

**TEKTRONIX®**

**PG 508  
50 MHz  
PULSE GENERATOR**

**INSTRUCTION MANUAL**

**Tektronix, Inc.  
P.O. Box 500  
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**Serial Number** \_\_\_\_\_

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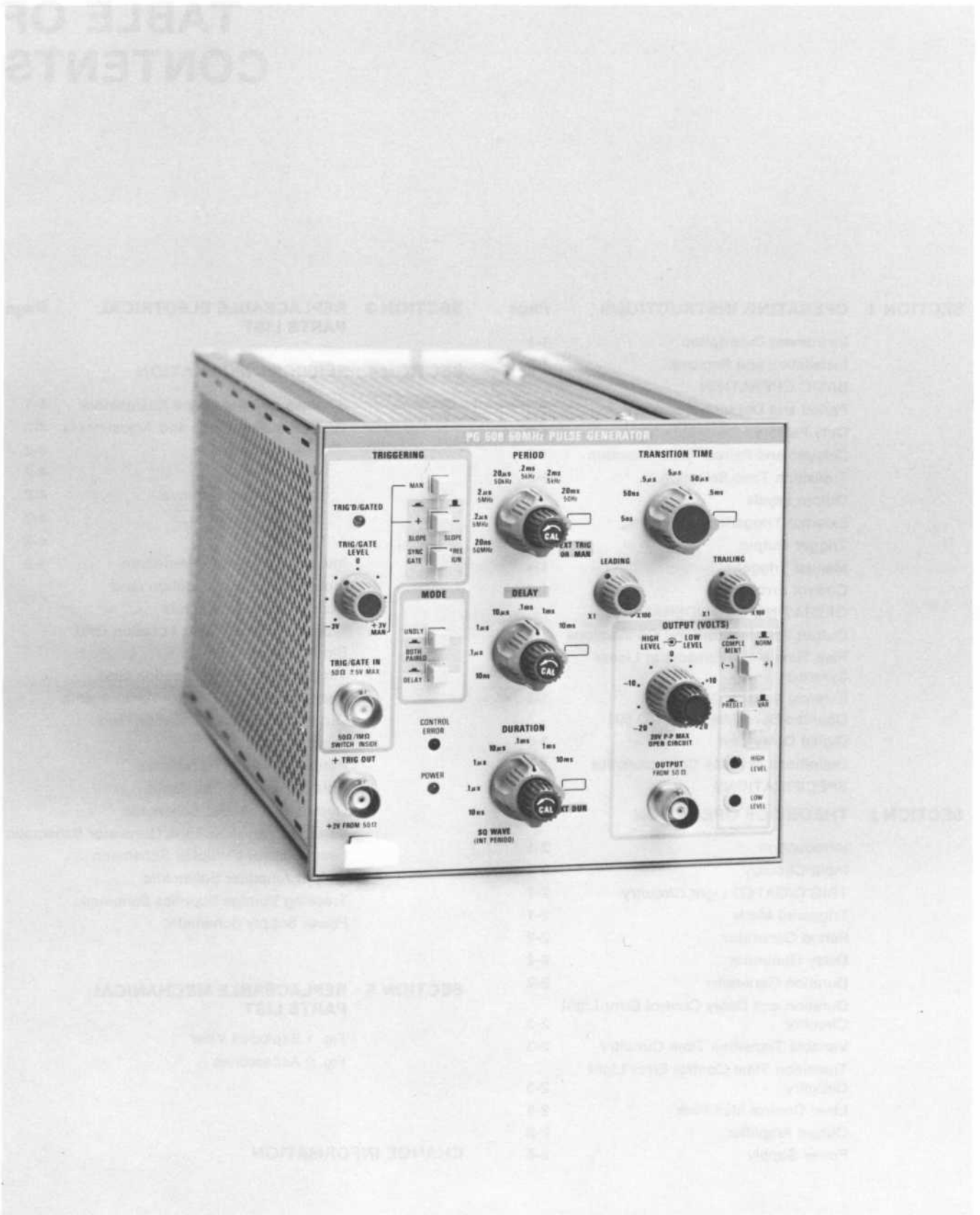
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# OPERATING INSTRUCTIONS

## Instrument Description

The PG 508 is a 50 MHz general purpose full function pulse generator usable in all TM 500-series power modules except the TM 501. It is compatible with MOS and other general purpose circuitry. Important features of the instrument include independent period and duration controls with a control error light, independent pulse top and bottom level controls, variable leading and trailing transition time adjustments, and fully adjustable pulse delay capabilities. Front panel controls and connectors provide a trigger or synchronous gate input with level and slope controls, square wave output and complementary pulse output for high duty factors. Delayed and paired pulse and manual trigger or gate capabilities are also provided. All inputs and outputs are internally terminated in  $50 \Omega$  except the TRIG/GATE input which is internally selectable for either  $50 \Omega$  or  $1 M\Omega$ ,  $20 \text{ pF}$  input impedance. Special positions on PERIOD, DURATION, DELAY, and TRANSITION controls permit customized control ranges.

The front panel is color coded for easy reference to controls and their associated functions. Green indicates triggering functions and blue indicates mode functions.

## Installation and Removal

The PG 508 is calibrated and ready for use when received. It operates in any two compartments of the TM 500-series power modules. See the power module instruction manual for line voltage requirements and power module operation. Fig. 1-1 shows the installation and removal procedure. Make certain the power module is **off** when inserting or removing the PG 508. Check that the PG 508 is fully inserted in the power module. Pull the power switch on the power module. The POWER light on the PG 508 should now be on. Refer to the Controls and Connectors foldout page in Section 4 of this manual for a complete description of the front panel controls and connectors.

