Tektronix®

PAL TEST MONITOR

INSTRUCTION MANUAL

Tektronix®

COMMITTED TO EXCELLENCE

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

INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
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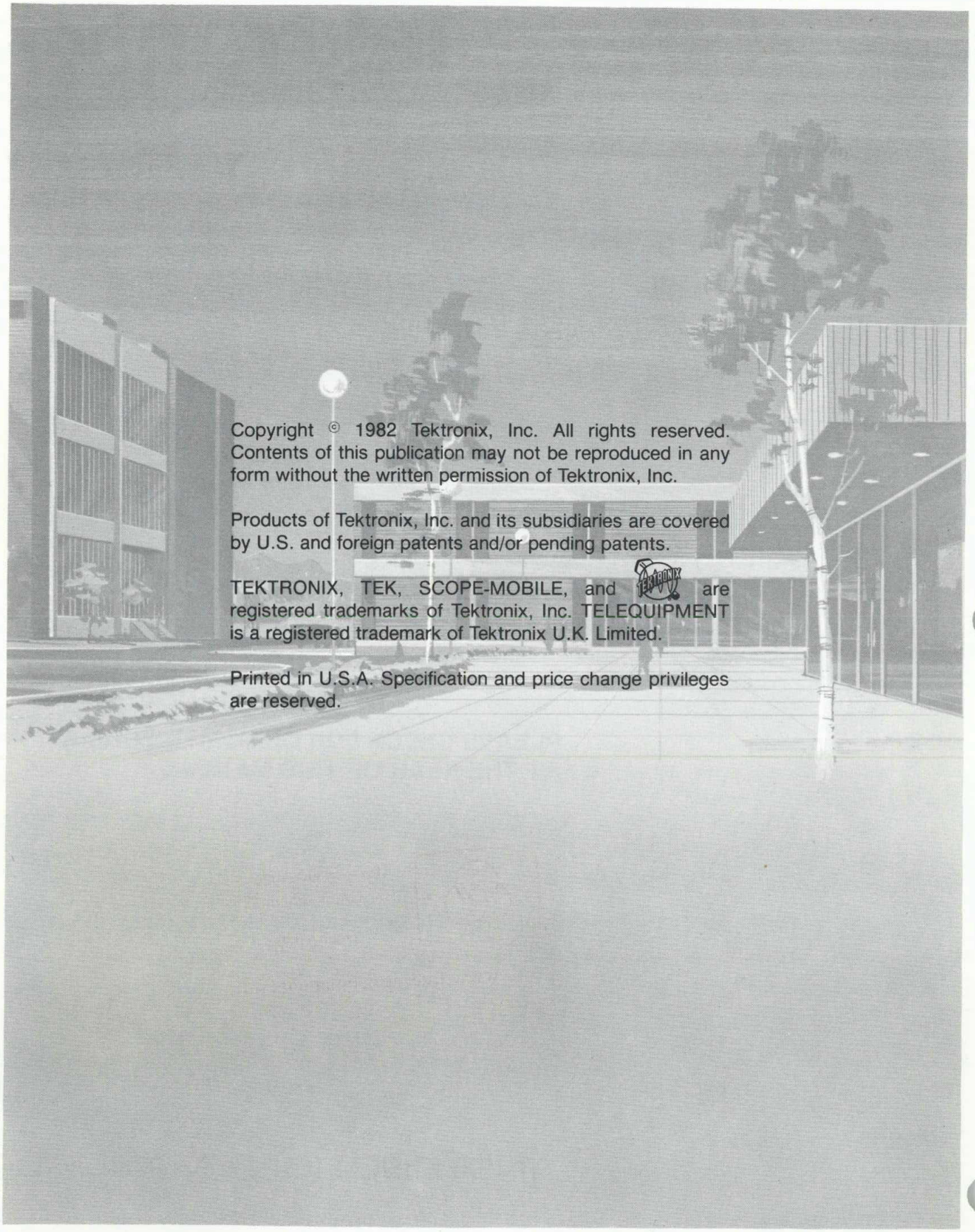


PREFACE

This manual is divided into two parts for safety purposes. Part I should be used by both operating and service personnel. The Safety Summary should be reviewed before operating or servicing the instrument. Part II contains service instructions that can lead to exposure of personnel to hazardous voltages. The service instructions are intended for use by qualified service personnel only.

TABLE OF CONTENTS

WARNING

The following servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing other than that contained in operating instructions unless you are qualified to do so.

TABLE OF CONTENTS (cont)

LIST OF ILLUSTRATIONS

NOTE

The following illustrations are located on foldouts in the back parts of the manual.

LIST OF TABLES

OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

TERMS

In This Manual

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

As Marked on Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

SYMBOLS

In This Manual

This symbol indicates where applicable cautionary or other information is to be found.

As Marked on Equipment

DANGER—High voltage.

Protective ground (earth) terminal.

ATTENTION—refer to manual.

Power Source

This product is intended to operate from a power source that will not apply more than 250 V rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Grounding the Product

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Danger Arising From Loss of Ground

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electric shock.

Use the Proper Fuse

To avoid fire hazard, use only the fuse of correct type, voltage rating and current rating as specified in the parts list for your product.

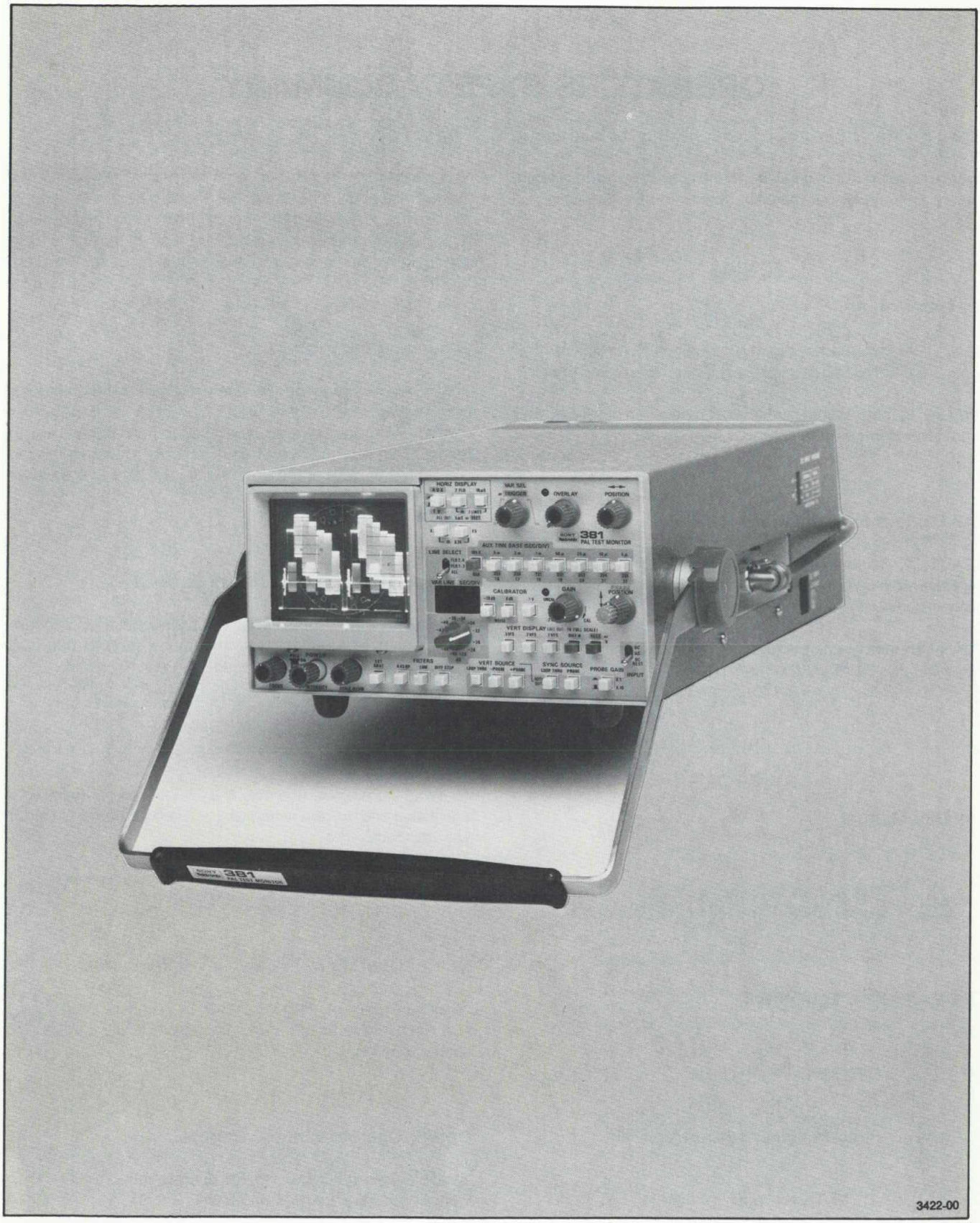
Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

Do Not Operate Without Covers

To avoid personal injury, do not operate this product without covers or panels installed.



381 PAL Test Monitor

PART I
OPERATORS INFORMATION

INTRODUCTION

Description

The Sony/Tektronix 381 PAL Test Monitor is a compact, lightweight instrument that combines three functions: waveform monitor, vectorscope, and oscilloscope. With these functions, most of the TV system measurements can be made with high accuracy similar to the waveform monitors and vectorscopes in broadcasting studios. The lightweight feature, only 5.5 kg, makes it possible to measure TV signals in various fields of activities. It can be powered from ac or dc sources.

The display can be selected for one of the three functions, through a 75 Ω loop-thru input or a 1 MΩ probe input, according to what measurement has to be done.

In the Waveform Monitor mode, a vertical sync signal measurement can be easily done using two field displays: 1H and 2H; and a new 7H display (sweep rate of 35 μs/div).

Selectable lines from 16/329 through 22/335, a fastest sweep rate of 0.2 μs/div, and a high brightness crt provide precision measurements with a bright display. With the overlay function, pulse-to-bar ratio measurements and color bar level checks can also be made accurately without parallax errors.

In Vector mode, displaying the burst vector, measuring color bar signals in the vertical interval, and selecting any line in a frame can also be possible.

Additionally, Differential Gain (DG)/Differential Phase (DP) measurements are very useful for checking video signal transmission lines.

Accessories

The 381 PAL Test Monitor comes equipped with a P6149 X10 Probe (complete with all of its accessories in a probe package), a crt viewing hood, fuses for ac and dc operation, and its own carrying case, cover, and strap. A switchable input adapter is included for easier external, phase-refrenced measurements. Also included is a dc power cord with a 381-compatible connector on one end and free wires on the other end for adaptation to a dc power source.

A 12 V dc Battery Pack and a C-30A Porta Lens camera adapter extension are available for use with the 381, but are not included as standard accessories. They must be ordered individually.

All part numbers for these accessories are listed at the rear of this manual.

Options

Option 11 is an ordering option requiring that the 12 V dc Battery Pack accessory be shipped with the Test Monitor.

SPECIFICATION

The following electrical characteristics are valid only if the instrument has been calibrated at an ambient temperature between +20°C and +30°C, the instrument is operating at an ambient temperature between 0°C and +50°C (unless otherwise noted), and the instrument has had a warmup period of at least 30 minutes.

Table 2-1
VERTICAL SYSTEM CHARACTERISTICS

Characteristics	Performance Requirements		Supplemental Information
Scale Factor Accuracy	LOOP THRU and PROBE X10	PROBE X1	
1 V	≤1%	≤2%	
0.5 V	≤3%	≤4%	
0.2 V	≤3%	≤4%	
0.1 V	≤3%	≤4%	
Gain			
INPUT LOOP THRU to SIGNAL OUTPUT	1, ±0.02.		
Variable Gain	0.2X, ±4%, to approximately 1.4X.		
Maximum Input Signal LOOP THRU	±1.5 V, dc + Peak ac.		
PROBE X1	±5 V, dc + Peak ac, at 1 kHz or less. SIGNAL OUTPUT not terminated.		
X10	±0.5 V, dc + Peak ac, at 1 kHz or less. SIGNAL OUTPUT not terminated.		
SIGNAL OUTPUT			
Maximum Dc Output Voltage into 75 Ω	0 V, ± 0.5 V dc.		Input signal absent.
Line Strobe			Inserted on SIGNAL OUTPUT on selected line or lines in Line Selector mode.

Table 2-1 (cont)

Characteristics	Performance Requirements				Supplemental Information
Frequency Response	From 50 kHz reference:				From 75 Ω source. GAIN at CAL position.
Flat					No Filters selected.
LOOP THRU Displayed and via SIGNAL OUTPUT (SIGNAL OUTPUT Selector in LOOP THRU)					
	10°C to 30°C		0°C to 50°C		
50 kHz to 5 MHz	±2%		±3%		
5 MHz to 10 MHz	+2%, −5%		+3%, −5%		
PROBE Displayed	X1	X10	X1	X10	
50 kHz to 5 MHz	±2%	±2%	±3%	±3%	
5 MHz to 10 MHz	+2%,−5%	+2%,−10%	+3%,−5%	+3%,−10%	
LOOP THRU or PROBE to SIGNAL OUTPUT (SIGNAL OUTPUT Selector in VERT SOURCE)					
	10°C to 30°C		0°C to 50°C		
50 kHz to 5 MHz	+2%, −8%		+3%, −10%		
PROBE INPUT Rolloff					X1 and X10 GAIN Modes:
1 dB					15 MHz typical
2 dB					18 MHz typical
3 dB					20 MHz typical
LUM Filter 1 MHz 4.43 MHz	 <−3 dB >−40 dB				From 25 Ω signal source (50 Ω termination).
4.43 BP Filter	From Flat reference level at 4.43 MHz,				
4.43 MHz	±1%.				
3.9 to 4.1 MHz	−3 dB.				
4.7 to 4.9 MHz	−3 dB.				
DIFF STEP Filter	Attenuation ≤2 dB, 0.4 MHz to 0.5 MHz. Attenuation ≥20 dB, at 4 kHz and 2 MHz. Attenuation ≥40 dB, at 3.58 MHz and 4.43 MHz.				

Table 2-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
Linear Waveform Distortion (2T)		
Pulse Preshoot	≤0.5% of applied pulse amplitude.	
Pulse Overshoot	≤1.0% of applied pulse amplitude.	
Pulse Ringing	≤0.5% of applied pulse amplitude.	
25 μs Bar Tilt	≤1%.	
Field Squarewave Tilt	≤1%	
Pulse to Bar Ratio (1.0, 0.5, 0.2 VFS)	1:0.99 to 1.01.	
Pulse to Bar Ratio (0.1 VFS Only)	1:0.98 to 1.02	
Non-linear Waveform Distortion		4.43 MHz Band Pass, 0.1 V Full Scale.
Differential Gain		
Displayed	≤0.5% at any APL.	
SIGNAL OUT	≤1.0% at any APL.	
Differential Phase		
Displayed	≤0.25° at any APL.	
SIGNAL OUT	≤0.5° at any APL.	
Return loss		
LOOP THRU	At least 40 dB to 5 MHz.	With 75 Ω termination.
CALIBRATOR		
0.7 V	≤0.5%.	
NOISE		
0 dB	700 mV ±5%.	
dB Step Accuracy	±1 dB.	In 2 dB increments.
381 S/N Ratio	≤−60 dB.	

Table 2-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
Probe Input		
Input Resistance	1 MΩ, ±2%.	
Input Capacitance	Approximately 24 pF.	
Max Safe Input Voltage	250 V dc + Peak ac, at 1 kHz or less.	
1 V CAL		
Output Voltage	1 V, ±0.5%.	
Waveform	Squarewave.	
Frequency	Approximately 1 kHz.	
Output Impedance	<1 Ω.	
Geometry	≤0.15 div.	

Table 2-2
HORIZONTAL SYSTEM CHARACTERISTICS

Characteristics	Performance Requirements		Supplemental Information
Sweep Timing Accuracy and Linearity			
TV Time Base	Accuracy	Linearity	
5 μs	Within 1%	Within 2%	
10 μs	Within 2%	Within 3%	
	Over center 10 div.		
AUX Time Base	Accuracy	Linearity	
	4%	5%	
	Over center 10 div.		
Magnified Timing and Linearity (X2, X5, X25)	Add 1%, for center 10 div of unmagnified sweep.		
2 Field Sweep Length	12.7 div, ±0.5 major div.		
Field Selector			
FLD 2,4	Positive selection of Odd Field pair.		Display starts on field 2.
FLD 1,3	Positive selection of Even Field pair.		Display starts on field 1.
BOTH	Time overlay of all fields.		
Line Selector			
Variable Range	From approximately line 17 or 330 of the selected field and extending at least 25% into adjacent field.		
Digital	Selects line 16 to line 22, or line 329 to line 335.		
Sync Input Requirements			
TV Sync	200 mV p-p to 2 V p-p.		Composite video.
AUX Sync	≤20 mV at 50 Hz. ≤10 mV at 50 kHz. ≤50 mV at 5 MHz.		
OVERLAY	Range sufficient to overlay any selected portion of time base display. Movable trace may be positioned off screen.		

Table 2-3
CHROMINANCE CHARACTERISTICS

Characteristics	Performance Requirements	Supplemental Information
Chrominance Bandwidth		
Subcarrier Frequency (Fsc)		4.433619 MHz
Upper −3 dB point	Fsc +500 kHz, ±100 kHz.	
Lower −3 dB point	Fsc −500 kHz, ±100 kHz.	
Vector Phase Accuracy	⩽2°.	
Subcarrier Regenerator		Phase-locked to incoming burst when present. Otherwise, free-running.
Pull-in Range	Fsc, ±50 Hz (20°C to 30°).	
Pull-in Time	Within 1 second.	
Phase Shift with Sub-carrier Frequency Change	⩽1° Fsc, ±25 Hz. ⩽2° Fsc, ±50 Hz.	
Phase Shift with Burst Amplitude Change	⩽2°, ±6 dB from normal amplitude.	
Phase Control Overall Range	At least 80°.	
Vector Gain Accuracy	⩽14 mV.	
Differential Phase Accuracy LOOP THRU Input	⩽10% of reading, ±0.3°.	Input Signal (Linearity) should be adjusted to normal amplitude by GAIN control.

Table 2-4
POWER SOURCE CHARACTERISTICS

Characteristics	Performance Requirement	Supplemental Information
Mains Voltage Range		
115 V ac		
LOW	90 V ac to 110 V ac.	
HI	107 V ac to 132 V ac.	
230 V ac		
LOW	180 V ac to 220 V ac.	
HI	214 V ac to 250 V ac.	
12 V dc	11 V dc to 14 V dc.	
24 V dc	22 V dc to 28 V dc.	
Fuse Data		
115 V ac	0.4 A Slow-blow.	
230 V ac	0.2 A Slow-blow.	
12 V dc	3 A Fast-blow.	
24 V dc	1.5 A Fast-blow.	
Power Consumption		35 W, maximum.
Mains Frequency		48 to 440 Hz.

Table 2-5
ENVIRONMENTAL CHARACTERISTICS

Characteristics	Performance Requirements	Supplemental Information
Temperature		
Non-operating	−25°C to 75°C.	
Operating	0°C to 50°C.	
Altitude		
Non-operating	To 15,000 m (50,000 feet).	
Operating	To 4,500 m (15,000 feet).	

Table 2-6
PHYSICAL CHARACTERISTICS

Characteristics	Description	Information
Height	112 mm.	See Fig. 2-1.
Width with handle	237 mm.	
Depth	372 mm.	
Depth with handle	482 mm.	
Weight Without Accessories	5.5 kg.	

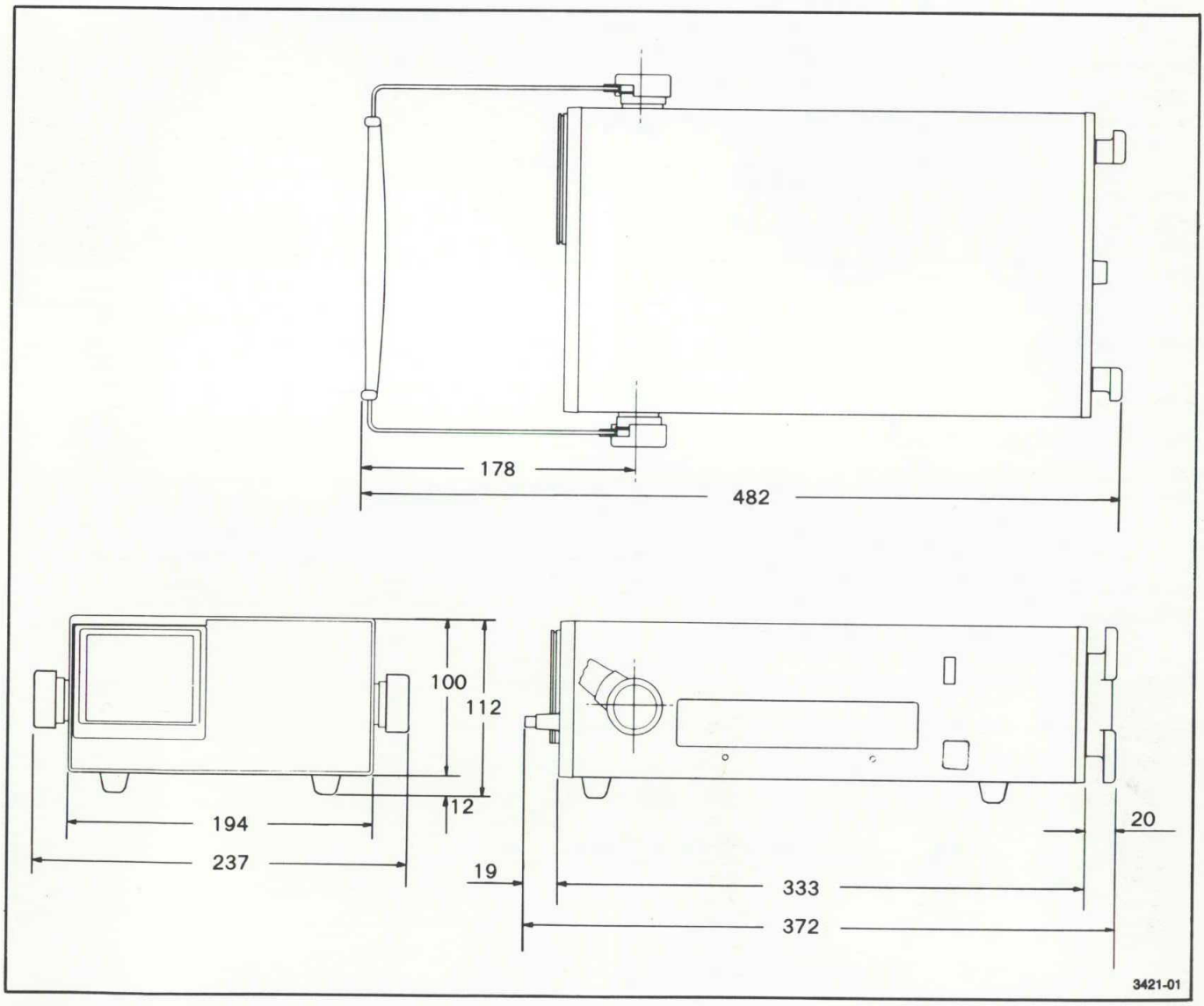


Fig. 2-1. 381 Dimensions.

OPERATING INSTRUCTIONS

This section of the manual will familiarize the operator with the instrument power requirements, functions of controls and connectors, and how to obtain a basic display.

SAFETY INFORMATION

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

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

POWER SUPPLY

Ac Powered Operation

Set the AC/DC switch to AC (see Fig. 3-2). In the AC mode, the instrument can operate from either a 115 V or 230 V nominal line voltage, 48 to 440 Hz.

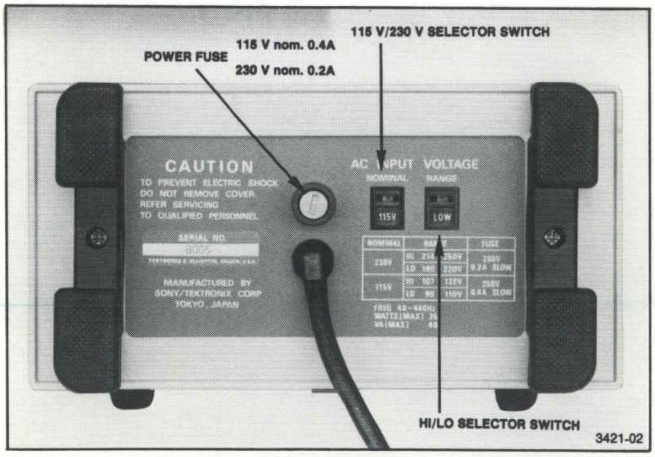


Fig. 3-1. Line Voltage and Fuse Data (Rear Panel).

Set the AC INPUT VOLTAGE NOMINAL switch to the nominal line voltage available. (See Fig. 3-1.)

Set the AC INPUT VOLTAGE RANGE switch so the expected line-voltage fluctuations remain within the Regulating Range selected (see Table 3-1).

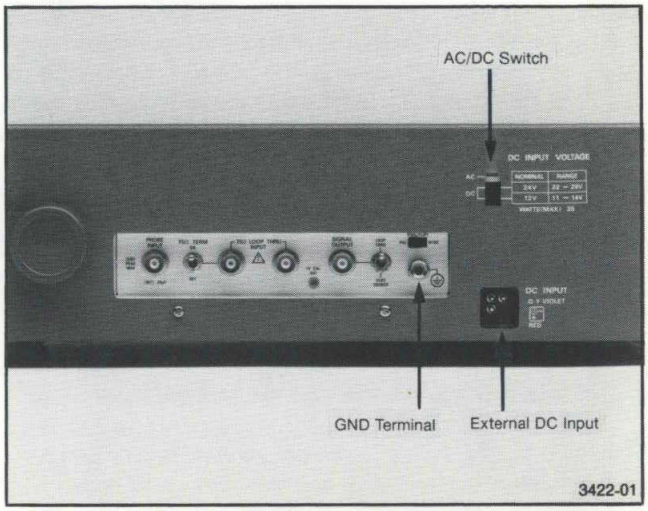


Fig. 3-2. Dc Power Input and Power Selection (Side Panel).

Table 3-1
AC REGULATING RANGE

Selector Switch		Range	Fuse
115 V	LO	90-110 V RMS	250 V
	HI	107-132 V RMS	0.4 A SLOW
230 V	LO	180-220 V RMS	250 V
	HI	214-250 V RMS	0.2 A SLOW

Frequency Range 48-440 Hz

To convert the instrument for operation from one ac source to the other, disconnect the power cord from the

power input source, and move the NOMINAL (230/115) switch to the position indicating the available nominal voltage.

CAUTION

This instrument may be damaged if operated with either the AC INPUT VOLTAGE NOMINAL or RANGE switches set for the wrong applied ac-power input source voltage or if the wrong line fuse is installed.

External Dc-powered Operation

This instrument can operate from an external dc power source of either +11 V to +14 V or +22 V to +24 V. Set the DC INPUT VOLTAGE switch to the available dc voltage. Apply the external dc power to the DC INPUT connector on the right side-panel. For safe operation, ensure that the instrument is securely grounded with a protective-ground contact.

CAUTION

The negative terminal of the DC INPUT connector is grounded to the chassis inside the instrument. It is dangerous to connect another instrument that has elevated ground levels to the common dc power supply due to large currents that can flow between the instruments. In that case, refer interconnections to qualified service personnel.

INPUTS AND OUTPUT

Probe Connection (Fig. 3-3)

Besides the furnished P6149 Probe, any probe matched with the input impedance, 1 MΩ paralleled with 24 pF, may be used.

When measuring with a probe, set the VERT SOURCE switch on the front panel to either +PROBE or −PROBE. If −PROBE is selected, the input signal is displayed in reversed polarity.

Loop Thru Input (Fig. 3-3)

Like 75 Ω loop thru inputs used in conventional TV equipment, this loop thru input can be connected to other instruments via the 381. When the internal 75 Ω Termination switch is turned ON, the 75 Ω loop thru input is terminated within the 381, and no external 75 Ω termination is required.

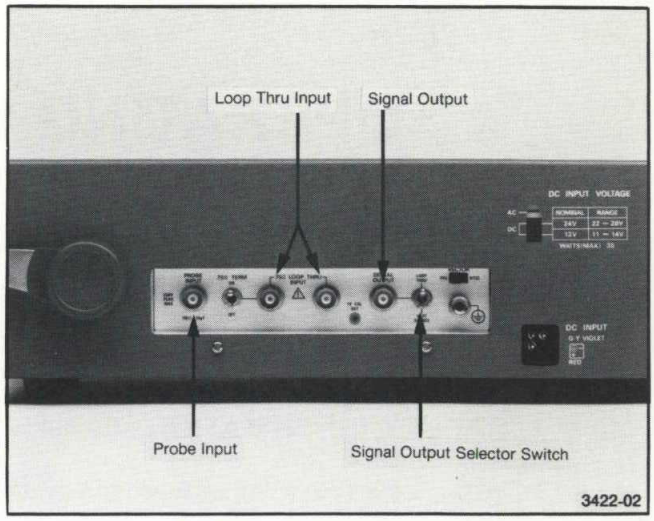


Fig. 3-3. Input and Output Connectors (Side Panel).

Signals applied to this input will be used for external-phase referencing in the Vectorscope mode when the SIGNAL OUTPUT selector switch is set to LOOP THRU.

Signal Output (Fig. 3-3)

A 75 Ω signal output supplies the signal to a video monitor or other instruments. If the 381 is selecting the line, the selected line is identified on the screen of the video monitor using intensity modulation.

If the SIGNAL OUTPUT selector switch is set to VERT SOURCE, the signal output is determined by the VERT SOURCE switch on the front panel. If set to LOOP THRU, the signal applied to the loop thru is output.

CONTROLS, CONNECTORS, INDICATORS

Front Panel (Figs. 3-4, 3-5, and 3-6)

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

Turn the control clockwise to increase display brightness.

(2) **FOCUS Control.** Front-panel control that adjusts to provide optimum display definition.

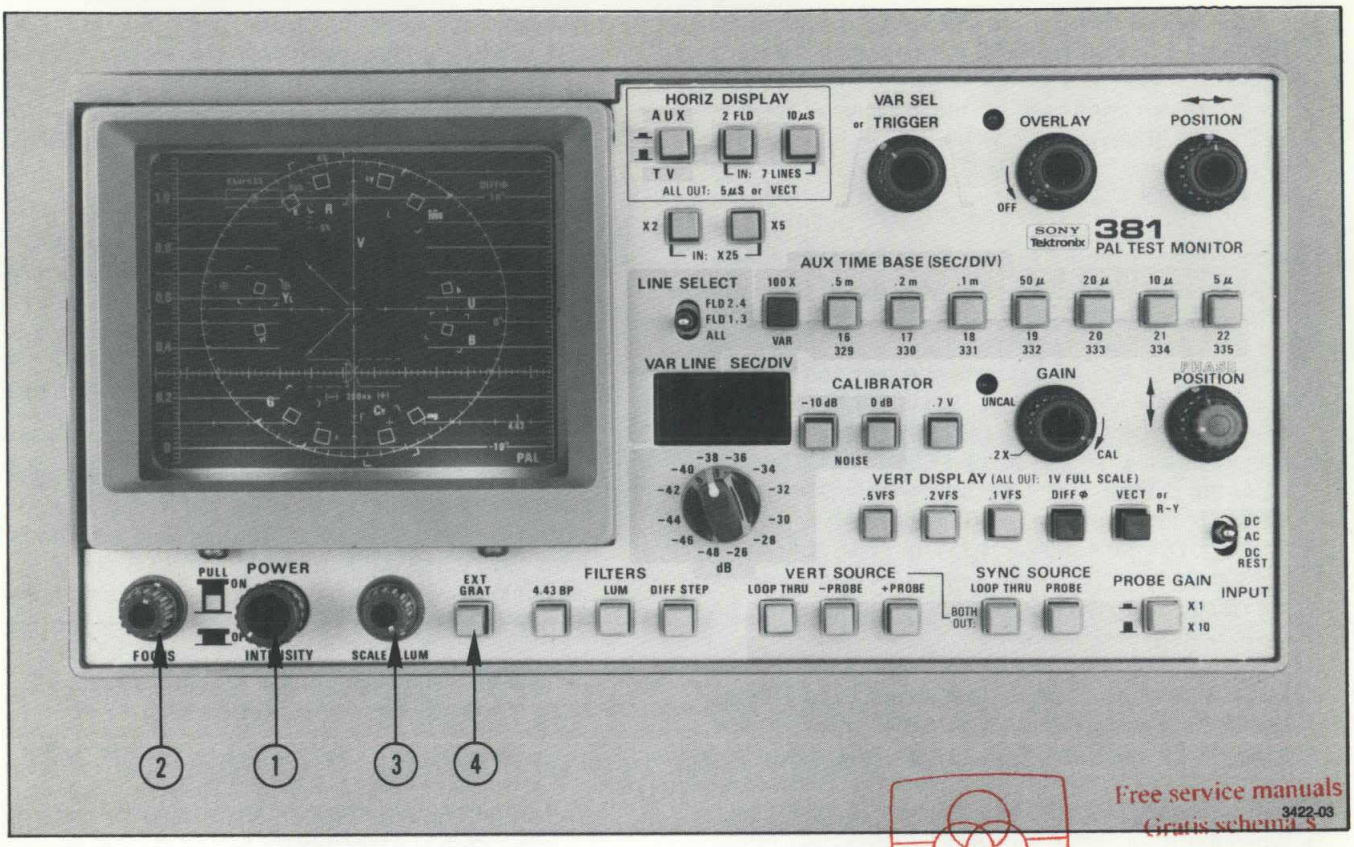


Fig. 3-4. Trace and Graticule Controls.

(3) **SCALE ILLUM Control.** The illumination of either internal or external graticule, as selected by the EXT GRAT switch, is controlled; turning clockwise makes the illumination brighter, and counterclockwise dimmer.

(4) **EXT GRAT Switch.** The 381 is provided with an internal graticule directly marked on the inner face of the crt and an external graticule mounted on the outer face of the crt. If the push button is not pressed in, the internal graticule is illuminated, and if pressed in, the external graticule is illuminated. The internal graticule is to be used for normal applications such as waveform monitor, vectorscope, or oscilloscope, whereas the external graticule is for measuring short-time distortion of a bar signal.

(5) **AUX-TV Selector Switch.** When the button is out, the TV mode is selected, allowing the instrument to be used as a waveform monitor or vectorscope. When pressed in, the horizontal display is turned to the auxiliary sweep, making the instrument operate as an oscilloscope. In place of TV signal synchronization, the trigger circuits are driven by voltage levels and slopes as in conventional oscilloscopes.

NOTE

This manual uses the television convention of referring to the time between two successive horizontal line sync pulses as "H".

(6) **TV Mode Horizontal Display Selection Switches.** These two buttons are effective only in the TV mode. When both buttons are out, a 1H waveform is displayed at 5 µs/div, when the 10 µs button is pressed in, a 2H waveform, when the 2FLD button is in, a 2-fields waveform, and when both buttons are in, a 7H display is available. The 7H display is convenient for observing the vertical interval signals when using the Line Select mode.

(7) **Horizontal Sweep Magnification Switches.** These two buttons are used for the magnification of horizontal sweep. When the X2 button is pressed in, the horizontal sweep is magnified 2-fold, when the X5 button is in, 5-fold, when both buttons are in, 25-fold, and when both buttons are out, 1-fold; that is, the normal sweep is obtained.

(8) **Field Selector Switch.** The first field displayed at the left of the screen in the 2FLD position of the TV mode is selected with this switch. When set to ALL, four fields are superimposed in the display. FLD2,4 or FLD1,3 must be specified when selecting a line in the VAR or digital LINE SELECT mode, such as when observing ITS.

(9) **Line Selection and Auxiliary Time Base Switches.** Eight push buttons select different elements in two modes. When button [5] is set to TV mode, they serve as LINE SELECT switches: any one of buttons 16 through 22 or 329 through 335 specifies and displays a line in the vertical interval. When set to VAR, any line in the specified field can be selected and displayed, and the number of the selected line is indicated by the LEDs at VAR LINE on the front panel. A line strobe is also added to the SIGNAL OUTPUT circuit for picture monitor intensification. It is also possible to use the digital LINE SELECT with VAR. In this case, if the selected line is close enough, only the line of the lower number is displayed.

When button [5] is set to AUX, these eight buttons select the sweep rate of the built-in auxiliary time base. With the gray 100X button at the left not pressed in, the white push buttons cover from 0.5 ms/div to 5 μs/div, as indicated on the panel. When the 100X button is pressed in, the sweep rate is multiplied by 100 to cover from 50 ms/div to 500 μs/div. The final sweep rate (time/div) determined by the combination of AUX TIME BASE button selection with the horizontal sweep expansion (X2, X5, X25) is directly indicated by LEDs on the front panel.

(10) **Variable Line Selection and Trigger Level/Slope Control.** The function of this control differs depending upon the mode selected by button [5]. In the TV mode, it works as the line selector in combination with the VAR button of [9]; while in the AUX mode, it selects the trigger level and slope for the oscilloscope mode.

(11) **OVERLAY Control.** To be used for the precise measurement of the test signal. When the control is turned clockwise, the waveform is doubled, and one waveform can be shifted horizontally. The LED at the top left lights up while this function is active. Normally, the control is to be turned fully counterclockwise to the OFF position. In the 2 FLD mode, the VAR button of [9] is to be set simultaneously, specifying the starting point of the waveform with control [10].

(12) **Horizontal Position Control.** To be used for horizontal positioning in every mode.

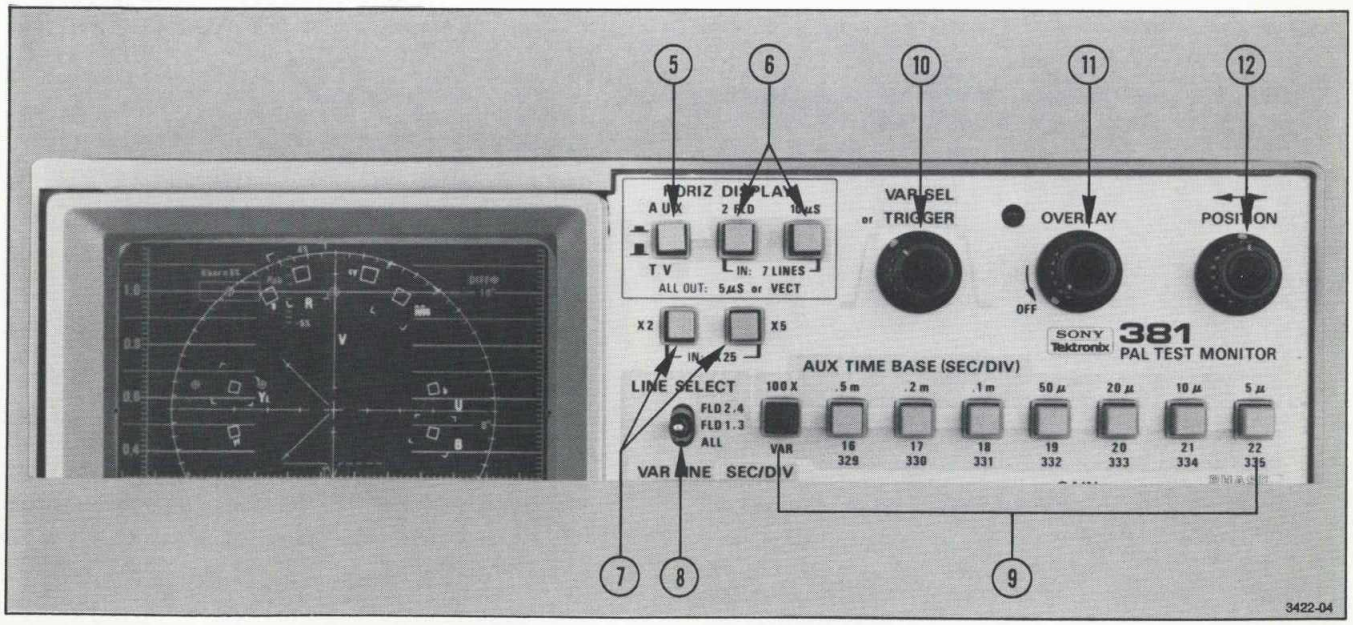


Fig. 3-5. Controls for Horizontal Functions.

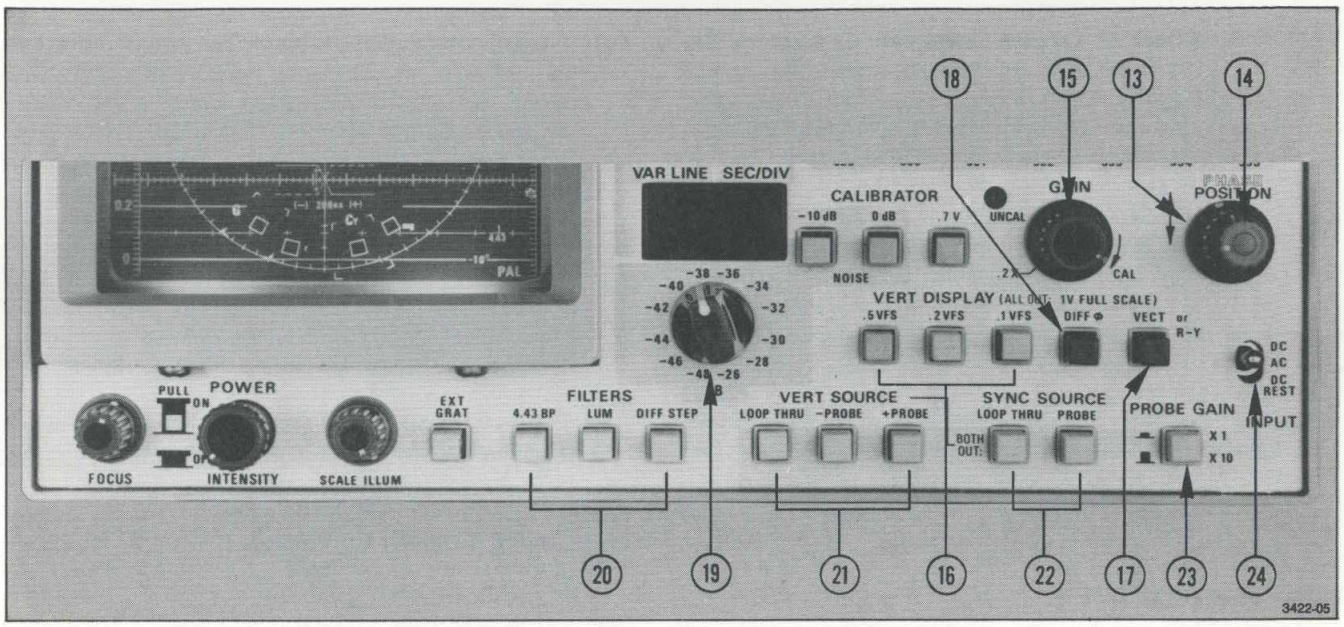


Fig. 3-6. Controls for Vertical Functions.

(13) **Vertical Position Control.** The outer knob of this control is for vertical positioning in every mode.

(14) **Vector Phase Control.** To be used for phase control in the vector display mode, DP measurement, and demodulated waveform display, allowing adjustment of the burst phase to the 180° reference line.

(15) **GAIN Control.** Adjusts the gain of the input signal in every mode, from 0.2X to 1.4X. The gain is calibrated only in the extreme clockwise position (detent). When the control is not in calibration, the UNCAL light at the top left lights up.

(16) **Vertical Display Selectors.** With all three of these buttons out, the vertical sensitivity is 1 V FULL SCALE. When one of these buttons is pushed in, the full scale calibration is changed to the value marked on the panel above the button and the vertical sensitivity is increased accordingly (0.5 VFS = X2, 0.2 VFS = X5, 0.1 VFS = X10).

(17) **Vector Display Switch.** When the VECT button is pressed in and all three buttons of HORIZ DISPLAY [5] and [6] are out, the vector display for the input signal is obtained.

(18) **DIFF Φ (DP) Measurement Switch.** When the button is pushed in, the Differential Phase (DP) measurement becomes available. The scale is calibrated for a modulated stair-step signal of 280 mV p-p chrominance, and can be directly read out in 2°/major div on the DIFFϕ scale at the right of the screen.

(19) **Voltage Calibrator Switches.** Three buttons and a rotary switch are used to provide calibrating signals by offsetting a signal with a calibrated voltage and reading the signal level from the superimposition of chopped waveforms. The .7 V button at the right is to offset by 700 mV and is useful for checking the video level of the TV signal. The 0 dB and −10 dB NOISE buttons at the left and the dB rotary switch and used for the tangential measurement of noise level. The total of these three readings is added to the signal (with 700 mV as 0 dB). The noise level is directly read as dB value for the switch position at which two traces of noise-carrying signal coincide. In the 2FLD mode, select the VAR [9] button at the same time. The offset point is selected by the control [10].

(20) **Video Filters Switches.** The normal flat response is available when all three push buttons are out. The 4.43 BP chrominance filter, LUM filter, and DIFF STEP filter are effective in any mode other than VECT and V display. In the case of DIFF STEP, use of DC REST makes the display unstable. It is recommended to use the DC or AC coupling mode.

(21) **Vertical Source Selector Switches.** When LOOP THRU is selected, the signal from the LOOP THRU INPUT on the side is displayed. For +PROBE, the signal from the PROBE INPUT on the side is displayed, and for −PROBE, the signal from the PROBE INPUT is displayed in reversed polarity. The last selection is convenient for checking the case where a TV signal is inverted.

(22) **SYNC SOURCE Selector Switches.** The source of the TV Sync signal is selected either from the LOOP THRU INPUT or from the PROBE INPUT. When both buttons are out, the sync signal is taken from the signal selected by the VERT SOURCE selectors [21].

(23) **PROBE GAIN Selector Switches.** When the button is in, the gain is X1, and when out, the gain is X10. The input signal from the PROBE INPUT can be amplified by 10, allowing measurements with a 10:1 voltage probe at the same sensitivity as the LOOP THRU INPUT.

(24) **Input Coupling Selector Switch.** The coupling of an input signal to the amplifier is selected for either AC or DC. At the DC REST position, a back porch clamp is activated.

Side Panel (Fig. 3-7)

(25) **PROBE INPUT Connector.** Standard probes used for the oscilloscope can be applied. The input impedance (RC) is 1 MΩ, paralleled with 24 pF.

(26) **75 Ω LOOP THRU INPUT Connector and Internal Termination Switch.** Like conventional TV equipment, the signal can be looped through and connected to another instrument via the 381. When the 75 Ω TERM switch is turned ON, the circuit is internally terminated with 75 Ω. In the Vector mode, the signal at this input is used as an external phase reference when the LOOP THRU/VERT SOURCE toggle switch of [27] selects LOOP THRU.

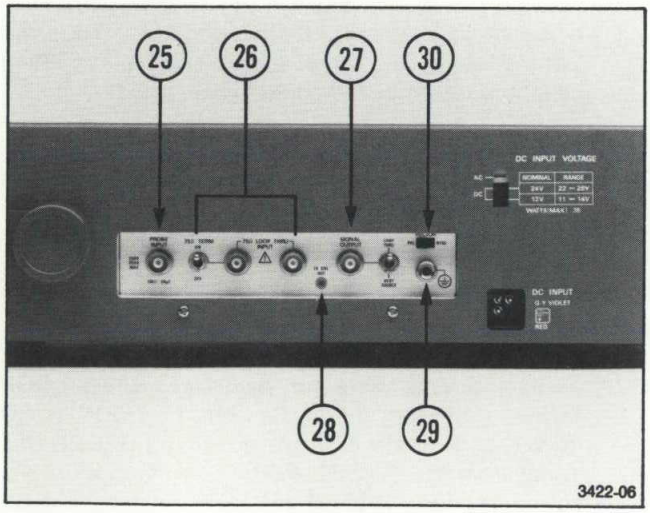


Fig. 3-7. Input/Output Controls and Connectors.

(27) **SIGNAL OUTPUT Connector.** The output of the internal amplifier is available here. When the LOOP THRU/VERT SOURCE toggle switch is set to LOOP THRU, an output from the 75 Ω LOOP THRU INPUT is provided. In the Vector mode, this position selects the External Phase Reference mode and the signal at the 75 Ω LOOP THRU INPUT of [26] is used as the external phase reference. When the switch is turned to VERT SOURCE, an output of the input signal source selected by [21] is obtained. In the TV VAR LINE Select mode [9] and [10], a line strobe pulse is added to this output for picture monitor intensification.

(28) **1 V Calibration Signal Output Jack.** A 1 V peak-to-peak calibration signal is available, which is convenient for checking the probe.

(29) **Ground Terminal Connector.** A terminal for chassis ground.

(30) **VECTOR Switch.** In the PAL position, a normal vector display of alternating burst and chrominance phases is presented. In the NTSC position, a 180° phase switcher is enabled, causing the −V burst and chrominance vectors to be switched in phase and overlayed with the +V burst and chrominance.

GRATICULE DESCRIPTIONS

The 381 is provided with an internal graticule directly marked on the inner face of the crt (Fig. 3-8) and an external graticule mounted at the front (Fig. 3-9).

Internal Graticule

The internal graticule contains three types of scale: conventional waveform monitoring, vector display, and oscilloscope. Each scale will be described in the order of numbers given in Fig. 3-8.

(1) The 0 to 1.0 scale, divided into major and minor divisions, on the left side of the graticule is used to describe the amplitude of the display during the waveform monitor and oscilloscope modes. It most commonly is used to measure the component parts of a standard 1.0 V composite video waveform.

(2) These marks inside the circle represent 2° intervals.

(3) This tic marks the 75% amplitude position for the 135° color burst vector.

(4) This tic marks the 75% amplitude position for the 225° color burst vector.

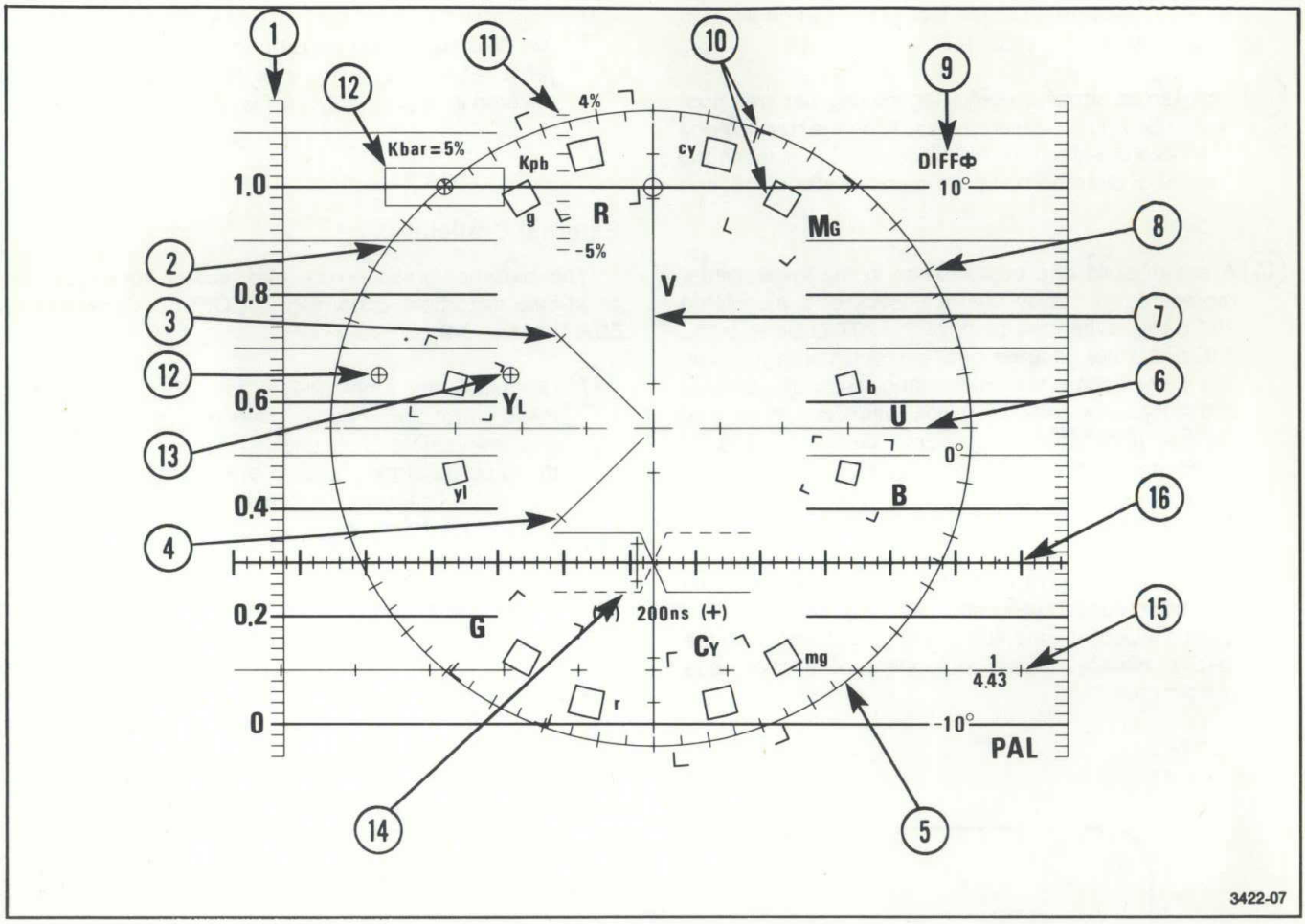


Fig. 3-8. Internal Graticule Pattern.

(5) This outer ring describes a calibrated test circle amplitude.

(6) The U modulation axis is marked by crosshairs corresponding to the component amplitudes of the color vectors.

(7) The V modulation axis is also marked to indicate the component amplitudes of the color vectors.

(8) These major marks outside the circle represent 10° intervals.

(9) The DIFFϕ (Differential Phase) scale on the right side of the graticule is calibrated to represent +10° to −10° of phase error. The scale is divided into 2° major divisions. Each major division is further divided into five equal minor divisions.

(10) The smaller rectangle represents ±3° of phase tolerances and ±5% of chrominance amplitude tolerances. The larger rectangle represents tolerance limits of ±10° and ±20%, respectively. There is a set of small and large rectangles for each of the color bars, marked with capital letter abbreviations. The conjugate colors associated with the 225° burst are marked with small rectangles and small letters.

(11) This scale is useful for measuring K_{pb}, using a 2T pulse. The scale is marked for +4% and −5% limits.

