

**TEKTRONIX®**

**5L4N**

**SPECTRUM  
ANALYZER**

**INTERIM**

**INSTRUCTION MANUAL**

**TEKTRONIX®**

**5L4N**

**SPECTRUM  
ANALYZER**

**INTERIM**

**INSTRUCTION MANUAL**

Tektronix, Inc.  
P.O. Box 500  
Beaverton, Oregon 97005

Serial Number \_\_\_\_\_

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**All TEKTRONIX instruments are warranted against defective materials and workmanship for one year. Any questions with respect to the warranty should be taken up with your TEKTRONIX Field Engineer or representative.**

**All requests for repairs and replacement parts should be directed to the TEKTRONIX Field Office or representative in your area. This will assure you the fastest possible service. Please include the instrument Type Number or Part Number and Serial Number with all requests for parts or service.**

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# SPECIFICATIONS -- 5L4N INTERIM

## SECTION 1

### GENERAL INFORMATION AND SPECIFICATIONS

#### Introduction

This is an interim manual containing some of the information that will be provided in the final manual. The manual (final) will be divided into ten major sections that provide the following information.

Section 1 -- General Information and Specifications: Contains the instrument description and specifications.

Section 2 -- Operation Instructions: Information relative to installing and operating the instrument.

Section 3 -- Performance Check: Provides procedures to check the operational performance of the instrument plus additional performance check procedures that require test equipment to verify that instrument performance is in accordance to specifications.

Section 4 -- Calibration Procedure: Describes test equipment setup and adjustment procedures required to calibrate the instrument.

Section 5 -- Circuit Description: Provides basic and general circuit analysis that may be useful when servicing or operating the instrument.

Section 6 -- Maintenance Instructions: Describes routine and corrective maintenance procedures with detailed instructions for replacing assemblies, sub-assemblies, and individual components.

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An exploded drawing is part of Section 10. Troubleshooting procedures plus general information that may aid in servicing the instrument are also provided.

Section 7 -- Options and Modifications: Provides data on production options available.

Section 8 -- Electrical Parts List: Provides information necessary to order replaceable parts and assemblies.

Section 9 -- Diagrams: Provides functional block diagram and detailed circuit schematics. Located adjacent to the diagram (usually on the back of the preceding diagram) are pictorial layout drawings which show sub-assembly and component locations. IC logic diagrams, waveforms and voltage data, for troubleshooting or circuit analysis, are also provided adjacent to or on the diagram.

Section 10 -- Mechanical Parts List, Exploded Drawings and Accessories: Provides information necessary to order replaceable parts. The Parts List is cross-referenced to the Electrical Parts List. Exploded drawing shows sequence of assembly and identifies assemblies.

Section 11 -- Changes and Corrections: Provides updating information for the manual in the form of inserts. These inserts are incorporated into the manual text and diagrams when the manual is updated.

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### Description

The 5L4N Spectrum Analyzer is a high performance, low frequency spectrum analyzer that plugs into and operates with the 5000-Series mainframe oscilloscopes. It is a swept front end analyzer which displays absolute amplitude information of signals within the frequency span of 0 Hz to 100 kHz.

The 5L4N features: Maximum sensitivity of -134 dBm ( $50\Omega$ ), -145 dBm ( $600\Omega$ ), -147 dBV (high Z) and 45 nV (Linear Mode). Intermodulation greater than 70 dB down. A differential (balanced) or single-ended input. Front panel input impedance selections of  $50\Omega$ ,  $600\Omega$ , or  $1M\Omega$  shunted by 50 pF (high Z). A fully calibrated vertical display appropriate to input impedance selected, with 80 dB dynamic range. Reference level selections from -10 dBm/dBV to -130 dBm/dBV, and deflection factor from 50 mV/Div to 20 nV/Div. Incidental FM'ing less than 2 Hz. Variable resolution bandwidth from more than 3 kHz to less than 10 Hz and automatic resolution for all spans. Start or center frequency display selection. A tracking generator signal source. Two video filters for noise averaging. Internal, external or automatic triggered sweep.

The analyzer is a double width plug-in for the 5000-Series mainframe. It is used in the right vertical and horizontal spaces of a three plug-in mainframe.

### ELECTRICAL CHARACTERISTICS

The following characteristics and features of the 5L4N Spectrum

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Analyzers are applicable over the environmental specification criteria for the mainframe and after a warmup period of 30 minutes or more.

### Frequency

Range: 0 to 100 kHz

Dial Readout Resolution: 500 Hz

Accuracy:  $\pm 3$  kHz (FINE tune control midrange and Span/Div calibrated for 10 kHz)

### Frequency Span

Calibrated spans from 10 kHz/Div to 20 Hz/Div, within 4%, in a 10-5-2 sequence, plus 0 Hz and LOG span are provided. The analyzer is a receiver in the 0 Hz position that provides time domain data within any selected resolution bandwidth, centered at the frequency tuned. The LOG position provides a full three decade logarithmic sweep from 100 Hz to 100 kHz.

### Resolution

The resolution bandwidth is variable from 3 kHz or more to 10 Hz or less. An AUTO position (when the control is fully ccw in the AUTO detent) provides automatic resolution bandwidth compensation for the sweep rates less than 10 ms/div and frequency span combinations, including the LOG span sweep mode.

Shape Factor: Shape factor (from the 60 dB to 6 dB level) is 4:1 or less at 3 kHz, increasing to 10:1 or less from 10 Hz to 1 kHz. Line frequency sidebands of 50 Hz or more can be resolved up to 60 dB below the signal level.

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Signal level change over the resolution bandwidth range is not more than 2 dB.

### Stability

Within 30 Hz/10 min, at a fixed ambient temperature that is within the operating ranges.

### Incidental FM

2 Hz (p-p) or less.

### Video Filtering

300 Hz or 10 Hz of filtering can be selected to provide signal or noise averaging.

### Amplitude Characteristics

#### Display Functions

10 dB/DIV: This mode provides a calibrated 80 dB dynamic range with an accuracy of .05 dB/dB to a total of 2 dB over the 80 dB dynamic window.

2 dB/DIV: This mode provides a calibrated 16 dB dynamic range with an accuracy that is within 0.1 dB/dB to a total of 1.0 dB over the 16 dB dynamic window.

LIN: V/DIV: This mode provides linear deflection with an accuracy that is within 3% of full scale, over the display window.



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## Display Range

### Reference Level Selection (Log Mode)

<u>Selection</u>	<u>Reference</u>
dBV	0 dBV = 1 volt rms
dBm at 50 $\Omega$	0 dBm (1 mW) = 223.6 mV rms
dBm at 600 $\Omega$	0 dBm (1 mW) = 774.6 mV rms

### Calibrated Reference Level Range and Accuracy

The display level is calibrated when the variable gain control is in the CAL detent (fully ccw). Variable control provides at least 10 dB increase in gain.

10 dB/DIV; Calibrated 10 dB steps from -10 dBm/dBV to -70 dBm/dBV, at the top of the display. Accuracy, with respect to the level for -40 dBm/dBV, is within 0.4 dB/10 dB to a total of 1 dB.

2 dB/DIV: Calibrated 10 dB steps from -10 dBm/dBV to -130 dBm/dBV, at the top of the display. Accuracy, with respect to the level for -40 dBm/dBV, is within 0.4 dB/10 dB to a total of 1 dB for -70 dBm/dBV and 2 dB for -130 dBm/dBV.

LIN/DIV: Calibrated steps in a 5-2-1 sequence, from 50 mV/Div to 20 nV/Div (rms). Accuracy is within 5% per decade to a total of 12% over the full range.

### Display Flatness (20 Hz - 100 kHz)

Flatness within  $\pm 0.2$  dB over any selected frequency span, with respect to the level of -40 dBV signal at 5 kHz.

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CW Sensitivity (Signal level + noise = 2X noise)

The following characteristics are applicable with the input internally terminated or with a 600 $\Omega$  or less source impedance:

Display Mode	Resolution Bandwidth	
	3 kHz	10 Hz
dBV	-123 dBV	-147 dBV
dBm 50 $\Omega$	-110 dBm	-134 dBm
dBm 600 $\Omega$	-121 dBm	-145 dBm
LIN	680 nV	45 nV

With the input open, displayed noise is the thermal noise of the input 1 M $\Omega$ /50 pF impedance.

Intermodulation Distortion (with the input signal level equal to or less than the reference level):

Third order products are down 70 dB or more from two -10 dBm/dBV signals, within any frequency span and 75 dB or more down from two -20 dBm/dBV signals, within any frequency span.

Spurious Signals from Internal Sources (Residual Response) with TRKG GEN and 5 kHz FREQ COMB OFF and the input terminated in an impedance of 600  $\Omega$  or less are:

Equal to or less than -130 dBm/dBV referred to the input

Line related spurii are less than -120 dBm/dBV

With high input impedance and single-ended, the high voltage oscillator in some mainframes causes spurii at 30 kHz and harmonics  $\leq$ 100 dBV.

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The zero (start) spur is less than -80 dBV or four divisions (10 dB/DIV) with -10 dBV to -40 dBV reference level range.

### Input Characteristics

The INPUT connector is a floating two-conductor BNC connector that provides either a differential or single-ended input. Input selection is provided by a switch that grounds the outer conductor of the connector when it is in the SINGLE ENDED position. An accessory adapter (floating BNC to dual BNC) provides full shielding of the input signal leads.

#### NOTE

*When operating in the DIFFerential mode, the INPUT connector is floating. The outer conductor therefore equals the voltage level of the external source. Since the external source voltage may be some high potential, the outer conductor voltage is clamped at  $\pm 10$  V for safety.*

Selectable input impedance provides; either high Z of  $1\text{ M}\Omega/50\text{ pF}$ , or internally terminated impedances of  $600\ \Omega$  or  $50\ \Omega \pm 2\%$ .

### Differential Input Characteristics

Common-mode signal range:  $\pm 10$  volt

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Maximum signal input:

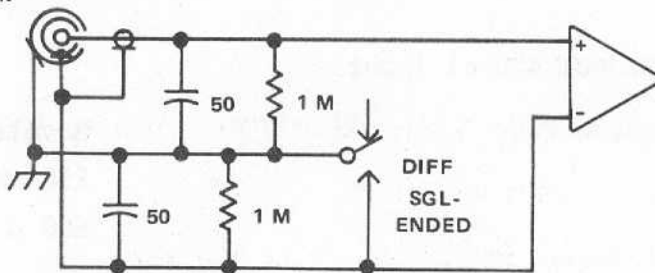
Low Z	5 volt (dc + peak ac); 250 mW at $50\Omega$ , 125 mW at $600\Omega$
High Z	100 volts (dc + peak ac); A fast-rise pulse signal $\pm 30\text{ V}$ (or $4\text{ V}/\mu\text{s}$ ) may open the 0.1 A input protective fuse.
Common-mode rejection ratio:	$\pm 70\text{ dB}$

Single-ended Input Characteristics

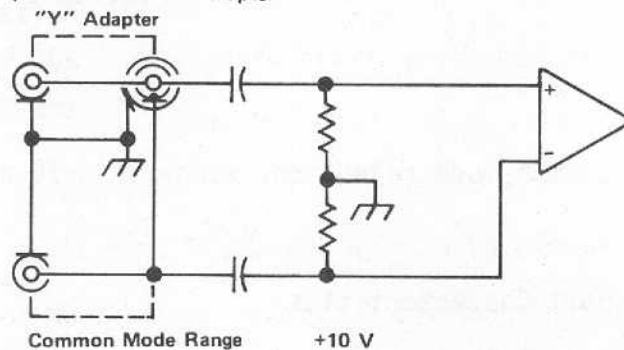
Maximum signal input for linear operation:  $-10\text{ dBm/dBV}$   
( $0.316\text{ rms}$ ). Useful measurements can be performed with the input  
level 10 dB above the reference level. This overload condition  
will increase spurious responses but will not damage the input  
circuit.

INPUT CHARACTERISTICS AND IMPEDANCE SELECTORS

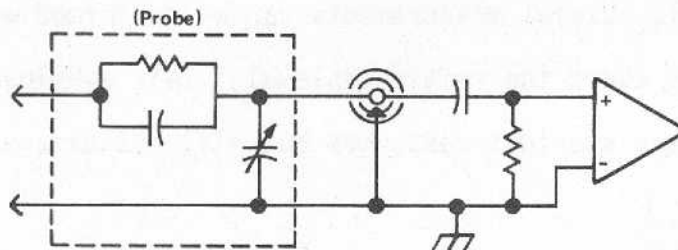
Basic Circuit



Differential Operation with "Y" Adapter



Single-Ended Operation with Probe



Impedance and Ref Lvl Selections

BUTTON	BASIC CKT	REF LVL
50 Ω		dBm (50 Ω)
600 Ω		dBm (600 Ω)
BOTH OUT		dBV

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### Sweep Characteristics

Linear Frequency Span: 20 Hz/Div, in a 10-5-2 sequence.

Accuracy of the spans within 4%.

Log Frequency Span: 100 Hz to 100 kHz.

Zero Frequency Span: The analyzer operates as a tuned receiver for time domain analysis within the bandwidth (resolution) selected, centered at the tuned frequency.

Internal Sweep Source: Time base; 1 s/Div to 1 ms/Div within 5%, in decade steps. A 10X MULTR control increases this time to at least 10 s/Div and provides continuous sweep rate adjustment over the sweep rate range.

External Sweep: Requires 0 volt to 500 mV  $\pm$ 50 mV, from a 1 k $\Omega$  or less source, to sweep the full span. The 50 mV/DIV pushbutton must be depressed to externally sweep the analyzer.

Manual Sweep: Manual sweep is provided.

Triggering: Internal triggering from the LEFT VERTICAL plug-in unit or the analyzer video, requires at least 1.0 division of signal. External triggering from the EXT IN/OUT jack requires at least 250 mV of signal with a maximum safe input level of 20 V (dc + peak ac). Input impedance is approximately 1 M $\Omega$ . The 50 mV/DIV and both SOURCE buttons must be out to trigger the sweep from an external source.

AUTOMATIC trigger selection provides a sweep baseline when a trigger signal is absent.

Single sweep triggering occurs each time the SWP button is pushed, when SGL SWP mode and positive SLOPE are selected.

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Line triggering is provided.

External and internal triggering signals are ac coupled.

Frequency range is approximately 10 Hz to 5 kHz.

Triggering level variable range is approximately 8 divisions peak-to-peak internal or 2 volt peak-to-peak external.

### Output Characteristics

Tracking Generator: A  $600\Omega$  signal source with a frequency equal to the analyzer input frequency within 3 Hz. Calibrated output is  $-40\text{ dBV} \pm 0.2\text{ dB}$  (10 mV) open circuit, or  $-46\text{ dBV}$  when terminated into  $600\Omega$ . The open circuit output level can be varied from approximately .001 volt to 0.1 volt.

5 kHz FREQUENCY COMB:  $600\Omega$  source of 5 kHz  $\pm .005\%$  frequency markers for span calibration.

VIDEO OUT: Provides 250 mV  $\pm 3\%$  of the video signal per displayed division (0 V to 2 V). Source impedance is about 1.0 k $\Omega$ .

EXT IN/OUT: Provides 500 mV  $\pm 25\text{ mV}$  per division of span, from 0 to 5 volts, when using internal or manual sweep.

### ENVIRONMENTAL CHARACTERISTICS

This instrument will meet the electrical characteristics over the environmental limits of the 5000-Series mainframe. Complete details on test procedures, including failure criteria, etc., can be obtained from Tektronix, Inc. Contact your local Tektronix Field Office or representative.

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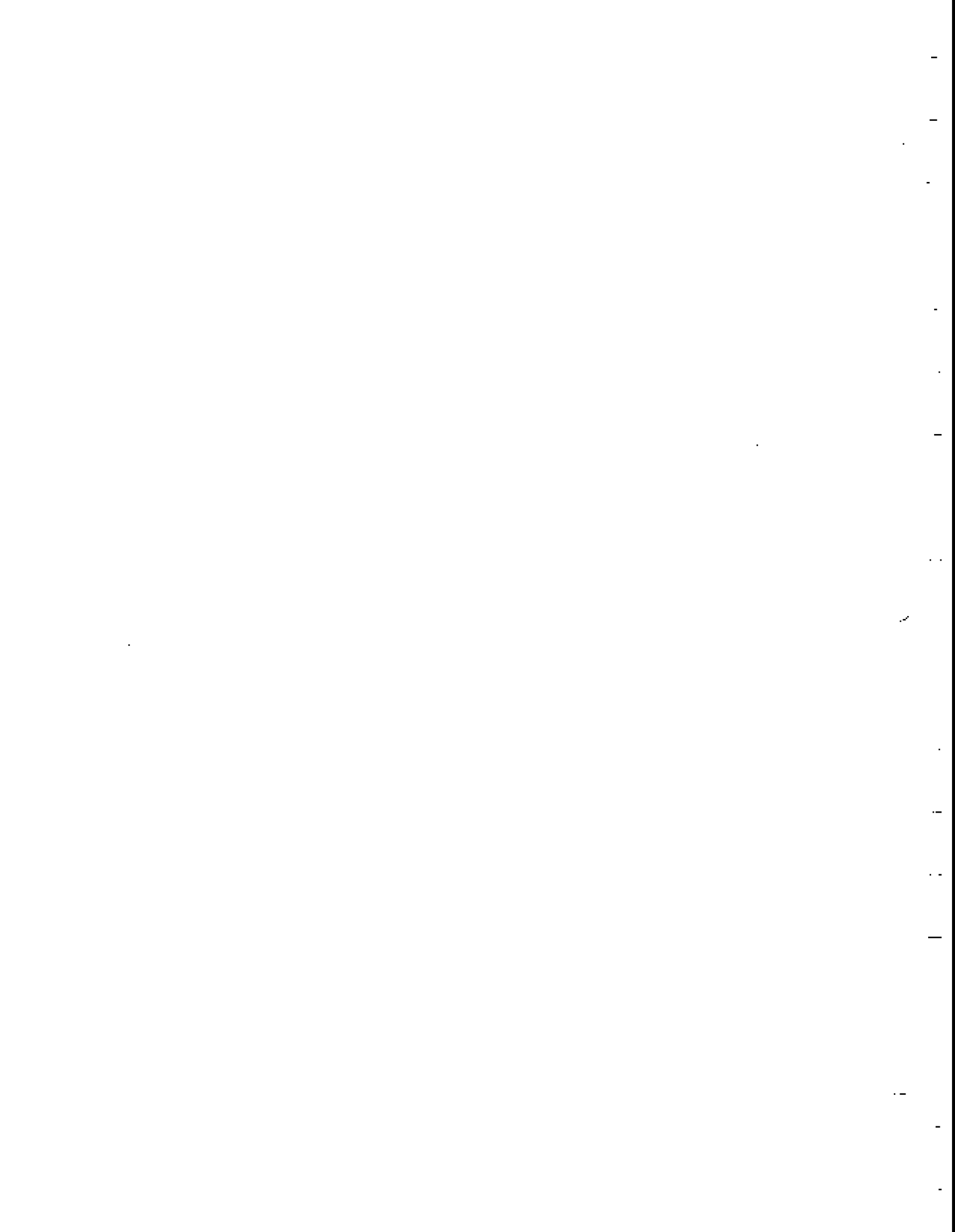
STANDARD ACCESSORIES

1	Manual	070-1733-00
1	Adapter, FLTG BNC to Dual BNC	013-0156-00

OPTIONAL ACCESSORIES

1	BNC to Pin Jack Adapter Cable	175-1178-00
1	10X Probe (P6006), 6 foot, BNC	010-0160-00
1	Blank Plug-In Panel	016-0195-00





# OPERATING INSTRUCTIONS - - 5L4N INTERIM

## SECTION 2

### Introduction

The 5L4N Spectrum Analyzer operates with a Tektronix 5000-Series mainframe oscilloscope. It is a double-width plug-in unit containing a horizontal and vertical section; therefore, it is installed in the horizontal and vertical compartments of the mainframe (right two compartments for three hole mainframes).

To install, align the upper and lower guide rails of the 5L4N with the plug-in compartment tracks and fully insert it until the front panel is flush with the oscilloscope panel. To remove, pull the release latch to disengage the unit from the plug-in compartment.

This section of the manual describes the following: 1) Front panel controls, selectors, adjustments, and connectors. 2) General operating information, such as; signal application, some typical applications, and measurement precautions. Preliminary adjustments and procedures required to match the 5L4N to the mainframe and the Operational checkout procedure are contained in Section 3.

### Functions of the Front Panel Controls, Selectors, Adjustments, and Connectors

The following description of these front panel controls should help familiarize you with the instrument operation and its applications. Because there are numerous operational modes, many front panel controls and selections are used. This requires abbreviating the descriptive name of most controls. Figs. 2-1 A and B illustrate the location and partial function of these front panel selectors, controls, and connectors.

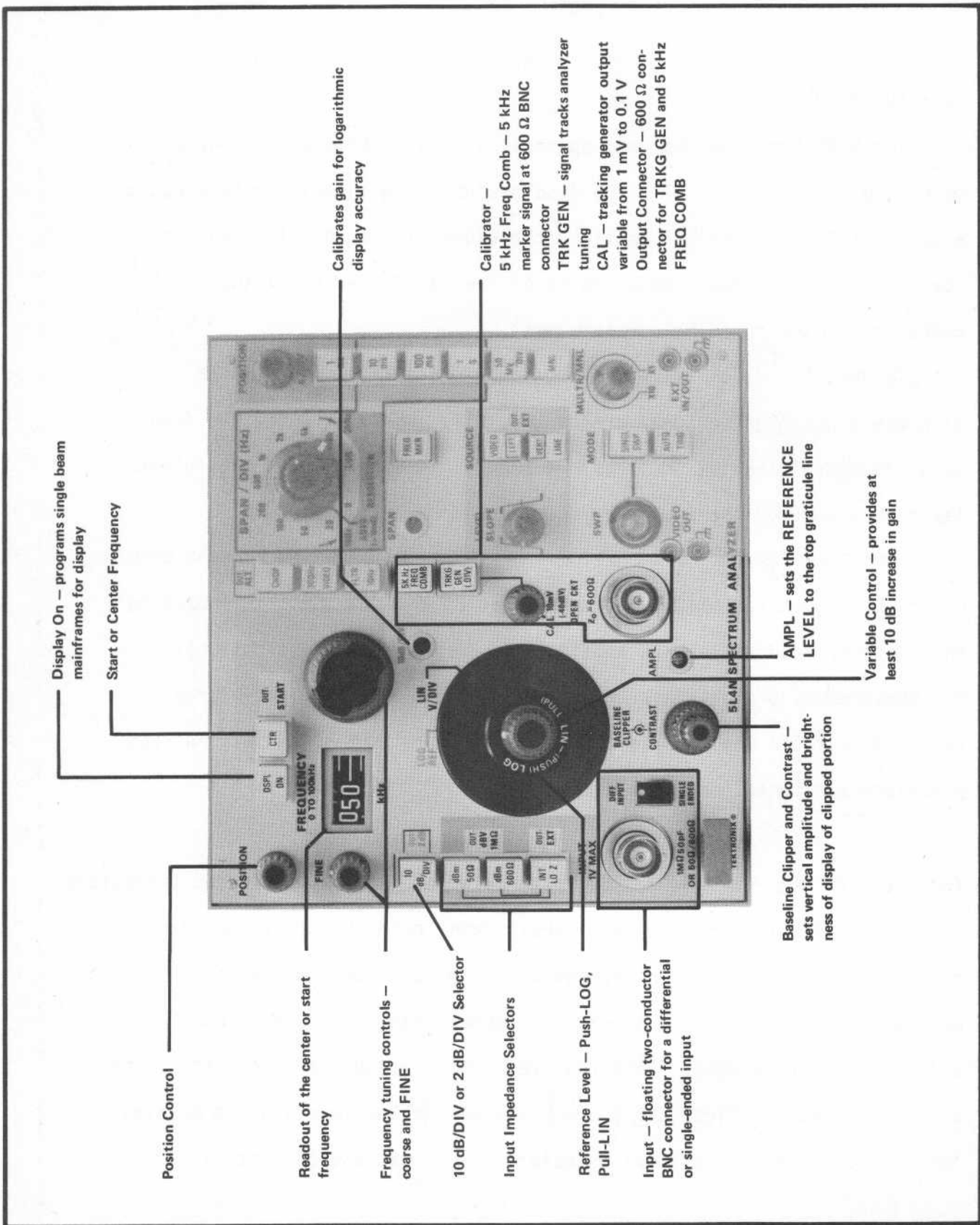


Fig. 2-1A. Front panel controls and selectors.

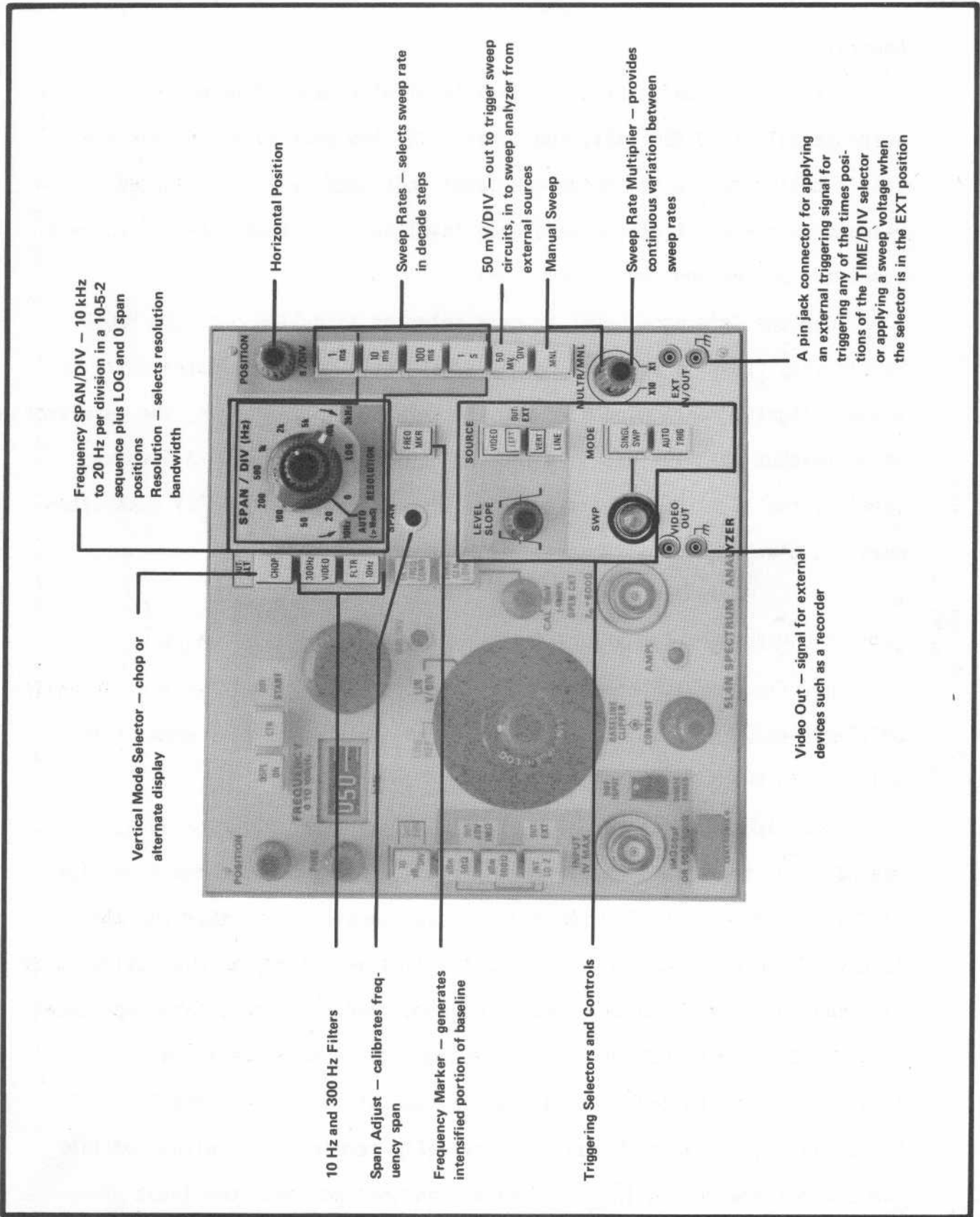


Fig. 2-1B. Front panel controls and selectors.

## OPERATING INSTRUCTIONS - - 5L4N INTERIM

### General

The vertical deflection of the 5L4N display is calibrated in absolute values of dBm, dBV, and V/Div. The top graticule line for the crt is calibrated to the reference level indicated by a back lighted readout on the skirt of the reference level selector knob (see Reference Level and Deflection Factor Selector).

When the Reference Level or gain selector is pulled out, the V/DIV Sensitivity (rms) is read out on the V/Div scale on the selector skirt by a black lighted panel window. When the selector is pushed in, the reference level readout is illuminated on the log scale of the skirt. A display level of the 10 dB/DIV or 2 dB/DIV is selected by the 10 dB/DIV pushbutton when the display mode is logarithmic.

### INPUT 1 V MAX Connector and DIFF INPUT/SINGLE ENDED Input Switch

This floating two-conductor BNC connector provides either a differential or single-ended input. A switch grounds the outer conductor when it is switched to the SINGLE ENDED position.

Input impedance can be high ( $1\text{ M}\Omega/50\text{ pF}$ ) or low ( $600\ \Omega$  or  $50\ \Omega$ ) depending on the selection of input impedance modes. The input Z is high ( $1\text{ M}\Omega$ ) when the INT LO Z pushbutton is out; however, if either the dBm  $50\ \Omega$  or  $600\ \Omega$  buttons are pushed in, the display reference level calibration (in dBm) corresponds to the voltage squared over the appropriate impedance (e.g.  $E^2/50\ \Omega$  or  $E^2/600\ \Omega$ ). Thus measurements of power relative to 1 mW (0 dBm) can be made without loading the circuit. When the INT LO Z button is pushed in, the input is internally terminated if either of the dBm buttons are pushed in. If both dBm buttons are out, the input

## OPERATING INSTRUCTIONS - - 5L4N INTERIM

impedance remains  $1\text{ M}\Omega$  and the display is calibrated in voltage (0 dBV 1 V, rms). When LIN mode is selected, the input may be terminated in 50 or 600  $\Omega$  by pushing INT LO Z and the desired dBm button. Input impedance characteristics are illustrated by basic drawings shown in Section 1.

The INPUT connector is a floating two conductor BNC connector. The outer conductor of the connector is connected to one input of a differential amplifier, when the switch is in the SINGLE ENDED position the outer conductor is grounded.

In the differential mode, the common mode signal range is  $\pm 10$  volts with a CMRR (common mode rejection ratio) greater than 70 dB. Maximum differential signal input at low impedance is 5 V (dc + peak ac) or (250 mW at 50  $\Omega$  and 125 mW at 600  $\Omega$ ) and is determined by input termination power. The maximum dc input applied to the center conductor in high impedance input mode is 100 V.

The input line is protected by a 0.1 A fuse that opens when signals of 30 V or more with risetimes of 4 V/ $\mu$ s are applied.

For either single-ended or differential operation, the maximum signal input for specified operation is two signals equal to or less than the reference level. Measurements can be made however, with the input overloaded up to 10 dB above the reference level (0 dBm/dBV or 1 V) without damage to the input circuit. This overload will increase spurious signal level on the display.

## OPERATING INSTRUCTIONS - - 5L4N INTERIM

### CAUTION

*When operating in the differential mode, the INPUT connector is floating. The outer conductor therefore equals the voltage level of the external source. Since the external source voltage may be some high potential the outer conductor is clamped by internal diodes to  $\pm 10$  V for safety.*

### FREQUENCY

The frequency is tuned by coarse and fine controls. The frequency of either the start or center of the display is indicated by a dial. The display is offset so the dial frequency is at the start of the display with the CTR button out and centered when the button is pushed. In the full span (10 kHz/Div) or LOG span display, a marker can be switched on with the FREQ MKR pushbutton. This marker is an intensified portion of the display (approximately 0.5 division wide) to indicate to the operator, that portion of the display that will be center or start frequency for the narrower frequency spans.

The FINE frequency control range is about 400 Hz or  $\pm 200$  Hz.

### DSPL ON

When this button is depressed, single beam mainframes are programmed so the 5L4N signals are displayed.

Reference Level and Deflection Factor Selector---(PULL) LIN --- (PUSH) LOG

This knob selects the reference level and gain for logarithmic displays or the deflection factor (V/Div) for linear displays. The selected reference

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

level is displayed within a lighted window on the knob skirt. The LOG REF readout scale is backlighted when the knob is pushed in and the LIN V/DIV scale is backlighted when the selector is pulled out.

10 dB/DIV or 2 dB/DIV

When the display is logarithmic, this pushbutton selects either 10 dB/DIV or 2 dB/DIV calibrated displays. Dynamic range of the displays are 80 dB and 16 dB.

10 dB/Div Adjustment

The gain for the logarithmic displays can be calibrated with this adjustment. The 10 dB/DIV mode is usually calibrated, however, the accuracy of the 2 dB/Div mode can be increased with the same adjustment. This adjustment also affects the LIN deflection factor.

AMPL Adjustment

This adjustment sets the reference level to the top graticule line, or calibrates the Volts/Division after the 10dB/Div adjustment.

BASELINE CLIPPER

This control sets the vertical amplitude of the clipped portion (subdued intensity) of the display.

CONTRAST

This control adjusts the brightness ratio between the clipped (subdued) baseline and the unclipped portion of the display. Display



## OPERATING INSTRUCTIONS -- 5L4N INTERIM

intensity is set by the mainframe Intensity control.

The clipper, contrast, and marker circuits are interlocked to the right vertical display of a single beam mainframe. These intensity modulations will appear on both traces of dual beam mainframes.

### TRKG GEN

When this button is pushed, a tracking generator signal which precisely tracks the spectrum analyzer tuning, is applied to the 600  $\Omega$  BNC connector. The output level (open circuit) of this signal can be varied from 1 mV (open circuit) to 0.1 V. When the variable control is fully ccw or in the CAL detent, the output level is a calibrated -40 dBV signal behind 600  $\Omega$ . If this calibrated signal is applied to the INPUT connector, an amplitude reference level is provided for calibrating the display reference.

### 5 KHz FREQ COMB

When this button is pushed, a calibrated 5 kHz marker signal is provided at the 600  $\Omega$  BNC connector. If this signal is applied to the INPUT, a frequency comb or picket fence of markers will be displayed. These markers can be used to check and calibrate the frequency span. The amplitude of the 25 kHz multiples is larger than the 5 kHz markers so 25 kHz segments, across the span, are easily identified.

### TRK Generator and 5 kHz FREQ COMB Output Connector

The output of the tracking generator or 5 kHz frequency comb is available at this 600  $\Omega$  BNC connector.

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### Video Filters

Two filters (300 Hz and 10 Hz) can be switched in to restrict the video bandwidth and reduce high video frequency components of the display. The filters are also used for display noise averaging.

### CHOP

The crt display of 5000 Series single beam mainframes depends on how the vertical plug-in units are programmed. If the DSPLY ON button for both vertical units are depressed, the CHOP pushbutton selects either chop (button in) or alternate (button out) display. The sweep rate for both the 5L4N and vertical plug-in unit, is the selected rate of the 5L4N time-base.

### SPAN/DIV and RESOLUTION

The SPAN/DIV and RESOLUTION controls are coaxial but not mechanically coupled. The SPAN/DIV range is 10 kHz to 20 Hz per division in a 10-5-2 sequence plus LOG and 0 (zero) span positions. The LOG position covers 100 Hz to 100 kHz. This provides three decades of logarithmic span, each decade covers an equal number of horizontal divisions. For correct LOG span the Freq dial should be set at 50 kHz or the FREQ MKR button pushed. The 0 span position provides time domain display of the video frequencies within the selected analyzer bandwidth at the frequency tuned.

The RESOLUTION control selects the resolution bandwidth. An AUTO detent position (control full ccw) provides the highest resolution possible for a calibrated display as the frequency span and sweep rate are changed. In the LOG span mode, this position provides the highest (narrowest bandwidth)

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

resolution at the low frequency end of the span and lower resolution (wider bandwidth) at the high end. The resolution bandwidth range is variable from 3 kHz or more to 10 Hz or less.

### SPAN Adjustment

This adjustment calibrates the frequency span by changing the horizontal gain.

### FREQ MKR

When the FREQ MKR button is pushed and the SPAN/DIV is 10 kHz/div or LOG, a frequency marker, which appears as an intensified portion of the trace is generated. The displayed spectrum is 0 to 100 kHz, (100 Hz to 100 kHz in LOG.) This marker indicates to the observer, the location of the tuned frequency on the spectrum and the portion that will be displayed as center or start frequency when the SPAN/DIV is decreased below 10 kHz. The marker is difficult to observe if storage mode is used and the intensity is high.

### Triggering and Sweep Controls

#### Triggering Modes

Three modes of triggering provide; automatic, single sweep, and triggered or normal display.

#### Triggering Sources

Four signal sources can be selected for triggering; line, the 5L4N video, the left vertical plug-in unit signal, and an external signal which is applied to the EXT IN/OUT jacks.

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VIDEO - Pushing this button selects the 5L4N video as the trigger signal.

LINE - Pushing this button selects a sample of the mainframe line voltage as the trigger signal.

LEFT VERT - Pushing both the VIDEO and LINE buttons in, selects the signal from the left vertical plug-in unit as the triggering signal.

OUT EXT - When both TRIG SOURCE pushbuttons are out, the triggering signal source is the signal applied to the EXT IN/OUT jacks. 250 mV peak-to-peak of external signal is required to trigger the sweep. The maximum safe input voltage for external trigger is 20 volts (dc + peak ac). The external trigger signal is ac coupled to the internal sweep generator.

### Triggering Modes

SGL SWP - With this button depressed and positive SLOPE selected, a sweep is initiated each time the SWP indicator button is pushed. The SWP button lights during sweep time.

AUTO TRIG - With this button depressed, the sweep automatically recurs at the end of holdoff time if a trigger signal is absent. The sweep triggers properly with inputs down to approximately 7 Hz.

MNL - Pushing this button connects the sweep circuits to the MULTR/MNL control so the sweep can be manually controlled.

### LEVEL SLOPE

This control selects the amplitude and slope at which triggering occurs. Since the triggering signal is ac coupled, the midrange of either slope is the average level.

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### Sweep Rate s/DIV

Four pushbuttons select sweep rates from 1 s/Div to 1 ms/Div in decade steps. A MULTR/MNL control provides continuous variation between these steps and sweep rate increase to at least 10 s/Div. Sweep rates from 10 s/Div to 10 ms/Div are recommended for spectrum analyzer operation; sweep rates faster than 10 ms/Div are limited by the bandwidth of the 5L4N.

### EXT IN/OUT

These pin jacks provide access to the analyzer sweep voltage, or provisions for applying an external sweep or trigger signal to the analyzer sweep circuits. Input impedance is about 1 M $\Omega$  for trigger mode and 30 k $\Omega$  or more in the external mode.

The signal output level is a 0 to 5 volt ramp when using internal sweep or manual scan. Input signal requirements are: 0 volt to 500 mV ramp to sweep the analyzer 10 divisions. This voltage range can be increased by a factor of 10 (0 V to 5 V) with the MULTR control. A 250 mV peak-to-peak or more signal is required to trigger the sweep circuits. (The 50 mV/DIV button must be out to trigger the sweep circuits, and pushed in when sweeping the analyzer from an external source.)

### VIDEO OUT

These pin jacks provide access to the video signal of the analyzer. Output level is 250 mV per displayed division of signal. Source impedance is about 1 k $\Omega$ .

### POSITION

These controls position the crt beam vertically (left control) and

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

horizontally (right control). The horizontal position control should be adjusted so the sweep starts at the left graticule line. The vertical position control should be adjusted so the baseline of a linear display is at the bottom graticule line.

### USING THE ANALYZER

#### 1. Signal Application

The INPUT connector is a floating two conductor BNC connector with its outer conductor connected through a switch (DIFF INPUT or SINGLE ENDED) to either, one input of a differential amplifier or to chassis ground.

**Input Impedance:** The input impedance for the 5L4N is  $1\text{ M } \Omega$  with approximately  $47\text{ pF}$  shunt capacitance that can be changed to  $50\text{ } \Omega$  or  $600\text{ } \Omega$  by selectable internal terminations. This provides a simple procedure to measure signal levels from a  $50\text{ } \Omega$  or  $600\text{ } \Omega$  signal source. To measure, terminate the INPUT with the appropriate impedance by depressing the INT LO Z button and the  $50\text{ } \Omega$  or  $600\text{ } \Omega$  dBm button.

If the signal source is high impedance, select the unterminated mode ( $1\text{ m } \Omega$ ) by disengaging the INT LO Z pushbutton. The 5L4N is calibrated in the units selected for the impedance selected. The Reference Level and Deflection Factor selector indicates the unit of calibration. Power measurements can be made without loading high impedance circuits.

**Input Levels:** In the differential mode, the common mode signal range is  $\pm 10$  volts. Common mode rejection is greater than 70 dB. Maximum signal

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

amplitude for linear amplification at low impedance, is 5 volt (dc + peak ac), or 250 mW at 50  $\Omega$  and 125 mW at 600  $\Omega$ . Maximum signal input amplitude for linear amplification with high impedance is 100 volt (dc + peak ac).

The FLTG BNC to Dua BNC ("Y") adapter (part of the standard accessories) provides shielded input connection for two signals to the INPUT when operating in the differential mode.

The maximum signal input level for linear amplification, when operating in the single-ended mode, is -10 dBm/dBV or 0.316 volt. Meaningful measurement can be made with signal levels up to 10 dB above the reference level without damaging the input circuits. This overload however increases the spurious signal level on the display.

### 2. Resolution, Frequency Span and Sensitivity.

Resolution is the ability of a spectrum analyzer to discretely display adjacent signals within a frequency span. This resolution ability is a function of analyzer bandwidth, sweep speed, frequency span, and incidental FM'ing. The frequency span and sweep time are adjusted for minimum resolution bandwidth to a cw signal. Theoretically, resolution and resolution bandwidth become synonymous at very long sweep times.

Resolution bandwidth is measured and specified for the 5L4N as the bandwidth (separation) at the 6 dB down point on the signal or when the notch between two merging signals is 6 dB down.

As the analyzer sweep rate is increased, signal amplitude will decrease and the effective analyzer bandwidth will increase, which means that both sensitivity and resolution have been degraded. The optimum resolution for a

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

given frequency span and sweep time, is expressed as:

$$R_0 = \sqrt{\frac{\text{Frequency Span (in kHz)}}{\text{Sweep Time (in ms)}}}$$

The analyzer bandwidth determines both the displayed noise level and the resolution capability of the analyzer. As the bandwidth decreases, signal-to-noise level and therefore sensitivity increases. Maximum sensitivity is therefore obtained at the higher resolution settings.

The resolution bandwidth can be manually controlled or an automatic mode can be selected which provides automatic bandwidth changes to compensate for any changes of the frequency span. In the LOG span mode, the automatic resolution provides narrow bandwidths for the low frequency end of the span and broader bandwidth at the higher frequency end. This automatic mode provides good resolution for all frequency spans, however manual adjustment should be used to optimize resolution when operating with narrow frequency spans.

The frequency span is symmetrical about the center frequency. Wide spans are used when monitoring a frequency spectrum for spurious signals, check harmonic Distortion, etc. Narrow spans are used to analyze a particular signal within the spectrum, such as; identify type of modulation, the percentage of modulation, bandwidth characteristics, presence of distortion, etc. When wide spans are displayed the sweep rate is usually increased to eliminate flicker. This requires wide resolution bandwidths to maintain sensitivity. When narrow spans are used, the resolution needs to be increased which requires slow sweep rates.



## OPERATING INSTRUCTIONS -- 5L4N INTERIM

As the sweep rate is increased, the amplitude of a cw signal will decrease and the bandwidth increases, which signifies that both the sensitivity and resolution have been degraded. The loss of the analyzer sensitivity due to sweep rate and dispersion can be expressed mathematically as:

$$\frac{S}{S_0} = \left[ 1 + 0.195 \left( \frac{D}{TB^2} \right)^2 \right]^{-1/4}$$

Where  $S/S_0$  is the ratio of the effective sensitivity to the analyzer measured sensitivity, at very slow sweep rates or zero dispersion.

D is the dispersion in hertz

B is the -3 dB bandwidth of the analyzer in hertz

T is the sweep time in seconds, or  $\frac{T}{D}$  is the sweep rate.

Usually the frequency span is set with automatic resolution to the desired setting, the RESOLUTION and sweep rate are then adjusted for the best sensitivity and resolution.

### 3. Using the Video Filters

The video filters are used to average distributed signals such as noise, and high frequency components on the display. When signals are closely spaced, the filters may be useful to reduce modulation between the signals for easier analysis. When the filters are used a reduction in the sweep rate may be required to maintain maximum sensitivity and a calibrated display. With both filters (300 Hz and 10 Hz) in, the filtering action is slightly increased over 10 Hz but in most cases no change will be noticed.

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

### 4. Selecting the Sweep Rate

Because the sweep rate affects the resolution and sensitivity, it must be decreased as the frequency span and resolution bandwidth are decreased. The sweep rate selection for the 5L4N is 1 ms/Div to 1 s/Div with a 10X MULTR that increases the range to at least 10 s/Div. The 1 ms/Div rate is too fast for most spectrum analysis, it does, however, provide a sweep rate that is applicable for some time domain operation.

When the frequency span is reduced to 0, the analyzer functions as a tuned receiver so time domain characteristics of a signal within the bandwidth capability of the analyzer, can be performed. The RESOLUTION bandwidth therefore should be maximum (3 kHz) for time domain analysis.

### 5. Manual Sweep

This mode is used to examine a particular point or portion of the display such as one of the null points of a frequency modulated spectrum. Calibrate the sweep span with a timed sweep, then depress the MNL button for manual sweep. Use the MULTR/MNL control to scan the selected spectrum. The display is swept from left to right as the control is rotated clockwise.

### 6. Triggering the Display

The triggering modes are; triggered sweep from an external source or from one of three internal sources; automatic triggering, which automatically triggers the sweep if a trigger signal is absent; and single sweep (SGL SWP), which requires the operator to push the SWP button to initiate a sweep. Automatic (AUTO) mode is usually used if the display is not time related to some signal source and the display is a frequency domain.

The internal triggering sources are: 1) The 5L4N video from a fixed

## OPERATING INSTRUCTIONS -- 5L4N INTERIM

tuned modulated signal or the vertical signal from the left vertical plug-in unit. The amplitude of these signals must equal or exceed one graticule division and the frequency range is 2 Hz to 100 kHz. 2) The line voltage.

External triggering signals are applied to the EXT IN/OUT jacks. The signal amplitude must equal or exceed 250 mV with a maximum safe input of 20 V (dc + peak ac). Both SOURCE and the 50 mV/DIV button must be out to connect an external triggering signal to the sweep generator.

In the AUTO TRIG mode, the sweep will synchronize with triggering signals 7 Hz or higher.

The SWP button lights when the sweep is running. This feature is useful when photographing displays to indicate shutter time. The button does not arm the triggering circuits like some time base units.

### 7. Using an External Sweep Source

A voltage ramp of 50 mV from a 1 k $\Omega$  or less source is required to sweep the analyzer each division, or 0 to 500 mV the full span. 0 volt corresponds to the left edge of the span or low frequency end and 500 mV corresponds to the right edge or high frequency end. Before switching to external operation, (50 mV/DIV button in) calibrate the sweep span using the internal sweep source and the 5 kHz FREQ COMB as described under Operational Check. Apply the external voltage to the EXT IN/OUT jack. Adjust the upper end of the voltage (500 mV) until the sweep span is calibrated.

## OPERATIONAL INSTRUCTIONS -- 5L4N INTERIM

### NOTE

*The frequency deviation across the selected span is a linear function (within 20%) of the input voltage, so 50 mV dc should tune the analyzer to the center of the selected frequency span.*

### 8. Using the Tracking Generator

The tracking generator is a 600  $\Omega$  signal source of the analyzer tuning response that delivers -40 dBV (.01 V open circuit) to the output connector. This signal is used to calibrate the reference level of the display or as a swept frequency test signal to plot the response characteristics of some external device such as a filter. The output level can be varied from about 1 mV to 0.1 V open circuit.

If the response of some external device is to be plotted, connect the device between the TRK GEN output and the INPUT to the 5L4N.