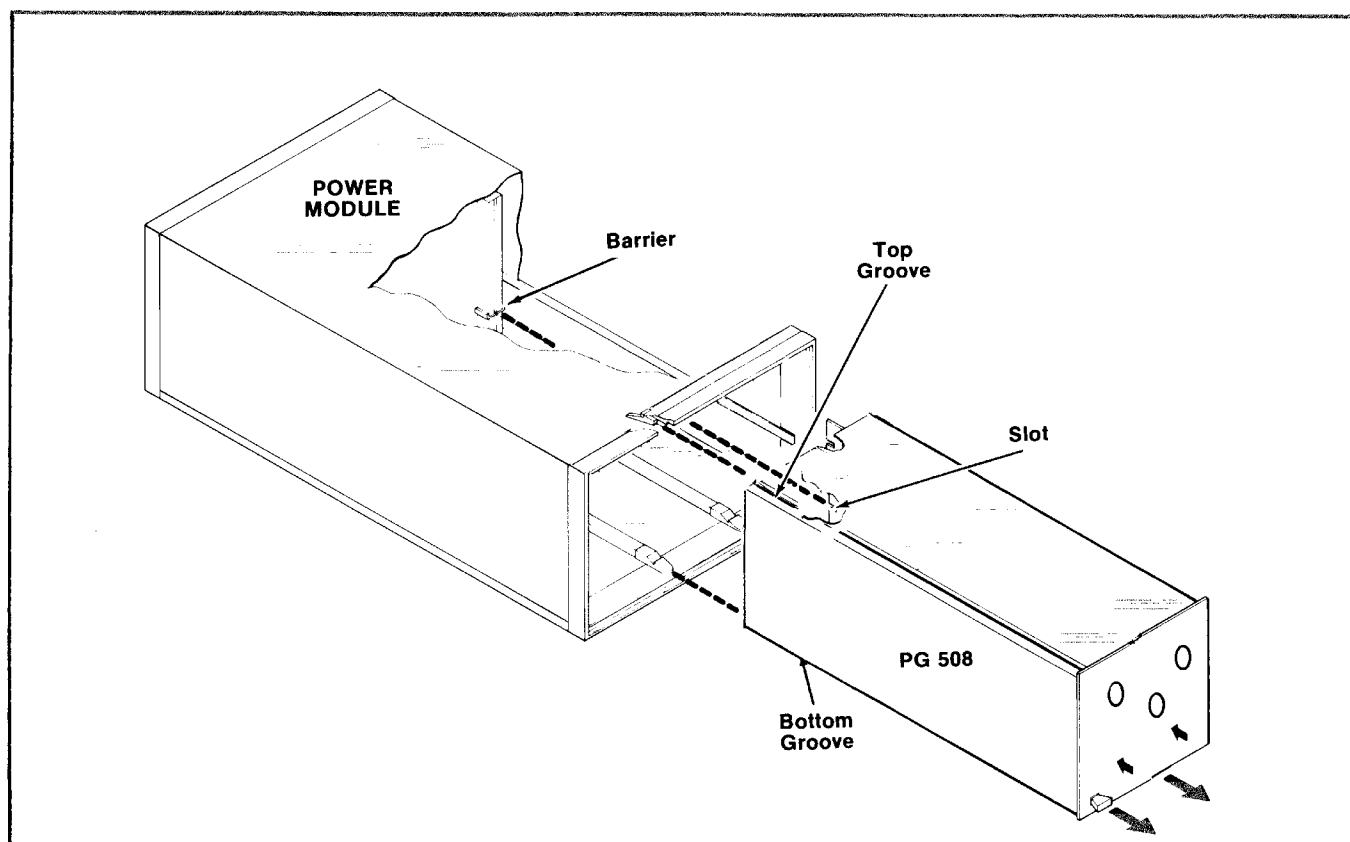


Fig. 1-1. PG 508 installation and Removal.

# BASIC OPERATION

## Period and Duration Selection

The period generator operates, in all modes except EXT TRIG or MAN, at a rate set by the PERIOD range switch and variable control. The duration of the output pulse is set by the DURATION range switch and variable control. When the DURATION control is set for a time greater than the PERIOD, the CONTROL ERROR lamp will light. When the DURATION control is set to the SQ WAVE position, the duration time is determined internally at approximately 50% of the period time.

The custom range positions on the PERIOD and DURATION controls permit user-selected period and duration times. To determine the approximate capacitor value for the desired period, multiply the period time in seconds by  $5 \times 10^{-3}$ . The result is the value of the capacitor in Farads. For example, a 50 ms period times  $5 \times 10^{-3}$  equals  $250 \times 10^{-6}$  or  $250 \mu\text{F}$ . This capacitor must be non-polarized and have at least a 6 V rating. Solder this capacitor in the position shown in Fig. 1-2.

To determine the capacitor value for the duration time desired, multiply the duration time by  $1 \times 10^{-2}$ . For example a 50 ms duration time requires 50 ms times  $1 \times$

$10^{-2}$  or a  $500 \mu\text{F}$  capacitor. If a polarized capacitor is used, observe the correct polarity. Use at least a 6 V rated capacitor. Connect this capacitor as shown in Fig. 1-2.

## Duty Factors

Duty factors greater than those specified are obtainable on several ranges. When the duty factor is increased to the point that internal circuitry prevents completion of the pulse waveform, the CONTROL ERROR light will flash. To further increase the duty factor, switch to the complement mode. Set the DURATION control for a pulse width equal to the desired pulse off time and push the front panel COMPLEMENT (—) pushbutton.

## Delayed and Paired Pulse Selection

In the pulse delay mode, the output pulse is delayed from the +TRIG OUT signal by the DELAY time selected plus a specified fixed delay. In the PAIRED mode of operation, the delay controls the time between the leading edges of the paired pulses. To use this feature push the DELAY button and trigger the external device from the +TRIG OUT jack. Set the DELAY control for the desired delay time from trigger to pulse leading edge. Use the variable control labeled CAL for time adjustments between steps or to increase the delay times beyond the steps.

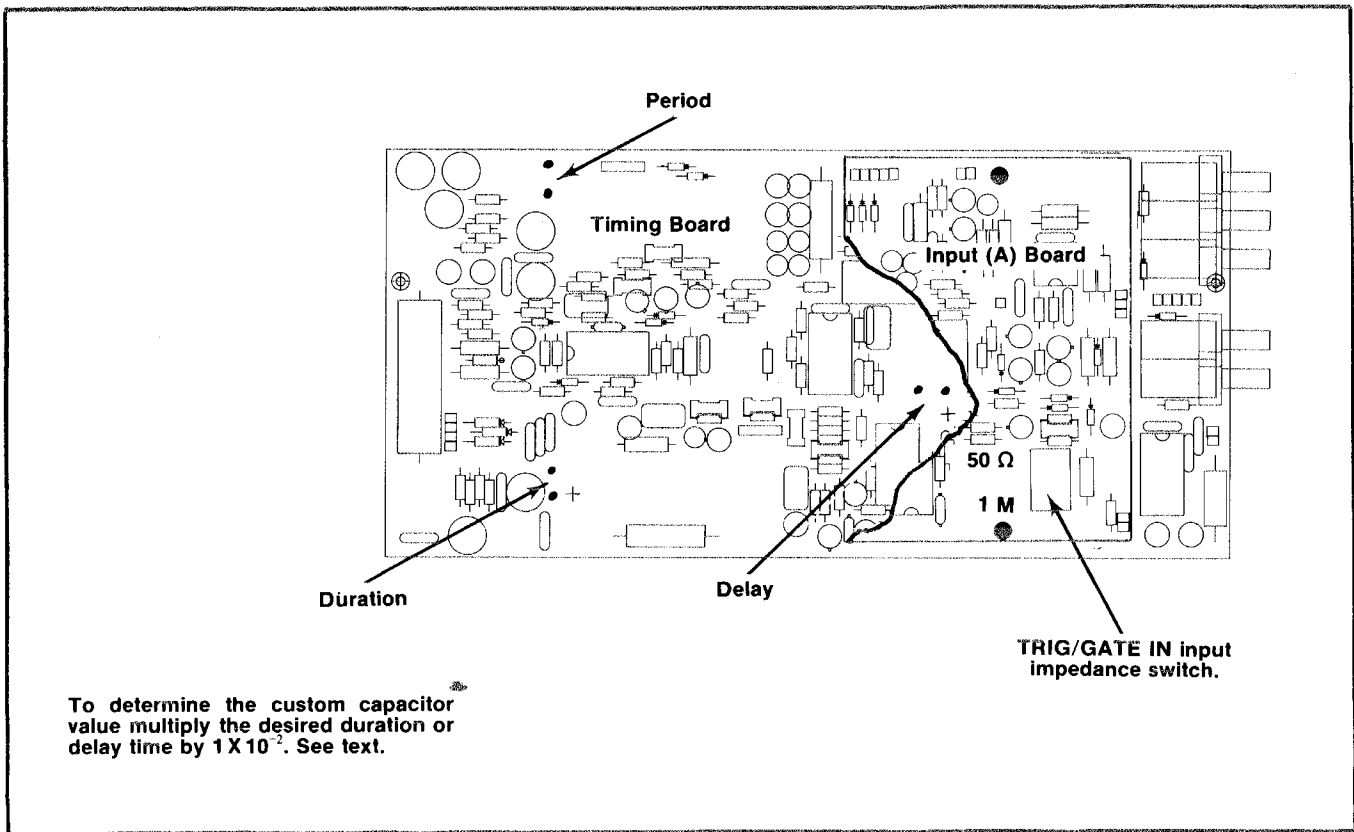


Fig. 1-2. Locations of period, delay and duration custom timing capacitors and TRIG/GATE IN input impedance switch. Remove the Input board to gain access to the delay pads.

