 1/4 inch, FHS
-3	426-0253-00			1						FRAME, front, left
-4	377-0121-00			1						INSERT, frame, left
-5	426-0252-00			1						FRAME, front, right
-6	377-0120-00			1						INSERT, frame, right
-7	426-0254-00			1						FRAME, front, bottom
	- - - - -			-						mounting hardware: (not included w/frame)
-8	212-0004-00			2						SCREW, 8-32 x 5/16 inch, PHS
-9	212-0002-00			2						SCREW, 8-32 x 1/4 inch, FHS
-10	426-0255-00			1						FRAME, front, top
	- - - - -			-						mounting hardware: (not included w/frame)
-11	212-0002-00			4						SCREW, 8-32 x 1/4 inch, FHS
-12	351-0093-00			1						GUIDE, left
	- - - - -			-						mounting hardware: (not included w/guide)
	212-0023-00			1						SCREW, 8-32 x 3/8 inch, PHS
-13	358-0293-01			1						BUSHING, plug-in securing, left
	- - - - -			-						mounting hardware:
	- - - - -			-						(not included w/bushing)
	211-0510-00			1						SCREW, 6-32 x 3/8 inch, PHS
	210-0005-00			1						LOCKWASHER, external, #6
	212-0001-00			1						SCREW, 8-32 x 1/4 inch, PHS
	210-0007-00			1						LOCKWASHER, external, #8
-14	351-0092-00			1						GUIDE, right
-15	358-0294-01			1						BUSHING, plug-in securing, right
	- - - - -			-						mounting hardware:
	- - - - -			-						(not included w/bushing)
	212-0001-00			1						SCREW, 8-32 x 1/4 inch, PHS
	210-0007-00			1						LOCKWASHER, external, #8
	211-0510-00			1						SCREW, 6-32 x 3/8 inch, PHS
	210-0005-00			1						LOCKWASHER, external, #6
	210-0457-00			1						NUT, keps, 6-32 x 5/16 inch

FIG. 2 CABINET (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q	Description
		Eff	Disc		
				y	1 2 3 4 5
2-16	348-0075-00			2	FOOT, rear guard, left and right
	- - - - -			-	mounting hardware for each:
	- - - - -			-	(not included w/foot)
-17	212-0004-00			2	SCREW, 8-32 x 5/16 inch, PHS
-18	386-0139-00			1	PLATE, rear
-19	386-0138-00			1	PLATE, top
-20	386-0140-00			1	PLATE, bottom
-21	348-0073-00			2	FOOT, left front and right rear
	- - - - -			-	mounting hardware for each:
	- - - - -			-	(not included w/foot)
-22	211-0532-00			2	SCREW, 6-32 x 3/4 inch, FIL HS
-23	348-0074-00			2	FOOT, right front and left rear
	- - - - -			-	mounting hardware for each:
	- - - - -			-	(not included w/foot)
-24	211-0532-00			2	SCREW, 6-32 x 3/4 inch, FIL HS
-25	210-0457-00			2	NUT, keps, 6-32 x 5/16 inch
-26	377-0119-00			4	INSERT, foot
-27	348-0072-00			1	FOOT, flip-stand bail
-28	377-0123-00			1	INSERT, pivot, left
-29	367-0051-00			1	PIVOT, handle, left
-30	367-0052-00			1	HANDLE
	- - - - -			-	mounting hardware: (not included w/handle)
-31	212-0040-00			2	SCREW, 8-32 x 3/8 inch, FHS
-32	377-0122-00			1	INSERT, pivot, right
-33	367-0050-00			1	PIVOT, handle, right
-34	214-0554-00			2	BOLT, hinge
-35	214-0558-00			2	WASHER, thrust, 5/16 ID x 1/2 inch OD
STANDARD ACCESSORIES					
	067-5011-00			1	CABLE, adapter calibration fixture
	- - - - -			-	(not shown)
	062-1600-00			1	MANUAL, instruction (not shown)