### 9. Measuring Absolute Signal Levels

Since the top of the graticule is a calibrated reference level as per the selector readout, and the graticule is calibrated in dB/Div, it is easy to measure the absolute level of most signals.

1) Calibrate the graticule as previously described in the Operational Check procedure. Ensure that the reference level variable (gain) control is in its CAL detent.

2) Connect the signal source to the INPUT and select the appropriate input termination as described previously under Signal Application. Switch the display mode to 10 dB/DIV or 2 dB/DIV. For maximum accuracy, use the 2 dB/DIV display mode.

## OPERATIONAL INSTRUCTIONS -- 5L4N INTERIM

3) Select a reference level with the selector to bring the signal to be measured within the screen or graticule window.

### NOTE

*If you are operating in the 10 dB/DIV mode, the reference level selector must be within the -60 to -10 range.*

4) The absolute signal level equals the number of dB graticule divisions from the reference level (top of the screen) to the signal reference (usually the signal peak) plus the reference level readout in dBm or dBV. For example: A signal level 4.5 divisions below the top graticule line, with a reference level readout of -60, in the 2 dB/DIV display mode, is  $-60 \text{ dBm/dBV} + (-9 \text{ dB})$  or 69 dBm/dBV. This refers to the signal level at the INPUT connector. Add the insertion loss of any external attenuators and cables (if used) between the signal source and the INPUT.

### NOTE

*The maximum input level to the INPUT for linear amplification is -10 dBm/dBV (0.316 V rms). Signals above this level should be attenuated a calibrated amount to bring them within the measurement capabilities of the 5L4N.*

## 10. Accurate Signal Level Difference Measurements in dB

1) Using the 2 dB/DIV display mode, position the top of the lowest amplitude signal to a reference line within the graticule window with the reference selector and variable. If display noise is excessive, use the

## OPERATIONAL INSTRUCTIONS -- 5L4N INTERIM

VIDEO FILTERS or decrease the resolution bandwidth. Decrease the sweep rate to maintain signal amplitude.

2) Use the reference level selector to reduce the amplitude of the larger signal until it is within the graticule area, and not the increased attenuation or decreased gain reading (e.g. -60 to -20 is 40 dB).

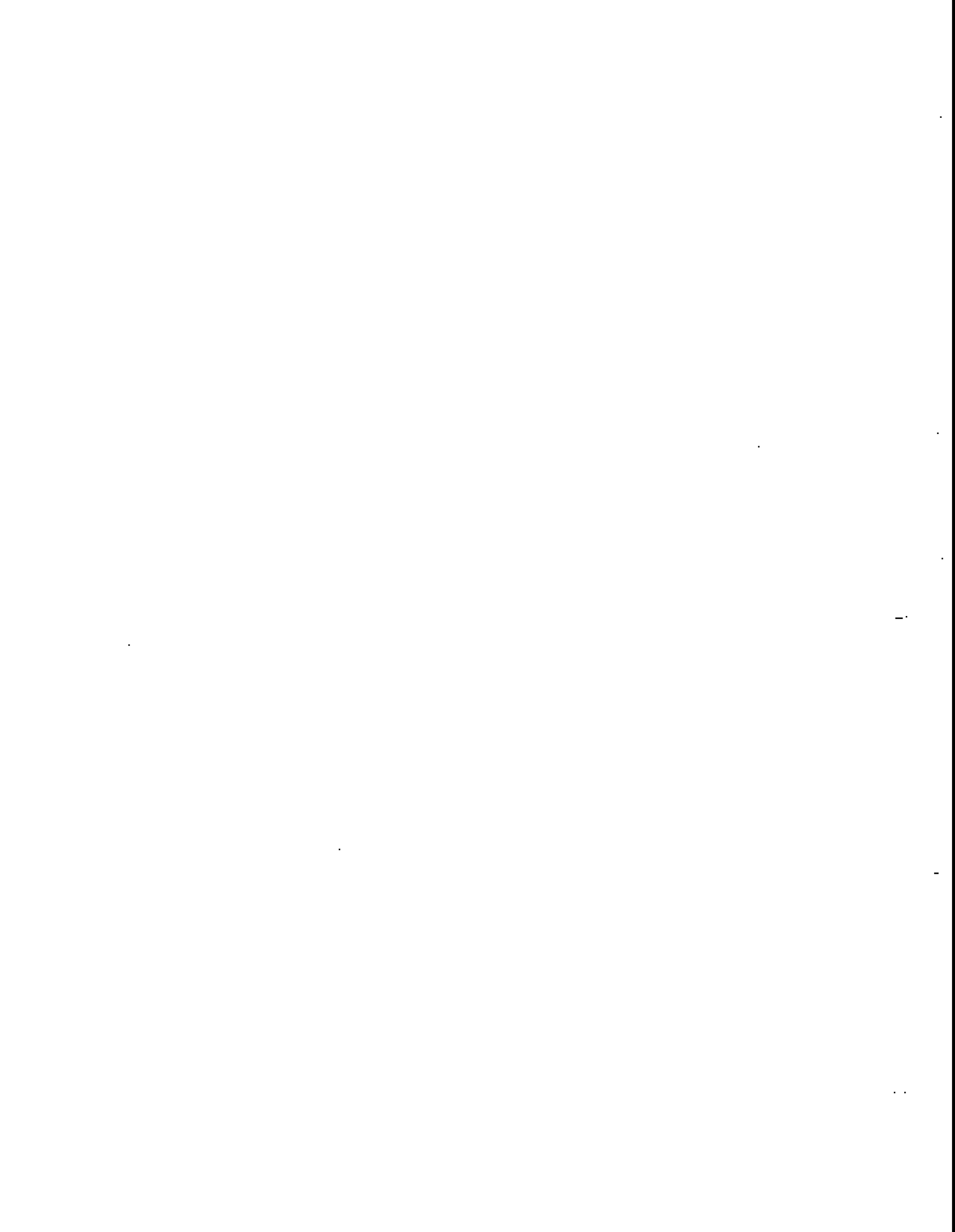
3) Measure the signal level from the reference line established for the smaller signal, then add the change in reference level selector reading to obtain the difference level in dB between the two signals.

### 11. Measuring Relative Signal Amplitude to LIN V/DIV Display Mode

Relative signal levels can be made by setting the amplitude of one signal, with the reference level selector and variable control, to the 5th graticule line from the baseline (bottom graticule line). The relative amplitude of other signals to this reference can then be read as a percentage if each graticule division is 20% or 0.2 increment of an eight division window. For example; a signal that is 3 divisions in amplitude is 60% of the reference.

## APPLICATIONS

Applications for spectrum analyzers include; measuring intermodulation products, cross modulation, radiation interference, modulation percentage modulation index, absolute and relative signal levels, etc. If you desire assistance for a specific application or current information on additional applications, contact your local Tektronix Field Office or representative.



# OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

## SECTION 3

### Introduction

There are two parts to this section. The first part is an operational checkout of the instruments performance that is suitable for instrument familiarization and incoming inspections. The latter part which will appear in the final manual is a more stringent procedure that verifies performance specifications. The first part requires minimal test equipment, the latter part requires extensive and sophisticated test equipment.

#### *NOTE*

*A storage or variable persistence mainframe oscilloscope is highly desirable because of the slow sweep speeds required to perform the following checks.*

### OPERATIONAL CHECK

Preliminary Adjustments to Calibrate the 5L4N to the Oscilloscope Mainframe

When the 5L4N Spectrum Analyzer unit is installed in the 5000-Series mainframe, it should be calibrated to the mainframe deflection sensitivities. The front panel calibration should be checked each time the instrument is first installed and turned on to ensure optimum accuracy.

Plug the 5L4N into the vertical and horizontal compartments of the mainframe. Connect the oscilloscope to a power source and switch the power on. Allow a few minutes for the instruments to stabilize.

Set the front panel controls as illustrated in Fig. 3-1 and apply the 5 kHz FREQ COMB signal to the INPUT through a short coaxial cable.



OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

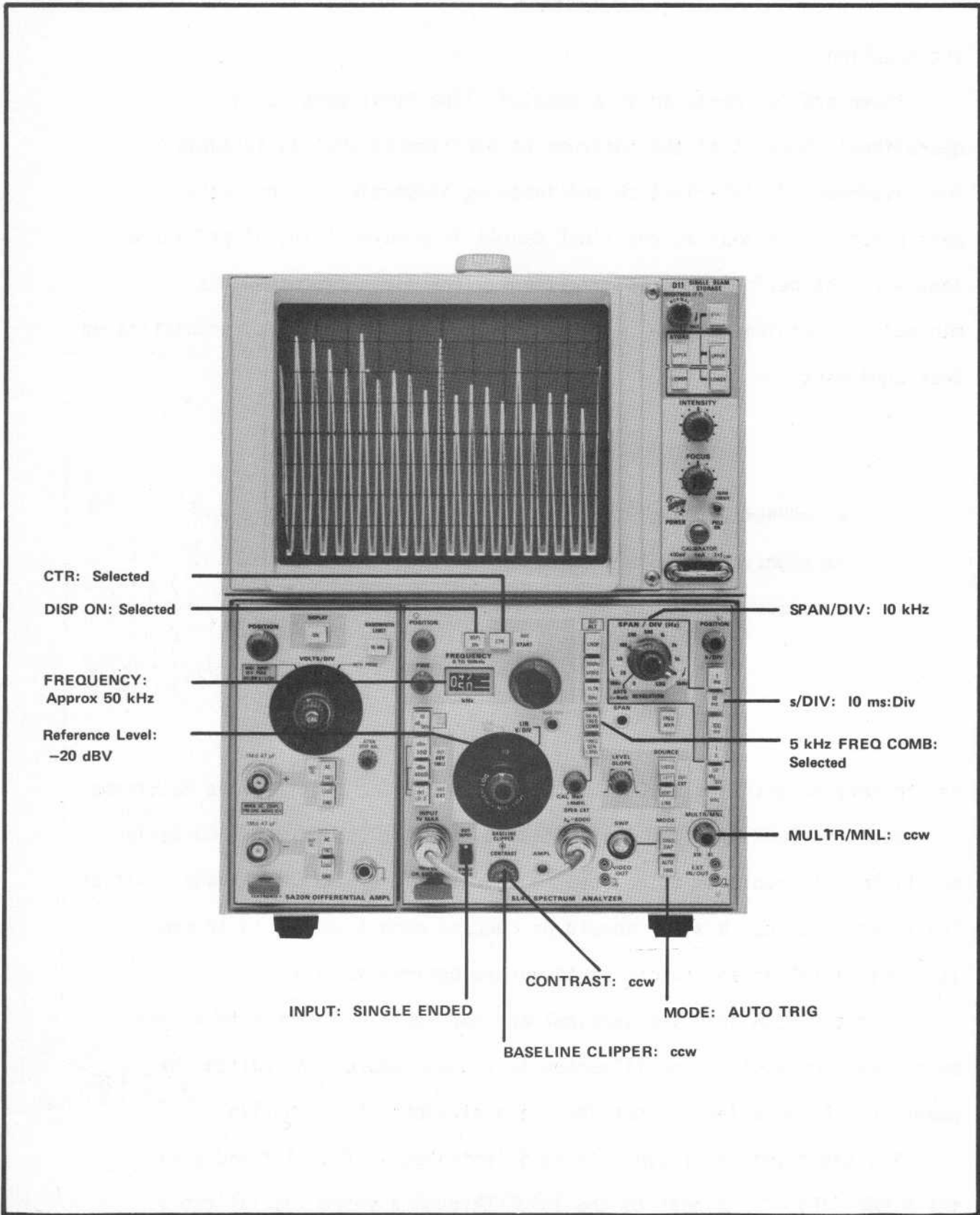


Fig. 3-1. Front panel control and selector positions for the initial operational check and front panel calibration.

OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

With the display mode in 2 dB/Div (LOG), adjust the mainframe Intensity and Focus controls for the best display definition (it may be necessary to select a slower sweep rate to adjust Focus and Intensity); set the baseline of the display at the bottom graticule line and center the display with the horizontal POSITION control. Select the STORE mode if the mainframe has store capabilities.

Depress the 10 dB/DIV button.  
Adjust the RESOLUTION for the best marker definition.  
Display should now resemble the illustration shown in Fig. 3-2A.

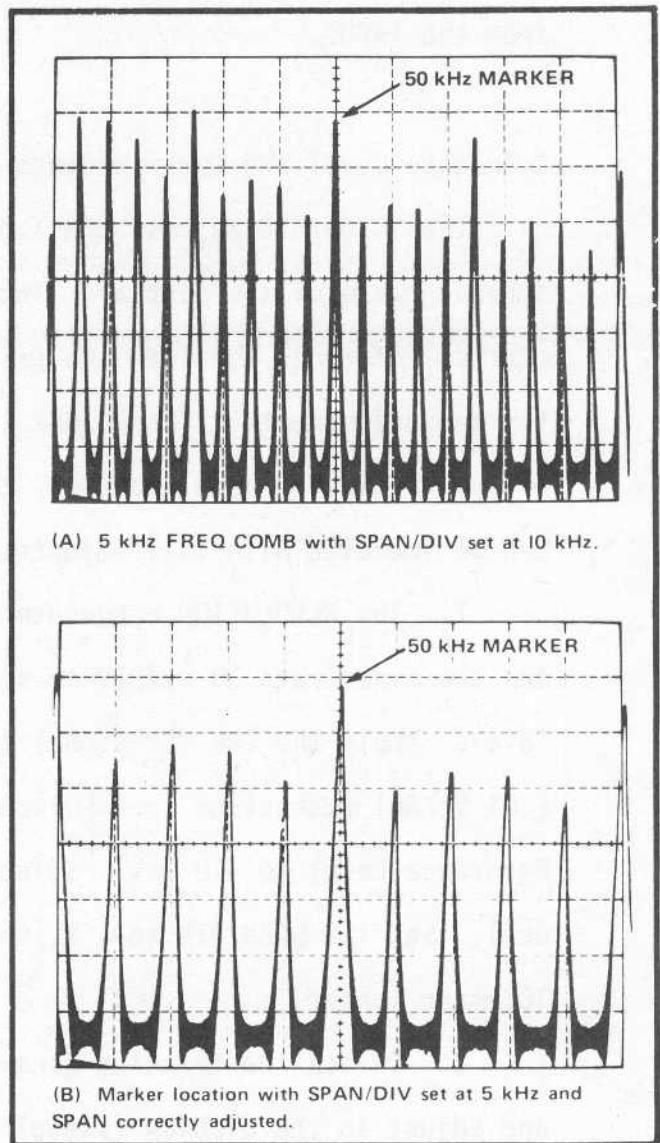


Fig. 3-2. Freq Span calibration.

## OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

### Calibrate the Sweep Span

- a. With the SPAN/DIV at 10 kHz, tune the 50 kHz marker to the center-line of the graticule, then decrease the SPAN/DIV to 5 kHz.
- b. Calibrate the display span to 5 kHz/Div by adjusting the SPAN for 1 marker/division around the center 6 divisions. Final display should resemble the display illustrated in Fig. 3-2B.
- c. Release the 5 kHz FREQ COMB pushbutton to remove the 5 kHz signal from the INPUT.

### Reference Level and Dynamic Range Calibration

The 10 dB/DIV adjusts the log gain of the analyzer to calibrate the dynamic range of the display. The AMPL adjusts the display amplitude to the correct reference level on the graticule. There is no interaction between the two adjustments. The 10 dB/DIV adjustment is usually made in the 10 dB/DIV display mode, however, the accuracy of the 2 dB/DIV mode can be improved with this adjustment if desired.

1. The RESOLUTION bandwidth must be maximum or in the AUTO position and the sweep rate 10 ms/DIV or slower when calibrating the reference level. Apply the TRK GEN signal to the INPUT by pushing the TRK GEN (.01 V CAL) pushbutton in. Switch the display mode to 10 dB/DIV and the Reference Level to -10 dBV. Select high impedance input (all switches out). Set the SPAN/DIV to 1 K, the RESOLUTION to AUTO, and TIME/DIV to 10 ms or longer.

2. Switch the tracking generator CAL control out of the cal detent and adjust so the display (sweep) is -60 dBV (5th major division down from full scale).

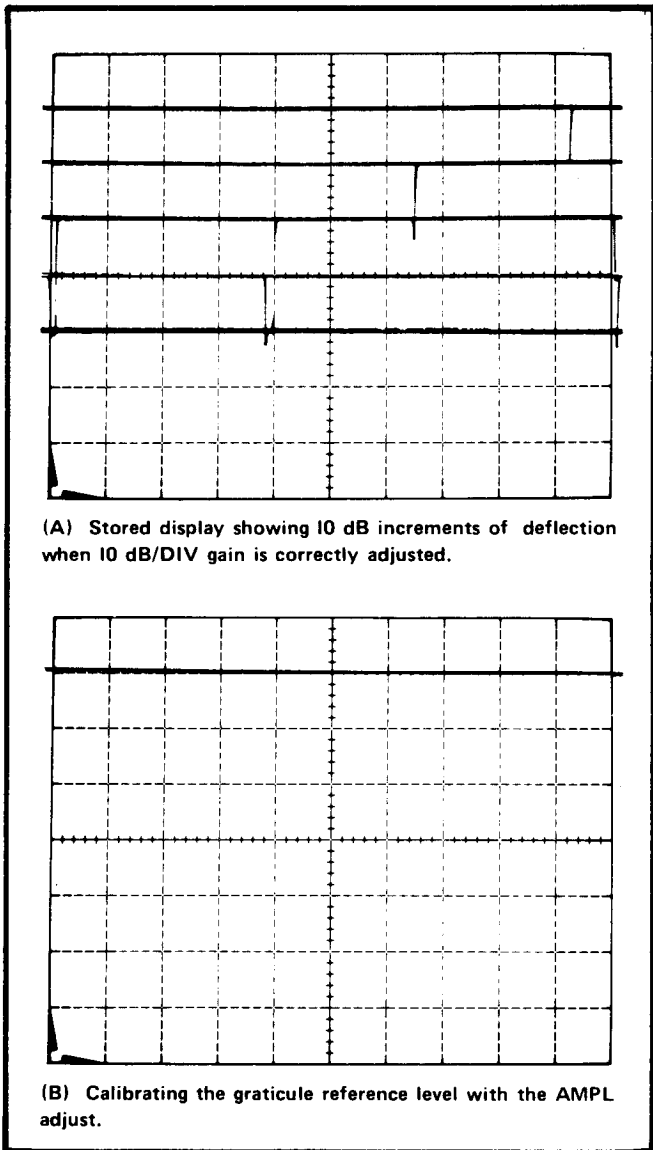


Fig. 3-3. Displays illustrating 10 dB/DIV and AMPL correctly adjusted.

3. Switch the Reference Level selector in 10 dB steps between -10 dBV and -60 dBV and calibrate the log gain with the 10 dB/DIV adjustment so the display shifts in 10 dB increments (Fig. 3-3A). The TRKG GEN variable may be used to keep the trace lined up with major crt graticule lines.

4. After the Log gain has been calibrated, remove the TRK GEN signal by dis-engaging the pushbutton. Switch the display mode to 2 dB/DIV and position the baseline of the display at the bottom graticule line.

5. Set the Reference Level to -30 dBV, the display mode to 10 dB/DIV, switch the TRK GEN variable output control into its CAL detent (output is a calibrated -40 dBV) and push the TRK GEN button in to re-apply the calibrated signal to the INPUT.

OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

6. Calibrate the amplitude reference with the AMPL adjustment so the display is -40 dBV on the graticule (1 division from the top graticule line, with the Reference Level selector at -30 dBV, see Fig. 3-3B).

Check Frequency Accuracy

1. Center the FINE frequency control and push the CTR pushbutton in. Switch the display mode to LIN by pulling out on the Reference Level selector, then set the selector for a V/DIV setting of 10 mV.
2. Apply the 5 kHz markers to the INPUT by disengaging the TRK GEN button and pushing the 5 kHz FREQ COMB button in.
3. Set the SPAN/DIV to 10 kHz, RESOLUTION to AUTO, and sweep rate for a satisfactory display (see Fig. 3-4). Note the higher amplitude 25 kHz markers.
4. Tune the frequency to 0000 then reduce the SPAN/DIV to 5 kHz.
5. Tune the frequency through the 100 kHz range checking the dial readout accuracy against the 25 kHz markers. Accuracy must equal or exceed  $\pm 3$  kHz.

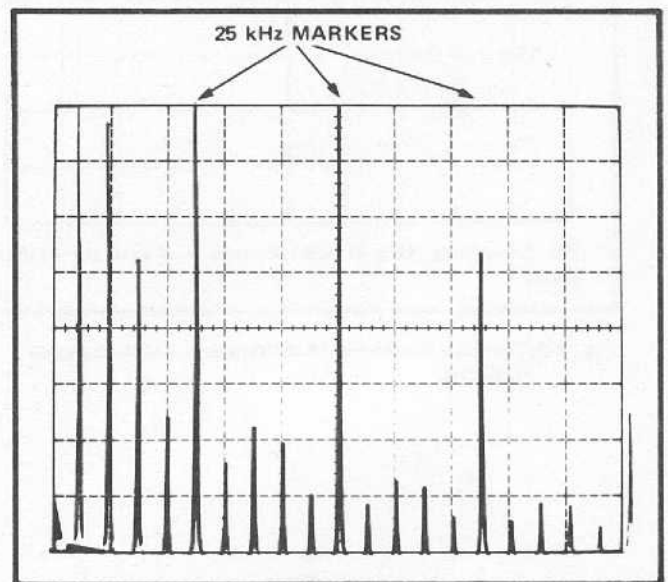


Fig. 3-4. 5 kHz FREQ COMB showing location of 25 kHz markers for checking frequency accuracy.

## OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

Check the 2 dB/DIV and LIN Mode of Operation

1. Apply the calibrated -40 dBV TRK GEN signal to the INPUT, switch the Reference Level selector to -30 and the display mode to 2 dB/DIV.
2. Display level should equal 5 divisions  $\pm 0.5$  division below the top graticule line; -30 dBV + (-10 dB).
3. Pull the Reference Level selector out and switch the LIN mode V/DIV selector to 2 mV.
4. Display level should equal 5 divisions  $\pm 1.5$  minor division.

Check the Log Span Operation

1. Apply the 5 kHz FREQ COMB to the INPUT, switch the Display Mode to LIN, and the V/DIV to 10 mV. Switch the frequency marker on by depressing the FREQ MKR button.
2. Switch the SPAN/DIV to LOG. Display should resemble the illustration in Fig. 3-5.

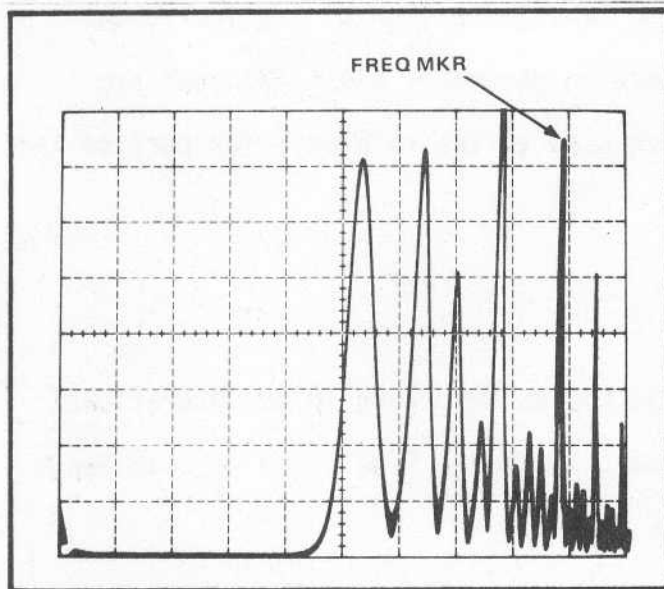


Fig. 3-5. 5 kHz FREQ COMB showing the location of the frequency markers.

## OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

### Adjust the Contrast and Check Baseline Clipper Operation

The contrast between the clipped portion of the display baseline and the remaining display is subject to ambient light conditions, the sweep rate, frequency span, and resolution.

1. Set the BASELINE CLIPPER control midrange, then adjust the CONTRAST control for the desired contrast between the clipped or subdued portion and the rest of the display. The contrast is usually adjusted so the clipped baseline portion of the display is just visible.

2. Adjust the BASELINE CLIPPER control so the baseline of the display is clipped. If there is excessive noise it may be desirable to clip the noise level as well.

## OPERATIONAL PERFORMANCE AND INSTRUMENT FAMILIARIZATION

This portion contains a sequence of procedures that check the operational performance of the 5L4N. It provides an adequate incoming performance inspection and a good familiarization of the instrument operation. Because the 5L4N tracking generator and 5 kHz comb are accurate signal sources, they are used as the reference for part of this check.

### 1. Preliminary Preparation

Perform the Preliminary adjustments described in the Operational Check and calibrate the sweep span, reference level, and dynamic range plus the preliminary operational checks.

OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

2. Check the Reference Level Accuracy, Range of the Variable Gain Control, and Deflection Factor Accuracy

a. Set the sweep rate to 100 ms/Div, SPAN/DIV to 1 kHz, RESOLUTION to AUTO, Variable gain control in the CAL detent, and add 10 Hz filter.

b. Apply the TRK GEN signal through 10 dB and 1 dB step attenuators to the INPUT. Select the internal termination to match the impedance of the step attenuators (50  $\Omega$  dBm for Hewlett Packard Model 355D and 355C, 600  $\Omega$  dBm for Hewlett Packard Model 350D).

c. Switch the display mode to 10 dB/DIV and the Reference Level at -10 dBm. Set the 10 dB step attenuator to 0 and adjust the 1 dB step attenuator for a display level of 4 divisions (midscreen).

d. Check the accuracy of the gain selector by increasing then decreasing the gain selections as the step attenuator is increased or decreased to offset the change. Display level should remain within  $\pm 0.5$  dB/10 dB or 1/4 minor division for each change in gain selection.

e. Return the 10 dB step attenuator to 0 dB and the 5L4N gain selector for a reference level of -10 dBm.

f. Decrease the 10 dB step attenuator 40 dB in 10 dB steps. Check the overall accuracy for a 40 dB change.

g. Return the 10 dB step attenuator to 0 dB then increase the 5L4N gain selector setting 40 dB. Check the accuracy for the 40 dB change.

h. Sum the deviation to obtain the error over the 80 dB window. Error must not exceed 2 dB or 1 minor deviation.

i. Rotate the variable gain control through its range checking the gain range. Should equal or exceed 10 dB. Return the variable control to the CAL detent.



OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

j. Switch the display mode to 2 dB/DIV. Adjust the gain selector and variable gain so the display level is five divisions (three divisions from the reference level).

k. Switch the 1 dB step attenuator in 2 dB steps to check the display accuracy of the 2 dB/DIV mode. Must equal or exceed 0.2 dB/DIV or 0.2 dB/2dB steps.

l. Return the step attenuator to 0 dB and adjust the variable gain control so the display level is full screen or 8 divisions.

m. Switch in 10 dB with the 10 dB step attenuator and 16 dB with the 1 dB step attenuator.

n. Check the 2 dB/DIV mode accuracy for a full 16 dB window. Accuracy must equal or exceed 1.0 dB or 0.5 division.

3. Check Incidental FM'ing and Stability (Incidental FM'ing 2Hz or less, stability 100 Hz/Hour)

a. With the 5 kHz COMB applied to the INPUT, and one of the 25 kHz markers tuned to the center of the display, decrease the SPAN/DIV and RESOLUTION bandwidth to 20 Hz and 10 Hz.

b. Switch the display mode to 2 dB/DIV, adjust the gain selector and variable control for a full screen display.

c. Measure the Incidental FM'ing of the displayed marker. The specification is 2 Hz or 0.1 divisions.

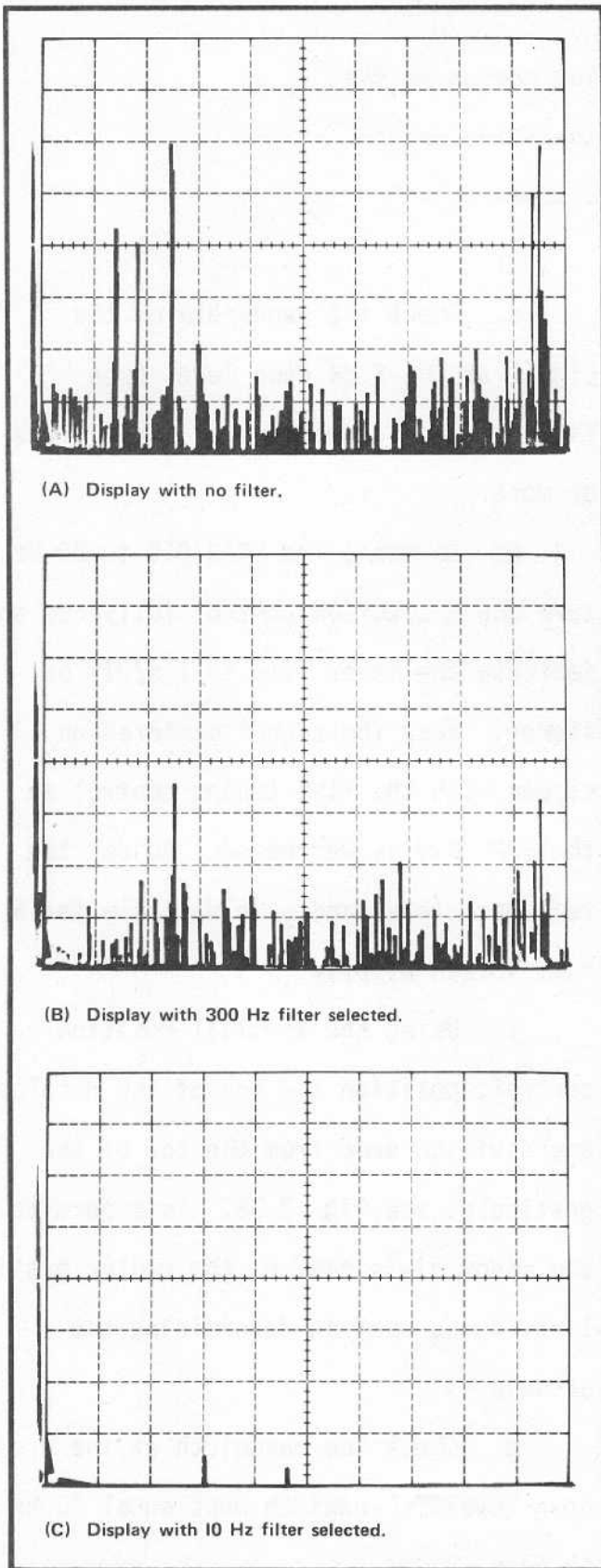


Fig. 3-6. Photos showing the use of the video filters to reduce the displayed noise.

4. Check the Operation of the Video Filters

The VIDEO FILTERS average and reduce the noise level on the display, see Fig. 3-6.

- a. Set the display mode to 2 dB/DIV; decrease the reference level until noise is displayed on the crt (approx. -120 dB).
- b. Check the operation of the 300 Hz and 10 Hz filters, see Fig. 3-6.

5. Check Resolution Bandwidths

(Bandwidth variable from  $\geq 3$  kHz to  $\leq 10$  Hz)

- a. Apply the 5 kHz COMB to the INPUT and tune one of the 25 kHz markers to the center of the screen.
- b. Turn the RESOLUTION control fully cw to the 3 kHz position and decrease the SPAN/DIV to 1 kHz.
- c. Switch the display mode to 2 dB/DIV. Adjust the reference level and gain variable for a full screen display.

OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

NOTE

Ensure that the sweep rate is low enough so the display is symmetrical and the baseline of the display is the bottom graticule line.

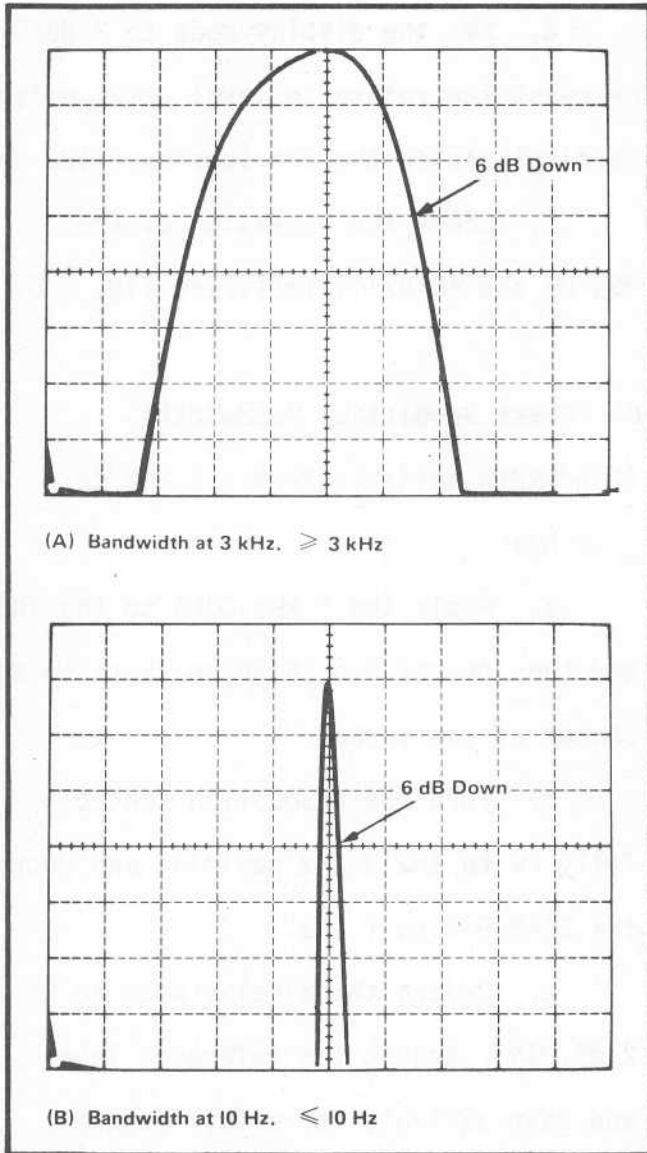


Fig. 3-7. Checking the bandwidth at 3 kHz and 10 Hz.

d. Check the bandwidth of the signal at the 6 dB down level (see Fig. 3-7A). Bandwidth must equal 3 kHz or more.

e. Decrease the SPAN/DIV to 20 Hz, turn the RESOLUTION control fully ccw and decrease the sweep rate to 1 s/DIV or slower. Keep the signal centered on screen with the FINE tuning control as the SPAN/DIV is decreased. Adjust the reference level and gain variable for a full screen display.

f. Using the Vertical Position control, position the top of the display one division down from the top of the graticule, see Fig. 3-7B. This permits the minor divisions, of the center graticule line, to be used in determining the bandwidth.

g. Check the bandwidth at the 6 dB down level. Bandwidth must equal 10 Hz or less.

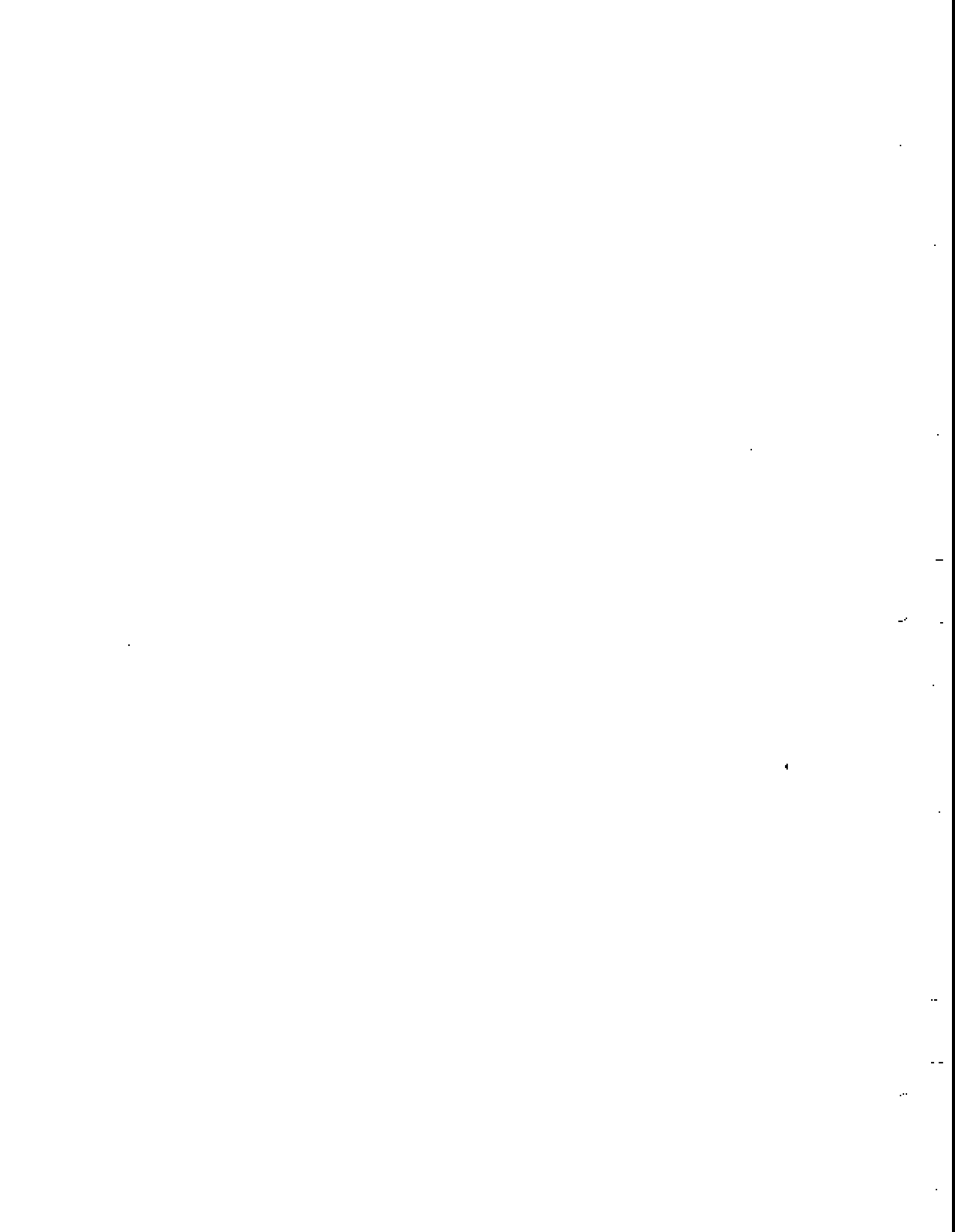
OPERATIONAL/PERFORMANCE CHECK -- 5L4N INTERIM

6. Check Internal Noise Level and Sensitivity

- a. Terminate the 5L4N in  $600 \Omega$  by depressing the dBm/ $600 \Omega$  and INT LO Z buttons.
- b. Set the vertical mode to 2 dB/Div and the reference level to -120 dBm.
- c. Set the resolution to the widest bandwidth (full cw) and the frequency SPAN/DIV at 5 kHz.
- d. Depress the 10 Hz video filter to average the observed noise level.
- e. The noise level which is the same as the sensitivity should be less than -121 dBm.
- f. Set the resolution to the narrowest bandwidth (full ccw) and the reference level to -130 dBm.
- g. The noise level should be less than -145 dBm.

7. Check for Residual Responses

- a. Set the frequency SPAN/DIV at 10 kHz, and resolution in AUTO (detent full ccw).
- b. Set the zero Hz marker to the left edge of the crt by setting the center frequency at 50 kHz.
- c. Set the LOG REF to -120 dBm with 10 Hz video filter in.
- d. Terminate the 5L4N in  $600\Omega$  by depressing the INT LO Z and dBm/ $600\Omega$  buttons.
- e. All residual responses (excepting the zero Hz marker) should be below -130 dBm.



# ELECTRICAL REPLACEABLE PARTS LIST

## 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

## 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

ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
CKT	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICOND	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	SEP	SEPARATELY
FXD	FIXED	VAR	VARIABLE
INCAND	INCANDESCENT	WW	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

# CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
00853	Sangamo Electric Co., S. Carolina Div.	P. O. Box 128	Pickens, SC 29671
01002	General Electric Co., Industrial and Power Capacitor Products Dept.	John St.	Hudson Falls, NY 12839
01121	Allen-Bradley Co.	1201 2nd St. South	Milwaukee, WI 53204
01295	Texas Instruments, Inc., Components Group	P. O. Box 5012	Dallas, TX 75222
01884	Sprague Electric Co., Dearborn Electronics	P. O. Box 1076	Longwood, FL 32750
02111	Spectrol Electronics Corp.	17070 East Gale Ave.	City of Industry, CA 91745
02735	RCA Corp., Solid State Division	Route 202	Somerville, NY 08876
04713	Motorola, Inc., Semiconductor Products Div.	5005 E. McDowell Rd.	Phoenix, AZ 85008
07263	Fairchild Semiconductor, A Div. of Fairchild Camera and Instrument Corp.	464 Ellis St.	Mountain View, CA 94040
07910	Teledyne Semiconductor	12515 Chadron Ave.	Hawthorne, CA 90250
08806	General Electric Co., Miniature Lamp Products Dept.	Nela PK.	Cleveland, OH 44112
10389	Chicago Switch, Inc.	2035 Wabansia Ave.	Chicago, IL 60647
11237	CTS Keene, Inc.	3230 Riverside Ave.	Paso Robles, CA 93446
12040	National Semiconductor Corp.	Commerce Drive	Danbury, CT 06810
12697	Clarostat Mfg. Co., Inc.	Lower Washington St.	Dover, NH 03820
15818	Teledyne Semiconductor	1300 Terra Bella Ave.	Mountain View, CA 94040
18324	Signetics Corp.	811 E. Arques	Sunnyvale, CA 94086
27014	National Semi-Conductor Corp.	2900 San Ysidro Way	Santa Clara, CA 95051
28480	Hewlett-Packard Co., Corporate Hq.	1501 Page Mill Rd.	Palo Alto, CA 94304
50522	Monsanto Co., Electronic Special Products	10131 Bubb Rd.	Cupertino, CA 95014
56285	Sprague and Carleton		Avon Keene, NH 03431
56289	Sprague Electric Co.		North Adams, MA 01247
71279	Cambridge Thermionic Corp.	445 Concord Ave.	Cambridge, MA 02138
72136	Electro Motive Mfg. Co., Inc., The	South Park and John Streets	Willimantic, CT 06226
72982	Erie Technological Products, Inc.	644 W. 12th St.	Erie, PA 16512
73138	Beckman Instruments, Inc., Helipot Div.	2500 Harbor Blvd.	Fullerton, CA 92634
75042	TRW Electronic Components, IRC Fixed Resistors, Philadelphia Division	401 N. Broad St.	Philadelphia, PA 19108
75915	Littelfuse, Inc.	800 E. Northwest Hwy	Des Plaines, IL 60016
76493	Bell Industries, Inc., Miller, J. W., Div.	P. O. Box 5825	Compton, CA 90224
80009	Tektronix, Inc.	P. O. Box 500	Beaverton, OR 97005
80031	Mepco/Electa Inc., A North American Phillips Co.	Columbia Rd.	Morristown, NJ 07960
80294	Bourns, Inc., Instrument Div.	6135 Magnolia Ave.	Riverside, CA 92506
81483	International Rectifier Corp.	9220 Sunset Blvd.	Los Angeles, CA 90069
86684	RCA Corp., Electronic Components	415 S. 5th St.	Harrison, NJ 07029
90201	Mallory Capacitor Co., Div. of P. R. Mallory Co., Inc.	3029 E. Washington St.	Indianapolis, IN 46206
91637	Dale Electronics, Inc.	P. O. Box 609	Columbus, NB 68601
91836	Kings Electronics Co., Inc.	40 Marbledale Road	Tuckahoe, NY 10707
97979	Reon Resistor Corp.	420 Lincoln Hwy.	Fraser, PA 19355

## Electrical Parts List—5L4N

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
A50	670-3427-00		CKT BOARD ASSY:INPUT LOW PASS IMPEDANCE	80009	670-3427-00
A100	670-3440-00		CKT BOARD ASSY:MIXER	80009	670-3440-00
A300	670-3439-00		CKT BOARD ASSY:VARIABLE RESOLUTION	80009	670-3439-00
A430	670-3425-00		CKT BOARD ASSY:CRYSTAL MOUNTING	80009	670-3425-00
A440	670-3436-00		CKT BOARD ASSY:DISPLAY FUNCTION AMPL	80009	670-3436-00
A580	670-3437-00		CKT BOARD ASSY:DETECTOR	80009	670-3437-00
A680A1	670-3432-00		CKT BOARD ASSY:VERT GAIN SWITCH	80009	670-3432-00
A680A2	670-3422-00		CKT BOARD ASSY:LOG/LIN SWITCH	80009	670-3422-00
A690	670-3431-00		CKT BOARD ASSY:VERT INTERFACE	80009	670-3431-00
A700	670-3433-00		CKT BOARD ASSY:SWEEP GEN AND AMPL	80009	670-3433-00
A800	670-3430-00		CKT BOARD ASSY:FREQ SPAN RESP	80009	670-3430-00
A900	670-3438-00		CKT BOARD ASSY:CALIB SHAPER	80009	670-3438-00
A1100	670-3423-00		CKT BOARD ASSY:START CENTER SWITCH	80009	670-3423-00
A1150	670-3434-00		CKT BOARD ASSY:MAIN MOTHER	80009	670-3434-00
A1250	670-3429-00		CKT BOARD ASSY:HORIZ INTERFACE	80009	670-3429-00
A1300	670-3435-00		CKT BOARD ASSY:TRANSVERSE INTERFACE	80009	670-3435-00
A1320	670-3426-00		CKT BOARD ASSY:LEFT MOTHER	80009	670-3426-00
A1340	670-3424-00		CKT BOARD ASSY:RIGHT MOTHER	80009	670-3424-00
C50	281-0501-00		CAP.,FXD,CER DI:4.7PF,+/-1PF,500V	72982	301-000S2H0479F
C54	285-0650-00		CAP.,FXD,PLSTC:0.027UF,5%,100V		
C56	281-0203-00		CAP.,VAR,PLSTC:2-10PF,100V	80031	C010EA/10E
C58	281-0207-00		CAP.,VAR,PLSTC:2-18PF,100V	80031	HT10EA-218
C60	285-0650-00		CAP.,FXD,PLSTC:0.027UF,5%,100V		
C62	281-0203-00		CAP.,VAR,PLSTC:2-10PF,100V	80031	C010EA/10E
C64	281-0501-00		CAP.,FXD,CER DI:4.7PF,+/-1PF,500V	72982	301-000S2H0479F
C100	290-0717-00		CAP.,FXD,ELCTLT:15UF,20%,50V		
C102	290-0717-00		CAP.,FXD,ELCTLT:15UF,20%,50V		
C104	290-0717-00		CAP.,FXD,ELCTLT:15UF,20%,50V		
C106	290-0717-00		CAP.,FXD,ELCTLT:15UF,20%,50V		
C125	281-0661-00		CAP.,FXD,CER DI:0.8PF,+/-0.1PF,500V	72982	301-000C0G0808B
C130	290-0718-00		CAP.,FXD,ELCTLT:22UF,20%,35V		
C134	290-0536-00		CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C136	283-0637-00		CAP.,FXD,MICA D:20PF,2.5%,100V	00853	D151E200D0
C137	283-0626-00		CAP.,FXD,MICA D:1800PF,5%,500V	00853	D19E182J0500
C138	283-0672-00		CAP.,FXD,MICA D:200PF,1%,500V	00853	D155F201F0
C140	283-0104-00		CAP.,FXD,CER DI:2000PF,5%,500V	72982	811-565B202J
C142	283-0670-00		CAP.,FXD,MICA D:375PF,1%,500V	00853	D155F3750F0
C144	283-0626-00		CAP.,FXD,MICA D:1800PF,5%,500V	00853	D19E182J0500
C146	283-0631-00		CAP.,FXD,MICA D:95PF,1%,100V	00853	D151E950F0
C148	283-0605-00		CAP.,FXD,MICA D:678PF,1%,300V	00853	D153F678F0
C152	283-0000-00		CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C164	290-0530-00		CAP.,FXD,ELCTLT:68UF,20%,6V	90201	TDC686M006FL
C168	290-0721-00		CAP.,FXD,ELCTLT:100UF,20%,20V		
C180	290-0536-00		CAP.,FXD,ELCTLT:10UF,20%,25V	90201	TDC106M025FL
C184	290-0722-00		CAP.,FXD,ELCTLT:100UF,20%,10V		
C198	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C200	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C202	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C204	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C206	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C208	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C209	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C210	283-0249-00		CAP.,FXD,CER DI:0.068UF,10%,50V	72982	8131N075WR5683K
C212	281-0204-00		CAP.,VAR,PLSTC:2-22PF,100V	80031	C010EA-20E
C213	285-0683-00		CAP.,FXD,PLSTC:0.022UF,5%,100V	01002	64F15AC223
C214	281-0204-00		CAP.,VAR,PLSTC:2-22PF,100V	80031	C010EA-20E
C215	283-0065-00		CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-505B102J
C216	283-0249-00		CAP.,FXD,CER DI:0.068UF,10%,50V	72982	8131N075WR5683K
C218	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600