(12) This rectangle defines the K_{bar} measurement limits of 5%. When the rising edge of a 25 μs bar is aligned to the first target circle below the K_{bar} window and the center of the bar is adjusted to pass through the target circle of the window, the maximum bar deviation can be evaluated. Also, with the bar in this position,

the 2T pulse portion of the test signal can be evaluated against the K_{pb} scale [11].

(13) This target circle is useful for making bar trail nonlinear distortion measurements. Align the trailing edge of an expanded bar to this mark before evaluating the amount of distortion on the external graticule [18] and [19].

(14) A set of solid and broken lines in the lower center represents the delay characteristics of a modulated 20T pulse. When the peak of the 20T pulse is set to 1.0, and if the baseline peak coincides with the solid line, there is a positive chrominance delay of +200 ns. If the baseline peak coincides with the broken line, there is a negative chrominance delay of −200 ns. When the vertical deflection factor is increased to 0.5 VFS or 0.2 VFS, the frame represents limits of 100 ns and 40 ns, respectively.

(15) These "tic" markers along the bottom represent the 4.43 MHz subcarrier period and may be used for a quick check of the monitor's timing accuracy using the readily available burst component of a composite video-signal.

(16) This time base scale in the lower middle has 12.6 major divisions, each division divided into five equal parts. At the TV sweep rate of 5 μs, the full scale is covered in about 64 μs, displaying 1H waveform.

External Graticule

The external graticule contains scales for measuring short-time distortions according to CCIR Recommendation 567. See Fig. 3-9.

(17) Normalize the amplitude of the 2T pulse between these target circles before making K_{2T} measurements. Use the vertical GAIN and POSITION controls to set the baseline of the pulse on the 0.3 line and the peak on the 1.0 line. Use the horizontal POSITION control to align the peak of the pulse with the upper target circle.

(18) The inner lines of the "submarine" figure define the 3% distortion limits of the pulse baseline flatness.

(19) These lines define the 5% distortion limits.

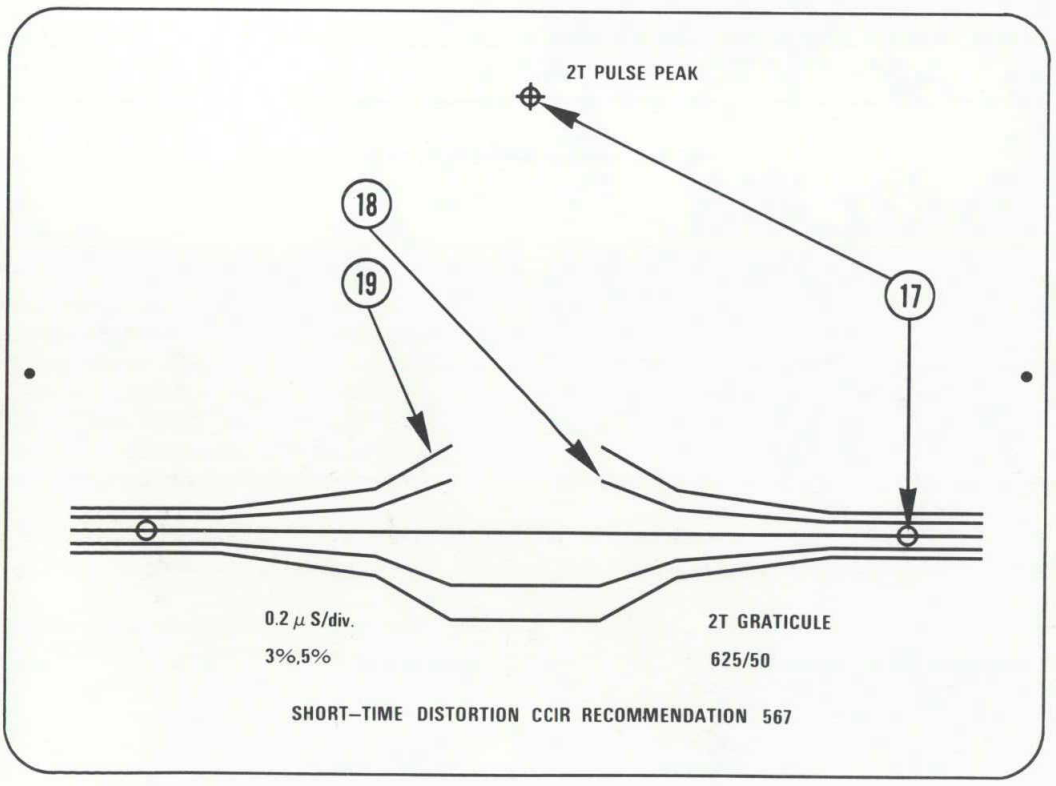


Fig. 3-9. External Graticule Pattern.

OPERATING INFORMATION

Signal Connection (Fig. 3-10)

The signal is acquired either from the 75 Ω LOOP THRU INPUT or from the 1 MΩ PROBE INPUT. The input BNC connectors are provided at the right-hand side. The LOOP THRU INPUT is used as the normal 75 Ω input, and the PROBE INPUT for high impedance measurements of a TV signal. When the LOOP THRU INPUT is to be terminated within the 381, turn ON the internal 75 Ω termination switch. If the signal is to be fed into another instrument via the 381, turn the switch OFF.

Operation with Probe (Fig. 3-10)

Connect a 10:1 probe to the PROBE INPUT, set the PROBE GAIN to X10, and the high impedance measurement will be available at the sensitivity selected on the front panel. If the PROBE GAIN is set to X1, the vertical sensitivity is reduced to one-tenth. When a 1:1 probe is used, the maximum sensitivity is 1 mV/div.

Signal Selection (Fig. 3-11)

The input signal is selected by the VERT SOURCE selector on the front panel. Set it to +PROBE for normal measurements with a probe. If set to −PROBE, the signal is displayed in reversed polarity.

Trigger Source Selection (Fig. 3-11)

In every mode, the trigger source is selected by the SYNC SOURCE selector on the front panel. When the LOOP THRU or PROBE button is pushed in, the sweep is triggered by the selected source independently of the input signal selected. With both buttons out, triggering is provided by the signal source selected by the VERT SOURCE.

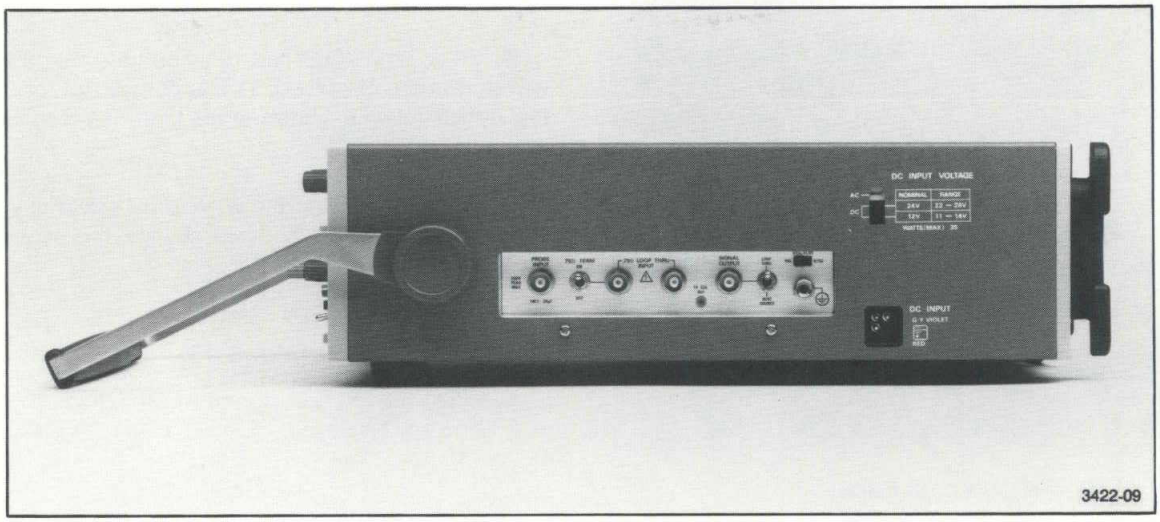


Fig. 3-10. Side Panel.

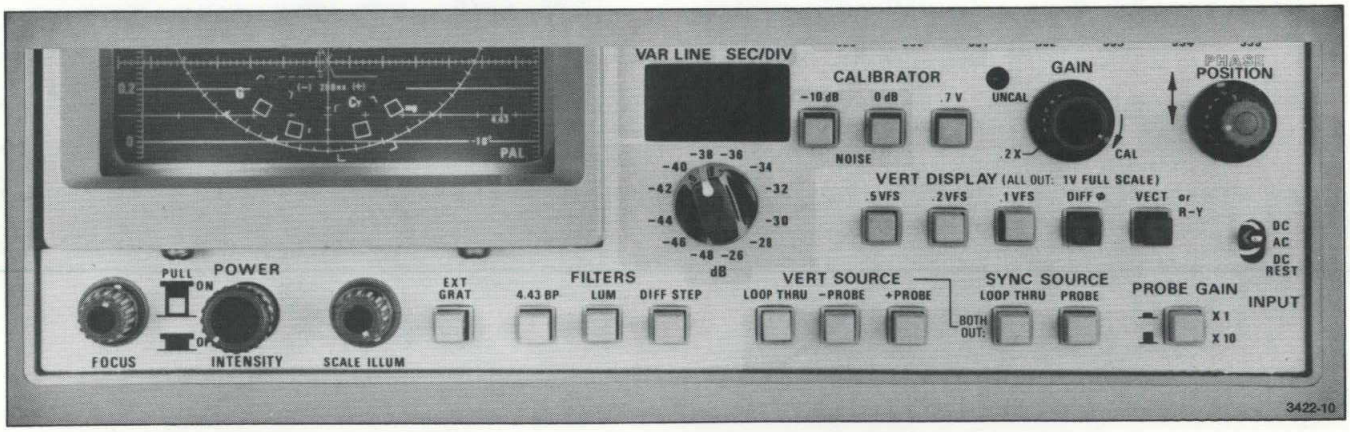


Fig. 3-11. Input Signal and Trigger Signal Setting.

WAVEFORM MONITOR OPERATION

Line Rate Display (Figs. 3-12, 3-13, and 3-14)

1. Select the input signal with VERT SOURCE. If none of these buttons are pushed in, there will be no display.

2. In the normal operation, all the push buttons except the VERT SOURCE should be out. Cancel all the push buttons except the VERT SOURCE.

3. Under this condition, a 1H waveform (5 μs/div) is displayed. When the 10 μs button of the HORIZ DISPLAY switch is pushed in, a 2H display (10 μs/div) becomes available. If the displayed waveform is doubled, check whether or not the OVERLAY switch is set to OFF, or the CALIBRATOR switches are all cancelled (out).

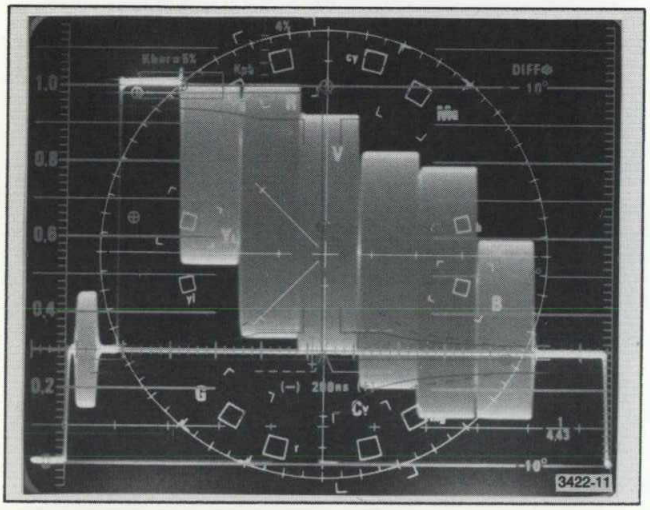


Fig. 3-12. 1H Display.

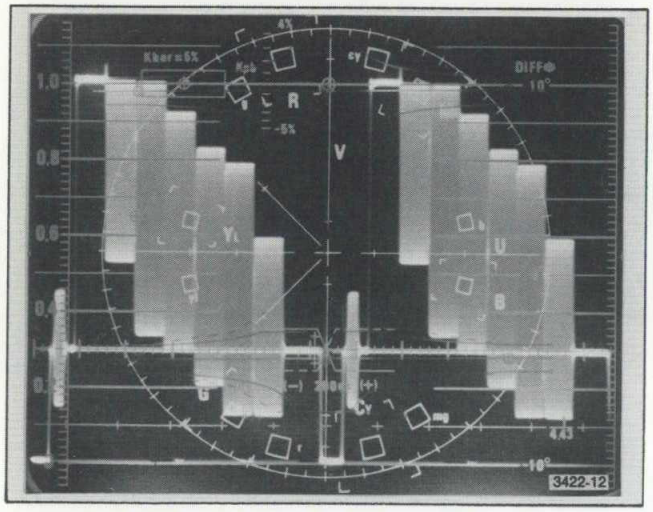


Fig. 3-13. 2H Display.

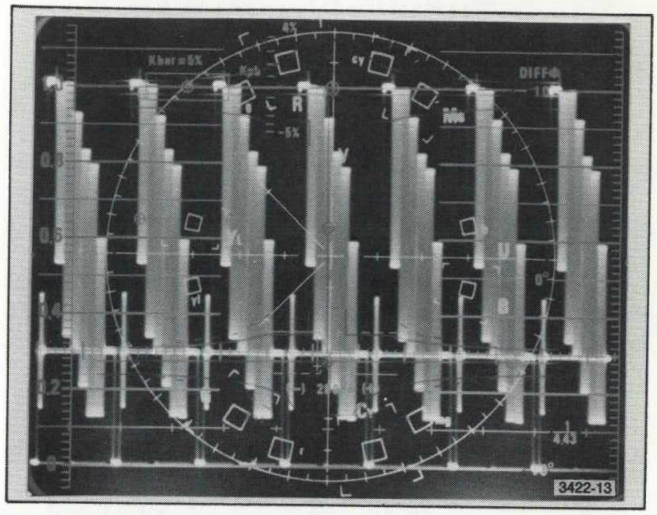


Fig. 3-14. 7H Display.

4. When both 2FLD and 10 μs buttons are pushed in, 7H waveforms are displayed. This is convenient for monitoring the vertical interval signals in the Line Select mode.

5. When magnifying the waveform, select any combination of X2, X5, and X25, and change the sensitivity with VERT DISPLAY.

Field Rate Display (Fig. 3-15)

1. When the 2FLD button of HORIZ DISPLAY is pushed in, 2 fields are displayed.

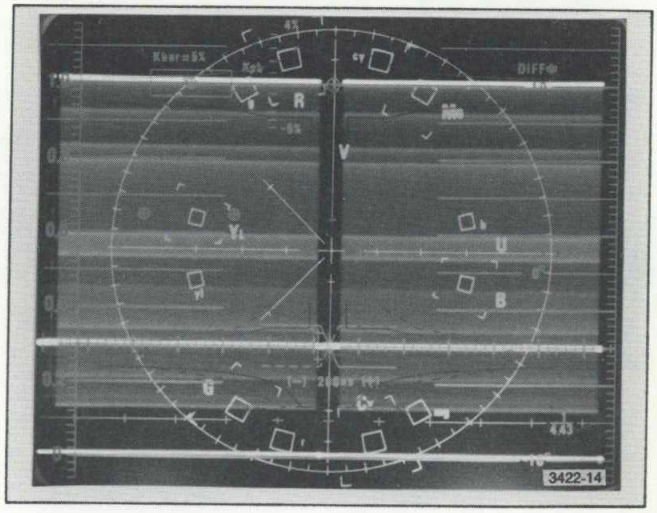


Fig. 3-15. 2 Field Display.

2. The field selected by the switch FLD2,4/FLD1,3/ALL is displayed at the left of the screen. If ALL is selected, waveforms all four fields are superimposed in the display.

Digital Line Select Display

1. Under the normal line rate display, if a LINE SELECT button is pushed in, the line number indicated below the button is selected and displayed.

2. The field is to be selected by the FLD2,4/FLD1,3/ALL switch. If ALL is selected, selected lines of two fields are superimposed in the display.

Variable Line Select Display

1. Push in the LINE SELECT button VAR.

2. Push in 2FLD of the HORIZ DISPLAY buttons. A two-field display is obtained with the selected line intensity-modulated (Fig. 3-16a). The number of the intensified line is displayed by the LED readout (Fig. 3-16b).

3. Turn the VAR SEL (TRIGGER) control until the readout coincides with the line number to be selected, or to shift the intensity-modulated segment.

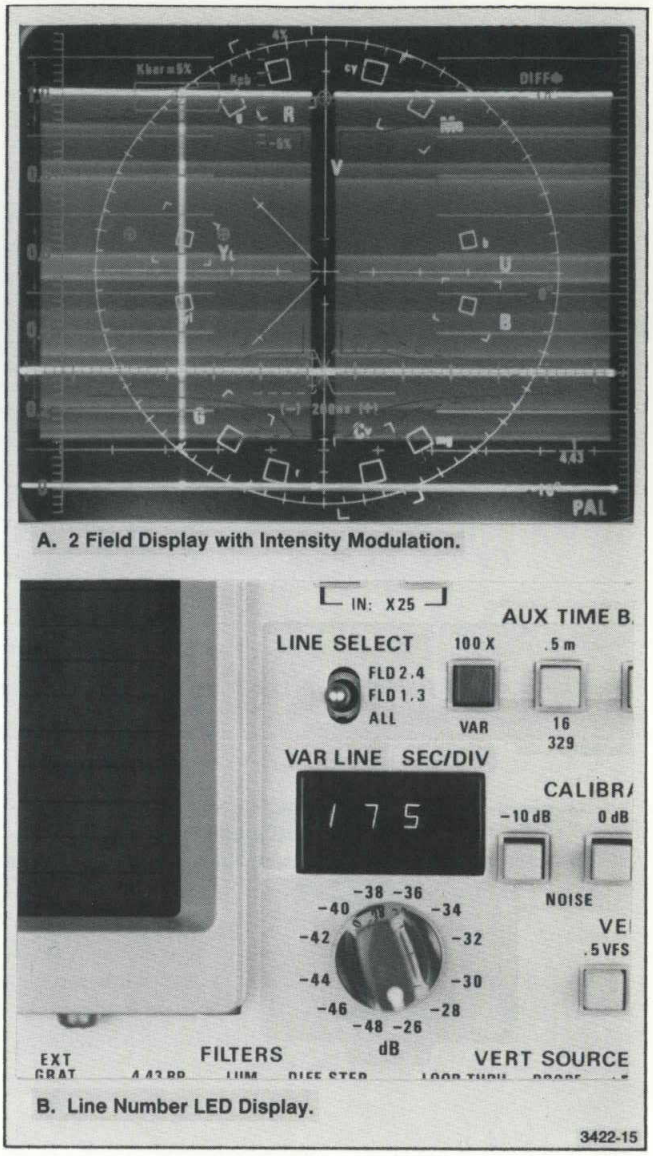
4. Change the HORIZ DISPLAY to a line rate display, 5 μs (1H), or 10 μs (2H). The actual line time for the segment indicated by the intensity modulation or chosen by the digital LINE SELECT VAR controls is displayed.

NOTE

During the LINE SELECT display, the video output with the selected line intensity-modulated is available from the SIGNAL OUTPUT on the side panel.

Overlay Display

1. Set up a normal line rate display or field rate display.



A. 2 Field Display with Intensity Modulation.

B. Line Number LED Display.

3422-15

Fig. 3-16. a) 2 Field Display with Intensity Modulation, b) Line Number LED Display.

2. Turn the OVERLAY control clockwise until the segments of the waveform to be observed are overlaid (Fig. 3-17).

3. When magnifying the sweep, shift the segment to be observed to the center of the crt by using the horizontal POSITION control, and push in the magnifier buttons (X2, X5, or X25).

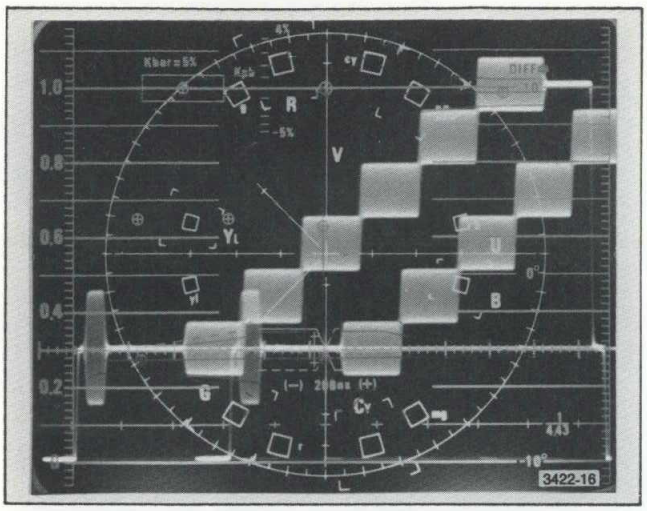


Fig. 3-17. Test Signal Overlay Display.

Noise Measurement

1. Display the segment to be observed in the normal line or field rate display mode.

2. Push in the NOISE button of the CALIBRATOR. A waveform, offset through the built-in calibrator by the noise voltage selected on the front panel, is displayed with the normal waveform. See Fig. 3-18.

3. Adjust the offset waveform with a combination of the −10 dB push button and the dB control until the noise-containing waveform looks like a single trace waveform in uniform intensity (tangential method).

4. The vertical sensitivity can be increased for maximum resolution.

5. This CALIBRATOR display indicates the noise level (RMS).

VECTORSCOPE OPERATION

Vector Display

1. Cancel all the push buttons of HORIZ DISPLAY to the out position.

2. Cancel all other push buttons except those for input control such as VERT SOURCE and SYNC SOURCE.

3. Push in the VECT button of VERT DISPLAY.

4. Align the vector display to the center of the crt with the horizontal and vertical POSITION controls.

5. Set the burst phase to 180° by using the PHASE control concentric with the vertical POSITION control. See Fig. 3-19.

6. Adjust the gain of vector display by using the GAIN control. The CAL position is calibrated by a 75% color bar.

NOTE

Select the input signal by pushing any of the VERT SOURCE buttons. Otherwise, there will be no display.

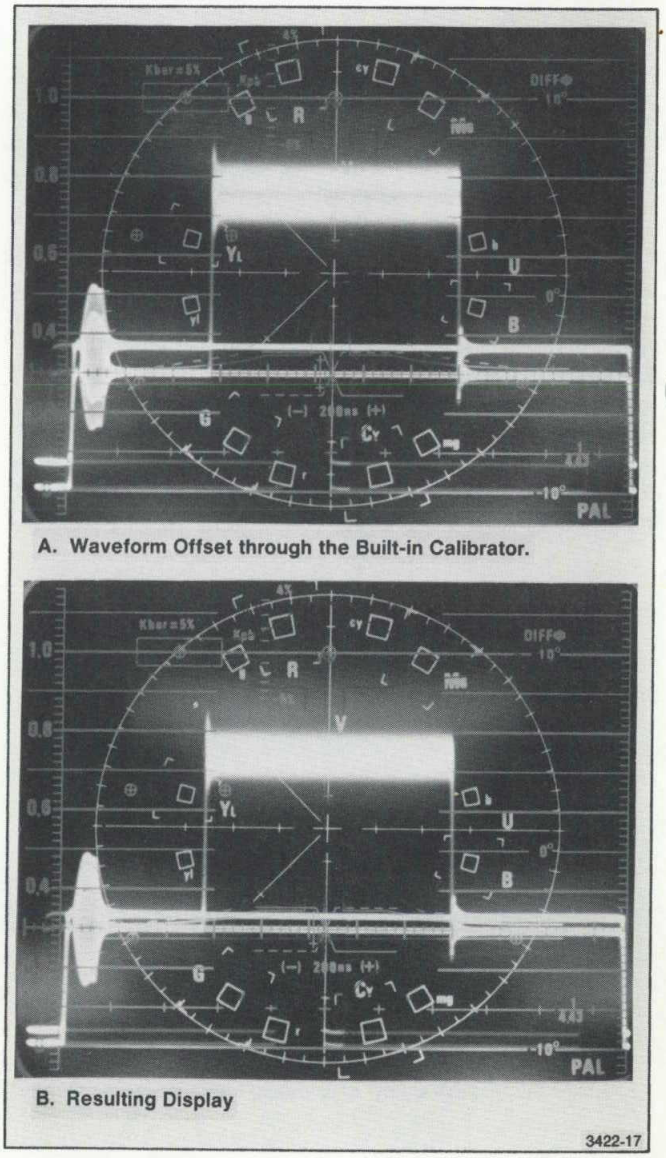
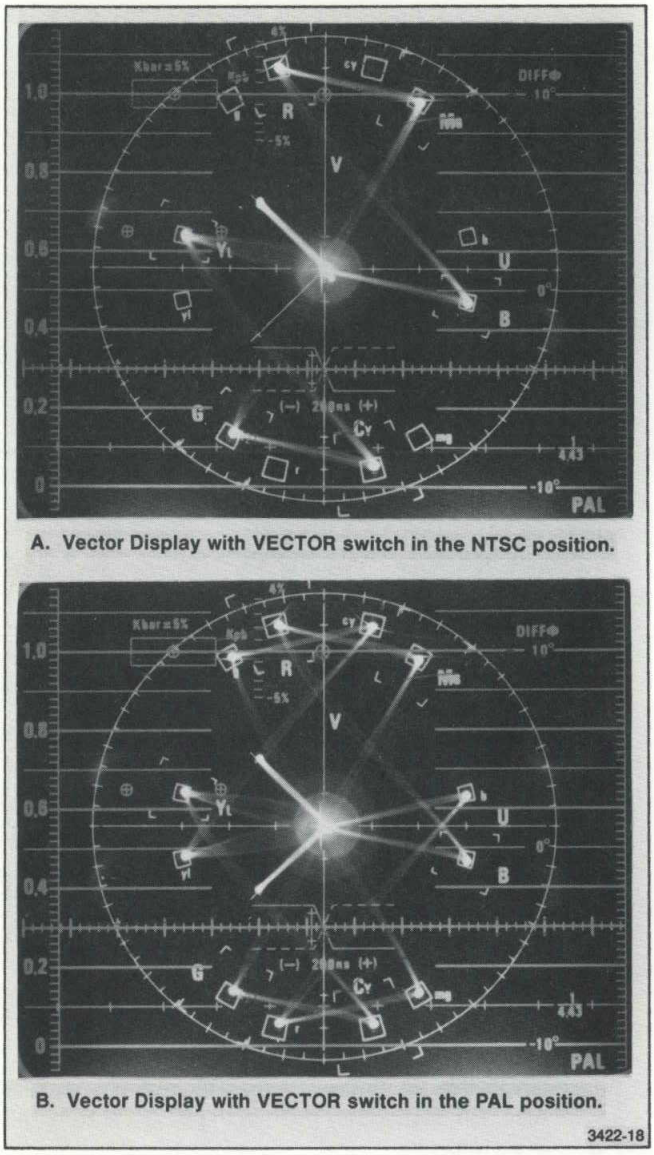


Fig. 3-18. a) A Waveform Offset Through the Built-in Calibrator, b) Resulting Display.



A. Vector Display with VECTOR switch in the NTSC position.

B. Vector Display with VECTOR switch in the PAL position.

Fig. 3-19. Vector Display.

Line Sweep Display of Color Demodulation Output

1. Make up a normal vector display.

2. Push in the 10 μs button of the HORIZ DISPLY.

3. A line sweep display (2H) of R-Y axis demodulation is obtained. See Fig. 3-20.

Differential Gain (DG) Measurements

1. Make up a normal line rate display.

2. Select a 280 mV modulated stairstep for the input test signal.

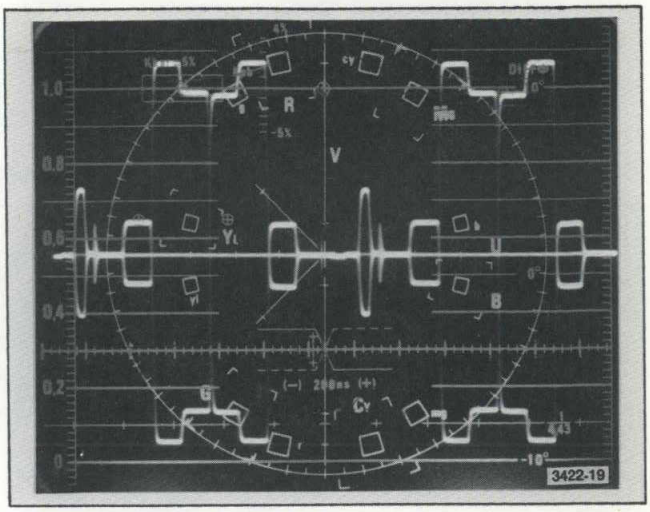


Fig. 3-20. Line Sweep Display of Color Demodulated Output.

3. Push in the 4.43 BP button of FILTERS.

4. Set the VERT DISPLAY to the highest sensitivity, 0.1 VFS. At this vertical setting, and with 280 mV peak to peak, of modulation on the stairstep test signal, each minor div on the scale now represents 1% of DG.

5. Shift the waveform by turning Vertical POSITION until the top of the modulated stairstep comes to the crt center (Fig. 3-21).

6. Using the OVERLAY control, position the parts of the waveform to be measured on top of each other. Evaluate the gain errors against the scale. DG of 0.5% would equal 10 mV, 2% for 40 mV and so on.

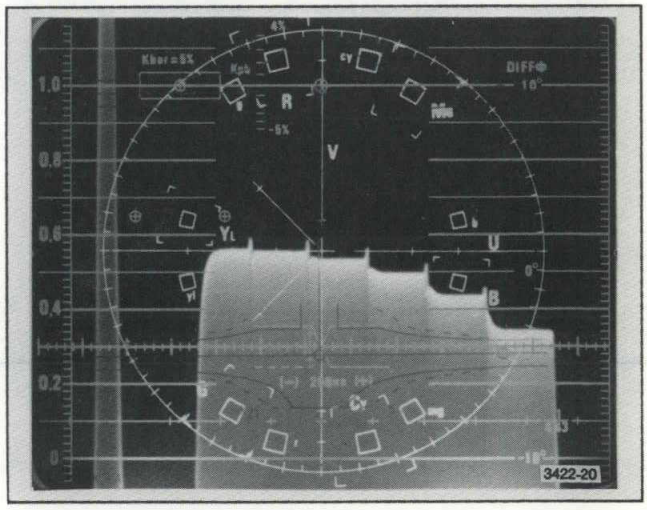


Fig. 3-21. DG Display with Modulated Stairstep Signal.

Differential Phase (DP) Measurements

1. Make up a normal vector display or a waveform monitor display at 5 μs/div.

2. Select a 280 mV modulated stairstep for the input test signal.

3. Push in the DIFFϕ button of the VERT DISPLAY.

4. Set the reference point of the stairstep to 0° position on the DIFFϕ scale of the crt by turning the Vertical POSITION control.

5. Using the PHASE control, also position the chrominance packet of the first step to the 0° line. See Fig. 3-22.

6. DP for various points of the modulated stairstep wave can be directly read from the DIFFϕ scale.

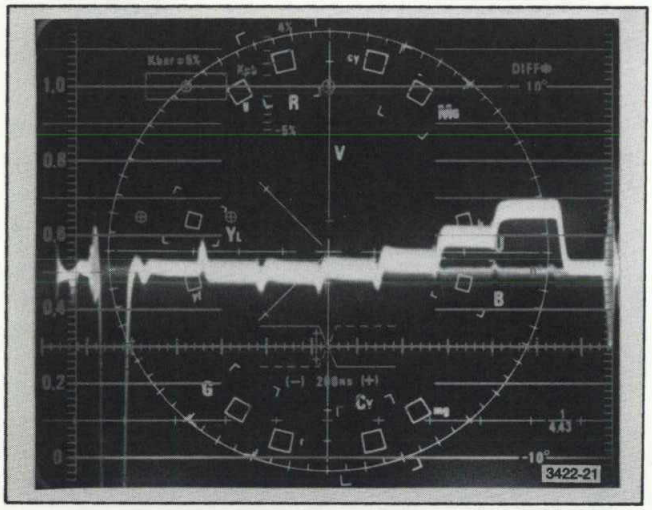


Fig. 3-22. DP Display with Modulated Stairstep Signal.

External Phase Reference Operation

The monitor must be externally referenced to the same master reference source as all the signals to be measured. In the Vector mode, the monitor is conditioned for External Phase Reference by setting the LOOP THRU/VERT SOURCE toggle switch to LOOP THRU.

Refering to the simplified block diagram of Fig. 3-23, the signal at the 75 Ω LOOP THRU INPUT is routed to the monitor's demodulator section and is the phase reference of the decoders and, therefore, the display, while the PROBE INPUT or LOOP THRU INPUT signal is routed by the front panel VERT SOURCE switch to the display section.

NOTE

If the LOOP THRU INPUT reference signal is a cw subcarrier, sync information must be provided to the sync stripper circuit by selecting the PROBE button of SYNC SOURCE on the front panel.

This application is useful for aligning phases of signal sources to a master reference (for instance, at the mixing point in a video switcher) or for measuring phase differences at two points in a video chain. For example, use the following procedure to phase a video source such as a VTR to a master reference such as black burst.

1. Connect the external reference signal (black burst) to the 75 Ω LOOP THRU INPUT and then loop it through to the PROBE INPUT as well.

2. Set the internal termination 75 Ω switch to ON. Set the monitor for external phase reference by putting the LOOP THRU/VERT SOURCE toggle switch to LOOP THRU.

3. Select +PROBE of VERT SOURCE on the front panel and push in the X5 button of the Horizontal Magnifier controls. Also, simultaneously push in the VECT button and the .2 VFS button.

4. Adjust the GAIN control to put the burst vector tip on the graticule circle. Use the PHASE control to rotate the burst vector to a convenient reference mark on the graticule circle. Note this point.

5. Remove the reference signal from the +PROBE INPUT and, in its place, connect the video signal to be phased. Use a 75 Ω feed through termination at this input.

6. Align the displayed burst to the reference point noted in part 4 by using the phasing controls of the displayed signal source.

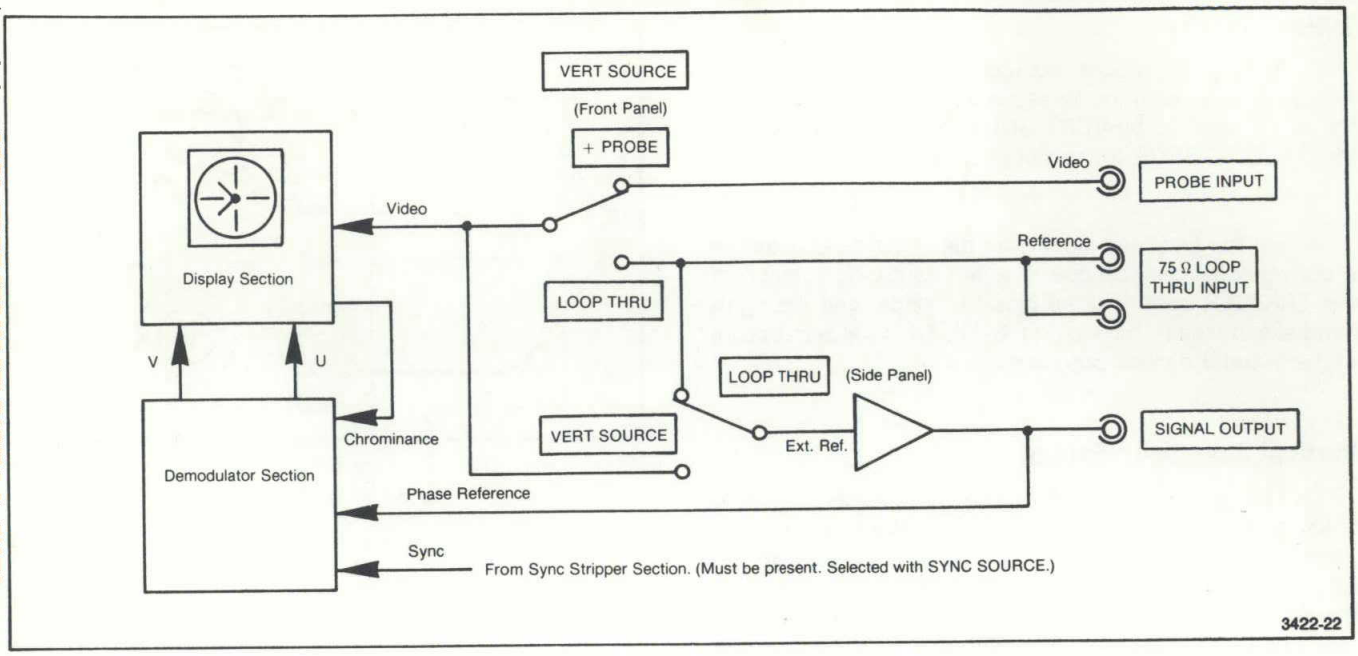


Fig. 3-23. Simplified Diagram of External Phase Reference Configuration.

Using the 015-0438-00 Subcarrier Reference Accessory

This accessory device provides the convenience of easy connections, built-in terminations, dual signal inputs, and switchable reference selection when doing externally-referenced phase measurements or alignments.

Monitor set-ups are the same as in the preceding example, except that PROBE GAIN on the front panel must also be set to X10.

OSCILLOSCOPE OPERATION

Preparation

1. Cancel all the push buttons except those of input signal and trigger selections.

2. Push in the AUX/TV selector of the HORIZ DISPLAY.

Sweep Rate Setting

1. Push in an appropriate button of the AUX TIME BASE (SEC/DIV). The sweep rate is indicated in sec/div above the selected push button.

2. Push in the 100X button of AUX TIME BASE (SEC/DIV). The sweep will proceed at a rate 100 times as slow as that indicated on the panel (e.g., 1 ms to 100 ms).

3. If the horizontal magnifier is used, the sweep rate can be increased up to 200 ns. The selected sweep rate, including the effects of X100 and magnification, is directly indicated on the front panel by the LED readout (Fig. 3-24).

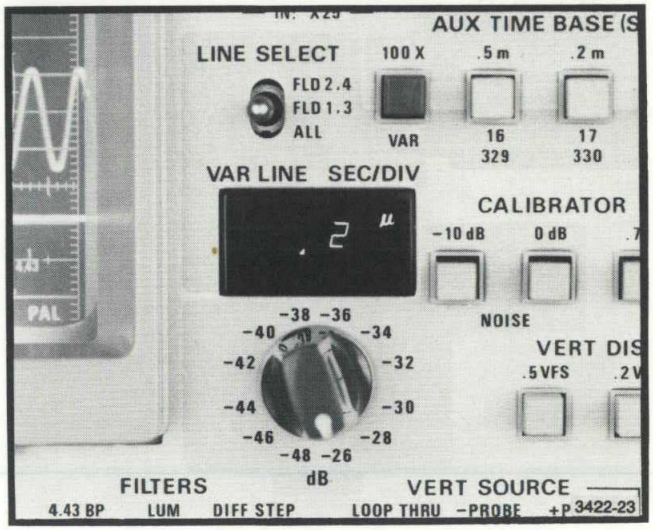


Fig. 3-24. Sweep Rate LED display.

Trigger Setting

1. Select the trigger source signal with the SYNC SOURCE buttons. If the sweep is to be triggered always by the signal selected by VERT SOURCE, set both buttons of the SYNC SOURCE to the out position.

2. Set the level and slope with the TRIGGER control as a conventional oscilloscope. The left-hand-side rotation of the TRIGGER control gives plus (+) slope, and the right-hand-side minus (−) slope (Fig. 3-25). The level zero occurs at the 9 and 3 o'clock positions.

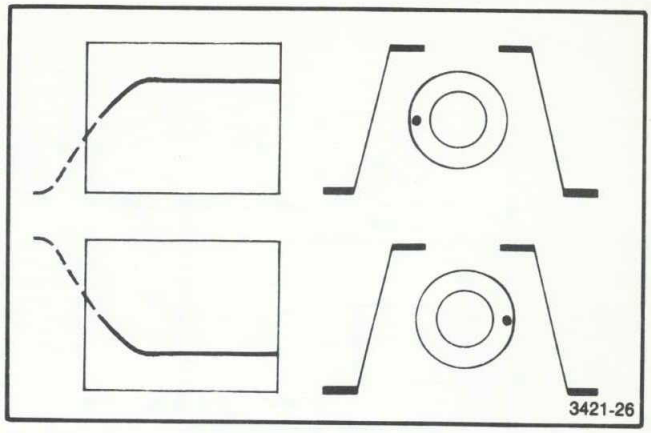


Fig. 3-25. Trigger Setting.

Vertical Sensitivity Setting

Like the waveform monitor mode, the vertical sensitivity is to be set with the VERT DISPLAY buttons on the front panel. Voltage values given on the front panel refer to the full scale value. For reading the voltage, the 0-10 div scale at the left-hand-side of the crt is to be used. The deflection factor (volt/div) is equal to one-tenth of VFS value given on the front panel.

WARNING

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER TO OPERATORS SAFETY SUMMARY AND SERVICE SAFETY SUMMARY PRIOR TO PERFORMING ANY SERVICE.

SERVICING SAFETY SUMMARY

FOR QUALIFIED SERVICE PERSONNEL ONLY

Refer also to the preceding Operators Safety Summary

Do Not Service Alone

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

Use Care When Servicing With Power On

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch the exposed connections and components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

Power Source

This product is intended to operate from a power source that will not apply more than 250 V rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord of the mainframe is essential for safe operation.

PART II
SERVICE INFORMATION

MAINTENANCE

The maintenance information contained in this section falls into three categories; Preventive Maintenance, Troubleshooting, and Corrective Maintenance.

Preventive Maintenance includes inspection, cleaning, and recalibration. Troubleshooting contains information for isolating a trouble to a component. Corrective Maintenance includes procedures for removing and replacing components.

PREVENTIVE MAINTENANCE

A regular schedule of preventive maintenance can improve instrument reliability. How often the preventive maintenance schedule is performed should be determined by the severity of the operating environment.

Visual Inspection

Visually inspect the instrument during the preventive maintenance routine for such defects as broken connectors, loose or disconnected pin connectors, improperly seated transistors and integrated circuits, and damaged components.

The corrective procedure for most visible defects is obvious; however, care must be taken to determine and correct the cause of heat-damaged components. Heat damage is frequently an indication of troubles elsewhere in the instrument.

Cleaning

Dust accumulating in the instrument acts as an insulating blanket, preventing efficient heat dissipation, and possibly causing overheating and component breakdown. Accumulated dust can also provide an electrical conduction path, especially under high humidity conditions.

CAUTION

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

Exterior. Remove accumulated dust with a soft cloth or small paint brush. The brush is particularly useful around the front-panel controls.

Remaining dust can be removed with a soft cloth, dampened in a mild detergent and water solution. Do not use abrasive cleaners.

Crt. Clean the crt face, graticule mask, external graticule, filter, and bezel with a soft, lint-free cloth dampened with mild detergent and water. Repeat with a cloth dampened with water only. Avoid hard rubbing when cleaning the crt faceplate, filter, and bezel.

Interior. The best way to remove accumulated dust inside the instrument is to blow it off with dry, low-velocity air. Remaining dust can be removed with a small paint brush followed by a soft cloth dampened in a mild detergent and water solution. A cotton-tipped applicator is useful in tight places.

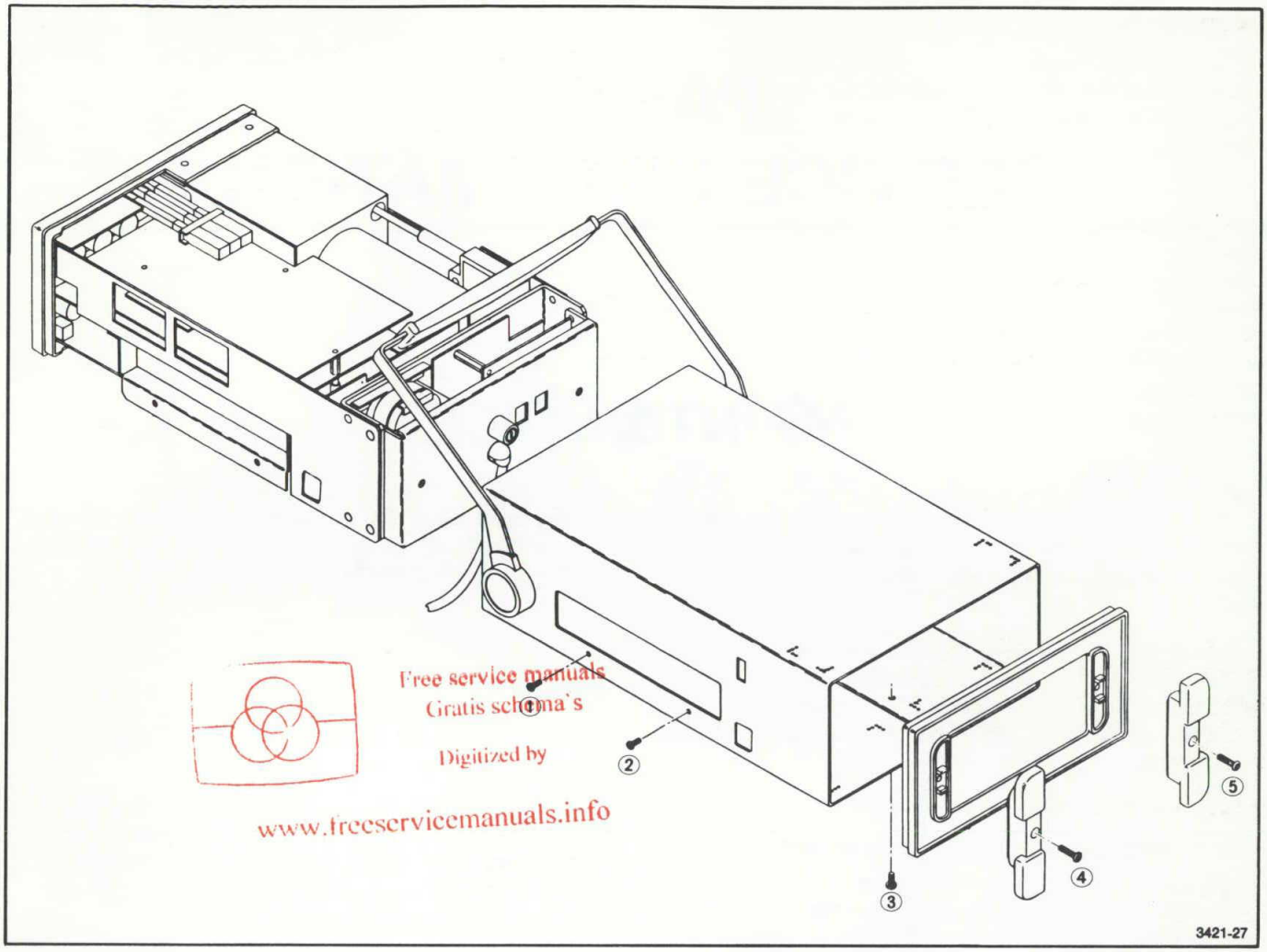


Fig. 4-1. Cabinet Removal.

Multi-pin Connectors

Most inter-circuit connections between the circuit boards or between boards and chassis-mounted components are made through multi-pin connectors. The connector holder has identification numbers that identify terminal connector No. 2 and up. A triangular key symbol is also located on the circuit board to identify pin No. 1 (see Fig. 4-2) so that the connector holder can be properly oriented.

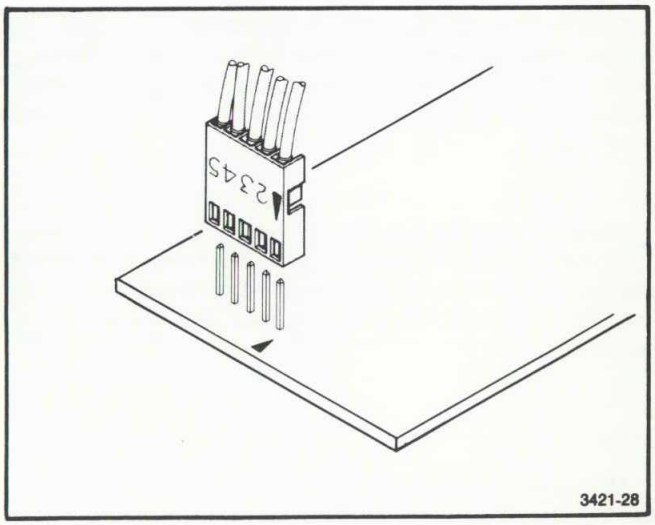


Fig. 4-2. Multi-pin Circuit Board Connector.

Transistor and Integrated Circuit Checks

Periodic transistor and integrated circuit checks are not recommended. The best performance check for these devices is actual operation of the instrument. Performance of the circuit is thoroughly checked during the calibration procedure. Any substandard transistors or integrated circuits will usually be detected at that time.

Recalibration

The length of time between recalibration depends on the amount of use the instrument receives, the nature of the environment, and the change in performance when some components are replaced.

In general, a partial recalibration is necessary if the components replaced affect the calibration of a portion of the instrument. Complete recalibration is recommended if the instrument is not operating at its full capability, or if the crt is replaced. To ensure correct and accurate instrument operation, the instrument performance should be checked at regular intervals; for example, after 1000 hours of operation if used continuously or every 6 months if used infrequently.

Calibration Procedure is given in Section 5.

TROUBLESHOOTING

The following is provided to augment information contained in other sections of this manual when troubleshooting the instrument. The schematic diagrams, circuit description, and calibration sections should be used to full advantage.

Troubleshooting Aids

Theory of Operation. Section 6 describes circuit operating theory. Used in conjunction with the schematics and block diagrams, the information provided in the Circuit Description section is helpful when analyzing circuit operation.

Diagrams. Circuit diagrams are given on the foldout pages in Section 9. The circuit number and electrical value of each component in this instrument are shown on the diagrams.

Circuit Boards. The circuit boards used in the instrument are outlined on the schematic diagrams. Circuit board illustrations are provided in Section 9.

Circuit Boards Location. For circuit boards location, see Fig. 4-3.

Access to Input Board and HV Board. When accessing the Input Board, first remove the INTENSITY control shaft and four wires to the crt deflection plate pins, then lift up the Main Board and fix it to the chassis. When accessing the HV Board, remove the two screws, then rotate the power module backward with care. (See Fig. 4-4).

Wire Color Code. All insulated wires used for interconnection in the instrument are color-coded to facilitate tracing a wire from one point to another.

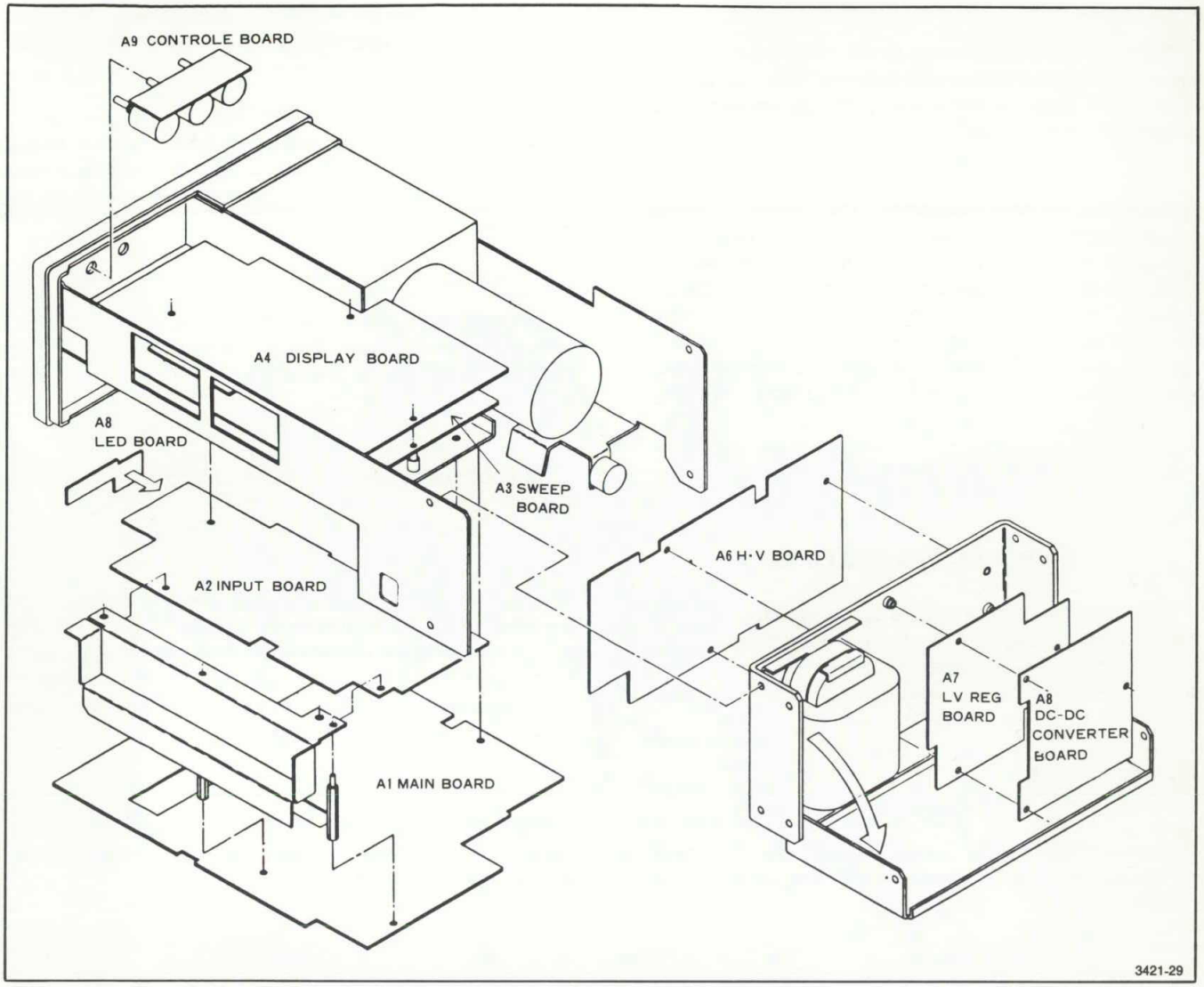


Fig. 4-3. Circuit Board Locations in the Monitor.