Paired pulses are obtained by pushing both the DELAY and UNDLY buttons. An initial pulse now occurs at external trigger time with the second or paired pulse delayed by the selected delay time. The CONTROL ERROR light illuminates if the delay is too short or long for a valid pulse train. A custom delay position is provided on the DELAY switch. To determine the value of the capacitor required, multiply the desired delay time in seconds by  $1 \times 10^{-2}$ . For example, a 50 ms delay time requires a  $500 \mu\text{F}$  capacitor ( $50 \text{ ms} \times 1 \times 10^{-2}$ ). Use either a polarized or non-polarized capacitor with a rating of at least 6 V. If a polarized capacitor is used, observe the polarity markings. Remove the input board and connect the capacitor as shown in Fig. 1-2.

### Transition Time Selection

The leading and trailing times of the pulses may be varied by using the TRANSITION TIME control and the LEADING and TRAILING variable controls. Select the desired transition time range with the TRANSITION TIME control and vary the leading and trailing times independently with the LEADING and TRAILING controls.

A custom range position is also provided on the TRANSITION TIME control. To select the correct capacitor (in Farads) for this range, multiply the desired transition time (in seconds) measured from 10% to 90% points, by  $4.4 \times 10^{-3}$ . For example, a desired transition time of 50 ms requires a capacitor of  $220 \mu\text{F}$ . Connect the capacitor as shown in Fig. 1-3. Use a capacitor with at least a 10 V rating and observe polarity requirements.

When the transition times become large compared with the duration or period times and the pulse does not reach full amplitude, the CONTROL ERROR light will flash indicating improper control settings.

### Output Levels

The output amplitude and offset are selected by independent pulse LOW LEVEL and HIGH LEVEL controls. Use the front panel voltage calibration marks for an open circuit load and divide the values by two when the PG 508 is operating into a  $50 \Omega$  load. The OUTPUT (VOLTS) controls are interlocked to prevent setting the HIGH LEVEL more negative than the LOW LEVEL. It is also impossible to set the controls for more than about 20 V peak to peak output amplitude into an open circuit or 10 V into  $50 \Omega$ .

Pulse amplitude always equals the pulse high level minus the pulse low level. Offset may be the high level or the low level, whichever is used as the base line reference level. The flexibility of this method is useful in certain applications such as logic testing. Either the high or low level can be varied without disturbing the other.

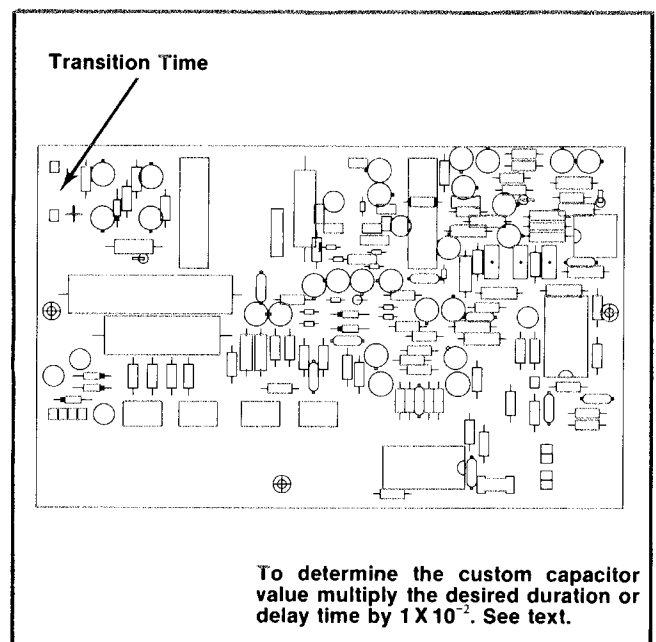


Fig. 1-3. Location for transition custom timing capacitor.

The pulse high and low levels can be preset. Push the PRESET button and adjust the HIGH LEVEL and the LOW LEVEL potentiometers with a screwdriver for the desired output levels.

### External Triggering and Gating

To change the TRIG/GATE IN input impedance remove the plug-in from the mainframe. Remove the left side cover. Set the slide switch, located on the Input board and labeled Input Impedance, to either the  $50 \Omega$  or the  $1 \text{ M}\Omega$  position. In the  $1 \text{ M}\Omega$  position the shunt capacitance is approximately  $20 \text{ pF}$ . A standard oscilloscope probe can be used to acquire the triggering signal from the external circuitry. If a compensated probe is used, calibrate the probe on the input of a  $1 \text{ M}\Omega$   $20 \text{ pF}$  oscilloscope first. A  $10\times$  probe allows triggering directly from high impedance sources such as MOS digital circuitry with an effective TRIG/GATE LEVEL range of  $\pm 30 \text{ V}$ .

For external gating select the desired period and duration. Press the SYNC GATE pushbutton. Select the desired trigger slope with the + or - SLOPE button. The OUTPUT now consists of pulses, described by the front panel controls, whenever the TRIG/GATE IN input exceeds the TRIG/GATE LEVEL control setting.

To externally trigger the PG 508, connect the triggering signal to the TRIG/GATE IN connector. Select the slope on which triggering is desired with the + or - SLOPE button. Place the PERIOD switch in the EXT TRIG OR MAN position. Now adjust the TRIG/GATE LEVEL control for the desired triggering level. The output waveform commences about 48 ns after the triggering signal.

## Operating Instructions—PG 508

For external DURATION place the DURATION control in the EXT DUR position, and the PERIOD control in the EXT TRIG OR MAN position. The period and duration of the output waveform are now controlled by the triggering waveform. This is an extremely useful mode of operation for translating logic levels, etc. If the PERIOD is set for internal operation and the DURATION for external, the CONTROL ERROR light illuminates indicating an illegal mode of operation.

The TRIG'D/GATED indicator light functions as a TRIG/GATE level indicator. When the +SLOPE is selected and the external input level exceeds the threshold set by the TRIG/GATE LEVEL control, the light is on continuously. For input voltages below the threshold the light is continuously off. When the input transits through the threshold the light flashes. When the -SLOPE is selected the light behaves as for +SLOPE selection. However, the polarities are reversed.

The TRIG'D/GATED indicator light may be used as a logic level indicator for troubleshooting logic circuitry. Set the TRIG/GATE LEVEL control to a voltage equal to the midrange value of the logic voltage swing. If an attenuator probe is used for signal pickup, remember to consider the attenuation factor when setting the TRIG/GATE LEVEL voltage.

### Trigger Output

The signal appearing at the connector is an approximate square wave. The leading edge (positive-going)

precedes the output pulse by a specified fixed delay plus the delay as set by the DELAY control. In paired pulse operation, the leading edge precedes the first pulse by the fixed delay. The second pulse then appears after the set delay. A complement square wave (negative-going leading edge) is also available at the front panel by moving a connector on the timing circuit board. See the illustration on the Rear Interface Connector Assignments at the rear of this manual for the location of this connector.