Electrical Parts List—5L4N

Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
C220	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C224	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C228	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C230	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C234	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C236	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C240	283-0065-00			CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-505B102J
C254	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C264	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C270	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C274	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C280	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C284	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C286	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C290	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C292	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C294	283-0177-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C295	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C297	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C300	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C302	283-0177-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C304	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C306	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C308	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C309	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C310	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C312	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C316	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C318	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C320	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C322	281-0610-00			CAP.,FXD,CER DI:2.2PF,+/-0.1PF,500V	72982	374-001C0J0229B
C324	281-0204-00			CAP.,VAR,PLSTC:2-22PF,100V	80031	C010EA-20E
C326	283-0604-00			CAP.,FXD,MICA D:304PF,2%,300V	00853	D153F3040G0
C328	281-0125-00			CAP.,VAR,MICA D:90-400PF,175V	72136	T51917-1
C329	281-0504-00			CAP.,FXD,CER DI:10PF,+/-1PF,500V	72982	301-000C0G0100F
C330	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C338	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C346	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C348	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C350	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C352	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C354	283-0177-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C356	281-0610-00			CAP.,FXD,CER DI:2.2PF,+/-0.1PF,500V	72982	374-001C0J0229B
C358	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C360	281-0204-00			CAP.,VAR,PLSTC:2-22PF,100V	80031	C010EA-20E
C362	283-0077-00			CAP.,FXD,CER DI:330PF,5%,500V	56289	40C94A3
C364	281-0125-00			CAP.,VAR,MICA D:90-400PF,175V	72136	T51917-1
C366	281-0504-00			CAP.,FXD,CER DI:10PF,+/-1PF,500V	72982	301-000C0G0100F
C370	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C374	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C375	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C376	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C378	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C380	281-0580-00			CAP.,FXD,CER DI:470PF,10%,500V	72982	301-000Z5D0471K
C382	281-0204-00			CAP.,VAR,PLSTC:2-22PF,100V	80031	C010EA-20E
C384	281-0125-00			CAP.,VAR,MICA D:90-400PF,175V	72136	T51917-1
C385	283-0177-00			CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C386	281-0504-00			CAP.,FXD,CER DI:10PF,+/-1PF,500V	72982	301-000C0G0100F
C388	283-0003-00			CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C392	283-0081-00			CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
C394	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C396	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C398	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C400	281-0580-00		CAP., FXD, CER DI:470PF, 10%, 500V	72982	301-000Z5D0471K
C402	281-0204-00		CAP., VAR, PLSTC:2-22PF, 100V	80031	C010EA-20E
C404	281-0125-00		CAP., VAR, MICA D:90-400PF, 175V	72136	T51917-1
C406	281-0504-00		CAP., FXD, CER DI:10PF, +/-1PF, 500V	72982	301-000C0G0100F
C410	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C414	283-0756-00		CAP., FXD, MICA D:4700PF, 5%, 300V		
C416	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C418	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C420	283-0634-00		CAP., FXD, MICA D:65PF, 1%, 100V	00853	D151E650F0
C422	283-0756-00		CAP., FXD, MICA D:4700PF, 5%, 300V		
C424	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C426	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C428	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C441	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C444	283-0177-00		CAP., FXD, CER DI:1UF, +80-20%, 25V	72982	8131N039651105Z
C446	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C448	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C450	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C452	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C454	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C460	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C476	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C478	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P
C482	281-0628-00		CAP., FXD, CER DI:15PF, 5%, 600V	72982	301-000C0G0150G
C488	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C490	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P
C492	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C496	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C514	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P
C516	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C520	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C534	281-0592-00		CAP., FXD, CER DI:4.7PF, +/-0.5PF, 500V	72982	301-023C0H0479D
C536	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P
C540	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C550	283-0167-00		CAP., FXD, CER DI:0.1UF, 10%, 100V	72982	8131N147W5R104K
C556	283-0177-00		CAP., FXD, CER DI:1UF, +80-20%, 25V	72982	8131N039651105Z
C580	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C582	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C584	285-0643-00		CAP., FXD, PLSTC:0.0047UF, 5%, 100V	01002	64F10AC472
C586	281-0605-00		CAP., FXD, CER DI:200PF, 10%, 500V	72982	301-000Y5D0201K
C588	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C594	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C596	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C599	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C610	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C616	283-0268-00		CAP., FXD, CER DI:0.015UF, 10%, 50V	72982	8131N075W5R153K
C618	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C622	283-0001-00		CAP., FXD, CER DI:0.005UF, +100-0%, 500V	72982	831-559E502P
C624	283-0328-00		CAP., FXD, CER DI:0.03UF, +80-20%, 200V	72982	8131N225651303Z
C626	283-0177-00		CAP., FXD, CER DI:1UF, +80-20%, 25V	72982	8131N039651105Z
C627	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P
C628	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C629	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P
C632	281-0630-00		CAP., FXD, CER DI:390PF, 5%, 500V	72982	301-000Y5D0391J
C640	283-0081-00		CAP., FXD, CER DI:0.1UF, +80-20%, 25V	56289	36C600
C642	283-0003-00		CAP., FXD, CER DI:0.01UF, +80-20%, 150V	72982	855-547E103Z
C666	283-0000-00		CAP., FXD, CER DI:0.001UF, +100-0%, 500V	72982	831-516E102P

Electrical Parts List—5L4N

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
C674	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C692	290-0517-00		CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C693	283-0087-00		CAP.,FXD,CER DI:300PF,10%,1000V		
C694	283-0065-00		CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-505B102J
C698	290-0517-00		CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C700	290-0297-00		CAP.,FXD,ELCTLT:39UF,10%,10V	56289	150D396X9010B2
C710	285-0809-00		CAP.,FXD,PLSTC:1UF,10%,50V	01884	LP88A1A105K
C736	283-0211-00		CAP.,FXD,CER DI:0.1UF,10%,200V	72982	8141208W5R104K
C738	290-0134-00		CAP.,FXD,ELCTLT:22UF,20%,15V	56289	150D226X0015B2
C740	283-0080-00		CAP.,FXD,CER DI:0.022UF,+80-20%,25V	56289	19C611
C742	283-0204-00		CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N058651103M
C748	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C749	281-0629-00		CAP.,FXD,CER DI:33PF,5%,600V	72982	308-000C0G0330G
C750	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C762	281-0524-00		CAP.,FXD,CER DI:150PF,+/-30PF,500V	72982	301-000X5U0151M
C776	283-0204-00		CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N058651103M
C810	281-0551-00		CAP.,FXD,CER DI:390PF,10%,500V	72982	301-000X5P0391K
C814	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M
C816	283-0204-00		CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N058651103M
C876	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C900	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C902	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C903	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C916	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C919	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C920	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C922	290-0512-00		CAP.,FXD,ELCTLT:22UF,20%,15V	56285	196D226X0015KA1
C927	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C928	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C932	283-0000-00		CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C936	290-0718-00		CAP.,FXD,ELCTLT:22UF,20%,35V		
C962	290-0718-00		CAP.,FXD,ELCTLT:22UF,20%,35V		
C988	290-0718-00		CAP.,FXD,ELCTLT:22UF,20%,35V		
C990	290-0512-00		CAP.,FXD,ELCTLT:22UF,20%,15V	56285	196D226X0015KA1
C996	283-0267-00		CAP.,FXD,CER DI:0.01UF,20%,500V	72982	841-541C103M
C998	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C999	290-0718-00		CAP.,FXD,ELCTLT:22UF,20%,35V		
C1000	290-0512-00		CAP.,FXD,ELCTLT:22UF,20%,15V	56285	196D226X0015KA1
C1004	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C1006	283-0249-00		CAP.,FXD,CER DI:0.068UF,10%,50V	72982	8131N075WR5683K
C1018	281-0509-00		CAP.,FXD,CER DI:15PF,+/-1.5PF,500V	72982	301-000C0G0150K
C1020	281-0125-00		CAP.,VAR,MICA D:90-400PF,175V	72136	T51917-1
C1022	283-0110-00		CAP.,FXD,CER DI:0.005UF,+80-20%,150V	56289	19C242B
C1024	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1026	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C1030	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1034	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C1036	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C1038	283-0756-00		CAP.,FXD,MICA D:4700PF,5%,300V		
C1040	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C1041	283-0190-00		CAP.,FXD,CER DI:47UF,5%,50V	72982	8141N077W5R474J
C1042	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C1043	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C1044	283-0177-00		CAP.,FXD,CER DI:1UF,+80-20%,25V	72982	8131N039651105Z
C1046	290-0526-00		CAP.,FXD,ELCTLT:6.8UF,20%,6V	90201	TDC685M006EL
C1048	290-0526-00		CAP.,FXD,ELCTLT:6.8UF,20%,6V	90201	TDC685M006EL
C1052	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1060	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1066	283-0081-00		CAP.,FXD,CER DI:0.1UF,+80-20%,25V	56289	36C600
C1068	283-0728-00		CAP.,FXD,MICA:120PF,+/-1%,500V	00853	DM15-5F121F0

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
C1070	283-0626-00		CAP.,FXD,MICA D:1800PF,5%,500V	00853	D19E182J0500
C1072	283-0692-00		CAP.,FXD,MICA D:670PF,1%,300V		
C1073	283-0003-00		CAP.,FXD,CER DI:0.01UF,+80-20%,150V	72982	855-547E103Z
C1074	290-0526-00		CAP.,FXD,ELCTLT:6.8UF,20%,6V	90201	TDC685M006EL
C1172	281-0509-00		CAP.,FXD,CER DI:15PF,+/-1.5PF,500V	72982	301-000C0G0150K
C1210	290-0530-00		CAP.,FXD,ELCTLT:68UF,20%,6V	90201	TDC686M006FL
C1212	290-0530-00		CAP.,FXD,ELCTLT:68UF,20%,6V	90201	TDC686M006FL
C1250	283-0204-00		CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N058651103M
C1252	290-0517-00		CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C1253	283-0087-00		CAP.,FXD,CER DI:300PF,10%,1000V		
C1256	283-0065-00		CAP.,FXD,CER DI:0.001UF,5%,100V	72982	805-505B102J
C1268	290-0517-00		CAP.,FXD,ELCTLT:6.8UF,20%,35V	56289	196D685X0035KA1
C1306	283-0111-00		CAP.,FXD,CER DI:0.1UF,20%,50V	72982	8131N075651104M
C1307	283-0204-00		CAP.,FXD,CER DI:0.01UF,20%,50V	72982	8121N058651103M
CR54	152-0246-00	XB010151	SEMICONV DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR56	152-0246-00	XB010151	SEMICONV DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR112	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR114	152-0246-00		SEMICONV DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR116	152-0246-00		SEMICONV DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR118	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR159	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR162	152-0246-00	B010100 B010150X	SEMICONV DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR164	152-0246-00	B010100 B010150X	SEMICONV DEVICE:SILICON,400PIV,200MA	07910	CD12676
CR212					
CR214					
CR216	153-0044-00		SEMICONV,DEVICE:SILICON,15V,MATCHED	80009	153-0044-00
CR218					
CR540	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR614	152-0322-00		SEMICONV DEVICE:SILICON,15V	28480	5082-2672
CR616	152-0322-00		SEMICONV DEVICE:SILICON,15V	28480	5082-2672
CR630	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR632	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR680	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR682	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR684	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR686	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR702	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR724	152-0322-00		SEMICONV DEVICE:SILICON,15V	28480	5082-2672
CR744	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR746	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR866	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR868	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR878	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR932	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR940	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR942	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR944	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR946	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR948	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR950	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR952	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR960	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR964	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR966	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR968	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR970	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR972	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR974	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152
CR976	152-0141-02		SEMICONV DEVICE:SILICON,30V,150MA	07910	1N4152

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR978	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR985	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR988	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR994	152-0597-00			SEMICON D DEVICE: VOLT VAR CAP, 330PF, 10%		
CR1032	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR1216	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR1218	152-0322-00			SEMICON D DEVICE: SILICON, 15V	28480	5082-2672
CR1220	152-0322-00			SEMICON D DEVICE: SILICON, 15V	28480	5082-2672
CR1222	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR1224	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR1226	152-0141-02			SEMICON D DEVICE: SILICON, 30V, 150MA	07910	1N4152
CR1264	152-0107-00			SEMICON D DEVICE: SILICON, 375V, 400MA	80009	152-0107-00
DS680	150-0111-00			LAMP, GLOW: NEON, 1.2MA	08806	2AC-AT
DS682	150-0111-00			LAMP, GLOW: NEON, 1.2MA	08806	2AC-AT
F56	159-0056-00			FUSE, CARTRIDGE: 0.1A, 125V, FAST-BLOW	75915	279-100
F62	159-0056-00	B010100	B010150X	FUSE, CARTRIDGE: 0.1A, 125V, FAST-BLOW	75915	279-100
J5	131-0274-00			CONNECTOR, RCPT, : BNC	91836	KC79-67
J6	131-0274-00			CONNECTOR, RCPT, : BNC	91836	KC79-67
J7	136-0387-00			JACK, TIP: GRAY	71279	4352-1-0318
J8	136-0387-00			JACK, TIP: GRAY	71279	4352-1-0318
K110	148-0035-00			RELAY, ARMATURE: SPDT, 15VDC, 600 OHM	80009	148-0035-00
K160	148-0034-00			RELAY, ARMATURE: DPDT, 15VDC, 600 OHM	80009	148-0034-00
L138	114-0178-00			COIL, RF: 1300-3000UH		
L142	114-0337-00			COIL, RF: 650-1300UH		
L146	114-0337-00			COIL, RF: 650-1300UH		
L212	114-0209-00			COIL, RF: 28-60UH, CORE NOT REPLACEABLE	80009	114-0209-00
L324	114-0341-00			COIL, RF: 7.13-7.35MH	80009	114-0341-00
L364	114-0341-00			COIL, RF: 7.13-7.35MH	80009	114-0341-00
L384	114-0341-00			COIL, RF: 7.13-7.35MH	80009	114-0341-00
L404	114-0341-00			COIL, RF: 7.13-7.35MH	80009	114-0341-00
L414	114-0200-00			COIL, RF: 60-120UH		
L420	114-0200-00			COIL, RF: 60-120UH		
L580	114-0200-00			COIL, RF: 60-120UH		
L616	108-0324-00			COIL, RF: 130UH	76493	70F102A1
L1038	114-0200-00			COIL, RF: 60-120UH		
L1068	114-0337-00			COIL, RF: 650-1300UH		
Q110	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q115	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q125	151-1027-00			TRANSISTOR: SILICON, JFE, N-CHAN	80009	151-1027-00
Q130A, B	151-0261-00			TRANSISTOR: SILICON, PNP, DUAL	12040	NS7410
Q135	151-0302-00			TRANSISTOR: SILICON, NPN	04713	2N2222A
Q140	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q145	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q150	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q155	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q160	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q165	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q170	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q175	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q180	151-0302-00			TRANSISTOR: SILICON, NPN	04713	2N2222A
Q210	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q215	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q230	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q235	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q240	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q245	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q250	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73

Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr	
		Eff	Dscont		Code	Mfr Part Number
Q255	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q260	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q265	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q275	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q280	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q285	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q290	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q295	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q320	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q325	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q330	151-1006-00			TRANSISTOR: SILICON, JFE, N-CHANNEL	15818	U1491
Q335	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q340A, B	151-0232-00			TRANSISTOR: SILICON, NPN, DUAL	12040	NS7348
Q350	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q360	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q365	151-1005-00			TRANSISTOR: SILICON, JFE, N-CHANNEL	15818	U1490
Q370	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q375	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q380	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q385	151-1005-00			TRANSISTOR: SILICON, JFE, N-CHANNEL	15818	U1490
Q390	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q395	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q400	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q405	151-1006-00			TRANSISTOR: SILICON, JFE, N-CHANNEL	15818	U1491
Q410	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q420	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q460	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q465	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q480	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q495	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q500	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q505	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q530	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q535	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q560	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q580	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q590	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q595	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q600	151-1066-00			TRANSISTOR: SILICON, FE, P-CHANNEL	15818	P1182E
Q620	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q625	151-1021-00			LAMP, LED: SILICON, JFE	50522	MAN73
Q660	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q665	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q670	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q672	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q674	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q675	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q680	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q682	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q695	151-0334-00			TRANSISTOR: SILICON, NPN	80009	151-0334-00
Q700	151-0188-00			TRANSISTOR: SILICON, PNP	04713	2N3906
Q745	151-1045-00	XB010151		TRANSISTOR: SILICON, JFE, P-CHANNEL	80009	151-1045-00
Q750A, B	151-0261-00			TRANSISTOR: SILICON, PNP, DUAL	12040	NS7410
Q770	151-0341-00			TRANSISTOR: SILICON, NPN	07263	2N3565
Q775	151-0341-00			TRANSISTOR: SILICON, NPN	07263	2N3565
Q810	151-0292-00			TRANSISTOR: SILICON, NPN	01295	TIS100
Q920A, B	151-0232-00			TRANSISTOR: SILICON, NPN, DUAL	12040	NS7348
Q925	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q930	151-0190-00			TRANSISTOR: SILICON, NPN	04713	2N3904
Q935	151-0301-00			TRANSISTOR: SILICON, PNP	04713	2N2907A

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
Q995	151-0219-00		TRANSISTOR:SILICON,PNP		
Q1005	151-0282-00		TRANSISTOR:SILICON,NPN	02735	2N5179
Q1010	151-0282-00		TRANSISTOR:SILICON,NPN	02735	2N5179
Q1020	151-0190-00		TRANSISTOR:SILICON,NPN	04713	2N3904
Q1025	151-0188-00		TRANSISTOR:SILICON,PNP	04713	2N3906
Q1160	151-0190-00		TRANSISTOR:SILICON,NPN	04713	2N3904
Q1190A,B	151-0232-00		TRANSISTOR:SILICON,NPN,DUAL	12040	NS7348
Q1260	151-0335-00		TRANSISTOR:SILICON,PNP	80009	151-0335-00
Q1265	151-0335-00		TRANSISTOR:SILICON,PNP	80009	151-0335-00
R3	311-1104-00		RES.,VAR, NONWIR:10K OHM,10%,0.50W	12697	381-CM40095
R4	311-0546-00		RES.,VAR, NONWIR:10K OHM,20%,0.75W	97979	TK0546G
R6	311-0546-00		RES.,VAR, NONWIR:10K OHM,20%,0.75W	97979	TK0546G
R8	311-1411-00		RES.,VAR, NONWIR:1K OHM X 10K OHM,20%,0.50W		
R10					
R14	311-1045-00		RES.,VAR, NONWIR:250K OHM,10%,0.50W		
R20	311-1045-00		RES.,VAR, NONWIR:250K OHM,10%,0.50W		
R22	311-1486-00		RES.,VAR, NONWIR:100K OHM X 2K OHM,20%,0.25W		
R24					
R26	311-1095-00		RES.,VAR, NONWIR:10K OHM,20%,0.50W	11237	300SF-3P1631
R28	311-1045-00		RES.,VAR, NONWIR:250K OHM,10%,0.50W		
R30	311-1324-00		RES.,VAR, WW:10K OHM,5%,2W	02111	534-9572
R32	311-0387-00		RES.,VAR, NONWIR:5K OHM,20%	11237	41027
R50	321-0510-00		RES.,FXD, FILM:2M OHM,1%,0.125W	75042	CEAT0-2004F
R52	321-0510-00		RES.,FXD, FILM:2M OHM,1%,0.125W	75042	CEAT0-2004F
R54	322-0618-00		RES.,FXD, FILM:50 OHM,1%,0.25W	75042	CEBT0-50R00F
R56	321-0661-00		RES.,FXD, FILM:600 OHM,1%,0.125W	75042	CEAT0-6000F
R58	315-0471-00		RES.,FXD, COMP:470 OHM,5%,0.25W	01121	CB4715
R100	315-0220-00		RES.,FXD, COMP:22 OHM,5%,0.25W	01121	CB2205
R102	315-0101-00		RES.,FXD, COMP:100 OHM,5%,0.25W	01121	CB1015
R104	315-0303-00		RES.,FXD, COMP:30K OHM,5%,0.25W	01121	CB3035
R106	315-0202-00		RES.,FXD, COMP:2K OHM,5%,0.25W	01121	CB2025
R108	315-0220-00		RES.,FXD, COMP:22 OHM,5%,0.25W	01121	CB2205
R109	315-0101-00		RES.,FXD, COMP:100 OHM,5%,0.25W	01121	CB1015
R110	301-0621-00		RES.,FXD, COMP:620 OHM,5%,0.50W	01121	EB6215
R112	315-0473-00		RES.,FXD, COMP:47K OHM,5%,0.25W	01121	CB4735
R114	321-0085-00		RES.,FXD, FILM:75 OHM,1%,0.125W	75042	CEAT0-75R00F
R116	321-0175-00		RES.,FXD, FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R118	321-0252-00		RES.,FXD, FILM:4.12K OHM,1%,0.125W	75042	CEAT0-4121F
R120	321-0263-00		RES.,FXD, FILM:5.36K OHM,1%,0.125W	75042	CEAT0-5361F
R122	321-0326-00		RES.,FXD, FILM:24.3K OHM,1%,0.125W	75042	CEAT0-2432F
R124	321-0252-00		RES.,FXD, FILM:4.12K OHM,1%,0.125W	75042	CEAT0-4121F
R126	321-0001-00		RES.,FXD, FILM:10 OHM,1%,0.125W	75042	CEAT0-10R00F
R128	321-0178-00		RES.,FXD, FILM:698 OHM,1%,0.125W	75042	CEAT0-6980F
R130	321-0251-00		RES.,FXD, FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R131	321-0193-00		RES.,FXD, FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R132	321-0175-00		RES.,FXD, FILM:649 OHM,1%,0.125W	75042	CEAT0-6490F
R134	321-0244-00		RES.,FXD, FILM:3.4K OHM,1%,0.125W	75042	CEAT0-3401F
R136	315-0471-00		RES.,FXD, COMP:470 OHM,5%,0.25W	01121	CB4715
R138	321-0183-00		RES.,FXD, FILM:787 OHM,1%,0.125W	75042	CEAT0-7870F
R140	315-0101-00		RES.,FXD, COMP:100 OHM,5%,0.25W	01121	CB1015
R148	315-0103-00		RES.,FXD, COMP:10K OHM,5%,0.25W	01121	CB1035
R150	321-0181-00		RES.,FXD, FILM:750 OHM,1%,0.125W	75042	CEAT0-7500F
R151	315-0153-00		RES.,FXD, COMP:15K OHM,5%,0.25W	01121	CB1535
R152	315-0270-00		RES.,FXD, COMP:27 OHM,5%,0.25W	01121	CB2705
R153	315-0103-00		RES.,FXD, COMP:10K OHM,5%,0.25W	01121	CB1035
R154	321-0181-00		RES.,FXD, FILM:750 OHM,1%,0.125W	75042	CEAT0-7500F
R156	315-0681-00		RES.,FXD, COMP:680 OHM,5%,0.25W	01121	CB6815
R157	315-0330-00		RES.,FXD, COMP:33 OHM,5%,0.25W	01121	CB3305
R158	301-0621-00		RES.,FXD, COMP:620 OHM,5%,0.50W	01121	EB6215

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Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
R159	315-0473-00			RES., FXD, COMP: 47K OHM, 5%, 0.25W	01121	CB4735
R160	311-1274-00			RES., VAR, NONWIR: 500K OHM, 10%, 0.50W		
R161	321-0510-00			RES., FXD, FILM: 2M OHM, 1%, 0.125W	75042	CEATO-2004F
R162	315-0102-00			RES., FXD, COMP: 1K OHM, 5%, 0.25W	01121	CB1025
R163	321-0510-00			RES., FXD, FILM: 2M OHM, 1%, 0.125W	75042	CEATO-2004F
R164	315-0396-00			RES., FXD, COMP: 39M OHM, 5%, 0.25W	01121	CB3965
R165	311-1007-00			RES., VAR, NONWIR: 20 OHM, 20%, 0.50W	80294	3329HG48-200
R166	321-0289-00			RES., FXD, FILM: 10K OHM, 1%, 0.125W	75042	CEATO-1002F
R168	321-0222-00			RES., FXD, FILM: 2K OHM, 1%, 0.125W	75042	CEATO-2001F
R169	321-0289-00			RES., FXD, FILM: 10K OHM, 1%, 0.125W	75042	CEATO-1002F
R170	321-0222-00			RES., FXD, FILM: 2K OHM, 1%, 0.125W	75042	CEATO-2001F
R172	321-0183-00			RES., FXD, FILM: 787 OHM, 1%, 0.125W	75042	CEATO-7870F
R174	321-0244-00			RES., FXD, FILM: 3.4K OHM, 1%, 0.125W	75042	CEATO-3401F
R180	321-0260-00			RES., FXD, FILM: 4.99K OHM, 1%, 0.125W	75042	CEATO-4991F
R182	321-0207-00			RES., FXD, FILM: 1.4K OHM, 1%, 0.125W	75042	CEATO-1401F
R184	315-0472-00			RES., FXD, COMP: 4.7K OHM, 5%, 0.25W	01121	CB4725
R186	321-0135-00			RES., FXD, FILM: 249 OHM, 1%, 0.125W	75042	CEATO-2490F
R188	307-0113-00			RES., FXD, COMP: 5.1 OHM, 5%, 0.25W	01121	CB51G5
R190	321-0183-00			RES., FXD, FILM: 787 OHM, 1%, 0.125W	75042	CEATO-7870F
R192	321-0048-00			RES., FXD, FILM: 30.9 OHM, 1%, 0.125W		
R194	321-0058-00			RES., FXD, FILM: 39.2 OHM, 1%, 0.125W	75042	CEATO-39R20F
R195	311-1273-00			RES., VAR, NONWIR: 200K OHM, 10%, 0.50W		
R198	315-0393-00			RES., FXD, COMP: 39K OHM, 5%, 0.25W	01121	CB3935
R199	321-0035-00			RES., FXD, FILM: 22.6 OHM, 1%, 0.125W		
R200	315-0101-00			RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015
R202	315-0470-00			RES., FXD, COMP: 47 OHM, 5%, 0.25W	01121	CB4705
R204	315-0220-00			RES., FXD, COMP: 22 OHM, 5%, 0.25W	01121	CB2205
R206	315-0101-00			RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015
R208	315-0470-00			RES., FXD, COMP: 47 OHM, 5%, 0.25W	01121	CB4705
R209	315-0220-00			RES., FXD, COMP: 22 OHM, 5%, 0.25W	01121	CB2205
R210	321-0289-00			RES., FXD, FILM: 10K OHM, 1%, 0.125W	75042	CEATO-1002F
R212	315-0101-00			RES., FXD, COMP: 100 OHM, 5%, 0.25W	01121	CB1015
R214	321-0218-00			RES., FXD, FILM: 1.82K OHM, 1%, 0.125W	75042	CEATO-1821F
R216	321-0273-00			RES., FXD, FILM: 6.81K OHM, 1%, 0.125W	75042	CEATO-6811F
R218	321-0135-00			RES., FXD, FILM: 249 OHM, 1%, 0.125W	75042	CEATO-2490F
R219	315-0332-00			RES., FXD, COMP: 3.3K OHM, 5%, 0.25W	01121	CB3325
R220	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R222	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R224	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R226	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R228	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R229	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R230	315-0272-00			RES., FXD, COMP: 2.7K OHM, 5%, 0.25W	01121	CB2725
R232	315-0220-00			RES., FXD, COMP: 22 OHM, 5%, 0.25W	01121	CB2205
R234	321-0258-00			RES., FXD, FILM: 4.75K OHM, 1%, 0.125W	75042	CEATO-4751F
R235	311-1265-00			RES., VAR, NONWIR: 2K OHM, 10%, 0.50W	80294	3329P-L58-202
R236	321-0227-00			RES., FXD, FILM: 2.26K OHM, 1%, 0.125W	75042	CEATO-2261F
R240	315-0103-00			RES., FXD, COMP: 10K OHM, 5%, 0.25W	01121	CB1035
R242	315-0100-00			RES., FXD, COMP: 10 OHM, 5%, 0.25W	01121	CB1005
R244	321-0193-00			RES., FXD, FILM: 1K OHM, 1%, 0.125W	75042	CEATO-1001F
R246	315-0682-00			RES., FXD, COMP: 6.8K OHM, 5%, 0.25W	01121	CB6825
R250	321-0293-00			RES., FXD, FILM: 11K OHM, 1%, 0.125W	75042	CEATO-1102F
R252	321-0204-00			RES., FXD, FILM: 1.3K OHM, 1%, 0.125W	75042	CEATO-1301F
R254	321-0164-00			RES., FXD, FILM: 499 OHM, 1%, 0.125W	75042	CEATO-4990F
R256	321-0244-00			RES., FXD, FILM: 3.4K OHM, 1%, 0.125W	75042	CEATO-3401F
R260	321-0233-00			RES., FXD, FILM: 2.61K OHM, 1%, 0.125W	75042	CEATO-2611F
R262	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R264	315-0104-00			RES., FXD, COMP: 100K OHM, 5%, 0.25W	01121	CB1045
R266	321-0205-00			RES., FXD, FILM: 1.33K OHM, 1%, 0.125W	75042	CEATO-1331F
R268	321-0204-00			RES., FXD, FILM: 1.3K OHM, 1%, 0.125W	75042	CEATO-1301F



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Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
R269	315-0472-00		RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R270	315-0104-00		RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R272	315-0104-00		RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R273	315-0104-00		RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R274	315-0104-00		RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R278	321-0287-00		RES.,FXD,FILM:9.53K OHM,1%,0.125W	75042	CEAT0-9531F
R280	315-0272-00		RES.,FXD,COMP:2.7K OHM,5%,0.25W	01121	CB2725
R282	315-0220-00		RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R284	321-0193-00		RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R286	315-0103-00		RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R288	315-0100-00		RES.,FXD,COMP:10 OHM,5%,0.25W	01121	CB1005
R289	315-0682-00		RES.,FXD,COMP:6.8K OHM,5%,0.25W	01121	CB6825
R290	321-0126-00		RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R291	315-0101-00		RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R292	315-0162-00		RES.,FXD,COMP:1.6K OHM,5%,0.25W	01121	CB1625
R293	315-0102-00		RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R294	315-0220-00		RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R295	315-0223-00		RES.,FXD,COMP:22K OHM,5%,0.25W	01121	CB2235
R296	315-0302-00		RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R297	321-0225-00		RES.,FXD,FILM:2.15K OHM,1%,0.125W	75042	CEAT0-2151F
R298	321-0332-00		RES.,FXD,FILM:28K OHM,1%,0.125W	75042	CEAT0-2802F
R300	315-0241-00		RES.,FXD,COMP:240 OHM,5%,0.25W	01121	CB2415
R302	315-0100-00		RES.,FXD,COMP:10 OHM,5%,0.25W	01121	CB1005
R304	315-0470-00		RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R306	315-0470-00		RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R308	315-0470-00		RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R309	315-0470-00		RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R310	321-0260-00		RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R312	315-0101-00		RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R314	315-0101-00		RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R316	315-0470-00		RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R318	315-0203-00		RES.,FXD,COMP:20K OHM,5%,0.25W	01121	CB2035
R320	315-0183-00		RES.,FXD,COMP:18K OHM,5%,0.25W	01121	CB1835
R322	321-0289-00		RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R324	315-0302-00		RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R325	311-1263-00		RES.,VAR,NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R328	321-0256-00		RES.,FXD,FILM:4.53K OHM,1%,0.125W	75042	CEAT0-4531F
R329	321-0193-00		RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R330	311-1259-00		RES.,VAR,NONWIR:100 OHM,10%,0.50W	80294	3329P-L58-101
R332	321-0106-00		RES.,FXD,FILM:124 OHM,1%,0.125W	75042	CEAT0-1240F
R334	315-0153-00		RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R336	315-0224-00		RES.,FXD,COMP:220K OHM,5%,0.25W	01121	CB2245
R338	315-0241-00		RES.,FXD,COMP:240 OHM,5%,0.25W	01121	CB2415
R340	315-0754-00		RES.,FXD,COMP:750K OHM,5%,0.25W	01121	CB7545
R342	321-0318-00		RES.,FXD,FILM:20K OHM,1%,0.125W	75042	CEAT0-2002F
R343	321-0251-00		RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R344	321-0431-00		RES.,FXD,FILM:301K OHM,1%,0.125W	75042	CEAT0-3013F
R348	315-0101-00		RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R350	315-0470-00		RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R352	315-0203-00		RES.,FXD,COMP:20K OHM,5%,0.25W	01121	CB2035
R354	315-0183-00		RES.,FXD,COMP:18K OHM,5%,0.25W	01121	CB1835
R356	321-0289-00		RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R358	315-0302-00		RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R364	315-0220-00		RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R365	311-1263-00		RES.,VAR,NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R368	321-0193-00		RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R369	321-0286-00		RES.,FXD,FILM:9.31K OHM,1%,0.125W	75042	CEAT0-9311F
R370	321-0132-00		RES.,FXD,FILM:232 OHM,1%,0.125W	75042	CEAT0-2320F
R372	315-0153-00		RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R374	315-0241-00		RES.,FXD,COMP:240 OHM,5%,0.25W	01121	CB2415

Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr	
		Eff	Dscont		Code	Mfr Part Number
R375	311-1259-00			RES.,VAR, NONWIR:100 OHM,10%,0.50W	80294	3329P-L58-101
R376	315-0512-00			RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB5125
R377	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R378	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R380	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R382	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEATO-1002F
R384	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R385	311-1263-00			RES.,VAR, NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R386	321-0286-00			RES.,FXD,FILM:9.31K OHM,1%,0.125W	75042	CEATO-9311F
R388	321-0132-00			RES.,FXD,FILM:232 OHM,1%,0.125W	75042	CEATO-2320F
R389	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEATO-1001F
R390	311-1259-00			RES.,VAR, NONWIR:100 OHM,10%,0.50W	80294	3329P-L58-101
R391	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R392	315-0241-00			RES.,FXD,COMP:240 OHM,5%,0.25W	01121	CB2415
R394	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R396	315-0512-00			RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB5125
R398	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R400	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R402	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEATO-1002F
R405	311-1263-00			RES.,VAR, NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R406	321-0256-00			RES.,FXD,FILM:4.53K OHM,1%,0.125W	75042	CEATO-4531F
R408	315-0241-00			RES.,FXD,COMP:240 OHM,5%,0.25W	01121	CB2415
R410	311-1259-00			RES.,VAR, NONWIR:100 OHM,10%,0.50W	80294	3329P-L58-101
R412	321-0106-00			RES.,FXD,FILM:124 OHM,1%,0.125W	75042	CEATO-1240F
R414	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R416	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R418	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R424	311-1263-00			RES.,VAR, NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R426	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEATO-2000F
R428	315-0682-00			RES.,FXD,COMP:6.8K OHM,5%,0.25W	01121	CB6825
R429	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R440	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R442	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R444	315-0220-00			RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R446	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R448	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R450	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R452	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R454	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R456	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R458	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R460	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R461	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	75042	CEATO-2741F
R462	321-0154-00			RES.,FXD,FILM:392 OHM,1%,0.125W	75042	CEATO-3920F
R464	321-0373-00			RES.,FXD,FILM:75K OHM,1%,0.125W	75042	CEATO-7502F
R466	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEATO-4021F
R468	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEATO-7152F
R470	321-0203-00			RES.,FXD,FILM:1.27K OHM,1%,0.125W	75042	CEATO-1271F
R472	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEATO-7152F
R474	315-0224-00			RES.,FXD,COMP:220K OHM,5%,0.25W	01121	CB2245
R476	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R478	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R479	315-0224-00			RES.,FXD,COMP:220K OHM,5%,0.25W	01121	CB2245
R480	315-0113-00			RES.,FXD,COMP:11K OHM,5%,0.25W	01121	CB1135
R482	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEATO-4021F
R484	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R486	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R488	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R490	315-0224-00			RES.,FXD,COMP:220K OHM,5%,0.25W	01121	CB2245
R491	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	75042	CEATO-2741F

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Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
R492	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEAT0-7152F
R493	321-0154-00			RES.,FXD,FILM:392 OHM,1%,0.125W	75042	CEAT0-3920F
R494	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R496	321-0373-00			RES.,FXD,FILM:75K OHM,1%,0.125W	75042	CEAT0-7502F
R500	321-0203-00			RES.,FXD,FILM:1.27K OHM,1%,0.125W	75042	CEAT0-1271F
R502	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEAT0-7152F
R504	315-0113-00			RES.,FXD,COMP:11K OHM,5%,0.25W	01121	CB1135
R506	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R508	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R510	315-0682-00			RES.,FXD,COMP:6.8K OHM,5%,0.25W	01121	CB6825
R512	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R514	315-0105-00			RES.,FXD,COMP:1M OHM,5%,0.25W	01121	CB1055
R516	321-0154-00			RES.,FXD,FILM:392 OHM,1%,0.125W	75042	CEAT0-3920F
R518	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R520	321-0373-00			RES.,FXD,FILM:75K OHM,1%,0.125W	75042	CEAT0-7502F
R522	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	75042	CEAT0-2741F
R524	321-0203-00			RES.,FXD,FILM:1.27K OHM,1%,0.125W	75042	CEAT0-1271F
R526	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEAT0-7152F
R528	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEAT0-7152F
R530	315-0113-00			RES.,FXD,COMP:11K OHM,5%,0.25W	01121	CB1135
R532	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R533	315-0562-00			RES.,FXD,COMP:5.6K OHM,5%,0.25W	01121	CB5625
R534	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R536	315-0105-00			RES.,FXD,COMP:1M OHM,5%,0.25W	01121	CB1055
R538	321-0139-00			RES.,FXD,FILM:274 OHM,1%,0.125W	75042	CEAT0-2740F
R540	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R541	321-0373-00			RES.,FXD,FILM:75K OHM,1%,0.125W	75042	CEAT0-7502F
R542	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R544	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	75042	CEAT0-2741F
R546	321-0218-00			RES.,FXD,FILM:1.82K OHM,1%,0.125W	75042	CEAT0-1821F
R548	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEAT0-7152F
R552	321-0371-00			RES.,FXD,FILM:71.5K OHM,1%,0.125W	75042	CEAT0-7152F
R554	315-0224-00			RES.,FXD,COMP:220K OHM,5%,0.25W	01121	CB2245
R556	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R558	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R560	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R562	315-0113-00			RES.,FXD,COMP:11K OHM,5%,0.25W	01121	CB1135
R566	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R580	321-0257-00			RES.,FXD,FILM:4.64K OHM,1%,0.125W	75042	CEAT0-4641F
R581	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R582	321-0161-00			RES.,FXD,FILM:464 OHM,1%,0.125W	75042	CEAT0-4640F
R584	315-0620-00			RES.,FXD,COMP:62 OHM,5%,0.25W	01121	CB6205
R586	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R588	315-0222-00			RES.,FXD,COMP:2.2K OHM,5%,0.25W	01121	CB2225
R590	315-0330-00			RES.,FXD,COMP:33 OHM,5%,0.25W	01121	CB3305
R592	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R593	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R594	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R596	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R598	315-0302-00			RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R599	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R600	311-1273-00			RES.,VAR,NONWIR:200K OHM,10%,0.50W		
R602	321-0423-00			RES.,FXD,FILM:249K OHM,1%,0.125W	75042	CEAT0-2493F
R604	321-0423-00			RES.,FXD,FILM:249K OHM,1%,0.125W	75042	CEAT0-2493F
R605	311-1273-00			RES.,VAR,NONWIR:200K OHM,10%,0.50W		
R606	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R608	321-0304-00			RES.,FXD,FILM:14.3K OHM,1%,0.125W	75042	CEAT0-1432F
R610	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	75042	CEAT0-4020F
R612	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	75042	CEAT0-4020F
R614	321-0254-00			RES.,FXD,FILM:4.32K OHM,1%,0.125W	75042	CEAT0-4321F

Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
R616	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R618	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R620	315-0562-00			RES.,FXD,COMP:5.6K OHM,5%,0.25W	01121	CB5625
R622	321-0181-00			RES.,FXD,FILM:750 OHM,1%,0.125W	75042	CEAT0-7500F
R624	321-0309-00			RES.,FXD,FILM:16.2K OHM,1%,0.125W	75042	CEAT0-1622F
R626	315-0474-00			RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R628	315-0474-00			RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R630	321-0290-00			RES.,FXD,FILM:10.2K OHM,1%,0.125W	75042	CEAT0-1022F
R632	321-0347-00			RES.,FXD,COMP:1K OHM,5%,0.25W	75042	CEAT0-4022F
R634	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R635	311-1273-00			RES.,VAR,NONWIR:200K OHM,10%,0.50W		
R636	315-0474-00			RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R638	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R642	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R644	321-0211-00			RES.,FXD,FILM:1.54K OHM,1%,0.125W	75042	CEAT0-1541F
R646	315-0222-00			RES.,FXD,COMP:2.2K OHM,5%,0.25W	01121	CB2225
R648	315-0124-00			RES.,FXD,COMP:120K OHM,5%,0.25W	01121	CB1245
R650	315-0202-00			RES.,FXD,COMP:2K OHM,5%,0.25W	01121	CB2025
R652	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R654	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R656	315-0393-00			RES.,FXD,COMP:39K OHM,5%,0.25W	01121	CB3935
R660	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R662	321-0295-00			RES.,FXD,FILM:11.5K OHM,1%,0.125W	75042	CEAT0-1152F
R663	315-0512-00			RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB1525
R664	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R666	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R667	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R668	315-0471-00			RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R670	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R672	315-0333-00			RES.,FXD,COMP:33K OHM,5%,0.25W	01121	CB3335
R676	315-0333-00			RES.,FXD,COMP:33K OHM,5%,0.25W	01121	CB3335
R678	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R680	315-0184-00			RES.,FXD,COMP:180K OHM,5%,0.25W	01121	CB1845
R685	311-1766-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W		
R690	321-0241-00			RES.,FXD,FILM:3.16K OHM,1%,0.125W	75042	CEAT0-3161F
R691	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R692	315-0822-00			RES.,FXD,COMP:8.2K OHM,5%,0.25W	01121	CB8225
R694	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	75042	CEAT0-1502F
R695	311-1267-00			RES.,VAR,NONWIR:5K OHM,10%,0.50W	73138	62PT-3500-502K
R696	315-0471-00			RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R698	321-0315-00			RES.,FXD,FILM:18.7K OHM,1%,0.125W	75042	CEAT0-1872F
R699	308-0248-00			RES.,FXD,WW:150 OHM,1%,5W	91637	RS2A-B150R0F
R700	315-0100-00			RES.,FXD,COMP:10 OHM,5%,0.25W	01121	CB1005
R702	321-0260-00			RES.,FXD,FILM:4.99K OHM,1%,0.125W	75042	CEAT0-4991F
R704	301-0681-00			RES.,FXD,COMP:680 OHM,5%,0.50W	01121	EB6815
R705	321-0325-00			RES.,FXD,FILM:23.7K OHM,1%,0.125W	75042	CEAT0-2372F
R710	311-1275-00			RES.,VAR,NONWIR:1M OHM,10%,0.50W		
R712	323-0488-00			RES.,FXD,FILM:1.18M OHM,1%,0.50W	75042	CECT0-1184F
R714	321-0408-00			RES.,FXD,FILM:174K OHM,1%,0.125W	75042	CEAT0-1743F
R715	311-1260-00			RES.,VAR,NONWIR:250 OHM,10%,0.50W	73138	62PT-345-0
R716	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R717	321-0348-00			RES.,FXD,FILM:41.2K OHM,1%,0.125W	75042	CEAT0-4122F
R718	315-0474-00			RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R719	321-0318-00			RES.,FXD,FILM:20K OHM,1%,0.125W	75042	CEAT0-2002F
R720	321-0429-00			RES.,FXD,FILM:287K OHM,1%,0.125W	75042	CEAT0-2873F
R722	321-0399-00			RES.,FXD,FILM:140K OHM,1%,0.125W	75042	CEAT0-1403F
R724	321-0319-00			RES.,FXD,FILM:20.5K OHM,1%,0.125W	75042	CEAT0-2052F
R726	309-0087-00			RES.,FXD,FILM:5M OHM,1%,0.50W		
R728	325-0072-00			RES.,FXD,FILM:10M OHM,1%,0.50W		
R730	323-0498-00			RES.,FXD,FILM:1.5M OHM,1%,0.50W		

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Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
R732	321-0402-00			RES.,FXD,FILM:150K OHM,1%,0.125W	75042	CEAT0-1503F
R734	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	75042	CEAT0-1502F
R736	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R740	311-1268-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W	73138	62PT-351-0
R742	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R744	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R745	311-1268-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W	73138	62PT-351-0
R746	315-0105-00			RES.,FXD,COMP:1M OHM,5%,0.25W	01121	CB1055
R750	315-0100-00			RES.,FXD,COMP:10 OHM,5%,0.25W	01121	CB1005
R752	315-0913-00			RES.,FXD,COMP:91K OHM,5%,0.25W	01121	CB9135
R754	315-0823-00			RES.,FXD,COMP:82K OHM,5%,0.25W	01121	CB8235
R755	311-1267-00			RES.,VAR,NONWIR:5K OHM,10%,0.50W	73138	62PT-3500-502K
R756	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R760	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R762	321-0244-00			RES.,FXD,FILM:3.4K OHM,1%,0.125W	75042	CEAT0-3401F
R764	321-0230-00			RES.,FXD,FILM:2.43K OHM,1%,0.125W	75042	CEAT0-2431F
R770	321-0381-00			RES.,FXD,FILM:90.9K OHM,1%,0.125W	75042	CEAT0-9092F
R772	321-0420-00			RES.,FXD,FILM:232K OHM,1%,0.125W	75042	CEAT0-2323F
R774	315-0222-00			RES.,FXD,COMP:2.2K OHM,5%,0.25W	01121	CB2225
R776	315-0513-00			RES.,FXD,COMP:51K OHM,5%,0.25W	01121	CB5135
R778	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R802	315-0623-00			RES.,FXD,COMP:62K OHM,5%,0.25W	01121	CB6235
R810	315-0513-00			RES.,FXD,COMP:51K OHM,5%,0.25W	01121	CB5135
R812	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R813	315-0274-00			RES.,FXD,COMP:270K OHM,5%,0.25W	01121	CB2745
R814	321-0327-00			RES.,FXD,FILM:24.9K OHM,1%,0.125W	75042	CEAT0-2492F
R816	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R818	315-0475-00			RES.,FXD,COMP:4.7M OHM,5%,0.25W	01121	CB4755
R820	321-0202-00			RES.,FXD,FILM:1.24K OHM,1%,0.125W	75042	CEAT0-1241F
R822	321-0299-00			RES.,FXD,FILM:12.7K OHM,1%,0.125W	75042	CEAT0-1272F
R824	315-0125-00			RES.,FXD,COMP:1.2M OHM,5%,0.25W	01121	CB1255
R825	311-1286-00			RES.,VAR,NONWIR:50K OHM,10%,0.50W		
R826	321-0251-00			RES.,FXD,FILM:4.02K OHM,1%,0.125W	75042	CEAT0-4021F
R830	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R832	315-0393-00			RES.,FXD,COMP:39K OHM,5%,0.25W	01121	CB3935
R834	321-0361-00			RES.,FXD,FILM:56.2K OHM,1%,0.125W	75042	CEAT0-5622F
R835	311-1765-00			RES.,VAR,NONWIR:1K OHM,20%,0.50W		
R836	321-0306-00			RES.,FXD,FILM:15K OHM,1%,0.125W	75042	CEAT0-1502F
R840	321-0341-00			RES.,FXD,FILM:34.8K OHM,1%,0.125W	75042	CEAT0-3482F
R842	321-0367-00			RES.,FXD,FILM:64.9K OHM,1%,0.125W	75042	CEAT0-6492F
R844	315-0134-00			RES.,FXD,COMP:130K OHM,5%,0.25W	01121	CB1345
R846	321-0411-00			RES.,FXD,FILM:187K OHM,1%,0.125W	75042	CEAT0-1873F
R848	315-0334-00			RES.,FXD,COMP:330K OHM,5%,0.25W	01121	CB3345
R850	315-0105-00			RES.,FXD,COMP:1M OHM,5%,0.25W	01121	CB1055
R852	321-0285-01			RES.,FXD,FILM:9.09K OHM,0.5%0.125W	75042	CEAT0-9091D
R854	321-0619-00			RES.,FXD,FILM:1.012K OHM,0.25%,0.125W	75042	CEAT2-10120C
R856	321-0098-01			RES.,FXD,FILM:102 OHM,0.5%,0.125W	75042	CEAT0-1020D
R858	321-0287-00			RES.,FXD,FILM:9.53K OHM,1%,0.125W	75042	CEAT0-9531F
R860	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	75042	CEAT0-2491F
R862	321-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.125W	75042	CEAT0-1501F
R864	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R866	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R867	315-0682-00			RES.,FXD,COMP:6.8K OHM,5%,0.25W	01121	CB6825
R868	315-0104-00			RES.,FXD,COMP:100K OHM,5%,0.25W	01121	CB1045
R870	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R872	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R873	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R874	321-0510-00			RES.,FXD,FILM:2M OHM,1%,0.125W	75042	CEAT0-2004F
R876	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R878	315-0113-00			RES.,FXD,COMP:11K OHM,5%,0.25W	01121	CB1135