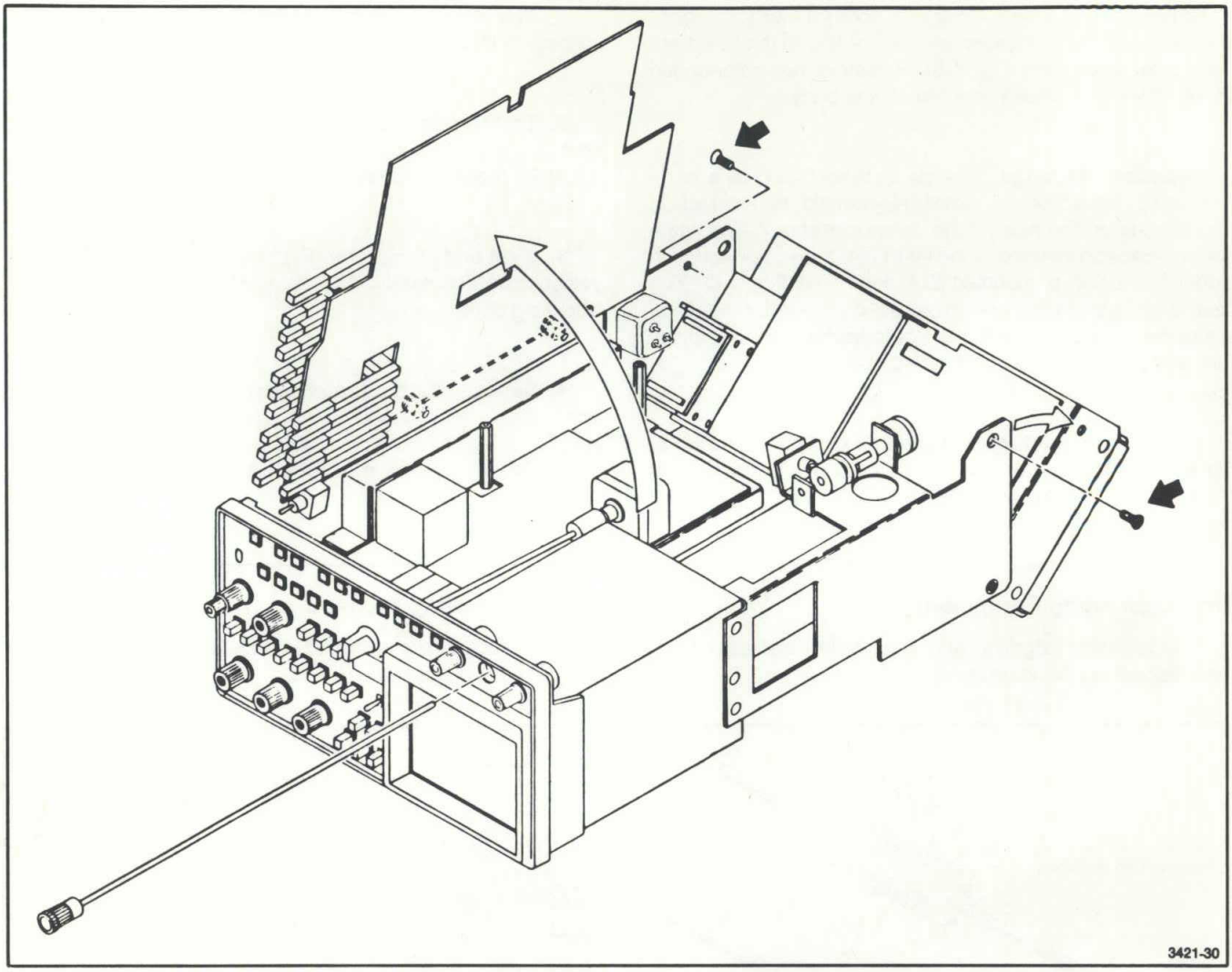


Fig. 4-4. Accessing the INPUT and HV Boards.

Resistor Color Code. Colored stripes on resistors signify electrical values, tolerances, etc., according to the EIA standard color code (see Fig. 4-5). Resistors not color-coded usually have the value imprinted on the body.

Capacitor Markings. The capacitance value of a common disc capacitor or small electrolytic is marked in microfarads on the side of the component body. The white ceramic capacitors used in the instrument are color-coded in picofarads using a modified EIA code (see Fig. 4-6). The "tear drop" capacitors are color-coded in microfarads using a modified EIA code, with the dot indicating both temperature and positive (+) side. See Fig. 4-6.

Transistor and Integrated Circuit Lead configurations. Fig 4-7 illustrates the lead configurations for the socket-mounted transistors, field effect transistors (FET's) and Integrated Circuits (IC's) used in the instrument.

Troubleshooting Equipment

The following signals and equipment are useful for troubleshooting the instrument.

1. Signals. 1 V peak-to-peak composite video test signals–NTSC.

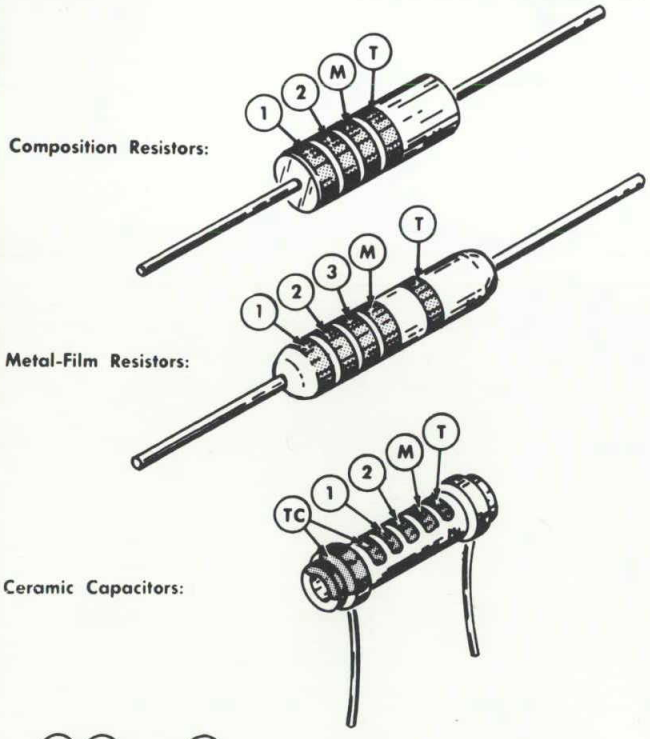
2. Test Oscilloscope. For viewing waveforms at various test points in the circuit. Frequency response: dc to at least 10 MHz. It should be equipped with a 10X probe.

3. DVM and Ohmmeter. For measuring dc voltages and resistances accurately. The ohmmeter is also required for checking continuity.

4. Semiconductor Tester. Some means of testing the transistors, diodes, and FET's used in this instrument is helpful. A transistor-curve tracer such as the TEKTRONIX Type 577 will give the most complete information.

Troubleshooting Procedure

This procedure is arranged in a sequence that checks the simple trouble possibilities first.



Resistor and Capacitor Color Code

Color	Significant Figures	Multiplier: Resistors	Multiplier: Capacitors	Tolerance: Resistors	Tolerance: Capacitors
Silver	---	10^{-2}	---	±10%	---
Gold	---	10^{-1}	---	±5%	---
Black	0	1	1	---	±20% or 2 pF*
Brown	1	10	10	±1%	±1% or 0.1 pF*
Red	2	10^2	10^2	±2%	±2%
Orange	3	10^3	10^3	±3%	±3%
Yellow	4	10^4	10^4	±4%	+100% −0%
Green	5	10^5	10^5	±0.5%	±5% or 0.5 pF*
Blue	6	10^6	10^6	---	---
Violet	7	---	---	---	---
Gray	8	---	10^{-2}	---	+80% −20% or 0.25 pF*
White	9	---	10^{-1}	---	±10% or 1 pF*
(none)	---	---	---	±20%	±10% or 1 pF*

*For capacitance of 10 pF or less.

3421-31

NOTE: (T) and/or (TC) color code for capacitors depends upon manufacturer and capacitor type. May not be present in some cases.

Fig. 4-5. Color Code for Resistors and Ceramic Capacitors.

Rated Voltage VDC 25°C	Color	CODE FOR CAPACITANCE IN PICOFARADS		
		1st Figure	2nd Figure	Multiplier—pF
4	Black	0	0	None
6	Brown	1	1	X 10
10	Red	2	2	X 10^2
15	Orange	3	3	X 10^3
20	Yellow	4	4	X 10^4
25	Green	5	5	X 10^5
35	Blue	6	6	X 10^6
50	Violet	7	7	X 10^7
	Gray	8	8	
3	White	9	9	

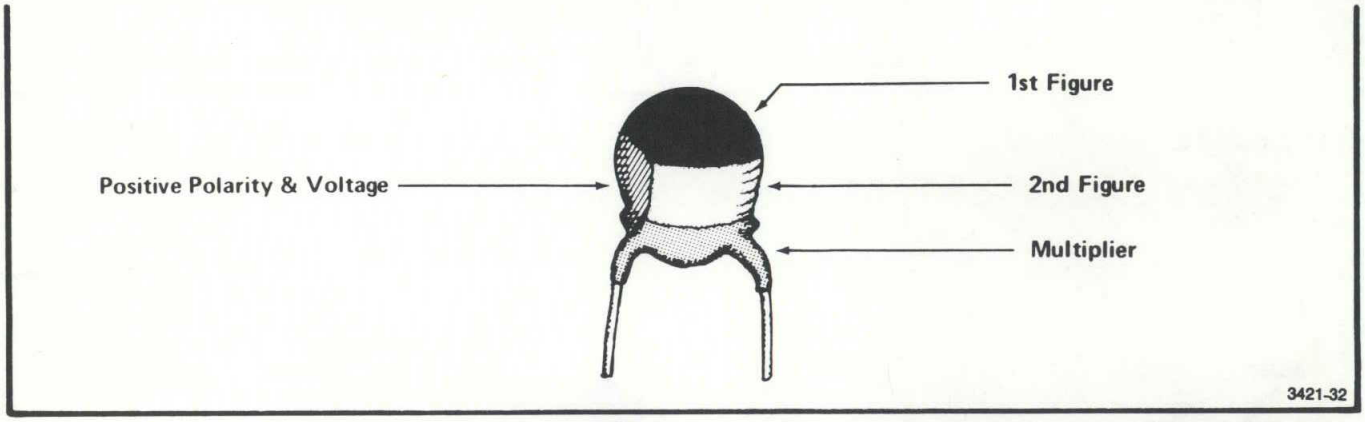


Fig. 4-6. Color-coding for Dipped Tantalum "Tear Drop" Capacitors.

1. Check Control Settings. Incorrect control settings can indicate a trouble that does not exist. If there is any question about the correct function or operation of any control, refer to the Operating Instruction section.

2. Check Associated Equipment. Before troubleshooting the instrument, check that the applied signal is correct and properly connected. Check that the probe, if used, is not defective.

3. Isolate Trouble to a Circuit. If the instrument is at fault, isolate the trouble to a circuit by noticing the trouble symptoms. This can be accomplished by using the front panel controls and observing the crt display to identify the nature of the trouble. Then, use steps 4 through 6 to isolate the trouble to the probable cause such as a defective component or connection.

4. Visual Check. Visually check the portion of the instrument in which the trouble is suspected. Some troubles can be located by checking for unsoldered connections, broken wires, loosely-seated transistors, loose-fitting connectors, damaged components, or damaged circuit boards.

5. Check Voltages and Waveforms. Often the defective component or stage can be located by checking for the correct voltage or waveform in the circuit.

CAUTION

Because of component density on circuit boards, care should be taken with meter leads and probe tips. Accidental shorts can cause abnormal voltages or transients that may destroy components. "Ground lugs" are not always at ground potential. Check the diagrams before using such connections as ground for meter prods or oscilloscope probes. Some transistor cases may be elevated.

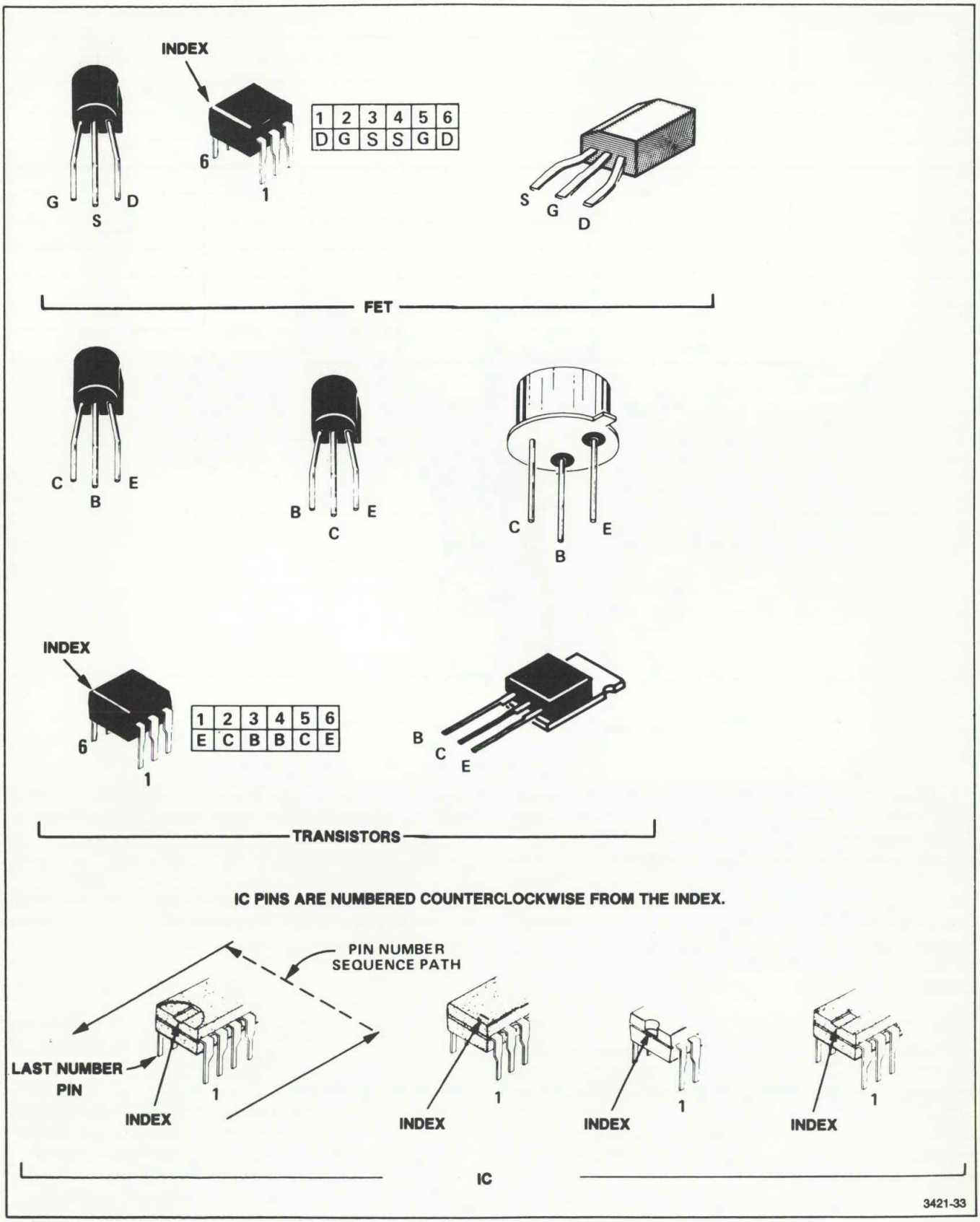


Fig. 4-7. Semiconductor Lead Configurations.

6. Check Individual Components. When you have isolated the trouble to one circuit or stage, the next step is to isolate the trouble to one component or part. Components that are soldered in place are best checked by disconnecting one end to isolate the measurement from the effects of surrounding circuitry. The following methods are provided for checking individual electrical components in the instrument.

a. Transistors. The best check of transistor operation is actual performance under operating conditions. If a transistor is suspected of being defective, it can be checked by substituting a new component or one which has been checked previously. However, be sure that the circuit conditions are not such that a replacement transistor might also be damaged. If substitute transistors are not available, use a dynamic tester (such as the TEKTRONIX Type 577) to check the transistor.

b. Integrated Circuits. Integrated circuits should not be replaced unless they are actually defective. The best method for checking these devices is by direct substitution with a new component or one which is known to be good. Be sure that circuit conditions are not such that a replacement component might be damaged.

c. Diodes. A diode can be checked for an open or shorted condition by measuring the resistance between terminals. Use an ohmmeter, set to the 1k scale to keep from damaging the diode, for measuring the diode resistance. The resistance should be very high in one direction and very low when the ohmmeter leads are reversed.

d. Resistors. Resistors can be checked with an ohmmeter. Check the Electrical Parts List for the tolerance of the resistors used in the instrument. Resistors normally do not need to be replaced unless the measured value varies widely from the specified value.

e. Inductors & Switch Contacts. Check for an open circuit (that should normally be closed) by checking continuity with an ohmmeter.

f. Capacitors. A leaky or shorted capacitor can best be detected by checking the resistance with an ohmmeter on the highest scale. Do not exceed the voltage rating of the capacitor. An open capacitor can best be detected with a capacitance meter or by checking whether the capacitor passes ac signals.

CORRECTIVE MAINTENANCE

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

Soldering Techniques

WARNING

Disconnect the instrument from the power source before soldering.

Reliability and optimum performance of this instrument can be maintained only if proper soldering techniques are used when repairing or replacing parts. Soldering techniques that apply to maintenance of precision electronic equipment should be used when working on this instrument. Use only 60/40 rosin-core, electronic grade solder. The choice of soldering iron is determined by the repair to be made. When soldering on circuit boards, use a 15- to 25-watt pencil-type soldering iron with a 1/8-inch wide, wedge-shaped tip. Keep the tip properly tinned for best heat transfer to the solder joint. A higher wattage soldering iron may separate the etched wiring from the base material. Avoid excessive heat; apply only enough heat to remove the component or to make a good solder joint. Also, apply only enough solder to make a firm solder joint; do not apply too much solder. Use a desoldering tool or other device when it is necessary to remove excess solder.

The pencil-type soldering iron used on the circuit boards can be used for soldering to switch terminals, potentiometers, or metal terminals mounted in plastic holders. For ground lugs that are connected to the chassis, or other metal terminals that are connected to a large heat-radiating surface, use a higher-wattage-rating soldering iron with a larger tip.

After soldering is completed, clean the area around the solder connection with a flux-remover solvent. Be careful not to remove any information printed in the area.

Circuit Board Replacement

If a circuit board is damaged beyond repair, the entire assembly, including all soldered-on components, can be replaced. Tektronix part numbers are given in the Replaceable Electrical Parts list.

Most of the circuit boards in this instrument are mounted on the chassis. Multi-pin connectors are used for interconnection with other circuits. Use the following procedure to remove circuit boards.

Chassis-Mounted Boards.

1. Disconnect the multi-pin connectors from the board. Note the order of these connectors so they can be correctly replaced. Disconnect any other connectors that are used for interconnection to other circuits.

2. Remove the securing screws.

3. Remove the board.

4. To replace the board, reverse the order of removal. Match the triangle key symbol on the multi-pin connectors to the same symbol on the board.

Table 4-1

RELATIVE SUSCEPTIBILITY TO STATIC DISCHARGE DAMAGE

Semiconductor Classes	Relative Susceptibility Levels[a]
MOS or CMOS microcircuits or discretes, or linear microcircuits with MOS inputs. (Most Sensitive)	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-frequency bipolar transistors	5
JFETs	6
Linear microcircuits	7
Low-power Schottky TTL	8
TTL (Least Sensitive)	9

[a] **Voltage equivalent for levels:**

1 = 100 to 500 V 4 = 500 V 7 = 400 to 1000 V(est.)
2 = 200 to 500 V 5 = 400 to 600 V 8 = 900 V
3 = 250 V 6 = 600 to 800 V 9 = 1200 V

(Voltage discharged from a 100 pF capacitor through a resistance of 100 Ω.)

Semiconductor Replacement

Semiconductors should not be replaced unless they are actually defective.

CAUTION

The POWER switch must be turned off before removing or replacing semiconductors.

If the semiconductors are removed from their sockets during routine maintenance, return them to their original sockets. Unnecessary replacement of semiconductors may affect the calibration of this instrument. When semiconductors are replaced, check the operation of the parts of the instrument whose calibration may be affected.

Replacement semiconductors should be of the original type or a direct replacement. Fig. 4-7 shows the lead configuration of the semiconductors used in this instrument. Some plastic-cased transistors have lead configurations that do not agree with those shown here. If a replacement transistor is made by a different manufacturer than the original, check the manufacturer's basing diagram for correct basing. All transistor sockets in this instrument are wired for the standard basing as used for metal-cased transistors. Power transistors that are mounted on the chassis use silicone grease to increase heat transfer. Replace the silicone grease when replacing these transistors.

WARNING

Handle silicone grease with care. Avoid getting silicone grease in the eyes. Wash hands thoroughly after use.

An extracting tool should be used to remove the 8-, 14-, and 16-pin integrated circuits to prevent damage to the pins. This tool is available from Tektronix, Inc. Order Tektronix Part No. 003-0619-00. If an extracting tool is not available when removing one of these integrated circuits, pull slowly and evenly on both ends of the device. Try to avoid having one end of the integrated circuit disengage from the socket before the other, as this may damage the pins.

CALIBRATION PROCEDURE

Introduction

These procedures are to be followed when ascertaining some characteristics, making routine calibration, and checking instruments to be reused after a long pause.

In paragraphs of this section, some parameters relevant to calibration are given values that are different from those in the preceding sections. The calibration is to be conducted at an ambient temperature between 20°C and 30°C after a warm-up period of 30 minutes.

The 381 control panel names and rear-panel names in the text are capitalized, e.g., HORIZ DISPLAY. Control and connector names on test equipment and interval controls in the 381 have only the first letter capitalized, e.g., Sig. Out Gain.

Test Equipment

The capabilities of the test equipment described in Table 5-1 are the minimum required for accurate checks and adjustments. Test equipment is assumed to be correctly calibrated and operating within its specifications. Detailed operating instructions for the test equipment are not given in these procedures. Refer to the instruction manual for the test equipment if more information is needed.

Test equipment used in preparing these procedures are given as examples in Table 5-1. If alternative equipment is used, it must meet or exceed the listed requirements.

Board and Adjustment Location Information

Board Identification. Refer to Fig. 4-3 in Section 4, Maintenance, for circuit board identification. Fig. 4-4 in the same section shows how to access the Input and HV Boards.

Adjustment Locations. Refer to the foldouts of Section 8 for illustrations of the circuit boards with adjustments located and labeled.

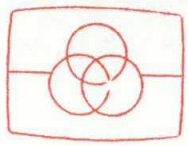


Table 5-1
RECOMMENDED TEST EQUIPMENT

Description	Performance Requirement	Example
PAL Video Signal Source	Test signal complement of a. 100/0/75/0 (EBU) Color Bars, b. 5- or 10-step Staircase modulated with 280 mV, p-p, chrominance, c. Multiburst, d. 4.433619 MHz, ±5 Hz, Subcarrier.	TEKTRONIX 1411 Test Signal Generator with SPG12, TSG11, TSG13, and TSG16.
Time Mark Generator	Marker ranges from 0.2 μs to 50 ms, with accuracy of 1%.	TEKTRONIX TG 501 Time Mark Generator.[a]
Amplitude Calibrator	At least 1 V squarewave, at least 250 Hz rate, 75 Ω-input compatible.	TEKTRONIX 067-0916-00 Video Amplitude Calibrator.
Frequency Counter	±1 Hz at 4.433619 MHz with at least 7 digits resolution.	TEKTRONIX DC 503A[a] Universal Counter/Timer.
Constant-amplitude Sinewave Generator	Range to at least 250 MHz with a 50 kHz reference. Flatness, at least 1%. Amplitude, at least 1 V.	TEKTRONIX SG 503[a] Signal Generator.
Low-frequency Signal Generator	Range from at least 50 Hz to 5 MHz. Amplitude at least 1 V.	TEKTRONIX FG 502[a] Function Generator.
Digital Voltmeter	Dc voltage range from −200 V to +100 V. Accuracy within 0.1%.	TEKTRONIX DM 501A[a] Digital Multimeter.
Test Oscilloscope	At least 100 MHz bandwidth, dual vertical channels with at least 10 mV/div deflection factor, and 100 ms/div to 0.5 μs/div timebase.	TEKTRONIX 7603 with a 7B53A, Option 05, Time Base, a 7A13 Differential Comparator, and a 7A26 Dual Trace Amplifier.
DC Power Supply	Range of 11 to 28 Vdc, capable of 3A, max.	Systron-Donner HR40-10C-0V or Lambda LP-532-FM.
Variable Autotransformer	Capable of supplying at least 35 W over a voltage range of 90 to 250 Vac.	General Radio W10MT3W Metered Autotransformer.
Impedance Converter	50 Ω to 75 Ω.	Tektronix Part No. 011-0057-00
End-Line Termination	75 Ω.	Tektronix Part No. 011-0102-00
BNC Cable T Connector		Tektronix Part No. 067-0525-00.
Video Cables (2)		Tektronix Part No. 012-0074-00.
10X Attenuator	75 Ω	Tektronix Part No. 011-0061-00.

[a] **Requires a TM 500-Series power module (TM 506 recommended).**

A. PRELIMINARY PROCEDURES

1. General Checking

Visually check for soldering, screw tightening, dressing, outer appearance, connector fastening, and knob mounting.

2. Fuse Check

F1800	0.2 A
F2000	1.5 A
F2002	3 A

3. Initial Control Settings

POWER	OFF
INTENSITY	ccw
FOCUS	Mid
SCALE ILLUM	ccw
HORIZ DISPLAY	10 μs
VAR SEL/TRIGGER	Mid
OVERLAY	ccw
HORIZ POSITION	Mid
FLD1,3/FLD2,4/ALL	ALL
GAIN	CAL
PHASE	Mid
VERT POSITION	Mid
dB	cw
INPUT	DC
VERT SOURCE	LOOP THRU
PROBE GAIN	X1

Other push-button switches are all in Out or OFF position.

75 Ω TERM	ON
LOOP THRU/ VERT SOURCE	LOOP THRU
VECTOR	PAL
DC INPUT VOLTAGE	AC
AC INPUT VOLTAGE	230 V, HI

B. RESISTANCE CHECKING

1. Power Supplies (See Table 5-2)

With the minus (−) lead of a circuit tester grounded, apply the plus (+) lead to respective power outputs to measure resistance.

Table 5-2
TYPICAL LV POWER SUPPLY RESISTANCES

Voltage	Multiplier	Resistance
−8 V	X100	200 Ω
+5 V	X100	900 Ω
+8 V	X100	230 Ω
+15 V	X100	650 Ω
+35 V	X1K	14 kΩ
+85 V	X1K	17 kΩ

2. Primary Transformer Winding (See Table 5-3)

Check resistance across two prongs of the power plug while changing the voltage settings.

Table 5-3
TYPICAL PRIMARY WINDING RESISTANCES

AC Input	Voltage	Multiplier	Resistance
115 V	LOW	X10	22 Ω
	HIGH	X10	25 Ω
230 V	LOW	X10	75 Ω
	HIGH	X10	90 Ω

Set AC INPUT VOLTAGE to 230 V, HI.

Set DC INPUT VOLTAGE to DC 24 V.

C. POWER SUPPLY AND CRT

1. Inv Bal Adjustment — <250 mV

Apply 24 V dc from an external dc supply to DC INPUT. Adjust R2010 (Fig. 8-7) to minimize ripple at P2014-1.

2. +15 V Adjustment — 15 V, ±0.2%

Connect a DVM between TP1900 and ground. Adjust R1866 until the DVM reads 15.00 V. See Fig. 8-6.

3. HV Adjustment — −1960 V ±2%

Connect an HV probe to TP1974. Adjust R1977 (Fig. 8-5) until the voltage reads −1960 V.

4. Voltage Deviation, Ripple and Regulation Check (See Tables 5-4 and 5-5)

Table 5-4
TYPICAL LV POWER SUPPLY DEVIATION AND RIPPLE

Voltage	Deviation	Ripple
−8 V	±1% (−7.92 to −8.08)	25 mV or less
+5 V	±5% (+4.75 to +5.25)	200 mV or less
+8 V	±1% (+7.92 to +8.80)	25 mV or less
+15 V	±0.2% (+14.97 to +15.03)	25 mV or less
+35 V	±1.5% (+34.475 to +35.525)	25 mV or less
+85 V	±3% (82.45 to +87.55)	25 mV or less

Table 5-5
AC INPUT VOLTAGE

Range	Nominal
22 V to 28 V dc	(24 V dc)
11 V to 14 V dc	(12 V dc)
90 V to 110 V ac	(115 V ac LO)
107 V to 132 V ac	(115 V ac HI)
180 V to 220 V ac	(230 V ac LO)
214 V to 250 V ac	(230 V ac HI)

Make sure that the output voltage requirements are satisfied as shown in Table 5-4 as the DC INPUT VOLTAGE and AC INPUT VOLTAGE ranges are switched.

5. Crt Bias Adjustment

Set DC INPUT VOLTAGE to DC24V, apply 24 V dc from an external dc supply, and push LINE SELECT 21. Adjust R1958 (Fig. 8-5) until the trace on the crt just fades away.

6. HV Regulation Check — <2%

Turn LINE SELECT 21 off, connect the HV probe to TP1974, and turn INTENSITY clockwise to check that the high voltage is between −1920.8 V and −1999.2 V.

7. Crt Check

Check the crt with regard to phosphor defects, double peaking, mesh defects, burrs, etc.

8. Astigmatism Adjustment

Feed a color bar signal into 75 Ω LOOP THRU INPUT from the TSG11. Set the INTENSITY control to the twelve o'clock position, and turn R1992 and FOCUS until optimum sharpness is realized everywhere on the crt.

9. Line Select Focus

Push in LINE SELECT 21, and turn R1678 until optimum sharpness is realized.

10. Trace Rotation —≤4°

Disconnect the color bar signal, set HORIZONTAL DISPLAY to AUX, and turn R1998 both clockwise and counterclockwise to make sure that the trace can be moved for 0.95 div on the voltage scale (11.2 div on the horizontal scale). Adjust R1998 to set the trace to the 0.3 line.

11. Geometry Adjustment — ≤0.15 div horizontal (voltage scale); ≤0.15 div vertical (time base scale)

Feed a 1 ms time mark signal into 75 Ω LOOP THRU INPUT through a 50 Ω-75 Ω minimum loss attenuator. Set AUX TIME BASE to 100X and 10 μ, and VERT DISPLAY to .2 VFS. Adjust the TRIGGER control until the display is stabilized and turn R1996 to minimize the curvature of the marker. Disconnect the marker and make sure that the bend of the trace is 0.15 div or less.

D. VERTICAL SYSTEM

1. LOOP THRU 1V Gain Adjustment

Disconnect the 50 Ω - 75 Ω minimum loss attenuator, turn 75 Ω TERM off, and connect the 1 V output of the Amplitude Calibrator to 75 Ω LOOP THRU INPUT and PROBE INPUT via a dual coupler. Set VERT DISPLAY to 1 VFS, and turn R513 (Fig. 8-1) until the trace deflects 10 div.

2. LOOP THRU .2X GAIN Adjustment

Set VERT DISPLAY to .2VFS and GAIN to .2X. Turn R180 until the trace deflects 10 div.

3. PROBE X10 Gain Adjustment

Set the Amplitude Calibrator output to 0.1 V, GAIN to CAL, VERT DISPLAY to 1VFS, VERT SOURCE TO +PROBE, and turn R86 to make the deflection 10 div.

4. PROBE Invert Bal Adjustment — ≤1 div

Disconnect the dual coupler, set VERT DISPLAY to 1VFS, and turn R89 until the trace shift is nullified when setting VERT SOURCE alternately to +PROBE and −PROBE.

5. LOOP THRU Dc Level Adjustment — ≤2 div

Set VERT SOURCE to LOOP THRU and turn R104 to minimize the trace shift while changing GAIN from clockwise to counterclockwise.

6. PROBE X10 Dc Level Adjustment — ≤2 div

Set VERT SOURCE to +PROBE and turn R94 to minimize the trace shift while turning the GAIN from clockwise to counterclockwise. If necessary, repeat steps 1 through 6.

7. SIGNAL OUTPUT Gain Adjustment

Connect 1V output of the Amplitude Calibrator 75 Ω LOOP THRU INPUT, one of the LOOP THRU connectors to the A input of the 7A13, and SIGNAL OUTPUT to the B input via a 75 Ω feedthru terminator. Set GAIN to CAL and VERT SOURCE to LOOP THRU. Adjust R254 (Fig. 8-2) to bring the null point of the waveform to a specified point on the test oscilloscope crt. Set LOOP THRU/VERT SOURCE to VERT SOURCE, and check for the null point.

8. POSITION Adjustment — <14 mV

Connect the video signal to 75 Ω LOOP THRU INPUT and turn the 75 Ω TERM on. Release 100X and 10 μ of AUX TIME BASE, set HORIZ DISPLAY to 10 μs, and adjust R589 (Fig. 8-1) to nullify the trace shift while setting the INPUT alternately to DC and DC REST.

9. Gain Check

The gain is to be checked in reference to Table 5-6, using the Amplitude Calibrator. Set HORIZ DISPLAY to AUX, set AUX TIME BASE to 100X and 10 μ, turn the 75 Ω TERM off, and set GAIN to CAL.

Table 5-6
VERTICAL ACCURACY

Range	Loop Thru	Probe X1	Probe X10	Signal Output
5 V		4% (GAIN .2X)		
1 V	1%	2%	1%	2%
0.5 V	3%	4%	3%	
0.2 V	3%	4%	3%	
0.1 V	3%	4%	3%	

E. RESPONSE

1. LOOP THRU

Release 100X and 10 μ of AUX TIME BASE, set HORIZ DISPLAY to 10 μs, and turn the 75 Ω TERM on. Feed a multiburst signal into 75 Ω LOOP THRU INPUT and connect the test oscilloscope to P29-1 with a X10 probe. Adjust C12 and C25 (Fig. 8-2) so the multiburst waveform becomes flat.

2. PROBE X1

Feed the multiburst signal to the PROBE INPUT through the 75 Ω feedthru terminator. Set VERT SOURCE to +PROBE and connect the test oscilloscope to the emitter of Q140 with a X10 probe. Adjust C51B, C52, and C115 (Fig. 8-1) so the multiburst waveform becomes flat, while checking the waveform with PROBE X10.

3. LOOP THRU .1 VFS

Feed the multiburst signal to LOOP THRU INPUT via 75 Ω X10 attenuator, and set VERT SOURCE to LOOP THRU and VERT DISPLAY to .1 VFS. Adjust R512, R514, and C610 (Fig. 8-1) to make the displayed waveform flat.

Disconnect the 75 Ω X10 attenuator, set VERT DISPLAY to 1 VFS, and adjust C830 (Fig. 8-1) to make the waveform flat. If necessary, repeat steps 1 through 3.

4. SIGNAL OUTPUT

Connect the test oscilloscope to SIGNAL OUTPUT via the feed-thru terminal, set LOOP THRU/VERT SOURCE to LOOP THRU, and adjust C254 (Fig. 8-2) to make the multiburst waveform flat.

5. Squarewave Response Check — ⩽20% (8 div on the screen)

Feed an 8 div, 100 kHz fast-rise signal from the Low Frequency Signal Generator into LOOP THRU INPUT via the 50 Ω-75 Ω minimum loss attenuator. Set HORIZ DISPLAY to AUX and check that the overshoot is 20% or less.

6. Frequency Response Check (See Table 5-7) — 5 MHz ±2%; 10 MHz +2, −5% (in reference to 50 kHz)

Put the Constant Amplitude Sinewave Generator in place of the fast-rise signal, and adjust the Generator for 10 div at 50 kHz. Check the Monitor's response for 5 MHz and 10 MHz, according to Table 2-1 in Section 2.

Table 5-7
VERTICAL RESPONSE MODES

Input	Range			
LOOP THRU	1 V	0.5 V	0.2 V	0.1 V
PROBE X1	1 V	0.5 V	0.2 V	0.1 V
PROBE X10	1 V	0.5 V	0.2 V	0.1 V

Connect the test oscilloscope to SIGNAL OUTPUT via a feed-thru termination, set LOOP THRU/VERT SOURCE to LOOP THRU and check the response at 5 MHz and 10 MHz. Then, set LOOP THRU/VERT SOURCE to VERT SOURCE and make sure that the response at 5 MHz is within +2, −8%.

F. CALIBRATOR

1. 1 V Cal Adjustment — ⩽±0.5%

Connect a DVM between TP1154 and ground, and turn R1162, (Fig. 8-2) until the DVM reads 1.000 V. Connect 1 V CAL OUT to 75 Ω LOOP THRU INPUT to check.

2. 0.7 V Adjustment — ⩽±0.5%

Set CALIBRATOR to 0.7 V and turn R413 so that the trace on the screen reads 0.7 V.

3. NOISE Check — ⩽±0.5 dB (+5.9, −5.6%)

Set NOISE to 0 dB and VERT DISPLAY to .1 VFS. Make sure the mV readings are as shown in Table 5-8.

Table 5-8
NOISE CHECK READINGS

Noise	dB	mV
0 dB	−26	70.2
0 dB	−28	55.7
0 dB	−30	44.3
0 dB	−32	35.2
0 dB	−34	28.0
0 dB	−36	22.2
0 dB	−38	17.6
0 dB	−40	14.0
0 dB	−42	11.1
0 dB	−44	8.8
0 dB	−46	7.0
0 dB	−48	5.6
−10 dB	−26	22.2

G. FILTER ADJUSTMENT

1. Position Adjustment — ⩽14 mV

Release −10 dB of NOISE and .1 VFS of VERT DISPLAY, and feed a color bar signal to 75 Ω LOOP THRU INPUT. Turn VERT POSITION to align the trace to the 0.3 line. Set FILTERS to 4.43 BP and turn R582 (Fig. 8-1) to align the trace to the 0.3 line.

2. 4.43 MHz BP Adjustment

Adjust L541 and L545 (Fig. 8-1) to realize maximum amplitude and best envelope. Turn R542 to set the burst amplitude to 300 mV peak to peak.

3. DIFF STEP Adjustment

Connect a modulated staircase signal in place of the color bar signal, and set FILTERS to DIFF STEP and VERT DISPLAY to .1 VFS. Adjust L561 and L564 (Fig. 8-1) to obtain the maximum amplitude in flat base line. Then, connect a 4.43 MHz subcarrier in place of the modulated staircase signal, and adjust L562 to minimize the subcarrier amplitude (20 mV or less).

4. LUM Adjustment

Connect a modulated staircase signal of 140 mV subcarrier in place of the subcarrier, set FILTERS to LUM, and adjust L551 and L557 so as to minimize the subcarrier amplitude (14 mV or less).

H. FILTER CHECK

1. LUM

Check for 3 dB down or less at 1 MHz. The attenuation at 4.43 MHz is to be 40 dB or more.

2. 4.43 BP

Make sure the amplitude at 4.43 MHz is within ±1% of FLAT, and the −3 dB point is between 3.9 MHz and 4.1 MHz, and between 4.7 MHz and 4.9 MHz.

3. DIFF STEP

Make sure the attenuation characteristics are as follows:

2 dB ≤0.4 to 0.5 MHz.
20 dB ≥14 kHz, 2.0 MHz.
40 dB ≥4.43 MHz.

I. HORIZONTAL SYSTEM

1. Limit Center Adjustment

Feed a 1 ms time mark signal into the 75 Ω LOOP THRU INPUT via a 50 Ω-75 Ω minimum loss attenuator. Turn 75 Ω TERM on, set HORIZ DISPLAY to AUX, set AUX TIME BASE to 100X and 10 μ, and adjust R1540 (Fig. 8-3) so that the best linearity is obtained on the screen without fold-back or halo.

2. X25 MAG REGIST Adjustment — ≤1 div

Feed a 5 ms time mark signal, push in the X25 button, adjust HORIZ POSITION to bring the 2nd mark to the center of the screen, and release the X25 button. Turn R1554 to bring the 2nd mark to the center. Repeat these steps until no shift occurs.

3. 5 μs Timing Adjustment

Feed a 5 μs time mark signal. Release 100X of AUX TIME BASE and select 5 μ. Adjust R1337 to set timing to 1 mark/div.

4. 2FLD Sweep Length Adjustment — ≤12.7 div, ±0.5 div

Disconnect the time mark signal and the minimum loss attenuator, and feed a color bar signal. Set HORIZ DISPLAY to 2FLD, and the FLD2,4/FLD1,3/ALL selector to FLD2,4. Adjust R1339 until the sweep length becomes 12.7 div.

5. Mag Gain Adjustment

Disconnect the color bar signal, and feed a 0.2 μs time mark signal through the minimum loss attenuator. Set HORIZ DISPLAY to AUX and X25. Adjust R1531 until the magnifier gain becomes equal to 1 mark/div.

6. Sweep Length Adjustment — ≤12.7 div, ±0.5 div

Disconnect the time mark signal and the minimum loss attenuator and connect the color bar signal. Set HORIZ DISPLAY to 10 μs, release the X25 buttons and 5 μ, and turn R1200 (Fig. 8-4) so the sweep ends with the leading edge of sync pulse.

7. Timing Check

Feed a 5 μs time mark signal into PROBE INPUT through the 50 Ω feed-through terminator. Release 10 μs of HORIZ DISPLAY, set VERT SOURCE to −PROBE, and check in reference to Tables 5-9 and 5-10.

Table 5-9
TV SWEEP ACCURACY

		X1	X2, X5, and X25
5 μs	Timing	1%	2%
	Linearity	2%	3%
10 μs	Timing	2%	3%
	Linearity	3%	4%

Table 5-10
AUX TIME BASE ACCURACY

	X1	X2, X5, and X25
Timing	4%	5%
Linearity	5%	6%

8. Trigger Check

Connect the Low Frequency Signal Generator to PROBE INPUT, and make sure that stable triggering is realized in reference to Table 5-11.

Table 5-11
TRIGGERING RESPONSE

Frequency	Level
50 Hz	20 mV
50 kHz	10 mV
5 MHz	50 mV

J. PLL

1. Subcarrier Adjustment — ⩽±3 Hz

Connect the modulated staircase signal to 75 Ω LOOP THRU INPUT. Set VERT DISPLAY to DIFFϕ. Adjust C3610 (Fig. 8-1) to minimize the trace width.

2. Phase Shift Adjustment

Set VERT DISPLAY to VECT. Turn the GAIN control from clockwise to counterclockwise, and adjust R3622 to minimize the phase shift.

3. Burst Gate Adjustment

Connect CH1 and CH2 of the test oscilloscope to pins 11 and 13 of U3600, respectively, through 10X probes. Turn R751 (Fig. 8-1) so the burst gate coincides with the burst.

K. VECTOR

1. Quad Phase and Gain Adjustment

Connect a 4.43 MHz sinusoidal signal of exactly 707 mV amplitude from the Constant Amplitude Sinewave Generator (CASG) to the 75 Ω LOOP THRU INPUT. Disconnect Q3860 and P3807 from their sockets. Turn R3008 and R3842 (Fig. 8-1) until the test circle coincides with the circle on the screen. Adjust C3606 so the test circle coincides. Readjust R3008 and R3842, and reinsert Q3860 and P3807 in their sockets.

2. Color Bar Check

Connect a color bar signal to the 75 Ω LOOP THRU INPUT, and make sure the dots are within the small targets.

3. DP Gain Adjustment

Connect a 280 mV modulated linearity test signal to 75 Ω LOOP THRU INPUT. Set the 75 Ω TERM switch to OFF. From the same test signal generator, add a 75% amplitude color bar signal by connecting it to the other LOOP THRU INPUT via a 10X attenuator (20 dB pad), thus mixing the two signals.

Specially condition the color bar signal by switching off all of its elements except the V and Sync components at the signal source.

Push the DIFF ϕ button and, using the POSITION and PHASE controls, set the display for a normal differential phase measurement. Adjust R3026 until the magenta portion of the color bar coincides with the 10.2° line on the DIFF ϕ scale.

4. Chrominance Bandwidth Check

Connect a 4.43 MHz signal from the CASG to the 75 Ω LOOP THRU INPUT through the minimum loss attenuator. Disconnect Q3860 from its socket, and adjust the CASG level until the test circle coincides with the graticule circle. Set the CASG frequency lower until the test circle coincides with the insides of the R and Cy boxes on the graticule. Read the CASG frequency at this moment. In the same way, increase the frequency and read the frequency for −3 dB point. Make sure that

−3 dB (Fsc−500 kHz) ±100 kHz, (3833.6 − 4033.6 kHz),

−3 dB (Fsc+500 kHz), ±100 kHz, (4833.6 − 5033.6 kHz).

5. Phase Control Range Check — At least 80°

Connect a color bar signal to 75 Ω LOOP THRU INPUT, and release the PROBE button of SYNC SOURCE. Set the burst to 180° and turn the PHASE control to make sure that the phase is variable more than 80°.

THEORY OF OPERATION

BLOCK DIAGRAM

The 381 is mainly divided into four sections: Vertical Amplifier, Timebase, Unblanking Circuit, and Power Supply.

VERTICAL AMPLIFIER

Signals fed into JI (LOOP THRU INPUT) are applied to the loop-through amplifier through the AC/DC selector switch via a circuit reducing the return loss. The output is connected to the VERT SOURCE, SYNC SOURCE, and SIGNAL OUTPUT switches.

Signals fed into J50 (PROBE INPUT) are applied to the probe amplifier through the PROBE GAIN and AC/DC selector switches. The probe amplifier provides the outputs for sync and vertical axis, the former being controlled by the SYNC SOURCE switch, and the latter by the VERT SOURCE switch.

The signal leaving the VERT SOURCE switch is divided into two: one is applied to J260 via the Signal Out amplifier, and the other is fed into the filter circuit via the GAIN control. If CAL is activated, the CAL signal is added to the signal before the GAIN.

The output of the filter circuit passes through the dc restorer and is fed into the Output Amplifier via the VERT DISPLAY switch to drive the crt.

In the vector mode, the restorer output is applied to the Chroma Amplifier, the output of which is fed into the demodulator to produce U and V signals. The U signal passes through the filter circuit and is fed into the Output Amplifier through the VERT DISPLAY switch to drive the crt.

TIMEBASE

Signals from the SYNC SOURCE switch are applied to the Sync Amplifier, the output of which is divided into two: one is fed into the sync stripper to provide H sync, V sync, and backporch gate to respective circuits; the other is applied to the trigger generator, which provides the trigger level control signal through the trigger level shaper circuit, and the line sweep trigger signal from the sync amplifier output.

The line sweep generator is triggered by the trigger signal mentioned above in the AUX mode, and by the trigger signal from the line select circuit or the H sync itself in case of the TV mode.

The line select circuit is divided into two: Digital and VAR. The Digital outputs the H sync after a delay selected on the panel, while the VAR outputs the H sync after a delay indicated by the LED display on the panel.

In the full line mode, the H sync itself serves as the trigger signal.

The line sweep generator output is fed into the HORZ DISPLAY switch, which also receives the V signal mentioned above the 2FLD sweep generator signal. One of these signals is selected by the switch and fed into the horizontal output amplifier.

When the overlay circuit is working, its output signal is added to the signal mentioned above at the input of the horizontal output amplifier, the output of which drives the crt.

UNBLANKING CIRCUIT

The unblanking circuit receives the gate signal from the sweep generator and amplifies it up to a level adequate to drive the crt.

When the line select is effective, the intensity becomes insufficient. The intensity level is automatically compensated to obtain adequate brightness. The focus voltage is also corrected in the same way.

POWER SUPPLY

The ac line voltage is applied to the power transformer through the fuse, the power switch, and the AC/DC selector switch. The 115 V/230 V and HI/LOW switches select an appropriate tap of the power transormer.

When the oscilloscope is operated on dc power, the input voltage is converted to the ac voltage by the converter circuit before being fed into the power transormer.

Regulated voltage supplies of −8 V, +8 V, +15 V, +35 V, and +85 V are provided through the power transformer, rectifier, and series regulator circuits.

Also, a 5 V supply for the logic is provided by the switching regulator, and unregulated 17 V is output to the scale illumination.

The high voltage for driving the crt is provided by the HV oscillator, and the power supply includes the intensity and focus control circuits.

DETAILED DESCRIPTION

① LOOP THRU INPUT CIRCUIT

The signal that passes through J1A and J1B is fed into the attenuator, including the ac-dc switch, Q11 (Fig. 6-1). The return loss at J1A and J1B is reduced by the attenuator, L1A and L1B. The signal is amplified to a specified amplitude by the loop thru amplifier before being sent to the next stage.

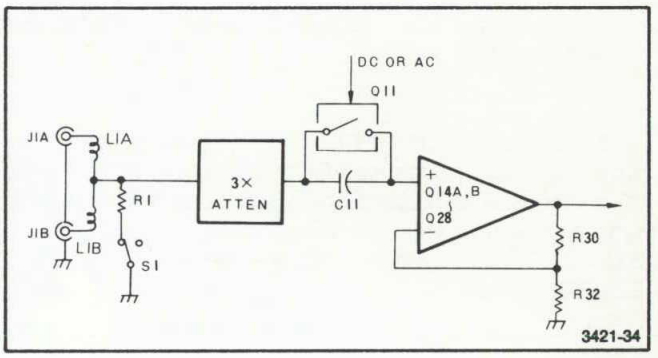


Fig. 6-1. Loop-thru Amplifier.

② PROBE INPUT CIRCUIT

The signal from J50 is fed into the buffer, Q70A, through the attenuator switch, S70, and the DC-AC switch, S12B (Fig. 6-2). The signal voltage is converted into current by Q80A and Q80B, and fed, respectively, to the sync amplifier and the amplifier consisting of Q100A through Q140. While CR100 through CR106 switches the signal under the control of S100A, B and C, it is possible to switch the sync source independently by S110A and B. The output signal from Q140 is fed into the added circuit, consisting of R150 through R160, together with the loop thru signal and the calibration signal.

The signal from this circuit is fed into the filter circuit via the variable gain potentiometer and directly into the signal output circuit.

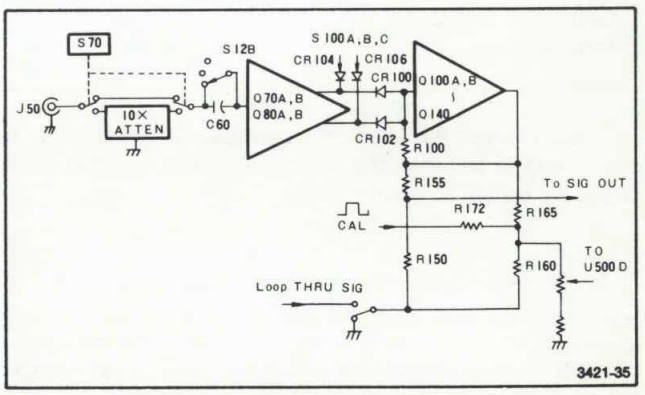


Fig. 6-2. Probe Input Circuit.

③ CALIBRATOR CIRCUIT

U300A switches the amplitude of the calibration signal to .7 V or to that for noise measurement under the control of S300B. U300C switches alternately between this voltage ground following the signal from the horizontal system. U400A inactivates this circuit in case of DP and vector modes and makes the logic level coincide with U300C. The calibration signal produced in this way is buffered by U400B and fed into the vertical system.

④ SIGNAL OUTPUT AMPLIFIER AND 1V CALIBRATOR CIRCUIT

Signal Output Amplifier

Q250A, B, Q254, Q256, and Q258 comprise an operational amplifier to amplify the signal from S200 and output it to J260 via 75 Ω resistor, R260. R240 provides a line select cursor.

Calibrator

A 1 kHz signal is applied to U300B, and the calibration output is buffered by U1154B and fed to J1172. This circuit provides a precise square wave of 1 V peak to peak, which is to be used for the probe calibration and the high frequency range compensation.

⑤ FILTER CIRCUIT

U500A through E and Q540 constitute current switches that allow selecting any one of the filters required for any of four functions: 4.43 BP, LUM, DIFF STEP, and direct coupling (Flat Response). The output signal is fed into the subsequent stage. U590 reduces the number of control lines. See Fig. 6-3.

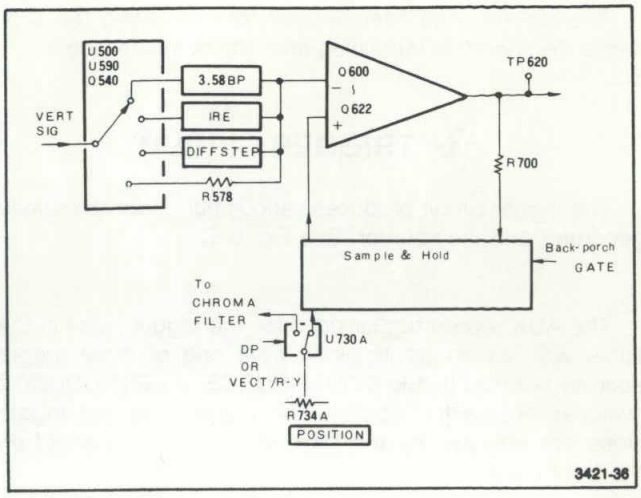


Fig. 6-3. Filter and Restorer.

⑥ DC RESTORER AND VERTICAL OUTPUT AMPLIFIER CIRCUITS

The input signal is amplified by Q600 through Q621. See Fig. 6-3. The amplifier is provided with two feedback loops, R625 for the amplifier, and R700 through R720 for dc restoration and vertical position injection. U700A and U730 comprise the sample-hold circuit, and a drift-less signal to the output in the dc restoration mode. In this case, the strobe signal is the same as the chroma burst gate produced by Q750.

U700B is logic for the dc restoration. In a mode not using dc restoration, U730B-10 is at a low level, and U700A acts simply as a buffer. In the DP and vector modes, U730A-11 and U730B-10 are at a high level, and the circuit serves for dc restoration. In this case, the vertical position voltage is fed to the chroma filter circuit.

S650 selects waveform monitor, DP, and vector/V modes besides changing over the vertical sensitivity. In the case of .5 VFS or .1 VFS, the 2X attenuator consisting of R660 and R662 is by-passed; while in the case of .2 VFS, .1 VFS or DP, Q810 controlling the X5 amplifier is driven and Q820 controlling the X1 amplifier is suppressed. The vertical sensitivity is determined by the combination of these components. In the DP or vector/V mode, S650 selects the demodulated V signal as the vertical signal. The signal from Q830 is amplified by the final stage consisting of Q850 through Q864, and the output is fed into the vertical deflection plates.

⑦ ⑧ ⑨ FILTER CIRCUIT

The chrominance circuit demodulates the video signal from the dc restorer circuit to produce signals for the vector display or differential phase and to supply them to the vertical output amplifier and the horizontal amplifier. See Fig. 6-4.