### Manual Trigger

To use this feature place the PERIOD switch in the EXT TRIG OR MAN position. Set the TRIG/GATE LEVEL control fully clockwise. If the +SLOPE is selected, the manual trigger will occur when the MAN button is depressed. If the -SLOPE is selected, the trigger occurs when the button is released. The manual trigger causes one output pulse, or a set of paired pulses if the DELAY and UNDLY buttons are depressed.

### Control Error Light

The CONTROL ERROR light helps to solve setup problems by indicating most control errors. A steady glow indicates static control setting errors while a flashing light indicates dynamic errors. In either case, the control settings do not correctly indicate the output. Check the control settings for compatibility. See Table 1-1. Dynamic functions monitored are period, delay, duration and transition time.

## OPERATING CONSIDERATIONS

### Output Terminations and Connections

The PG 508 operates as a voltage source in series with an internal 50  $\Omega$  impedance. Maximum pulse fidelity is obtained when the output operates into an external 50  $\Omega$  impedance. The output circuitry of the PG 508 is fully protected against any voltage transients when operating into passive loads.

Table 1-1 lists static control settings that illuminate the CONTROL ERROR light and their corresponding operating modes. Some of these modes may be useful.

If the load has a dc voltage across it, connect a blocking capacitor in series with the OUTPUT connector and the load. Make certain the time constant of the capacitor and load is large enough to maintain pulse top flatness.

TABLE 1-1

| Control Settings                         | Operation                            |
|--|--------------------------------------|
| EXT TRIG OR MAN and SYNC GATE            | External Trigger Mode                |
| EXT DUR and Internal Period              | Square Wave Mode                     |
| EXT TRIG OR MAN and SQ WAVE (INT PERIOD) | External Duration Mode               |
| SQ WAVE (INT PERIOD) and SYNC GATE       | Truncated square wave when gate ends |
| SQ WAVE (INT PERIOD) and DELAY           | No delay                             |
| EXT DUR and DELAY                        | No delay                             |

**Risetime Measurements in Linear Systems**

Consider the rise and falltime of associated equipment when measuring the rise or falltime of a linear device. If the risetime of the device under test is at least ten times slower than the combined risetimes of the PG 508, the monitoring oscilloscope, and associated cables, the error introduced will not exceed 1%, and usually may be ignored. If the rise or falltime of the test device is less than ten times slower than the combined risetimes of the testing systems, determine the actual risetime of the device under test by using the following formula:

$$R_t = \sqrt{R_1^2 + R_2^2 + R_3^2 + \dots}$$

$R_t$  equals the overall rise or falltime of the entire measurement system and  $R_1, R_2, R_3,$  etc., are the risetimes or falltimes of the individual components comprising the system.

**External Voltage Control**

The high and low level output voltages can be controlled externally through pins 22B and A at the rear interface connector. Fig. 1-4 shows the equivalent circuit.

Connections must be made from pad K to pad L and pad M to pad N located as shown on the adjustment location illustration in the fold out pages at the rear of this manual. Use ordinary hookup wire of the proper length. Solder the wire to the pads. Also note the location of the Ext Hi and Ext Lo potentiometers on the output board.

To use this feature, set the front panel controls as follows: depress the PRESET button (PRESET), place the PERIOD switch in the EXT TRIG OR MAN position, the DURATION in EXT DUR and the NORM COMPLEMENT switch in the NORM position (out). Use a screwdriver to center the Ext Hi and the preset HIGH LEVEL controls. Supply a voltage to the external high input (pin 22B on the rear interface connector) equal to the lowest external input voltage desired (maximum 20 V).

Now adjust the front panel preset HIGH LEVEL control for an OUTPUT voltage equal to the minimum desired output voltage. It may be necessary to adjust the preset LOW LEVEL control as the OUTPUT voltage is limited to 20 V peak to peak open circuit. The high level OUTPUT voltage is clamped by the low level OUTPUT voltage if this range is exceeded. Now apply a voltage equal to the highest external control voltage desired to the same rear interface connector (pin 22B). Adjust the Ext Hi potentiometer until the highest desired output voltage is obtained. It may be necessary to adjust the preset LOW LEVEL control to obtain the desired output. The high level OUTPUT voltage cannot go below the low level OUTPUT voltage due to the level control voltage clamps. The Ext Hi and the preset HIGH LEVEL controls interact. It may be necessary to repeat the above procedure several times until the desired results are obtained.

Now push the NORM COMPLEMENT switch (COMPLEMENT). Center the Ext Lo and preset LOW LEVEL potentiometers. Supply a voltage to pin 22A of the rear interface connector equal to the lowest external control voltage desired. Adjust the preset LOW LEVEL control for an OUTPUT voltage equal to the lowest OUTPUT voltage desired. Change this voltage to the highest desired external control voltage. Adjust the Ext Lo potentiometer for the highest OUTPUT voltage desired. As these adjustments interact, readjust the preset LOW LEVEL and the Ext Lo potentiometers for the desired results. Do not readjust the preset HIGH LEVEL or the Ext Hi potentiometers. The OUTPUT voltages now vary linearly and independently with the external control voltage.

**Counted Burst Using the DD 501 Digital Delay Unit**

This application permits preselecting the number of output pulses from the PG 508. The event is initiated by an externally applied signal or pulse, 5 ns or longer. The time duration of this signal or pulse has no effect on the output from the PG 508.

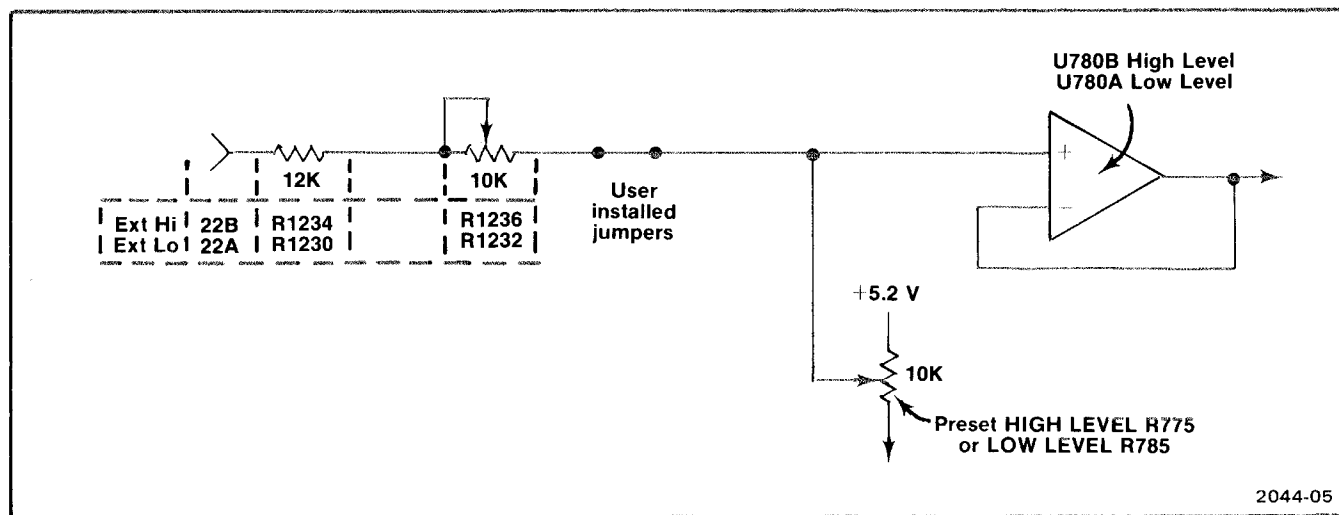


Fig. 1-4. Equivalent circuit of external input for output voltage control.