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Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
R900	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R902	315-0220-00			RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R903	315-0220-00			RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R910	307-0103-00			RES.,FXD,COMP:2.7 OHM,5%,0.25W	01121	CB27G5
R912	307-0103-00			RES.,FXD,COMP:2.7 OHM,5%,0.25W	01121	CB27G5
R914	307-0103-00			RES.,FXD,COMP:2.7 OHM,5%,0.25W	01121	CB27G5
R916	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R918	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R919	315-0220-00			RES.,FXD,COMP:22 OHM,5%,0.25W	01121	CB2205
R920	311-1263-00			RES.,VAR,NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R921	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	75042	CEAT0-2001F
R922	315-0152-00			RES.,FXD,COMP:1.5K OHM,5%,0.25W	01121	CB1525
R924	321-0277-00			RES.,FXD,FILM:7.5K OHM,1%,0.125W	75042	CEAT0-7501F
R926	321-0249-00			RES.,FXD,FILM:3.83K OHM,1%,0.125W	75042	CEAT0-3831F
R927	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R928	321-0286-00			RES.,FXD,FILM:9.31K OHM,1%,0.125W	75042	CEAT0-9311F
R930	321-0244-00			RES.,FXD,FILM:3.4K OHM,1%,0.125W	75042	CEAT0-3401F
R932	315-0121-00			RES.,FXD,COMP:120 OHM,5%,0.25W	01121	CB1215
R934	321-0184-00			RES.,FXD,FILM:806 OHM,1%,0.125W	75042	CEAT0-8060F
R936	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R938	321-0126-00			RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R939	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	75042	CEAT0-3321F
R940	321-0176-00			RES.,FXD,FILM:665 OHM,1%,0.125W	75042	CEAT0-6650F
R941	321-0294-00			RES.,FXD,FILM:11.3K OHM,1%,0.125W	75042	CEAT0-1132F
R942	321-0302-00			RES.,FXD,FILM:13.7K OHM,1%,0.125W	75042	CEAT0-1372F
R944	321-0308-00			RES.,FXD,FILM:15.8K OHM,1%,0.125W	75042	CEAT0-1582F
R946	321-0314-00			RES.,FXD,FILM:18.2K OHM,1%,0.125W	75042	CEAT0-1822F
R947	321-0319-00			RES.,FXD,FILM:20.5K OHM,1%,0.125W	75042	CEAT0-2052F
R948	321-0323-00			RES.,FXD,FILM:22.6K OHM,1%,0.125W	75042	CEAT0-2262F
R950	321-0163-00			RES.,FXD,FILM:487 OHM,1%,0.125W	75042	CEAT0-4870F
R951	321-0145-00			RES.,FXD,FILM:316 OHM,1%,0.125W	75042	CEAT0-3160F
R952	321-0150-00			RES.,FXD,FILM:357 OHM,1%,0.125W	75042	CEAT0-3570F
R954	321-0153-00			RES.,FXD,FILM:383 OHM,1%,0.125W	75042	CEAT0-3830F
R956	321-0155-00			RES.,FXD,FILM:402 OHM,1%,0.125W	75042	CEAT0-4020F
R957	321-0156-00			RES.,FXD,FILM:412 OHM,1%,0.125W	75042	CEAT0-4120F
R958	321-0128-00			RES.,FXD,FILM:210 OHM,1%,0.125W	75042	CEAT0-2100F
R960	311-1268-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W	73138	62PT-351-0
R961	321-0273-00			RES.,FXD,FILM:6.81K OHM,1%,0.125W	75042	CEAT0-6811F
R962	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R964	315-0624-00			RES.,FXD,COMP:620K OHM,5%,0.25W	01121	CB6245
R966	321-0261-00			RES.,FXD,FILM:5.11K OHM,1%,0.125W	75042	CEAT0-5111F
R967	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	75042	CEAT0-8061F
R968	321-0295-00			RES.,FXD,FILM:11.5K OHM,1%,0.125W	75042	CEAT0-1152F
R970	321-0307-00			RES.,FXD,FILM:15.4K OHM,1%,0.125W	75042	CEAT0-1542F
R971	321-0317-00			RES.,FXD,FILM:19.6K OHM,1%,0.125W	75042	CEAT0-1962F
R972	321-0326-00			RES.,FXD,FILM:24.3K OHM,1%,0.125W	75042	CEAT0-2432F
R974	321-0333-00			RES.,FXD,FILM:28.7K OHM,1%,0.125W	75042	CEAT0-2872F
R976	321-0091-00			RES.,FXD,FILM:86.6 OHM,1%,0.125W	75042	CEAT0-86R60F
R977	321-0132-00			RES.,FXD,FILM:232 OHM,1%,0.125W	75042	CEAT0-2320F
R978	321-0147-00			RES.,FXD,FILM:332 OHM,1%,0.125W	75042	CEAT0-3320F
R980	321-0156-00			RES.,FXD,FILM:412 OHM,1%,0.125W	75042	CEAT0-4870F
R981	321-0163-00			RES.,FXD,FILM:487 OHM,1%,0.125W	75042	CEAT0-5620F
R982	321-0169-00			RES.,FXD,FILM:562 OHM,1%,0.125W	75042	CEAT0-5620F
R984	321-0143-00			RES.,FXD,FILM:301 OHM,1%,0.125W	75042	CEAT0-3010F
R985	311-1268-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W	73138	62PT-351-0
R986	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F
R988	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R989	315-0624-00			RES.,FXD,COMP:620K OHM,5%,0.25W	01121	CB6245
R990	321-0265-00			RES.,FXD,FILM:5.62K OHM,1%,0.125W	75042	CEAT0-5621F
R992	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEAT0-1002F

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Ckt No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr Part Number
		Eff	Dscont			
R994	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	75042	CEAT0-4990F
R995	311-1268-00			RES.,VAR,NONWIR:10K OHM,10%,0.50W	73138	62PT-351-0
R996	321-0314-00			RES.,FXD,FILM:18.2K OHM,1%,0.125W	75042	CEAT0-1822F
R998	321-0164-00			RES.,FXD,FILM:499 OHM,1%,0.125W	75042	CEAT0-4990F
R999	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1000	315-0470-00			RES.,FXD,COMP:47 OHM,5%,0.25W	01121	CB4705
R1002	315-0152-00			RES.,FXD,COMP:1.5K OHM,5%,0.25W	01121	CB1525
R1004	315-0100-00			RES.,FXD,COMP:10 OHM,5%,0.25W	01121	CB1005
R1006	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1007	315-0471-00			RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R1008	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1010	321-0241-00			RES.,FXD,FILM:3.16K OHM,1%,0.125W	75042	CEAT0-3161F
R1013	315-0150-00			RES.,FXD,COMP:15 OHM,5%,0.25W	01121	CB1505
R1014	321-0241-00			RES.,FXD,FILM:3.16K OHM,1%,0.125W	75042	CEAT0-3161F
R1016	315-0471-00			RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R1018	315-0270-00			RES.,FXD,COMP:27 OHM,5%,0.25W	01121	CB2705
R1020	311-1265-00			RES.,VAR,NONWIR:2K OHM,10%,0.50W	80294	3329P-L58-202
R1022	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1024	315-0822-00			RES.,FXD,COMP:8.2K OHM,5%,0.25W	01121	CB8225
R1025	311-1265-00			RES.,VAR,NONWIR:2K OHM,10%,0.50W	80294	3329P-L58-202
R1026	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1028	315-0473-00			RES.,FXD,COMP:47K OHM,5%,0.25W	01121	CB4735
R1030	315-0473-00			RES.,FXD,COMP:47K OHM,5%,0.25W	01121	CB4735
R1032	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1034	315-0222-00			RES.,FXD,COMP:2.2K OHM,5%,0.25W	01121	CB2225
R1036	315-0472-00			RES.,FXD,COMP:4.7K OHM,5%,0.25W	01121	CB4725
R1038	315-0471-00			RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R1040	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1041	315-0241-00			RES.,FXD,COMP:240 OHM,5%,0.25W	01121	CB2415
R1042	315-0102-00			RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R1044	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1046	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1048	315-0512-00			RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB5125
R1050	321-0244-00			RES.,FXD,FILM:3.4K OHM,1%,0.125W	75042	CEAT0-3401F
R1052	315-0512-00			RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB5125
R1054	315-0183-00			RES.,FXD,COMP:18K OHM,5%,0.25W	01121	CB1835
R1055	311-1260-00			RES.,VAR,NONWIR:250 OHM,10%,0.50W	73138	62PT-345-0
R1056	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1058	315-0273-00			RES.,FXD,COMP:27K OHM,5%,0.25W	01121	CB2735
R1060	311-1260-00			RES.,VAR,NONWIR:250 OHM,10%,0.50W	73138	62PT-345-0
R1062	315-0183-00			RES.,FXD,COMP:18K OHM,5%,0.25W	01121	CB1835
R1064	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1066	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1068	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1074	321-0204-00			RES.,FXD,FILM:1.3K OHM,1%,0.125W	75042	CEAT0-1301F
R1076	321-0204-00			RES.,FXD,FILM:1.3K OHM,1%,0.125W	75042	CEAT0-1301F
R1150	315-0124-00			RES.,FXD,COMP:120K OHM,5%,0.25W	01121	CB1245
R1152	315-0473-00			RES.,FXD,COMP:47K OHM,5%,0.25W	01121	CB4735
R1154	315-0272-00			RES.,FXD,COMP:2.7K OHM,5%,0.25W	01121	CB2725
R1156	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1158	315-0203-00			RES.,FXD,COMP:20K OHM,5%,0.25W	01121	CB2035
R1160	315-0752-00			RES.,FXD,COMP:7.5K OHM,5%,0.25W	01121	CB7525
R1162	315-0153-00			RES.,FXD,COMP:15K OHM,5%,0.25W	01121	CB1535
R1164	321-0193-00			RES.,FXD,FILM:1K OHM,1%,0.125W	75042	CEAT0-1001F
R1166	315-0201-00			RES.,FXD,COMP:200 OHM,5%,0.25W	01121	CB2015
R1170	315-0510-00			RES.,FXD,COMP:51 OHM,5%,0.25W	01121	CB5105
R1172	321-0188-00			RES.,FXD,FILM:887 OHM,1%,0.125W	75042	CEAT0-8870F
R1174	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1176	315-0101-00			RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
R1178	321-0661-00			RES.,FXD,FILM:600 OHM,1%,0.125W	75042	CEAT0-6000F

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
R1180	315-0105-00		RES.,FXD,COMP:1M OHM,5%,0.25W	01121	CB1055
R1190	311-1263-00		RES.,VAR,NONWIR:1K OHM,10%,0.50W	73138	62PT-347-0
R1192	321-0289-00		RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEATO-1002F
R1194	321-0172-00		RES.,FXD,FILM:604 OHM,1%,0.125W	75042	CEATO-6040F
R1195	311-1272-00		RES.,VAR,NONWIR:100K OHM,10%,0.50K	73138	62PT-355-0
R1196	321-0343-00		RES.,FXD,FILM:36.5K OHM,1%,0.125W	75042	CEATO-3652F
R1198	321-0402-00		RES.,FXD,FILM:150K OHM,1%,0.125W	75042	CEATO-1503F
R1200	311-1269-00		RES.,VAR,NONWIR:20K OHM,10%,0.50W	73138	62PT-352-0
R1202	321-0356-00		RES.,FXD,FILM:49.9K OHM,1%,0.125W	75042	CEATO-4992F
R1204	321-0289-00		RES.,FXD,FILM:10K OHM,1%,0.125W	75042	CEATO-1002F
R1205	311-1265-00		RES.,VAR,NONWIR:2K OHM,10%,0.50W	80294	3329P-L58-202
R1206	315-0103-00		RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1208	321-0259-00		RES.,FXD,FILM:4.87K OHM,1%,0.125W	75042	CEATO-4871F
R1210	321-0256-00		RES.,FXD,FILM:4.53K OHM,1%,0.125W	75042	CEATO-4531F
R1212	321-0256-00		RES.,FXD,FILM:4.53K OHM,1%,0.125W	75042	CEATO-4531F
R1214	321-0259-00		RES.,FXD,FILM:4.87K OHM,1%,0.125W	75042	CEATO-4871F
R1215	311-1265-00		RES.,VAR,NONWIR:2K OHM,10%,0.50W	80294	3329P-L58-202
R1216	315-0155-00		RES.,FXD,COMP:1.5M OHM,5%,0.25W	01121	CB1555
R1218	315-0102-00		RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R1220	316-0685-00		RES.,FXD,COMP:6.8M OHM,10%,0.25W	01121	CB6851
R1222	315-0155-00		RES.,FXD,COMP:1.5M OHM,5%,0.25W	01121	CB1555
R1224	315-0102-00		RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R1225	311-1268-00		RES.,VAR,NONWIR:10K OHM,10%,0.50W	73138	62PT-351-0
R1226	315-0474-00		RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R1228	315-0102-00		RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R1230	315-0223-00		RES.,FXD,COMP:22K OHM,5%,0.25W	01121	CB2235
R1250	321-0241-00		RES.,FXD,FILM:3.16K OHM,1%,0.125W	75042	CEATO-3161F
R1252	315-0822-00		RES.,FXD,COMP:8.2K OHM,5%,0.25W	01121	CB8225
R1253	315-0103-00		RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R1254	321-0306-00		RES.,FXD,FILM:15K OHM,1%,0.125W	75042	CEATO-1502F
R1255	311-1267-00		RES.,VAR,NONWIR:5K OHM,10%,0.50W	73138	62PT-3500-502K
R1256	321-0315-00		RES.,FXD,FILM:18.7K OHM,1%,0.125W	75042	CEATO-1872F
R1258	315-0471-00		RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R1260	307-0113-00		RES.,FXD,COMP:5.1 OHM,5%,0.25W	01121	CB51G5
R1262	308-0248-00		RES.,FXD,WW:150 OHM,1%,5W	91637	RS2A-B150R0F
R1264	307-0104-00		RES.,FXD,COMP:3.3 OHM,5%,0.25W	01121	CB33G5
R1266	308-0248-00		RES.,FXD,WW:150 OHM,1%,5W	91637	RS2A-B150R0F
R1305	315-0102-00		RES.,FXD,COMP:1K OHM,5%,0.25W	01121	CB1025
R1306	315-0271-00		RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715
R1307	315-0271-00		RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715
R1308	315-0271-00		RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715
R1309	315-0101-00		RES.,FXD,COMP:100 OHM,5%,0.25W	01121	CB1015
S5	260-0960-00		SWITCH,SLIDE:2A AT 120VAC	10389	23-021-006
S21	260-0779-00		SWITCH,PUSH:SWP		
S51	260-1707-00		SWITCH,PUSH:INPUT IMPEDANCE SELECTOR		
S52					
S53					
S54					
S685	263-1093-00		ACTR ASSY,CAM SW:VERT GAIN SELECTOR	80009	263-1093-00
S714	260-1702-00		SWITCH,PUSH:50MV/DIV		
S715		SWITCH,PUSH:MNL			
S716		SWITCH,PUSH:100MS			
S717		SWITCH,PUSH:10MS			
S718			SWITCH,PUSH:1MS		
S719			SWITCH,PUSH:		
S800	263-1081-00		ACTR ASSY,CAM SW:FREQ SPAN	80009	263-1081-00
S812	260-1704-00		SWITCH,PUSH:VIDEO LEFT		
S814	260-1227-01		SWITCH,PUSH:LINE VERT		
S816		SWITCH,PUSH:DP,2-BUTTON	80009	260-1227-01	
S818		SWITCH,PUSH:AUTO TRIG			



Electrical Parts List—5L4N

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
S860	260-1132-00		SWITCH,PUSH:FREQ MKR	80009	260-1132-00
S1121	260-1708-00		SWITCH,PUSH:CTR		
S1122	XXX-XXXX-XX		SWITCH,PUSH:DISPLAY ON		
S1151	260-1706-00		SWITCH,PUSH:CHOP		
S1214	260-1132-00		SWITCH,PUSH:1 BUTTON,DOUBLE POLE	80009	260-1132-00
S1215	260-1132-00		SWITCH,PUSH:1 BUTTON,DOUBLE POLE	80009	260-1132-00
S1216	260-1706-00		SWITCH,PUSH:VIDEO FILTER 10 HZ		
S1218	260-1706-00		SWITCH,PUSH:VIDEO FILTER 300 HZ		
T56	120-0440-00		XFMR,TOROID:6 TURNS BIFILAR	80009	120-0440-00
T62	120-0440-00		XFMR,TOROID:6 TURNS BIFILAR	80009	120-0440-00
T212	120-0954-00		XFMR,TOROID:14 TURNS 2 TRIFILAR	80009	120-0954-00
T218	120-0954-00		XFMR,TOROID:14 TURNS 2 TRIFILAR	80009	120-0954-00
T320	120-0957-00		XFMR,RF:POT CORE	80009	120-0957-00
T350	120-0956-00		XFMR,TOROID:3 WINDINGS	80009	120-0956-00
T380	120-0956-00		XFMR,TOROID:3 WINDINGS	80009	120-0956-00
T400	120-0956-00		XFMR,TOROID:3 WINDINGS	80009	120-0956-00
T1000	120-0955-00		XFMR,TOROID:4 WINDINGS	80009	120-0955-00
U290	307-1025-00		OPT ISOLATOR:LIGHT EMITTING DIODE		
U295	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U338	307-1025-00		OPT ISOLATOR:LIGHT EMITTING DIODE		
U340	156-0158-00		MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	S5558V
U374	307-1025-00		OPT ISOLATOR:LIGHT EMITTING DIODE		
U392	307-1025-00		OPT ISOLATOR:LIGHT EMITTING DIODE		
U408	307-1025-00		OPT ISOLATOR:LIGHT EMITTING DIODE		
U470	156-0048-00		MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	86684	CA3046
U490	156-0048-00		MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	86684	CA3046
U510	156-0048-00		MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	86684	CA3046
U540	156-0048-00		MICROCIRCUIT,LI:FIVE NPN TRANSISTOR ARRAY	86684	CA3046
U620	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U630	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U640	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U650	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U660	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U690	156-0105-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	27014	LM301AN
U750	155-0055-00		MICROCIRCUIT,LI:MONOLITHIC,TRIG & SWEEP	80009	155-0055-00
U812	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U830	156-0158-00		MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	S5558V
U860	156-0158-00		MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	S5558V
U960	156-0158-00		MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	S5558V
U1040	156-0177-00		MICROCIRCUIT,DI:DUAL LINE RECEIVER		
U1042	156-0039-00		MICROCIRCUIT,DI:DUAL J-K FLIP FLOP	04713	MC7473P
U1044	156-0079-00		MICROCIRCUIT,DI:DECADE COUNTER,TTL	07263	9390PC
U1046	156-0079-00		MICROCIRCUIT,DI:DECADE COUNTER,TTL	07263	9390PC
U1047	156-0079-00		MICROCIRCUIT,DI:DECADE COUNTER,TTL	07263	9390PC
U1060	156-0130-00		MICROCIRCUIT,LI:BALANCED MODEM	04713	MC1496G
U1174	156-0132-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER		
U1190	156-0158-00		MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER	18324	S5558V
U1225	156-0067-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	07263	U6T7741393
U1250	156-0105-00		MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER	27014	LM301AN
U1305	156-0047-00		MICROCIRCUIT,DI:3-INPUT NAND GATE	01295	SN7410N
VR54	152-0149-00	XB010151	SEMICONV DEVICE:ZENER,0.4W,10V,5%	04713	1N961B
VR56	152-0149-00	XB010151	SEMICONV DEVICE:ZENER,0.4W,10V,5%	04713	1N961B
VR106	152-0243-00		SEMICONV DEVICE:ZENER,0.4W,15V,5%	81483	1N965B
VR130	152-0227-00		SEMICONV DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR164	152-0227-00		SEMICONV DEVICE:ZENER,0.4W,6.2V,5%	81483	69-6585
VR690	152-0461-00		SEMICONV DEVICE:ZENER,0.4W,6.2V,5%	04713	1N821
VR802	152-0226-00		SEMICONV DEVICE:ZENER,0.4W,5.1V,5%	81483	69-6584
VR1048	152-0279-00		SEMICONV DEVICE:ZENER,0.4W,5.1V,5%	07910	1N751A
VR1250	152-0461-00		SEMICONV DEVICE:ZENER,0.4W,6.2V,5%	04713	1N821
Y430	158-0094-00		XTAL UNIT,QTZ:249.975 KHZ,0.0005%		
Y432	158-0094-00		XTAL UNIT,QTZ:249.975 KHZ,0.0005%		
Y434	158-0094-00		XTAL UNIT,QTZ:249.975 KHZ,0.0005%		
Y436	158-0094-00		XTAL UNIT,QTZ:249.975 KHZ,0.0005%		
Y438	158-0094-00		XTAL UNIT,QTZ:249.975 KHZ,0.0005%		

## DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

### Symbols and Reference Designators

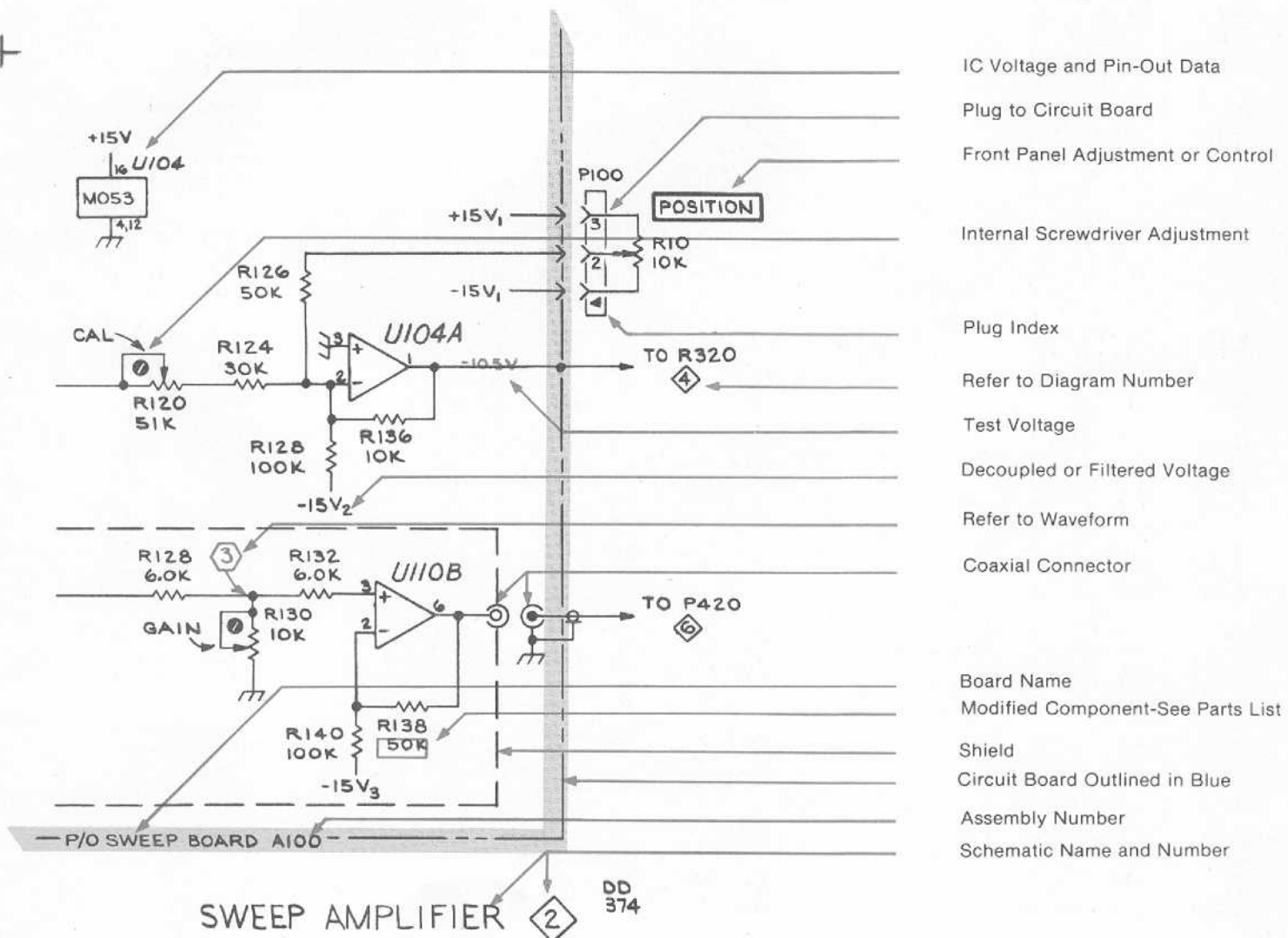
Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors =	Values one or greater are in picofarads (pF). Values less than one are in microfarads ( $\mu$ F).
Resistors =	Ohms ( $\Omega$ ).

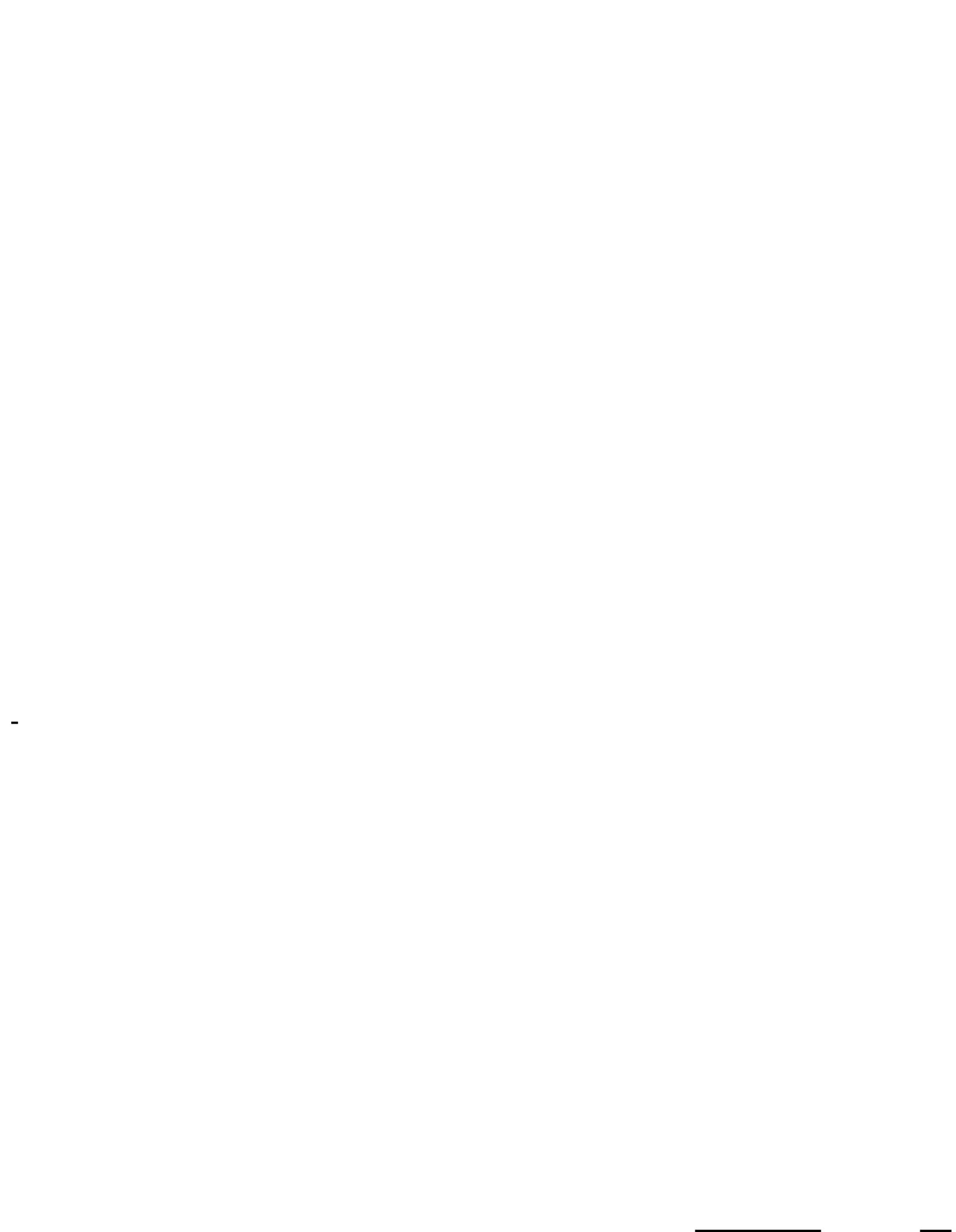
Symbols used on the diagrams are based on ANSI Y32.2, 1970 Standards. Exceptions and additions are shown on the diagram sample.

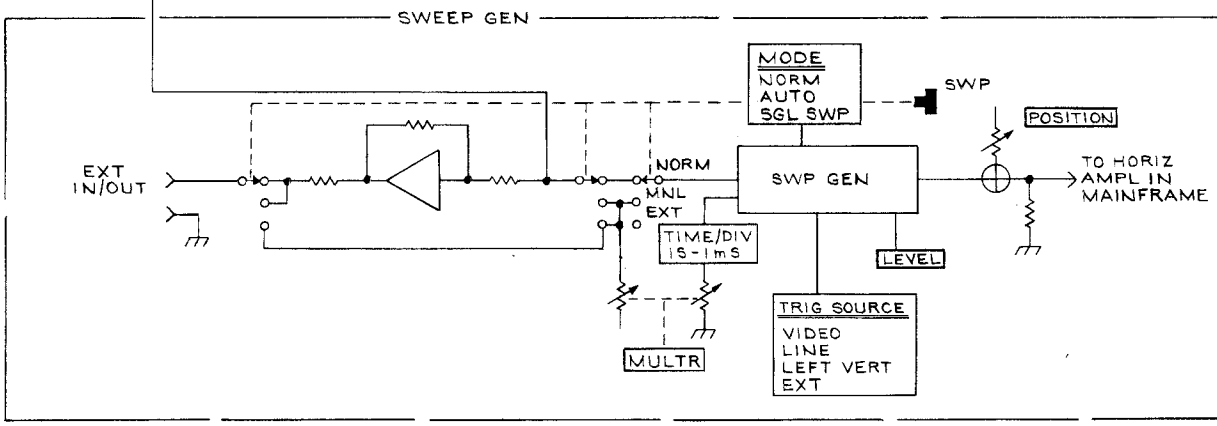
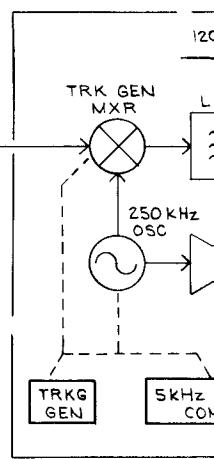
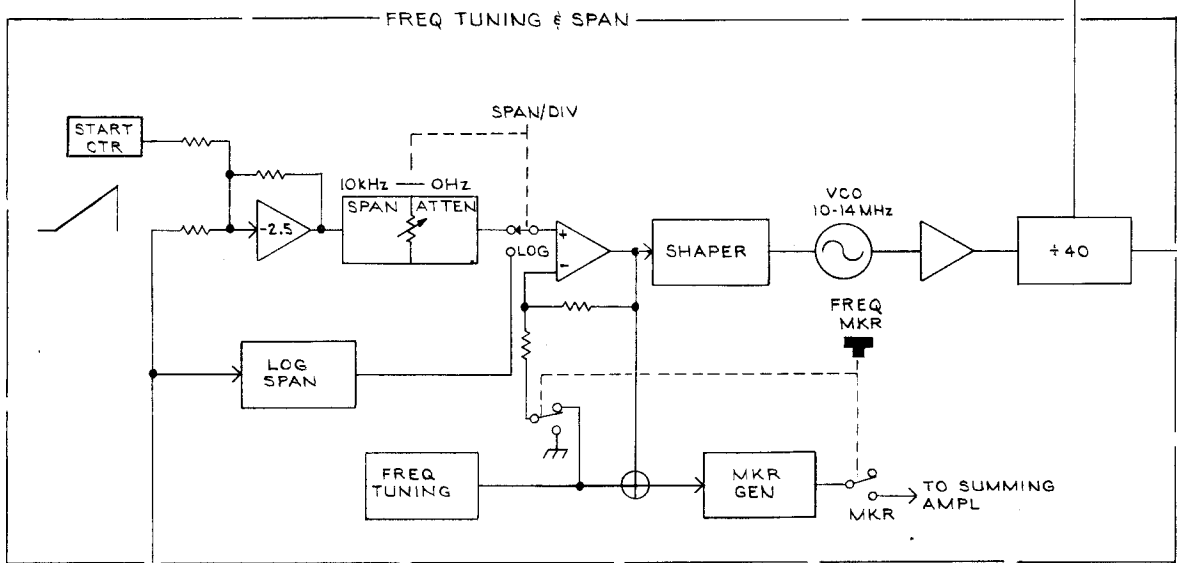
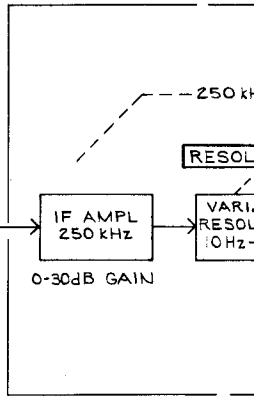
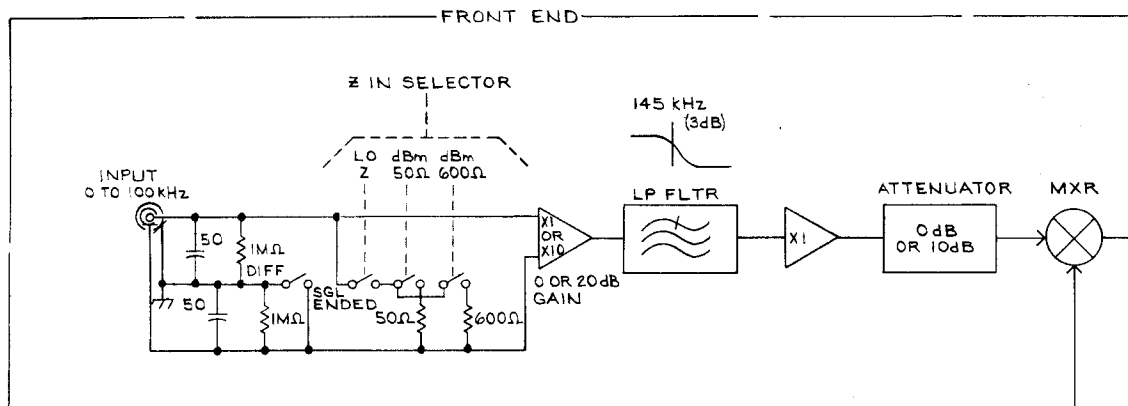
Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The following special symbols are used on the diagrams:

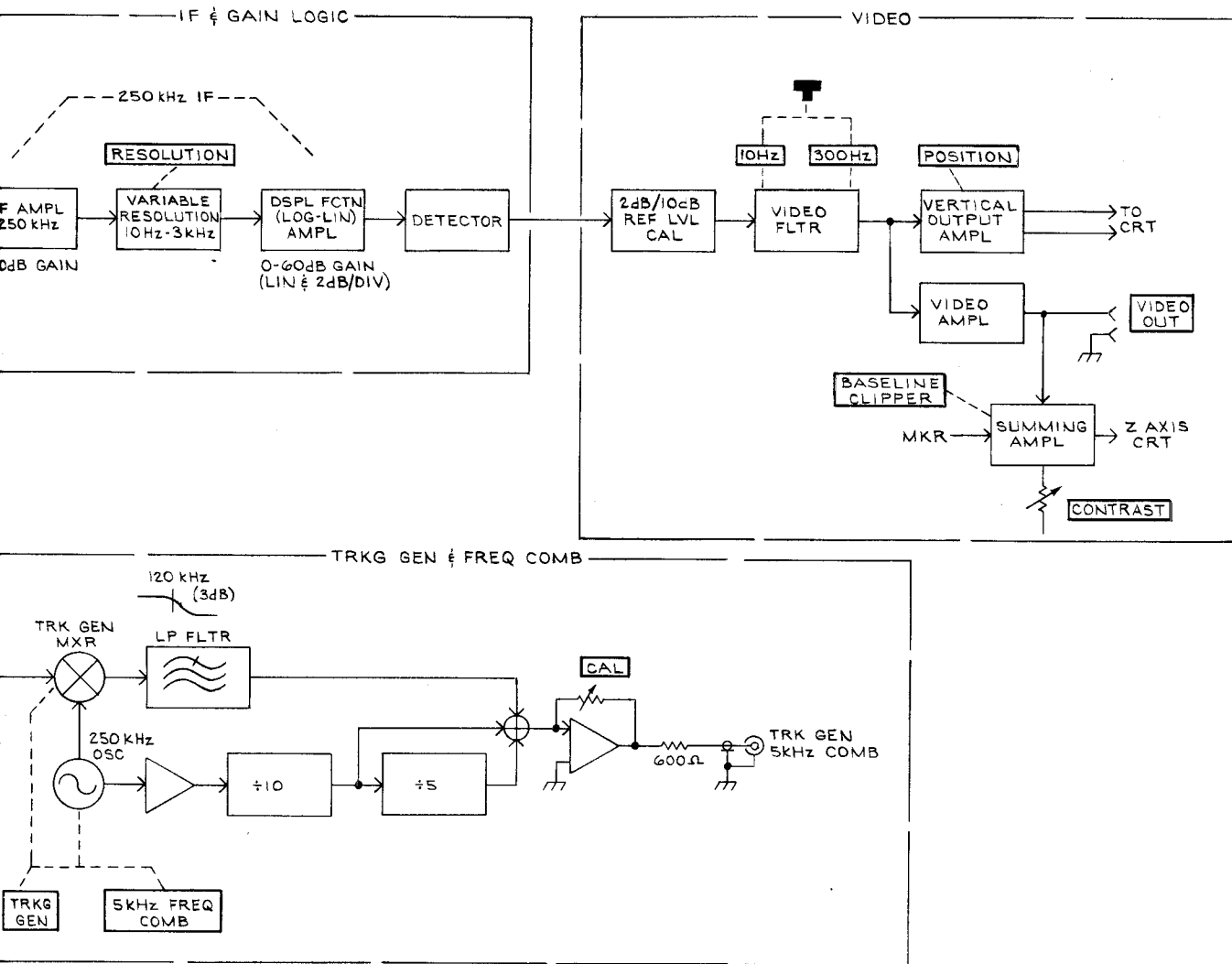








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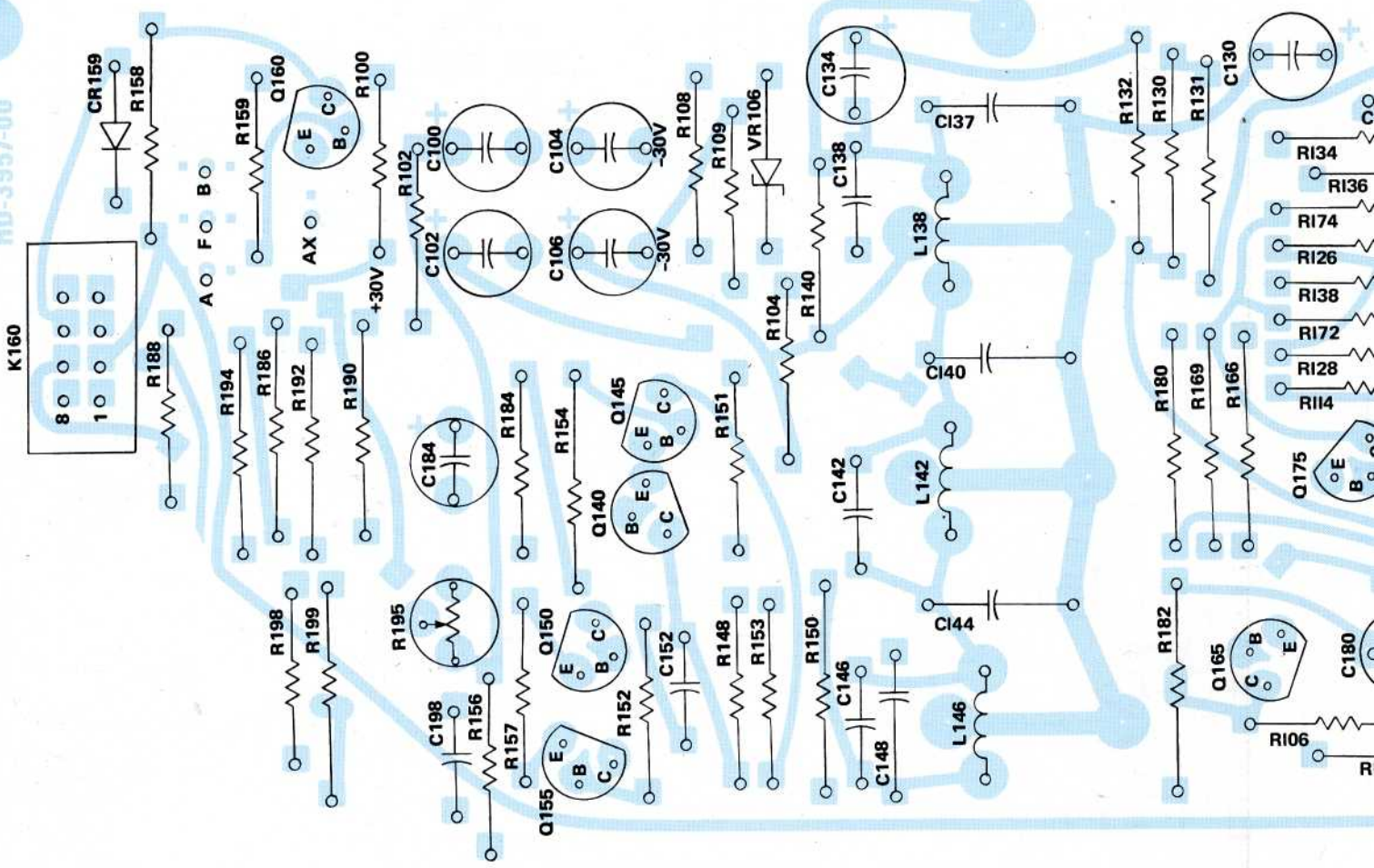
BLOCK DIAGRAM