The chrominance input amplifier deals with the chrominance signal for demodulation and the phase reference signal for subcarrier regeneration, separately.

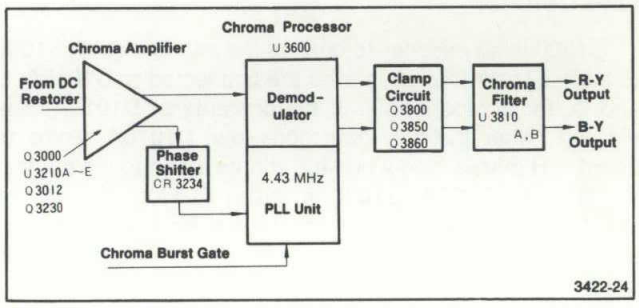


Fig. 6-4. Chroma Circuit.

The chrominance oscillator produces subcarrier whose phase is locked with the phase reference signal from the input amplifier.

The chrominance demodulator demodulates the chrominance signal from the input amplifier by means of the chrominance oscillator signal and outputs V and U signals.

The clamp circuit exerts clamp with +H pulse to equalize the dc level of V and U signals.

The chrominance filter is used for eliminating the subcarrier components remaining after the demodulation.

⑩ TRIGGER CIRCUIT

The trigger circuit produces various pulses for the sweep generator and the counter. See Fig. 6-5.

The AUX sweep trigger provides the trigger pulse in the same way as an oscilloscope from one of three trigger sources selected by the SYNC SOURCE or VERT SOURCE switches on the front panel. The trigger level and trigger slope are adjusted by the VAR SEL/TRIGGER control on the front panel.

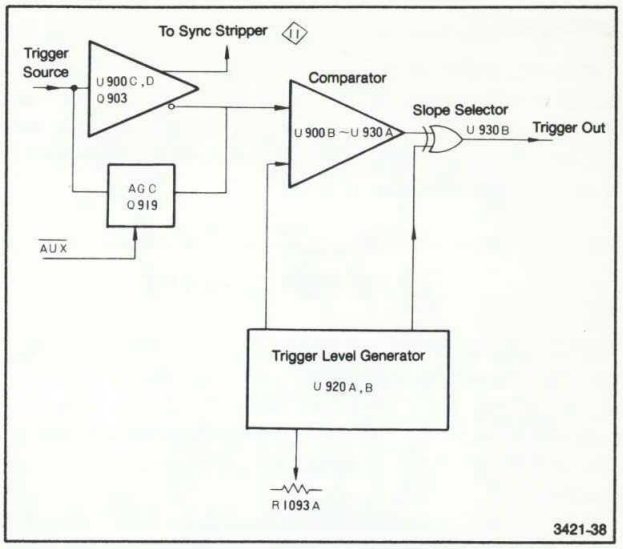


Fig. 6-5. Trigger Circuit.

⑪ SYNC STRIPPER

In the TV mode, the trigger signal is fed into the sync stripper (Fig. 6-6). The sync stripper separates and generates from these signals H sync, V sync, and backporch signals. It shapes and supplies them as pulses for respective circuits.

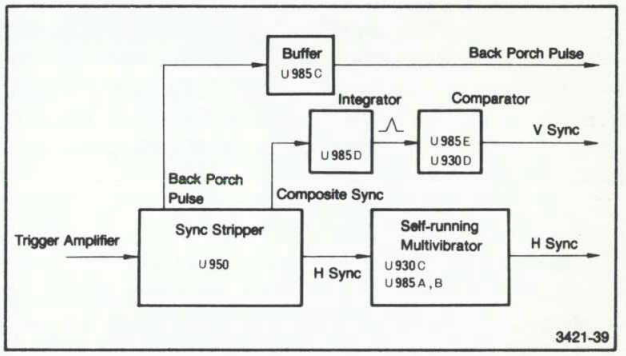


Fig. 6-6. Sync Stripper.

⑫ LINE COUNTER AND VARIABLE LINE SELECTOR CIRCUITS

Line Counter

U1000 is an encoder to change the information of S1000 to 3 bits. The information lines are connected to U1015A, B and D, for comparison with the contents of U1010A. See Fig. 6-7. After the field gate goes low, U1010A begins to count +H pulses, and when the counts attain to the number specified by S1000, Q1030 is driven to stop counting by U1010A. The pulse is used as a trigger for starting the line sweep. U1080C and Q1070 constitute logic for gating a trigger in correspondence to various sweep modes.

Variable Line Selector

When the field sweep exceeds a voltage determined by the variable line selector, R1093A and B, U1032B generates a latch pulse in synchronization with +H, and the pulse is fed into the readout circuit and to the sweep trigger through U1080D (Fig. 6-7).

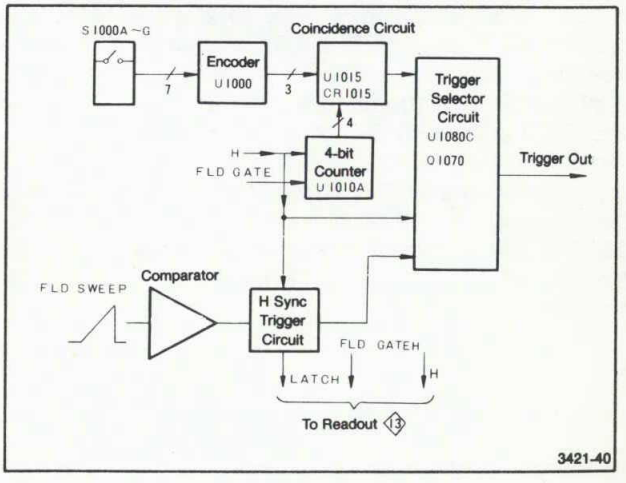


Fig. 6-7. Line Counter.

⑬ READOUT CIRCUIT

Variable Line Counter Mode

U1120 begins to count +H pulses when the field gate goes low. U1110 begins to count +H pulses on receiving a latch pulse from the variable line selector and triggers the transfer input of U1120 after 6 pulses. See Fig. 6-8.

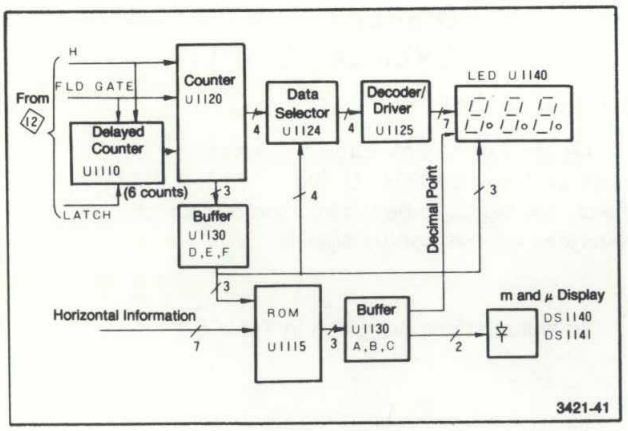


Fig. 6-8. Readout.

The data stored in U1120 is fed into U1125 via U1124. U1125 drives U1140 in synchronization with the digit drive pulse from U1120. The digit drive pulse is produced by U1120 on the basis of time constant C1120 X R1120. The original oscillator output is used also in the 1 V calibrator.

Time Base Display Mode

In the AUX mode, the data selector, U1124, is switched from U1120 to U1115. U1115 is a ROM addressed by the horizontal time base, magnification rate, AUX, and digit information. The contents of U1115 are used for displaying numerics, decimal point, "m", and "u."

14 SWEEP GENERATOR CIRCUIT

Line Sweep Generator

The line sweep generator receives a trigger signal from the trigger circuit or the line counter circuit and generates a sawtooth wave. Referring to Fig. 6-9, U1185A, U1184C and Q1181 constitute a retriggerable one-shot multivibrator, which drives U1185B if there is no trigger signal to make the sweep circuit free-run. Capacitors C1197A and C1197B determine the timing. In the TV sweep mode and the AUX sweep X1, C1197B is selected by U1186A and U1186C, while in other cases, C1197A is selected.

Q1195 and Q1196 are actuated by the output of U1185B to reset capacitors C1197A and C1197B, respectively.

U1196A is an operational amplifier for integration, and generates a sawtooth wave whose slope is determined by the timing capacitor, C1197, and the current from Q1210. When the sawtooth wave rises to a certain level (approximately 4 V), Q1204 turns conductive and resets U1185B to stop generating the sawtooth wave.

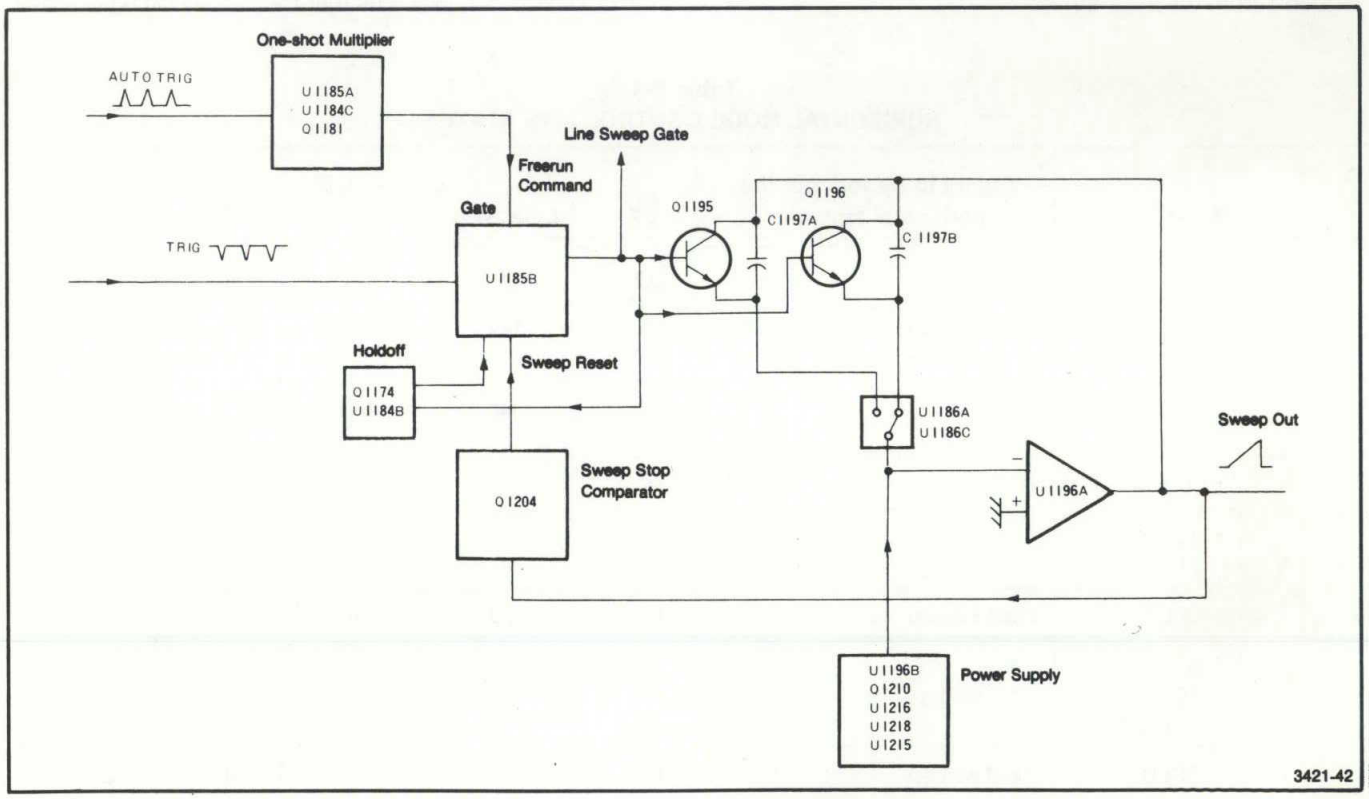


Fig. 6-9. Sweep Generator.

Q1210 and U1196B constitute a constant-current circuit, and the current value is selected by analog switches U1218, U1216, and U1215.

U1184B and Q1174 constitute a hold-off circuit to provide the circuit an adequate time interval for discharging the timing capacitor.

Field Sweep Generator

The field sweep generator produces a sawtooth wave for the field sweep by using V sync (vertical sync signal) and +H (horizontal sync signal) from the sync stripper. See Fig. 6-10. The field gate generator circuit consisting of U1032A, U1230B, U1015D, and Q1232 produces a gate pulse for FLD2, FLD1, or BOTH, as selected by field selector switches S1015A and B on the panel. The field gate is differentiated by C1237 and R1238, amplified by Q1240 to provide a short pulse for resetting the sawtooth wave, and fed into the line counter and the variable counter in the readout circuit.

A mirror integrating circuit composed of Q1244, C1244, R1244, and U1244A generates the sawtooth wave for the field sweep upon receiving the pulse from Q1240.

U1244B makes the circuit free run when no signal is available from the sync stripper.

⑮ DISPLAY CONTROL AND OVERLAY CIRCUIT

Display Control

The display control circuit, consisting of HORIZ DISPLAY switches S1305A, B and C, Q1308, U1340A and B, selects the signal to be fed into the horizontal amplifier and generates various control signals.

The signal states are given in Table 6-1.

Overlay

The overlay circuit applies offset voltage to the input of horizontal amplifier at the end of every sweep. It is possible to move the waveform along the horizontal axis by adjusting the offset voltage. See Fig. 6-11.

U1230A is a D-type flip-flop, which is toggled by the line sweep gate signal, and its output controls the analog switch, U1382B, to provide offset voltage.

The offset voltage is generated by R1381A and B, and the LED, DS1394, indicates that the overlay circuit is active.

Table 6-1
HORIZONTAL MODE CONTROL LINE STATES

Mode		Signal to be fed into the horizontal amplifier	Control Line				
			$\overline{\text{AUX}}$	Line Swp	2FLD	$\overline{\text{VEC}}$	V
AUX		Line sweep	LO	HI	LO	HI	LO
TV	2FLD	Field sweep	HI	LO	HI	HI	LO
TV	5 μs 10 μs 7LINES	U signal	HI	HI	LO	HI	LO
VEC		U signal	HI	LO	LO	LO	HI
V	10 μS 7LINES	Line sweep	HI	HI	LO	HI	HI
V	2FLD	Field sweep	HI	LO	HI	HI	HI
Dp	5 μs 10 μs 7LINES	Line sweep	HI	HI	LO	HI	LO
Dp	2FLD	Field sweep	HI	LO	HI	HI	LO

V signal is supplied from S650E.

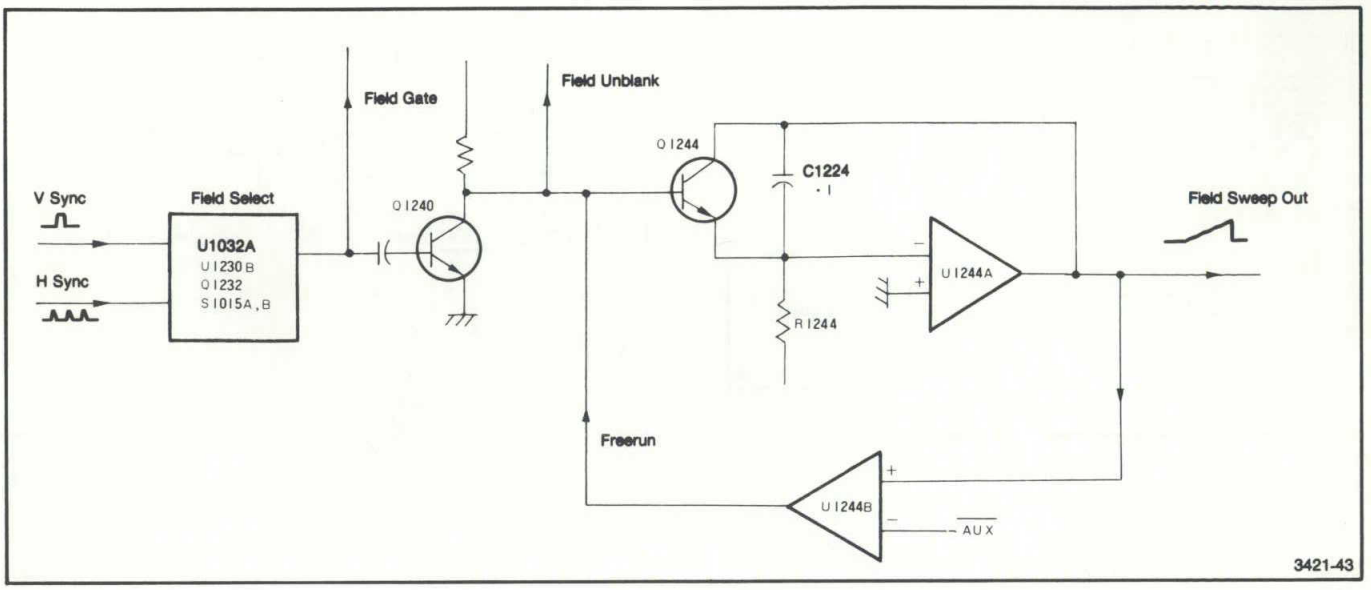


Fig. 6-10. 2 Field Sweep Generator.

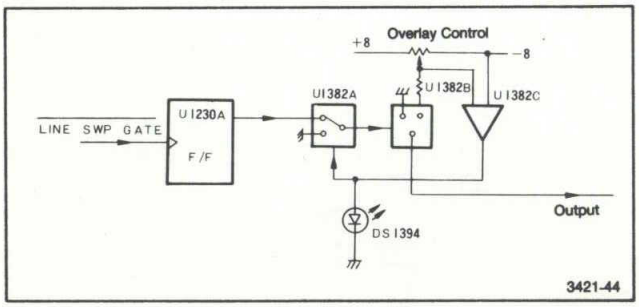


Fig. 6-11. Overlay Circuit.

16 HORIZONTAL AMPLIFIER CIRCUIT

The horizontal amplifier circuit amplifies the signal selected by the display control circuit to a level adequate for driving the crt. See Fig. 6-12.

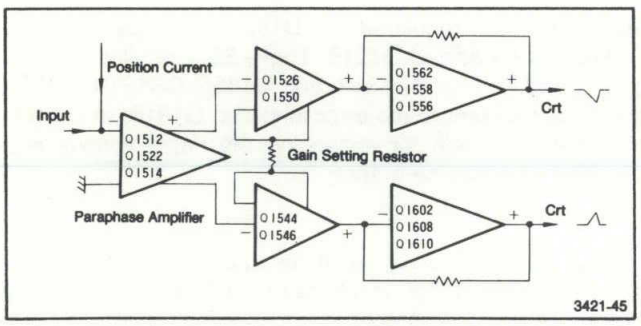


Fig. 6-12. Horizontal Amplifier Circuit.

Q1512 and Q1522 constitute a paraphase amplifier to convert the single-ended input signal to a differential signal, and Q1514 is a constant-current source.

Q1526 with Q1550, and Q1544 with Q1546 constitute feedback amplifiers, converting the voltage input into current before the next state.

Q1556, Q1558, and Q1562 constitute a feedback amplifier of the inverting type, converting current into voltage to drive the crt. The same applies to Q1602, Q1608, and Q1610, which convert the signal from Q1546 into voltage to drive the crt.

The current from POSITION control R1504A and B is fed into the amplifier input to move the waveform to any horizontal position.

17 UNBLANKING CIRCUIT

U1650A, B, C and Q1650 constitute unblanking logic to select the signal to be fed into the amplifier of next stage by the control signal. See Fig. 6-13.

Q1706 and Q1712 constitute a feedback amplifier to convert the signal current from the unblanking logic into voltage for the dc restorer in the crt circuit. This voltage determines the intensity of the trace. The intensity is controlled by R1698.

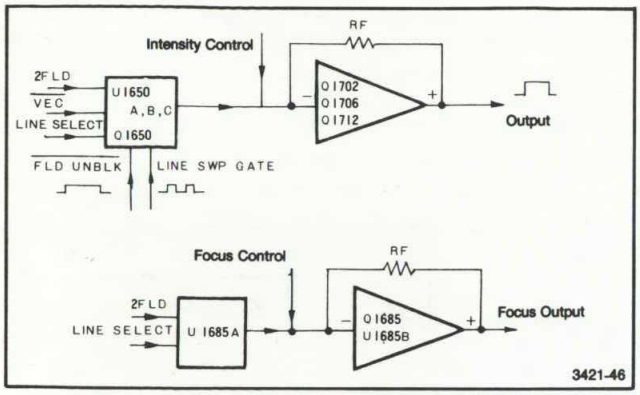


Fig. 6-13. Unblanking Circuit.

U1685B and Q1685 constitute another feedback amplifier to amplify the voltage signal from the FOCUS CONTROL, R1682. This voltage is fed into the dc restorer circuit in the crt circuit to adjust the focus.

U1685A varies the focusing voltage in the line select mode to display an always sharp waveform.

18 CRT CIRCUIT

The Crt circuit supplies all voltages and signals required for the operation of the crt. See Fig. 6-14. T1930, Q1932, and U1978 constitute a high voltage converter oscillating at approximately 30 kHz. A 4 kV peak-to-peak signal from T1930-8 is rectified and smoothed by CR1934, C1934, and C1936. The heater voltage from the step-down transformer, T1938, is fed into the crt heater together with −1960 V. U1990 rectifies the signal from T1930 while multiplying it 10-fold to provide a high voltage of +10 kV, which is fed into the post-stage accelerating electrode of the crt. Resistors R1992, R1996, and R1998 supply voltages for astigmatism, geometry, and trace rotation. The remainder of the circuit is for dc restoration for the unblanking and focus electrodes. The voltage seen at the junction of R1962 and R1964 amplitude-modulates signals from T1930-7 and restores the respective electrodes in the crt via C1950 and C1980 in reference to −1960 V.

19 LOW VOLTAGE REGULATED POWER SUPPLY CIRCUIT

The output voltages of secondary windings of T1806 are rectified and smoothed by C1810, C1812, C1840, C1844, C1870, and C1900. See Fig. 6-15. The circuit consisting of U1824B and Q1858 provides exactly +15 V in reference to VR1848, and this voltage is used as a reference for regulating other voltages. Therefore, only the +15 V is adjustable in the low voltage regulated power supplies. +35 V, +8 V,

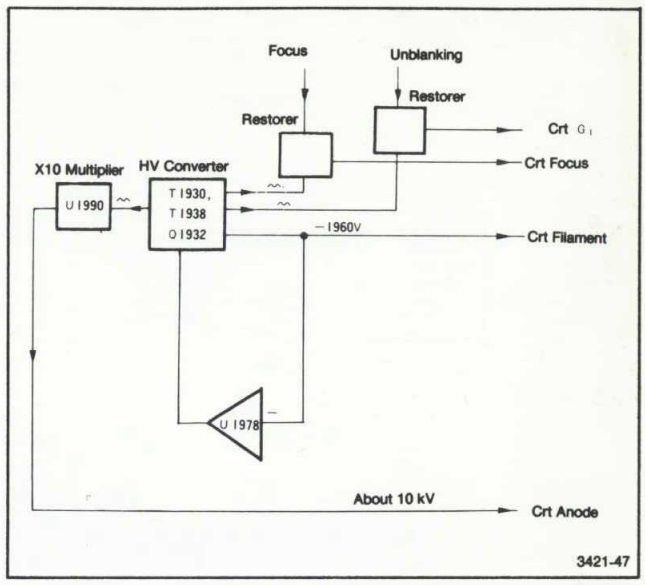


Fig. 6-14. Crt Circuit.

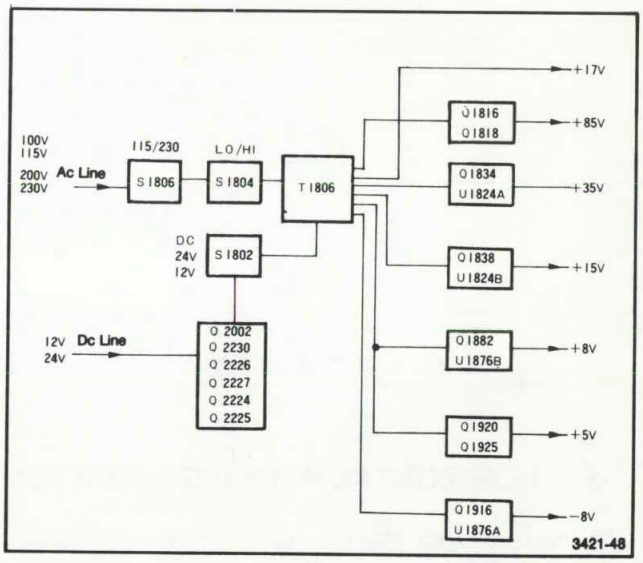


Fig. 6-15. Low Voltage Regulated Power Supply Circuit.

and −8 V are regulated by U1824A, Q1834, U1876B, Q1882, U1876A, and Q1916. The +85 V regulating circuit consists of Q1818, CR1819, and Q1816. CR1819 supplies a constant current to the error amplifier, Q1818, to increase the open-loop gain for enhancing the ripple voltage suppressing effect at the output.

The +5 V regulating circuit constitutes a switching regulator, in which Q1920 is a voltage switch, CR1926 a flywheel diode, and Q1925 a comparator. This circuit is subjected to self-excited oscillation, and the output voltage is smoothed by L1926 and C1926.

20 DC-DC CONVERTER AND PRIMARY CIRCUIT

Ac power from P1800 is applied to T1806 through F1800, S1800A, B, S1801A, C, S1806A, B, and S1804A, B. Together S1806A, B and S1804A, B constitute a selecting switch for operating voltage, while S1801A, C constitutes a switch to turn the ac line off in case of operation at 24 V dc or 12 V dc.

Dc power applied to J2001 and J2002 is supplied to a circuit composed of T1806 and Q2002 through Q2227 via F2000, F2002, S1802A, and S1800C, D. S1802A changes the fuse to a suitable value depending upon the operating voltage selected by S1802C, D. S1802B disconnects T2222 from T1806 in case of ac operation.

Q2002 is a starter to excite the circuit by temporarily feeding current into the base circuit of Q2224 and Q2227 when the power is turned on. The collectors of Q2224 and Q2227 are connected to appropriate windings of T1806 by S1802C and D. This circuit oscillates self-excited at a frequency determined by the saturatable transformer, T2222. The inverter balance, R2010, prevents T1806 from being dc-excited. Q2230 stops the circuit operation when 24 V dc is applied while the system is set for 12 V dc.

REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

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

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

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

Change information, if any, is located at the rear of this manual.

LIST OF ASSEMBLIES

A list of assemblies can be found at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

CROSS INDEX-MFR. CODE NUMBER TO MANUFACTURER

The Mfr. Code Number to Manufacturer index for the Electrical Parts List is located immediately after this page. The Cross Index provides codes, names and addresses of manufacturers of components listed in the Electrical Parts List.

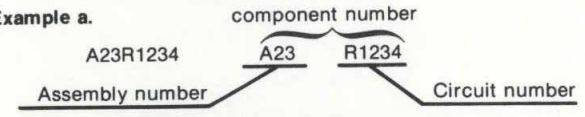
ABBREVIATIONS

Abbreviations conform to American National Standard Y1.1.

COMPONENT NUMBER (column one of the Electrical Parts List)

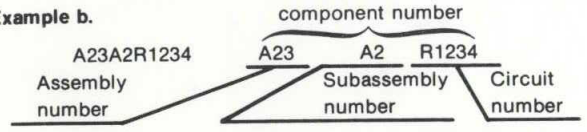
A numbering method has been used to identify assemblies, subassemblies and parts. Examples of this numbering method and typical expansions are illustrated by the following:

Example a.



Read: Resistor 1234 of Assembly 23

Example b.



Read: Resistor 1234 of Subassembly 2 of Assembly 23

Only the circuit number will appear on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the Mechanical Parts List. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

TEKTRONIX PART NO. (column two of the Electrical Parts List)

Indicates part number to be used when ordering replacement part from Tektronix.

SERIAL/MODEL NO. (columns three and four of the Electrical Parts List)

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number entered indicates part is good for all serial numbers.

NAME & DESCRIPTION (column five of the Electrical Parts List)

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

MFR. CODE (column six of the Electrical Parts List)

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

MFR. PART NUMBER (column seven of the Electrical Parts List)

Indicates actual manufacturers part number.

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
000FJ	MARCOM SWITCHES INC.	67 ALBANY STREET	CAZENOVIA, N.Y. 13035
0000M	SONY/TEKTRONIX CORPORATION	P O BOX 14, HANEDA AIRPORT	TOKYO 149, JAPAN
00853	SANGAMO ELECTRIC CO., S. CAROLINA DIV.	P O BOX 128	PICKENS, SC 29671
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP	P O BOX 5012, 13500 N CENTRAL EXPRESSWAY	DALLAS, TX 75222
02735	RCA CORPORATION, SOLID STATE DIVISION	ROUTE 202	SOMERVILLE, NY 08876
04222	AVX CERAMICS, DIVISION OF AVX CORP.	P O BOX 867, 19TH AVE. SOUTH	MYRTLE BEACH, SC 29577
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	5005 E MCDOWELL RD,PO BOX 20923	PHOENIX, AZ 85036
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	464 ELLIS STREET	MOUNTAIN VIEW, CA 94042
09023	CORNELL-DUBILIER ELECTRONIC DIVISION FEDERAL PACIFIC ELECTRIC CO.	2652 DALRYMPLE ST.	SANFORD, NC 27330
09353	C AND K COMPONENTS, INC.	103 MORSE STREET	WATERTOWN, MA 02172
12954	SIEMENS CORPORATION, COMPONENTS GROUP	8700 E THOMAS RD, P O BOX 1390	SCOTTSDALE, AZ 85252
12969	UNITRODE CORPORATION	580 PLEASANT STREET	WATERTOWN, MA 02172
14433	ITT SEMICONDUCTORS	3301 ELECTRONICS WAY P O BOX 3049	WEST PALM BEACH, FL 33402
18324	SIGNETICS CORP.	811 E. ARQUES	SUNNYVALE, CA 94086
19647	CADDOCK ELECTRONICS INC.	3127 CHICAGO AVENUE	RIVERSIDE, CA 92507
24546	CORNING GLASS WORKS, ELECTRONIC COMPONENTS DIVISION	550 HIGH STREET	BRADFORD, PA 16701
32997	BOURNS, INC., TRIMPOT PRODUCTS DIV.	1200 COLUMBIA AVE.	RIVERSIDE, CA 92507
50157	MIDWEST COMPONENTS INC.	P. O. BOX 787 1981 PORT CITY BLVD.	MUSKEGON, MI 49443
51984	NEC AMERICA INC. RADIO AND TRANSMISSION DIV.	2990 TELESTAR CT. SUITE 212	FALLS CHURCH, VA 22042
54473	MATSUSHITA ELECTRIC, CORP. OF AMERICA	1 PANASONIC WAY	SECAUCUS, NJ 07094
55680	NICHICON/AMERICA/CORP.	6435 N PROESEL AVENUE	CHICAGO, IL 60645
56289	SPRAGUE ELECTRIC CO.	87 MARSHALL ST.	NORTH ADAMS, MA 01247
59660	TUSONIX INC.	2155 N FORBES BLVD	TUCSON, AZ 85705
71279	CAMBRIDGE THERMIONIC CORP.	445 CONCORD AVE.	CAMBRIDGE, MA 02138
71400	BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
71590	CENTRALAB ELECTRONICS, DIV. OF GLOBE-UNION, INC.	P O BOX 858	FORT DODGE, IA 50501
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73138	BECKMAN INSTRUMENTS, INC., HELIPOT DIV.	2500 HARBOR BLVD.	FULLERTON, CA 92634
78488	STACKPOLE CARBON CO.		ST. MARYS, PA 15857
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
80031	ELECTRA-MIDLAND CORP., MEPCO DIV.	22 COLUMBIA ROAD	MORRISTOWN, NJ 07960
82104	STANDARD GRIGSBY CO., DIV. OF SUN CHEMICAL CORPORATION	920 RATHBONE AVENUE	AURORA, IL 60507
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
90201	MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY AND CO., INC.	3029 E. WASHINGTON STREET P. O. BOX 372	INDIANAPOLIS, IN 46206
91418	RADIO MATERIALS COMPANY, DIV. OF P.R. MALLORY AND COMPANY, INC.	4242 W BRYN MAWR	CHICAGO, IL 60646
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601
95712	BENDIX CORP., THE ELECTRICAL COMPONENTS DIV., MICROWAVE DEVICES PLANT	HURRICANE ROAD	FRANKLIN, IN 46131

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	670-6593-02			CKT BOARD ASSY:MAIN	0000M	670-6593-02
A2	670-6594-00			CKT BOARD ASSY:INPUT	0000M	670-6594-00
A3	670-6595-00			CKT BOARD ASSY:SWEEP	0000M	670-6595-00
A4	670-6596-00			CKT BOARD ASSY:DISPLAY	0000M	670-6596-00
A5	670-6597-00			CKT BOARD ASSY:LED	0000M	670-6597-00
A6	670-6598-00			CKT BOARD ASSY:HIGH VOLTAGE	0000M	670-6598-00
A7	670-6599-02			CKT BOARD ASSY:LOW VOLTAGE REGULATOR	0000M	670-6599-02
A8	670-6600-00			CKT BOARD ASSY:DC-DC CONVERTER	0000M	670-6600-00
A9	670-6601-00			CKT BOARD ASSY:CONTROL	0000M	670-6601-00
A1	----- -----			CKT BOARD ASSY:MAIN		
A1C51	281-0237-00			CAP.,VAR,CER DI:3.3-18PF,250V	0000M	281-0237-00
A1C52	281-0236-00			CAP.,VAR,CER DI:2.8-10PF,250V	0000M	281-0236-00
A1C53	283-0288-00			CAP.,FXD,CER DI:35PF,10%,500V	0000M	283-0288-00
A1C60	285-1207-00			CAP.,FXD,PLSTC:0.047UF,10%,250V	0000M	285-1207-00
A1C64	283-0001-00			CAP.,FXD,CER DI:0.005UF,+100-0%,500V	72982	831-559E502P
A1C80	281-0814-00			CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A1C85	283-0288-00			CAP.,FXD,CER DI:35PF,10%,500V	0000M	283-0288-00
A1C90	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A1C100	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1C102	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A1C114	290-0725-00			CAP.,FXD,ELCTLT:100UF,+75-10%,50V	56289	30D107G050DH9
A1C115	281-0236-00			CAP.,VAR,CER DI:2.8-10PF,250V	0000M	281-0236-00
A1C116	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A1C145	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C512	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1C514	281-0767-00			CAP.,FXD,CER DI:330PF,20%,100V	12969	CGB331MEX
A1C532	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C541	283-0669-00			CAP.,FXD,MICA D:360PF,1%,500V	00853	D155F361F0
A1C542	283-0638-00			CAP.,FXD,MICA D:130PF,1%,100V	00853	D151F131F0
A1C545	281-0797-00			CAP.,FXD,CER DI:15PF,10%,100V	72982	8035D9AADC0G150K
A1C551	283-0698-00			CAP.,FXD,MICA D:390PF,1%,500V	09023	CD15ED391F03
A1C553	283-0636-00			CAP.,FXD,MICA D:36PF,1.4%,100V	00853	D155F360G0
A1C554	283-0646-00			CAP.,FXD,MICA D:170PF,1%,100V	00853	D151E171F0
A1C555	283-0674-00			CAP.,FXD,MICA D:85PF,1%,500V	00853	D155F850F0
A1C557	283-0634-00			CAP.,FXD,MICA D:65PF,1%,100V	00853	D151E650F0
A1C562	283-0669-00			CAP.,FXD,MICA D:360PF,1%,500V	00853	D155F361F0
A1C564	283-0605-00			CAP.,FXD,MICA D:678PF,1%,300V	00853	D153F6780F0
A1C581	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C600	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A1C602	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C606	281-0786-00			CAP.,FXD,CER DI:150PF,10%,100V	72982	8035D2AADX5P151K
A1C610	281-0236-00			CAP.,VAR,CER DI:2.8-10PF,250V	0000M	281-0236-00
A1C611	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C621	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C622	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C630	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A1C690	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A1C692	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A1C694	290-0843-00			CAP.,FXD,ELCTLT:47UF,20%,35V,TANTALUM	0000M	290-0843-00
A1C710	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A1C715	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C730	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
A1C772	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A1C830	281-0237-00			CAP.,VAR,CER DI:3.3-18PF,250V	0000M	281-0237-00
A1C832	281-0797-00			CAP.,FXD,CER DI:15PF,10%,100V	72982	8035D9AADC0G150K

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1C845	281-0786-00			CAP.,FXD,CER DI:150PF,10%,100V	72982	8035D2AADX5P151K
A1C850	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C853	281-0797-00			CAP.,FXD,CER DI:15PF,10%,100V	72982	8035D9AADC0G150K
A1C862	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1C870	290-0778-00			CAP.,FXD,ELCTLT:1UF,+50-10%,50V	54473	ECE-A50N1
A1C882	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C3000	281-0814-00			CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A1C3014	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3100	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3124	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3126	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3200	283-0634-00			CAP.,FXD,MICA D:65PF,1%,100V	00853	D151E650F0
A1C3201	281-0814-00			CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A1C3202	281-0814-00			CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A1C3210	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3229	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3230	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3236	281-0762-00			CAP.,FXD,CER DI:27PF,20%,100V	72982	8035D9AADC0G270M
A1C3260	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3600	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A1C3602	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3606	281-0237-00			CAP.,VAR,CER DI:3.3-18PF,250V	0000M	281-0237-00
A1C3608	283-0638-00			CAP.,FXD,MICA D:130PF,1%,100V	00853	D151F131F0
A1C3610	281-0236-00			CAP.,VAR,CER DI:2.8-10PF,250V	0000M	281-0236-00
A1C3612	283-0648-00			CAP.,FXD,MICA D:10PF,5%,100V	00853	D151C100D0
A1C3614	283-0637-00			CAP.,FXD,MICA D:20PF,2.5%,100V	00853	D151E200D0
A1C3620	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3624	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3628	290-0524-00			CAP.,FXD,ELCTLT:4.7UF,20%,10V	90201	TDC475M010EL
A1C3636	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3690	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3691	290-0725-00			CAP.,FXD,ELCTLT:100UF,+75-10%,50V	56289	30D107G050DH9
A1C3695	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A1C3800	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A1C3804	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1C3806	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1C3822	281-0767-00 ----- -----			CAP.,FXD,CER DI:330PF,20%,100V (NOMINAL VALUE, SELECTED)	12969	CGB331MEX
A1C3850	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A1C3852	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1C3854	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A1CR66	152-0323-03			SEMICOND DEVICE:SIG,SI,BAX 13	0000M	152-0323-03
A1CR96	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR100	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR102	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR104	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR106	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR107	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR108	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR110	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR115	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR120	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR140	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR522	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR596	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR598	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR602	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1CR610	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR620	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR621	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR650	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR730	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR811	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR850	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1CR3234	152-0269-00			SEMICOND DEVICE:SILICON,VAR VCAP.,4V,33PF	04713	SMV1263
A1CR3601	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A1DL3210	119-1314-00			DELAY LINE,ELEC:63.943 USED,390 OHM	0000M	119-1314-00
A1L541	114-0379-00			COIL,RF:VARIABLE,6.5-23UH	0000M	114-0379-00
A1L545	114-0377-00			COIL,RF:VARIABLE,45-130UH	0000M	114-0377-00
A1L551	114-0383-00			COIL,RF:VARIABLE,22-80UH	0000M	114-0383-00
A1L557	114-0378-00			COIL,RF:VARIABLE,30-60UH	0000M	114-0378-00
A1L561	114-0381-00			COIL,RF:VARIABLE,65-190UH	0000M	114-0381-00
A1L562	114-0380-00			COIL,RF:VARIABLE,2.9-6.5UH	0000M	114-0380-00
A1L564	114-0382-00			COIL,RF:VARIABLE,350-750UH	0000M	114-0382-00
A1L690	108-0948-00			COIL,RF:FIXED,100UF,10%FERRITE	0000M	108-0948-00
A1L692	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A1L693	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A1L694	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A1L3200	108-1012-00			COIL,RF:FIXED,4.7UH	0000M	108-1012-00
A1L3210	108-1013-00			COIL,RF:FIXED,8.2UH	0000M	108-1013-00
A1L3234	108-1024-00			COIL,RF:FIXED,68UH	0000M	108-1024-00
A1L3606	108-1014-00			COIL,RF:FIXED,680UH	0000M	108-1014-00
A1L3608	108-1014-00			COIL,RF:FIXED,680UH	0000M	108-1014-00
A1Q70	----- -----			COIL,RF:(NOT AVAILABLE AT THIS PRINTING)		
A1Q80	151-0717-00			TRANSISTOR:NPN DUAL,SI,6 DIP	0000M	151-0717-00
A1Q90	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A1Q100	151-0717-00			TRANSISTOR:NPN DUAL,SI,6 DIP	0000M	151-0717-00
A1Q110	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q120	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q140	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q540	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A1Q600	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A1Q602	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q610	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q620	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q621	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q750	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q810	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q820	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q830	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q832	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q840	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q842	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A1Q850	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q854	151-0403-00			TRANSISTOR:SILICON,NPN	0000M	151-0403-00
A1Q860	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q864	151-0403-00			TRANSISTOR:SILICON,NPN	0000M	151-0403-00
A1Q3000	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3003	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3004	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3012	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A1Q3050	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3120	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3200	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1Q3221	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3230	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1Q3560	151-0671-00			TRANSISTOR:NPN,SI,TO-220 2SC1983	0000M	151-0671-00
A1Q3604	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A1Q3800	151-1092-00			TRANSISTOR:FE,N CHANNEL,SI 2SK23A	0000M	151-1092-00
A1Q3850	151-1092-00			TRANSISTOR:FE,N CHANNEL,SI 2SK23A	0000M	151-1092-00
A1Q3860	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A1R40	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1R52	321-0807-01			RES.,FXD,FILM:900K OHM,0.5%,0.125W	91637	MFF1816G90002D
A1R53	321-0389-01			RES.,FXD,FILM:110K OHM,0.5%,0.125W	91637	MFF1816G11002D
A1R60	321-0486-00			RES.,FXD,FILM:1.13M OHM,1%,0.125W	91637	HMF188G11303F
A1R62	315-0915-00			RES.,FXD,CMPSN:9.1M OHM,5%,0.25W	01121	CB9155
A1R64	315-0474-00			RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
A1R66	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R70	321-0068-00			RES.,FXD,FILM:49.9 OHM,1%,0.125W	91637	MFF1816G49R90F
A1R72	321-0068-00			RES.,FXD,FILM:49.9 OHM,1%,0.125W	91637	MFF1816G49R90F
A1R74	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R80	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
A1R82	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	MFF1816G100R0F
A1R84	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
A1R85	315-0121-00			RES.,FXD,CMPSN:120 OHM,5%,0.25W	01121	CB1215
A1R86	311-0634-04			RES.,VAR,NONWW:TRMR,500 OHM,20%,0.5W	0000M	311-0634-04
A1R87	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R88	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A1R89	311-0633-02			RES.,VAR,NONWW:TRMR,5K OHM,0.5W	0000M	311-0633-02
A1R90	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	91637	MFF1816G200R0F
A1R92	321-0301-00			RES.,FXD,FILM:13.3K OHM,1%,0.125W	91637	MFF1816G13301F
A1R94	311-0634-04			RES.,VAR,NONWW:TRMR,500 OHM,20%,0.5W	0000M	311-0634-04
A1R96	321-0208-00			RES.,FXD,FILM:1.43K OHM,1%,0.125W	91637	MFF1816G14300F
A1R100	321-0217-00			RES.,FXD,FILM:1.78K OHM,1%,0.125W	91637	MFF1816G17800F
A1R102	321-0246-00			RES.,FXD,FILM:3.57K OHM,1%,0.125W	91637	MFF1816G35700F
A1R104	311-0634-04			RES.,VAR,NONWW:TRMR,500 OHM,20%,0.5W	0000M	311-0634-04
A1R105	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
A1R107	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A1R108	321-0170-00			RES.,FXD,FILM:576 OHM,1%,0.125W	91637	MFF1816G576R0F
A1R109	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1R110	321-0245-00			RES.,FXD,FILM:3.48K OHM,1%,0.125W	91637	MFF1816G34800F
A1R115	315-0821-00			RES.,FXD,CMPSN:820 OHM,5%,0.25W	01121	CB8215
A1R120	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A1R142	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A1R150	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A1R155	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A1R160	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
A1R165	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
A1R170	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
A1R172	321-0215-00			RES.,FXD,FILM:1.69K OHM,1%,0.125W	91637	MFF1816G16900F
A1R180	311-2005-00			RES.,VAR,NONWW:CKT BOARD,100 OHM,10%,0.5W	0000M	311-2005-00
A1R184	321-0068-00			RES.,FXD,FILM:49.9 OHM,1%,0.125W	91637	MFF1816G49R90F
A1R510	321-0113-00			RES.,FXD,FILM:147 OHM,1%,0.125W	91637	MFF1816G147R0F
A1R511	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R512	311-1022-03			RES.,VAR,NONWIR:THRM,50K OHM,20%,0.5W	0000M	311-1022-03
A1R513	311-0609-03			RES.,VAR,NONWW:TRMR,2K OHM,20%,0.5W	0000M	311-0609-03
A1R514	311-1022-03			RES.,VAR,NONWIR:50K OHM,10%,0.50W	73138	82-32-1
A1R515	321-0113-00			RES.,FXD,FILM:147 OHM,1%,0.125W	91637	MFF1816G147R0F
A1R520	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	MFF1816G30100F
A1R522	321-0227-00			RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
A1R524	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1R526	321-0148-00			RES.,FXD,FILM:340 OHM,1%,0.125W	91637	MFF1816G340R0F
A1R530	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A1R532	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A1R540	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R542	311-1258-00			RES.,VAR,NONWIR:50 OHM,10%,0.50W	32997	3329P-L58-500
A1R548	321-0217-00			RES.,FXD,FILM:1.78K OHM,1%,0.125W	91637	MFF1816G17800F
A1R550	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R558	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
A1R560	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R561	315-0751-00			RES.,FXD,CMPSN:750 OHM,5%,0.25W	01121	CB7515
A1R562	315-0301-00			RES.,FXD,CMPSN:300 OHM,5%,0.25W	01121	CB3015
A1R568	321-0126-03			RES.,FXD,FILM:200 OHM,0.25%,0.125W	91637	MFF1816D200R0C
A1R570	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R578	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A1R581	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R582	311-0605-03			RES.,VAR,NONWW:TRMR,200 OHM,20%,0.5W	0000M	311-0605-03
A1R584	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
A1R588	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R589	311-0635-04			RES.,VAR,NONWW:TRMR,1K OHM,20%,0.5W	0000M	311-0635-04
A1R590	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A1R594	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A1R596	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A1R598	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
A1R600	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R602	321-0246-00			RES.,FXD,FILM:3.57K OHM,1%,0.125W	91637	MFF1816G35700F
A1R612	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A1R620	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A1R621	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A1R622	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A1R625	321-0208-00			RES.,FXD,FILM:1.43K OHM,1%,0.125W	91637	MFF1816G14300F
A1R630	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R650	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A1R660	321-0126-01			RES.,FXD,FILM:200 OHM,0.5%,0125W	91637	MFF1816G200R0D
A1R662	321-0126-01			RES.,FXD,FILM:200 OHM,0.5%,0125W	91637	MFF1816G200R0D
A1R700	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R710	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R712	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R714	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R716	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
A1R720	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R727	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A1R748	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R749	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A1R750	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R751	311-0644-04			RES.,VAR,NONWW:TRMR,20K OHM,20%,0.5W	0000M	311-0644-04
A1R752	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A1R754	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R756	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A1R760	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A1R770	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R772	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R774	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R810	321-0174-00			RES.,FXD,FILM:634 OHM,1%,0.125W	91637	MFF1816G634R0F
A1R811	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R820	321-0181-00			RES.,FXD,FILM:750 OHM,1%,0.125W	91637	MFF1816G750R0F
A1R830	----- -----			RESISTOR:249 OHM,1%,0.25W		
	----- -----			(NOT AVAILALBLE AT THIS PRINTING)		

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1R832	----- -----			RESISTOR:249 OHM,1%,0.25W		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A1R836	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A1R840	----- -----			RESISTOR:47.5 OHM,1%,0.25W		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A1R842	----- -----			RESISTOR:47.5 OHM,1%,0.25W		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A1R843	315-0681-00			RES.,FXD,CMPSN:680 OHM,5%,0.25W	01121	CB6815
A1R845	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
A1R850	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
A1R852	321-0068-00			RES.,FXD,FILM:49.9 OHM,1%,0.125W	91637	MFF1816G49R90F
A1R853	315-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A1R854	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A1R856	307-1033-00			RES.,FXD,FILM:1.2K OHM,1%,3W	19647	MS245N-D12000F
A1R860	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
A1R862	321-0068-00			RES.,FXD,FILM:49.9 OHM,1%,0.125W	91637	MFF1816G49R90F
A1R864	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A1R866	307-1033-00			RES.,FXD,FILM:1.2K OHM,1%,3W	19647	MS245N-D12000F
A1R870	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R880	321-0079-00			RES.,FXD,FILM:64.9 OHM,1%,0.125W	91637	MFF1816G64R90F
A1R882	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A1R3000	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A1R3001	315-0201-00			RES.,FXD,CMPSN:200 OHM,5%,0.25W	01121	CB2015
A1R3002	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R3003	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
A1R3004	315-0392-00			RES.,FXD,CMPSN:3.9K OHM,5%,0.25W	01121	CB3925
A1R3006	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A1R3008	311-0635-04			RES.,VAR,NONWW:TRMR,1K OHM,20%0,5W	0000M	311-0635-04
A1R3010	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A1R3012	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R3014	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
A1R3020	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R3022	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1R3024	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A1R3026	311-0609-03			RES.,VAR,NONWW:TRMR,2K OHM,20%,0.5W	0000M	311-0609-03
A1R3050	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A1R3120	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A1R3121	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A1R3122	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R3124	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915
A1R3127	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A1R3200	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1R3201	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
A1R3210	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915
A1R3221	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A1R3226	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R3227	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A1R3228	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A1R3229	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A1R3230	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A1R3231	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A1R3236	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
A1R3550	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A1R3600	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R3602	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A1R3604	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
A1R3606	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1R3608	315-0391-00			RES.,FXD,CMPSN:390 OHM,5%,0.25W	01121	CB3915
A1R3614	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A1R3616	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1R3620	315-0393-00			RES.,FXD,CMPSN:39K OHM,5%,0.25W	01121	CB3935
A1R3622	311-0633-02			RES.,VAR,NONWW:TRMR,5K OHM,0.5W	0000M	311-0633-02
A1R3624	315-0393-00			RES.,FXD,CMPSN:39K OHM,5%,0.25W	01121	CB3935
A1R3626	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
A1R3628	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
A1R3680	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1R3800	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A1R3802	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
A1R3804	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A1R3806	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A1R3810	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A1R3820	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	91637	MFF1816G301R0F
A1R3822	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
A1R3824	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1R3842	311-0635-04			RES.,VAR,NONWW:TRMR,1K OHM,20%,0.5W	0000M	311-0635-04
A1R3844	321-0197-00			RES.,FXD,FILM:1.1K OHM,1%,0.125W	91637	MFF1816G11000F
A1R3850	315-0475-00			RES.,FXD,CMPSN:4.7M OHM,5%,0.25W	01121	CB4755
A1R3852	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A1R3854	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A1R3860	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
A1R3862	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A1RT845	307-0124-00			RES.,THERMAL:5K OHM,10%	50157	1D1618
A1RT3007	307-0124-00			RES.,THERMAL:5K OHM,10%	50157	1D1618
A1S12	260-2026-00			SWITCH,TOGGLE:DPDT,5A,120VAC	0000M	260-2026-00
A1S70	260-1132-02			SWITCH,PUSH:DPDT,1A,28VDC,1 BUTTON	71590	2KAB010000-543
A1S100	260-1544-01			SWITCH,PUSH:3 STA,2 POLE,W/O MTG EARS	82104	OBD
A1S110	260-1228-00			SWITCH,PUSH:DPDT,2 BUTTON	80009	260-1228-00
A1S500	260-1544-01			SWITCH,PUSH:3 STA,2 POLE,W/O MTG EARS	82104	OBD
A1S650	260-1424-01			SWITCH,PUSH:5 STA,2 POLE INTERLOCK	80009	260-1424-01
A1S3040	----- -----			SWITCH,SLIDE: (NOT AVAILABLE AT THIS PRINTING)		
A1S3500	260-1132-02			SWITCH,PUSH:DPDT,1A,28VDC,1 BUTTON	71590	2KAB010000-543
A1U500	156-0197-00			MICROCIRCUIT,LI:5 TRANSISTOR ARRAY	02735	CA3086
A1U590	156-0514-03			MICROCIRCUIT,DI:DIFF 4-CHANNEL MUX 4052	0000M	156-0514-03
A1U700	156-1422-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	156-1422-00
A1U730	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A1U3600	156-1420-00			MICROCIRCUIT,LI:CHROMA PROCESSOR	0000M	156-1420-00
A1U3810	156-1422-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	146-1422-00
A1VR3600	152-0278-00			SEMICOND DEVICE:ZENER,0.4W,3V,5%	04713	SZG35009K20
A1Y3610	158-0104-01			XTAL UNIT,QTZ:4.433619 MHZ,0.0035%,PRL	0000M	158-0104-01