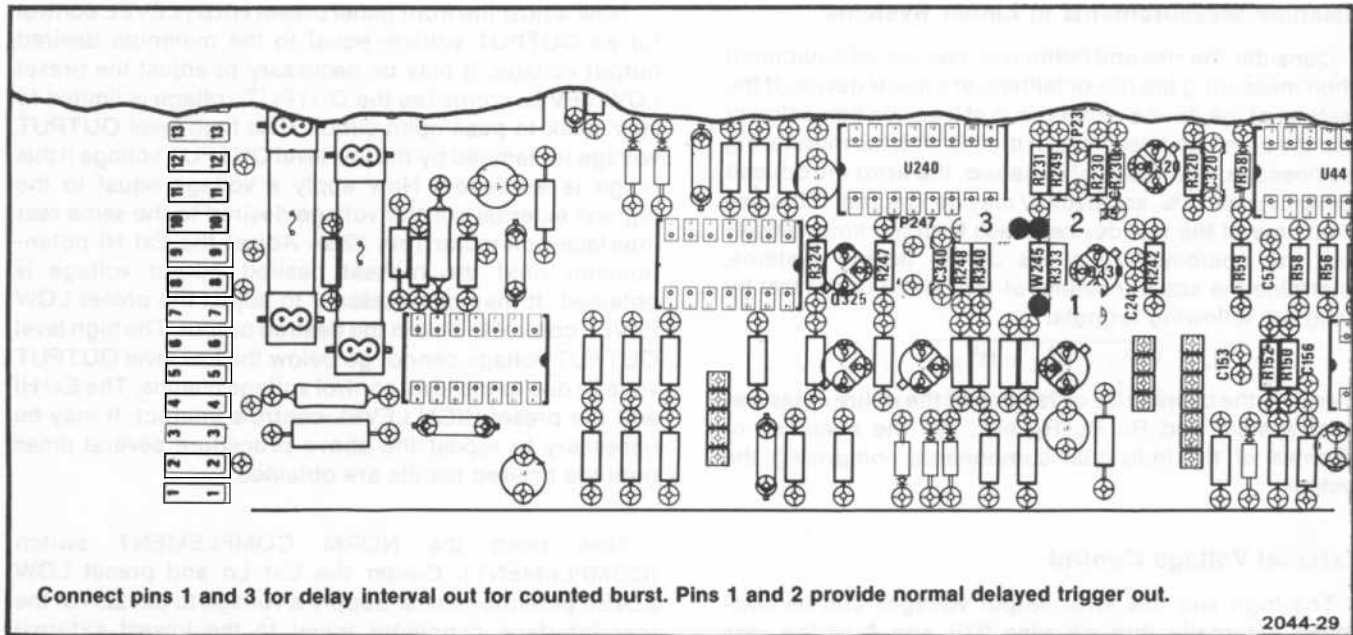


Fig. 1-5. Location of trigger jumpers in DD 501 for selecting trigger or delay interval output.

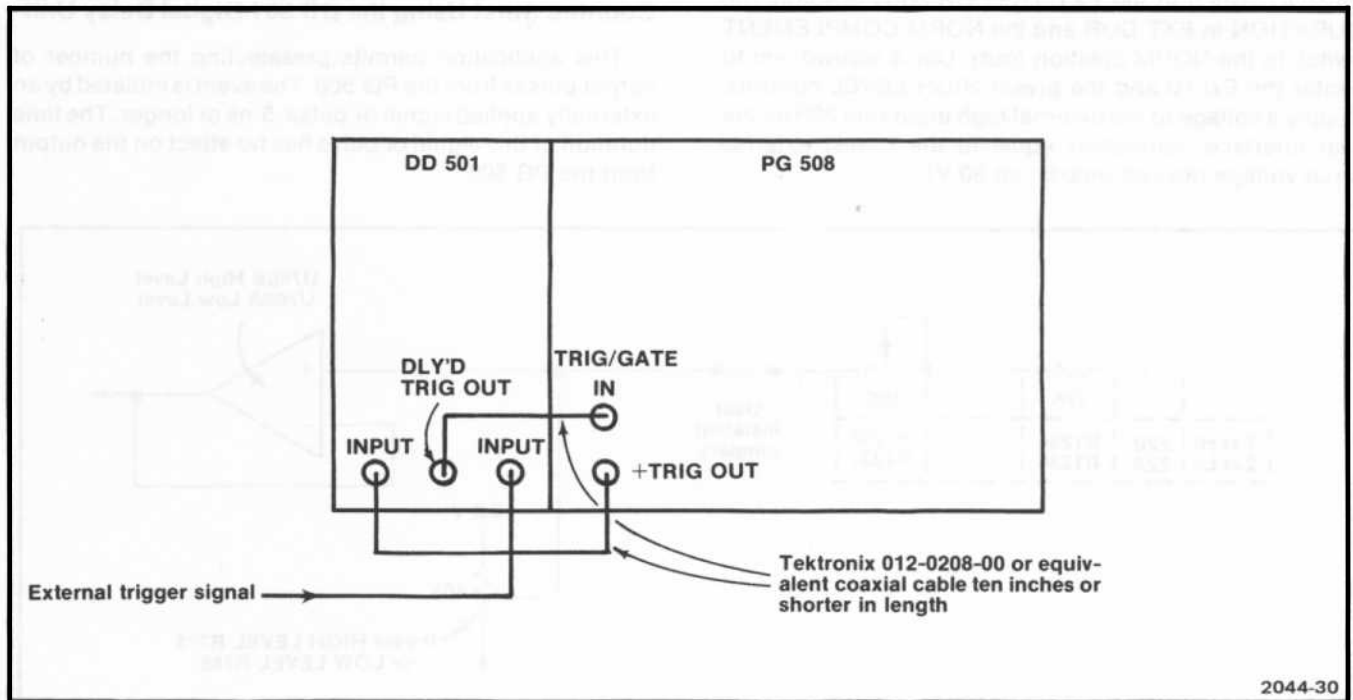


Fig. 1-6. PG 508-DD 501 interconnections for counted burst operation.

To use this feature, place the DD 501 in the delay interval mode of operation by moving the wire strap as shown in Fig. 1-5 or changing connections, depending on the DD 501 available. Connect the PG 508 and the DD 501 as shown in Fig. 1-6. Use ten inch (Tektronix Part Number 012-0208-00) or shorter cables for interconnecting the two units to reduce delays.

Make certain the PG 508 TRIG/GATE IN input impedance is set for 50  $\Omega$ . (See External Triggering and Gating discussion and Fig. 1-2.) Set the controls of the PG 508 for the desired output waveform with the PG 508 in FREE RUN. Do not use the SQ WAVE mode. Place the PG 508 in the + SLOPE, SYNC GATE mode and set the TRIG/GATE LEVEL control at the 2 o'clock position. Select EVENTS + SLOPE, START + SLOPE and place the EVENTS and START LEVEL controls at the 2 o'clock position on the DD 501. The three TRIG'D lights on the DD 501 and the TRIG'D/GATED light on the PG 508 will be off until the DD 501 is triggered. Upon receipt of a trigger, all lights will illuminate. If not, check the setup and slightly adjust the LEVEL controls as necessary.