DD474

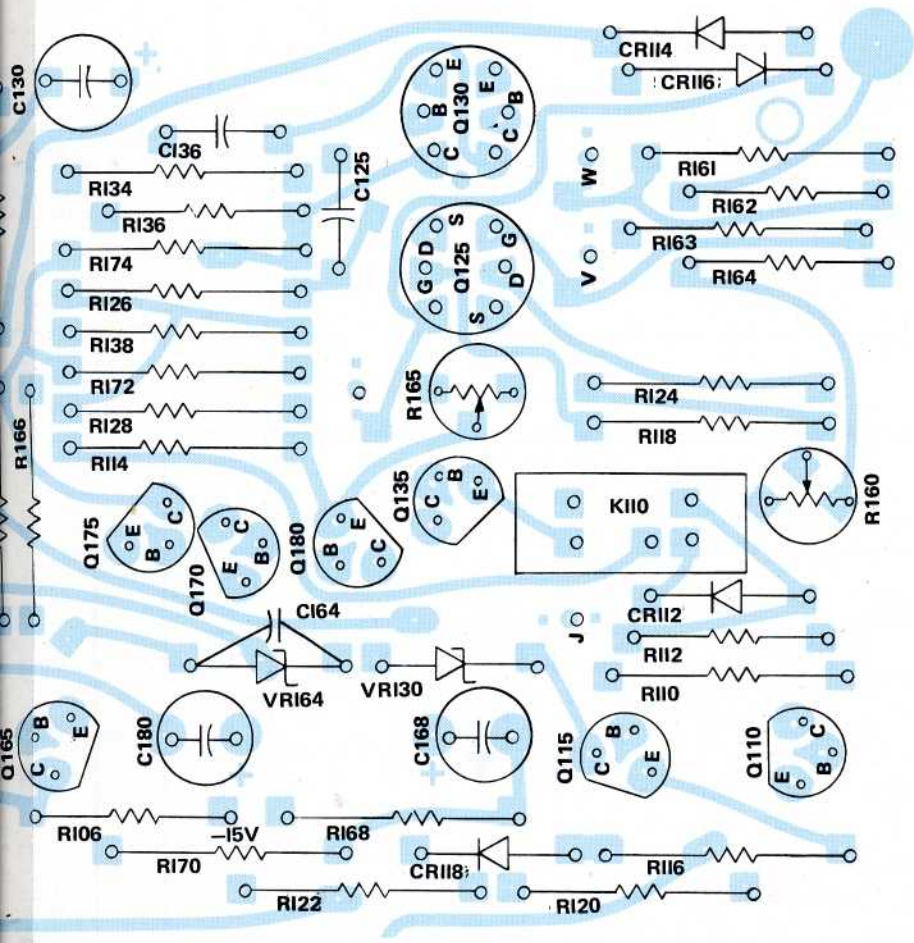
BLOCK DIAGRAM



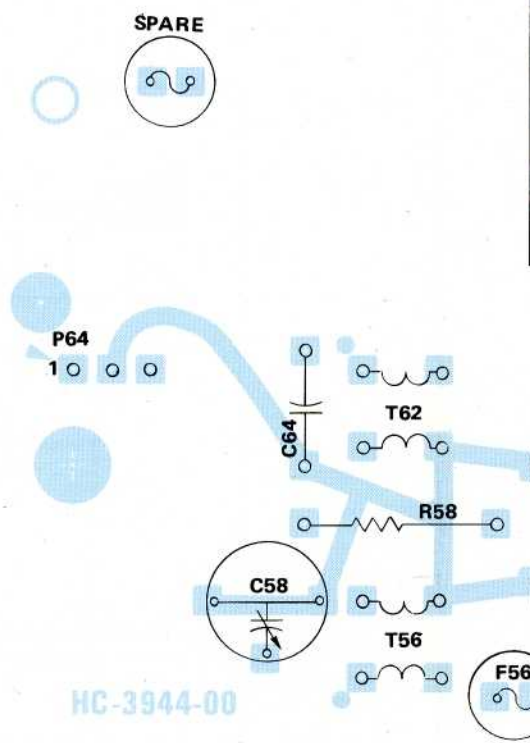
HD-3957-00



P/O A100 Input Amplifier, LP Filter, Mixer & 250 kHz IF



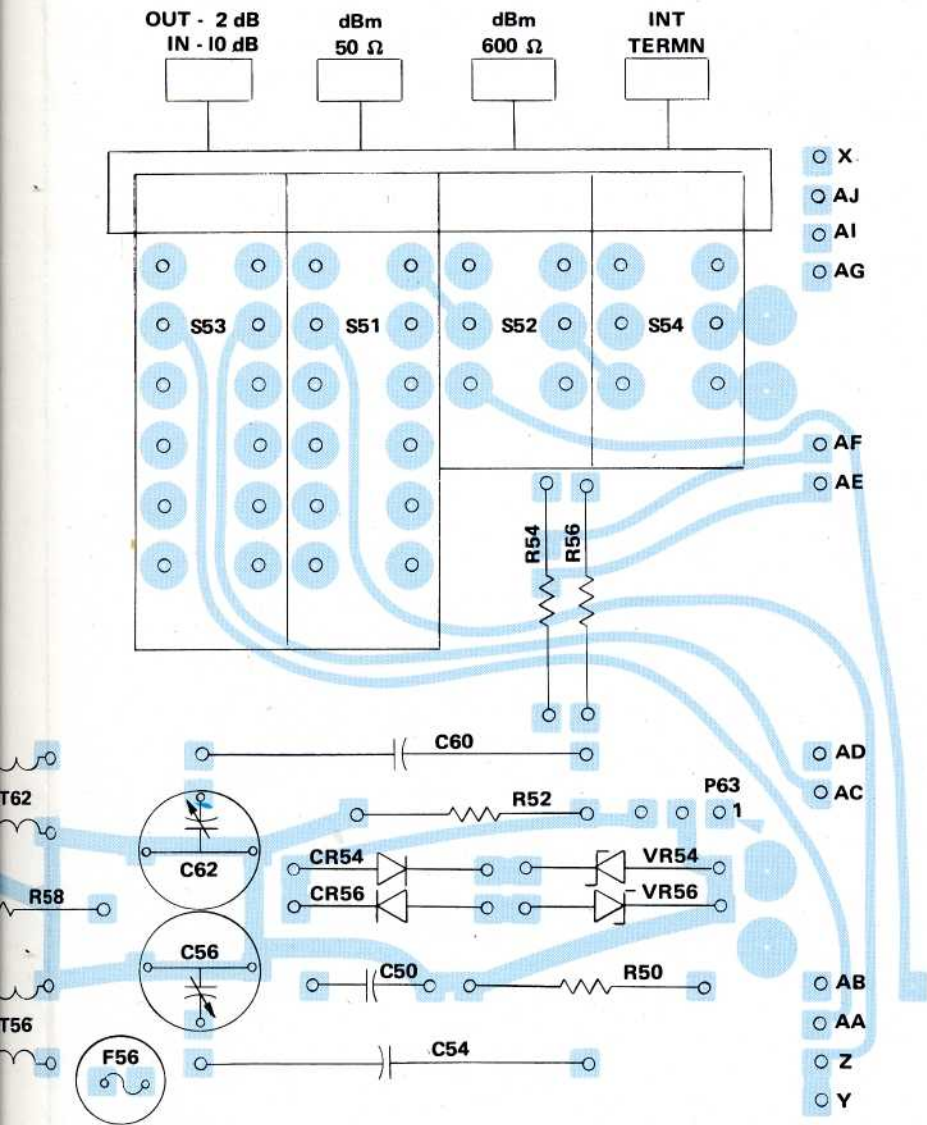
250 kHz IF



HC-3944-00

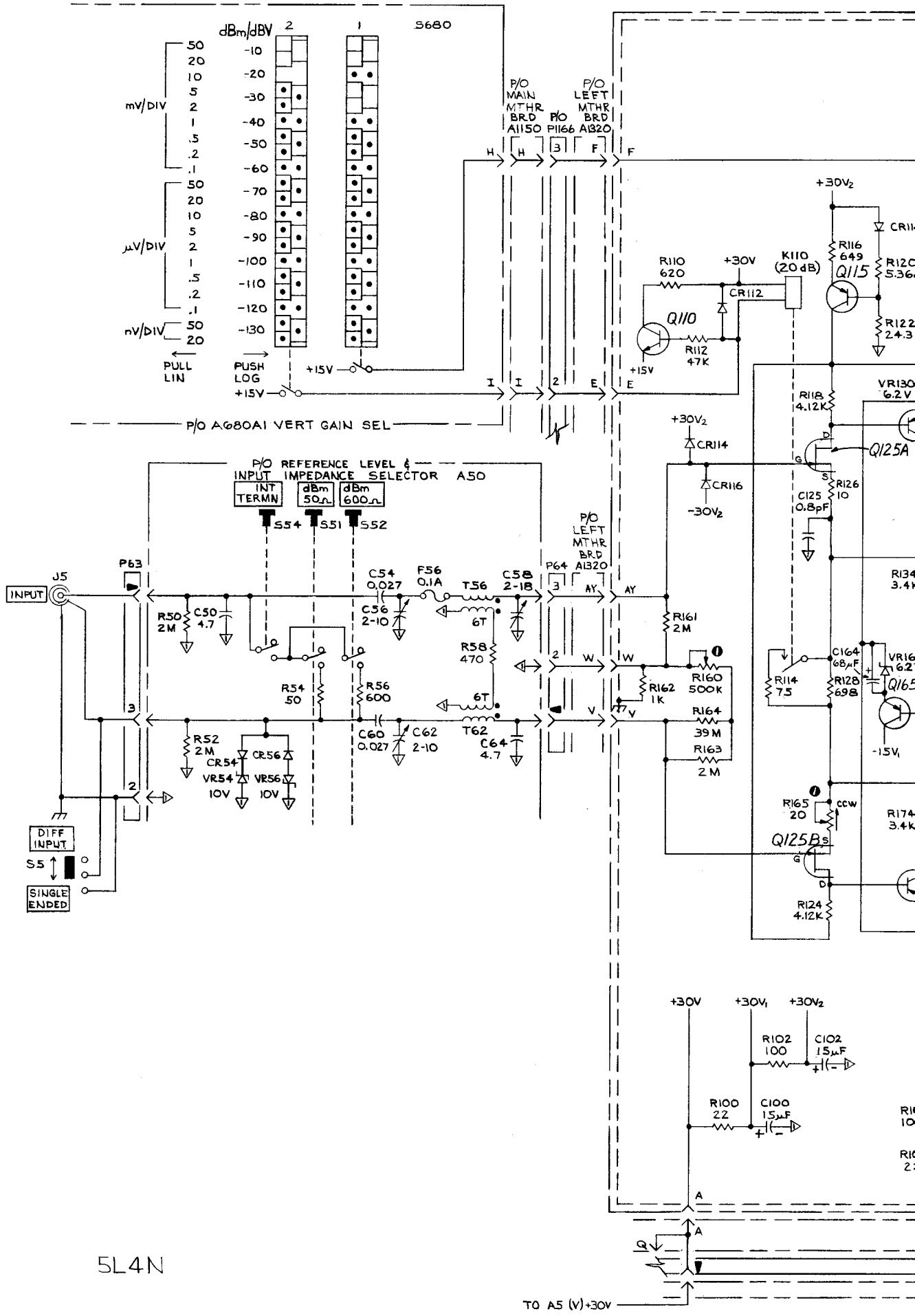
A50 Hi/Lo Input





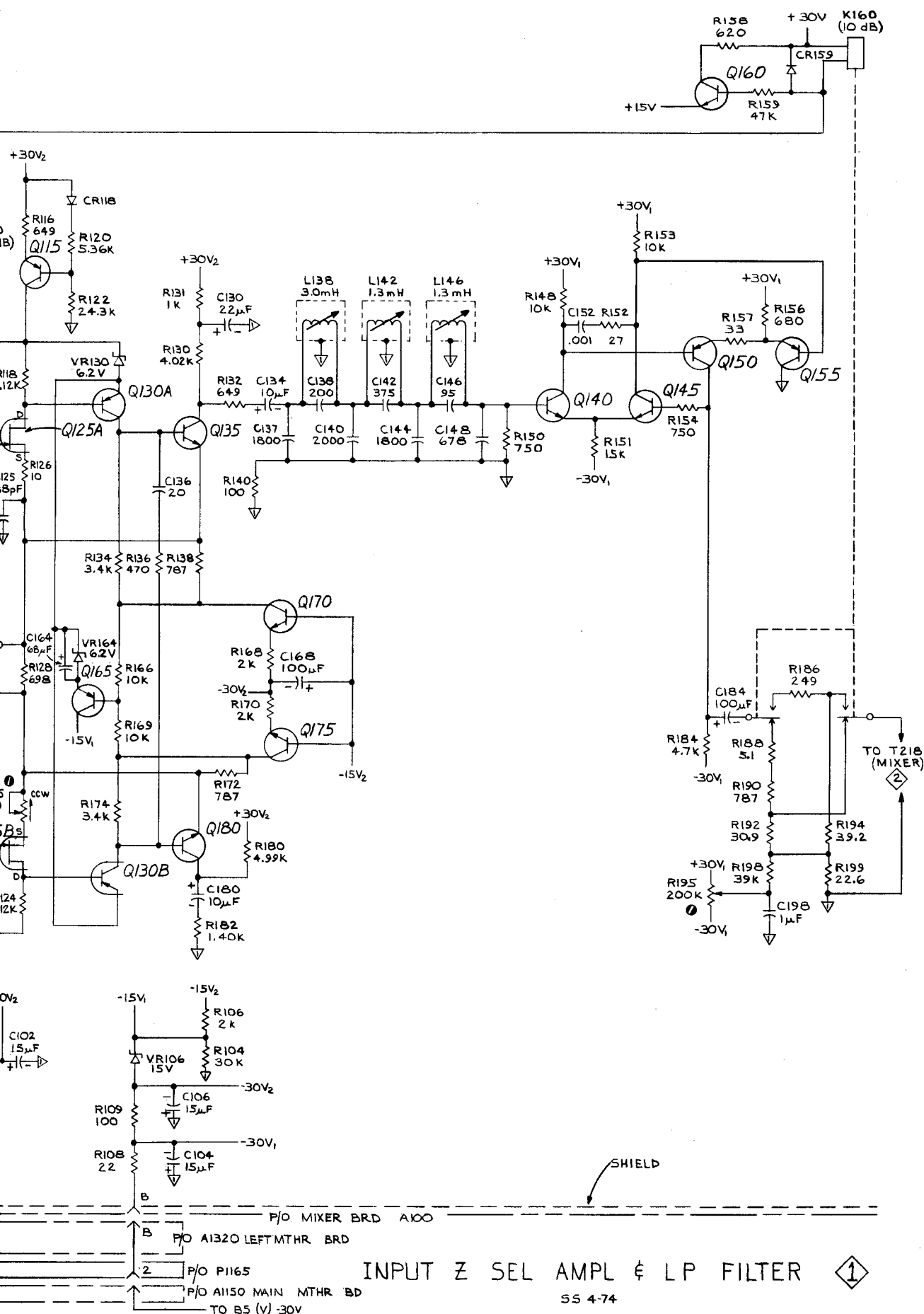
A50 Hi/Lo Input Impedance & LOG Display Selector





5L4N

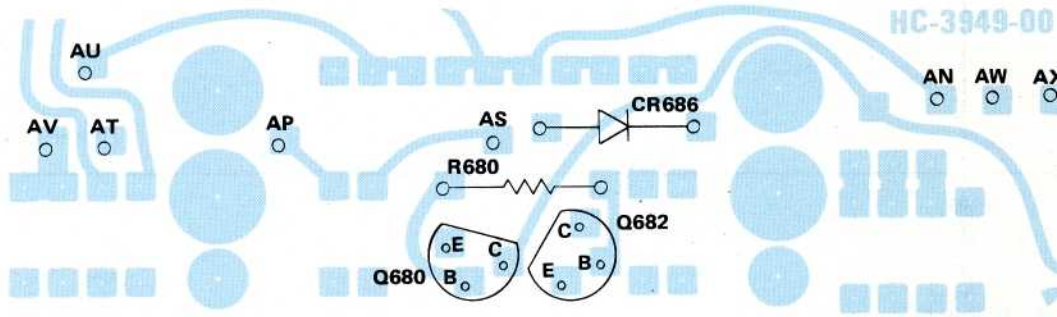
TO A5 (V)+30V



INPUT IMPD SEL AMPL & LP FILTER ①

P/O MIXER BRD A100  
 P/O A1320 LEFTMTHR BRD  
 P/O P1165  
 P/O A1150 MAIN MTHR BD  
 TO B5 (V) -30V

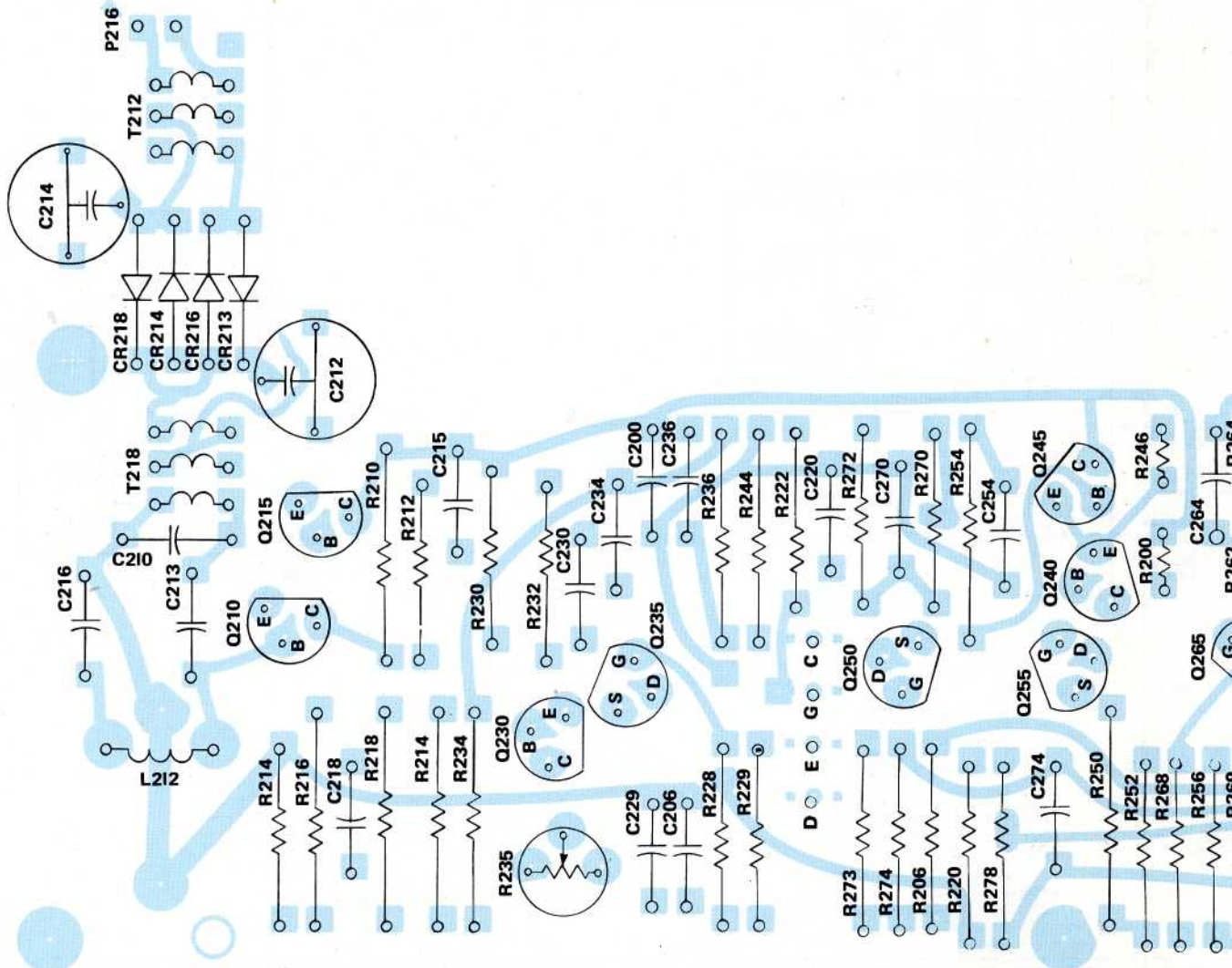
INPUT Z SEL AMPL & LP FILTER ①  
 SS 4-74



P/O A680A1 Vertical Sensing Selector

A1150 Main Mother Board component location shown on back of Diagram 9

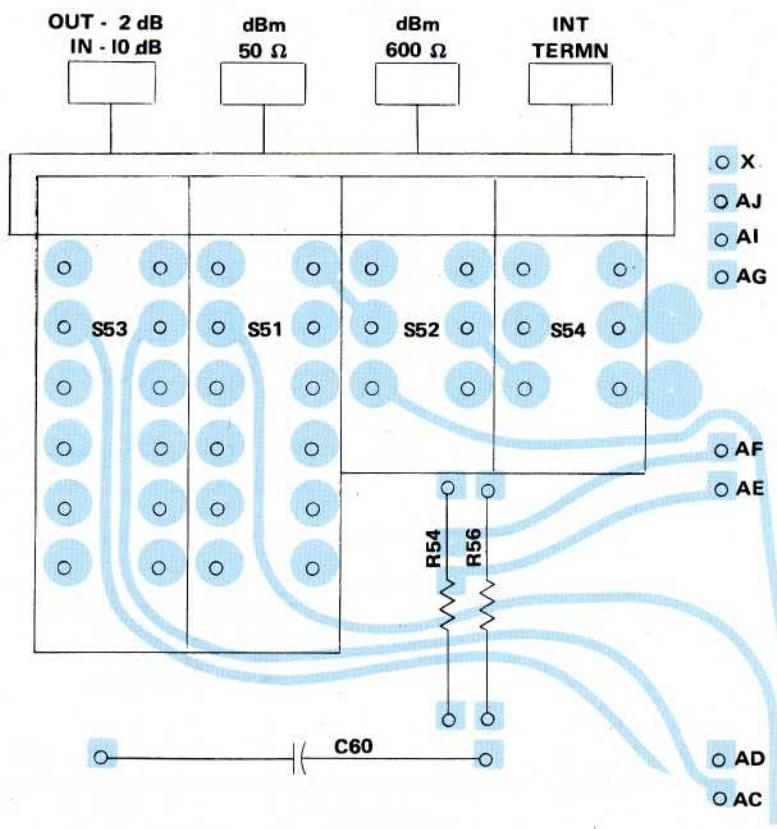
COMPONENT LOCATIONS FOR DIAGRAM 2



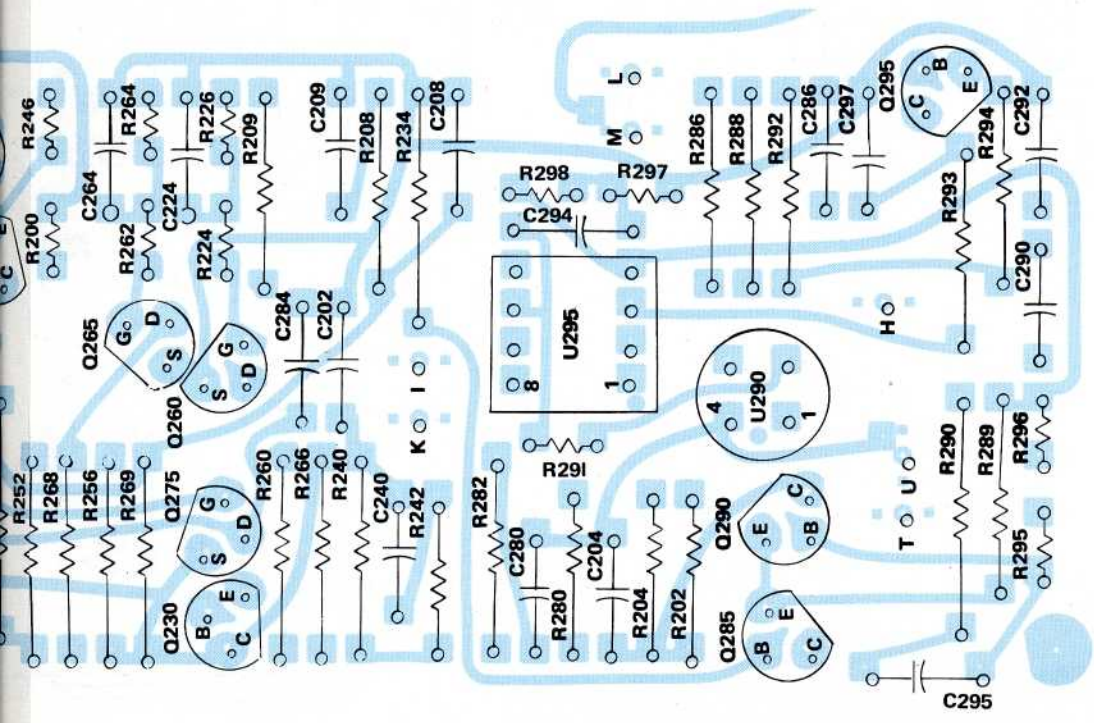
P/O A100 Input Amplifier, LP Filter, Mixer & 250

3949-00

AN AW AX  
AY  
AZ  
BA

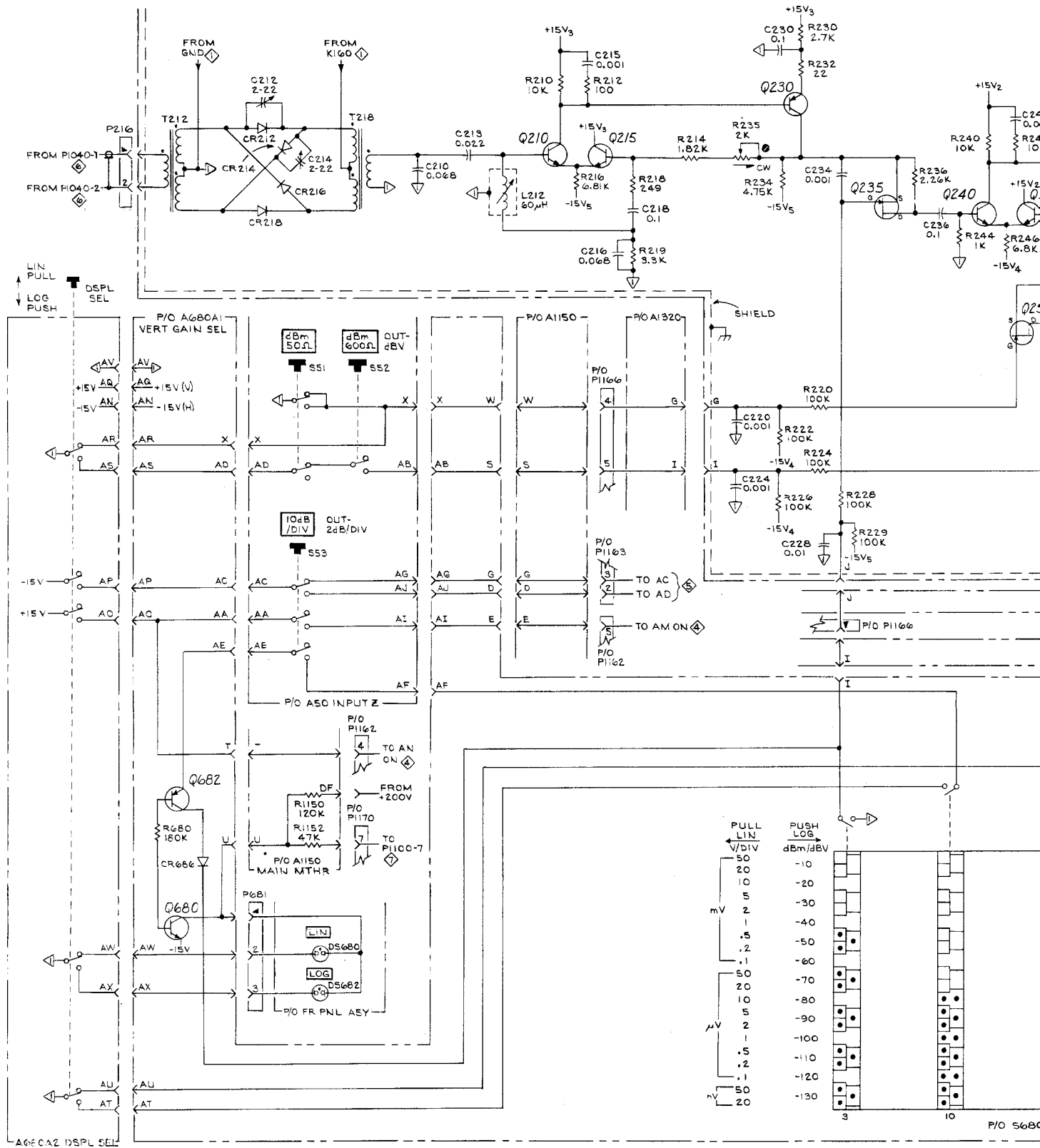


P/O A50 Hi/Lo Input Impedance & LOG Display Selector

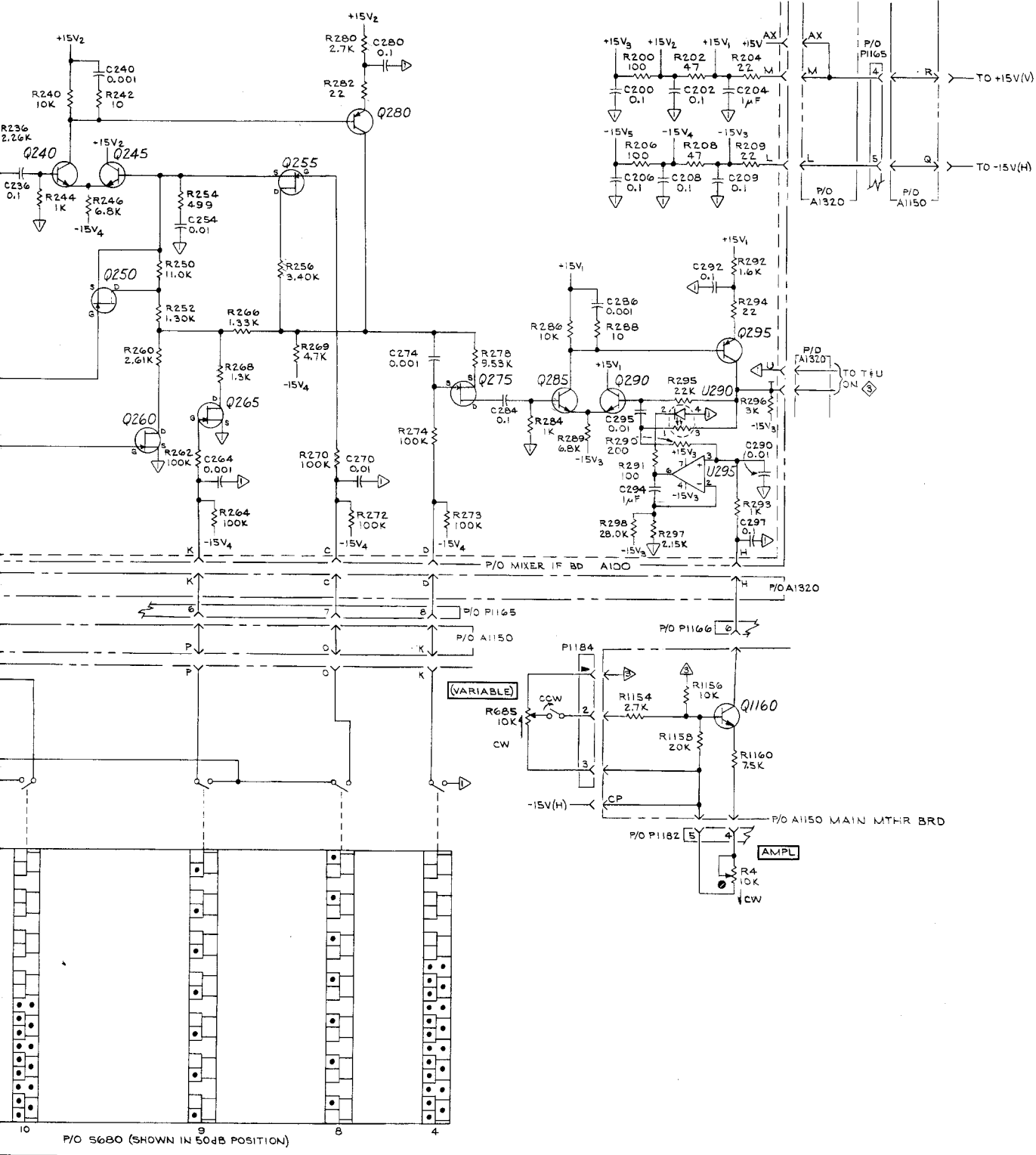


Mixer & 250 kHz IF





5L4N

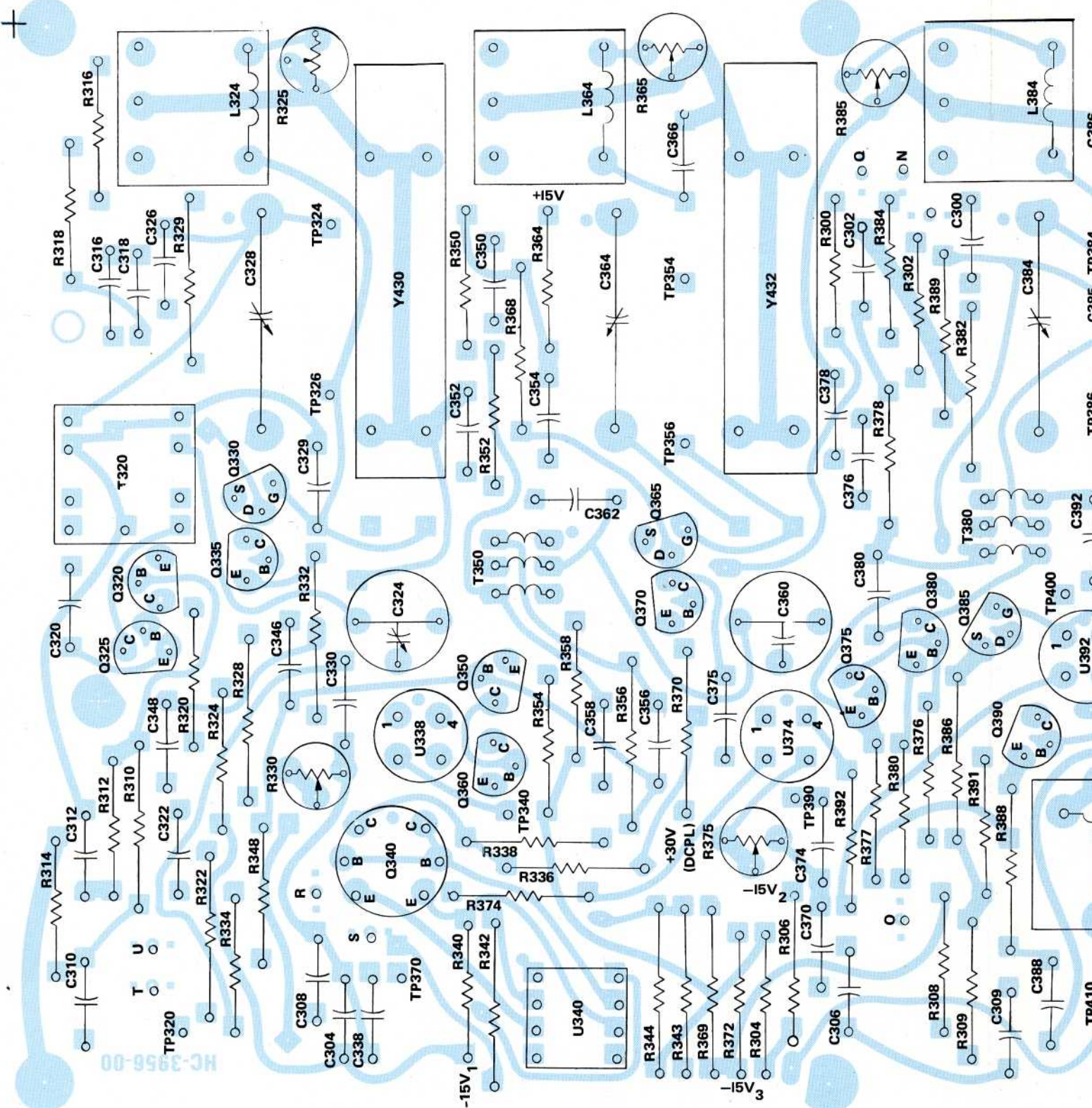


MIXER & 250 kHz SWITCHED GAIN AMPL



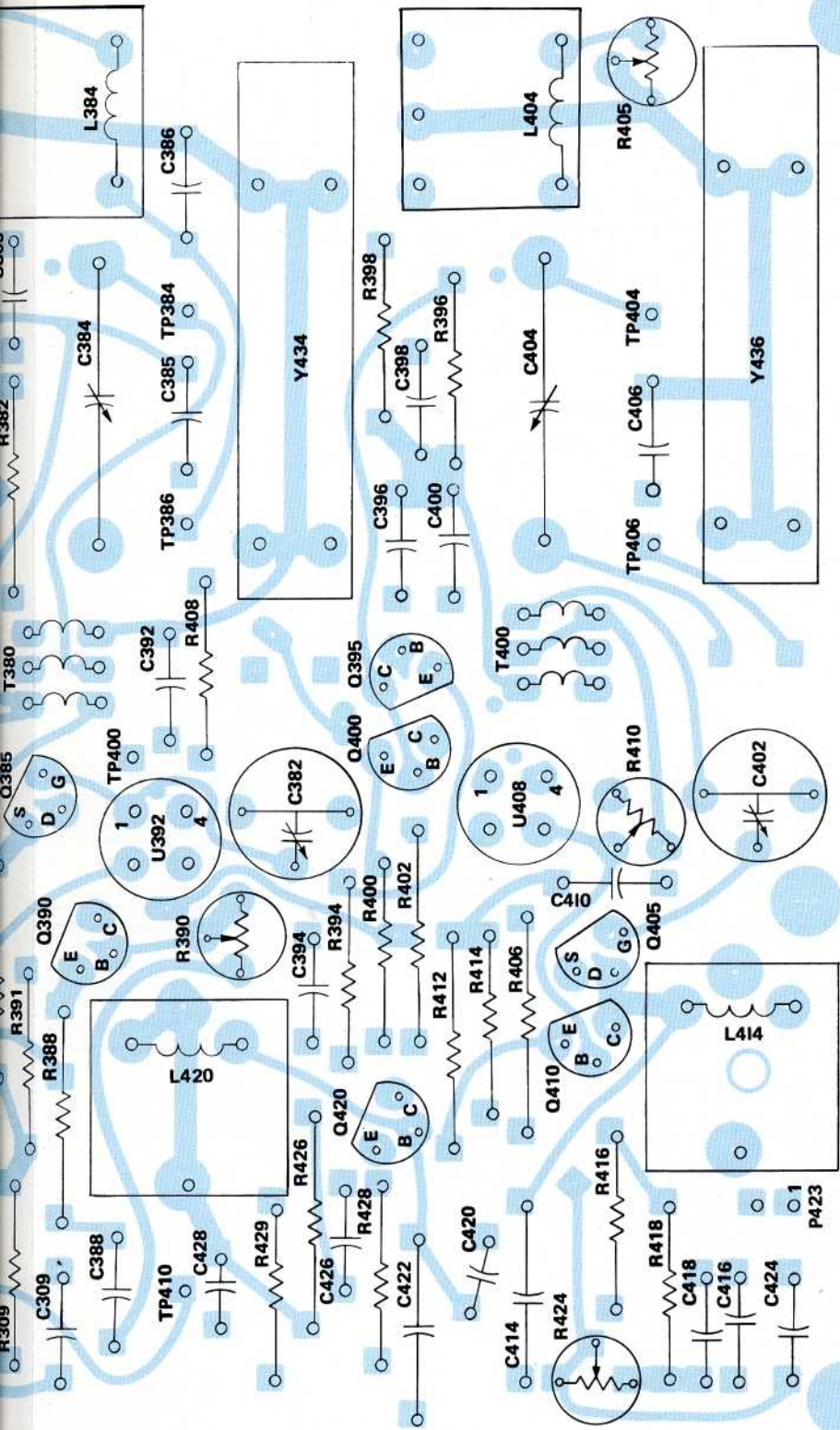
DD 474

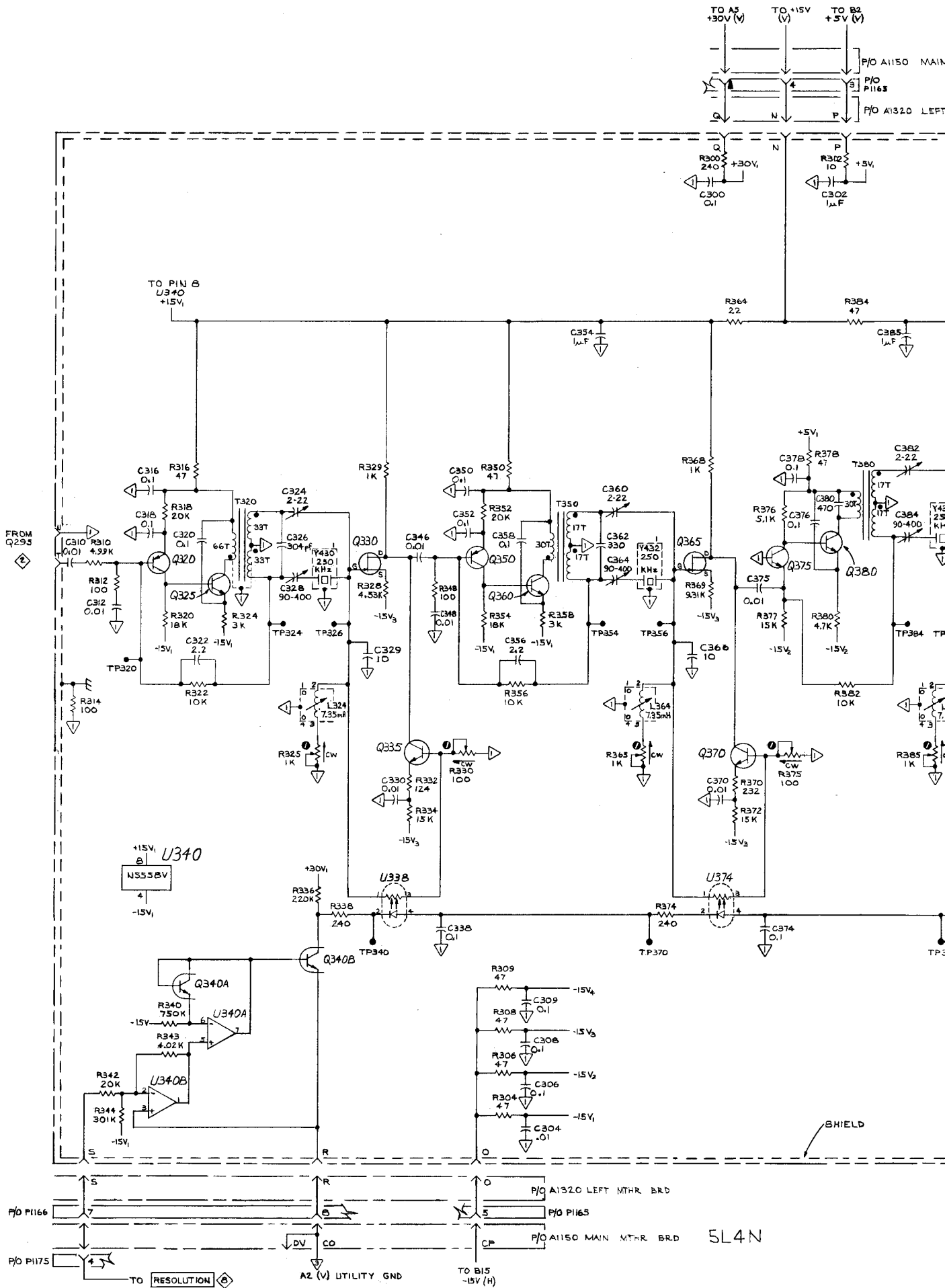


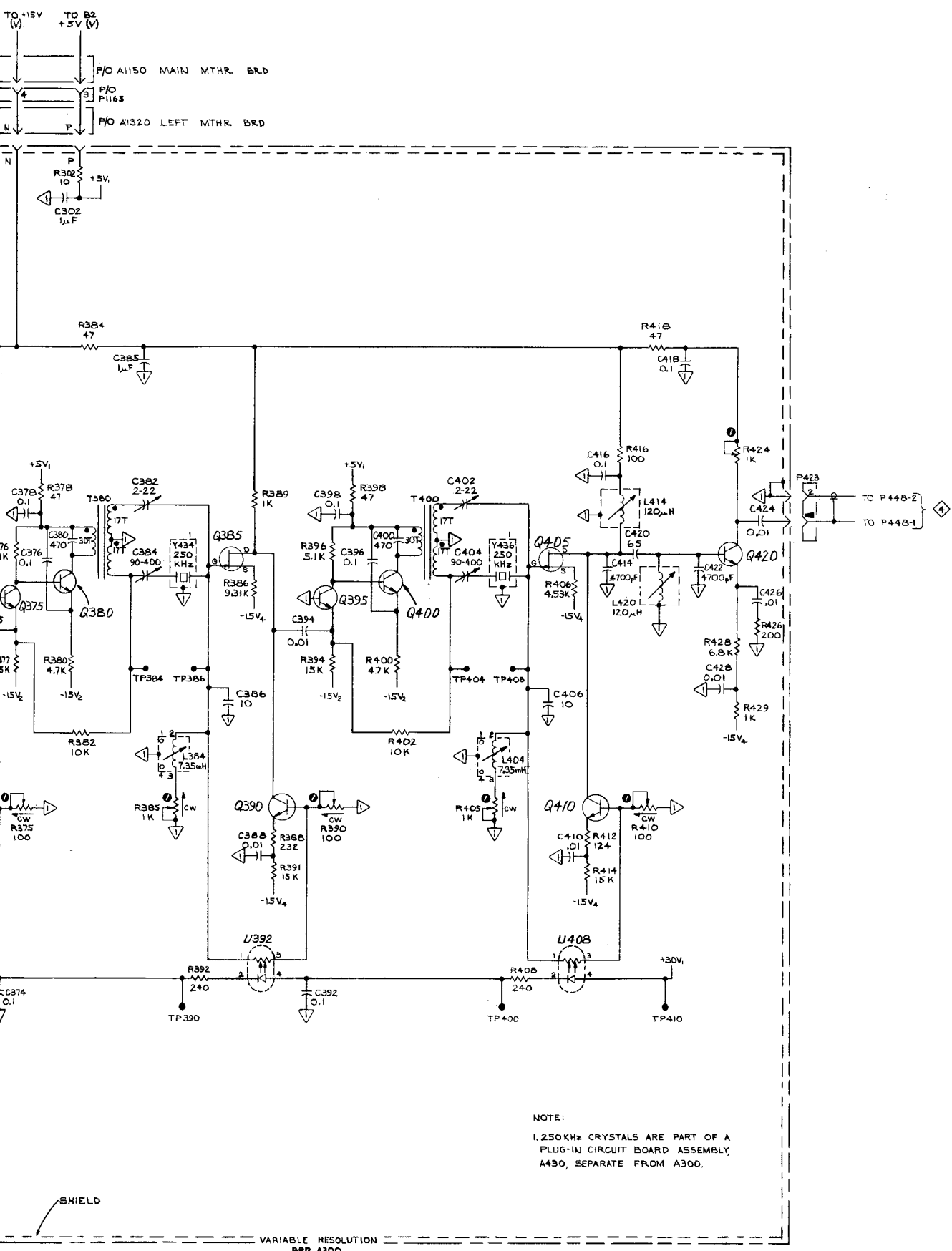


A300 Variable Resolution

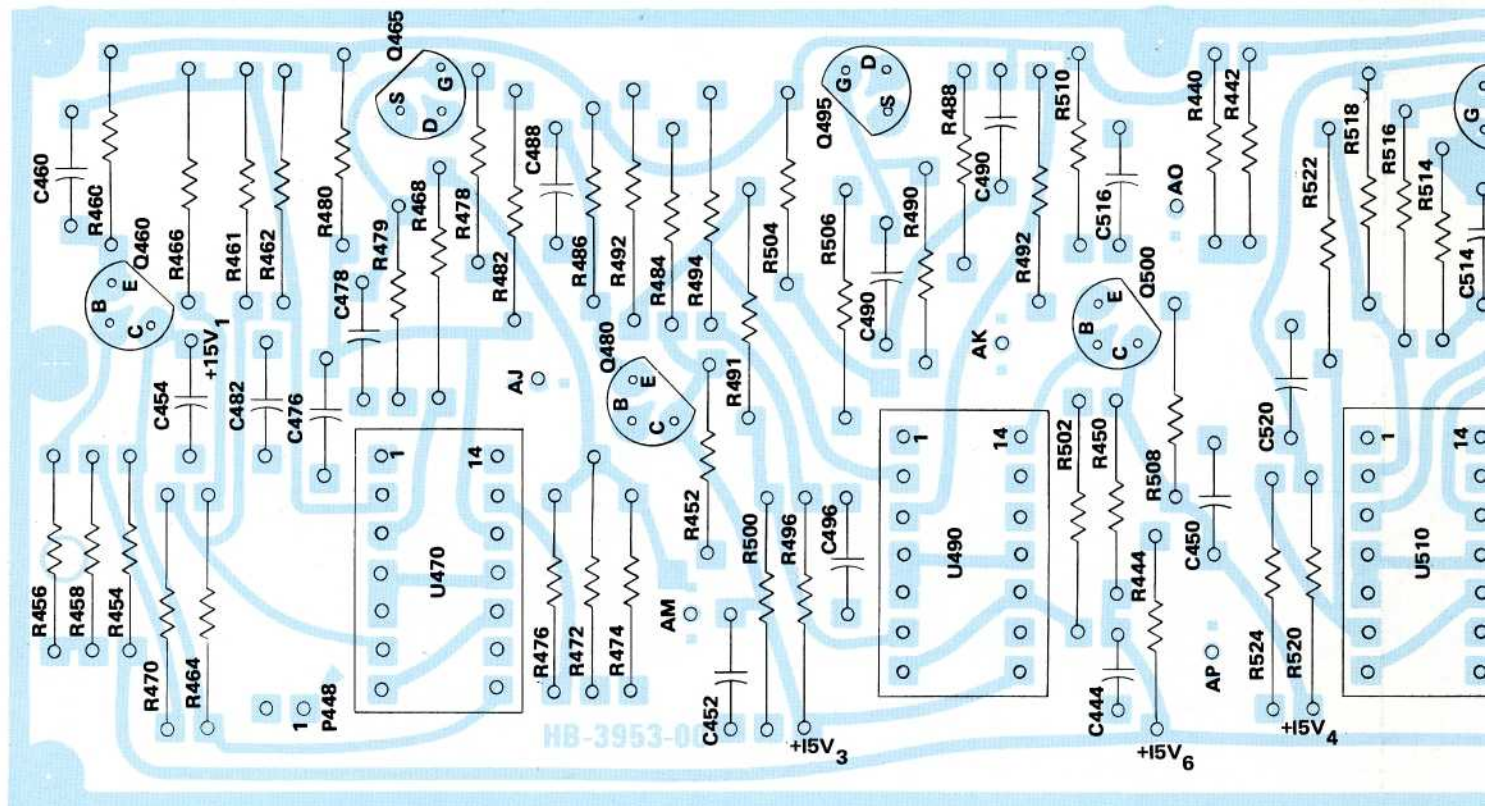




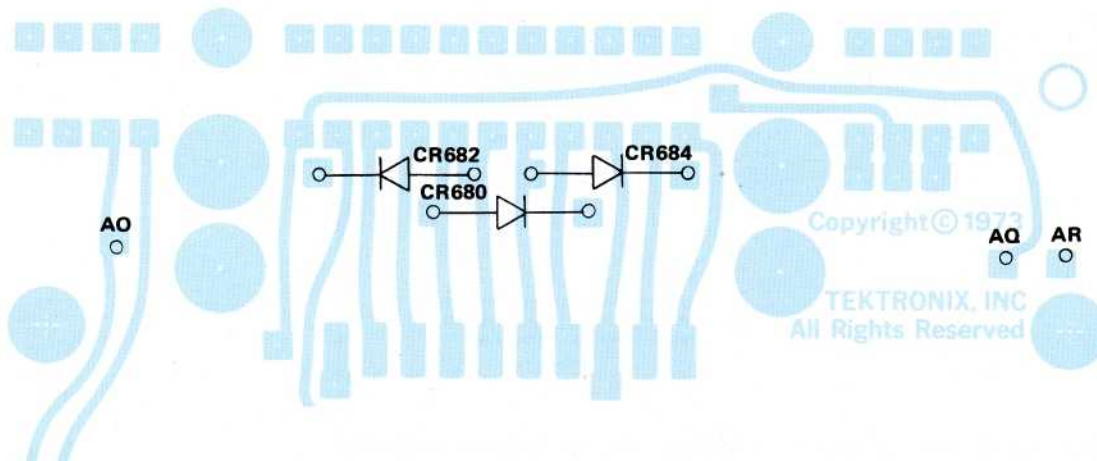




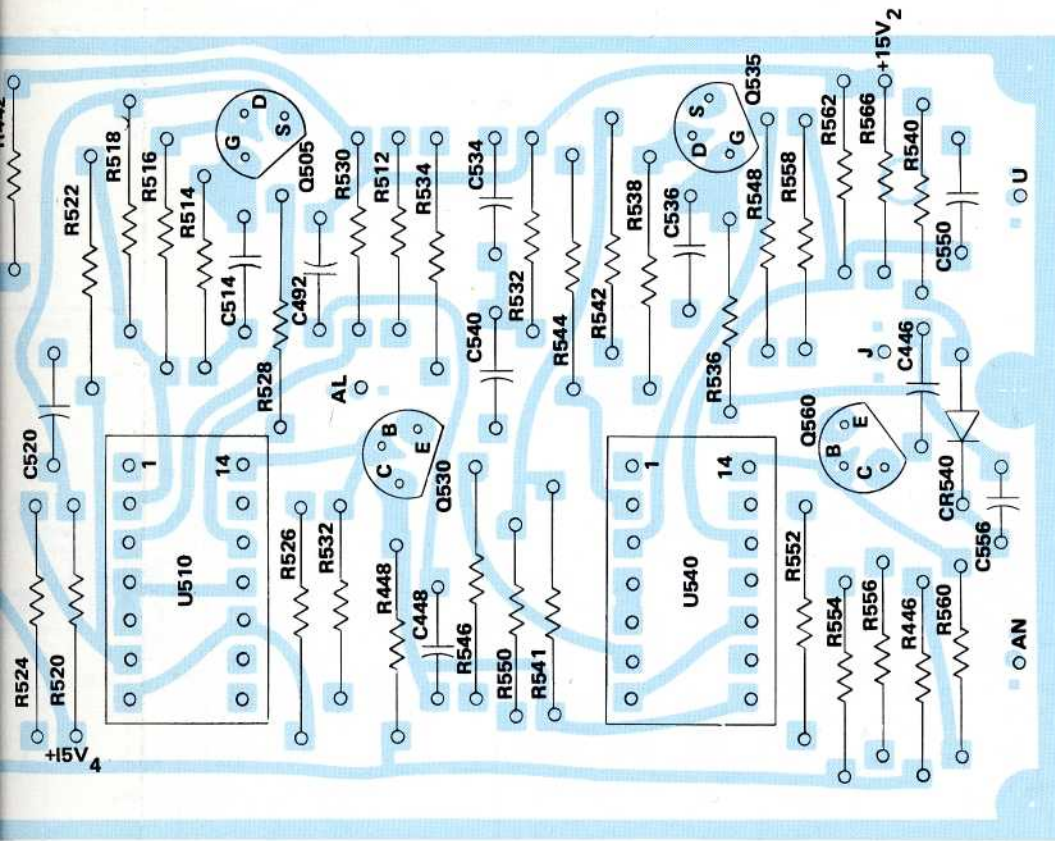
NOTE:  
1.250KHz CRYSTALS ARE PART OF A  
PLUG-IN CIRCUIT BOARD ASSEMBLY,  
A430, SEPARATE FROM A300.