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A2	----- -----			CKT BOARD ASSY:INPUT		
A2C10	281-0810-00			CAP.,FXD,CER DI:5.6PF,0.5%,100V	04222	GC10-1A5R6D
A2C11	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A2C12	281-0182-00			CAP.,VAR,PLSTC:1.8-10PF,500V	80031	2805D1R810BH02F0
A2C21	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C25	281-0236-00			CAP.,VAR,CER DI:2.8-10PF,250V	0000M	281-0236-00
A2C26	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C37	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A2C45	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A2C46	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A2C47	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C48	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A2C49	285-1166-00			CAP.,FXD,PLSTC:0.047UF,5%,200V	0000M	285-1166-00
A2C251	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C252	281-0592-00			CAP.,FXD,CER DI:4.7PF,+/-0.5PF,500V	59660	301-000-C0H0479D
A2C254	281-0236-00			CAP.,VAR,CER DI:2.8-10PF,250V	0000M	281-0236-00
A2C256	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C258	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C259	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A2C400	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C402	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A2C411	----- -----			CAP.,FXD,ELCTLT:2.2PF,10%,50V		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A2C1110	281-0786-00			CAP.,FXD,CER DI:150PF,10%,100V	72982	8035D2AADX5P151K
A2C1120	285-1117-00			CAP.,FXD,PLSTC:0.018UF,2%,100V	0000M	285-1117-00
A2C1166	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A2CR21	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR25	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR36	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR251	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR254	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR256	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR257	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR411	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR420	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR430	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR1120	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR1121	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR1126	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2CR1127	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A2L46	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A2L47	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A2L48	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A2Q11	151-1111-00			TRANSISTOR:FE,N CHANNEL,SI,TO-92	0000M	151-1111-00
A2Q14	151-1112-00			TRANSISTOR:FE,N CHANNEL,SI,6 DIP	0000M	151-1112-00
A2Q25	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A2Q28	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A2Q250	151-0717-00			TRANSISTOR:NPN DUAL,SI,6 DIP	0000M	151-0717-00
A2Q254	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A2Q256	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A2Q258	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A2R10	321-0368-00			RES.,FXD,FILM:66.5K OHM,1%,0.125W	91637	MFF1816G66501F
A2R11	321-0339-00			RES.,FXD,FILM:33.2K OHM,1%,0.125W	91637	MFF1816G33201F
A2R12	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
A2R13	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A2R15	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A2R20	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A2R27	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A2R28	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A2R30	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A2R32	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	91637	MFF1816G499R0F
A2R35	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
A2R36	315-0106-00			RES.,FXD,CMPSN:10M OHM,5%,0.25W	01121	CB1065
A2R37	315-0474-00			RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
A2R198	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A2R204	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A2R208	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A2R240	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A2R250	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A2R251	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A2R252	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	91637	MFF1816G15000F
A2R253	321-0161-00			RES.,FXD,FILM:464 OHM,1%,0.125W	91637	MFF1816G464R0F
A2R254	311-2005-00			RES.,VAR,NONWW:CKT BOARD,100 OHM,10%,0.5W	0000M	311-2005-00
A2R256	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A2R257	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A2R258	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A2R259	315-0270-00			RES.,FXD,CMPSN:27 OHM,5%,0.25W	01121	CB2705
A2R260	321-0085-00			RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF1816G75R00F
A2R300	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
A2R301	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A2R305	321-0383-00			RES.,FXD,FILM:95.3K OHM,1%,0.125W	91637	MFF1816G95301F
A2R310	321-0349-00			RES.,FXD,FILM:42.2K OHM,1%,0.125W	91637	MFF1816G42201F
A2R311A	321-0160-00			RES.,FXD,FILM:453 OHM,1%,0.125W	91637	MFF1816G453R0F
A2R311B	321-0150-00			RES.,FXD,FILM:357 OHM,1%,0.125W	91637	MFF1816G357R0F
A2R311C	321-0141-00			RES.,FXD,FILM:287 OHM,1%,0.125W	91637	MFF1816G287R0F
A2R311D	321-0131-00			RES.,FXD,FILM:226 OHM,1%,0.125W	91637	MFF1816G226R0F
A2R311E	321-0122-00			RES.,FXD,FILM:182 OHM,1%,0.125W	91637	MFF1816G182R0F
A2R311F	321-0112-00			RES.,FXD,FILM:143 OHM,1%,0.125W	91637	MFF1816G143R0F
A2R311G	321-0102-00			RES.,FXD,FILM:113 OHM,1%,0.125W	91637	MFF1816G113R0F
A2R311H	321-0093-00			RES.,FXD,FILM:90.9 OHM,1%,0.125W	91637	MFF1816G90R90F
A2R311I	321-0083-00			RES.,FXD,FILM:71.5 OHM,1%,0.125W	91637	MFF1816G71R50F
A2R311J	321-0073-00			RES.,FXD,FILM:56.2 OHM,1%,0.125W	91637	MFF1816G56R20F
A2R311K	321-0065-00			RES.,FXD,FILM:46.4 OHM,1%,0.125W	91637	MFF1816G46R40F
A2R311L	321-0120-00			RES.,FXD,FILM:174 OHM,1%,0.125W	91637	MFF1816G174R0F
A2R330	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
A2R335	321-0255-00			RES.,FXD,FILM:4.42K OHM,1%,0.125W	91637	MFF1816G44200F
A2R404	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R406	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A2R410	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A2R411	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A2R413	311-1740-01			RES.,VAR,NONWW:TRMR,1K OHM,20%,0.5W	0000M	311-1740-01
A2R420	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A2R422	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R430	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A2R1110	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R1111	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R1112	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R1115	307-0446-00			RES,NTWK,FXD FI:10K OHM,20%,(9) RES	91637	MSP10A01-103M
A2R1120	315-0363-00			RES.,FXD,CMPSN:36K OHM,5%,0.25W	01121	CB3635
A2R1123	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A2R1124	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R1125	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
A2R1126	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A2R1127	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A2R1129	307-0702-00			RES.,NTWK,FXD FI:7 RES,10K OHM,10%	0000M	307-0702-00
A2R1140	315-0122-00			RES.,FXD,CMPSN:1.2K OHM,5%,0.25W	01121	CB1225
A2R1160	321-0271-00			RES.,FXD,FILM:6.49K OHM,1%,0.125W	91637	MFF1816G64900F
A2R1162	311-2093-00			RES.,VAR,NONWW:TRMR,100 OHM,10%,0.5W	0000M	311-2093-00
A2R1164	321-0188-00			RES.,FXD,FILM:887 OHM,1%,0.125W	91637	MFF1816G887R0F
A2R1166	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A2S300	260-1544-01			SWITCH,PUSH:3 STA,2 POLE,W/O MTG EARS	82104	OBD
A2S311	260-2022-00			SWITCH,ROTARY:NOISE MEASUREMENT	0000M	260-2022-00
A2U300	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A2U400	156-1422-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	156-1422-00
A2U1110	156-1421-00			MICROCIRCUIT,DI:OCTAL COUNTER/DIVIDER	0000M	156-1421-00
A2U1115	156-1418-00			MICROCIRCUIT,DI:1024 X 8 PROM	0000M	156-1418-00
A2U1120	156-1419-00			MICROCIRCUIT,DI:COUNTER 'CMOS,TC5037P,16 DIP	0000M	156-1419-00
A2U1124	156-0505-00			MICROCIRCUIT,DI:4 BIT AND/OR SEL	04713	MC14519BCL
A2U1125	156-0795-00			MICROCIRCUIT,DI:BCD 7-SEG LCHDCDR/DRVR	04713	MC14511BCL
A2U1130	156-0385-00			MICROCIRCUIT,DI:HEX.INVERTER	80009	156-0385-00
A2U1154	156-1423-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	156-1423-00

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A3	----- -----			CKT BOARD ASSY:SWEEP		
A3C941	283-0059-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N031Z5U0105Z
A3C1027	281-0786-00			CAP.,FXD,CER DI:150PF,10%,100V	72982	8035D2AADX5P151K
A3C1030	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
A3C1040	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
A3C1052	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A3C1078	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
A3C1090	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A3C1096	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A3C1097	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A3C1232	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A3C1237	285-1117-00			CAP.,FXD,PLSTC:0.018UF,2%,100V	0000M	285-1117-00
A3C1244	285-0622-00			CAP.,FXD,PLSTC:0.1UF,20%,100V	56289	410P10401
A3C1246	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
A3C1248	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A3C1250	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A3C1312	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
A3C1316	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A3C1510	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A3C1526	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A3C1544	281-0763-00			CAP.,FXD,CER DI:47PF,10%,100V	72982	8035D9AADC1G470K
A3C1562	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A3C1564	285-1166-00			CAP.,FXD,PLSTC:0.047UF,5%,200V	0000M	285-1166-00
A3C1566	281-0756-00			CAP.,FXD,CER DI:2.2PF,0.5%,200V	12969	CGB2R2DFN
A3C1606	281-0756-00			CAP.,FXD,CER DI:2.2PF,0.5%,200V	12969	CGB2R2DFN
A3C1608	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A3C1610	285-1166-00			CAP.,FXD,PLSTC:0.047UF,5%,200V	0000M	285-1166-00
A3C1614	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A3C1616	290-0755-00			CAP.,FXD,ELCTLT:100UF,+50-10%,10V	56289	502D223
A3CR936	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR942	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1005	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1015	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1026	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1027	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1028	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1030	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1034	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1078	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1088	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1089	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1090	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1318	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1340	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1342	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1346	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1518	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1550	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1552	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1600	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3CR1602	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A3L1095	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A3L1096	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A3L1097	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A3L1614	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A3L1616	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A3Q1000	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A3Q1030	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1032	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A3Q1070	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1232	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1240	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1244	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1310	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1512	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A3Q1514	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1522	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A3Q1526	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A3Q1544	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A3Q1546	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1550	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1556	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1558	151-0668-00			TRANSISTOR:NPN,SI,TO-92	0000M	151-0668-00
A3Q1562	151-0718-00			TRANSISTOR:NPN DUAL,SI,6 DIP	0000M	151-0718-00
A3Q1602	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A3Q1608	151-0668-00			TRANSISTOR:NPN,SI,TO-92	0000M	151-0668-00
A3Q1610	151-0718-00			TRANSISTOR:NPN DUAL,SI,6 DIP	0000M	151-0718-00
A3R935	315-0753-00			RES.,FXD,CMPSN:75K OHM,5%,0.25W	01121	CB7535
A3R936	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A3R938	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A3R940	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A3R941	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A3R942	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A3R1000	307-0703-00			RES.,NTWK,FXD FI:7 RES,10K OHM,10%	0000M	307-0703-00
A3R1005	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1015	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R1027	307-0703-00			RES.,NTWK,FXD FI:7 RES,10K OHM,10%	0000M	OBD
A3R1028	315-0622-00			RES.,FXD,CMPSN:6.2K OHM,5%,0.25W	01121	CB6225
A3R1030	307-0703-00			RES.,NTWK,FXD FI:7 RES,10K OHM,10%	0000M	307-0703-00
A3R1032	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R1034	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A3R1040	315-0474-00			RES.,FXD,CMPSN:470K OHM,5%,0.25W	01121	CB4745
A3R1042	315-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A3R1044	315-0361-00			RES.,FXD,CMPSN:360 OHM,5%,0.25W	01121	CB3615
A3R1054	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1080	307-0703-00			RES.,NTWK,FXD FI:7 RES,10K OHM,10%	0000M	307-0703-00
A3R1085	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R1087	315-0823-00			RES.,FXD,CMPSN:82K OHM,5%,0.25W	01121	CB8235
A3R1089	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A3R1091	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A3R1092	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
A3R1095	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A3R1230	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A3R1234	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
A3R1236	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R1238	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1240	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A3R1242	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1244	321-0442-00			RES.,FXD,FILM:392K OHM,1%,0.125W	91637	MFF1816G39202F
A3R1246	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R1248	315-0273-00			RES.,FXD,CMPSN:27K OHM,5%,0.25W	01121	CB2735
A3R1256	315-0334-00			RES.,FXD,CMPSN:330K OHM,5%,0.25W	01121	CB3345
A3R1310	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
A3R1312	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A3R1314	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A3R1316	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A3R1318	315-0153-00			RES.,FXD,CMPSN:15K OHM,5%,0.25W	01121	CB1535
A3R1319	315-0393-00			RES.,FXD,CMPSN:39K OHM,5%,0.25W	01121	CB3935
A3R1320	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A3R1332	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1333	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1336	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1338	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1339	311-1980-00			RES.,VAR,NONWIR:CKT BD,5K OHM,10%,0.5W	0000M	311-1980-00
A3R1340	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A3R1342	321-0227-00			RES.,FXD,FILM:2.26K OHM,1%,0.125W	91637	MFF1816G22600F
A3R1344	321-0325-00			RES.,FXD,FILM:23.7K OHM,1%,0.125W	91637	MFF1816G23701F
A3R1346	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
A3R1372	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R1374	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A3R1376	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A3R1378	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A3R1382	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R1384	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A3R1385	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A3R1392	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
A3R1394	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A3R1502	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A3R1503	315-0224-00			RES.,FXD,CMPSN:220K OHM,5%,0.25W	01121	CB2245
A3R1508	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
A3R1509	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A3R1510	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
A3R1512	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	91637	MFF1816G14000F
A3R1514	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	91637	MFF1816G10000F
A3R1516	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	91637	MFF1816G68100F
A3R1518	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	91637	MFF1816G40200F
A3R1520	321-0237-00			RES.,FXD,FILM:2.87K OHM,1%,0.125W	91637	MFF1816G28700F
A3R1522	321-0252-00			RES.,FXD,FILM:4.12K OHM,1%,0.125W	91637	MFF1816G41200F
A3R1524	321-0207-00			RES.,FXD,FILM:1.4K OHM,1%,0.125W	91637	MFF1816G14000F
A3R1526	321-0265-00			RES.,FXD,FILM:5.62K OHM,1%,0.125W	91637	MFF1816G56200F
A3R1528	----- -----			RESISTOR:6.65K OHM,1%,0.25W		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A3R1529	321-0202-03			RES.,FXD,FILM:1.24K OHM,0.25%,0.125W	24546	NC55C1241C
A3R1530	321-0129-00			RES.,FXD,FILM:215 OHM,1%,0.125W	91637	MFF1816G215R0F
A3R1531	311-2093-00			RES.,VAR,NONWW:TRMR,100 OHM,10%,0.5W	0000M	311-2093-00
A3R1532	321-0260-03			RES.,FXD,FILM:4.99K OHM,0.25%,0.125W	24546	NC55C4991C
A3R1538	321-0289-03			RES.,FXD,FILM:10K OHM,0.25%,0.125W	91637	MFF1816D10001C
A3R1540	311-1980-00			RES.,VAR,NONWIR:CKT BD,5K OHM,10%,0.5W	0000M	311-1980-00
A3R1542	321-0289-03			RES.,FXD,FILM:10K OHM,0.25%,0.125W	91637	MFF1816D10001C
A3R1544	321-0265-00			RES.,FXD,FILM:5.62K OHM,1%,0.125W	91637	MFF1816G56200F
A3R1546	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
A3R1550	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F
A3R1552	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
A3R1554	311-2041-00			RES.,VAR,NONWIR:CKT BD,10K OHM,10%,0.5W	0000M	311-2041-00
A3R1556	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1558	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1560	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A3R1562	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A3R1564	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1566	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	91637	MFF1816G24901F
A3R1568	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	91637	MFF1816G24901F

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A3R1602	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	91637	MFF1816G71501F
A3R1604	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1606	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	91637	MFF1816G24901F
A3R1608	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	91637	MFF1816G24901F
A3R1609	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1610	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A3R1612	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A3R1616	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A3S1000	260-2015-00			SWITCH,PUSH:8 BUTTON,2 POLE(7) & PP(1)	0000M	260-2015-00
A3S1015	260-1910-00			SWITCH,TOGGLE:3P3T,250V,AC/GND/DC	0000M	260-1910-00
A3S1530	260-2016-00			SWITCH,PUSH:2 BUTTON,2 & 4 POLE,MAG	0000M	260-2016-00
A3U920	156-0158-00			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	MC1458N
A3U1000	156-1282-00			MICROCIRCUIT,DI:8 BIT PRIORITY ENCODER	0000M	156-1282-00
A3U1010	156-0579-02			MICROCIRCUIT,DI:DUAL 4 BIT BIN COUNTER,SEL	80009	156-0579-02
A3U1015	156-0990-00			MICROCIRCUIT,DI:QUAD 2-INPUT EXCL OR GATE	80009	156-0990-00
A3U1032	156-0382-00			MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	01295	SN74LS00(N OR J)
A3U1080	156-0197-00			MICROCIRCUIT,LI:5 TRANSISTOR ARRAY	02735	CA3086
A3U1230	156-0388-00			MICROCIRCUIT,DI:DUAL D-TYPE FLIP-FLOP	80009	156-0388-00
A3U1244	156-0158-00			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	MC1458N
A3U1340	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A3U1382	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A3VR1562	152-0697-00			SEMICOND DVC,DI:ZEN,SI,5.1V,0.4W	0000M	152-0697-00

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A4	----- -----			CKT BOARD ASSY:DISPLAY		
A4C900	290-0843-00			CAP.,FXD,ELCTLT:47UF,20%,35V,TANTALUM	0000M	290-0843-00
A4C910	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
A4C912	281-0791-00			CAP.,FXD,CER DI:270PF,10%,100V	72982	8035D2AADX5R271K
A4C914	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C915	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C916	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C919	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A4C920	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C921	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C925	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
A4C927	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C930	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C933	281-0814-00			CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A4C945	281-0814-00			CAP.,FXD,CER DI:100PF,10%,100V	04222	GC70-1-A101K
A4C950	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
A4C951	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
A4C952A	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C952B	281-0815-00			CAP.,FXD,CER DI:0.027UF,20%,50V	72982	8005D9AABW5R273M
A4C953	283-0598-00			CAP.,FXD,MICA D:253PF,5%,300V	09023	CD15EC(253)J03
A4C954	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C955	285-1165-00			CAP.,FXD,PLSTC:0.1UF,5%,100V	0000M	285-1165-00
A4C959	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C966	285-1166-00			CAP.,FXD,PLSTC:0.047UF,5%,200V	0000M	285-1166-00
A4C968	285-1165-00			CAP.,FXD,PLSTC:0.1UF,5%,100V	0000M	285-1165-00
A4C970	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A4C974	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A4C980	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A4C1178	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C1180	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C1185	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C1186	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A4C1187	290-0267-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	162D105X0035CD2
A4C1196	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
A4C1197	295-0169-00			CAP.,SET,MTCHD:1UF,0.01UF,0.001UF,MTCHD 1%	80009	295-0169-00
A4C1210	281-0812-00			CAP.,FXD,CER DI:1000PF,10%,100V	72982	8035D9AADX7R102K
A4C1650	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A4C1661	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
A4C1686	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	91418	SM103Z5014R9
A4C1700	290-0512-00			CAP.,FXD,ELCTLT:22UF,20%,15V	56289	196D226X0015KA1
A4C1706	285-1166-00			CAP.,FXD,PLSTC:0.047UF,5%,200V	0000M	285-1166-00
A4C1707	283-0240-00			CAP.,FXD,CER DI:1PF,20%,500V	56289	53C141
A4C1712	285-1166-00			CAP.,FXD,PLSTC:0.047UF,5%,200V	0000M	285-1166-00
A4CR900	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR901	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR902	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR903	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR915	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR916	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR925	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR930	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR963	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR964	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR1181	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR1198	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR1651	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR1657	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A4CR1678	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A4CR1707	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A4CR1708	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A4L900	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A4L902	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A4L904	108-0948-00			COIL,RF:FIXED,100UF,10%,FERRITE	0000M	108-0948-00
A4Q903	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A4Q910	151-1111-00			TRANSISTOR:FE,N CHANNEL,SI,TO-92	0000M	151-1111-00
A4Q925	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A4Q1174	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A4Q1181	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A4Q1195	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A4Q1196	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A4Q1204	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A4Q1210	151-1111-00			TRANSISTOR:FE,N CHANNEL,SI,TO-92	0000M	151-1111-00
A4Q1308	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A4Q1650	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A4Q1685	151-0667-00			TRANSISTOR:PNP,SI,TO-5,2SC1762-1	0000M	151-0667-00
A4Q1702	151-0665-00			TRANSISTOR:PNP,SI,TO-92 2SA733	0000M	151-0665-00
A4Q1706	151-0668-00			TRANSISTOR:NPN,SI,TO-92	0000M	151-0668-00
A4Q1712	151-0718-00			TRANSISTOR:NPN DUAL,SI,6 DIP	0000M	151-0718-00
A4R900	315-0182-00			RES.,FXD,CMPSN:1.8K OHM,5%,0.25W	01121	CB1825
A4R901	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R902	321-0247-00			RES.,FXD,FILM:3.65K OHM,1%,0.125W	91637	MFF1816G36500F
A4R903	315-0752-00			RES.,FXD,CMPSN:7.5K OHM,5%,0.25W	01121	CB7525
A4R904	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A4R905	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A4R907	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
A4R910	315-0331-00			RES.,FXD,CMPSN:330 OHM,5%,0.25W	01121	CB3315
A4R912	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
A4R913	321-0250-00			RES.,FXD,FILM:3.92K OHM,1%,0.125W	91637	MFF1816G39200F
A4R914	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A4R915	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R916	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A4R917	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
A4R918	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R919	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R920	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A4R921	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A4R923	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R924	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A4R925	315-0272-00			RES.,FXD,CMPSN:2.7K OHM,5%,0.25W	01121	CB2725
A4R926	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R927	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A4R928	315-0471-00			RES.,FXD,CMPSN:470 OHM,5%,0.25W	01121	CB4715
A4R930	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R931	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R932	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R933	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R934	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R943	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R945	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R950	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R955	315-0623-00			RES.,FXD,CMPSN:62K OHM,5%,0.25W	01121	CB6235
A4R956	315-0754-00			RES.,FXD,CMPSN:750K OHM,5%,0.25W	01121	CB7545
A4R957	315-0243-00			RES.,FXD,CMPSN:24K OHM,5%,0.25W	01121	CB2435
A4R959	315-0510-00			RES.,FXD,CMPSN:51 OHM,5%,0.25W	01121	CB5105

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A4R960	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R961	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R963	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A4R964	321-0242-00			RES.,FXD,FILM:3.24K OHM,1%,0.125W	91637	MFF1816G32400F
A4R965	321-0305-00			RES.,FXD,FILM:14.7K OHM,1%,0.125W	91637	MFF1816G14701F
A4R966	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R968	315-0514-00			RES.,FXD,CMPSN:510K OHM,5%,0.25W	01121	CB5145
A4R970	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R971	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R972	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A4R974	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R975	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R976	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A4R978	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A4R981	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A4R983	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A4R986	315-0184-00			RES.,FXD,CMPSN:180K OHM,5%,0.25W	01121	CB1845
A4R1179	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A4R1180	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R1181	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R1182	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A4R1183	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R1184	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R1185	315-0332-00			RES.,FXD,CMPSN:3.3K OHM,5%,0.25W	01121	CB3325
A4R1186	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R1187	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R1188	315-0333-00			RES.,FXD,CMPSN:33K OHM,5%,0.25W	01121	CB3335
A4R1189	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R1192	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R1194	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
A4R1200	311-0635-04			RES.,VAR,NONWW:TRMR,1K OHM,20%,0.5W	0000M	311-0635-04
A4R1202	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	91637	MFF1816G49900F
A4R1204	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A4R1205	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
A4R1206	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R1210	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A4R1212	321-0355-00			RES.,FXD,FILM:48.7K OHM,1%,0.125W	91637	MFF1816G48701F
A4R1214	321-0337-00			RES.,FXD,FILM:31.6K OHM,1%,0.125W	91637	MFF1816G31601F
A4R1216A	321-0816-03			RES.,FXD,FILM:5K OHM,0.25%,0.125W	91637	MFF1816D50000C
A4R1216B	321-0289-03			RES.,FXD,FILM:10K OHM,0.25%,0.125W	91637	MFF1816D10001C
A4R1216C	321-0318-03			RES.,FXD,FILM:20K OHM,0.25%,0.125W	24546	NC55C2002C
A4R1216D	321-0756-03			RES.,FXD,FILM:50K OHM,0.25%,0.125W	91637	MFF1816D50001C
A4R1216E	----- -----			RES.,FXD,FILM:100K OHM,0.25%,0.125W		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A4R1216F	321-0414-03			RES.,FXD,FILM:200K OHM,0.25%,0.125W	24546	NC55C2003C
A4R1216G	321-0648-02			RES.,FXD,FILM:500K OHM,0.5%,0.125W	24546	NC55C5003D
A4R1216H	321-0341-00			RES.,FXD,FILM:34.8K OHM,1%,0.125W	91637	MFF1816G34801F
A4R1219	307-0703-00			RES.,NTWK,FXD FI:7 RES,10K OHM,10%	0000M	307-0703-00
A4R1307	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A4R1308	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A4R1309	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R1337	311-0609-03			RES.,VAR,NONWW:TRMR,2K OHM,20%,0.5W	0000M	311-0609-03
A4R1651	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R1653	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R1655	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A4R1660	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A4R1661	321-0267-00			RES.,FXD,FILM:5.9K OHM,1%,0.125W	91637	MFF1816G59000F

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A4R1674	315-0224-00			RES.,FXD,CMPSN:220K OHM,5%,0.25W	01121	CB2245
A4R1676	315-0684-00			RES.,FXD,CMPSN:680K OHM,5%,0.25W	01121	CB6845
A4R1678	311-1275-00			RES.,VAR,NONWIR:1M OHM,10%,0.50W	32997	3329P-L58-105
A4R1680	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
	----- -----			(NOMINAL VALUE, SELECTED)		
A4R1681	315-0105-00			RES.,FXD,CMPSN:1M OHM,5%,0.25W	01121	CB1055
A4R1683	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A4R1684	315-0154-00			RES.,FXD,CMPSN:150K OHM,5%,0.25W	01121	CB1545
A4R1685	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A4R1686	315-0225-00			RES.,FXD,CMPSN:2.2M OHM,5%,0.25W	01121	CB2255
A4R1687	315-0225-00			RES.,FXD,CMPSN:2.2M OHM,5%,0.25W	01121	CB2255
A4R1696	315-0512-00			RES.,FXD,CMPSN:5.1K OHM,5%,0.25W	01121	CB5125
A4R1702	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A4R1707	315-0473-00			RES.,FXD,CMPSN:47K OHM,5%,0.25W	01121	CB4735
A4R1712	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A4R1714	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
A4R1716	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A4S1305	260-2017-00			SWITCH,PUSH:3 BUTTON,4 POLE,DISPLAY	0000M	260-2017-00
A4U900	156-0197-00			MICROCIRCUIT,LI:5 TRANSISTOR ARRAY	02735	CA3086
A4U930	156-0990-00			MICROCIRCUIT,DI:QUAD 2-INPUT EXCL OR GATE	80009	156-0990-00
A4U950	155-0144-00			MICROCIRCUIT,LI:DUAL IN-LINE,16 LEAD	80009	155-0144-00
A4U985	156-0197-00			MICROCIRCUIT,LI:5 TRANSISTOR ARRAY	02735	CA3086
A4U1184	156-0384-00			MICROCIRCUIT,DI:QUAD 2-INPUT NAND GATE	80009	156-0384-00
A4U1185	156-0388-00			MICROCIRCUIT,DI:DUAL D-TYPE FLIP-FLOP	80009	156-0388-00
A4U1186	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A4U1188	156-0072-00			MICROCIRCUIT,DI:MONOSTABLE MV,TTL,14 DIP	01295	SN74121(N OR J)
A4U1196	156-1422-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	156-1422-00
A4U1215	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A4U1216	156-0513-00			MICROCIRCUIT,DI:8-CHAN MUX	80009	156-0513-00
A4U1218	156-0513-00			MICROCIRCUIT,DI:8-CHAN MUX	80009	156-0513-00
A4U1650	156-0515-00			MICROCIRCUIT,DI:TRIPLE 3-CHAN MUX	80009	156-0515-00
A4U1685	156-0158-00			MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	MC1458N
A4VR1707	152-0286-00			SEMICOND DEVICE:ZENER,0.4W,75V,5%	80009	152-0286-00
A5	----- -----			CKT BOARD ASSY:LED		
A5DS198	150-1081-00			LT EMITTING DIO:RED		
A5DS1140	150-1081-00			LT EMITTING DIO:RED	0000M	150-1081-00
A5DS1141	150-1081-00			LT EMITTING DIO:RED	0000M	150-1081-00
A5U1140	150-1082-00			LAMP,LED RDOUT:RED,7 SEG,3 DIGIT	0000M	150-1082-00

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A6	----- -----			CKT BOARD ASSY:HIGH VOLTAGE		
A6C1910	290-0910-00			CAP.,FXD,ELCTLT:3.3UF,+50-10%,160V	0000M	290-0910-00
A6C1911	290-0907-00			CAP.,FXD,ELCTLT:47UF,+30-10%,50V	0000M	290-0907-00
A6C1912	290-0846-00			CAP.,FXD,ELCTLT:47UF,-10+75%,35 WVDC	54473	ECE-A35V47LU
A6C1913	290-0746-00			CAP.,FXD,ELCTLT:47UF,+50-10%,16V	55680	16U-47V-T
A6C1914	290-0746-00			CAP.,FXD,ELCTLT:47UF,+50-10%,16V	55680	16U-47V-T
A6C1930	290-0821-00			CAP.,FXD,ELCTLT:11000UF,+100-10%,15V	0000M	290-0821-00
A6C1931	285-0686-00			CAP.,FXD,PLSTC:0.068UF,10%,100V	56289	410P68391
A6C1932	283-0279-00			CAP.,FXD,CER DI:0.001UF,20%,3000V	59660	878-530 Y5S0102M
A6C1934	283-0120-00			CAP.,FXD,CER DI:0.015UF,+80-30%,2500V	56289	45C12
A6C1936	283-0120-00			CAP.,FXD,CER DI:0.015UF,+80-30%,2500V	56289	45C12
A6C1950	285-1040-00			CAP.,FXD,PLSTC:0.0012UF,10%,4000V	56289	430P522
A6C1954	290-0164-00			CAP.,FXD,ELCTLT:1UF,+50-10%,150V	56289	500D105F150BA7
A6C1960	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
A6C1964	283-0120-00			CAP.,FXD,CER DI:0.015UF,+80-30%,2500V	56289	45C12
A6C1970	290-0910-00			CAP.,FXD,ELCTLT:3.3UF,+50-10%,160V	0000M	290-0910-00
A6C1973	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A6C1974	283-0279-00			CAP.,FXD,CER DI:0.001UF,20%,3000V	59660	878-530 Y5S0102M
A6C1976	281-0775-00			CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8005D9AABZ5U104M
A6C1978	281-0772-00			CAP.,FXD,CER DI:0.0047UF,10%,100V	04222	GC701C472K
A6C1980	285-1040-00			CAP.,FXD,PLSTC:0.0012UF,10%,4000V	56289	430P522
A6C1981	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
A6C1982	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	59660	831-519-Z5U-102P
A6Q1992	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A6C1994	283-0773-00			CAP.,FXD,MICA D:578PF,1%,300V	00853	D15-3F5780F0
A6C1996	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A6CR1934	152-0409-00			SEMICOND DEVICE:SILICON,12,000V,5MA	80009	152-0409-00
A6CR1936	152-0409-00			SEMICOND DEVICE:SILICON,12,000V,5MA	80009	152-0409-00
A6CR1948	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A6CR1950	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A6CR1952	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A6CR1962	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A6CR1970	152-0242-00			SEMICOND DEVICE:SILICON,225V,200MA	07263	FDH5004
A6CR1980	152-0331-00			SEMICOND DEVICE:SILICON,800V,25MA	0000M	152-0331-00
A6CR1982	152-0331-00			SEMICOND DEVICE:SILICON,800V,25MA	0000M	152-0331-00
A6CR1984	152-0331-00			SEMICOND DEVICE:SILICON,800V,25MA	0000M	152-0331-00
A6CR1986	152-0331-00			SEMICOND DEVICE:SILICON,800V,25MA	0000M	152-0331-00
A6F2000	159-0156-00			FUSE,CÁRTRIDGE:1.5A,250V	0000M	159-0156-00
A6F2002	159-0015-02			FUSE,CARTRIDGE:3AG,3A,250V,FAST-BLOW	71400	AGC 3
A6L1930	108-1011-00			COIL,RF:FIXED,470UH	0000M	108-1011-00
A6Q1932	151-0423-00			TRANSISTOR:SILICON,NPN	51984	NTC2333L
A6R1932	315-0100-00			RES.,FXD,CMPSN:10 OHM,5%,0.25W	01121	CB1005
A6R1934	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R1936	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A6R1938	315-0470-00			RES.,FXD,CMPSN:47 OHM,5%,0.25W	01121	CB4705
A6R1946	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A6R1948	315-0226-00			RES.,FXD,CMPSN:22M OHM,5%,0.25W	01121	CB2265
A6R1952	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R1956	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A6R1958	311-1745-00			RES.,VAR,NONWIR:TRMR,100K OHM,10%,0.5W	0000M	311-1745-00
A6R1960	315-0164-00			RES.,FXD,CMPSN:160K OHM,5%,0.25W	01121	CB1645
A6R1961	315-0164-00			RES.,FXD,CMPSN:160K OHM,5%,0.25W	01121	CB1645
A6R1962	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R1964	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A6R1973	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A6R1974	325-0196-01			RES.,FXD,FILM:40M OHM,2%,2W	0000M	325-0196-01
A6R1975	321-0430-00			RES.,FXD,FILM:294K OHM,1%,0.125W	91637	MFF1816G29402F

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A6R1976	315-0222-00			RES.,FXD,CMPSN:2.2K OHM,5%,0.25W	01121	CB2225
A6R1977	311-1981-00			RES.,VAR,NONWW:CKT BOARD,20K OHM,10%,0.5W	0000M	311-1981-00
A6R1978	315-0334-00			RES.,FXD,CMPSN:330K OHM,5%,0.25W	01121	CB3345
A6R1980	315-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.25W	01121	CB5135
A6R1981	315-0513-00			RES.,FXD,CMPSN:51K OHM,5%,0.25W	01121	CB5135
A6R1982	315-0226-00			RES.,FXD,CMPSN:22M OHM,5%,0.25W	01121	CB2265
A6R1992	311-1745-00			RES.,VAR,NONWIR:TRMR,100K OHM,10%,0.5W	0000M	311-1745-00
A6R1996	311-1745-00			RES.,VAR,NONWIR:TRMR,100K OHM,10%,0.5W	0000M	311-1745-00
A6R1998	311-1743-01			RES.,VAR,NONWIR:TRMR 10K OHM,20%,0.5W	0000M	311-1743-01
A6S1802	260-1728-00			SWITCH:4P3T	0000M	260-1728-00
A6T1930	120-1317-01			XFMR,POWER STU:	80009	120-1317-01
A6U1978	156-0067-00			MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	02735	85145
A6VR1954	152-0286-00			SEMICOND DEVICE:ZENER,0.4W,75V,5%	80009	152-0286-00
A6VR1980	152-0283-00			SEMICOND DEVICE:ZENER,0.4W,43V,5%	12954	DZ750903B1N976B

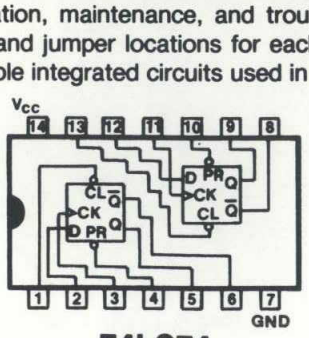
Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A7	----- -----			CKT BOARD ASSY:LOW VOLTAGE REGULATOR		
A7C1810	290-0905-00			CAP.,FXD,ELCTLT:100UF,+50-10%,100V	0000M	290-0905-00
A7C1812	290-0906-00			CAP.,FXD,ELCTLT:100UF,+30-10%,50V	0000M	290-0906-00
A7C1840	290-0927-00			CAP.,FXD,ELCTLT:330UF,20%,35V	0000M	290-0927-00
A7C1844	290-0926-00			CAP.,FXD,ELCTLT:3300UF,+30-10%,35V	0000M	290-0926-00
A7C1850	290-0803-00			CAP.,FXD,ELCTLT:6.8UF,20%,20V	80009	290-0803-00
A7C1870	290-0909-00			CAP.,FXD,ELCTLT:3300UF,+30-10%,16V	0000M	290-0909-00
A7C1900	290-0909-00			CAP.,FXD,ELCTLT:3300UF,+30-10%,16V	0000M	290-0909-00
A7C1901	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
A7C1926	290-0536-00			CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
A7CR1810	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A7CR1812	152-0758-00			SEMICOND DEVICE:RECT,BRIDGE,70V,1.5A	0000M	152-0758-00
A7CR1818	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A7CR1819	152-0460-00			SEMICOND DEVICE:SILICON,25V,1MA	04713	1N5299
A7CR1840	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A7CR1842	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A7CR1844	152-0758-00			SEMICOND DEVICE:RECT,BRIDGE,70V,1.5A	0000M	152-0758-00
A7CR1870	152-0758-00			SEMICOND DEVICE:RECT,BRIDGE,70V,1.5A	0000M	152-0758-00
A7CR1900	152-0758-00			SEMICOND DEVICE:RECT,BRIDGE,70V,1.5A	0000M	152-0758-00
A7CR1918	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A7CR1925	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A7CR1926	152-0759-00			SEMICOND DEVICE:RECT,SCHOTTRY,1A,50V 10DQ	0000M	152-0759-00
A7L1926	108-1034-00			COIL,RF:FIXED,250UH	0000M	108-1034-00
A7Q1816	151-0668-00			TRANSISTOR:NPN,SI,TO-92	0000M	151-0668-00
A7Q1818	151-0677-00			TRANSISTOR:NPN,SI,TO-220 2SC1983	0000M	151-0677-00
A7Q1920	151-1095-00			TRANSISTOR:SILICON,PNP	0000M	151-1095-00
A7Q1925	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A7R1816	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A7R1817	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A7R1818	321-0362-00			RES.,FXD,FILM:57.6K OHM,1%,0.125W	91637	MFF1816G57601F
A7R1819	321-0348-00			RES.,FXD,FILM:41.2K OHM,1%,0.125W	91637	MFF1816G41201F
A7R1822	321-0389-00			RES.,FXD,FILM:110K OHM,1%,0.125W	91637	MFF1816G11002F
A7R1824	321-0377-00			RES.,FXD,FILM:82.5K OHM,1%,0.125W	91637	MFF1816G82501F
A7R1836	315-0472-00			RES.,FXD,CMPSN:4.7K OHM,5%,0.25W	01121	CB4725
A7R1848	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A7R1850	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A7R1864	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A7R1865	321-0247-00			RES.,FXD,FILM:3.65K OHM,1%,0.125W	91637	MFF1816G36500F
A7R1868	311-1740-01			RES.,VAR,NONWW:TRMR,1K OHM,20%,0.5W	0000M	311-1740-01
A7R1873	----- -----			RESISTOR:4.31K OHM,1%,0.25W		
	----- -----			(NOT AVAILABLE AT THIS PRINTING)		
A7R1875	321-0292-03			RES.,FXD,FILM:10.7K OHM,0.25%,0.125W	91637	MFF1816D10701C
A7R1900	321-0316-03			RES.,FXD,FILM:19.1K OHM,0.25%,0.125W	91637	MFF1816D19101C
A7R1905	321-0290-00			RES.,FXD,FILM:10.2K OHM,1%,0.125W	91637	MFF1816G10201F
A7R1916	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A7R1920	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A7R1921	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A7R1923	321-0197-00			RES.,FXD,FILM:1.1K OHM,1%,0.125W	91637	MFF1816G11000F
A7R1925	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	91637	MFF1816G24900F
A7R1926	315-0683-00			RES.,FXD,CMPSN:68K OHM,5%,0.25W	01121	CB6835
A7U1824	156-1423-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	156-1423-00
A7U1876	156-1423-00			MICROCIRCUIT,LI:DUAL OPNL AMPL	0000M	156-1423-00
A7VR1834	152-0265-00			SEMICOND DEVICE:ZENER,0.4W,24V,5%	04713	SZG35009K8
A7VR1848	152-0317-00			SEMICOND DEVICE:ZENER,0.25W,6.2V,5%	04713	SZG20012
A7VR1852	152-0217-00			SEMICOND DEVICE:ZENER,0.4W,8.2V,5%	04713	SZG20

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A8	----- -----			CKT BOARD ASSY:DC-DC CONVERTER		
A8C2000	290-0911-00			CAP.,FXD,ELCTLT:220UF,+30-10%,50V	0000M	290-0911-00
A8C2004	290-0820-00			CAP.,FXD,ELCTLT:2.2UF,+75-10%,50V	0000M	290-0820-00
A8C2224	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A8C2226	281-0773-00			CAP.,FXD,CER DI:0.01UF,10%,100V	04222	GC70-1C103K
A8CR2000	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A8CR2006	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A8CR2008	152-0327-00			SEMICOND DEVICE:SIG,SI,BAX13	0000M	152-0327-00
A8CR2222	152-0066-00			SEMICOND DEVICE:SILICON,400V,750MA	14433	LG4016
A8CR2230	152-0759-00			SEMICOND DEVICE:RECT,SCHOTTRY,1A,50V,10DQ	0000M	152-0759-00
A8Q2002	151-0220-00			TRANSISTOR:SILICON,PNP	07263	S036228
A8Q2224	151-0671-00			TRANSISTOR:NPN,SI,TO-220 2SC1983	0000M	151-0671-00
A8Q2225	152-0671-00			SEMICOND DVC,DI:ZEN,SI,47V,5%,1W	0000M	152-0671-00
A8Q2226	151-0671-00			TRANSISTOR:NPN,SI,TO-220 2SC1983	0000M	151-0671-00
A8Q2227	151-0671-00			TRANSISTOR:NPN,SI,TO-220 2SC1983	0000M	151-0671-00
A8Q2230	151-1087-00			TRANSISTOR:SILICON,NPN	0000M	151-1087-00
A8R2000	315-0223-00			RES.,FXD,CMPSN:22K OHM,5%,0.25W	01121	CB2235
A8R2002	315-0221-00			RES.,FXD,CMPSN:220 OHM,5%,0.25W	01121	CB2215
A8R2004	315-0152-00			RES.,FXD,CMPSN:1.5K OHM,5%,0.25W	01121	CB1525
A8R2006	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A8R2010	311-2093-00			RE.,VAR,NONWW:TRMR,100 OHM,10%,0.5W	0000M	311-2093-00
A8R2012	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A8R2222	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
A8R2224	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A8R2225	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A8R2226	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A8R2227	315-0220-00			RES.,FXD,CMPSN:22 OHM,5%,0.25W	01121	CB2205
A8R2230	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A8R2232	315-0104-00			RES.,FXD,CMPSN:100K OHM,5%,0.25W	01121	CB1045
A8S1804	260-1980-00			SWITCH,SLIDE:DPDT,10A,125V,HI/LOW	82389	EPS2-PC1
A8S1806	260-1980-01			SWITCH,SLIDE:DPDT,10A,125V,MKD 115V/230V	000FJ	4021.1913
A8T2222	120-0852-00			XFMR,TOROID:2 WINDINGS	80009	120-0852-00
A8VR2002	152-0697-00			SEMICOND DVC,DI:ZEN,SI,5V,0.4W	0000M	152-0697-00
A8VR2230	152-0590-00			SEMICOND DEVICE:ZENER,18V,5% AT 7MA	80009	152-0590-00
A9	----- -----			CKT BOARD ASSY:CONTROL		
A9DS1394	150-1081-00			LT EMITTING DIO:RED		
A9R1093	311-2086-00			RES.,VAR,NONWW:PNL,2 X 20K,10%,0.1W	0000M	311-2086-00
A9R1380	311-2086-00			RES.,VAR,NONWW:PNL,2 X 20K,10%,0.1W	0000M	311-2086-00
A9R1504	311-2086-00			RES.,VAR,NONWW:PNL,2 X 20K,10%,0.1W	0000M	311-2086-00

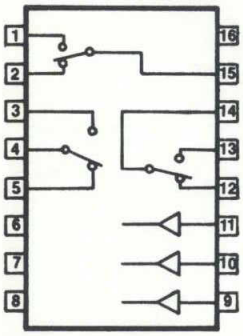
Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
				CHASSIS PARTS		
C50	283-0329-00			CAP.,FXD,CER DI:0.39PF,10%,500V	0000M	283-0329-00
DS3560	150-0196-00			LAMP,INCAND:14V,80MA,BASE	0000M	150-0196-00
DS3562	150-0196-00			LAMP,INCAND:14V,80MA,BASE	0000M	150-0196-00
DS3564	150-0196-00			LAMP,INCAND:14V,80MA,BASE	0000M	150-0196-00
DS3566	150-0196-00			LAMP,INCAND:14V,80MA,BASE	0000M	150-0196-00
F1800(1)	159-0179-00			FUSE,CARTRIDGE:0.4A,250V,SLOW	0000M	159-0179-00
F1800(2)	159-0180-00			FUSE,CARTRIDGE:0.2A	0000M	159-0180-00
J1A	131-0106-00			CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
J1B	131-0106-00			CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
J50	131-0106-00			CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
J260	131-0106-00			CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
J1172	136-0387-00			JACK,TIP:GRAY	71279	450-4352-01-0318
J2000	129-0103-00			POST,BDG,ELEC:ASSEMBLY	80009	129-0103-00
J2001	136-0490-00			JACK,TIP:BANANA JACK ASSY	80009	136-0490-00
J2002	136-0491-00			JACK,TIP:BANANA JACK ASSY	80009	136-0491-00
L1A	276-0569-00			CORE,EM:TOROID,FERRITE,0.12 OD X 0.07 ID	78488	57-9660
L1B	276-0569-00			CORE,EM:TOROID,FERRITE,0.12 OD X 0.07 ID	78488	57-9660
L1990	108-0799-03			COIL,TUBE DEFL:TRACE ROTATION	0000M	108-0799-03
LR858	108-0807-00			COIL,RF:8.5UH	80009	108-0807-00
LR868	108-0807-00			COIL,RF:8.5UH	80009	108-0807-00
Q1834	151-0671-00			TRANSISTOR:NPN,SI,TO-220	0000M	151-0671-00
Q1858	151-0671-00			TRANSISTOR:NPN,SI,TO-220	0000M	151-0671-00
Q1882	151-0671-00			TRANSISTOR:NPN,SI,TO-220	0000M	151-0671-00
Q1916	151-0671-00			TRANSISTOR:NPN,SI,TO-220	0000M	151-0671-00
R1	323-0085-00			RES.,FXD,FILM:75 OHM,1%,0.50W	91637	MFF1226G75R00F
R50	315-0101-00			RES.,FXD,CMPSN:100 OHM,5%,0.25W	01121	CB1015
R175	311-1485-01			RES.,VAR,NONWW:PNL,500 OHM,10%,0.1W	0000M	311-1485-01
R734	311-2085-00			RES.,VAR,NONWW:PNL,2X20K,10%,0.1W,10%,0.5W	0000M	311-2085-00
R1682	311-2087-00			RES.,VAR,NONWW:PNL,5K OHM,20%,0.5W	0000M	311-2087-00
R1698	311-1998-00			RES.,VAR,NONWW:PNL,10K OHM,0.1W,LINER	0000M	311-1998-00
R3570	311-2087-00			RES.,VAR,NONWW:PNL,5K OHM,20%,0.5W	0000M	311-2087-00
S1	260-2008-00			SWITCH,TOGGLE:SPDT,6A,125VAC	0000M	260-2008-00
S175	----- -----			(FUNISHED AS A UNIT WITH R175)		
S200	260-0834-00			SWITCH,TOGGLE:DPDT,5A,125VAC,0.25-40 THD	09353	U21-SHZQE
S1800	260-2009-00			SWITCH,TOGGLE:4SPDT,6A,125VAC	0000M	260-2009-00
S1801	260-1728-00			SWITCH:4P3T	0000M	260-1728-00
T1806	120-1316-00			XFRM,POWER,STPDN:	80009	120-1316-00
U1990	119-0711-00			POWER SUPPLY:2KV AC P-P IN,10KV DC OUT	0000M	119-0711-00
V1990	154-0837-00			ELECTRON TUBE:CRT(381)	0000M	154-0837-00

SERVICING ILLUSTRATIONS

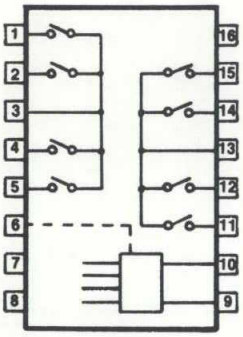
Information contained in this section serves as an aid to the service technician who performs the calibration, maintenance, and troubleshooting procedures. Included are illustrations showing the adjustment and jumper locations for each circuit board. Also included are functional diagrams for commercially-available integrated circuits used in this instrument.