Set the EVENTS DELAY COUNT on the DD 501 for one less than the desired number of counts up to PG 508 repetition rates of about 20 MHz. See below for further information. If necessary, a single trigger may be obtained by rotating the DD 501 START LEVEL control through the 0 position, with no external trigger applied. A single trigger may also be obtained by using the TEKTRONIX manual (One Shot) Trigger Generator, Tektronix Part Number 016-0597-00. All other DD 501 and PG 508 operating controls function normally.

Due to propagation delays in the PG 508, DD 501 and the interconnecting cables, one or more pulses in addition to the desired number are generated when the PG 508 repetition rates are set between 20 MHz and 50 MHz. These extra pulses are consistent for any given frequency irrespective of the desired EVENTS DELAY COUNT setting. To determine the number of extra pulses for a given PG 508 period, set the PG 508 and the DD 501 controls as previously described. Now adjust the PG 508 TRIG/GATE LEVEL or the DD 501 EVENTS LEVEL for the same number of extra pulses at DD 501 EVENTS DELAY COUNT setting of zero and nine.

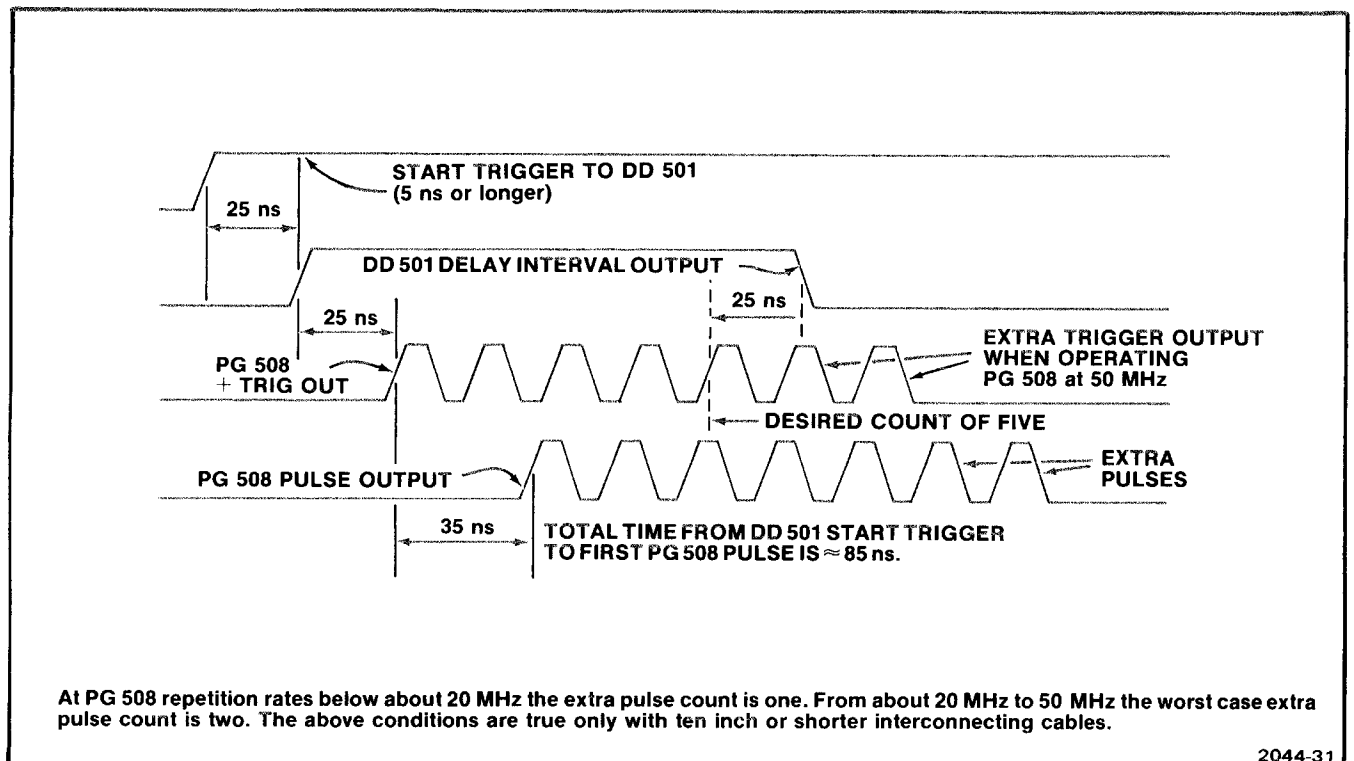


Fig. 1-7. Typical propagation delays using PG 508 with DD 501 in counted burst mode at 50 MHz repetition rate.

**Definitions of Pulse Characteristics**

The following is a glossary of common pulse characteristics used in this manual. They are illustrated in Fig. 1-8.

**Amplitude.** The maximum absolute peak value of a pulse measured from the baseline regardless of sign, and excluding unwanted aberrations or overshoot. Measurement points are at 50% of the pulse duration time (pulse high level) and on the baseline (pulse low level) at 50% of the off time (the pulse period minus the pulse duration).

**Aberrations.** Unwanted deviations or excursions in the pulse shape from an ideal square corner and flat top, i.e., overshoot, undershoot or rounding, ringing, and tilt or slope.

**Baseline.** The quiescent dc voltage reference level of the pulse waveform.

**Complementary Pulse.** Normal pulse with high and low levels interchanged. Pulse on-time becomes pulse off-time.

**Duty Factor.** Sometimes referred to as duty cycle. The ratio of pulse duration to period, or the product of pulse duration and pulse repetition rate. Duty factor in % = Duration/Period X 100.

**Falltime.** The time interval, at the pulse trailing edge, for the pulse amplitude to fall from the 90% amplitude level to the 10% amplitude level.

**Flatness.** The absence of long term variations to the pulse top; excluding overshoot, ringing or pulse rounding. Sometimes referred to as tilt or slope.

**High Level.** The most positive value of a pulse, regardless of unwanted aberrations or overshoot, measured at a point that is located at 50% of the pulse duration.

**Low Level.** The most negative value of a pulse, regardless of unwanted aberrations or overshoot, measured at a point that is 50% of the off time.

**Offset.** A dc potential of either polarity applied to the waveform to bias the baseline to an amplitude other than zero.

**Overshoot.** The short term pulse excursion (or transient) above the pulse top or below the baseline, which is simultaneous to the leading or trailing edge of the pulse.

**Period.** The time interval for a full pulse cycle, inverse of frequency or repetition rate, or the interval between corresponding pulse amplitudes of two consecutive undelayed or delayed pulses. Generally measured between the 50% amplitude levels of two consecutive pulses.

**Preshoot.** A transient excursion that precedes the step function. It may be of the same or opposite polarity as the pulse.