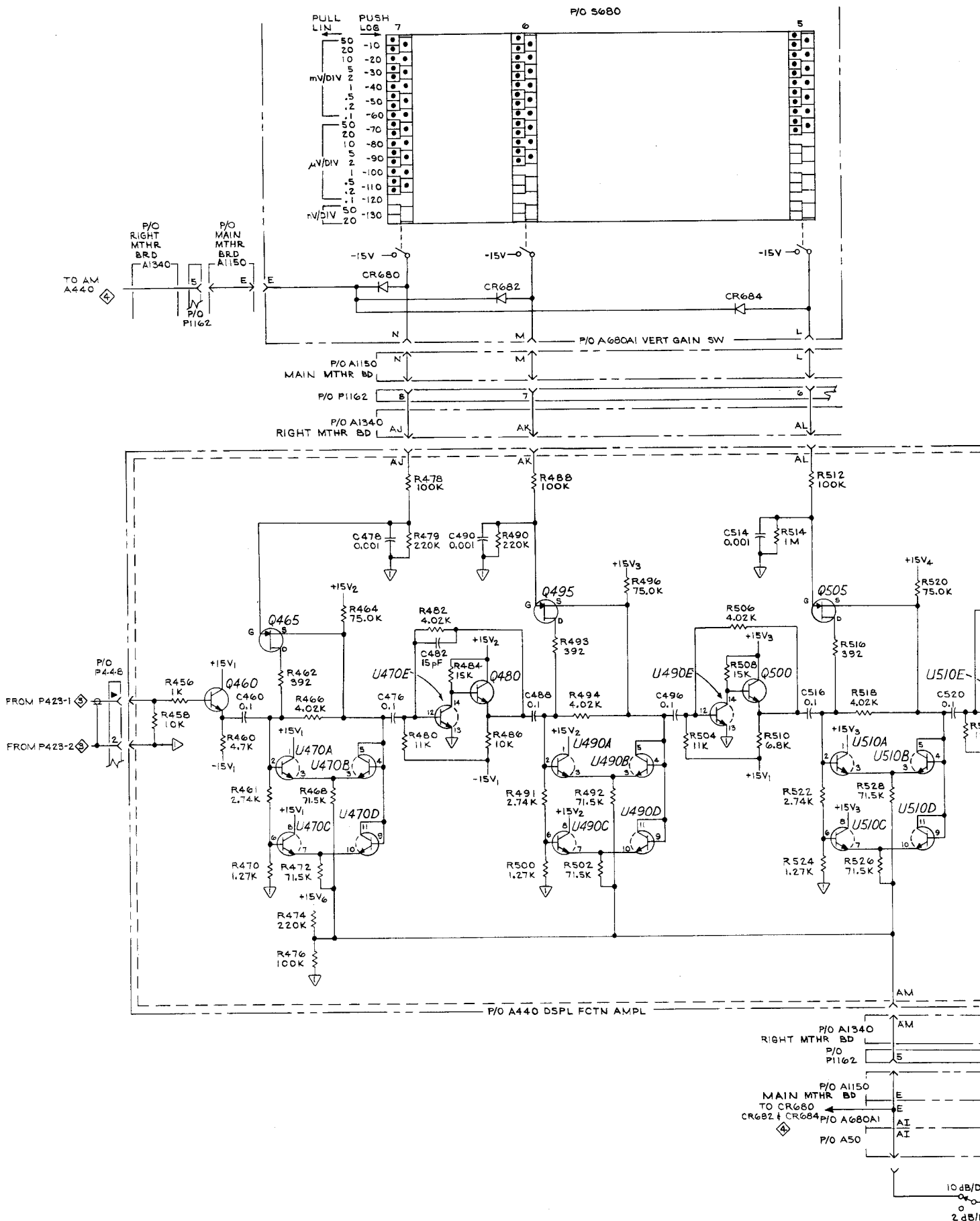
A440 Display Function Amplifier



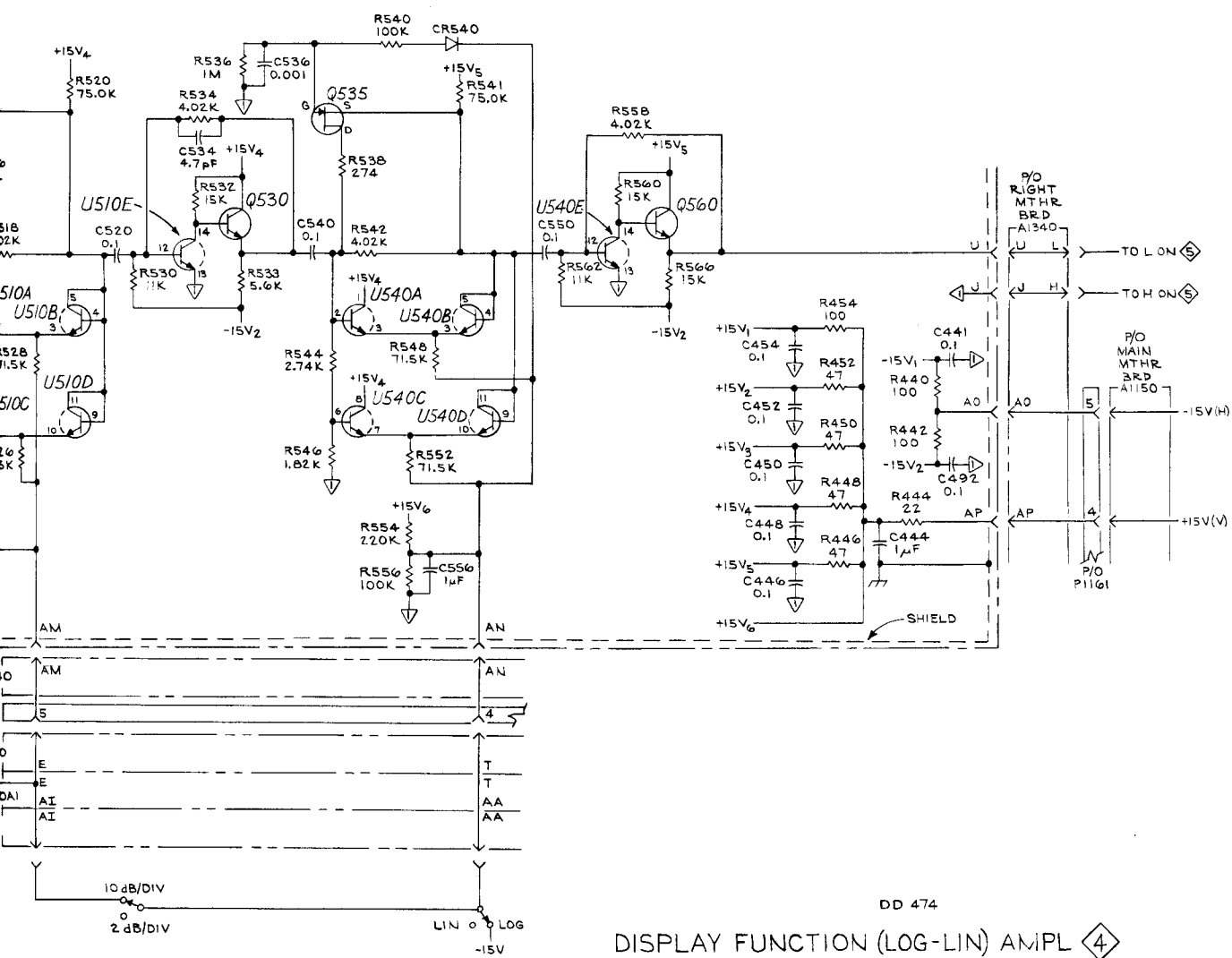
P/O A680A1 Vertical Sensing Selector

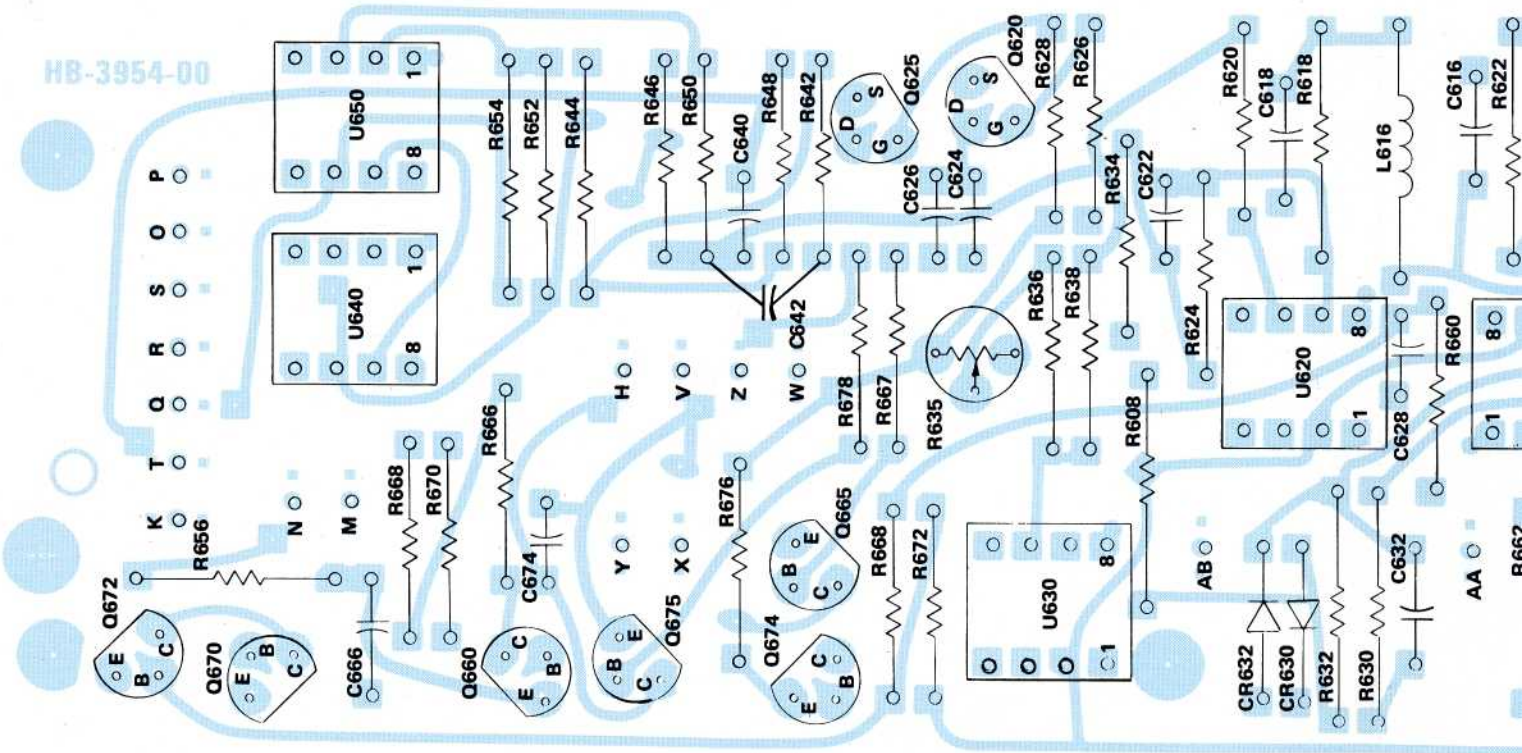


Amplifier

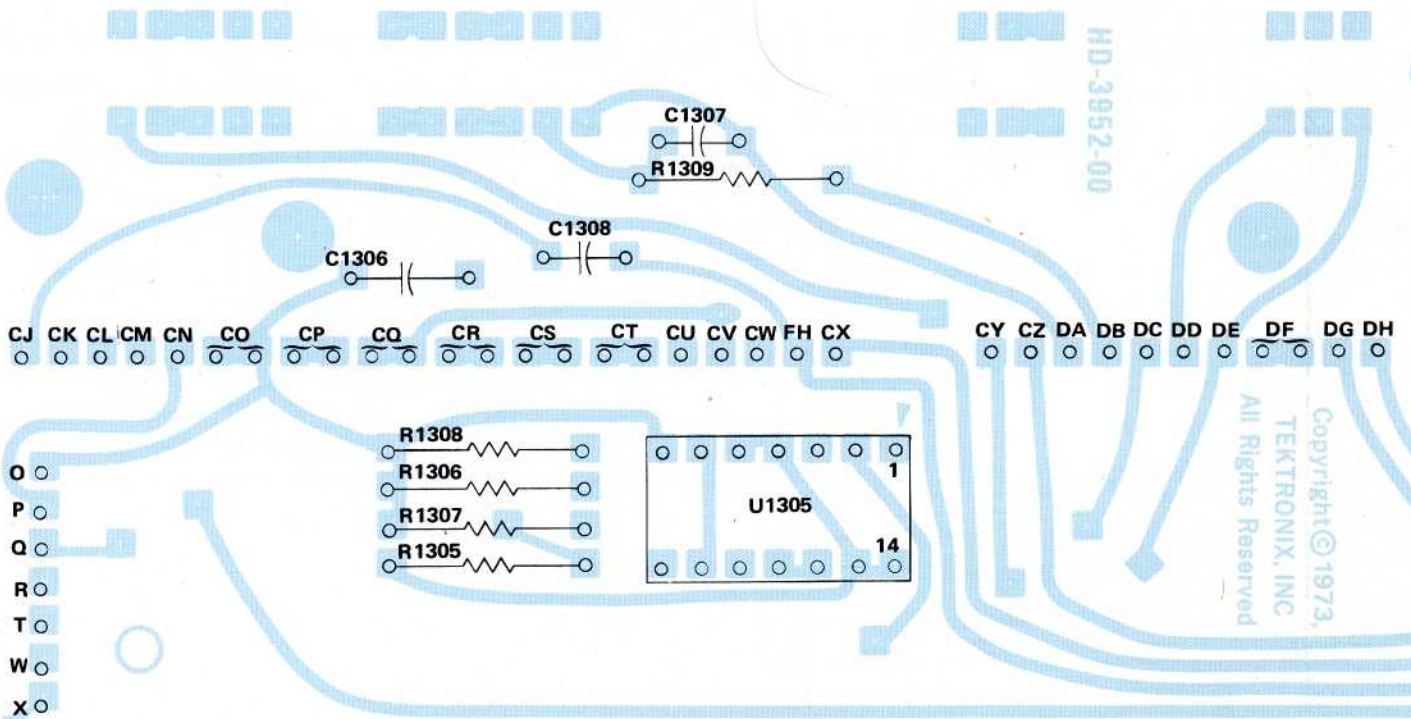


5L4N





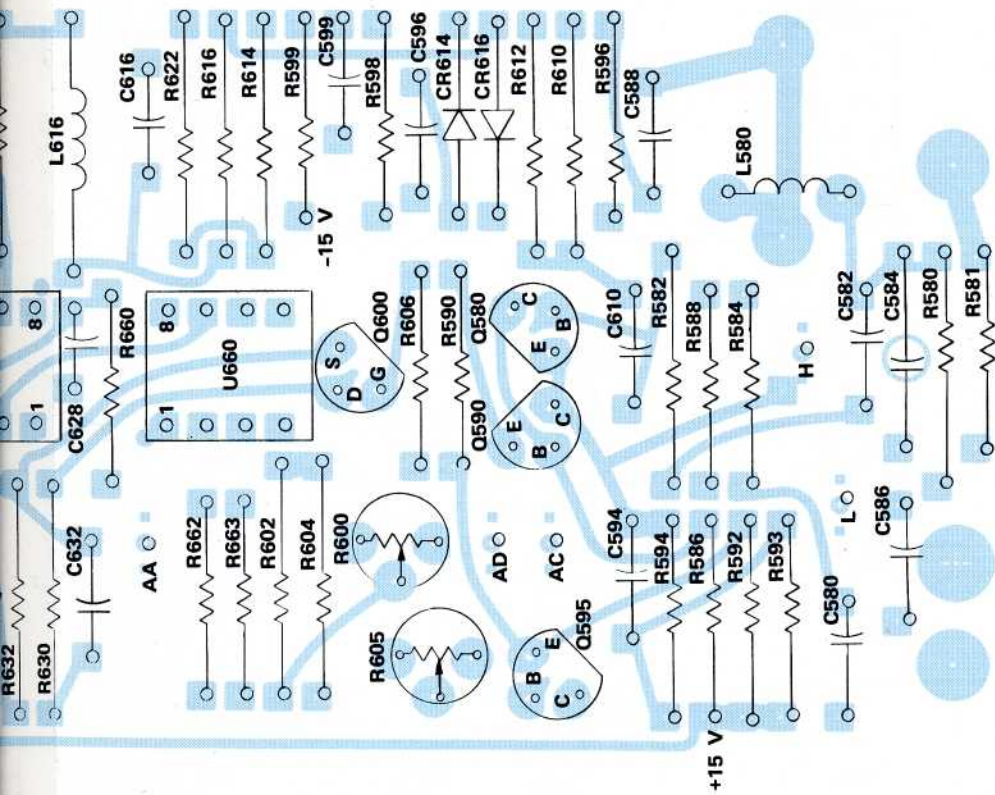
A580 Detector, Video Filter & Video Amplifier Circuit Board



A1300 Vertical Transverse Interface & Chop Logic Circuit Board



Amplifier Circuit Board

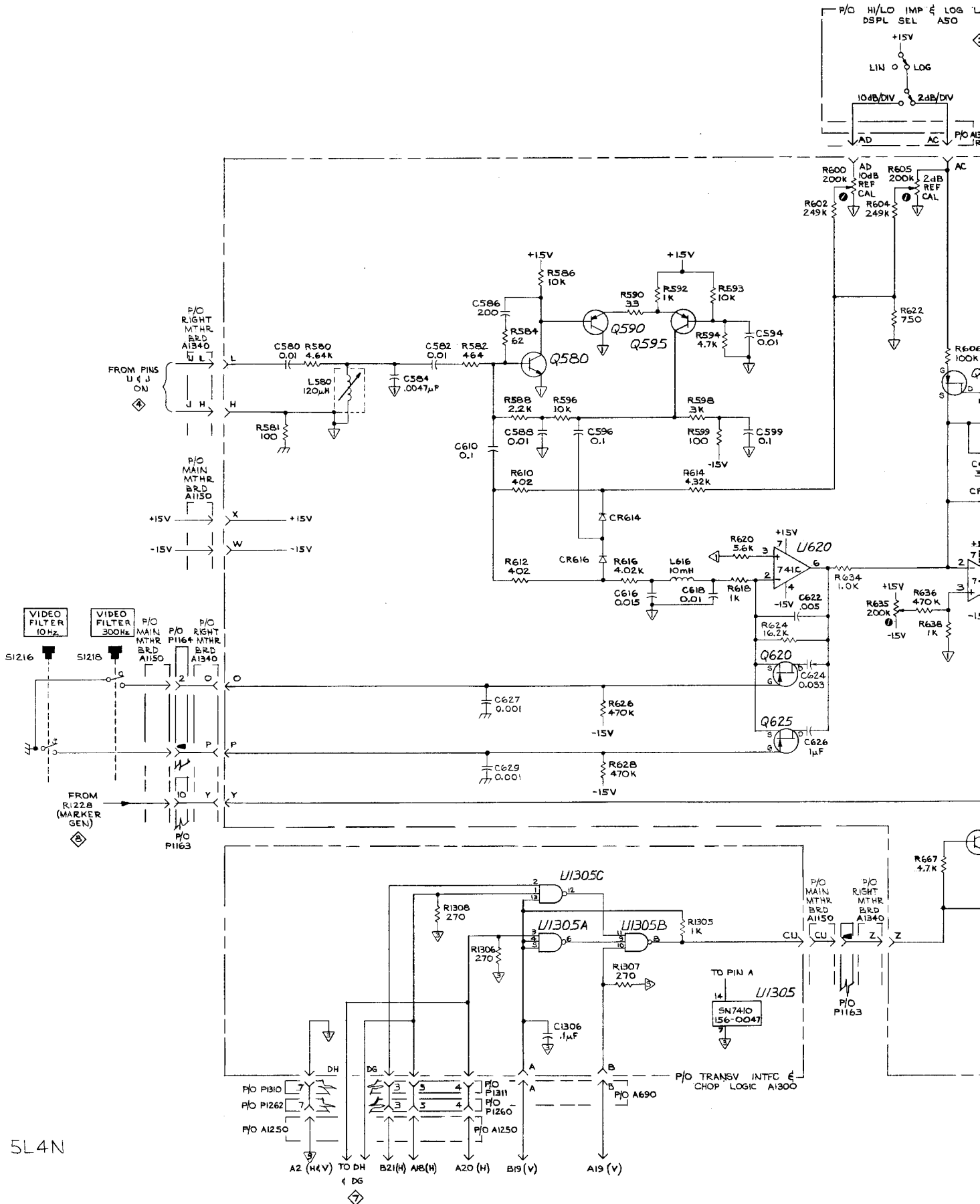


DF DG DH

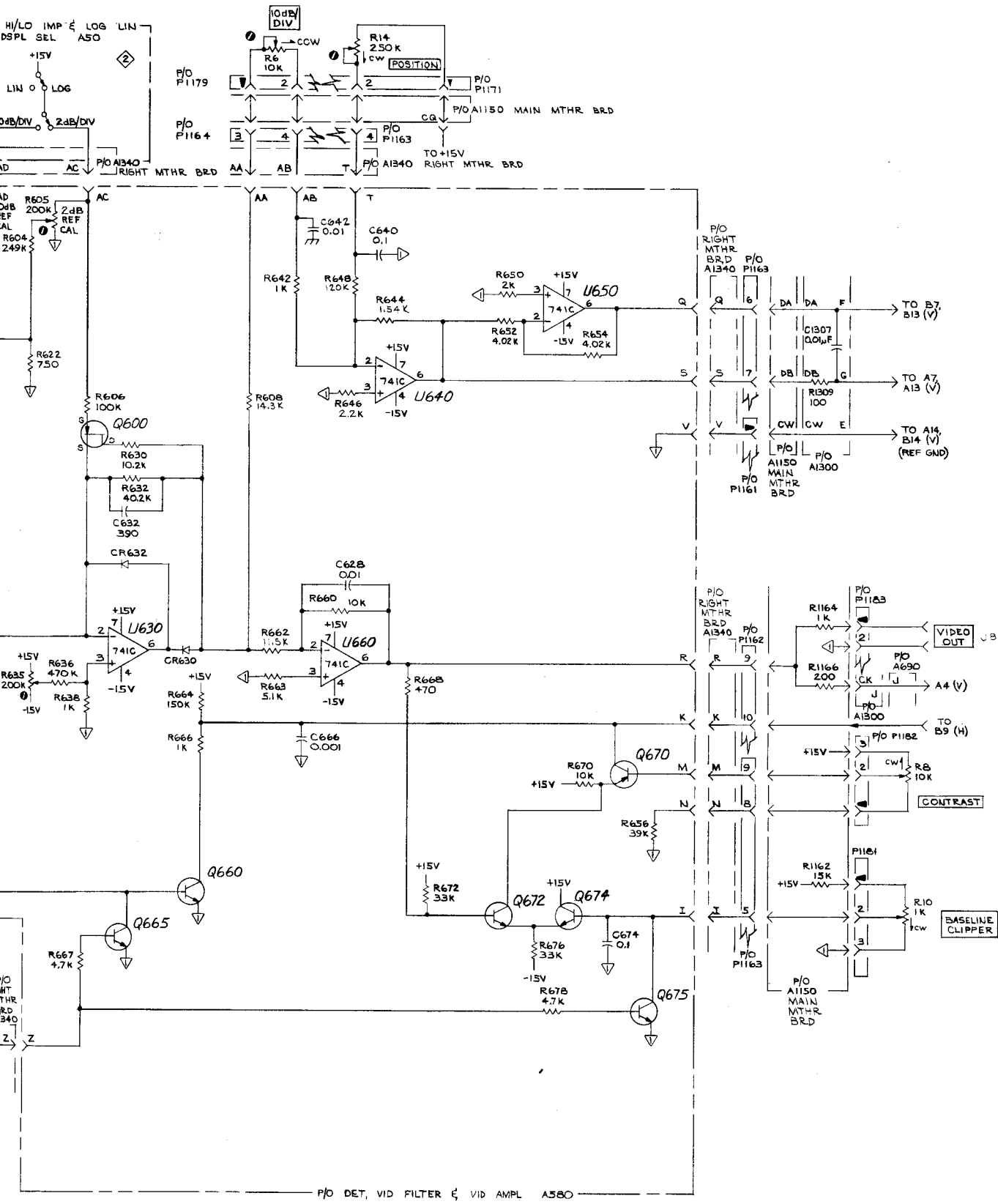
AH  
AG  
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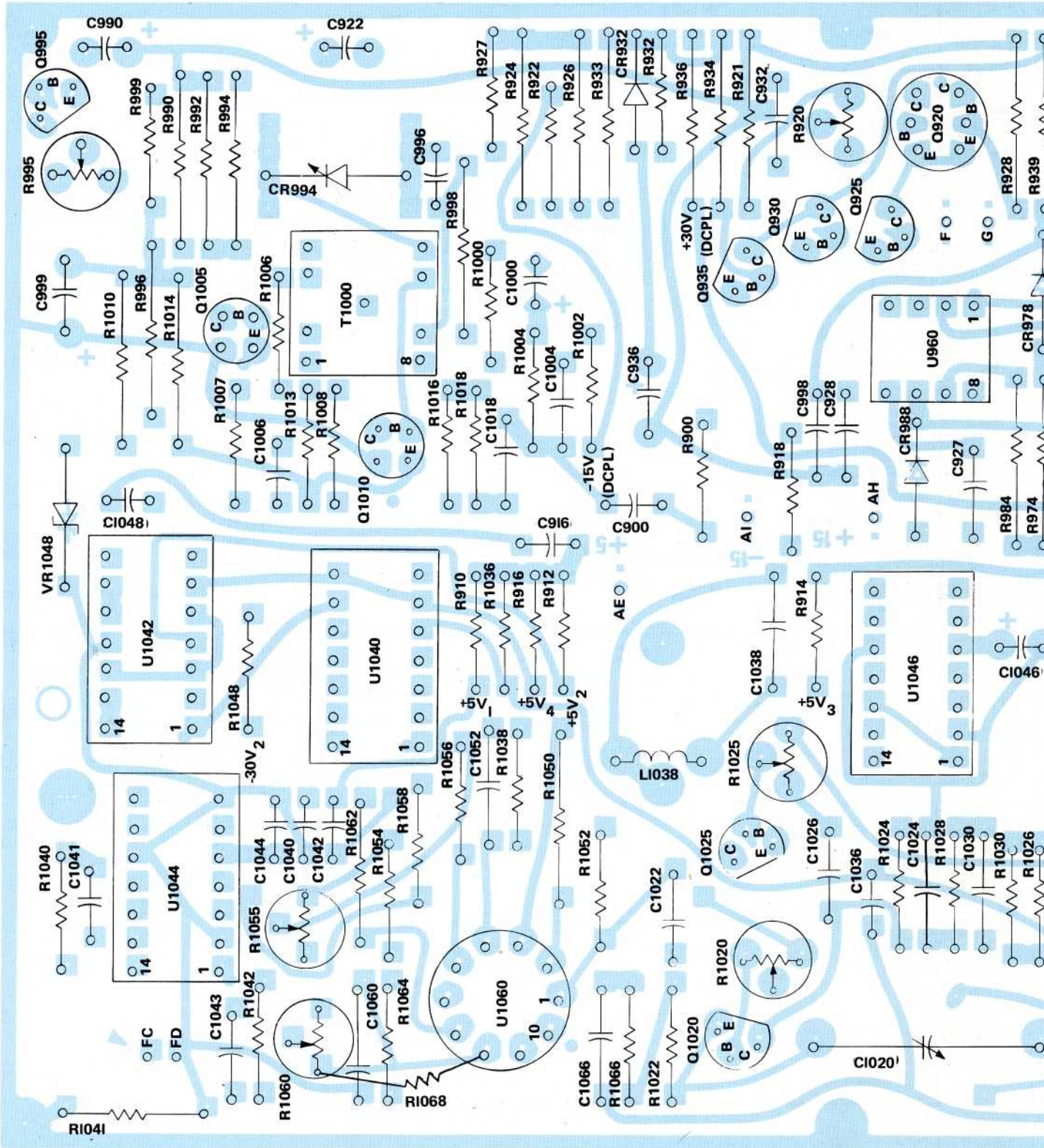


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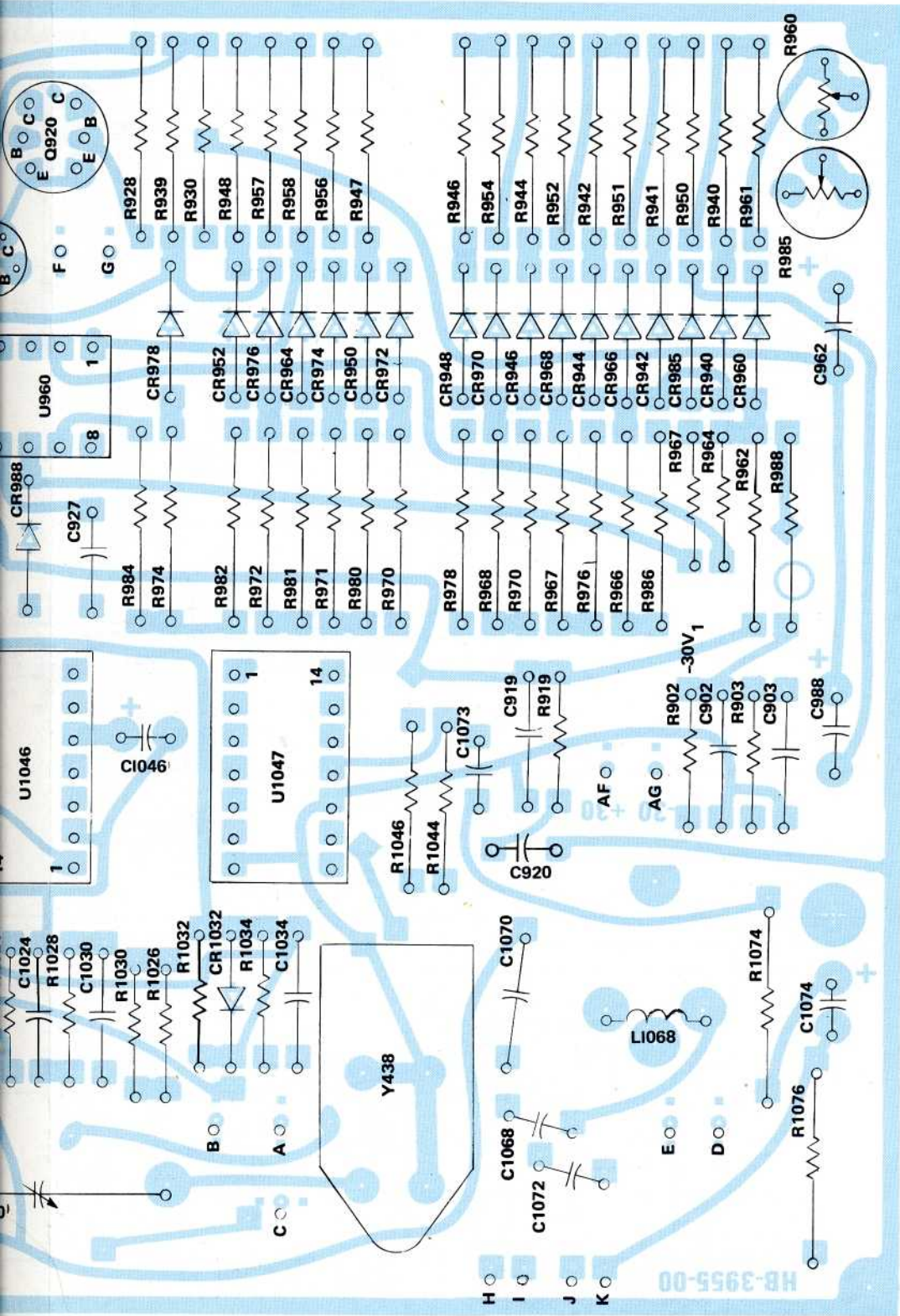


DET, VID FILTER & VID AMPL 5

DET VID FLTR & VID AMPL 5



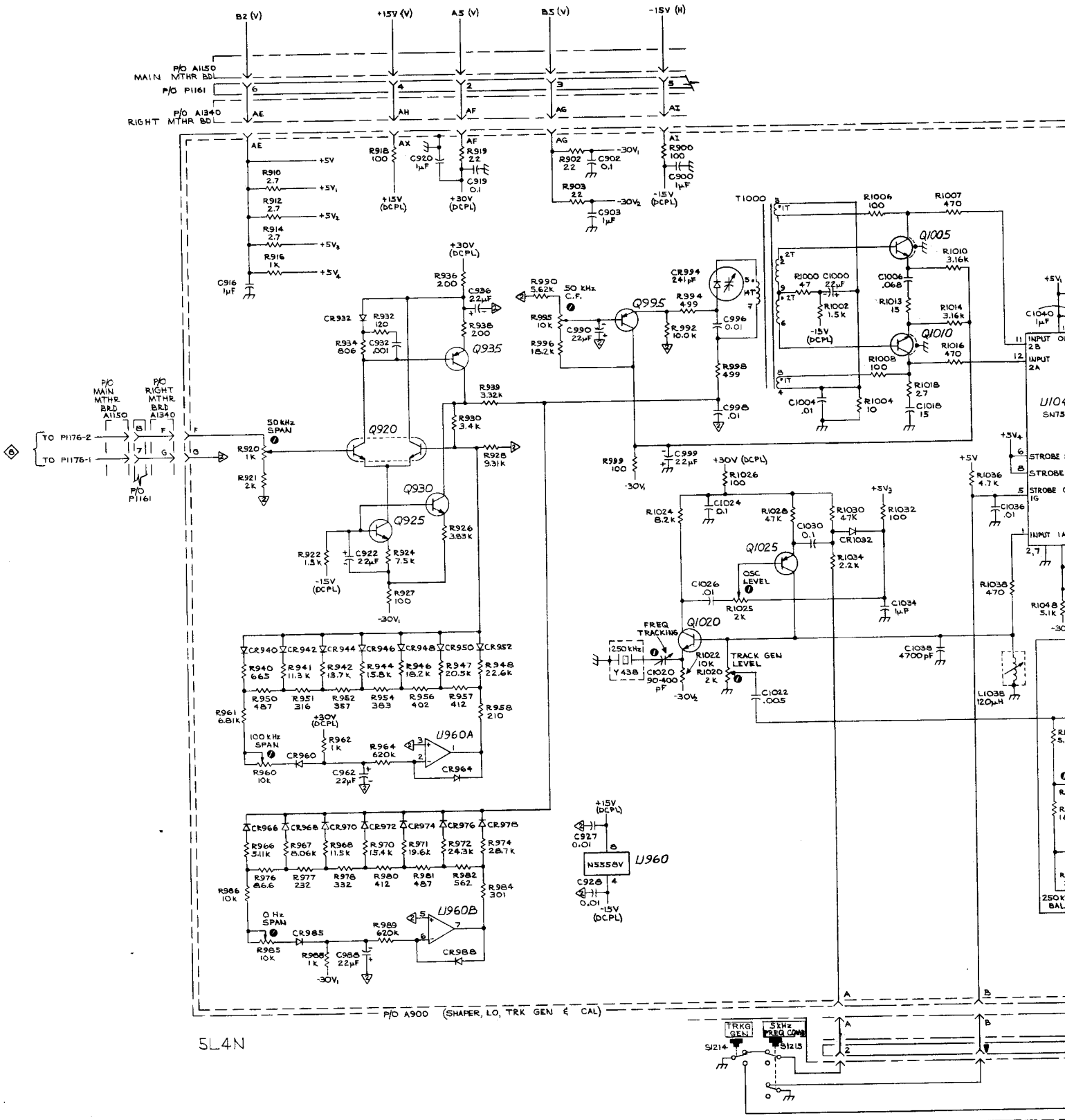
A900 Shaper, LO, Tracking Generator & Calibrator



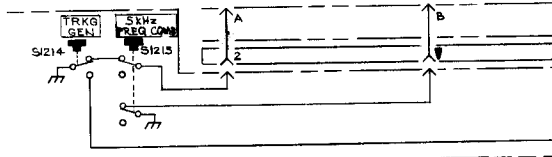
erator & Calibrator

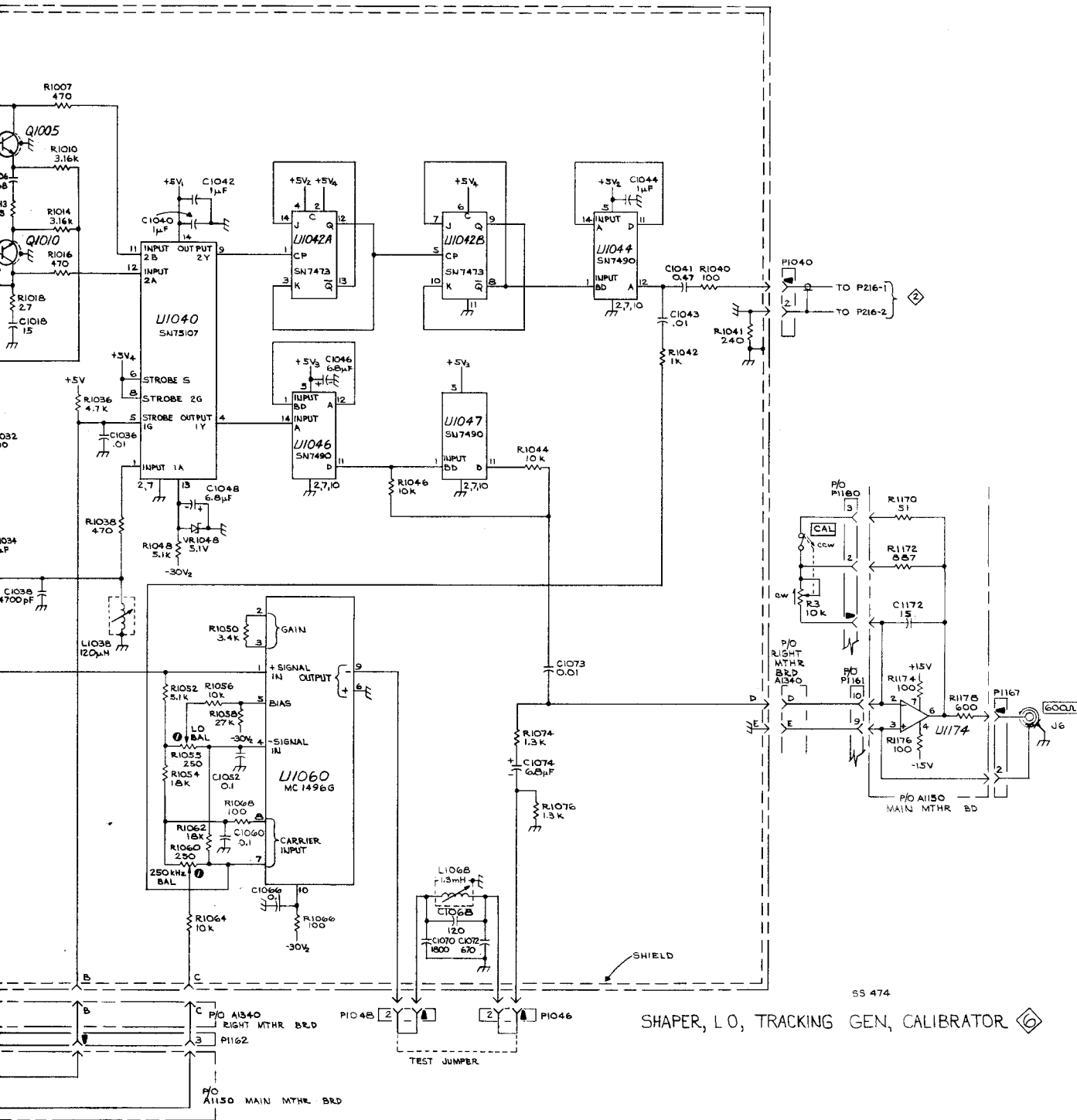
shown on back of Diagram 9



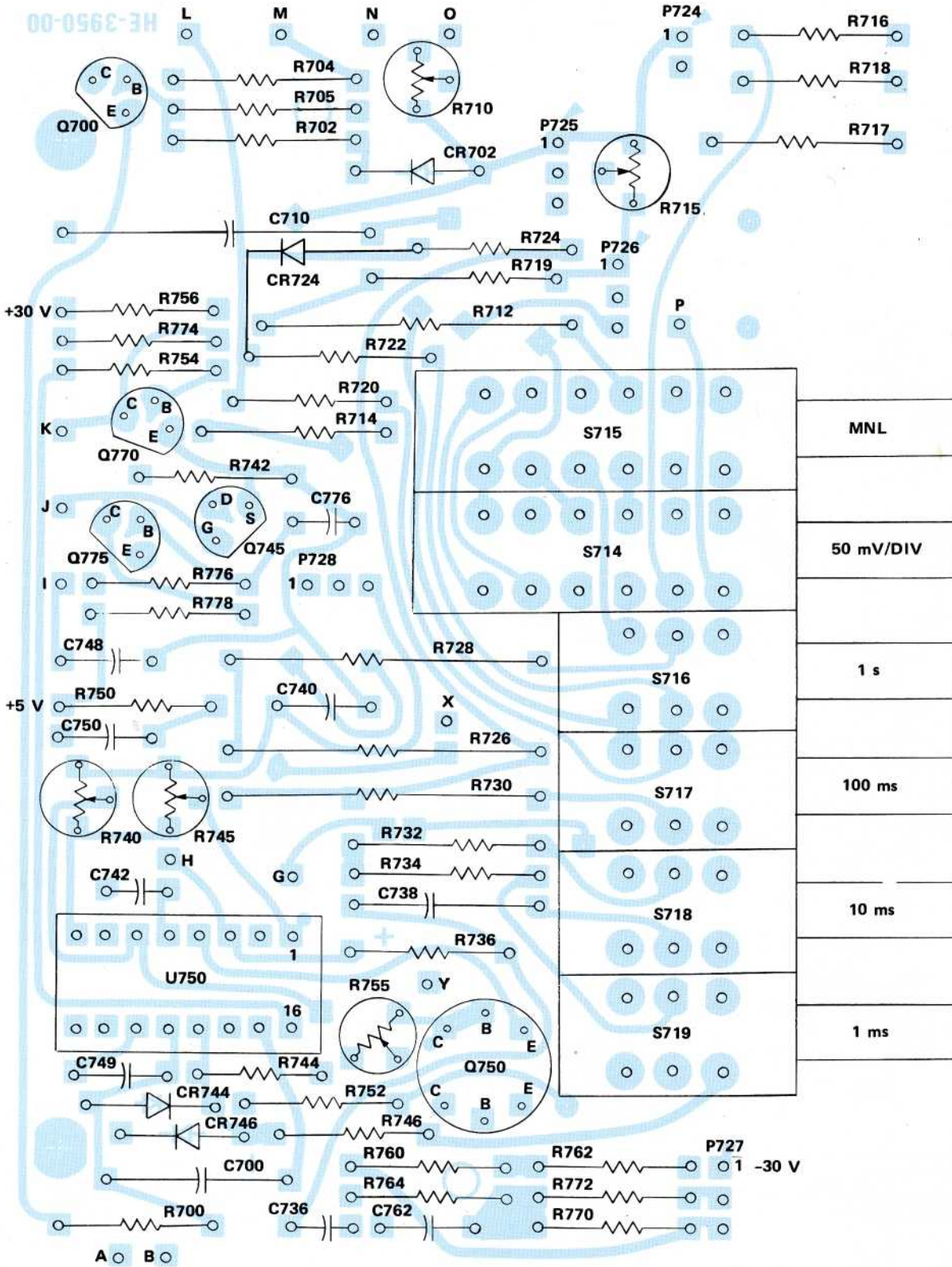


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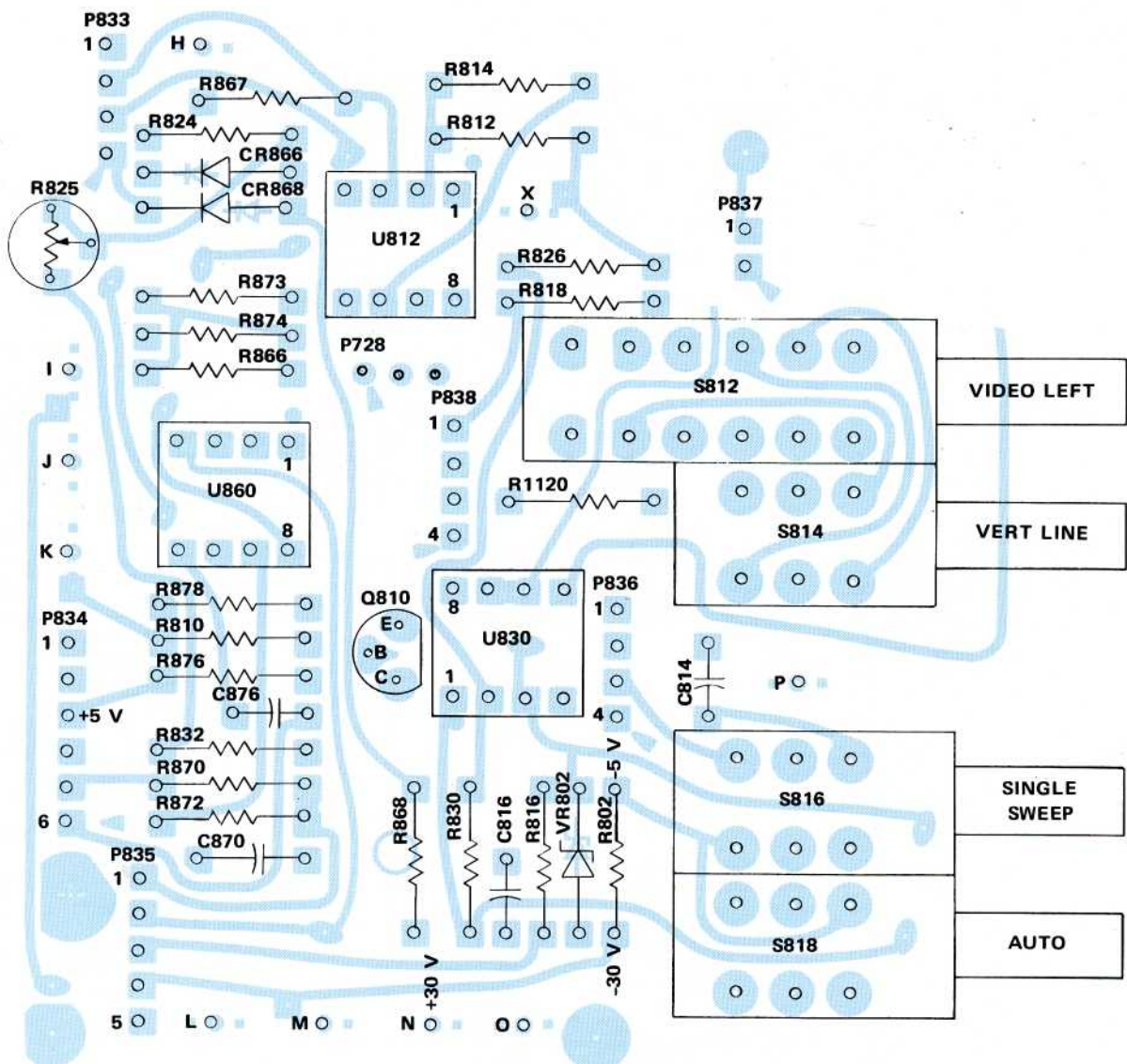