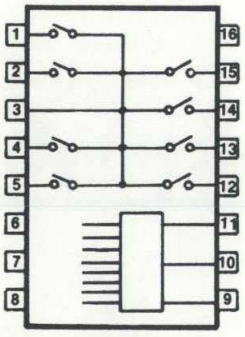
74LS74



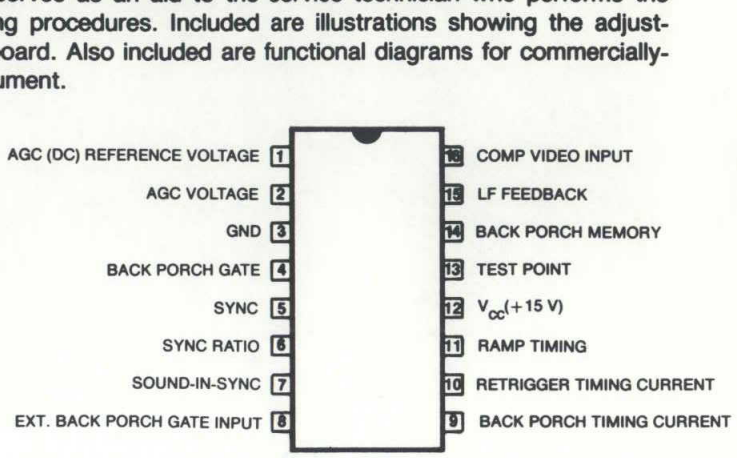
4053



4052



4051



155-0144-00

4053 TRUTH TABLE

Control Inputs		ON Switches
	Select	
Inhibit	A, B or C	A, B or C
0	0	0
0	1	1
1	x	None

x = Don't Care

4052 TRUTH TABLE

Control Inputs			ON Switches	
	Select			
Inhibit	B	A	x	y
0	0	0	0	0
0	0	1	1	1
0	1	0	2	2
0	1	1	3	3
1	x	x	None	

4051 TRUTH TABLE

Control Inputs				ON Switches
	Select			
Inhibit	C	B	A	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	x	x	x	None

3421-49

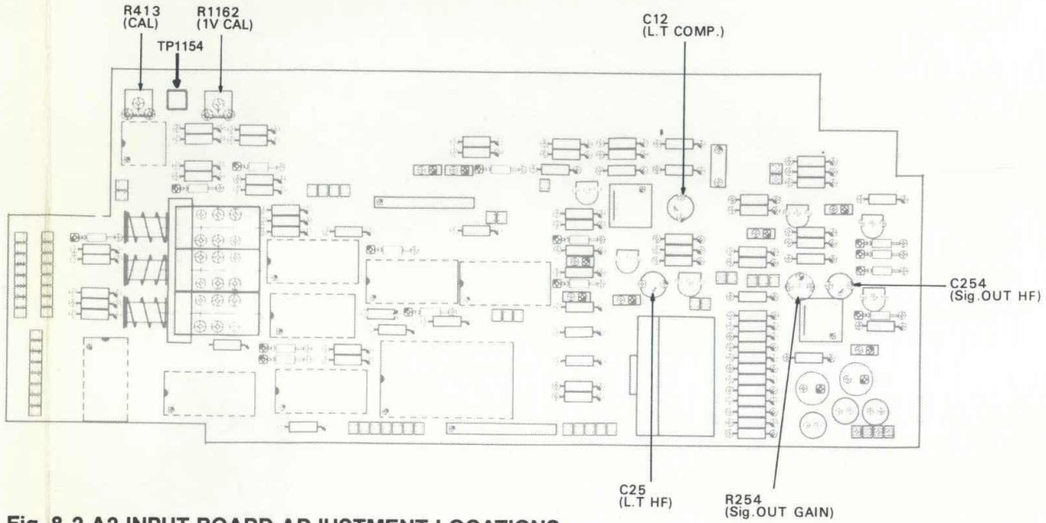


Fig. 8-2 A2 INPUT BOARD ADJUSTMENT LOCATIONS

3422-26

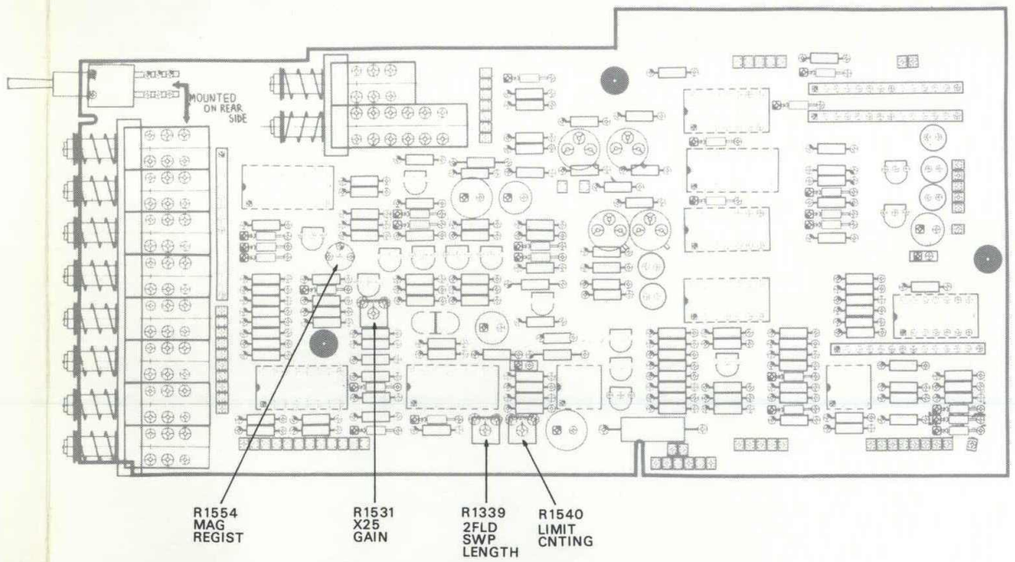


Fig. 8-3 A3 SWEEP BOARD ADJUSTMENT LOCATIONS

3422-27

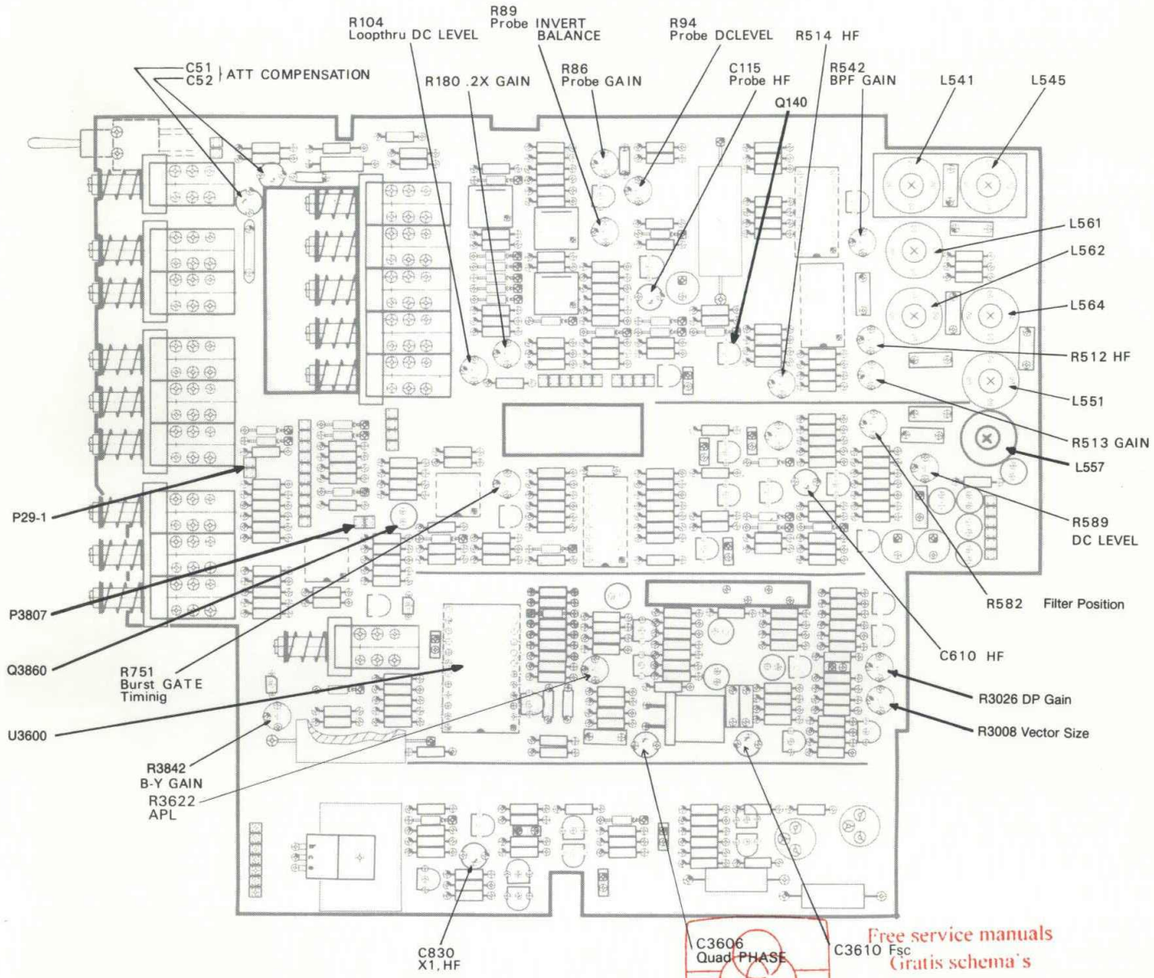


Fig. 8-1 A1 MAIN BOARD ADJUSTMENT LOCATIONS

3422-25

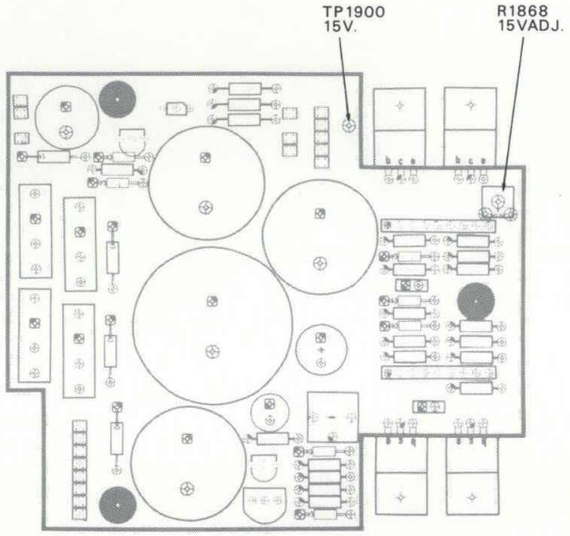


Fig. 8-6 A7 LV BOARD ADJUSTMENT LOCATIONS

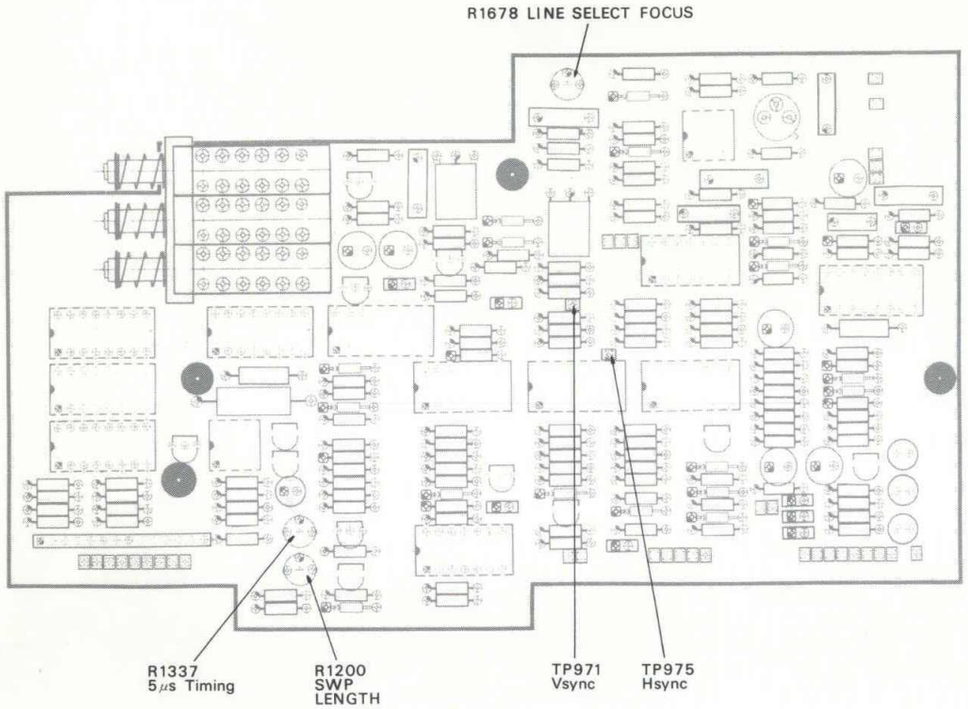


Fig. 8-4 A4 DISPLAY BOARD ADJUSTMENT LOCATIONS

3422-28

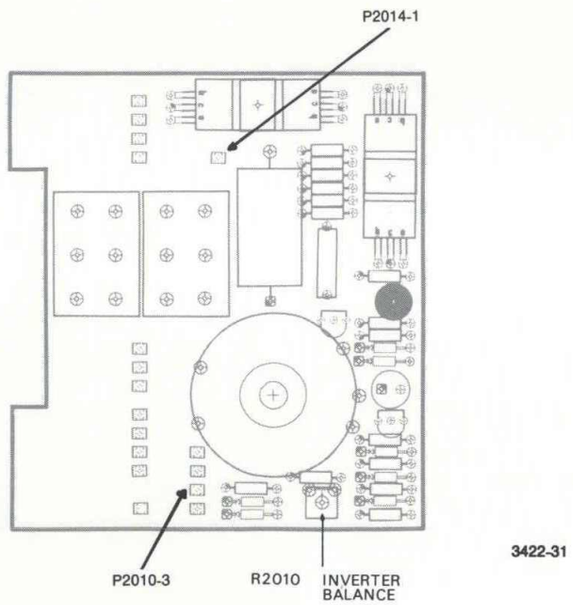


Fig. 8-7 A8 DC-DC CONVERTER BOARD ADJUSTMENT LOCATIONS

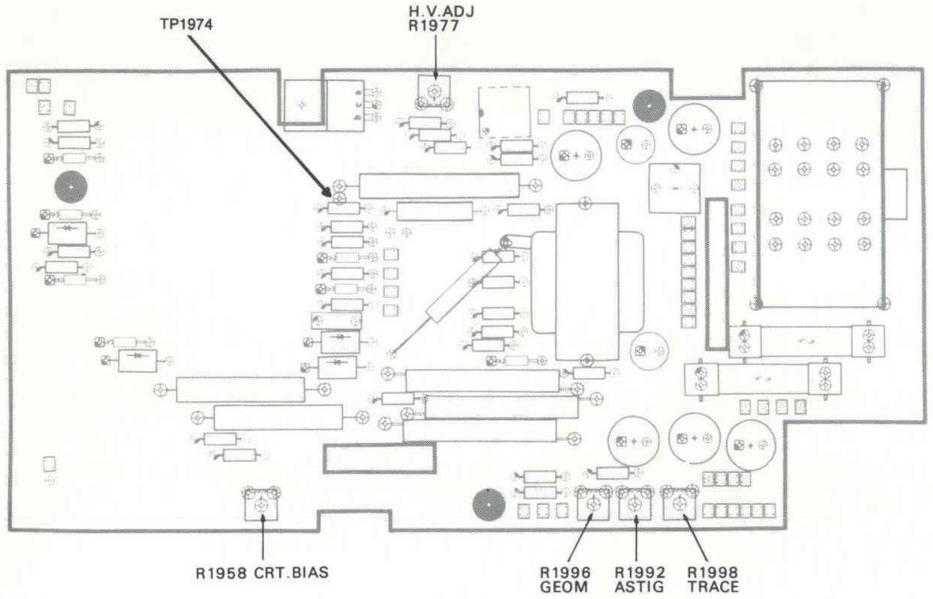


Fig. 8-5 A6 HV BOARD ADJUSTMENT LOCATIONS

3422-29

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

Y14.15, 1966	Drafting Practices.
Y14.2, 1973	Line Conventions and Lettering.
Y10.5, 1968	Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

American National Standard Institute
1430 Broadway
New York, New York 10018

Component Values

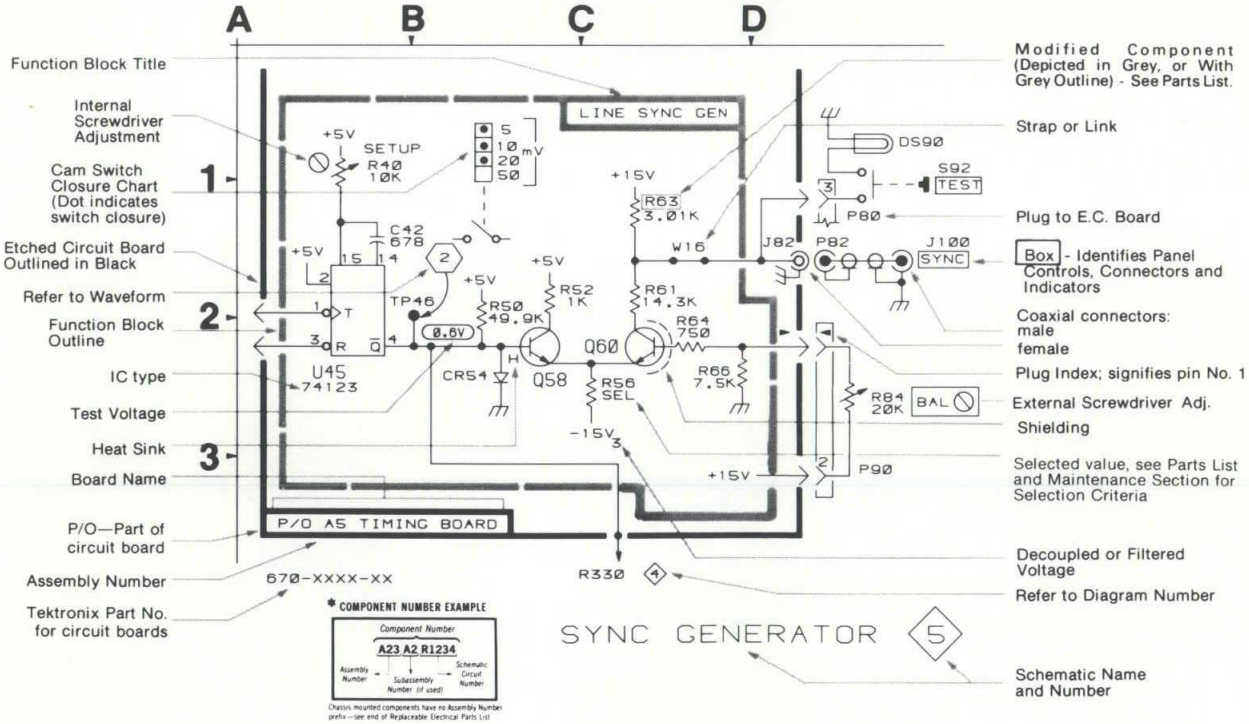
Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF). Values less than one are in microfarads (μF).
Resistors = Ohms (Ω).

The information and special symbols below may appear in this manual.

Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number *(see following illustration for constructing a component number).



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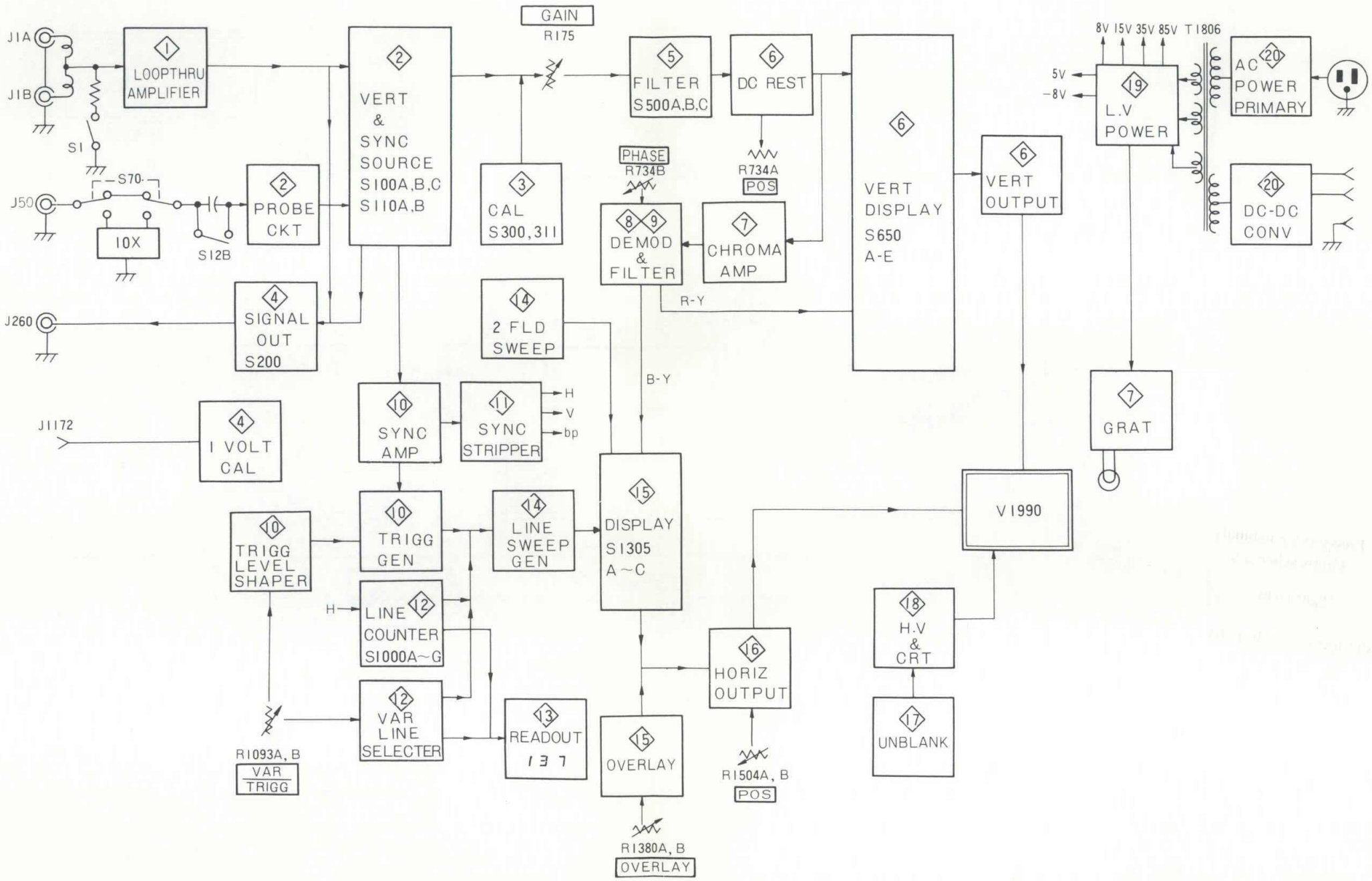
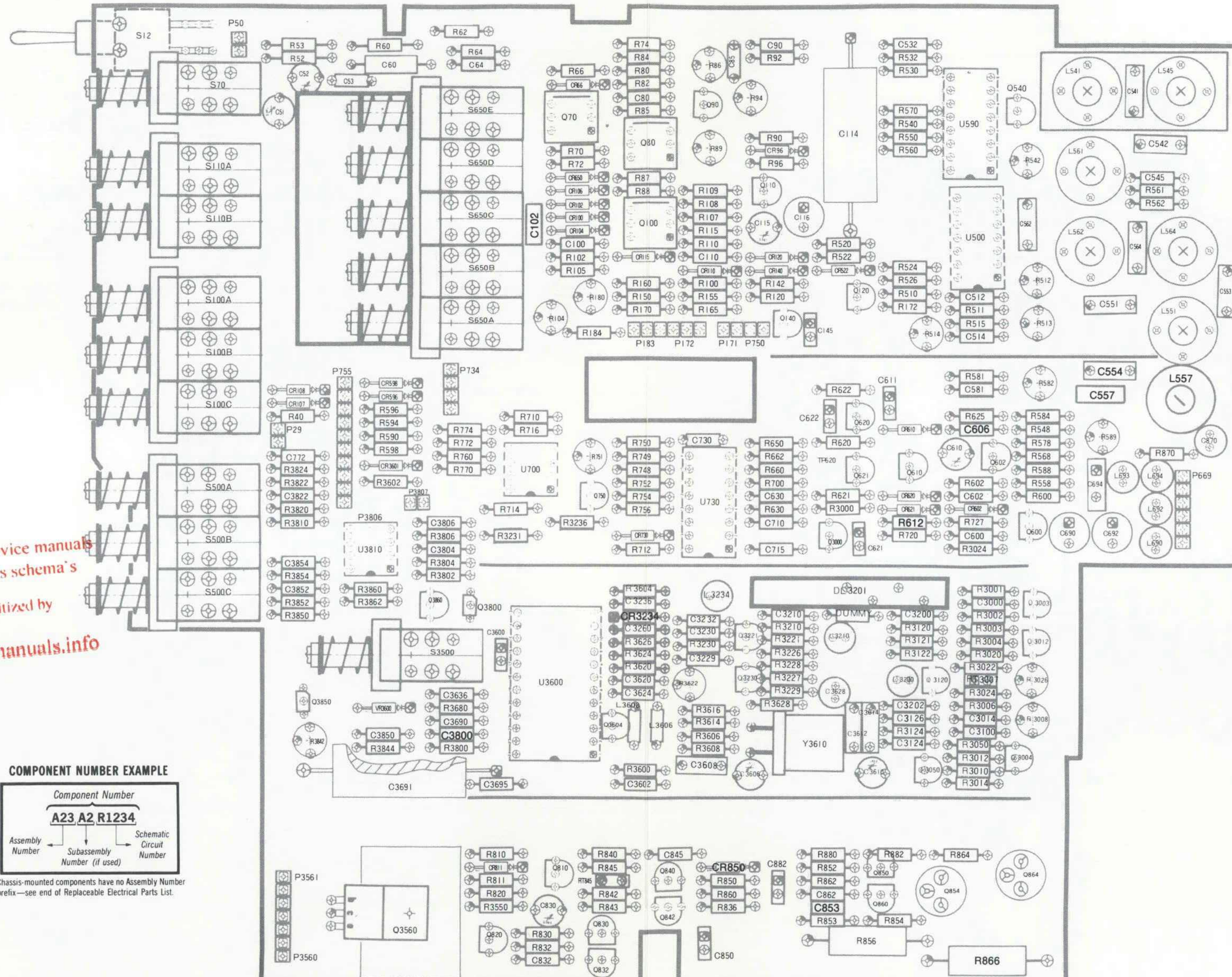


381

3422 - 70

BLOCK DIAGRAM



COMPONENT NUMBER EXAMPLE

Component Number

A23 A2 R1234

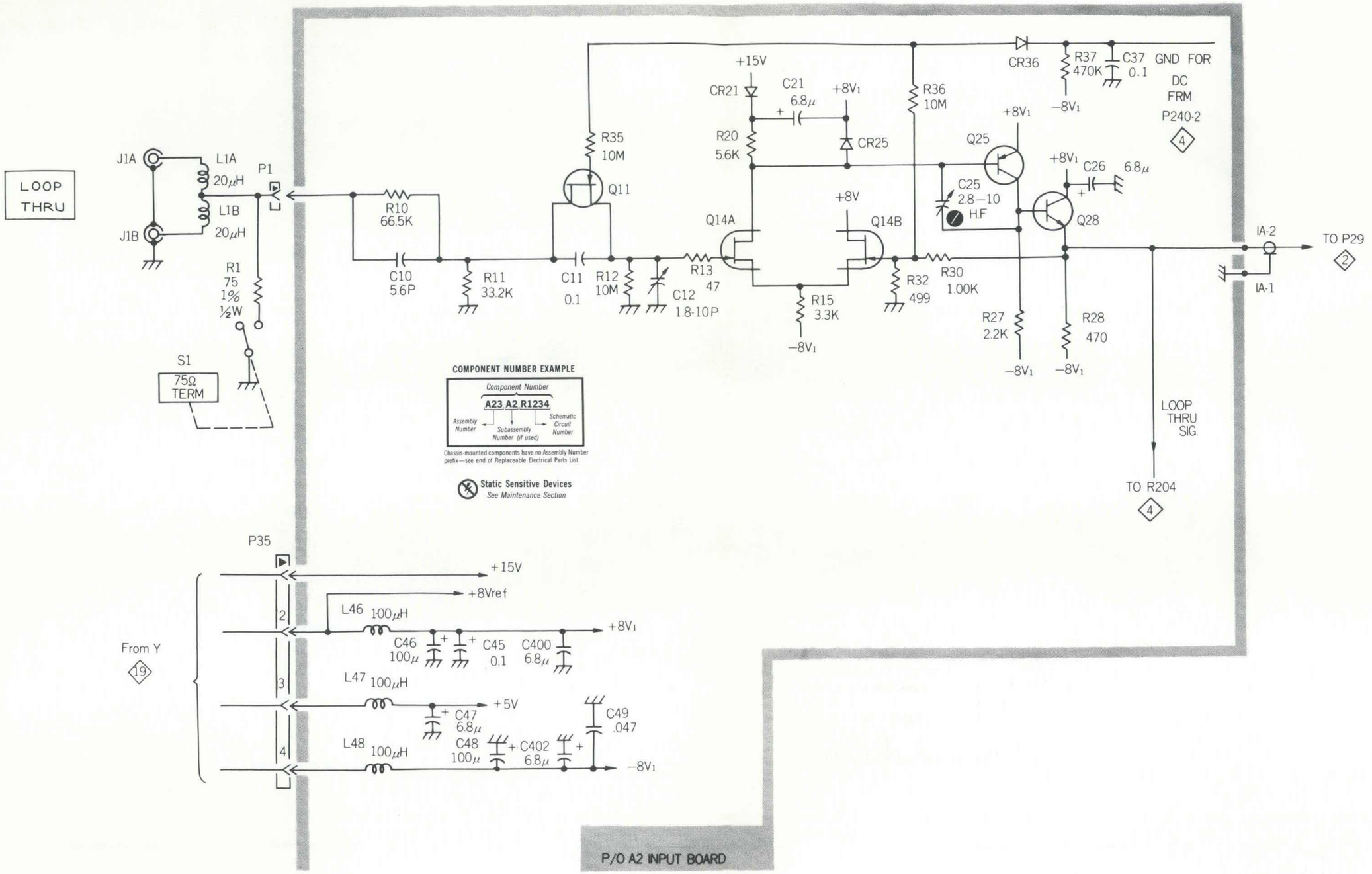
Assembly Number — *Subassembly Number (if used)* — *Schematic Circuit Number*

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section

Fig. 9-1 A1 MAIN BOARD PARTS LOCATIONS

3422-32



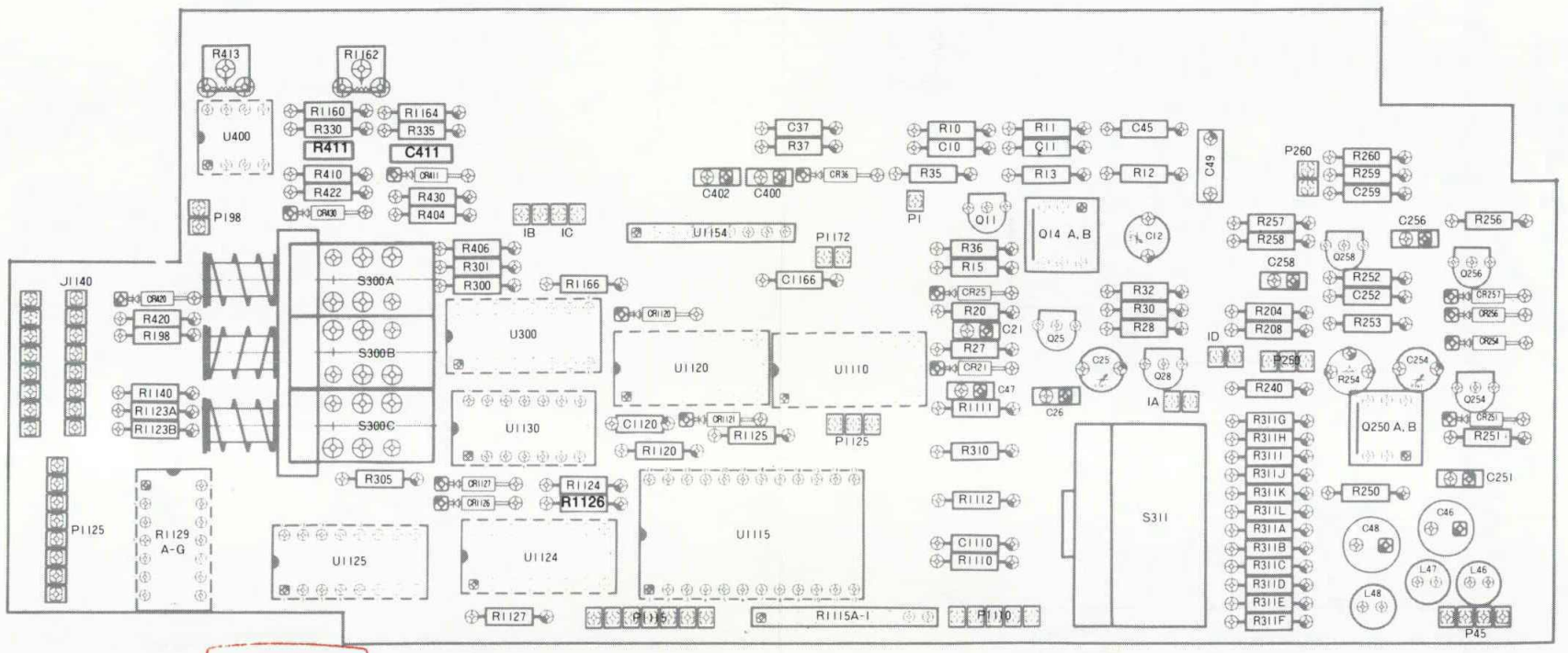
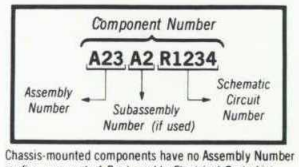


Fig. 9-2 A2 INPUT BOARD PARTS LOCATIONS

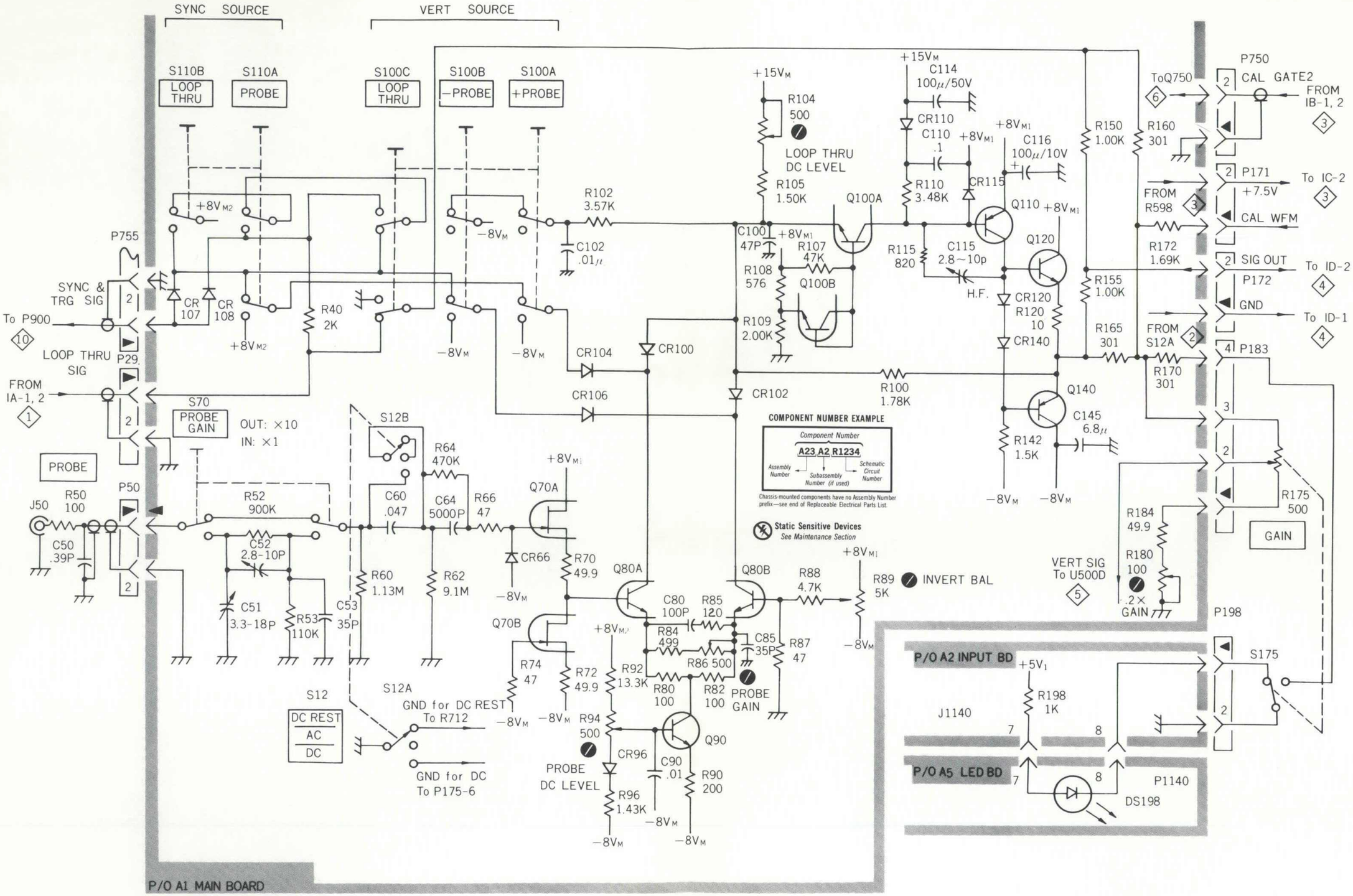
3422-33

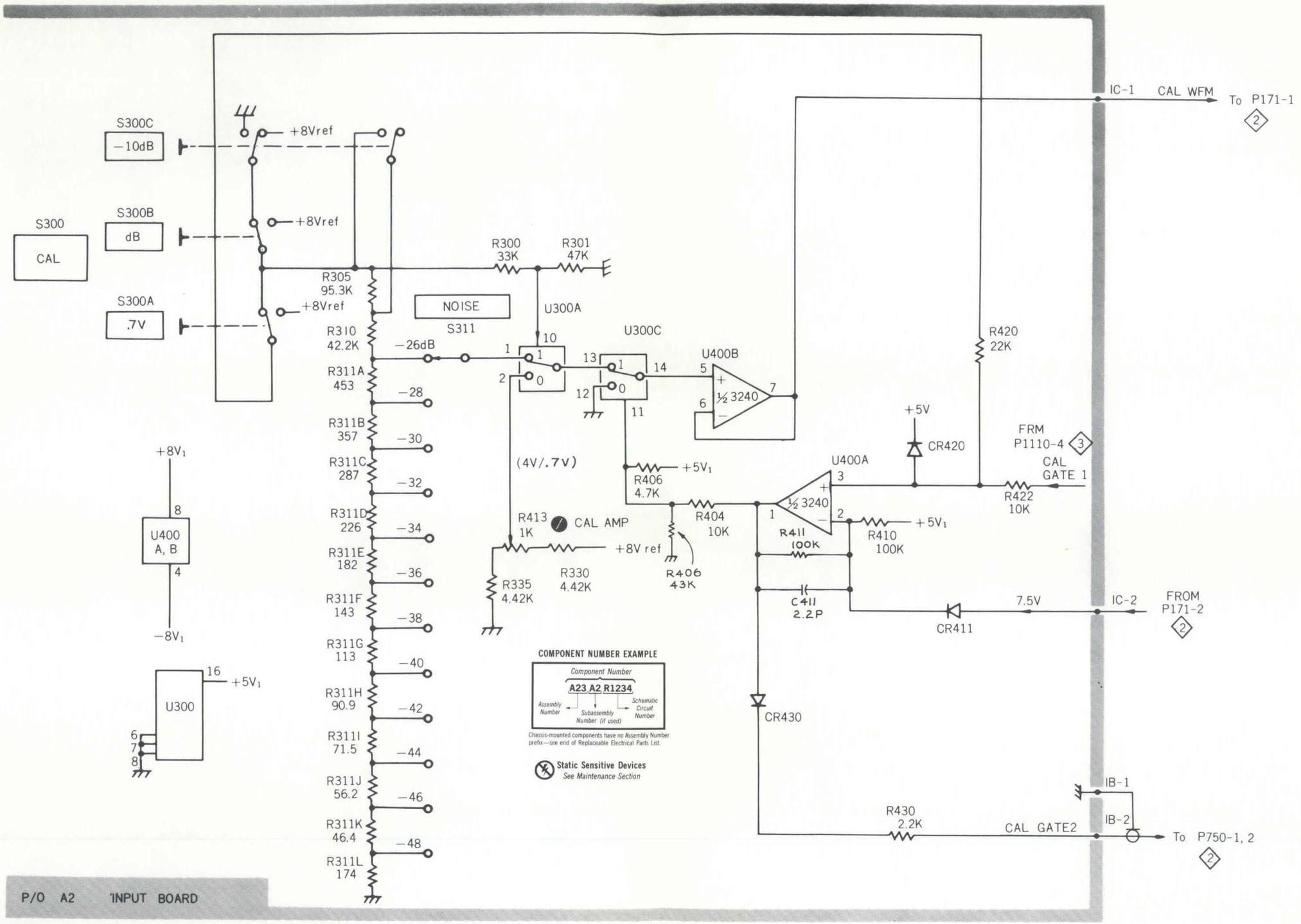
Static Sensitive Devices
See Maintenance Section

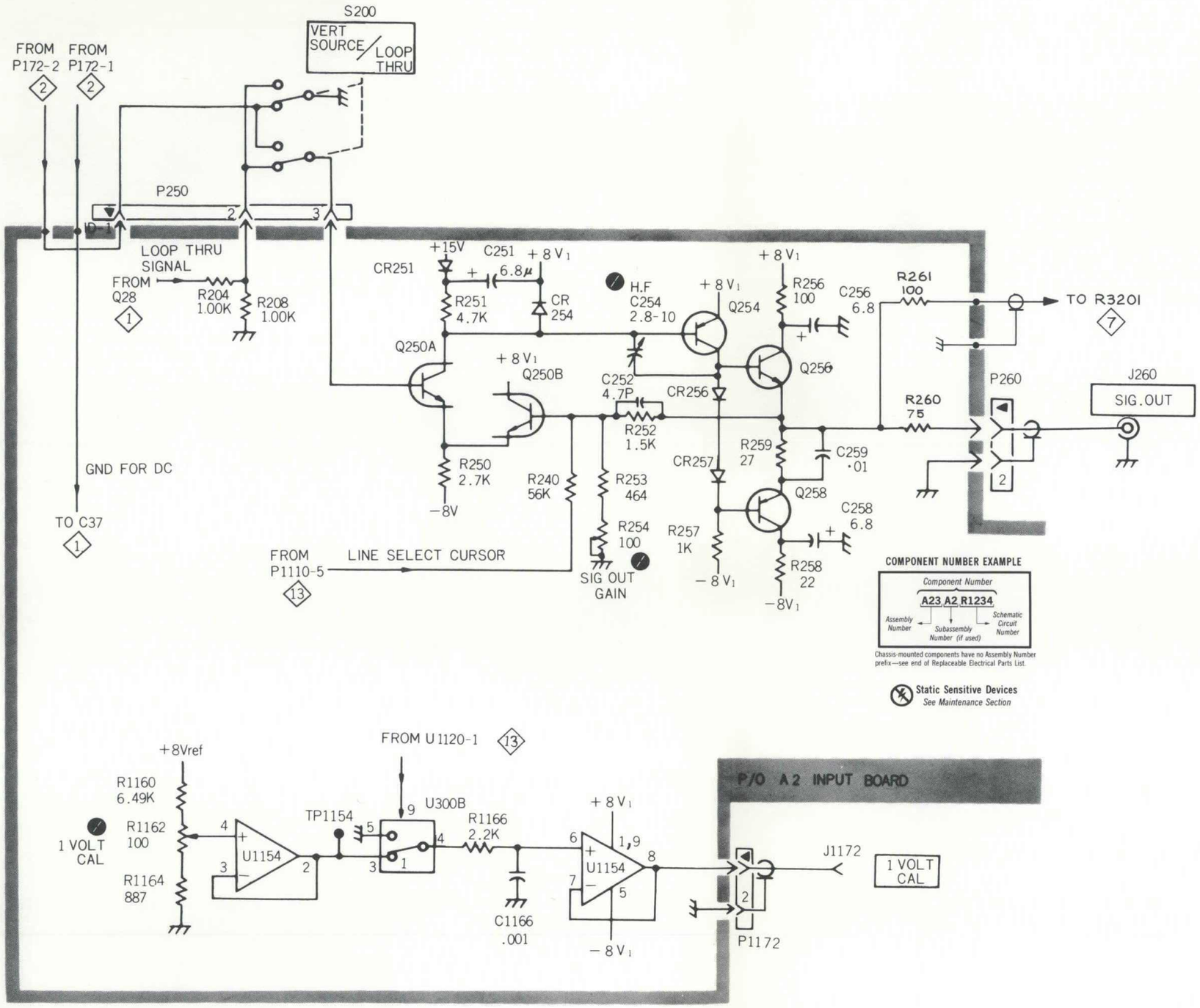
COMPONENT NUMBER EXAMPLE

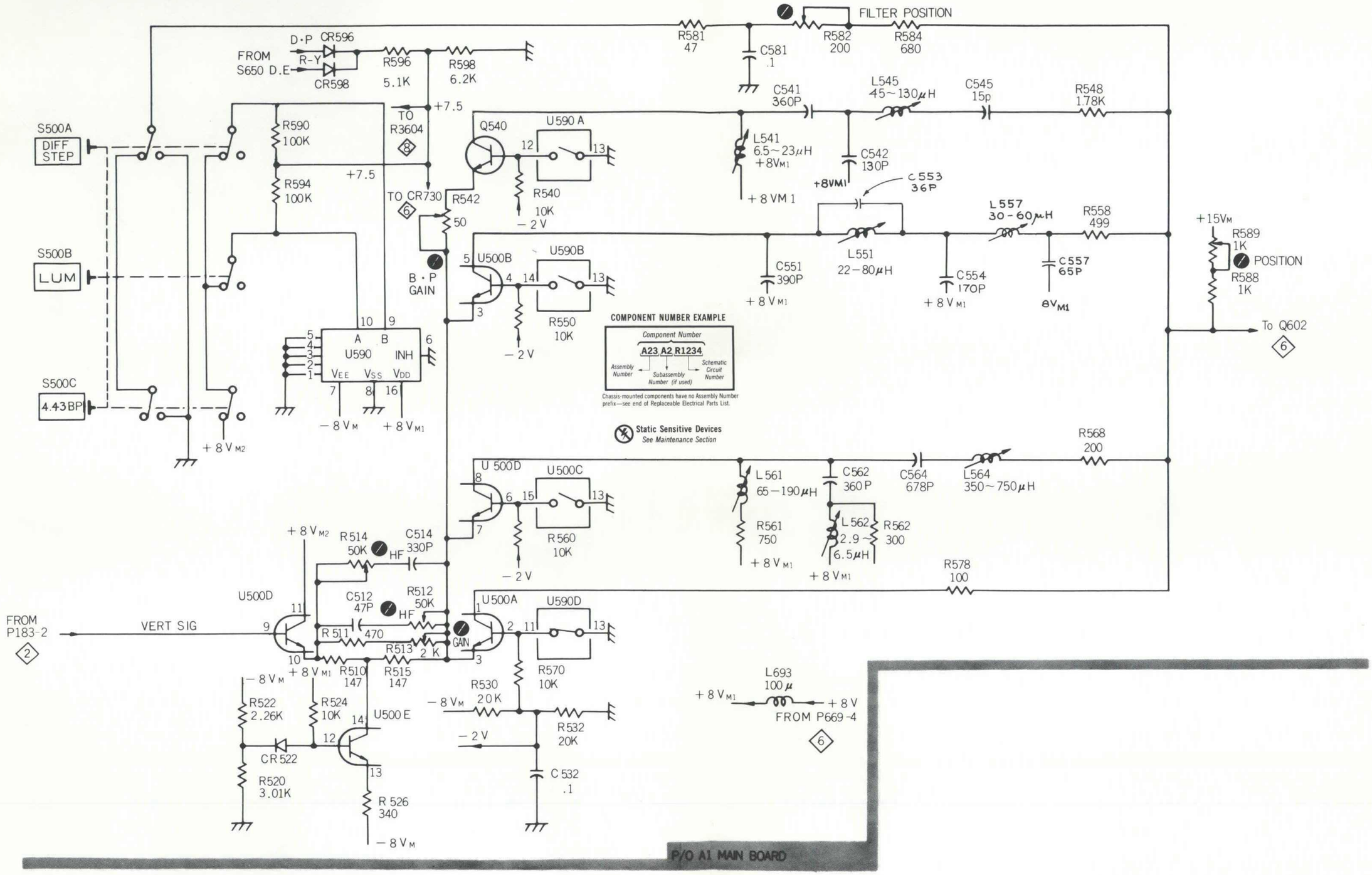


Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

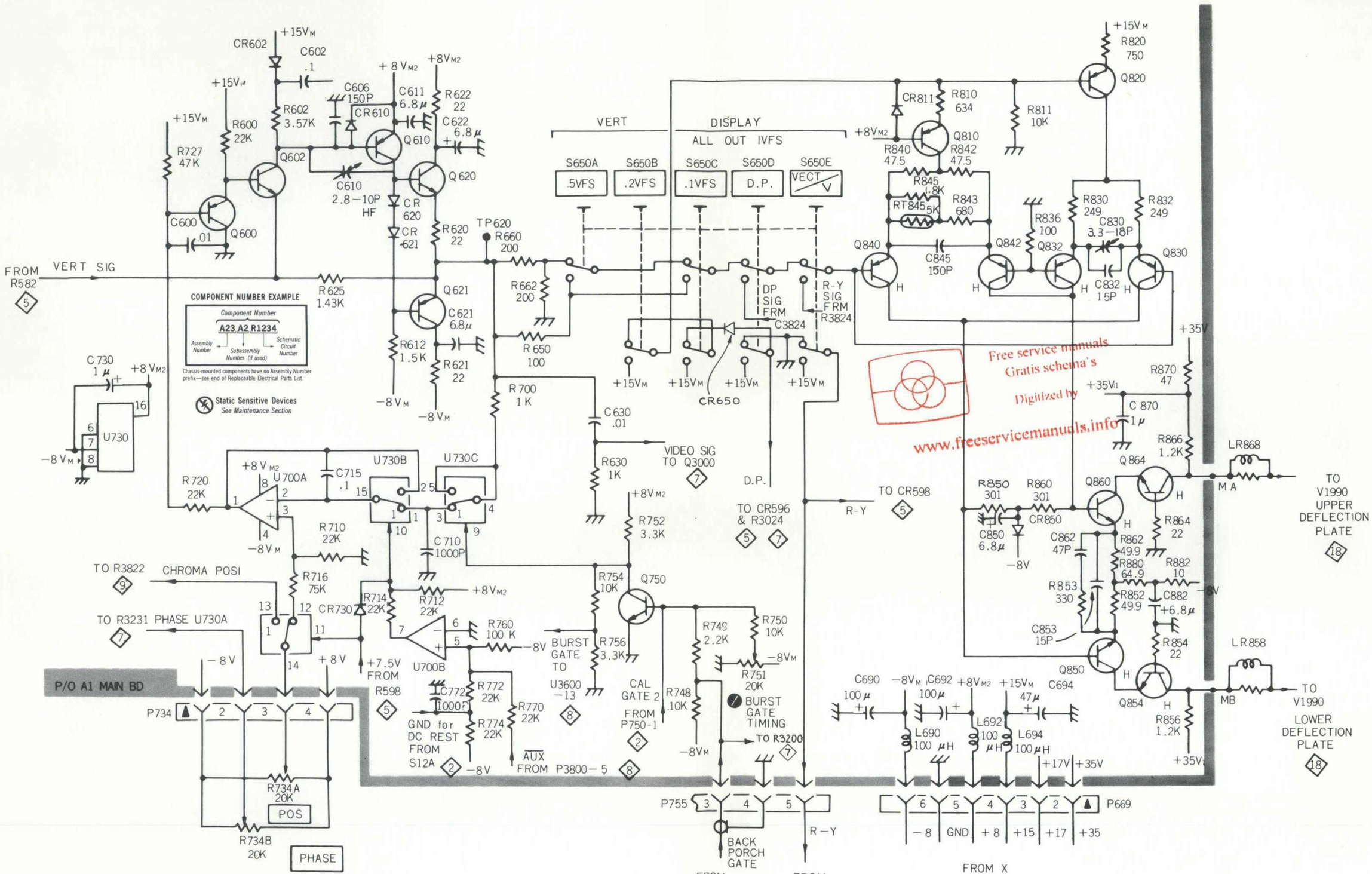


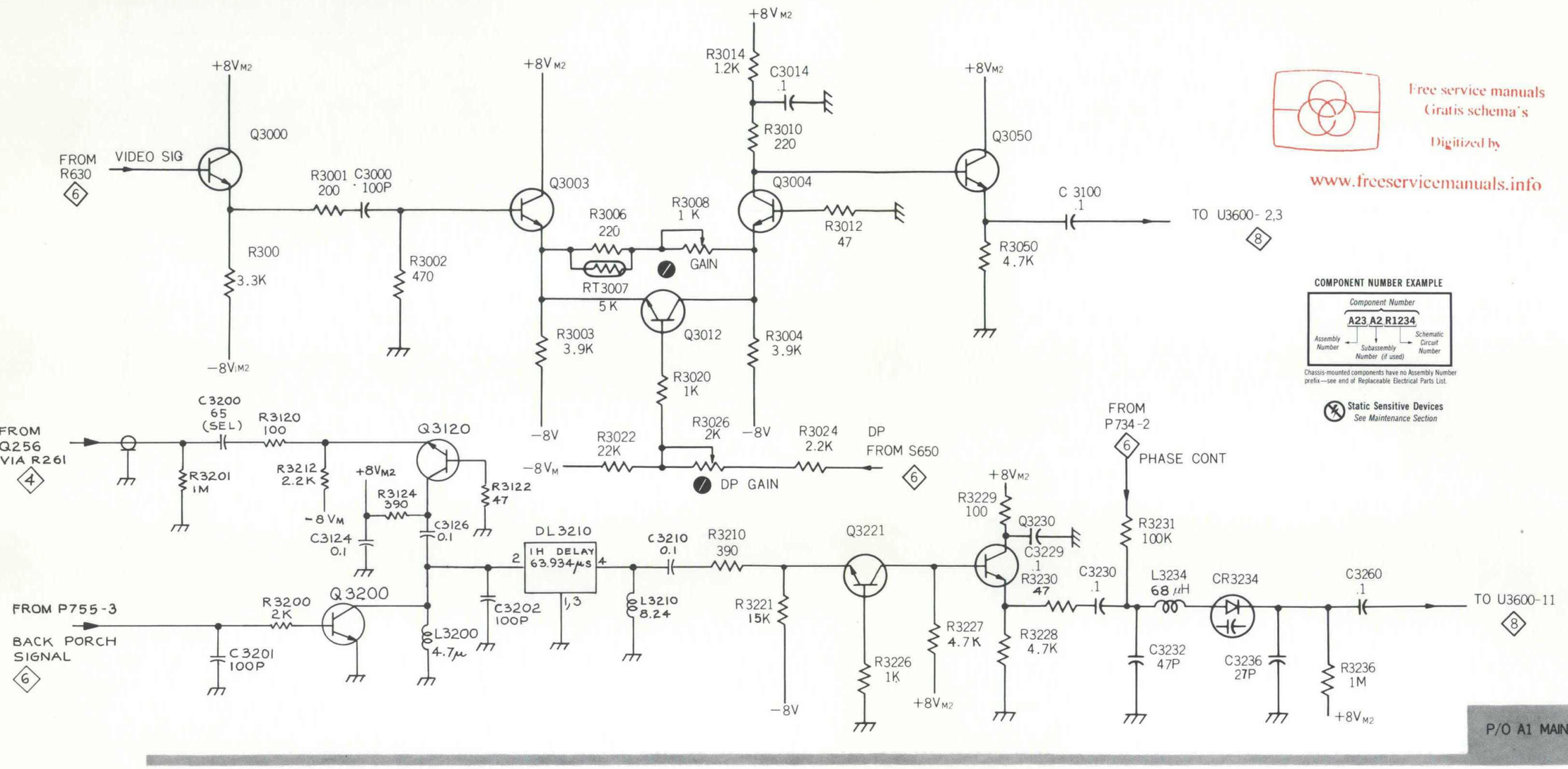


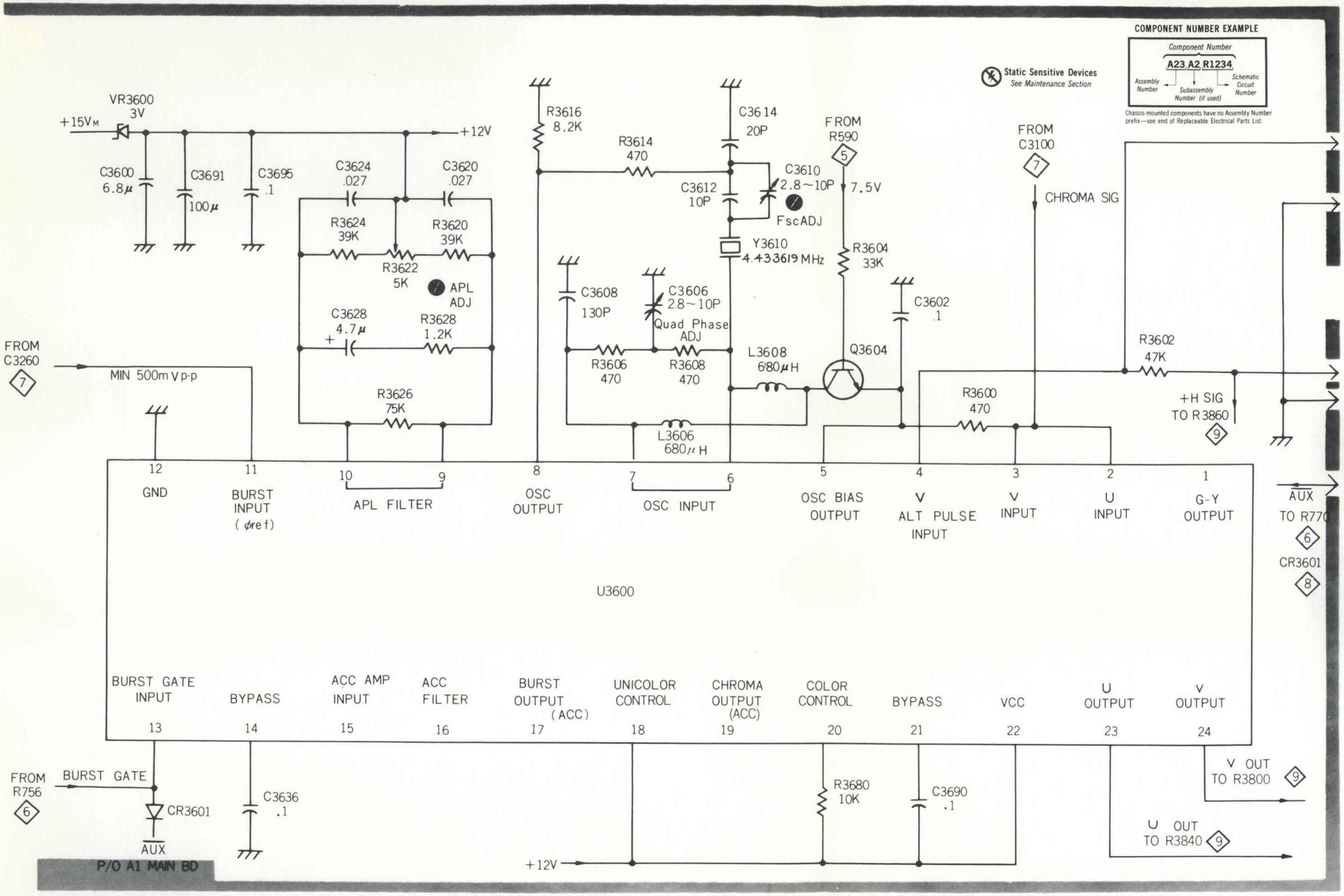


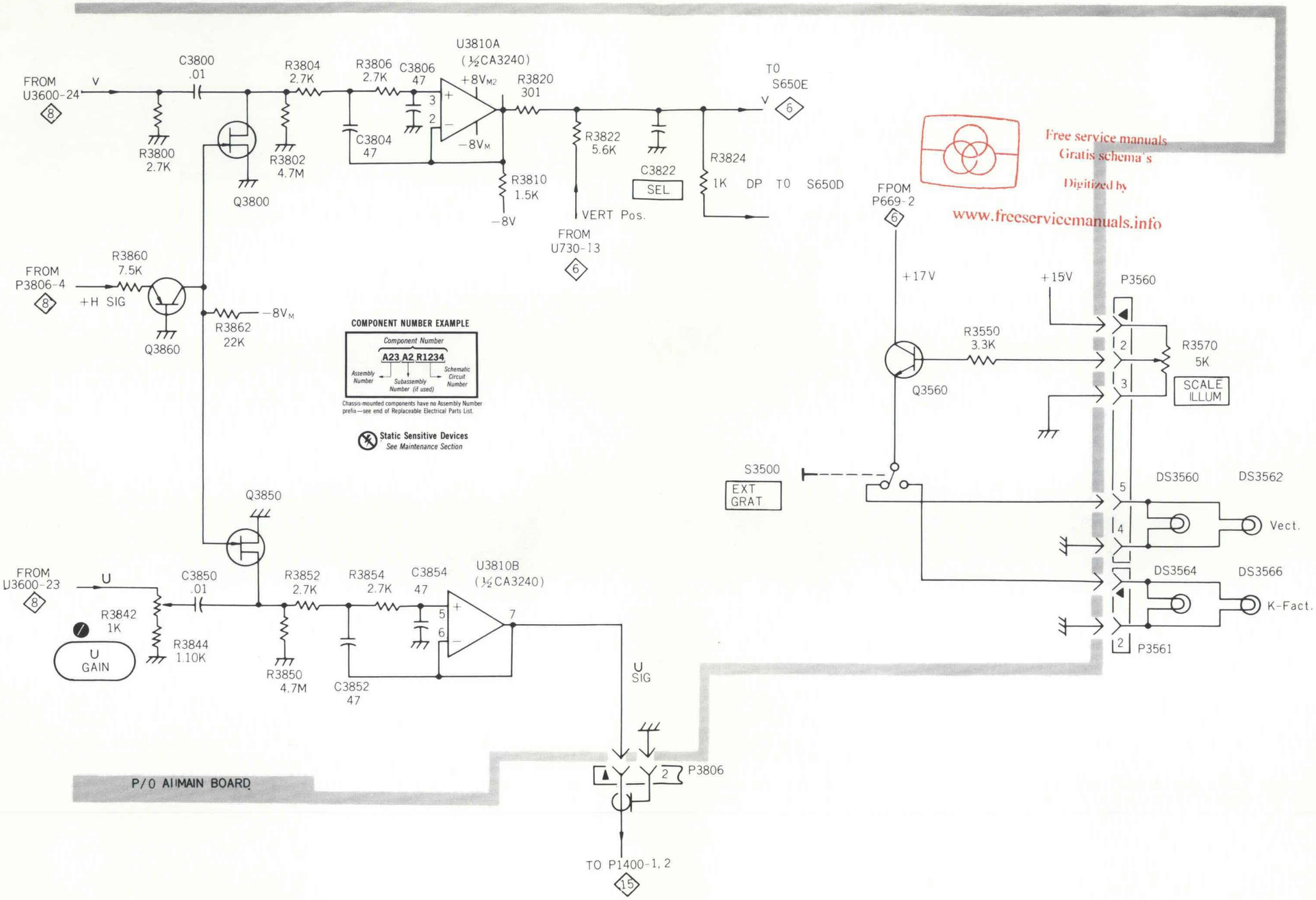


P/O A1 MAIN BOARD









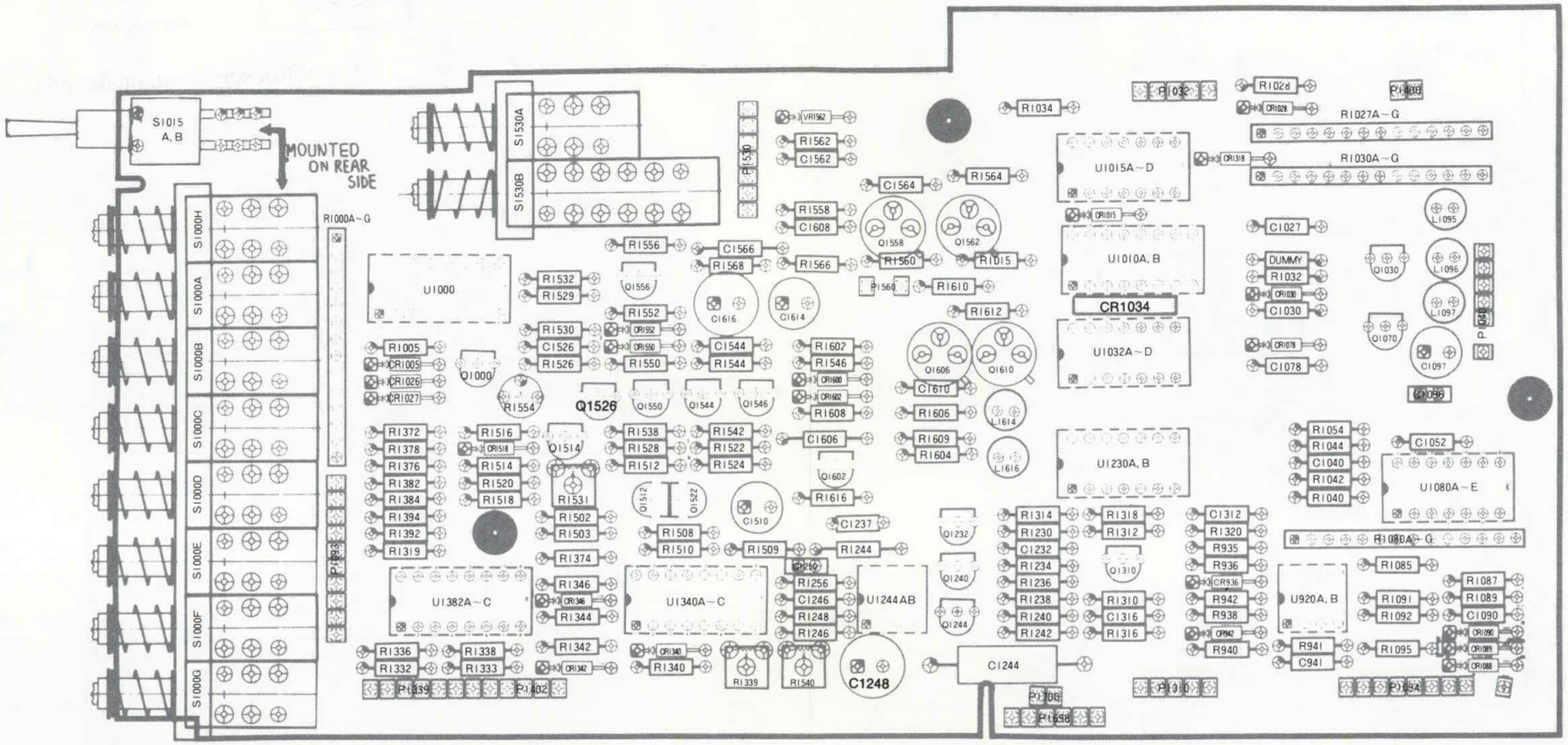
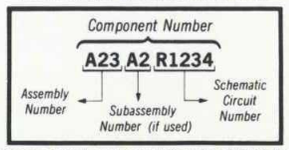