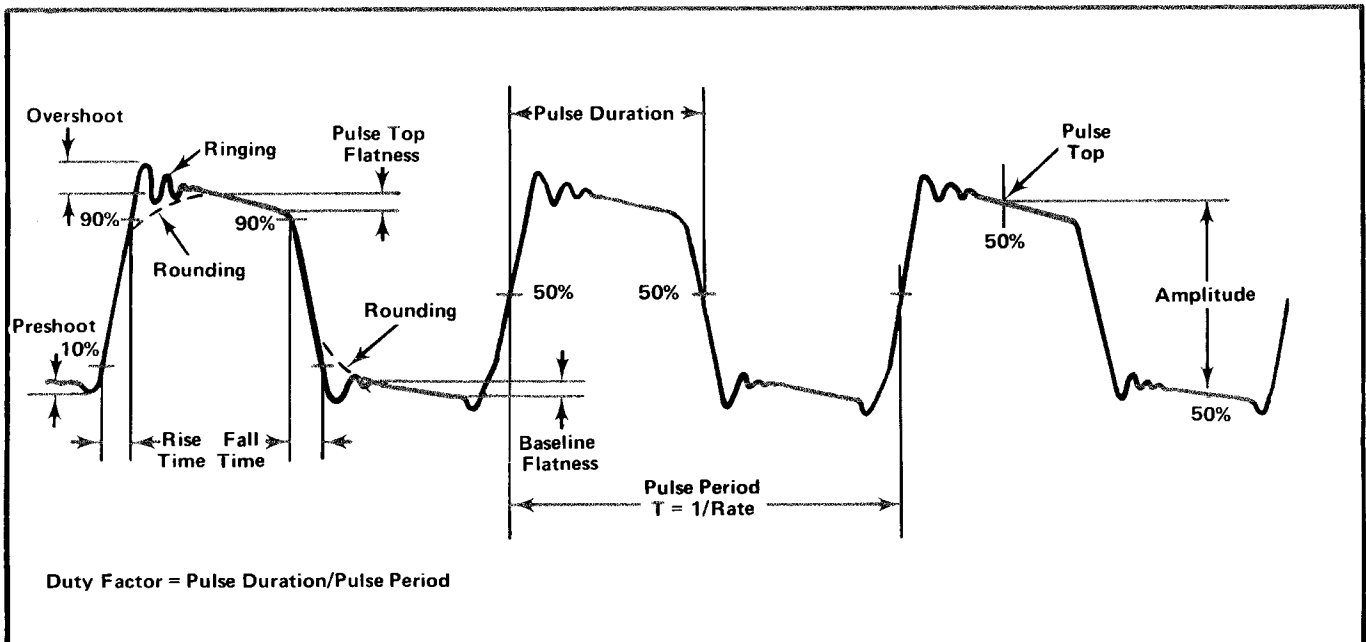


Fig. 1-8. Pulse characteristics.

**Pulse Duration.** The time interval between the leading and trailing edge of a pulse at which the instantaneous amplitude reaches 50% of the peak pulse amplitude.

**Polarity.** The direction from the baseline of the pulse excursion, either positive-going (+) or negative-going (-).

**Ringling.** Periodic aberrations that dampen in time, following the overshoot.

**Risetime.** The time interval, at the step function leading edge, for the pulse to rise from the 10% to 90% amplitude levels.

**Rounding or Undershoot.** The rounding of the pulse corners at the edges of a step function.

**Tilt or Slope.** A distortion of an otherwise flat-topped pulse, characterized by either a decline or a rise of the pulse top (see Flatness).

## SPECIFICATIONS

### PERIOD:

Range:  $\leq 20$  ns to  $\geq 200$  ms in seven decade steps plus variable, with overlap on all ranges. Periods longer than 200 ms can be obtained in custom range position.

Jitter:  $< 0.1\%$  +50 ps.

### DELAY: (Time between leading transitions in the paired pulse mode)

Range:  $\leq 10$  ns to  $\geq 100$  ms in seven decade steps plus variable, with overlap on all ranges. Delays longer than 100 ms can be obtained in custom range position.

Duty Factor: Delays to at least 70% of pulse periods for periods of  $0.2 \mu\text{s}$  or greater, decreasing to at least 50% for a 20 ns period.

Jitter:  $\leq 0.1\%$  to +50 ps.

### DURATION

Range:  $\leq 10$  ns to  $\geq 100$  ms in seven decade steps plus variable, with overlap on all ranges. Durations longer than 100 ms can be obtained in custom range position. An additional position provides durations of approximately 50% of the period setting for square wave output.

Duty Factor: Pulse durations to at least 70% of pulse periods for periods of  $\geq 0.2 \mu\text{s}$ , decreasing to at least 50% for a 20 ns period.

Jitter:  $\leq 0.1\%$  +50 ps.

### PULSE OUTPUT:

Transition Times: Independently adjustable leading and trailing transition times from  $\leq 5$  ns typical ( $\leq 7$  ns at some offset and amplitude levels) to  $\geq 50$  ms, measured from the 10% point to the 90% point, in six decade steps plus variable. Variable controls with 100:1 range (50:1 on 5 ns) provide overlap on all ranges. Transition times longer than 50 ms are obtainable in the custom range position.

Transition Linearity: Deviation from straight line  $\leq 5\%$  between the 10% and 90% point for transition times greater than 10 ns.

Amplitude: Pulse high and low levels independently adjustable over a  $\pm 20$  V range from a  $50 \Omega$  low reactance source. Maximum pulse amplitude into a  $50 \Omega$  load is  $\geq 10$  V peak to peak; minimum is  $\leq 0.5$  V peak to peak. Maximum pulse amplitude into an open circuit is  $\geq 20$  V peak to peak; minimum is  $\leq 1.0$  V peak to peak. The preset level controls are adjustable over the same ranges.

Aberrations:  $\leq 5\%$ , +50 mV into a  $50 \Omega$  load for pulse levels between  $\pm 5$  V. May increase to  $\leq 10\%$ , +50 mV for pulse levels outside this range.

### TRIGGER OUTPUT:

Amplitude:  $\geq +2$  V from  $50 \Omega$ .

## Operating Instructions—PG 508

Source Impedance: 50  $\Omega$ .

Duty Cycle:

Internal Triggering  $\approx 50\%$ .

External Triggering Determined by duty cycle of triggering signal.

### TRIGGER/GATE INPUT:

Sensitivity: 80 mV peak to peak to  $\geq 10$  MHz; 250 mV peak to peak to 50 MHz at 50  $\Omega$  input impedance.

Input Impedance: Internally selected, 50  $\Omega$  or 1 M $\Omega$  paralleled by  $\approx 20$  pF.

Maximum Input:  $\pm 5$  V peak into 50  $\Omega$ ,  $\pm 20$  V peak into 1 M $\Omega$ .

Minimum Input Pulse Width: 10 ns.

Trigger Level:

Polarity: Front panel selectable, + or - slope.

Range:  $\pm 3$  V.

### TRIG'D GATED LIGHT:

Flashing: Input triggered at greater than approximately a 10 Hz repetition rate or following the input signal at slower repetition rates.

On: (Logic True) TRIG/GATE IN input potential above TRIG/GATE LEVEL setting with + SLOPE selected or below TRIG/GATE LEVEL setting with - SLOPE selected.

Off: (Logic False) TRIG/GATE IN input potential below TRIG/GATE LEVEL with + SLOPE selected or above TRIG/GATE LEVEL with - SLOPE selected.

Synchronous Gate: Rate generator starts synchronously with external gating signal and completes the last output pulse.

### PULSE DELAY MODES:

Undelayed, delayed and paired. Paired pulse mode limited to 25 MHz. Minimum pulse separation governed by duration duty factor specification.

### FIXED DELAYS:

Trigger Out to Pulse Out:  $\approx 23$  ns.

Gate Input to Trigger Out:  $\approx 25$  ns.