SHAPER, LO TRKG GEN,  
CALIBRATOR



A700 Sweep Generator & Amplifier Circuit Board



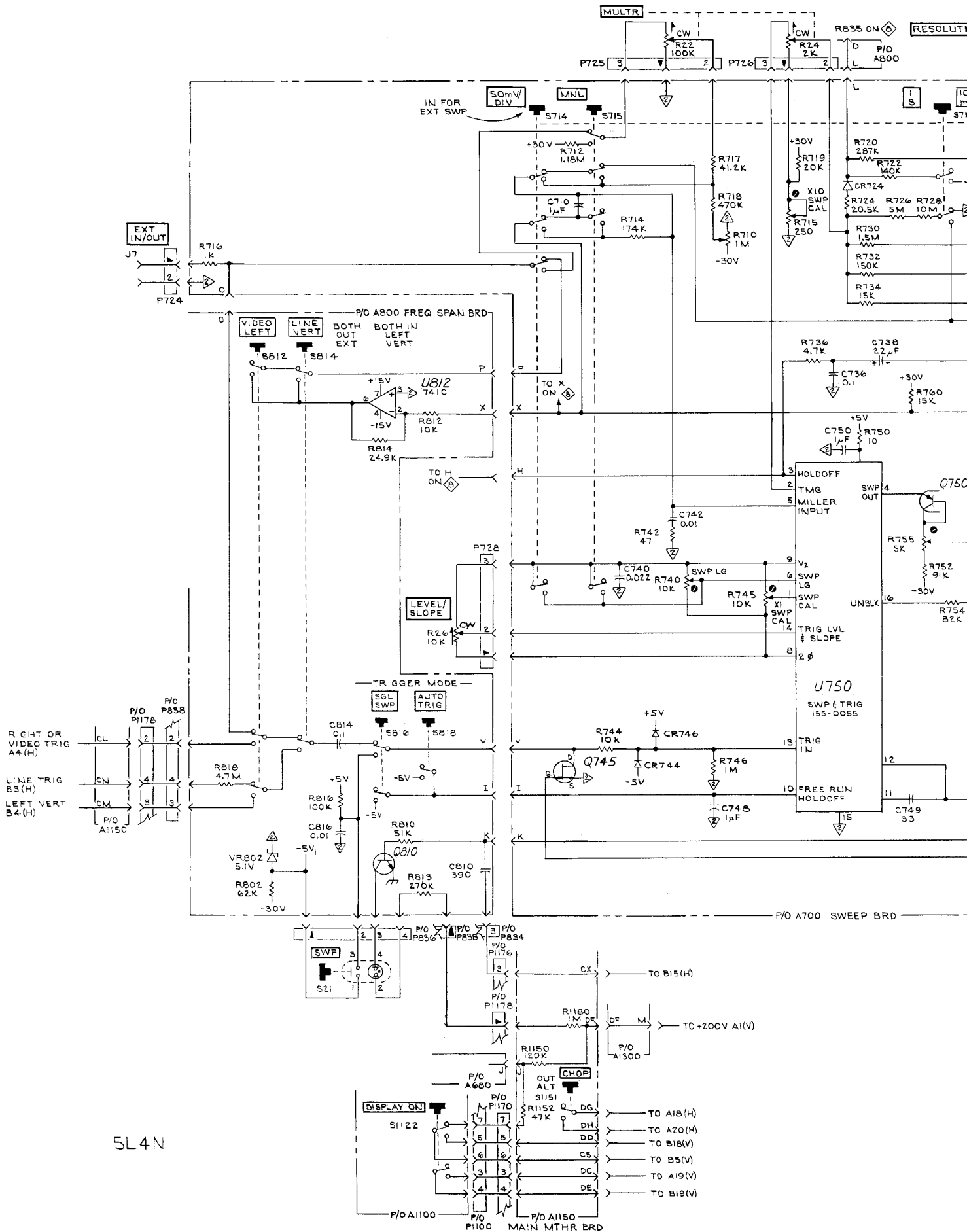


HC-3947-00

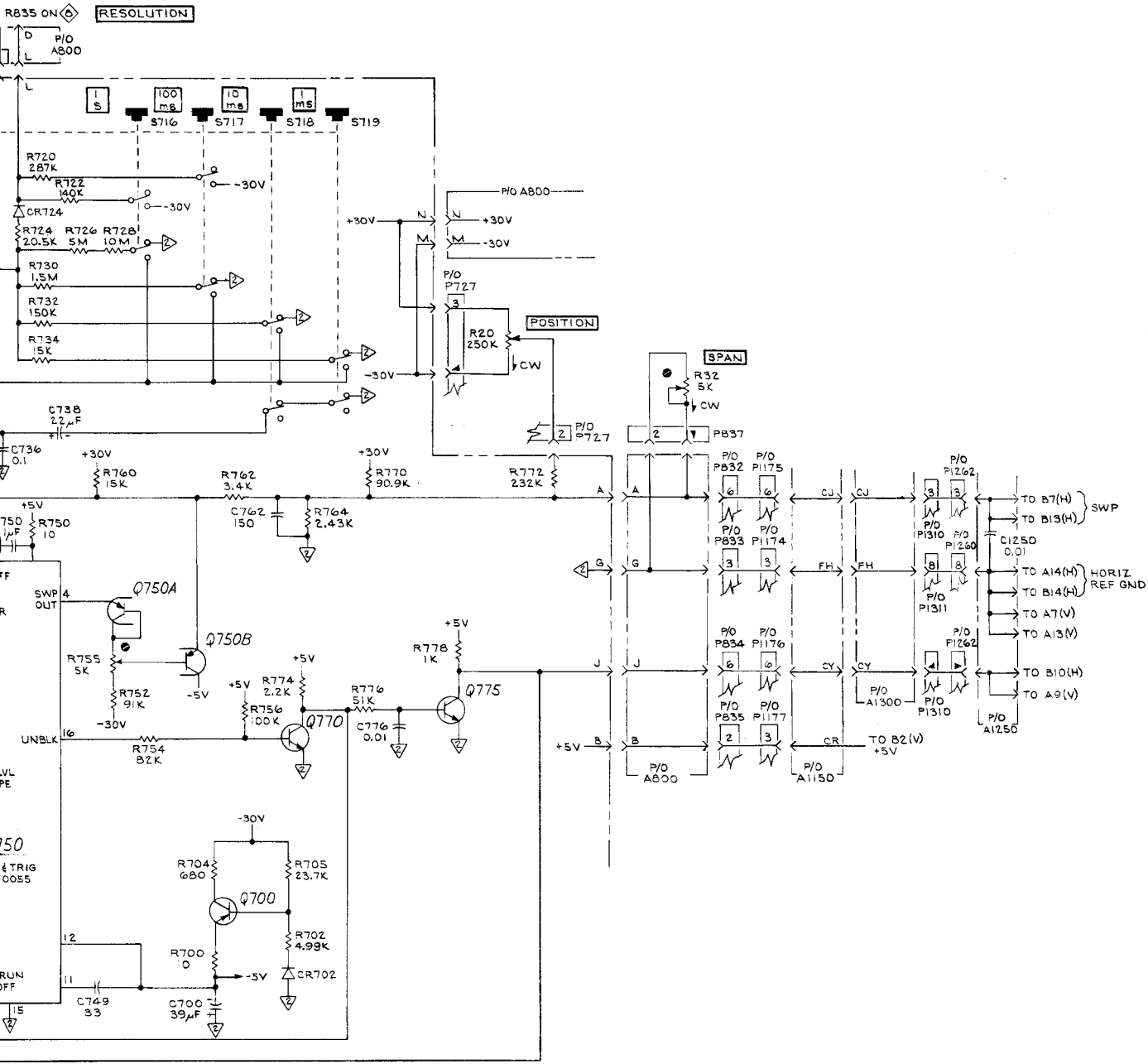
P/O A800 Frequency Span Selector, Trigger Mode & Source Selector Circuit Board

A1150 Main Mother Board component location shown on back of Diagram 9



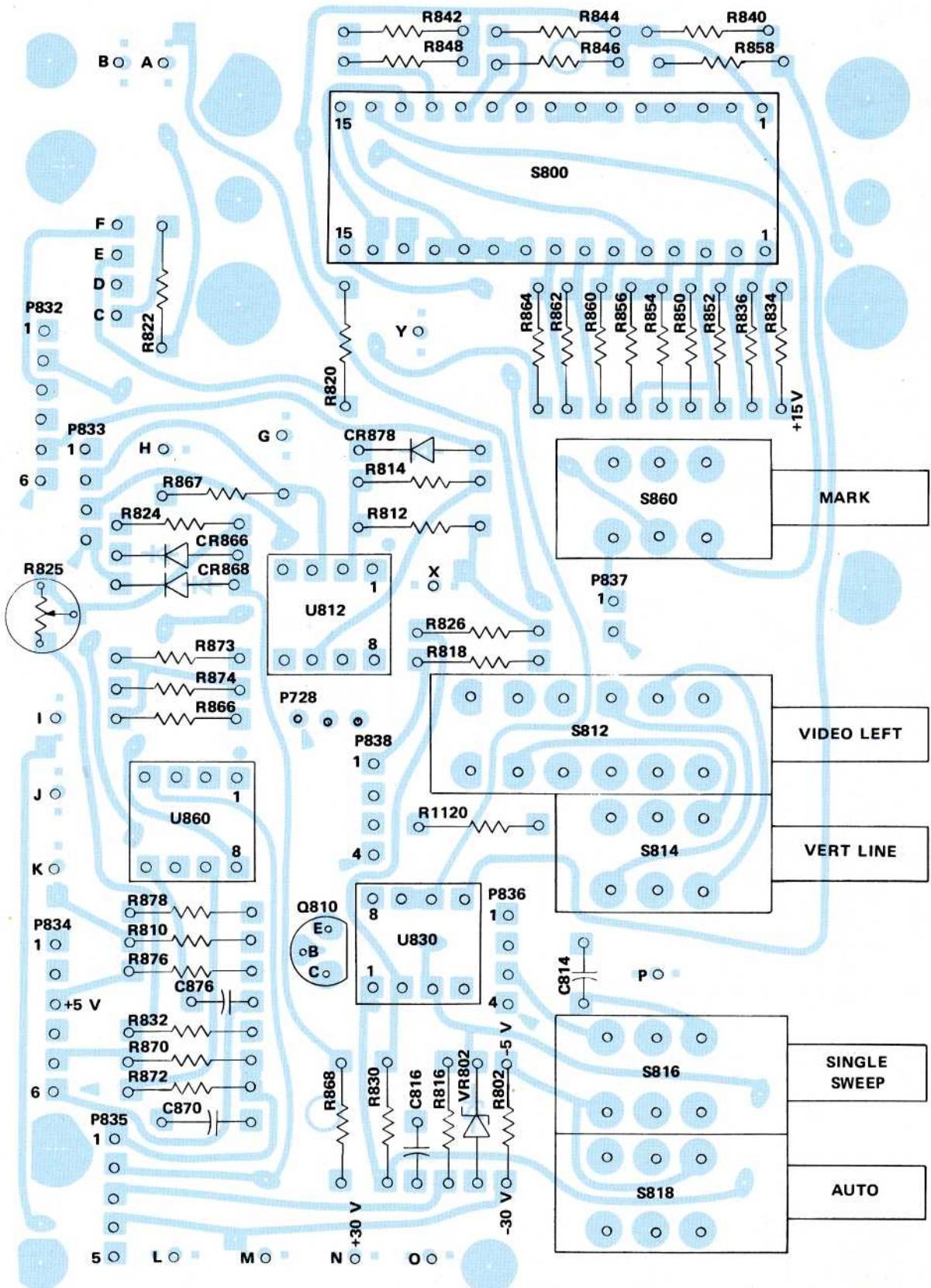


5L4N



SWEEP BRD

DD 374

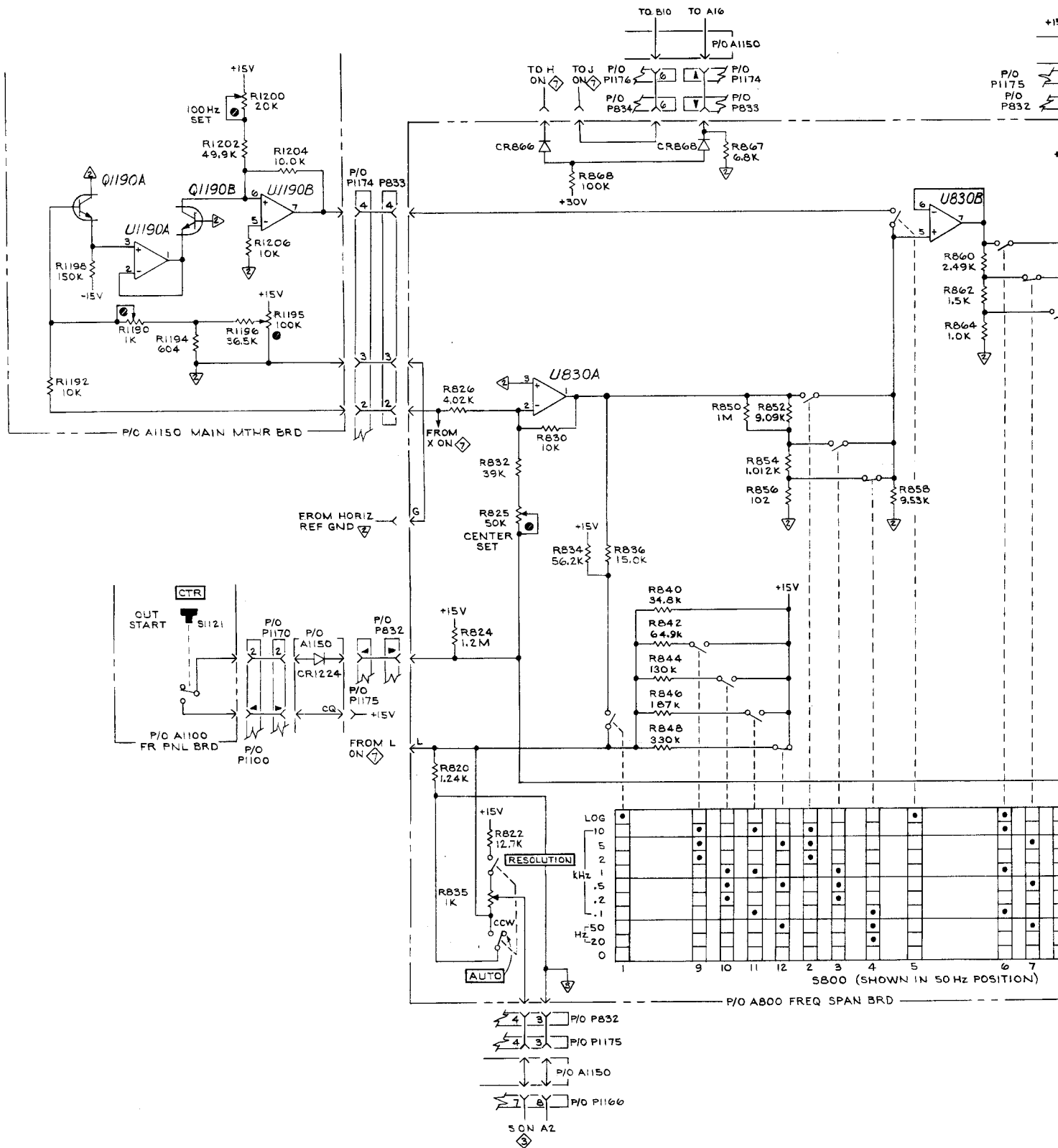


HC-3947-00

A800 Frequency Span Selector, Trigger Mode & Source Selector Circuit Board

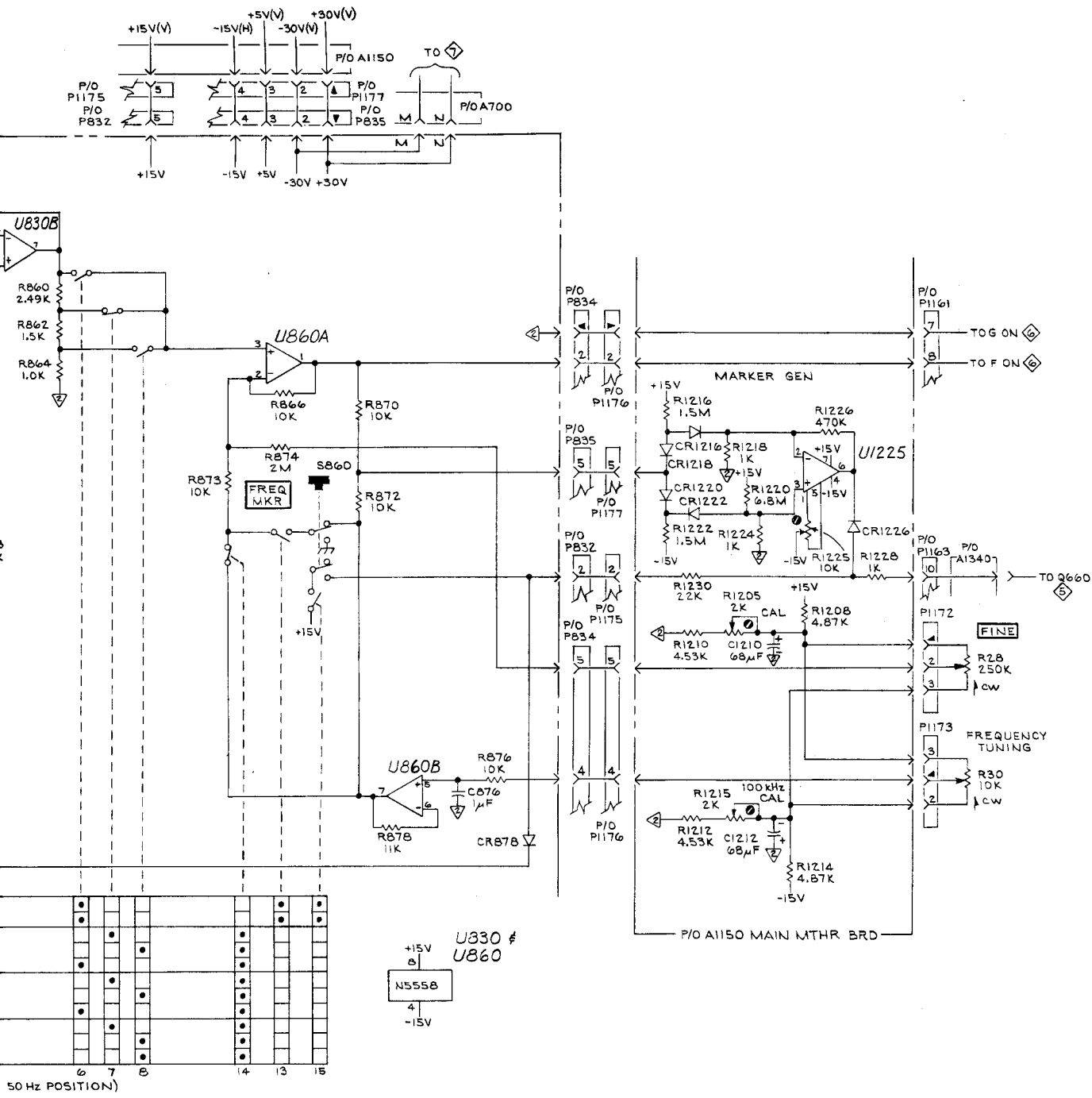






5L4N

FREQ SPAN, MARKER GEN & FREQ TUNING



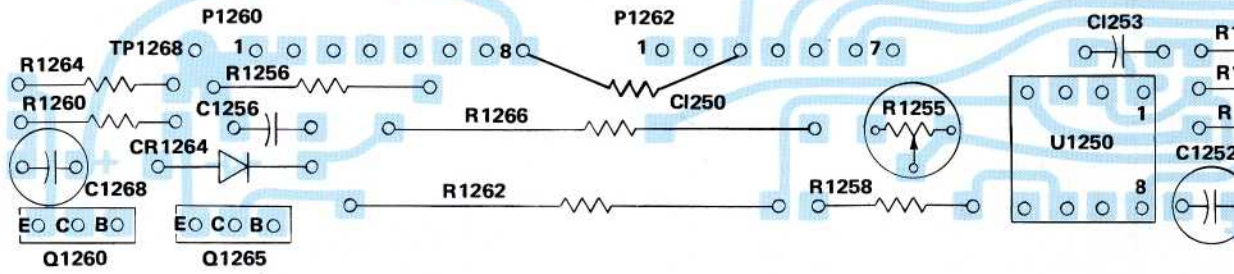
DD 474

FREQ SPAN, MARKER GEN & FREQ TUNING

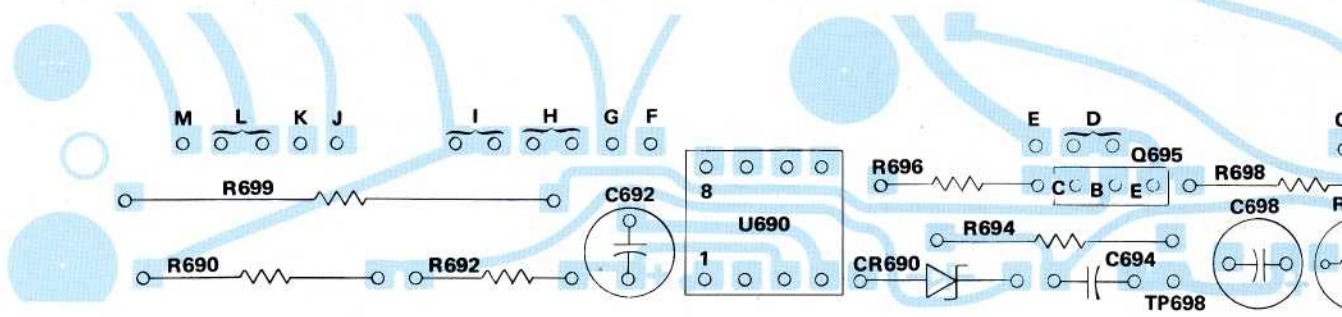




HC-3946-00

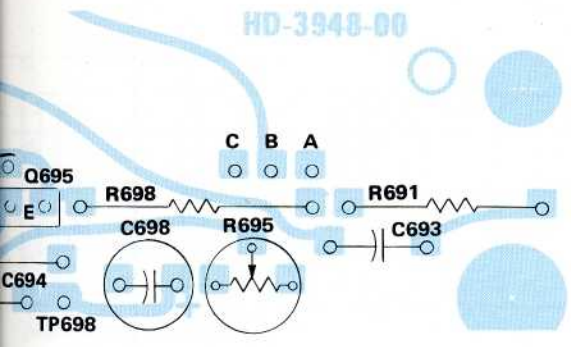
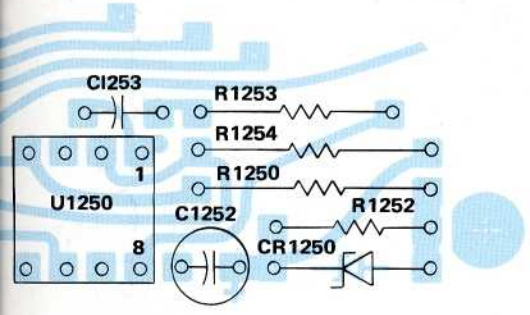


A690 Vertical Interface & +15 V Supply



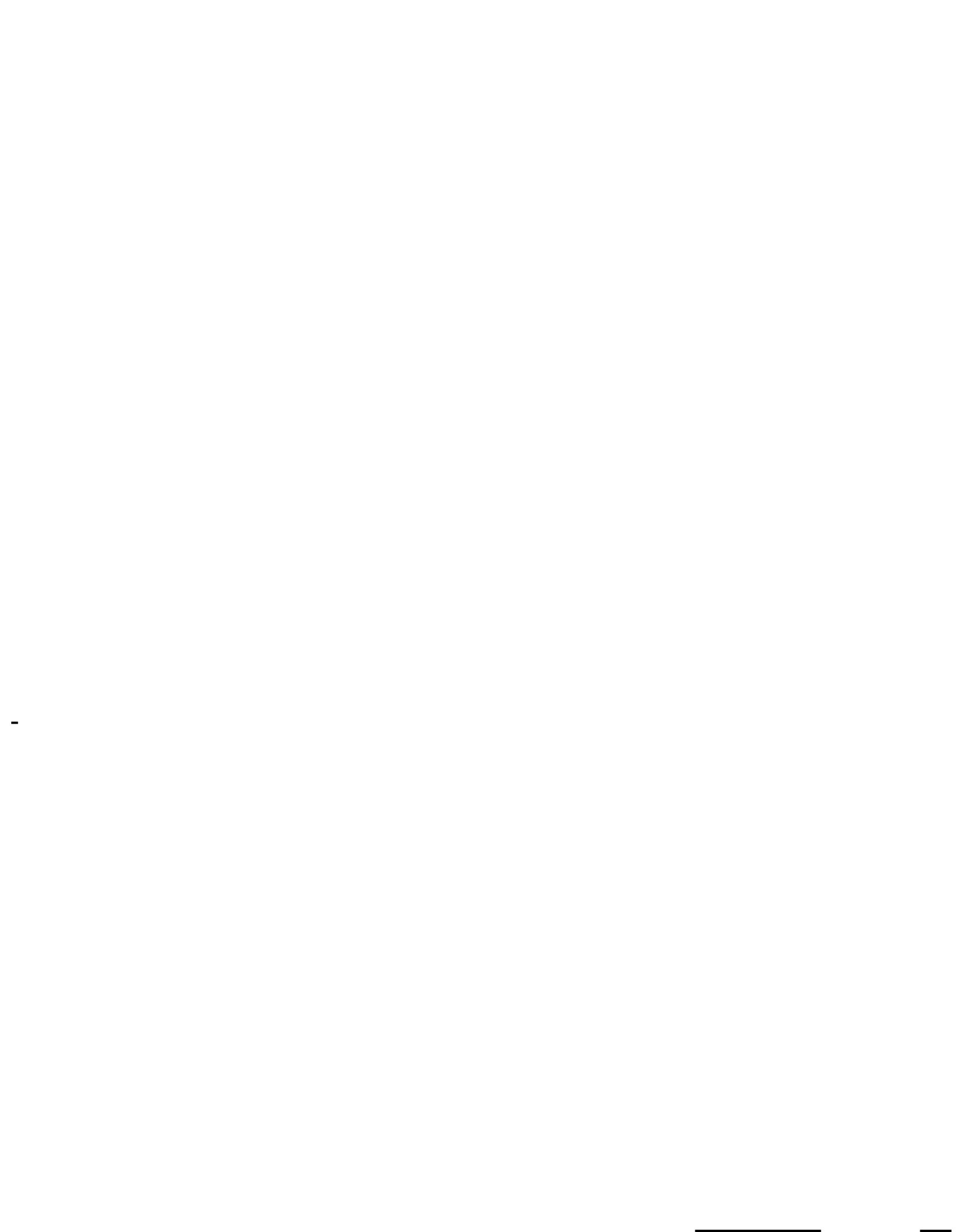
A1250 Detector Video Filter & Video Amplifier Circuit Board

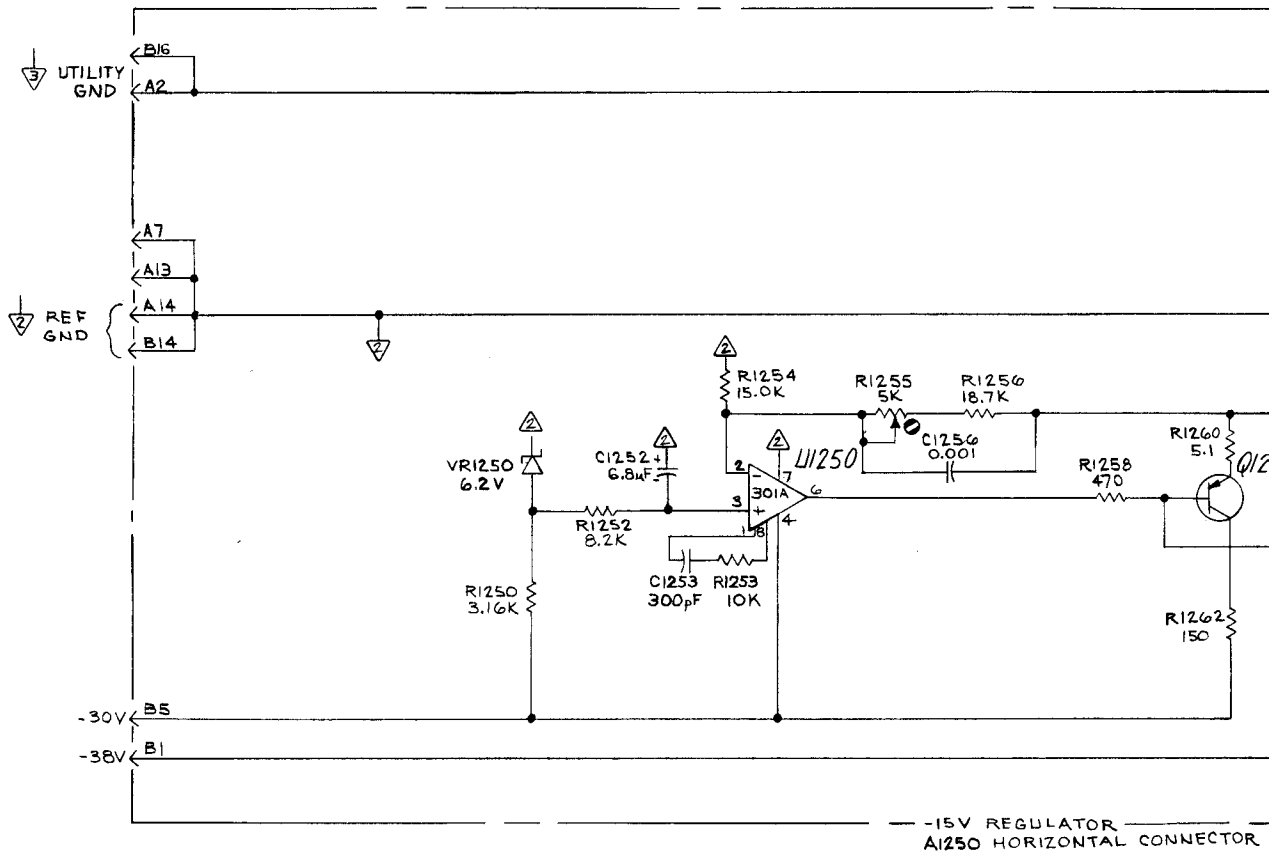
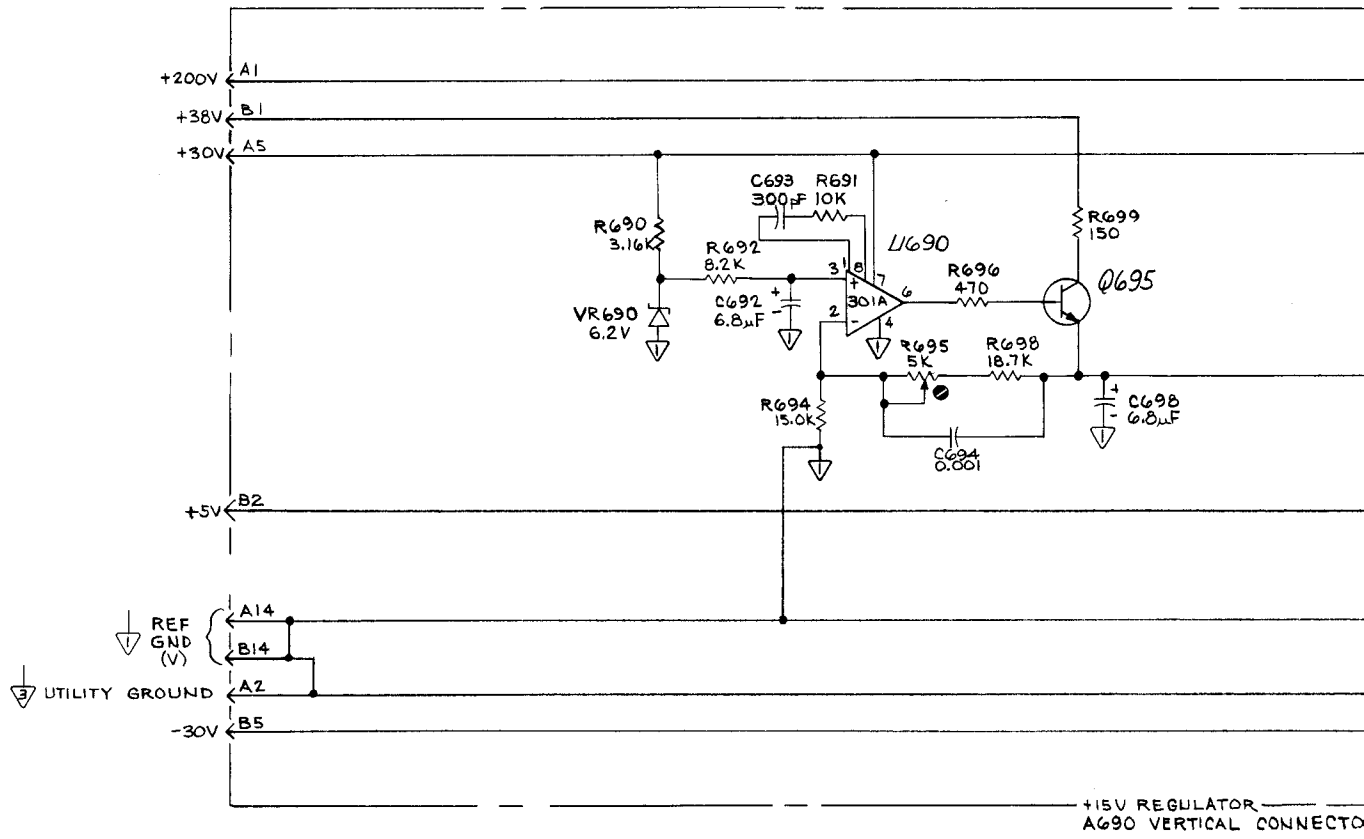




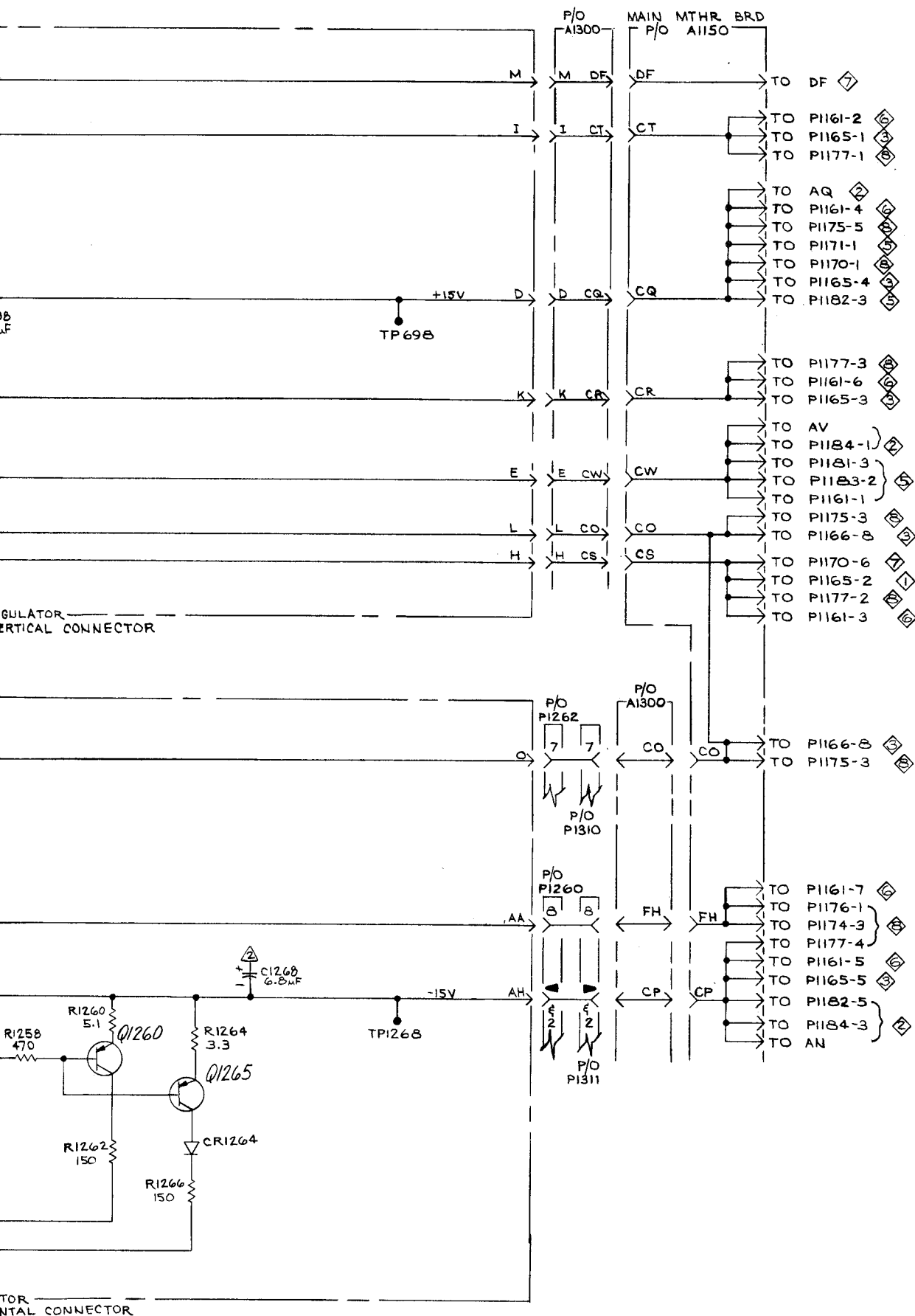
Circuit Board

+



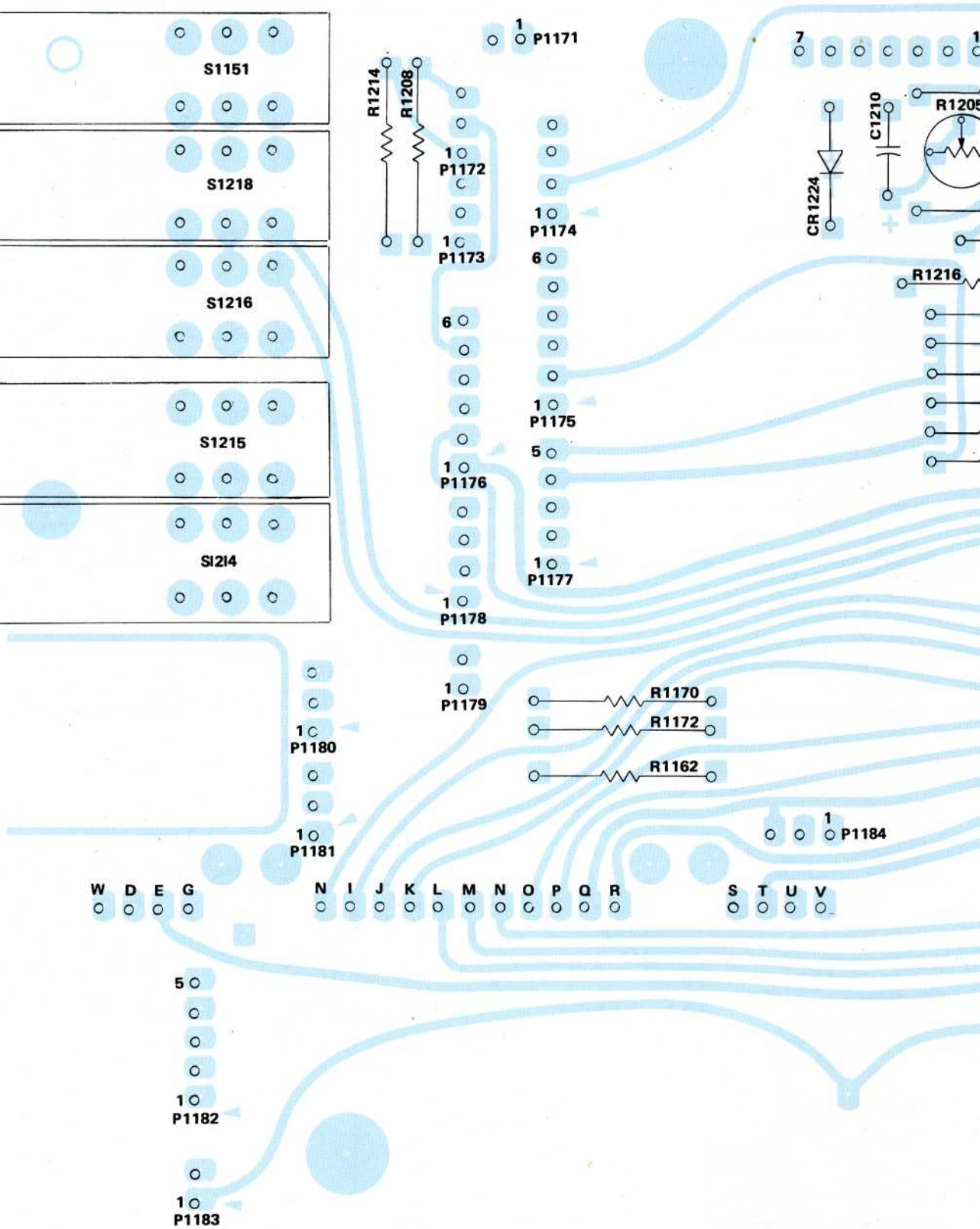
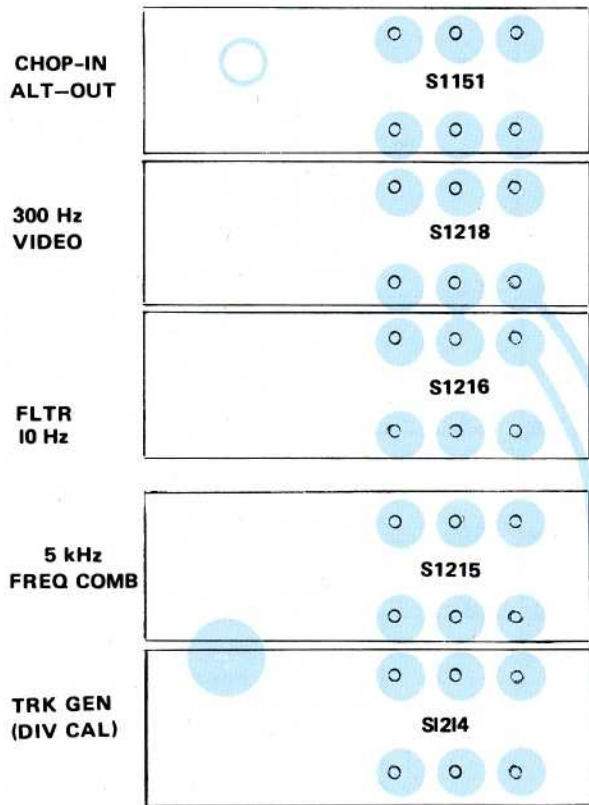


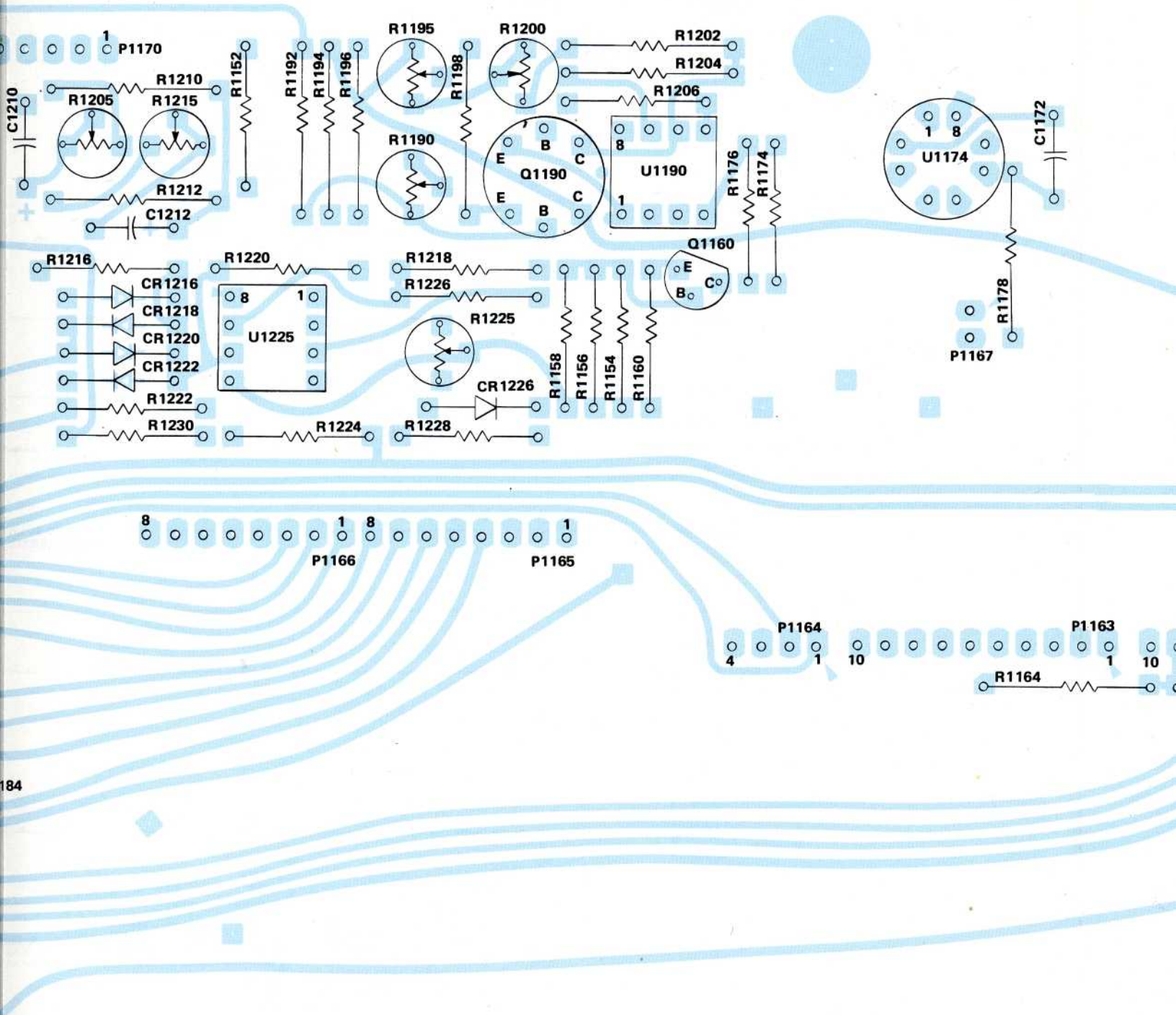
5L4N

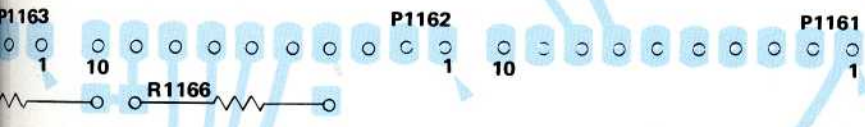
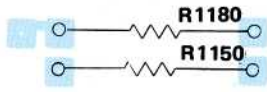