Fig. 9-3 A3 SWEEP BOARD PARTS LOCATIONS

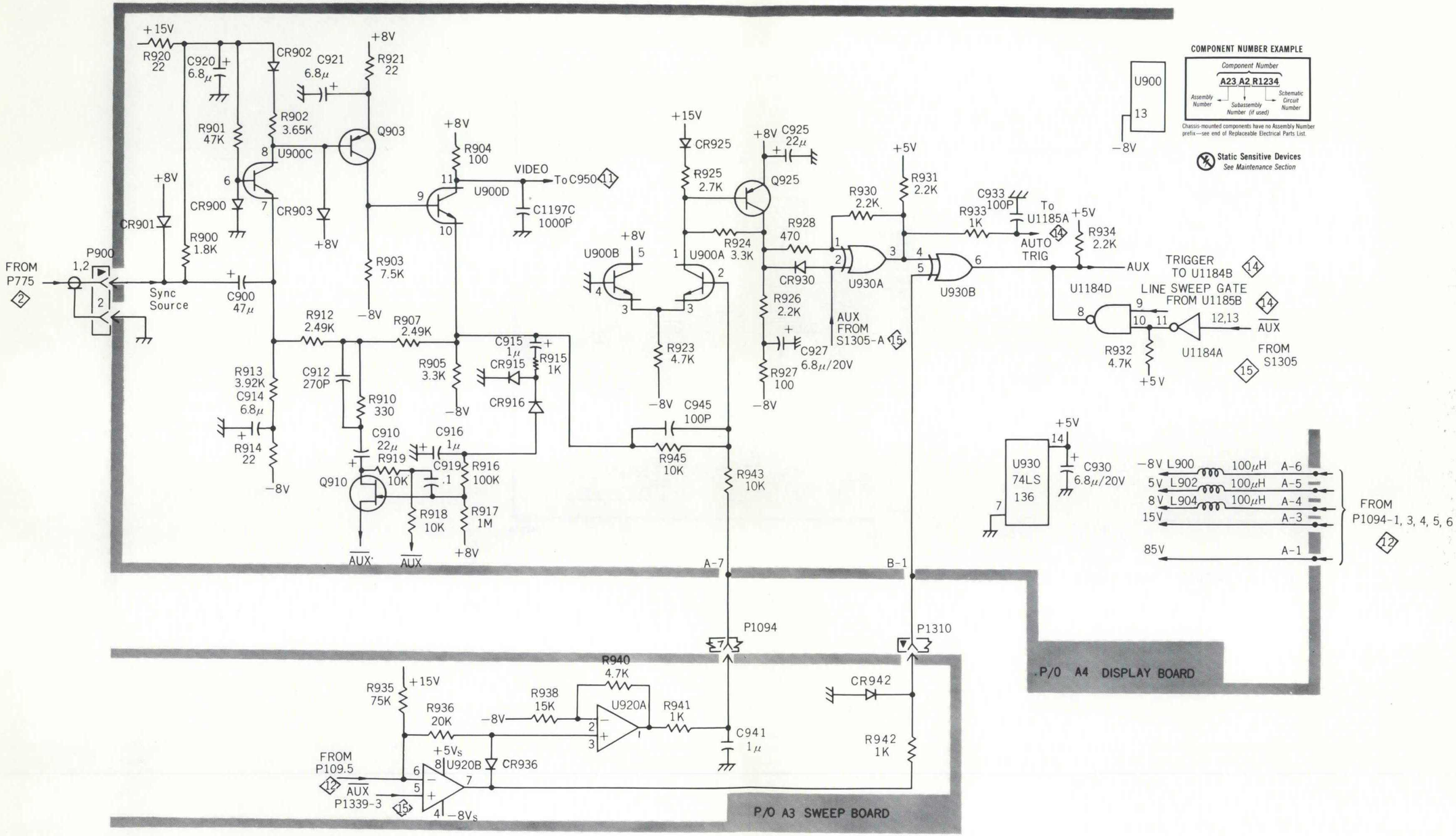
3422-34

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



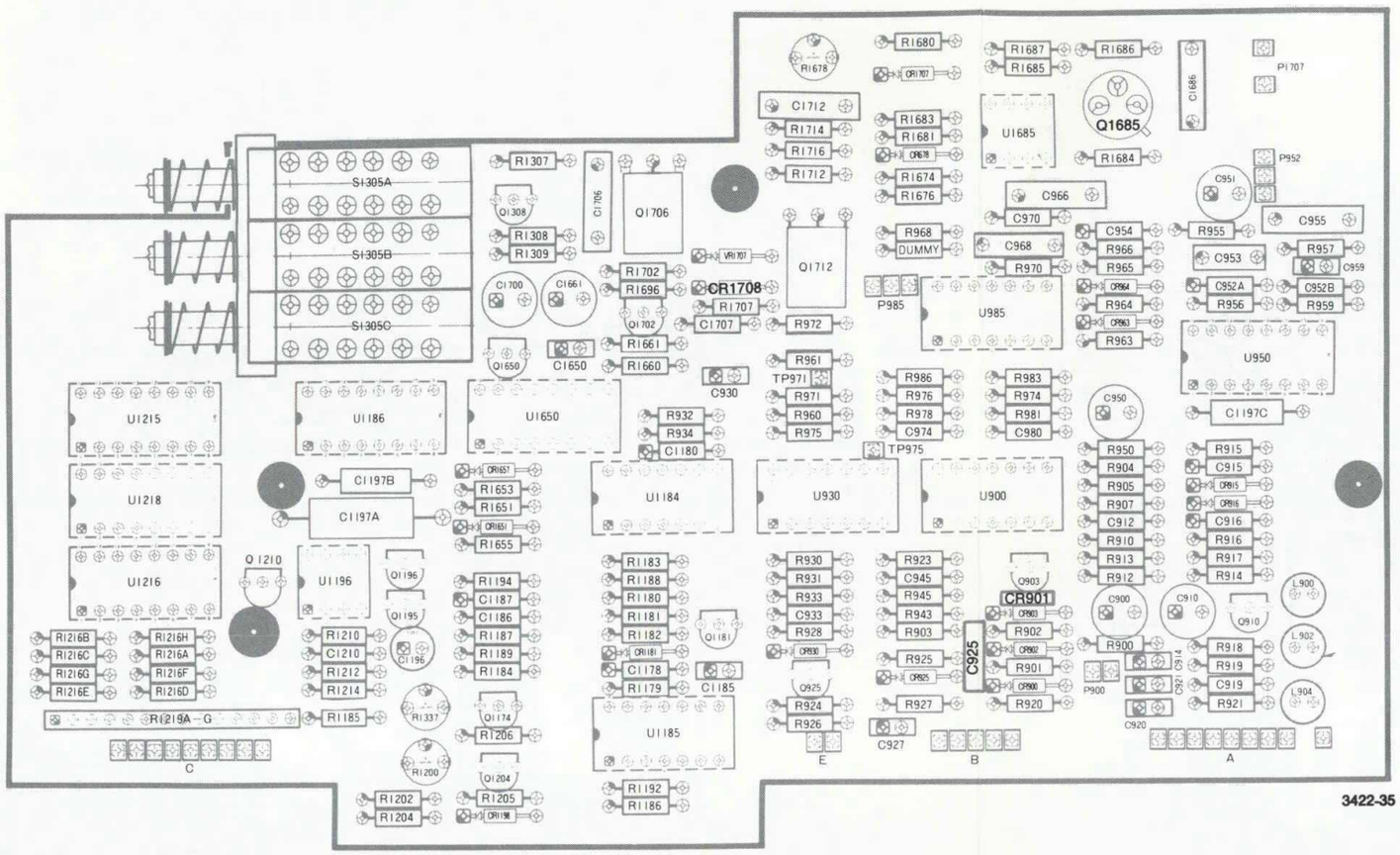


Fig. 9-4 A4 DISPLAY BOARD PARTS LOCATIONS

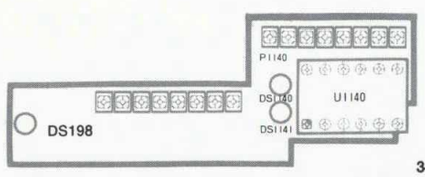
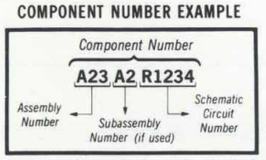


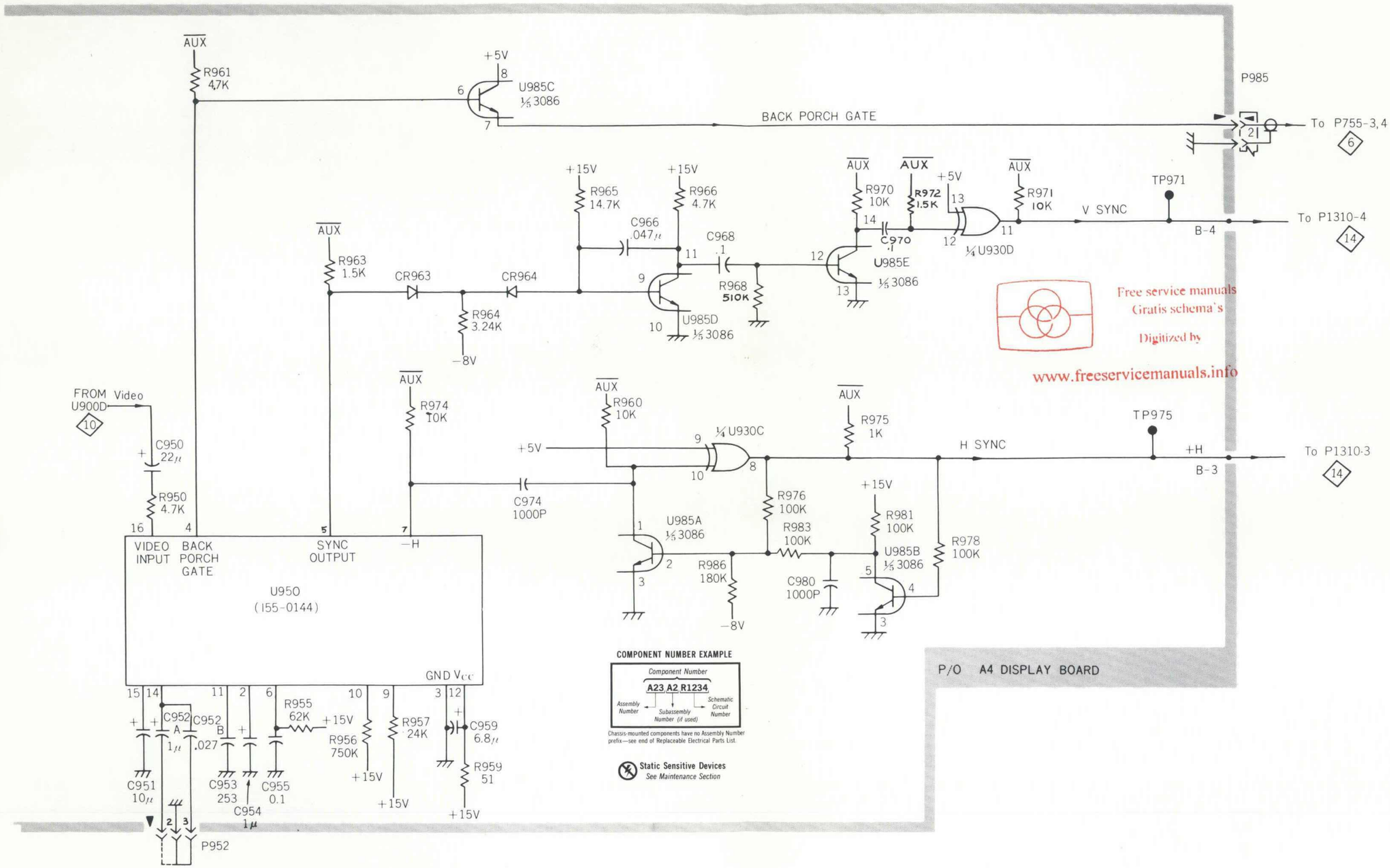
Fig. 9-5 LED BOARD PARTS LOCATIONS

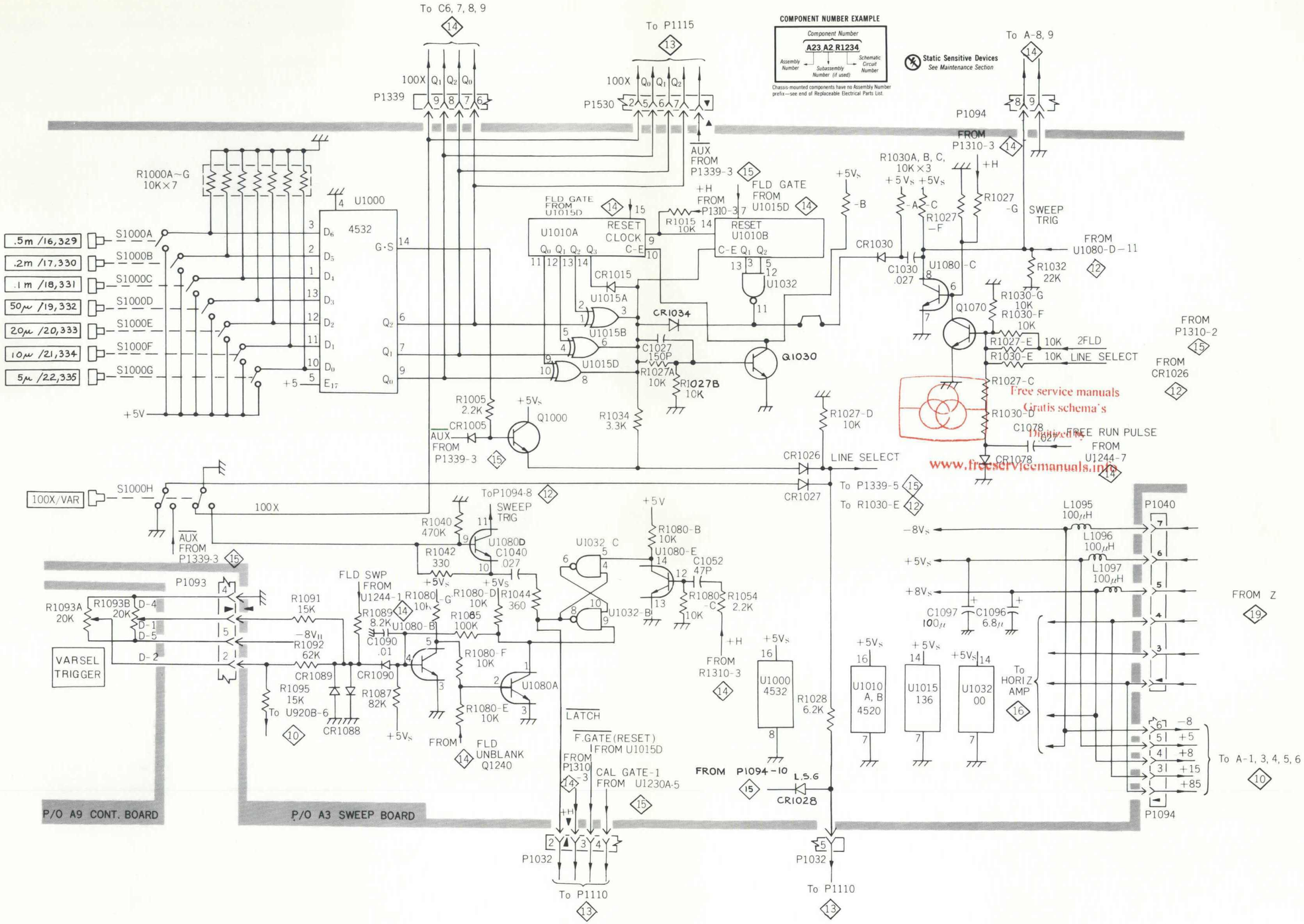
Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.





COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234 (Assembly Number / Subassembly Number (if used) / Schematic Circuit Number)

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices — See Maintenance Section

FROM P1032 <12>

P1110

+5V1 R1115I 10K R1112 10K

+5V1 R1115G 10K R1111 10K

+5V1 R1115H 10K R1110 10K

C1110 150

CAL GATE To R422 <3>

LS CURSOR To R240 <4>

P1125 J1125 ※NOTE

U1110 4022 CLK CLR EN

R1125 1M

U1120 TC5037 CLR SCAN TRF

CR1120 C1120 .018 CR1121 R1120 36K

To U300-9 <4>

U1130D U1130F U1130E

R1124 10K

U1124 4519

U1125 4511 LE BI

R1129 A~G 1.5K×7

U1140

P1125

R1123B 1K R1123A 1K J1140 P1140

R1115B~E 10K×4

R1115A 10K R1126 10K

CR1126

R1115F 10K

CR1127 R1127 100K

P/O A5 LED BD

FROM P1530 <12>

P1115

U1115 μPB417

U1130C U1130B U1130A

U1110 4022

U1130 74LS04

DS1140 DS1141

R1140 1.2K

※NOTE 2-3 Shorted

P/O A2 INPUT BD.

READOUT <13>

COMPONENT NUMBER EXAMPLE

Component Number: A23 A2 R1234 (Assembly Number / Subassembly Number (if used) / Schematic Circuit Number)

Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices See Maintenance Section

TO P1094-10 ⑮

A-10 LINE SWP GATE

+5V R1179 3K C1178 1μ

FROM R933 ⑱

AUTO TRIG

U1188 74121 (B, A1, A2, Q)

U1184C ¼ LS03 R1180 47K

Q1181

CR1181 AUX

C1180 1μ

R1184 2.2K

R1181 47K

R1182 1K

R1183 2.2K

R1206 10K

FROM P1094-8 ⑫

A-8 TRIG

FROM P1094-9 ⑫

A-9

AUX TRIG

FROM U9308 ⑱

U1184B ¼ LS03

R1188 33K

R1189 2.2K

Q1174

Q1204

R1187 2.2K

C1187 1μ

CR11 98

U1186B ⅓ B 4053

R1202 R1200 1K

R1205 68K

4.99K R1204 10.0K

SWP LENGTH

−8V

+8V

To U1650-C ⑰

To CR1657 ⑰ U1184D ⑱

LIVE SWEEP GATE

FROM S1305A ⑮

U1185B ½ LS74

R1192 4.7K

R1194 68K

R1186 2.2K

C1186 .01

Q1195

Q1196

Q1197A 1μ

C1197B .01

U1186C ⅓ 4053

U1186A ⅓ 4053

Q1210

R1210 100

S1305A-R2 SEE ⑮

R1219G 10K

R1185 3.3K

100X

FROM P1339 ⑫

U1196A ½ 3240

5μS TIMING

R1337 2K

U1196B ½ 3240

C1210 1000

R1212 48.7K

R1214 31.6K

C1196 22μ

To P1339-1 ⑮

C1185 6.8μ

U1185 LS74

U1184 LS03

U1186 4053

U1218 4051

U1216 4051

U1215 4053

SWEEP

S1305B-R1 SEE ⑮

S1305C-R1 SEE ⑮

AUX

U1218 4051

U1216 4051

U1215 4053

R1219 A~F 10K×6

R1216A~H

5K 10K 20K 50K 100K 200K 500K 34.8K

TO U 1218

C-8 C-7 C-6

FROM P1339 ⑫

P/O A4 DISPLAY BOARD

S1015A.B R1234 33K FLD2,4 FLD1,3 ALL

Q1232

C1232 .1μ

R1236 10K

R1240 4.7K

R1242 22K

R1238 22K

C1237 .018

R1230 1K

P1310

FROM B-4 ⑫

FROM B-3 ⑫

U1032A ¼ LS00

U1015D

U1230B ½ LS74

Q1240

FLD GATE

To R1314 ⑮ U1010 ⑫ P1032-3 ⑫

To C1078 ⑫

FREE RUN PULSE

U1244B ½ 458

R1256 330K

R1248 27K

C1246 .027

R1246 10K

AUX FROM P1339-3 ⑮

Q1244

C1244 .1

U1244A ½ 458

(NDCPL) +15 V C1250 6.8μ

C1248 100μ

R1244 392K

2FLD SWEEP To R1339 ⑮

To R1089 ⑫

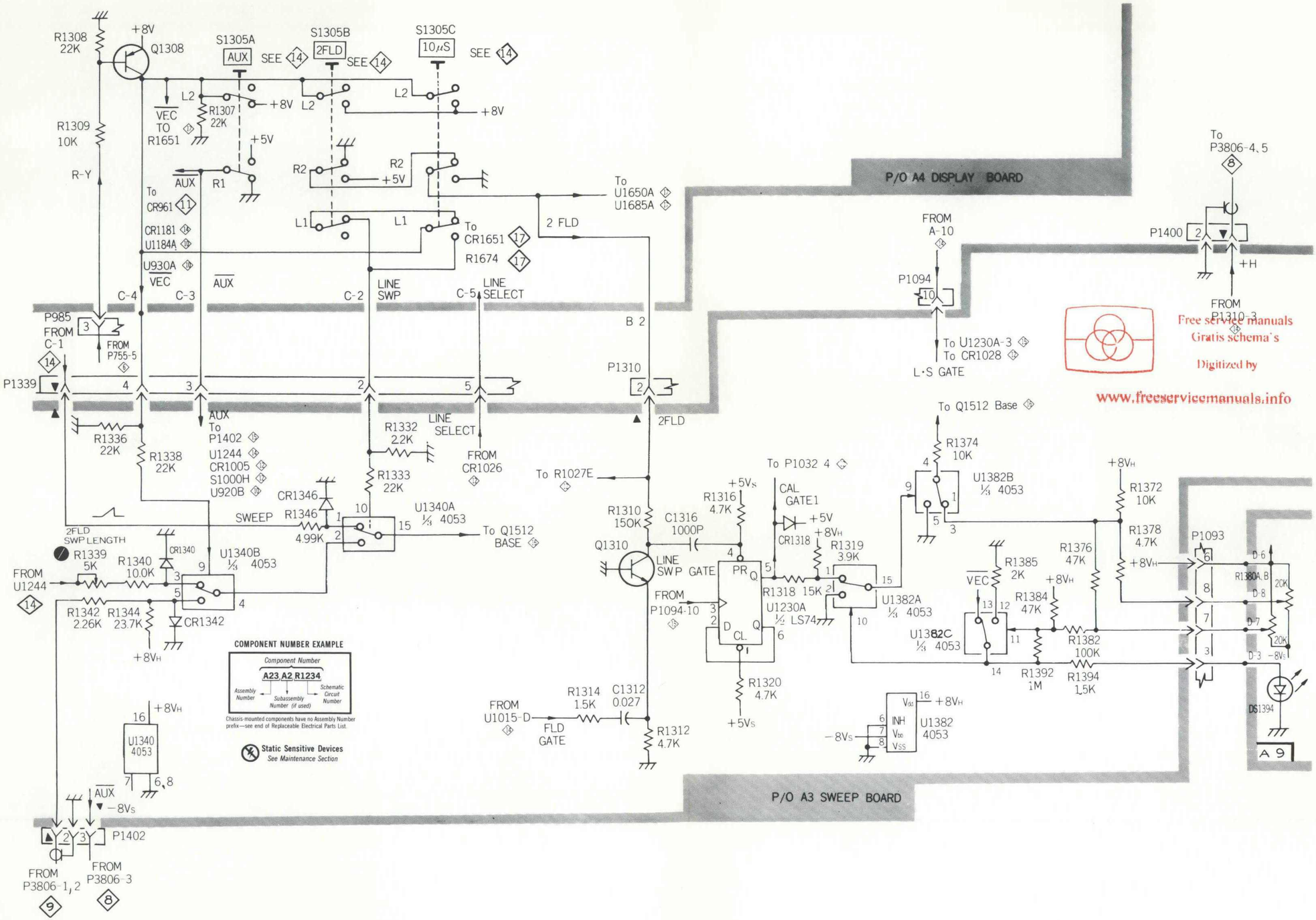
FLD UNBLANK

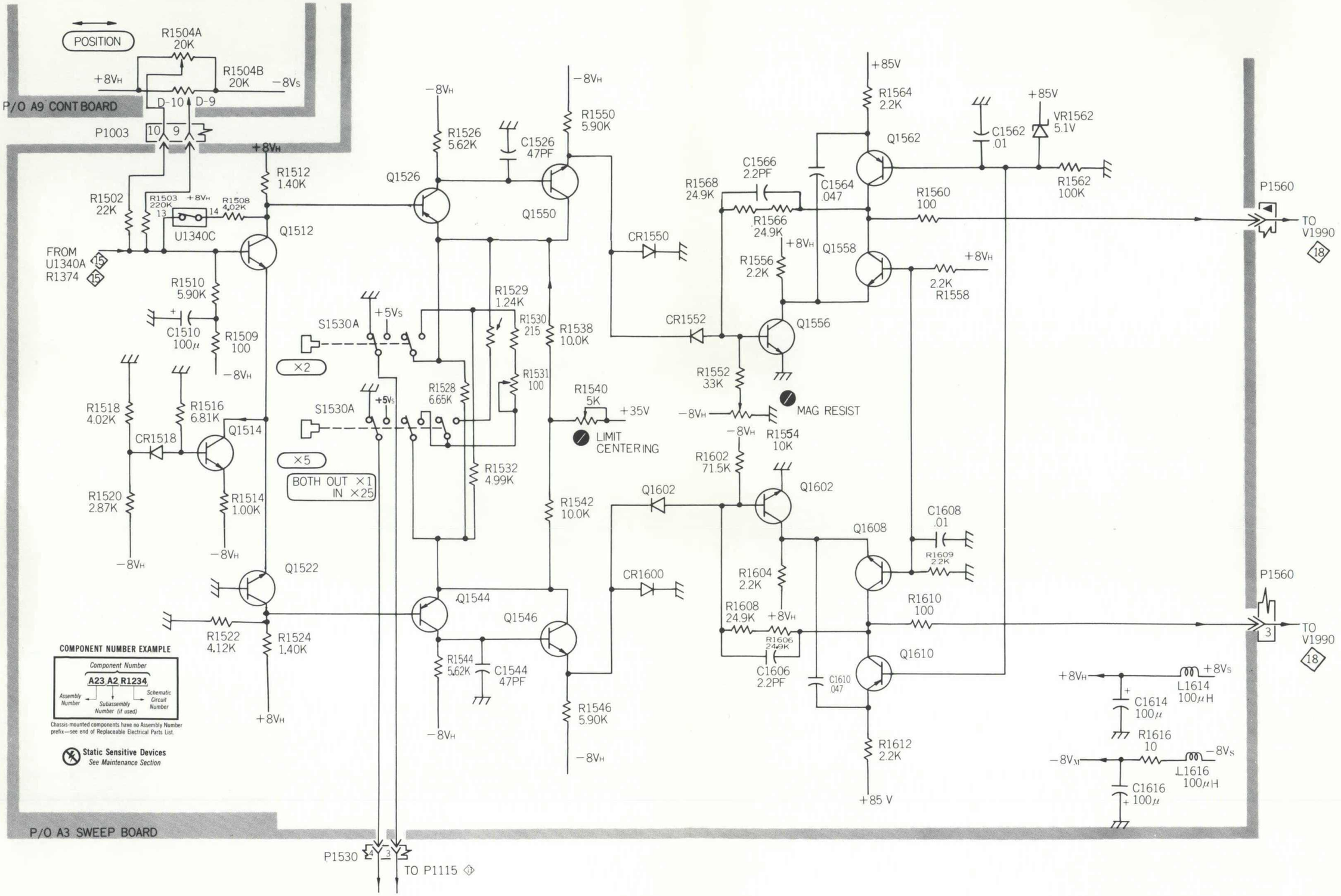
To B-5 ⑫

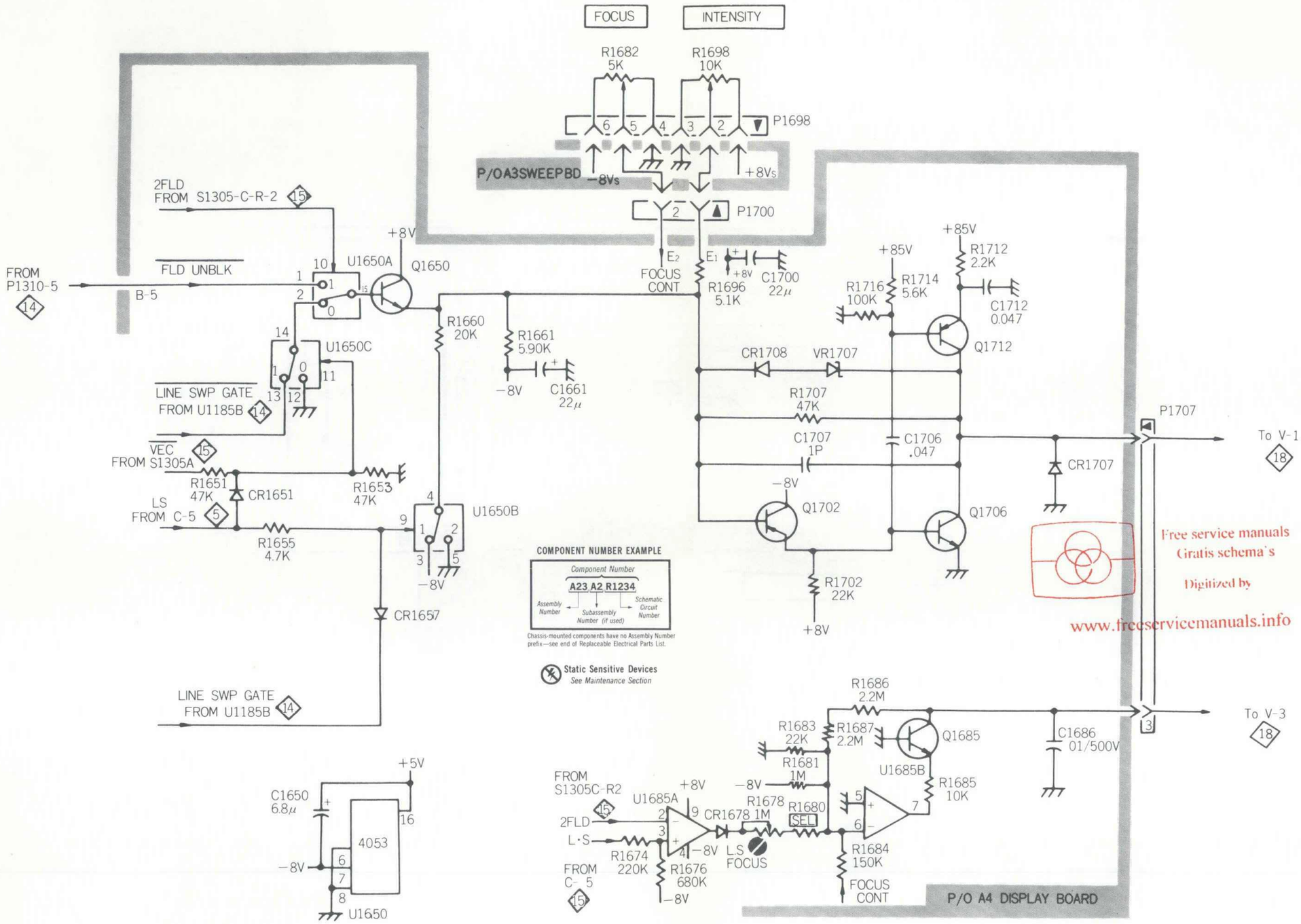
To R1080-E ⑫

U1230 LS74

P/O A3 SWEEP BOARD







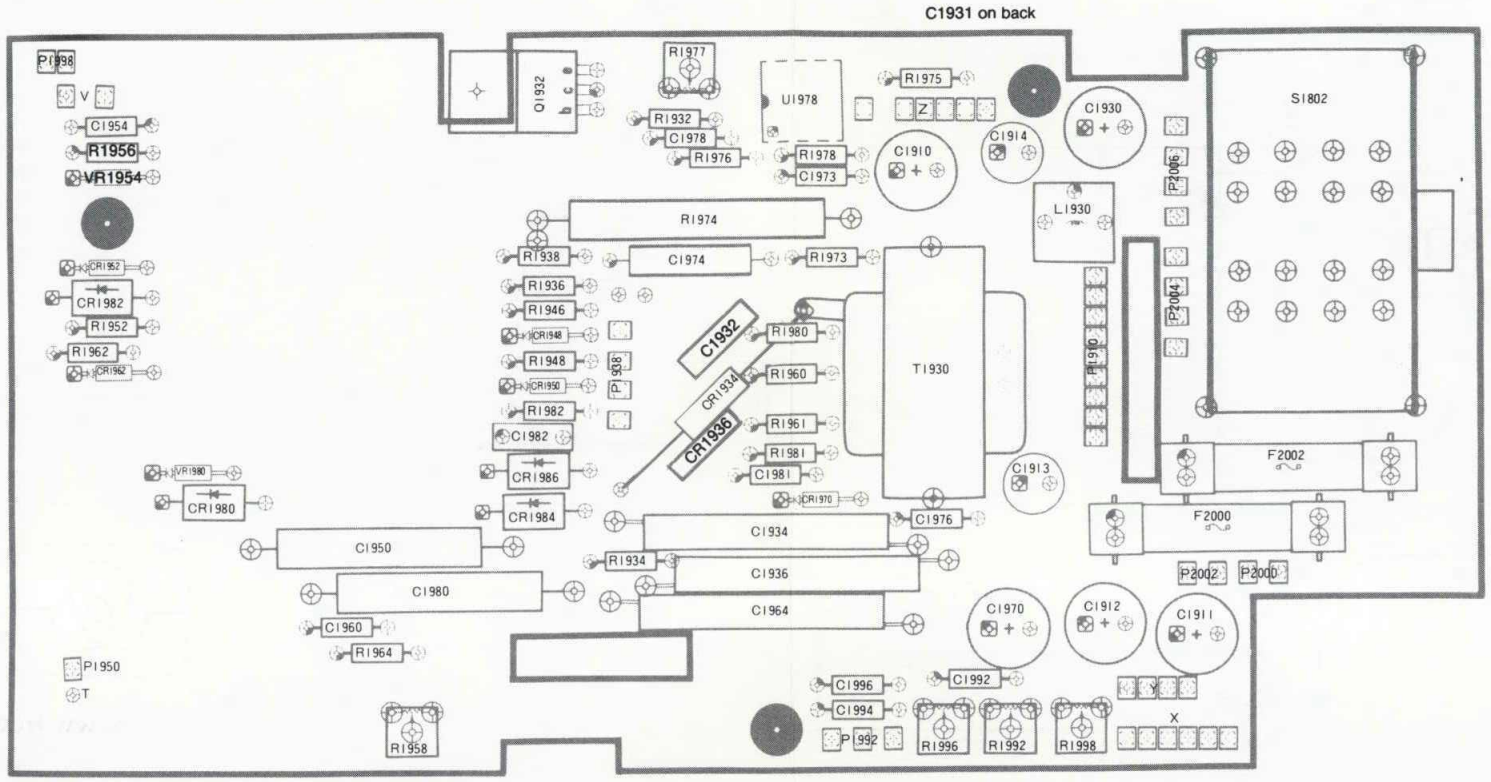
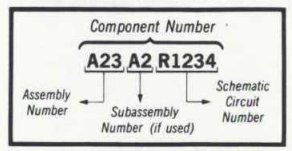


Fig. 9-6 A6 HV BOARD PARTS LOCATIONS

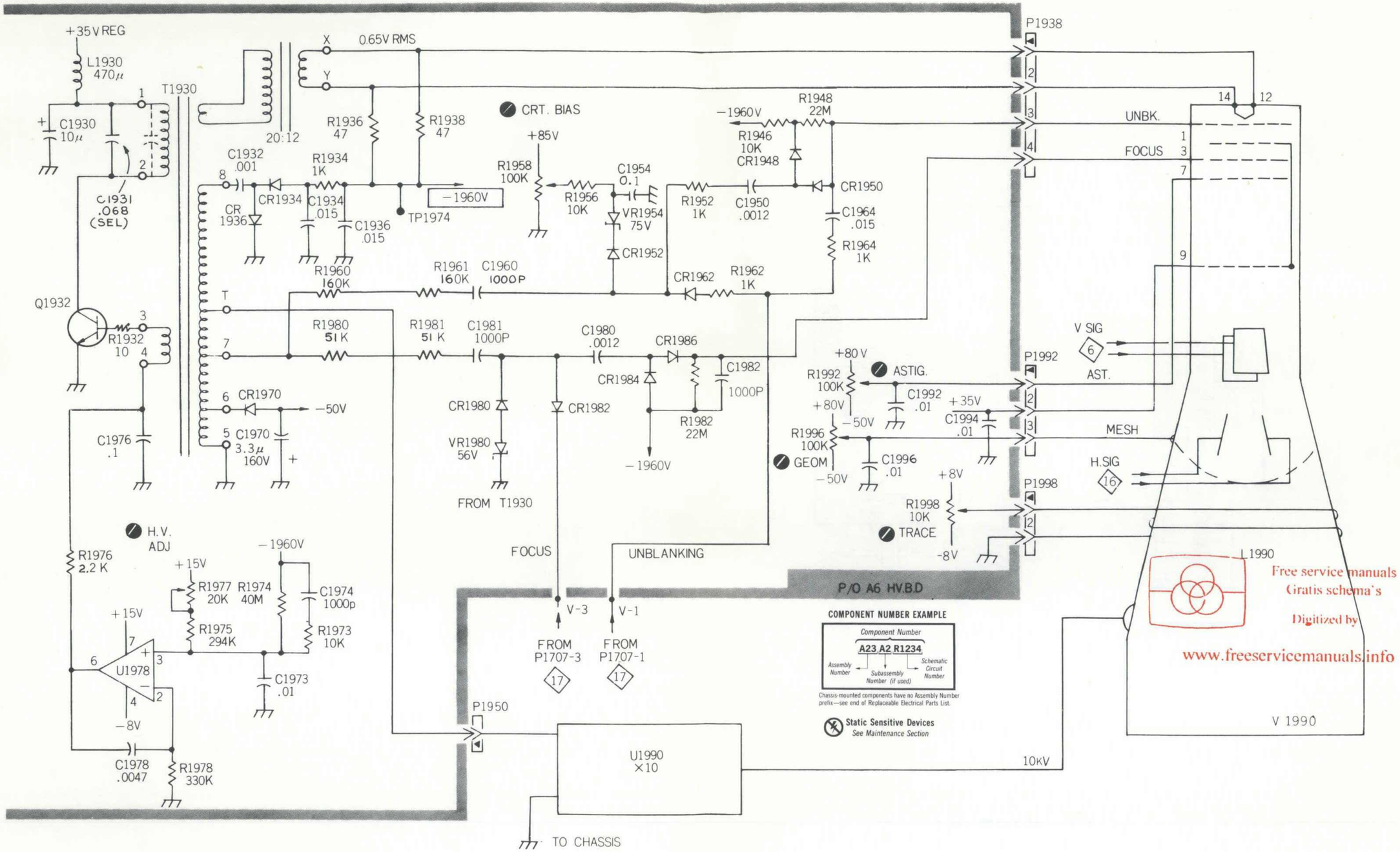
3422-37

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



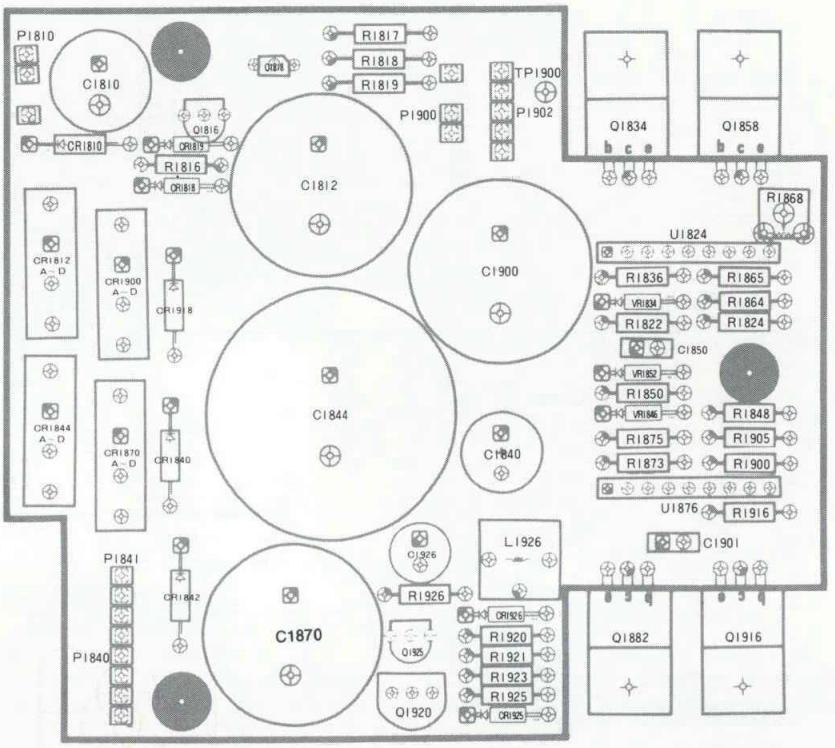
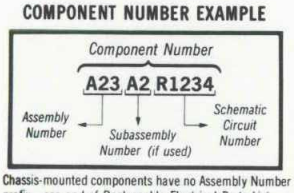


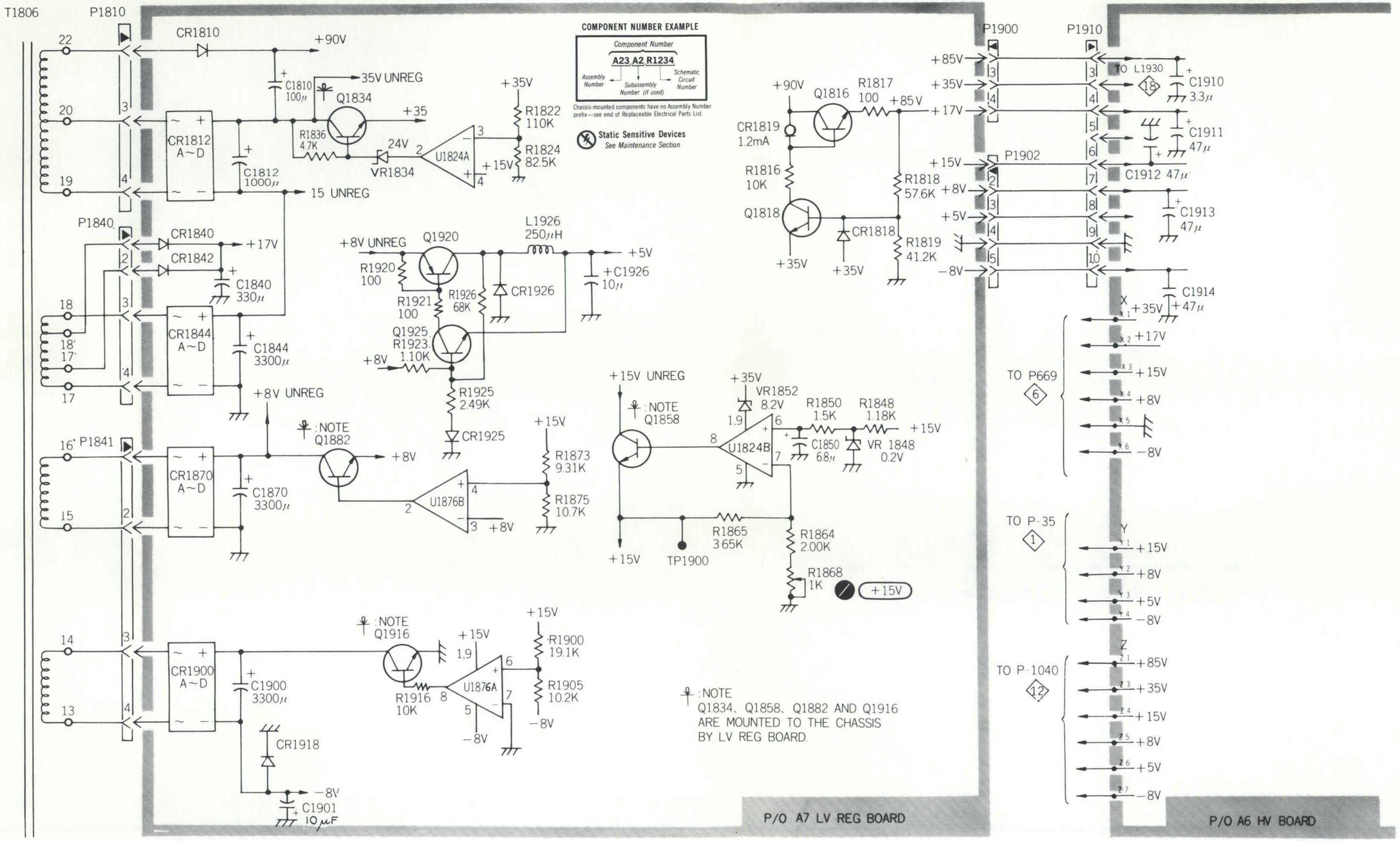
Fig. 9-7 A7 LV BOARD PARTS LOCATIONS 3422-38

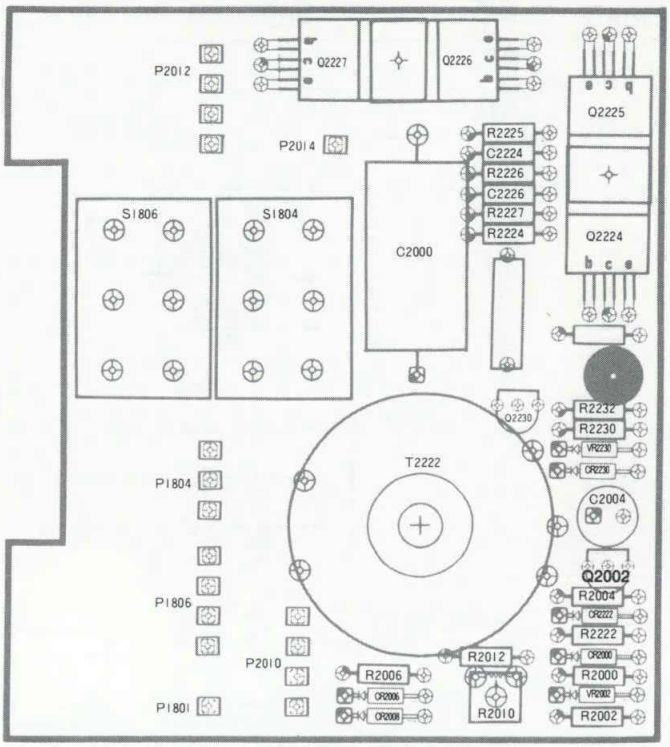
COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

Static Sensitive Devices
See Maintenance Section



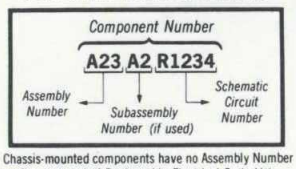


3422-39

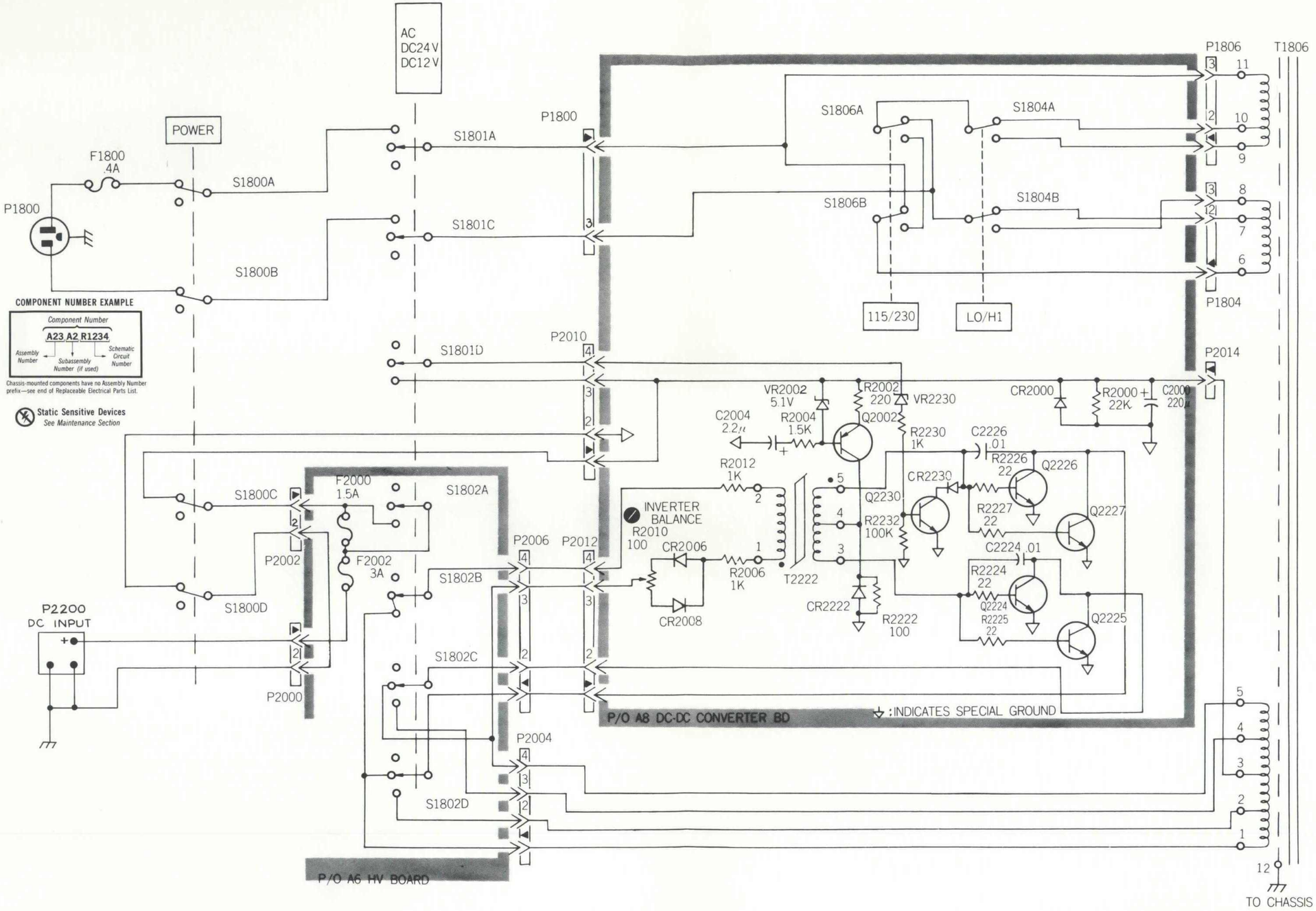
Fig. 9-8 A8 DC-DC CONVERTER BOARD PARTS LOCATIONS

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

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

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

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

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000	Part first added at this serial number
00X	Part removed after this serial number

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

```
1 2 3 4 5                    Name & Description

Assembly and/or Component
Attaching parts for Assembly and/or Component
- - - * - - -
   Detail Part of Assembly and/or Component
   Attaching parts for Detail Part
   - - - * - - -
      Parts of Detail Part
      Attaching parts for Parts of Detail Part
      - - - * - - -
```

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

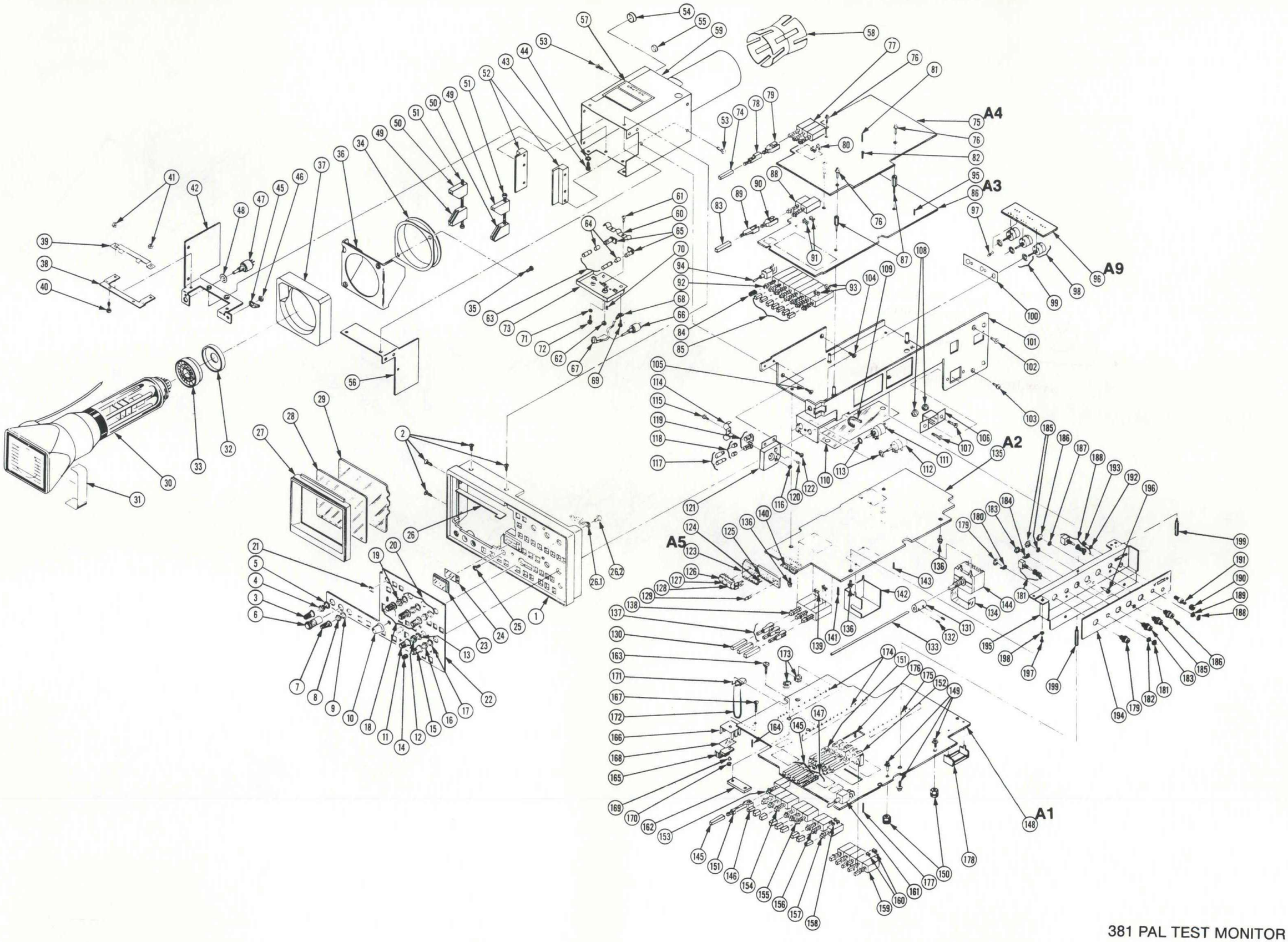
Mfr. Code	Manufacturer	Address	City, State, Zip
S3629	PANEL COMPONENTS CORP.	2015 SECOND ST.	BERKELEY, CA 94170
000BK	STAUFFER SUPPLY	105 SE TAYLOR	PORTLAND, OR 97214
000CY	NORTHWEST FASTENER SALES, INC.	7923 SW CIRRUS DRIVE	BEAVERTON, OR 97005
0000M	SONY/TEKTRONIX CORPORATION	P O BOX 14, HANEDA AIRPORT	TOKYO 149, JAPAN
11897	PLASTIGLIDE MFG. CORPORATION	P O BOX 867, 1757 STANFORD ST.	SANTA MONICA, CA 90406
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
24618	TRANSCON MFG. CO.	2655 PERTH ST.	DALLAS, TX 75220
28520	HEYMAN MFG. CO.	147 N. MICHIGAN AVE.	KENILWORTH, NJ 07033
49671	RCA CORPORATION	30 ROCKEFELLER PLAZA	NEW YORK, NY 10020
71159	BRISTOL SOCKET SCREW, DIV. OF AMERICAN CHAIN AND CABLE CO., INC.	P O BOX 2244, 40 BRISTOL ST.	WATERBURY, CT 06720
71279	CAMBRIDGE THERMIONIC CORP.	445 CONCORD AVE.	CAMBRIDGE, MA 02138
71590	CENTRALAB ELECTRONICS, DIV. OF GLOBE-UNION, INC.	P O BOX 858	FORT DODGE, IA 50501
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
74445	HOLO-KROME CO.	31 BROOK ST. WEST	HARTFORD, CT 06110
77250	PHEOLL MANUFACTURING CO., DIVISION OF ALLIED PRODUCTS CORP.	5700 W. ROOSEVELT RD.	CHICAGO, IL 60650
78189	ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
79807	WROUGHT WASHER MFG. CO.	2100 S. O BAY ST.	MILWAUKEE, WI 53207
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
86928	SEASTROM MFG. COMPANY, INC.	701 SONORA AVENUE	GLENDALE, CA 91201
95712	BENDIX CORP., THE ELECTRICAL COMPONENTS DIV., MICROWAVE DEVICES PLANT	HURRICANE ROAD	FRANKLIN, IN 46131
96904	NATVAR CORP.	211 RANDOLPH AVE.	WOODBRIDGE, NJ 07095
98159	RUBBER TECK, INC.	19115 HAMILTON AVE., P O BOX 389	GARDENA, CA 90247

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-1	386-4458-00			1		SUBPANEL,FRONT:	0000M	386-4458-00
						(ATTACHING PARTS)		
-2	211-0105-00			4		SCREW,MACHINE:4-40 X 0.188,100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-3	366-1023-01			2		KNOB:GY,0.127 ID X0.392 OD X 0.531 H	80009	366-1023-01
	213-0246-00			1		. SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-4	220-0740-00			1		NUT,PLAIN,HEX:0.25-32 X 4.6MM X 8.0MM,BRS	0000M	220-0740-00
-5	210-3035-00			1		WASHER,FLAT:7.6MM ID X 0.5MM THK,STL NP	0000M	210-3035-00
-6	366-1379-00			1		KNOB:V/H POS	0000M	366-1379-00
	213-0239-00			1		. SETSCREW:3-48 X 0.062 INCH,HEX SOC STL	71159	OBD
-7	366-1023-01			1		KNOB:GY,0.127 ID X0.392 OD X 0.531 H	80009	366-1023-01
	213-0246-00			1		. SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-8	220-0740-00			1		NUT,PLAIN,HEX:0.25-32 X 4.6MM X 8.0MM,BRS	0000M	220-0740-00
-9	210-3035-00			1		WASHER,FLAT:7.6MM ID X 0.5MM THK,STL NP	0000M	210-3035-00
-10	366-0379-00			1		KNOB:GRAY,MODE	80009	366-0379-00
	213-0153-00			1		. SETSCREW:5-40 X 0.125,STL BK OXD,HEX SKT	000CY	OBD
-11	366-1189-00			1		KNOB:GRAY	80009	366-1189-00
	213-0246-00			1		. SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-12	220-0739-00			1		NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	0000M	220-0739-00
-13	210-3035-00			1		WASHER,FLAT:7.6MM ID X 0.5MM THK,STL NP	0000M	210-3035-00
-14	366-1391-02			1		KNOB:GY,0.081 ID,0.28 OD,0.32 L	80009	366-1391-02
	213-0725-00			1		. SETSCREW:3-48 X 0.095 INCH,HEX SOC STL	74445	OBD
-15	366-1077-00			1		KNOB:GRAY	80009	366-1077-00
	213-0153-00			1		. SETSCREW:5-40 X 0.125,STL BK OXD,HEX SKT	000CY	OBD
-16	220-0739-00			1		NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	0000M	220-0739-00
-17	210-3035-00			1		WASHER,FLAT:7.6MM ID X 0.5MM THK,STL NP	0000M	210-3035-00
-18	366-1189-00			3		KNOB:GRAY	80009	366-1189-00
	213-0246-00			3		. SETSCREW:5-40 X 0.093 ITL BK OXD,HEX SKT	71159	OBD
-19	220-0739-00			3		NUT,PLAIN,HEX:6MM THD X 4.6MM X 8.0MM,BRS	0000M	220-0739-00
-20	210-3035-00			3		WASHER,FLAT:7.6MM ID X 0.5MM THK,STL NP	0000M	210-3035-00
-21	426-1072-00			31		FRAME,PUSH BTN:PLASTIC	80009	426-1072-00
-22	----- -----			1		PANEL,FRONT:		
	----- -----			-		(NOT AVAILABLE AT THIS PRINTING)		
-23	378-0160-00			1		FILTER,LIGHT:PURPLE,POLYCARBONATE,RAW	0000M	378-0160-00
-24	334-3849-00			1		MARKER,IDENT:MKD UM	0000M	334-3849-00
-25	211-0559-00			1		SCREW,MACHINE:6-32 X 0.375"100 DEG,FLH STL	83385	OBD
-26	348-0697-00			1		GASKET:LIGHT SHIELD,BLACK FELT	0000M	348-0697-00
-26.1	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-26.2	211-0503-00			1		SCREW,MACHINE:6-32 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
-27	200-2526-01			1		RTNR,CRT SCALE:	0000M	200-2526-01
-28	378-0161-00			1		FILTER,LIGHT:CRT,GRAY POLYCARBONATE	0000M	378-0161-00
-29	----- -----			1		SCALE CRT:K FACTOR,COLOR		
	----- -----			-		(NOT AVAILABLE AT THIS PRINTING)		
-30	----- -----			1		ELECTROM,TUBE:(SEE V1990 REPL)		
-31	253-0267-00			AR		TAPE,PRESS SENS:0.08 X 20 X 2000MM,AL FOIL	0000M	253-0267-00
-32	386-1316-00			1		SUPPORT,CRT:REAR	80009	386-1316-00
-33	136-0266-01			1		SKT,PL-IN ELEK:ELCTRN TUBE,12 CONT,W/LEADS	0000M	OBD
-34	----- -----			1		COIL,RF:(SEE L1990 REPL)		
						(ATTACHING PARTS)		
-35	211-0008-00			2		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-36	343-0901-00			1		RTNR,CUSHION:	0000M	343-0901-00
-37	348-0663-00			1		CUSHION,CRT:RUBBER	0000M	348-0663-00
-38	386-4460-00			1		PN,CRT RTNR,MTG:	0000M	386-4460-00
-39	131-2673-00			1		CONTACT,ELEC:GROUNDING,BRONZE	0000M	131-2673-00
						(ATTACHING PARTS)		
-40	211-0644-00			2		SCREW,MACHINE:4-40,7.9MM LG,PH,POZ,SST	0000M	211-0644-00
-41	210-0406-00			2		NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS	73743	12161-50
						- - - * - - -		
-42	426-1760-00			1		FRAME,CRT SHLD:	0000M	426-1760-00
						(ATTACHING PARTS)		
-43	211-0008-00			2		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
-44	210-0004-00			2		WASHER,LOCK:#4 INTL,0.015THK,STL CD PL	000BK	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-45	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-46	210-0407-00			1		NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
						- - - * - - -		
-47	----- -----			1		RESISTOR,VAR:(SEE R1682 REPL)		
-48	210-0046-00			1		WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
-49	343-0900-01			2		CLAMP,RETAINER:	0000M	343-0900-01
-50	343-0900-02			2		CLAMP,RETAINER:	0000M	343-0900-02
						(ATTACHING PARTS)		
-51	211-0600-00			2		SCREW,MACHINE:6-32 X 2 INCH,FIL SST	83385	OBD
						- - - * - - -		
-52	386-4454-00			2		SUPPORT,CLAMP:ALUMINUM	0000M	386-4454-00
						(ATTACHING PARTS)		
-53	211-0008-00			4		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-54	348-0063-00			1		GROMMET,PLASTIC:0.50 INCH DIA	80009	348-0063-00
-55	348-0067-00			1		GROMMET,PLASTIC:0.312 INCH DIA	80009	348-0067-00
-56	426-1759-00			1		FRAME,CRT SHIELD:	0000M	426-1759-00
-57	334-3360-00			1		MARKER,IDENT:MARKED WARNING	0000M	334-3360-00
-58	386-3201-00			1		SUPPORT,CRT:REAR	0000M	386-3201-00
-59	337-2778-00			1		SHIELD,ELEC:CRT	0000M	337-2778-00
-60	352-0591-00			1		HOLDER,LAMP:TRIPLE,SST	0000M	352-0591-00
						(ATTACHING PARTS)		
-61	211-0136-00			2		SCREW,MACHINE:2-56 X 0.094 INCH,PNH STL	73743	OBD
-62	210-0405-00			2		NUT,PLAIN,HEX.:2-56 X 0.188 INCH,BRS	73743	12157-50
						- - - * - - -		
-63	----- -----			2		LAMP:(SEE DS3564,DS3566 REPL)		
-64	162-0013-00			2		INSUL SLVG,ELEC:0.148 ID,BLK VINYL,105 DEG	96904	TYP400-SIZ7-BLK
-65	136-0761-00			2		LAMPHOLDER:1 MIDGET GROOVED BASE	80009	136-0761-00
-66	----- -----			1		RESISTOR,VAR:(SEE R3570 REPL)		
-67	210-0223-00			2		TERMINAL,LUG:0.25 INCH DIA,SE	86928	A313-136
-68	210-0201-00			1		TERMINAL,LUG:0.12 ID,LOCKING,BRZ TIN PL	86928	OBD
						(ATTACHING PARTS)		
-69	211-0008-00			1		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-70	348-0031-00			1		GROMMET,PLASTIC:0.156 INCH DIA	80009	348-0031-00
-71	210-0004-00			1		WASHER,LOCK:#4 INTL,0.015THK,STL CD PL	000BK	OBD
						(ATTACHING PARTS)		
-72	211-0008-00			1		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-73	378-0163-00			1		REFLECTOR,LIGHT:LEFT	0000M	378-0163-00
-74	366-1512-00			3		PUSH BUTTON:GRAY,0.18 SQ X 0.83 INCH LG	80009	366-1512-00
-75	----- -----			1		CKT BOARD ASSY:DISPLAY(SEE A4 REPL)		
						(ATTACHING PARTS)		
-76	211-0244-00			3		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL	78189	OBD
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-77	----- -----			1		. SWITCH,PUSH:(SEE A4S1305 REPL)		
-78	384-1382-00			3		. EXTENSION SHAFT:1.09 INCH LONG	80009	384-1382-00
-79	384-1136-00			3		. EXTENSION SHAFT:0.95 INCH LONG	80009	384-1136-00
-80	361-0685-00			4		. SPACER,SWITCH:0.365 INCH LONG	80009	361-0685-00
-81	131-0589-00			2		. TERMINAL,PIN:0.46 L X 0.025 SQ	22526	47350
-82	214-0579-00			2		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-83	366-1512-00			2		PUSH BUTTON:GRAY,0.18 SQ X 0.83 INCH LG	80009	366-1512-00
-84	366-1559-06			1		PUSH BUTTON:SIL GY,0.18 SQ X 0.43,ABS	80009	366-1559-06
-85	366-1559-00			7		PUSH BUTTON:SIL GY,0.18 SQ X 0.43	80009	366-1559-00
-86	----- -----			1		CKT BOARD ASSY:SWEEP(SEE A3 REPL)		
						(ATTACHING PARTS)		
-87	129-0833-00			3		SPACER,POST:21.4MM W/4-40 EXT & INT THD	0000M	129-0833-00
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-88	----- -----			1		. SWITCH,PUSH:(SEE A3S1530 REPL)		
-89	384-1382-00			2		. EXTENSION SHAFT:1.09 INCH LONG	80009	384-1382-00
-90	384-1136-00			2		. EXTENSION SHAFT:0.95 INCH LONG	80009	384-1136-00
-91	361-0542-00			4		. SPACER,SWITCH:PLASTIC	71590	J-64281
-92	----- -----			1		. SWITCH,PUSH:(SEE A3S1000 REPL)		
-93	361-0685-00			4		. SPACER,SWITCH:0.365 INCH LONG	80009	361-0685-00
-94	----- -----			1		. SWITCH,TOGGLE:(SEE A3S1015 REPL)		
-95	131-0608-00			AR		. TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357

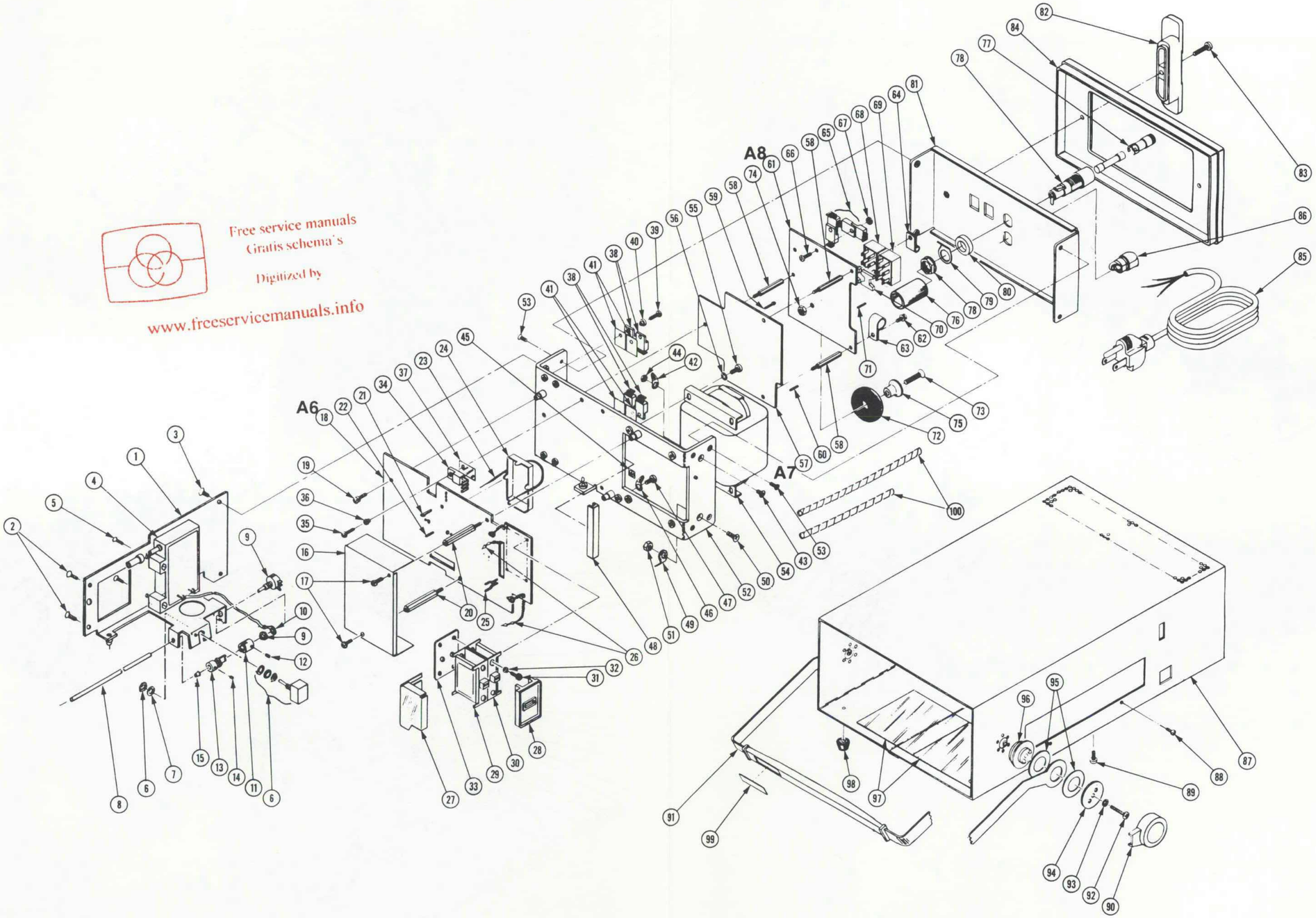
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-96	----- -----			1		CKT BOARD ASSY:CONTROL(SEE A9 REPL)		
-97	----- -----			1		. LT EMITTING DIO:(SEE A9DS1394 REPL)		
-98	----- -----			3		. RESISTOR,VAR:(SEE A9R1093,A9R1380,A9R1504		
	----- -----			-		. REPL)		
-99	210-0046-00			3		. WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
-100	337-2815-00			1		SHIELD,ELEC:VARIABLE RESISTOR	0000M	337-2815-00
-101	441-1540-01			1		CHASSIS,SCOPE:MAIN	0000M	441-1540-01
						(ATTACHING PARTS)		
-102	211-0538-00			1		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-103	211-0538-00			1		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
-104	211-0038-00			1		SCREW,MACHINE:4-40 X 0.312,FLH,100 DEG	83385	OBD
-105	311-0105-00			1		SCREW,MACHINE:4-40 X 0.188,100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-106	131-1333-00			1		CONNECTOR,RCPT,:POWER	80009	131-1333-00
						(ATTACHING PARTS)		
-107	211-0101-00			2		SCREW,MACHINE:4-40 X 0.25,100 DEG,FLH STL	83385	OBD
-108	210-0586-00			2		NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	83385	OBD
						- - - * - - -		
-109	255-0334-00			AR		PLASTIC CHANNEL:12.75 X 0.175X 0.155,NYL	11897	122-37-2500
-110	342-0144-00			1		INSULATOR,FILM:BATTERY PACK SHIELD,MYLAR	0000M	342-0144-00
-111	----- -----			1		RESISTOR,VAR:(SEE R175 REPL)		
-112	----- -----			1		RESISTOR,VAR:(SEE R734 REPL)		
-113	210-0046-00			2		WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
-114	352-0590-00			1		HOLDER,LAMP:DUAL,SST	0000M	352-0590-00
						(ATTACHING PARTS)		
-115	211-0136-00			1		SCREW,MACHINE:2-56 X 0.094 INCH,PNH STL	73743	OBD
-116	210-0405-00			1		NUT,PLAIN,HEX.:2-56 X 0.188 INCH,BRS	73743	12157-50
						- - - * - - -		
-117	----- -----			2		LAMP:(SEE DS3560,DS3562 REPL)		
-118	162-0013-00			2		INSUL SLVG,ELEC:0.148 ID,BLK VINYL,105 DEG	96904	TYP400-SIZ7-BLK
-119	136-0761-00			2		LAMPHOLDER:1 MIDGET GROOVED BASE		
-120	348-0031-00			1		GROMMET,PLASTIC:0.156 INCH DIA	80009	348-0031-00
-121	378-0162-00			1		REFLECTOR,LIGHT:RIGHT	0000M	378-0162-00
						(ATTACHING PARTS)		
-122	211-0005-00			2		SCREW,MACHINE:4-40 X 0.125 INCH,PNH STL	83385	OBD
						- - - * - - -		
-123	----- -----			1		CKT BOARD ASSY:LED(SEE A5 REPL)		
-124	131-0608-00			8		. TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
-125	131-0589-00			8		. TERMINAL,PIN:0.46 L X 0.025 SQ	22526	47350
-126	----- -----			1		LAMP,LED:(SEE A5U1140 REPL)		
-127	----- -----			1		. LT EMITTING DIO:(SEE A5DS1140 REPL)		
-128	----- -----			1		. LT EMITTING DIO:(SEE A5DS1141 REPL)		
-129	----- -----			1		. LT EMITTING DIO:(SEE A5DS198 REPL)		
-130	366-1512-00			3		PUSH BUTTON:GRAY,0.18 SQ X 0.83 INCH LG	80009	366-1512-00
-131	376-0199-00			1		CPLG,SHAFT,RGD:3.3MM & 4.1MM ID,AL	0000M	376-0199-00
-132	213-0022-00			2		. SETSCREW:4-40 X 0.188 INCH,HEX SOC STL	74445	OBD
-133	384-1579-00			1		EXTENSION SHAFT:143MM X 3.124MM OD	0000M	384-1579-00
-134	342-0299-00			1		INSULATOR,FILM:MYLAR	0000M	342-0299-00
-135	----- -----			1		CKT BOARD ASSY:INPUT(SEE A2 REPL)		
						(ATTACHING PARTS)		
-136	211-0244-00			4		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL	78189	OBD
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-137	384-1382-00			3		. EXTENSION SHAFT:1.09 INCH LONG	80009	384-1382-00
-138	----- -----			1		. SWITCH,PUSH:(SEE A2S300 REPL)		
-139	361-0685-00			4		. SPACER,SWITCH:0.365 INCH LONG	80009	361-0685-00
-140	136-0328-03			8		. SOCKET,PIN TERM:HORIZ,SQ PIN RCPT	22526	47710
-141	214-0579-00			1		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-142	337-2800-00			1		. SHIELD,ELEC:PROBE INPUT	0000M	337-2800-00
-143	131-0608-00			AR		. TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
-144	----- -----			1		. SWITCH:(SEE A2S311 REPL)		
-145	366-1512-00			4		PUSH BUTTON:GRAY,0.18 SQ X 0.83 INCH LG	80009	366-1512-00
-146	366-1559-00			9		PUSH BUTTON:SIL GY,0.18 SQ X 0.43	80009	366-1559-00
-147	366-1512-02			2		PUSH BUTTON:SIL SY,0.18 SQ X 0.83	80009	366-1512-02
-148	----- -----			1		CKT BOARD ASSY:MAIN(SEE A1 REPL)		
						(ATTACHING PARTS)		
-149	211-0244-00			5		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL	78189	OBD
-150	352-0589-00			2		HOLDER,CKT BD:	0000M	352-0589-00
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
	----- -----			-		CKT BOARD ASSY INCLUDES:		
1-151	384-1099-00			5		. EXTENSION SHAFT:PUSH BUTTON,1.54 INCH LONG	80009	384-1099-00
-152	103-0186-02			5		. ADAPTER,EXT SFT:PUSH SW,0.60 OFFSET	80009	103-0186-02
-153	----- -----			1		. SWITCH,PUSH:(SEE A1S3500 REPL)		
-154	----- -----			1		. SWITCH,PUSH:(SEE A1S500 REPL)		
-155	----- -----			1		. SWITCH,PUSH:(SEE A1S100 REPL)		
-156	----- -----			1		. SWITCH,PUSH:(SEE A1S110 REPL)		
-157	----- -----			1		. SWITCH,PUSH:(SEE A1S70 REPL)		
-158	361-0685-00			16		. SPACER,SWITCH:0.365 INCH LONG	80009	361-0685-00
-159	----- -----			1		. SWITCH,PUSH:(SEE A1S650 REPL)		
-160	361-0685-00			4		. SPACER,SWITCH:0.365 INCH LONG	80009	361-0685-00
-161	----- -----			1		. SWITCH,TOGGLE:(SEE A1S12 REPL)		
-162	214-3119-00			1		. HT SK,MICROCKT:24 DIP	0000M	214-3119-00
						(ATTACHING PARTS)		
-163	211-0012-00			2		. SCREW,MACHINE:4-40 X 0.375,PNH STL CD PL	83385	OBD
						- - - * - - -		
-164	131-0589-00			AR		. TERMINAL,PIN:0.46 L X 0.025 SQ	22526	47350
-165	----- -----			1		. TRANSISTOR:(SEE A1Q3560 REPL)		
-166	214-3132-00			1		. HEAT SINK,XSTR:TO-202 & 220	0000M	214-3132-00
						(ATTACHING PARTS)		
-167	211-0198-00			1		. SCREW,MACHINE:4-40 X 0.438 PNH,STL,POZ	77250	OBD
-168	342-0163-01			1		. INSULATOR,PLATE:TRANSISTOR,SILICON	0000M	342-0163-01
-169	210-1178-00			1		. WASHER,SHLDR:U/W TO-220 TRANSISTOR	49671	DF137A
-170	210-0586-00			1		. NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	83385	OBD
						- - - * - - -		
-171	----- -----			1		. CRYSTAL:(SEE A1X3610 REPL)		
-172	346-0032-00			1		. STRAP,RETAINING:0.075 DIA X 4.0 L,MLD RBR	98159	2859-75-4
-173	214-3133-00			2		. HEAT SINK,XSTR:TO-5	0000M	214-3133-00
-174	131-2554-00			2		. BUS CONDUCTOR:0.6 IN PITCH,5 TERM	0000M	131-2554-00
-175	131-2553-00			1		. BUS CONDUCTOR:0.6 IN PITCH,5 TERM	0000M	131-2553-00
-176	214-0579-00			1		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-177	131-0787-00			2		. CONTACT,ELEC:0.64 INCH LONG	22526	47359
-178	337-2801-00			1		. SHIELD,ELEC:FILTER	0000M	337-2801-00
-179	131-0106-00			1		CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
-180	210-0255-00			1		TERMINAL,LUG:0.391 ID,LOCKING,BRS CD PL	80009	210-0255-00
-181	----- -----			1		SWITCH,TOGGLE:(SEE S1 REPL)		
-182	210-0940-00			1		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-183	131-0106-00			1		CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
-184	210-0255-00			1		TERMINAL,LUG:0.391 ID,LOCKING,BRS CD PL	80009	210-0255-00
-185	131-0106-00			1		CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
-186	131-0106-00			1		CONNECTOR,RCPT,:FEMALE,BNC	95712	9856-1
-187	210-0255-00			1		TERMINAL,LUG:0.391 ID,LOCKING,BRS CD PL	80009	210-0255-00
-188	----- -----			1		SWITCH,TOGGLE:(SEE S200 REPL)		
-189	210-0940-00			1		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-190	200-0103-00			1		NUT,PLAIN,KNURL:0.25-28 X 0.375" OD,BRASS	80009	200-0103-00
-191	129-0077-00			1		STUD,SHOULDERED:0.938 INCH LONG,BRASS	80009	129-0077-00
-192	210-0046-00			1		WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
-193	210-0455-00			1		NUT,PLAIN,HEX.:0.25-28 X 0.375 INCH,BRASS	73743	3089-402
-194	----- -----			1		PANEL,SIDE:COLOR		
	---- -----			-		(NOT AVAILABLE AT THIS PRINTING)		
-195	407-2558-00			1		BRACKET,INPUT:	0000M	407-2558-00
						(ATTACHING PARTS)		
-196	136-0387-00			1		JACK,TIP:GRAY	71279	450-4352-01-0318
-197	211-0008-00			1		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
-198	210-0004-00			1		WASHER,LOCK:#4 INTL,0.015THK,STL CD PL	000BK	OBD
						- - - * - - -		
-199	129-0829-00			2		SPACER,POST:38.7MM,W/4-40 INT THD	0000M	129-0829-00



381 PAL TEST MONITOR

FIG. 2 EXPLODED



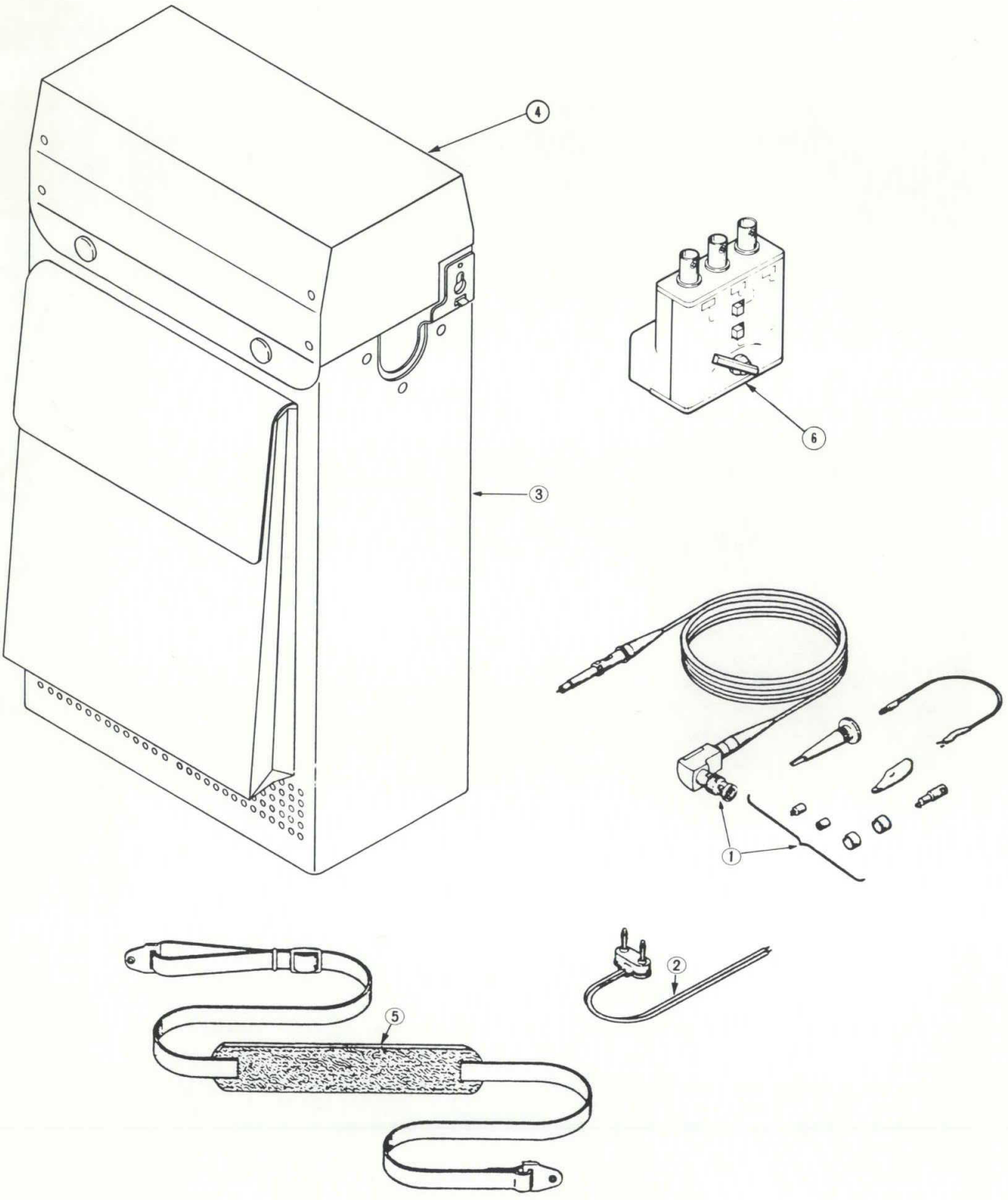
381 PAL TEST MONITOR

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-1	441-1539-00			1		CHASSIS,SCOPE:LEFT SIDE,AL	0000M	441-1539-00
						(ATTACHING PARTS)		
-2	211-0038-00			2		SCREW,MACHINE:4-40 X 0.312,FLH,100 DEG	83385	OBD
-3	211-0538-00			2		SCREW,MACHINE:6-32 X 0.312"100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-4	----- -----			1		POWER SUPPLY:(SEE U1999 REPL)		
						(ATTACHING PARTS)		
-5	211-0102-00			2		SCREW,MACHINE:4-40 X 0.500",FLH,STL	83385	OBD
						- - - * - - -		
-6	----- -----			1		SWITCH,TOGGLE:(SEE S1800 REPL)		
-7	210-0940-00			1		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
-8	384-1578-00			1		EXTENSION SHAFT:22.15MM X 3.124MM OD	80009	384-1578-00
-9	----- -----			1		RESISTOR,VAR:(SEE R1698 REPL)		
						(ATTACHING PARTS)		
-10	210-0223-00			1		TERMINAL,LUG:0.25 INCH DIA,SE	86928	A313-136
-11	354-0426-00			1		RING,CPLG,SHAFT:10MM ID X 3.2MM OD	0000M	354-0426-00
-12	213-0075-00			2		. SETSCREW:4-40 X 0.094,STL BK OXD,HEX SKT	000BK	OBD
-13	105-0857-00			1		ACTUATOR,SWITCH:POWER,DELRIN	0000M	105-0857-00
-14	213-0022-00			1		. SETSCREW:4-40 X 0.188 INCH,HEX SOC STL	74445	OBD
-15	348-0031-00			1		GROMMET,PLASTIC:0.156 INCH DIA	80009	348-0031-00
						- - - * - - -		
-16	337-2799-00			1		SHIELD,ELEC:HIGH VOLTAGE	0000M	337-2799-00
						(ATTACHING PARTS)		
-17	211-0008-00			2		SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-18	----- -----			1		CKT BOARD ASSY:HIGH VOLTAGE(SEE A6 REPL)		
						(ATTACHING PARTS)		
-19	211-0244-00			1		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL	78189	OBD
-20	129-0712-00			2		SPACER,POST:37.2MM L,W/4-40 THD	0000M	129-0712-00
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-21	214-0579-00			1		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-22	131-0608-00			AR		. TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
	131-0589-00			AR		. TERMINAL,PIN:0.46 L X 0.025 SQ	22526	47350
-23	346-0032-00			1		. STRAP,RETAINING:0.075 DIA X 4.0 L,MLD RBR	98159	2859-75-4
-24	342-0514-00			1		. INSUL,CKT BOARD:HIGH VOLTAGE,PLASTIC	0000M	342-0514-00
-25	344-0154-00			4		. CLIP,ELECTRICAL:FUSE,CKT BD MT	80009	344-0154-00
-26	006-0531-00			2		. STRAP,TIEDOWN,E:BLUE PLASTIC BEADED	24618	700-3688
-27	342-0554-00			1		. INSUL,SWITCH:POLYCARBONATE	0000M	342-0554-00
-28	200-0228-00			1		. COVER,SLIDE SW:	0000M	200-0228-00
-29	----- -----			1		SWITCH,SLIDE:(SEE A6S1801 REPL)		
-30	----- -----			1		. SWITCH,SLIDE:(SEE A6S1802 REPL)		
						(ATTACHING PARTS)		
-31	211-0008-00			4		. SCREW,MACHINE4-40 X 0.250,PNH,STL,CD PL	83385	OBD
-32	210-0054-00			4		. WASHER,LOCK:SPLIT,0.118 ID X 0.212"OD STL	83385	OBD
						- - - * - - -		
-33	386-4457-00			1		. PLATE,SW MTG:	0000M	38-4457-00
-34	----- -----			1		TRANSISTOR:(SEE Q1932 REPL)		
						(ATTACHING PARTS)		
-35	211-0097-00			1		SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
-36	210-1178-00			1		WASHER,SHLDR:U/W TO-220 TRANSISTOR	49671	DF137A
						- - - * - - -		
-37	342-0163-01			1		INSULATOR,PLATE:TRAN,SILICON RUBBER	0000M	342-0163-01
-38	----- -----			4		TRANSISTOR:(SEE Q1834,Q1858,Q1882,Q1916 REPL)		
						(ATTACHING PARTS)		
-39	211-0012-00			4		SCREW,MACHINE:4-40 X 0.375,PNH STL CD PL	83385	OBD
-40	210-1178-00			4		WASHER,SHLDR:U/W TO-220 TRANSISTOR	49671	DF137A
						- - - * - - -		
-41	342-0163-01			4		INSULATOR,PLATE:TRAN,SILICON RUBBER	0000M	342-0163-01
-42	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-43	211-0541-00			1		SCREW,MACHINE:6-32 X 0.25"100 DEG,FLH STL	83385	OBD
-44	210-0407-00			1		NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
						- - - * - - -		
-45	334-3379-00			4		MARKER,IDENT:MARKED GROUNDSYMBOL	80009	334-3379-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-46	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-47	211-0510-00			1		SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
-48	252-0717-00			AR		PLASTIC EXTR:CHAN 5.3MM X 5MM X 100MM	0000M	52-0717-00
-49	210-0202-00			1		TERMINAL,LUG:0.146 ID,LOCKING,BRZ TINNED	78189	2104-06-00-2520N
						(ATTACHING PARTS)		
-50	211-0541-00			1		SCREW,MACHINE:6-32 X 0.25"100 DEG,FLH STL	83385	OBD
-51	210-0407-00			1		NUT,PLAIN,HEX.:6-32 X 0.25 INCH,BRS	73743	3038-0228-402
						- - - * - - -		
-52	441-1538-00			1		CHASSIS,SCOPE:REAR	0000M	441-1538-00
						(ATTACHING PARTS)		
-53	211-0038-00			4		SCREW,MACHINE:4-40 X 0.312,FLH,100 DEG	83385	OBD
						- - - * - - -		
-54	----- -----			1		XFMR,POWER:(SEE T1806 REPL)		
						(ATTACHING PARTS)		
-55	211-0510-00			4		SCREW,MACHINE:6-32 X 0.375,PNH,STL,CD PL	83385	OBD
-56	210-0006-00			4		WASHER,LOCK:#6 INTL,0.018THK,STL CD PL	78189	1206-00-00-0541C
						- - - * - - -		
-57	----- -----			1		CKT BOARD ASSY:LOW VOLTAGE(SEE A7 REPL)		
						(ATTACHING PARTS)		
-58	129-0831-00			3		SPACER,POST:34MM L,W/4-40 INT THD	0000M	129-0831-00
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-59	214-0579-00			1		. TERM,TEST POINT:BRS CD PL	80009	214-0579-00
-60	131-0608-00			AR		. TERMINAL,PIN:0.365 L X 0.025 PH BRZ GOLD	22526	47357
-61	----- -----			1		CKT BOARD ASSY:DC-DC(SEE A8 REPL)		
						(ATTACHING PARTS)		
-62	211-0244-00			3		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL	78189	OBD
						- - - * - - -		
-63	343-0918-00			1		CLAMP,CABLE:9.1MM ID,TEFLON	0000M	343-0918-00
-64	343-0919-00			1		CLAMP,CABLE:4.4MM ID TEFLON	0000M	343-0919-00
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-65	----- -----			4		. TRANSISTOR:(SEE A8Q2224,A8Q2225,A8Q2226,		
	----- -----			-		. A8Q2227 REPL)		
						(ATTACHING PARTS)		
-66	211-0012-00			2		. SCREW,MACHINE:4-40 X 0.375,PNH STL CD PL	83385	OBD
-67	210-0586-00			2		. NUT,PL,ASSEM WA:4-40 X 0.25,STL CD PL	83385	OBD
						- - - * - - -		
-68	----- -----			1		. SWITCH,SLIDE:(SEE A8S1804 REPL)		
-69	----- -----			1		. SWITCH,SLIDE:(SEE A8S1806 REPL)		
-70	361-1131-00			2		. SPACER,SL SW:16.5 L X 14.6 W 3MM THK	0000M	361-1131-00
-71	131-0589-00			AR		. TERMINAL,PIN:0.46 L X 0.025 SQ	22526	47350
-72	----- -----			1		. XFMR,TOROID:(SEE A8T2222 REPL)		
						(ATTACHING PARTS)		
-73	212-0011-00			1		. SCREW,MACHINE:8-32 X 0.750 INCH,FLH STL	83385	OBD
-74	210-0409-00			1		. NUT,PLAIN,HEX.:8-32 X 0.312 INCH,BRS	73743	3046-402
						- - - * - - -		
-75	343-0443-00			1		. RETAINER,XFMR:	80009	343-0443-00
-76	162-0707-00			AR		INSUL,SLV ELEC:HEAT SHRINK	0000M	162-0707-00
-77	200-2264-00			1		CAP.,FUSEHOLDER:3AG FUSES	S3629	FEK 031 1666
-78	204-0833-00			1		BODY,FUSEHOLDER:3AG & 5 X 20MM FUSES	S3629	031.1653(MDLFEU)
						(ATTACHING PARTS)		
-79	210-0241-00			1		TERMINAL,LUG:0.515 ID X 0.625 INCH OD SE	80009	210-0241-00
-80	210-1351-00			1		WASHER,FLAT:13MM ID X 19MM OD X 5MM	0000M	210-1351-00
						- - - * - - -		
-81	333-2691-00			1		PANEL,REAR:	0000M	333-2691-00
-82	348-0662-00			2		FOOT,CABINET:W/CORD WRAP	0000M	348-0662-00
						(ATTACHING PARTS)		
-83	211-0513-00			2		SCREW,MACHINE:6-32 X 0.625 INCH,PNH STL	83385	OBD
						- - - * - - -		
-84	426-1758-00			1		FRAME,CABINET:	0000M	426-1758-00
-85	----- -----			1		CABLE ASSY,PWR,:3 WIRE,92 INCH LONG		
	----- -----			-		(NOT AVAILABLE AT THIS PRINTING)		
-86	358-0323-00			1		BSHG,STRAIN RLF:90 DEG,0.515 DIA HOLE	28520	SR-15-1

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
2-87	390-0791-02			1		CABINET,SCOPE:	0000M	390-0791-02
						(ATTACHING PARTS)		
-88	213-0284-00			2		SCREW,CABINET:4-40 X 4.5MM,PH BRZ,STL,NP	0000M	213-0284-00
-89	211-0507-00			1		SCREW,MACHINE:6-32 X 0.312 INCH,PNH STL	83385	OBD
						- - - * - - -		
-90	200-1342-00			2		COVER,HANDLE:35.5MM OD X 14MM H,PLASTIC	0000M	200-1342-00
-91	367-0203-00			1		HANDLE,CARRYING:BLACK VINYL	0000M	367-0203-00
						(ATTACHING PARTS)		
-92	212-0033-00			2		SCREW,MACHINE:8-32 X 0.750 INCH,PNH STL	83385	OBD
-93	210-0008-00			2		WASHER,LOCK:INTL,0.172 ID X 0.331"OD,STL	78189	1208-00-00-0541C
-94	386-3936-00			2		PLATE,MOUNTING:HANDLE,STEEL	0000M	386-3936-00
-95	386-2182-00			4		PLATE,FRICTION:	0000M	386-2182-00
-96	343-0757-00			2		RETAINER,HANDLE:	0000M	343-0757-00
						- - - * - - -		
-97	342-0141-00			2		INSULATOR,FILM:CABINET TOP,MYLAR	0000M	342-0141-00
-98	348-0080-01			4		FOOT,CABINET:BOTTOM	80009	348-0080-01
-99	334-3850-01			1		PLATE,IDENT:MKT HANDLE	0000M	334-3850-01
-100	162-0710-00			AR		INSUL SLVG,ELEC:2.6MM ID,0.5MM THK	0000M	162-0710-00

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
						STANDARD ACCESSORIES		
-1	010-6149-03			1		PROBE,VOLTAGE:P6149,2 METER,10X W/ACCESS	80009	010-6149-03
-2	161-0094-01			1		CABLE ASSY,PWR:		
-3	016-0663-02			1		CASE,CARRYING:HARD SHELL	0000M	016-0663-02
-4	200-2260-00			1		COVER,CRYG CASE:	0000M	200-2260-00
-5	346-0131-00			1		STRAP ASSY,CRYG:	0000M	346-0131-00
-6	015-0438-00			1		ADAPTER ASSY:SUBCARRIER PHASE REF BOX	0000M	015-0438-00
	159-0015-02			1		FUSE,CARTRIDGE:3AG,3A,250V,FAST	0000M	159-0015-02
	159-0156-00			1		FUSE,CARTRIDGE:1.5A,250V	0000M	159-0156-00
	070-3421-00			1		MANUAL,TEH:(380)	0000M	070-3421-00
	070-3422-00			1		MANUAL,TECH:381	80009	070-3422-00
						OPTIONAL ACCESSORIES		
	016-0297-00			1		VISOR,CRT:	80009	016-0297-00
	016-0693-04			1		BATTERY,STORAGE:12V,6H@600M,10 CELLS	80009	016-0693-04
	016-0327-00			1		ADAPTER,CAMERA:EXTENSION	80009	016-0327-00



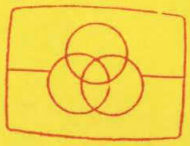
381 PAL TEST MONITOR

MANUAL CHANGE INFORMATION

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Since the change information sheets are carried in the manual until all changes are permanently entered, some duplication may occur. If no such change pages appear following this page, your manual is correct as printed.



Tektronix®
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MANUAL CHANGE INFORMATION

Date: May 27, 1982 Change Reference: C1/582

Product: 381 PAL TEST MONITOR Manual Part No.: 070-3422-00

DESCRIPTION

TEXT CHANGES

SECTION 2 SPECIFICATION, Page 2-1, Maximum Input Signal

CHANGE TO READ:

Characteristics	Performance Requirements	Supplemental Information
Maximum Input Signal		
Dc Coupled LOOP THRU	±1.5 V, dc plus Peak ac.	
Ac Coupled LOOP THRU	2.0 V p-p at any average picture level.	
	1.0 V p-p at any average picture level with SIGNAL OUTPUT terminated.	

Page 2-6, Phase Shift with Subcarrier Frequency Change

CHANGE TO READ:

Characteristics	Performance Requirements	Supplemental Information
Phase Shift with Sub-carrier Frequency Change		Typically less than 1° with ±10 Hz frequency change.
		Typically less than 2° with ±20 Hz frequency change.

(SEE OTHER SIDE)

Product: 381 PAL TEST MONITOR Date: May 27, 1982 Change Reference: C1/582

DESCRIPTION

PARTS LIST & DIAGRAM CHANGES

SECTIONS 7 & 9, REPLACEABLE ELECTRICAL PARTS and CIRCUIT BOARD ILLUSTRATIONS & DIAGRAMS (CHROMA FILTER, Diagram ◇9◇)

CHANGE TO:

A1C3804	281-0798-00	CAP.,FXD,CER DI: 51PF, 2%, 100V
A1C3806	281-0798-00	CAP.,FXD,CER DI: 51PF, 2%, 100V
A1C3852	281-0798-00	CAP.,FXD,CER DI: 51PF, 2%, 100V
A1C3854	281-0798-00	CAP.,FXD,CER DI: 51PF, 2%, 100V
A1R3804	315-0239-00	RES.,FXD,CMPSN: 3.01K OHM, 1%, 0.125W
A1R3806	315-0239-00	RES.,FXD,CMPSN: 3.01K OHM, 1%, 0.125W
A1R3852	315-0239-00	RES.,FXD,CMPSN: 3.01K OHM, 1%, 0.125W
A1R3854	315-0239-00	RES.,FXD,CMPSN: 3.01K OHM, 1%, 0.125W

Tektronix
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MANUAL CHANGE INFORMATION

Date: 6-2-82 Change Reference: C2/682

Product: 381 PAL Test Monitor Manual Part No.: 070-3422-00

DESCRIPTION

ELECTRICAL PARTS LIST CHANGE

CHANGE TO:

A1Q70	151-1149-00	TRANSISTOR:FET,SI,TO-92