+15 V & -15 V RGLTRS & PWR DISTRIBUTION

+15V & -15V REGULATORS & POWER DISTRIBUTION

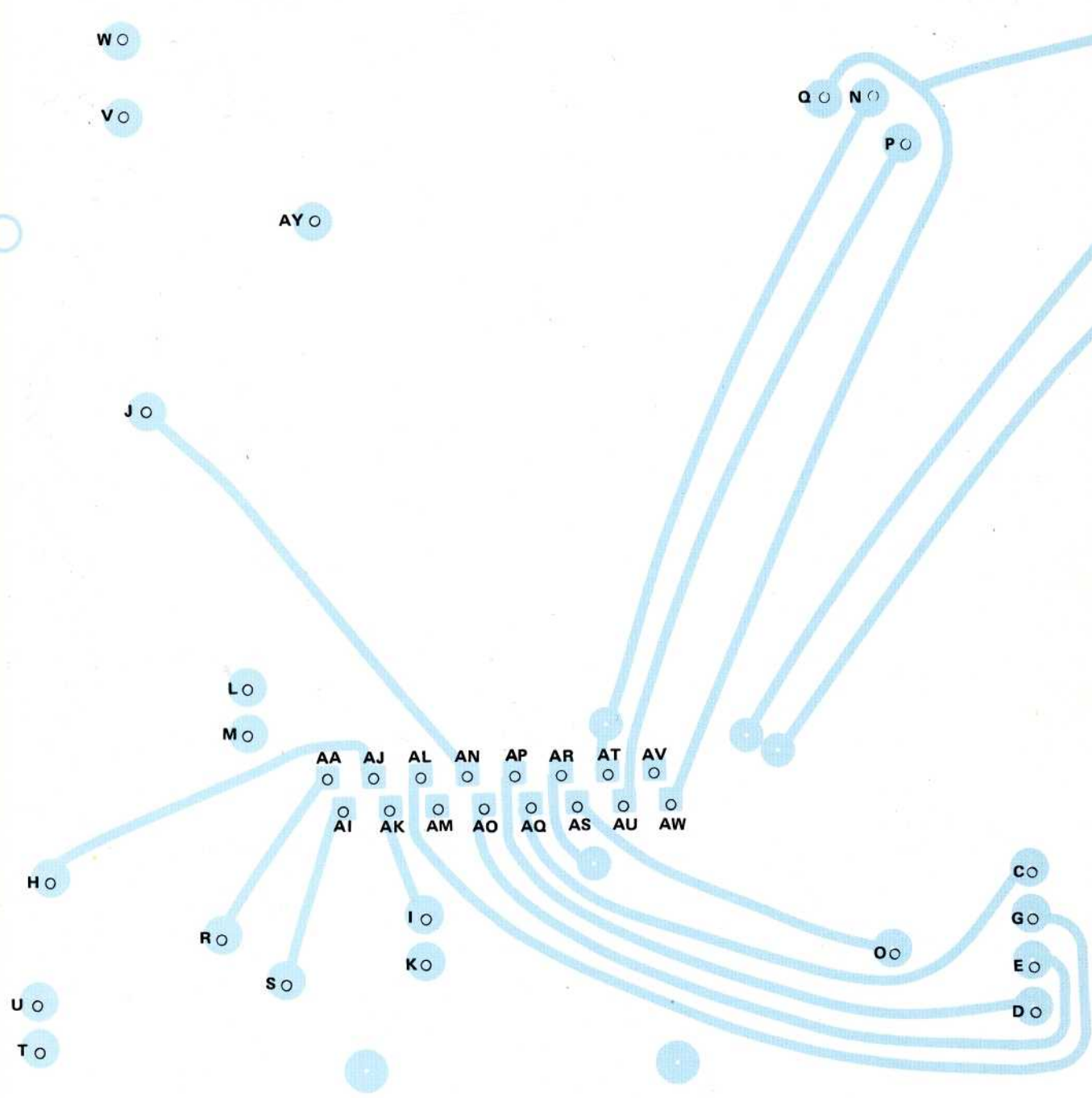






+

+

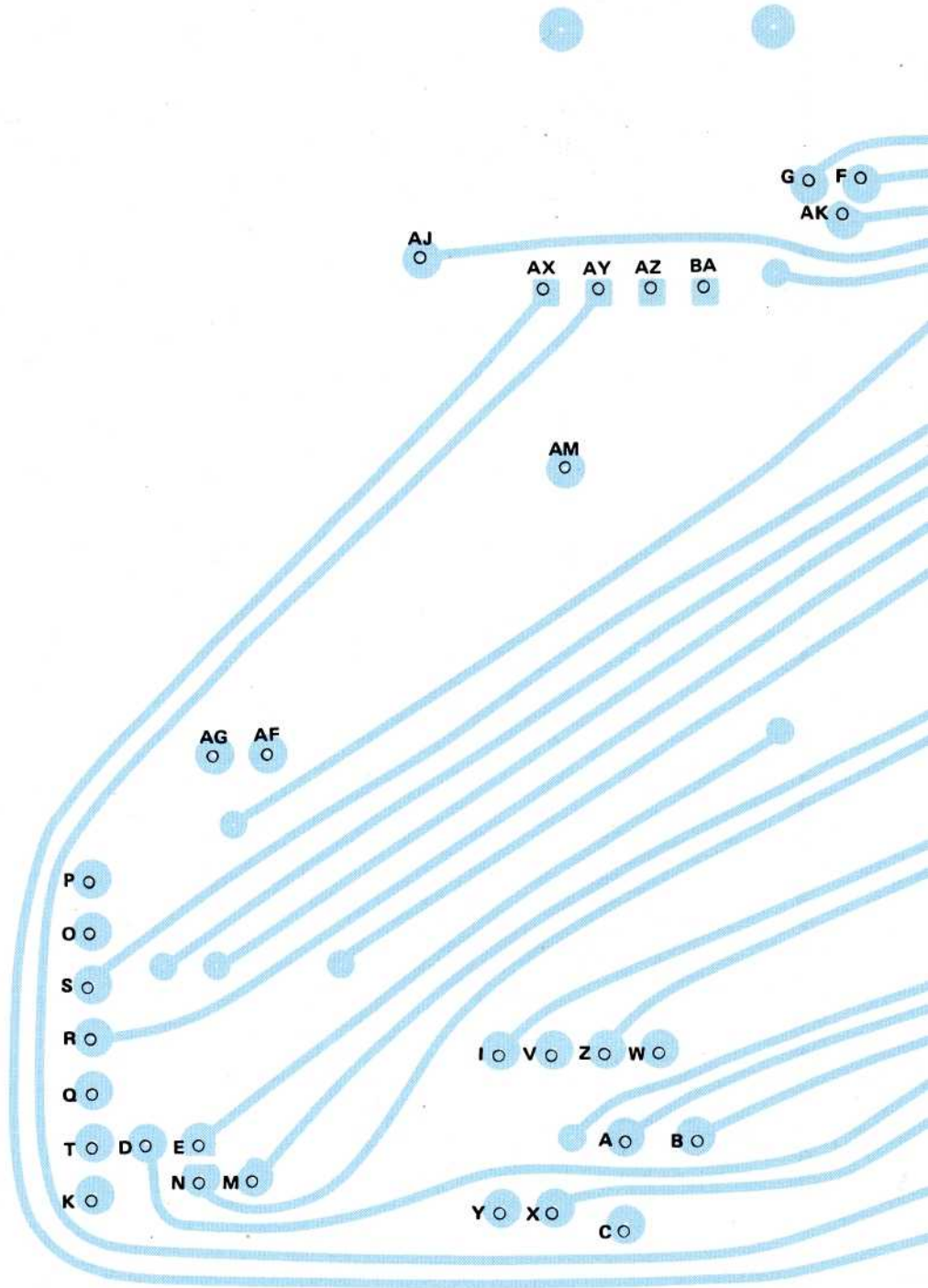
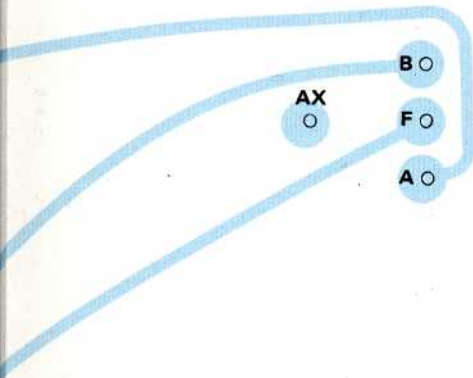


HC-3943-00

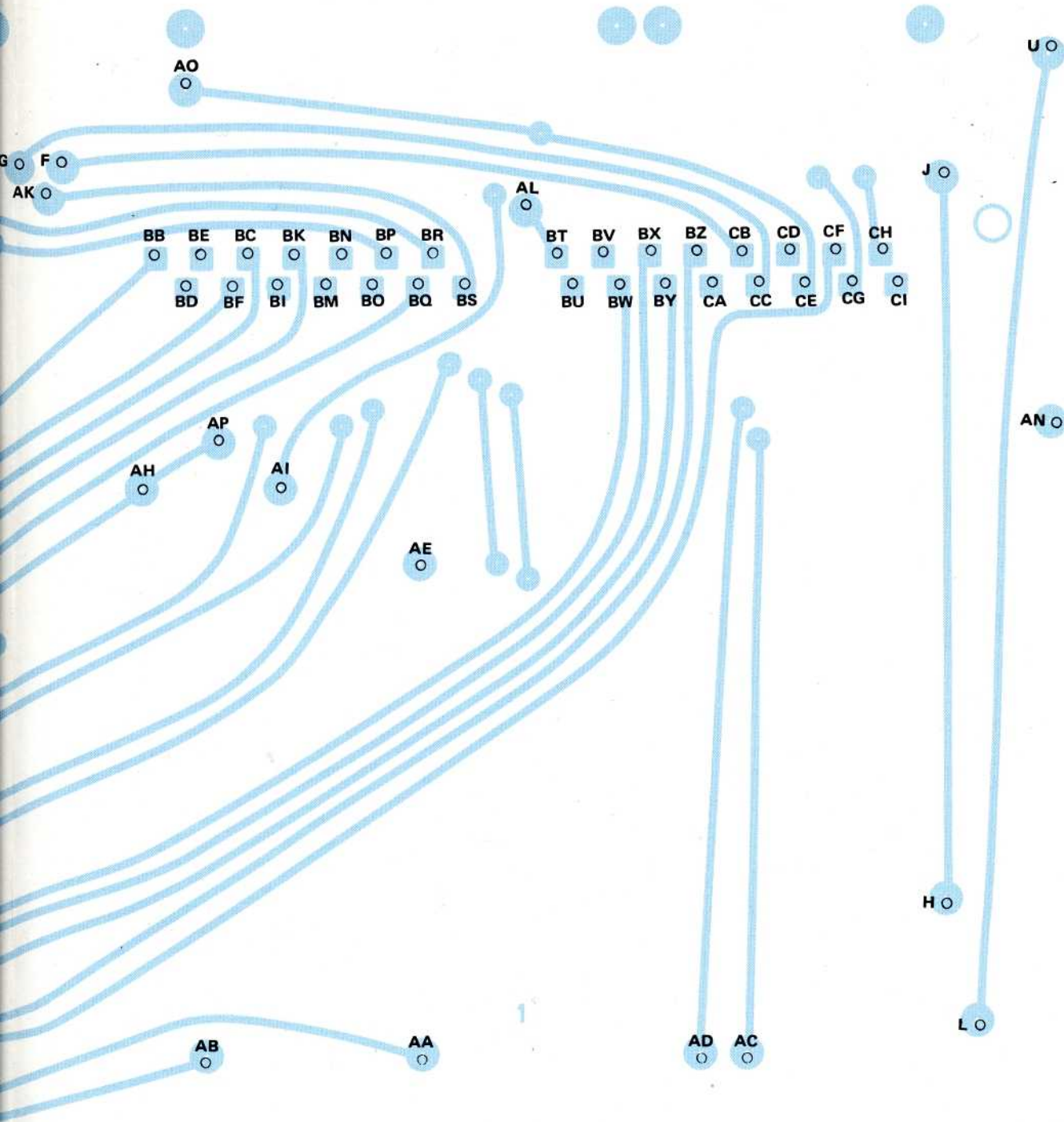
A1340 Right Mother Board

DATE: 11-15-68





5L4N



A1320 Left Mother Board

COMPONENT LOCATION FOR  
A1320 & A1340

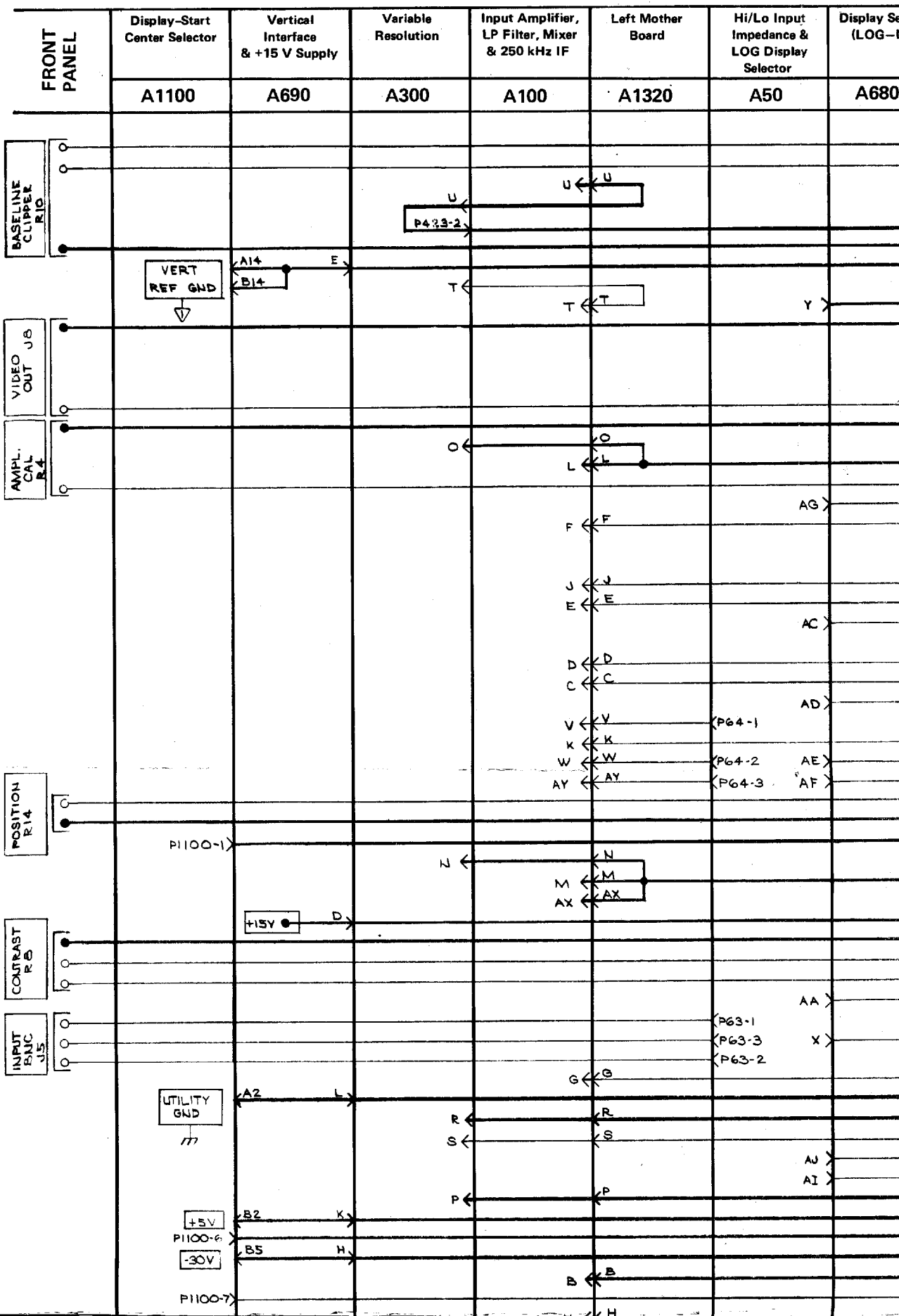








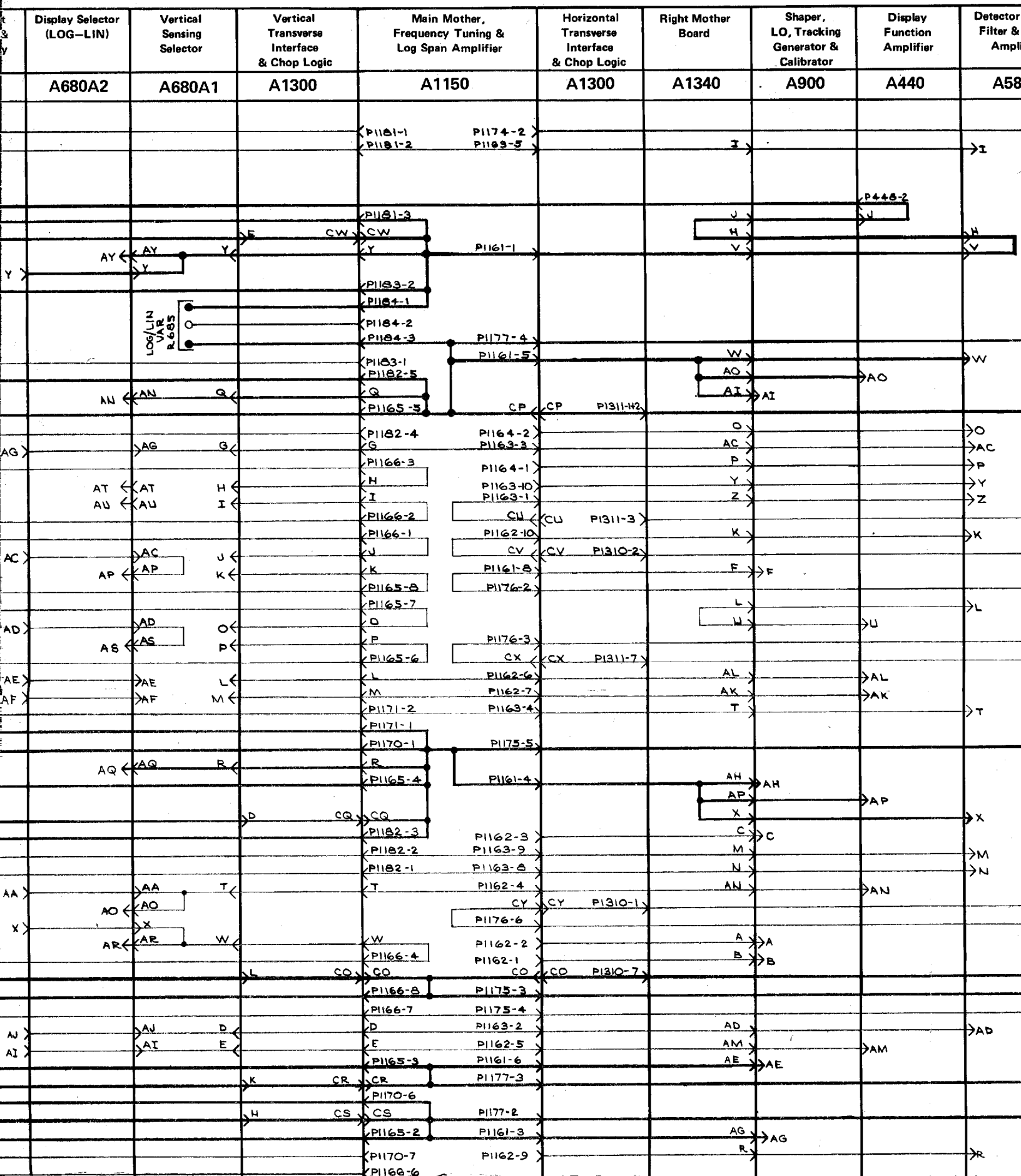
# IN

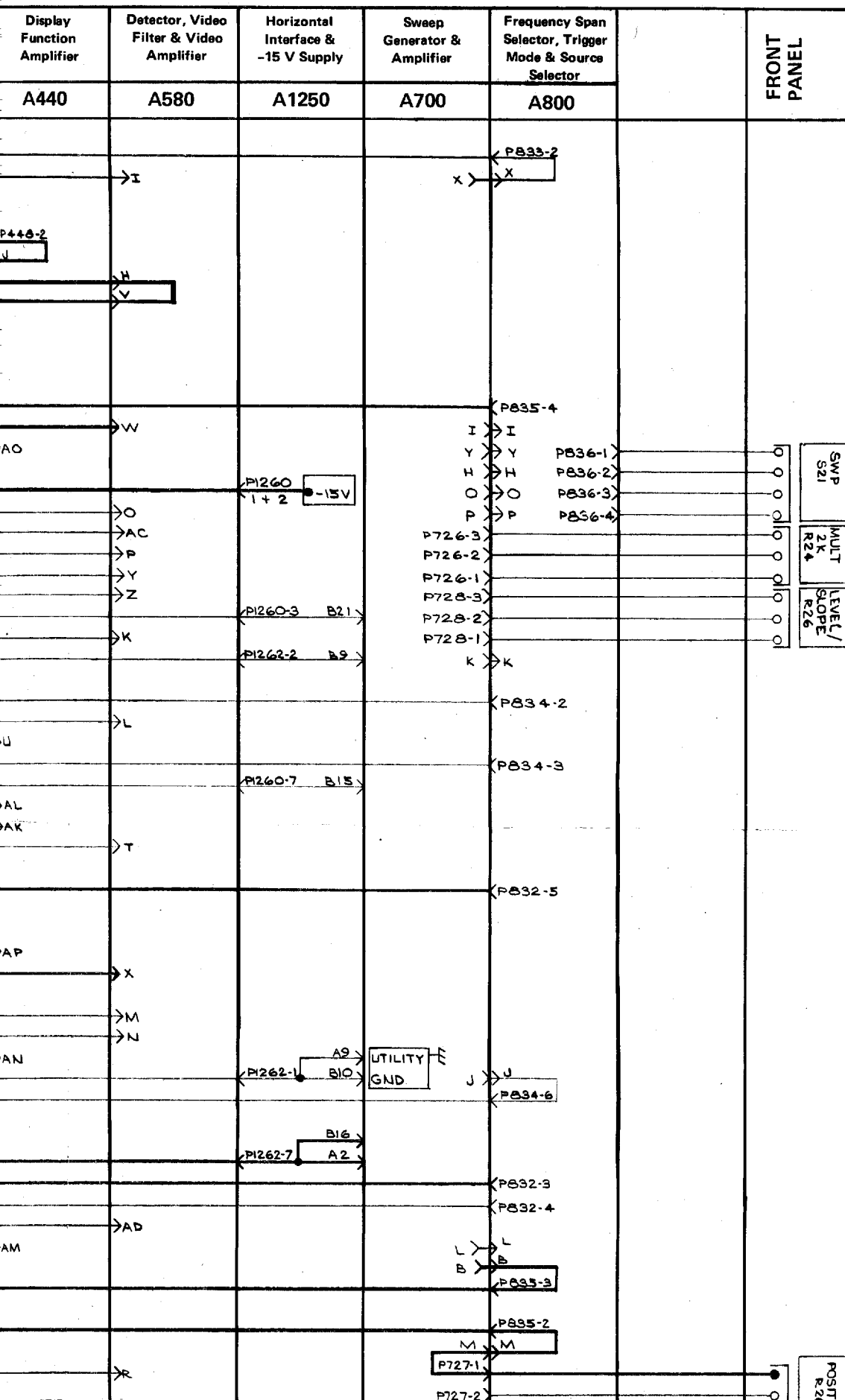


# 5L4N

# INTERCONNECT

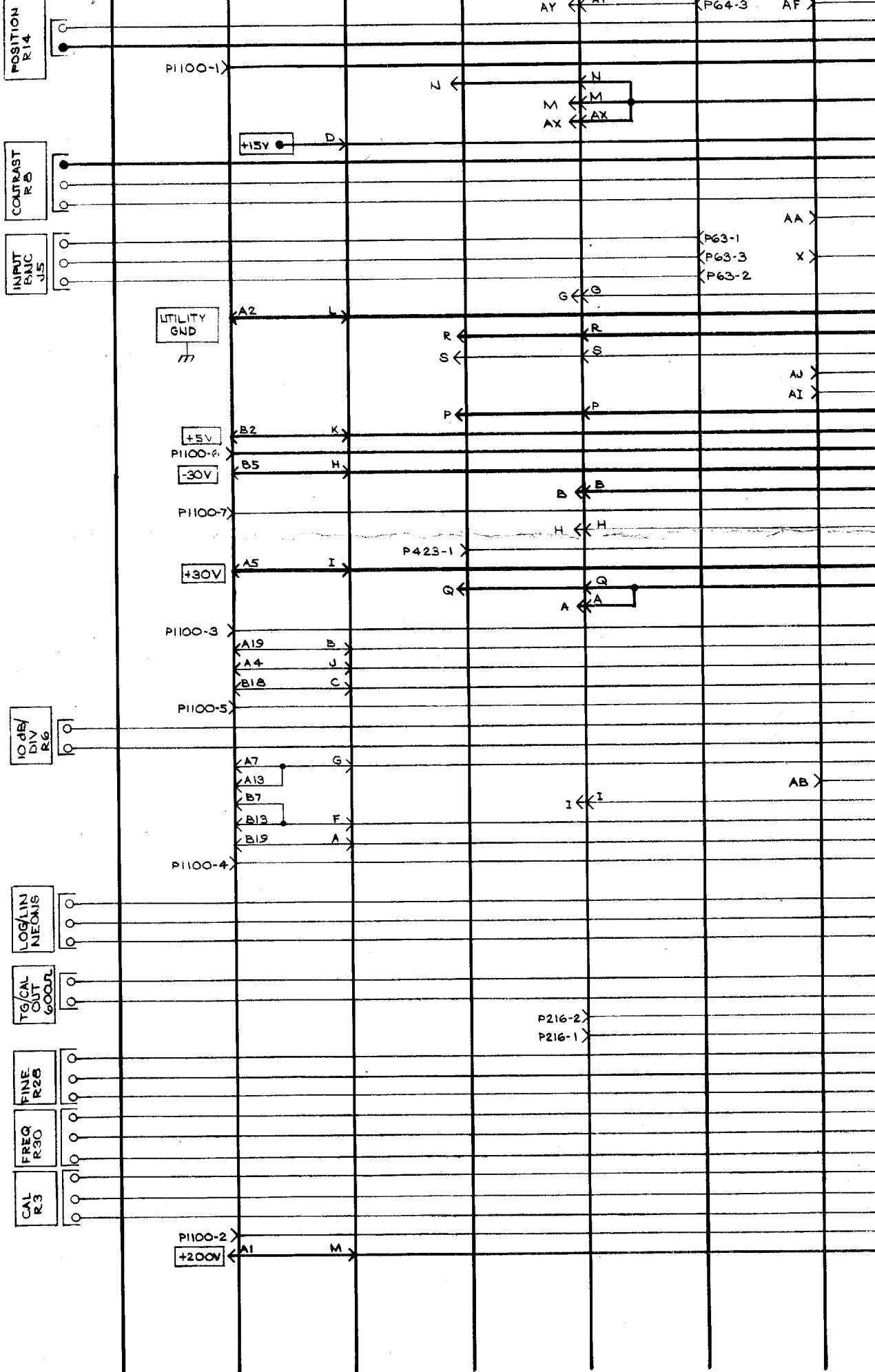
# CHART

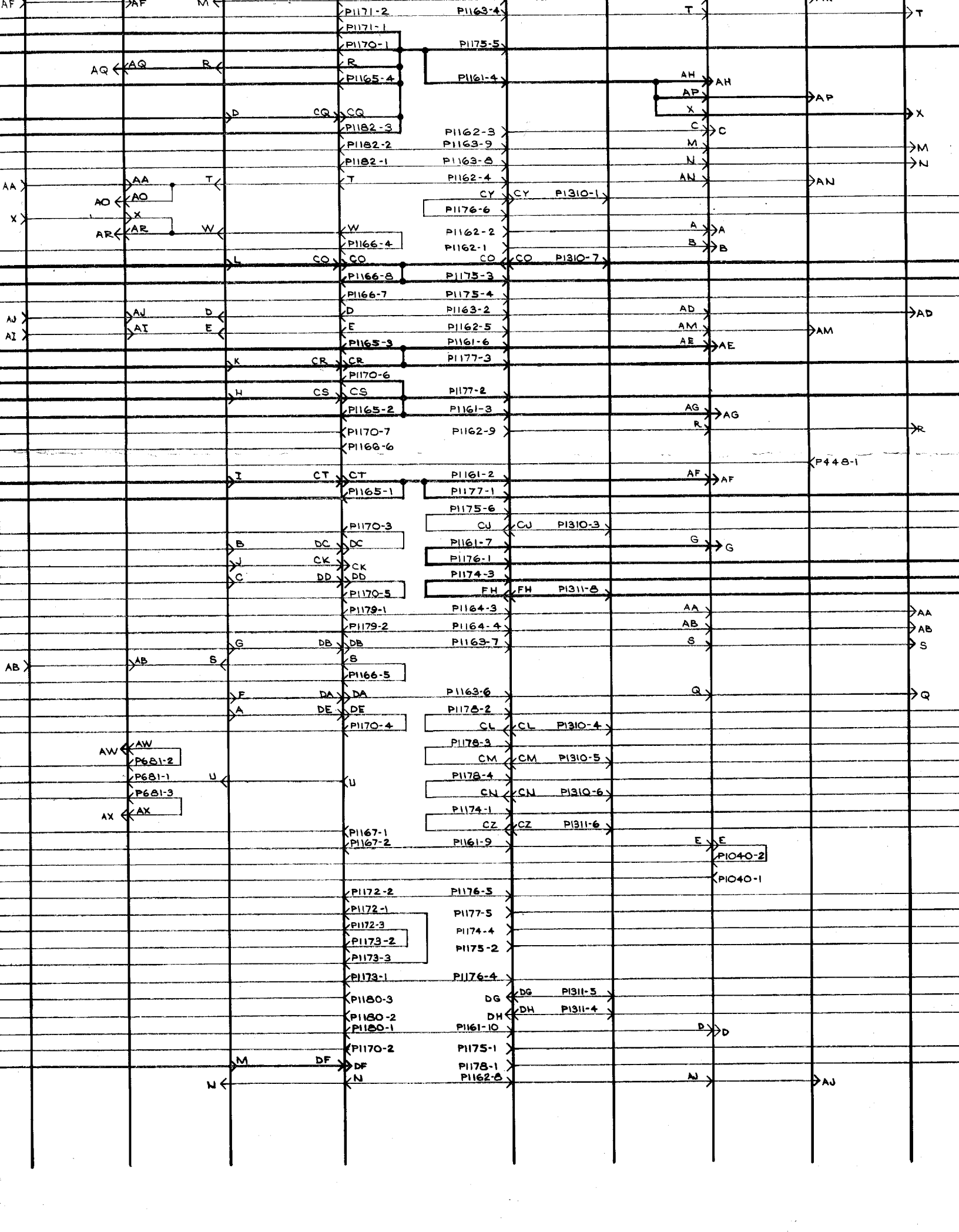




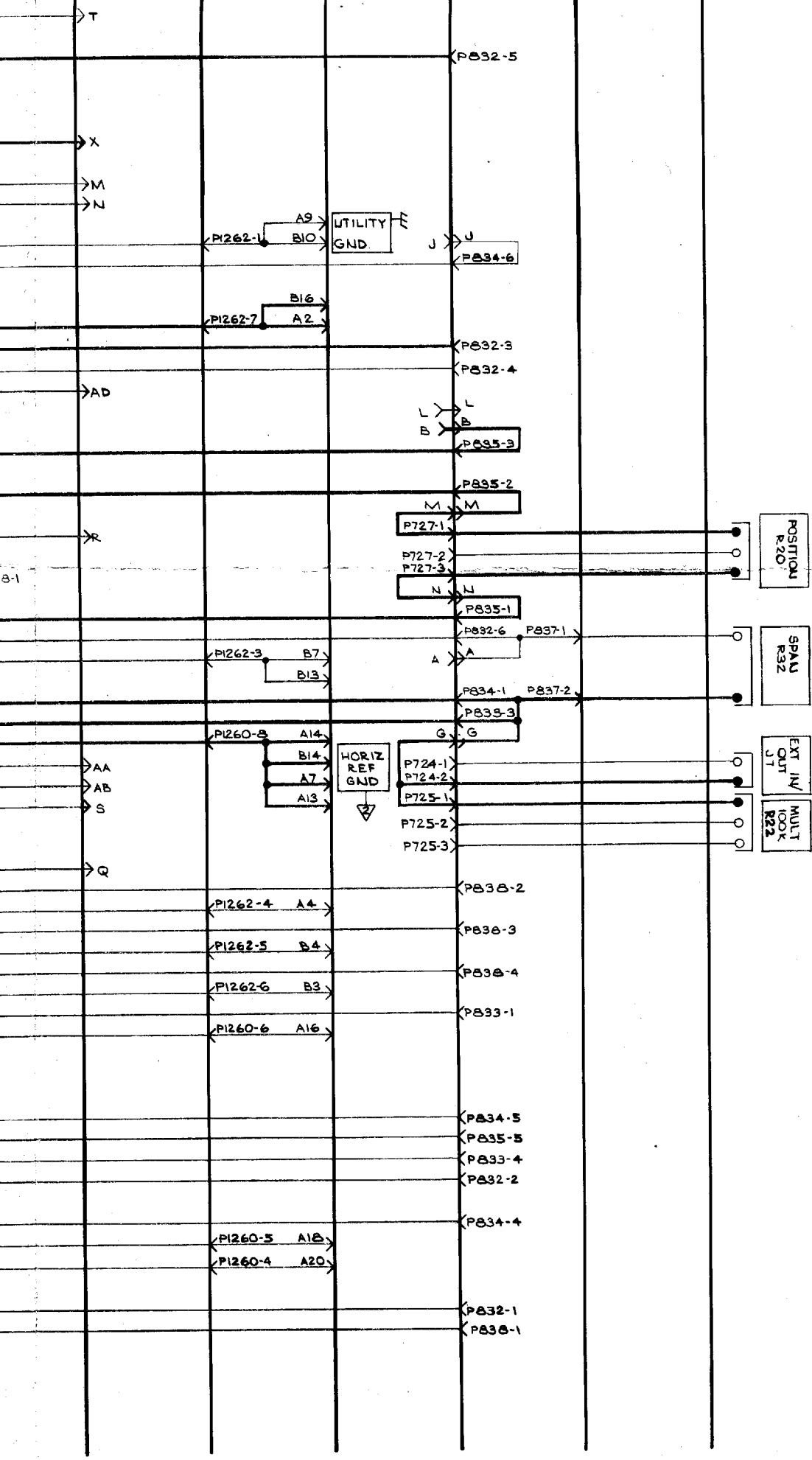
INT







INTERCONNECT  
CHART



## **MANUAL CHANGE INFORMATION**

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

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

A single change may affect several sections. Sections of the manual are often printed at different times, so some of the information on the change pages may already be in your manual. Since the change information sheets are carried in the manual until ALL changes are permanently entered, some duplication may occur. If no such change pages appear in this section, your manual is correct as printed.

CONTAMINATED SOILS

The following information is provided for your information. It is intended to provide a general overview of the site and the results of the investigation. The information is not intended to be used as a basis for any legal action. The information is provided for your information only and should not be used for any other purpose.



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# MANUAL CHANGE INFORMATION

PRODUCT 5L4N

EFF SN B010100-up

CHANGE REFERENCE C1/774

DATE 7-19-74/REV.

CHANGE:

DESCRIPTION

Pilot Change #9

TEXT CORRECTION

Page 2-21, Step 2, Line 2

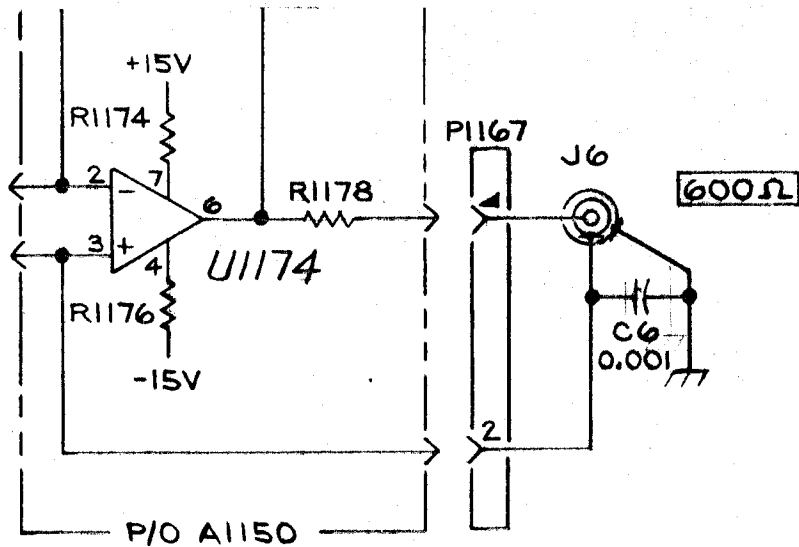
CHANGE TO READ:

larger signal until it is within the graticule area, and note the increased

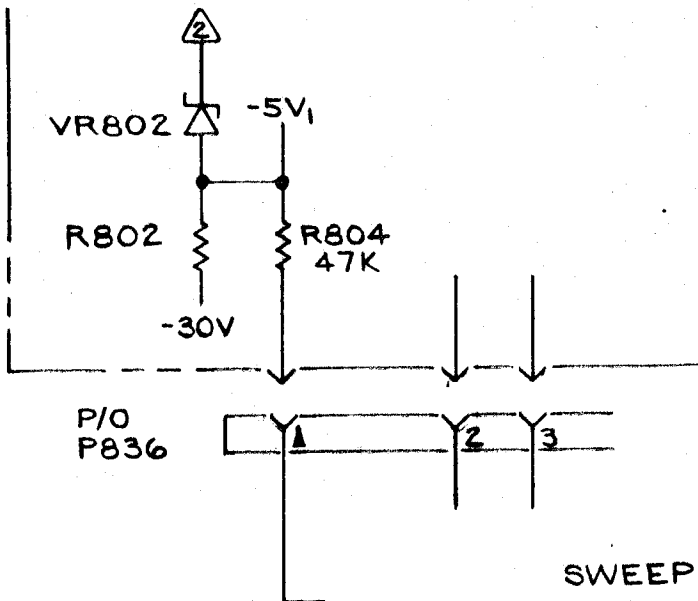
### ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

ADD:

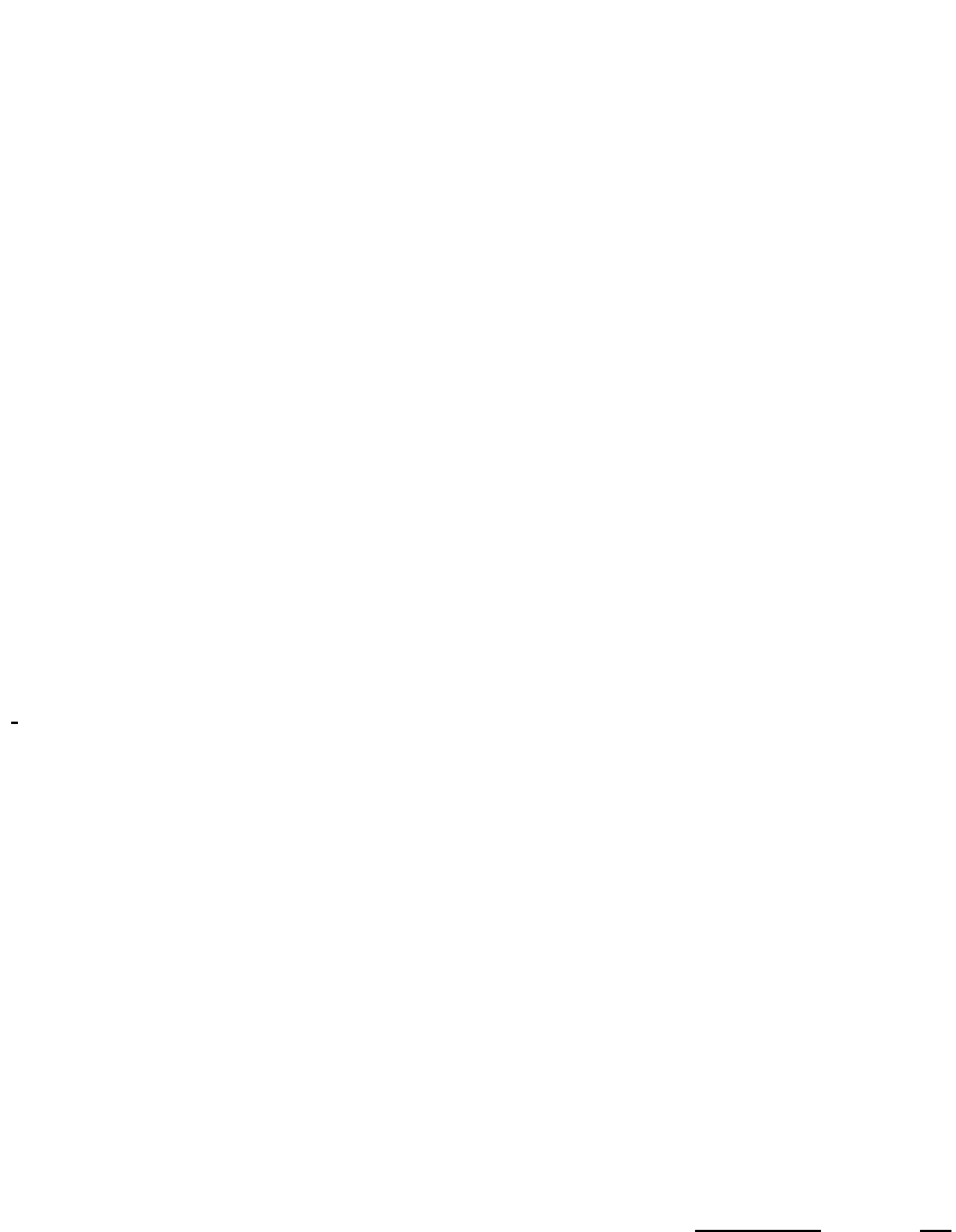
C6	283-0000-00	CAP.,FXD,CER DI:0.001 $\mu$ F,+100-0%, 500 V
R804	315-0473-00	RES.,FXD,COMP:47K OHM,5%, 0.25 W



SHAPER, LO, TRACKING  
GEN, CALIBRATOR  $\diamond 6$



SWEEP GEN & AMPL  $\diamond 7$





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# MANUAL CHANGE INFORMATION

PRODUCT 5L4N  
EFF SN B010100-up

CHANGE REFERENCE C2/874  
DATE 8-6-74

CHANGE:

DESCRIPTION

Pilot Change #11.

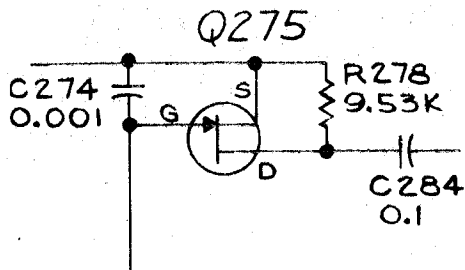
## ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

CHANGE TO:

Q680

151-0292-00

TRANSISTOR: SILICON, NPN



PARTIAL-  
MIXER & 250kHz SWITCHED  
GAIN AMPL 2





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# MANUAL CHANGE INFORMATION

PRODUCT 5I4N INTERIM

CHANGE REFERENCE C3/874

EFF SN B010100-up

DATE 8-22-74

CHANGE:	DESCRIPTION
---------	-------------

Pilot Changes #12 &amp; #13

TEXT CORRECTION

Page 1-8

Line 1

CHANGE TO READ: The zero (start) spur is less than -70 dBV or five divisions...

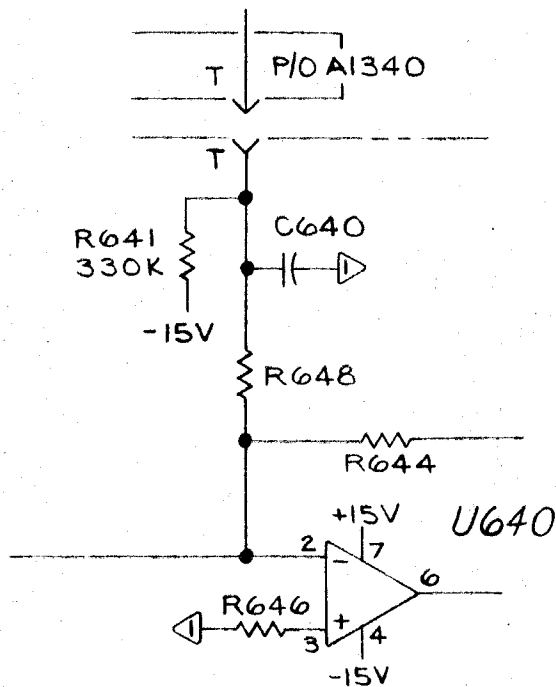
## ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

## CHANGE TO:

C125	281-0529-00	CAP.FXD,CER DI:1.5 PF (NOMINAL VALUE) SELECTED
C329	281-0504-00	CAP.FXD,CER DI:10 PF (NOMINAL VALUE) SELECTED
C366	281-0504-00	CAP.FXD,CER DI:10 PF (NOMINAL VALUE) SELECTED
C386	281-0504-00	CAP.FXD,CER DI:10 PF (NOMINAL VALUE) SELECTED
C406	281-0504-00	CAP.FXD,CER DI:10 PF (NOMINAL VALUE) SELECTED
R648	315-0154-00	RES.FXD,COMP:150K OHM, 5%, 0.25W
R702	321-0264-00	RES.FXD,FILM:5.49K OHM, 1%, 0.125W

## ADD:

R641	315-0334-00	RES.FXD,COMP:330K OHM, 5%, 0.25W
------	-------------	----------------------------------

P/O DET, VID FILTER  
& VID AMPL 5





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# MANUAL CHANGE INFORMATION

PRODUCT 5L4N

CHANGE REFERENCE C4/974

EFF SN B010100-up

DATE 9-11-74

**CHANGE:**

**DESCRIPTION**

#16,#17,#18,#19

ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

CHANGE TO:

C125	281-0178-00	CAP.,VAR,PLSTC:1-4 PF
Q165	151-0435-00	TRANSISTOR, SILICON, PNP, MPSA65
R712	315-0125-00	RES.,FXD,COMP:1.2M OHM, 5%, 0.25W
R1210	321-0262-00	RES.,FXD,FILM:5.23K OHM, 1%, 0.125W
R1212	321-0262-00	RES.,FXD,FILM:5.23K OHM, 1%, 0.125W
R1214	321-0252-00	RES.,FXD,FILM:4.12K OHM, 1%, 0.125W





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# MANUAL CHANGE INFORMATION

PRODUCT 5L4N

CHANGE REFERENCE C5/1074

DATE 10-7-74

CHANGE:

DESCRIPTION

A 3 wire multi-pin extender cable has been added to the 5L4N instrument package. This cable permits the left wing of the instrument to be extended for maintenance and calibration.