### CONTROL ERROR LIGHT:

Steady On: Indicates invalid operating mode. Output is undefined.

Flashing: Timing control settings selected do not properly define the output pulse because valid limits have been exceeded.

Steady Off: Indicates valid operation for most control settings.

### POWER REQUIREMENT:

Nominal: 40 Watts

Maximum: 45 Watts

### POWER DISSIPATION:

Nominal: 25 Watts

Maximum: 28 Watts

WEIGHT: 3.5 lbs.



# THEORY OF OPERATION

## Introduction

Refer to the block diagram and the schematics in the foldout pages at the rear of this manual as well as the following discussion to understand the operation of the PG 508.

## Input Circuitry

This circuitry processes the external trigger or gating signal providing triggering waveforms for the period circuit. The 50  $\Omega$  input impedance for this circuitry is provided by R12, switched in or out by internal switch S12. When R12 is out of the circuit, the input impedance is 1 M  $\Omega$ , obtained by R14 and R16. Diodes CR16 and CR17 are protective diodes. The proper voltage at the drain of Q20 is set by VR20. The source voltage of Q20 is set by VR22. Impedance transformation, with no voltage shift, is obtained by source follower Q20. Constant current for Q20 is supplied by Q22. A differential comparator is formed by Q25 and Q26. This comparator compares the trigger or gate input level with the level set by the front panel TRIG/GATE control. Constant current for this comparator is provided by Q30. Level control voltage for the differential comparator is provided by operational amplifier U40. The output, pin 6, swings over a range of  $\pm 3$  V. The voltage at TP36 is the triggering level voltage, as set by the TRIG/GATE LEVEL control. If the triggering or gating voltage at the base of Q25 is more positive than TP36, then Q26 is conducting and Q25 is off. This places the collector of Q26 more positive than the collector of Q25. When the gating or triggering waveform level drops below TP36, Q25 conducts and Q26 turns off.

This switching waveform is applied to the bases of U60A and U60B, operating as a differential pair. The collector of U60A drives U60C in a cascode mode of operation. The collector of U60C drives the base of U60D which, as an emitter follower, drives the input of U70B. This gate operates as a dual input Schmitt trigger shaper. When the emitter of U60D goes to about 4.2 V above ground, pin 7 of U70B goes high. When the emitter of U60D drops to about 3.8 V, pin 7 of U70B drops to its low level. The inverting output terminal, pin 6, is always in the opposite state from pin 7. Positive feedback for this portion of the Schmitt is provided by R72. If the unit is manually triggered, pin 10 of U70B is momentarily connected to +5 V. Pin 10 of U70B, along with R75 and R76 now acts as a Schmitt shaper for the manual trigger. This action holds the output, pin 7, high and the inverting output, pin 6, low as long as the MAN button is depressed.

When the plus slope is selected for triggering or gating, +5 V is applied to pin 4 of U70A. This gate is now inhibited and the signal passes through U70C. As the outputs of U70A and C are connected together, a high on either output overrides the low. Pin 13 of U70C is low as long as the anodes of CR82 and CR84 are low, which occurs when the logic circuitry has enabled the input circuitry. When the control logic is set to disable the input circuitry, the anodes of these diodes are raised to +5 V which disables gates U70A and U70C.

Pin 12 of U70C now shifts between the high and low state corresponding with the input gate or trigger. The output from U70C, pin 14, is passed to the period circuitry. A high at the output of U70C turns the period circuitry off and a low starts the period generator.

## TRIG'D/GATED Light Circuitry

Transistors Q100, Q102, Q110 and their associated components compose the circuitry that operates the front panel TRIG'D/GATE light emitting diode. The pair Q100 and Q102 form a modified astable multivibrator, while Q110 operates as a voltage source. When the output of U70A or U70C is high (period generator off) or the logic circuitry has inhibited the input circuitry, the base of Q100 is high. This causes the base of Q102 to be low through R106. The collector of Q102 is now high and the light emitting diode is off. When the base of Q100 goes low, the base of Q102 goes high, the collector goes low and the light emitting diode illuminates. The light emitting diode circuitry follows the triggering gate up to about a 5 Hz rate, i.e., about 100 ms on and 100 ms off. At faster gating frequencies, C106 inhibits the changing states of this circuitry at about the 5 Hz rate.

## Triggered Mode

In the triggered mode of operation S200-2 is closed. This places a high on pin 10 of U140B locking pin 7 high and pin 6 low irrespective of the level on pin 11. This disables the period generator. Pin 15 of U140C now follows pin 4 of U140A in coincidence with the input triggering signal. Pin 14 of U140C drives Q244 and pin 15 drives Q240. The output from the collector of Q240 is in phase with the trigger or gate input signal providing the trigger output, and the phase of the waveform at the collector of Q244 is inverted.

### Period Generator

This circuitry generates the internal period timing waveform. In this mode, U140B operates as an astable multivibrator. When either input of U140B is high, pin 7 is high and pin 6 is low. The switched timing capacitances are connected from pin 7 to pin 11. These capacitors are switched by the period range switch. The period variable control, R190, varies the resistance in the negative feedback loop.

To start the period cycle, assume pin 7 of U140B goes high and pin 6 low. This positive step, at pin 7, is coupled through the period timing capacitor to pin 11. As the timing capacitor discharges through the resistances connected from pin 11 to pin 6, the voltage at pin 11 decays at a rate determined by the timing capacitor and these resistances. When the switching level (approximately 4 V) is reached, pin 7 goes low and pin 6 goes high. The negative step, at pin 7, is coupled through the timing capacitor, and appears at pin 11. The capacitor now charges through the resistances until the switching level is reached, and the period cycle repeats. The symmetry adjustment compensates for the bias current through pin 11.

When the PERIOD switch is in any position other than EXT TRIG (MAN), switch S200-2 is opened. This lowers pin 10 of U140B and permits the period generator to operate during the external gate on time. During the time of the external gating signal pins 4 and 2 of U140A are low. Pin 3 is high. As transistors Q150 and Q160 form a comparator, with their bases connected to pins 3 and 1 of U140A respectively, the collector of Q150 is low causing the emitter of Q175 to be low, as well as pin 11 of U140B. This allows the period generator to operate. During the gated off time this action reverses. Pin 11 of U140B rises and inhibits the period generator.

Resistor R170 and R165 adjust the lock up voltage at pin 11 of U140B so that, at turn on, the first period generated is identical in time with subsequent periods. Resistor R165 is switched into the circuit only on the 20 ns range. Components R177 and C177 form a time constant to help compensate for first period error.

### Delay Generator

This circuitry provides the delay for delayed or paired pulse operation. As the signal from the period generator of the external trigger input goes from high to low at pin 7 of U270B, pin 3 goes high. This causes pin 5 of U270A to go high and pin 2 low. Pin 13 of U270D and pin 9 of U300B go low. Pin 15 of U270D goes high but pin 10 of U300B does not follow until about 10 ns later, due to the delaying action of R275 and C275. When pin 9 of U300B goes low pin 6 goes high, assuming pin 11 is already low. Pin 6 stays

high until pin 10 goes high as described above. This action provides the delay generator with about a 10 ns trigger pulse under all input conditions.

The positive-going trigger pulse, at pin 5 of U300A, causes pin 3 to go low and pin 2 high. Positive feedback through R300 and C300 causes pin 4 to go high. The low at the base of Q320 turns Q320 off. The emitter of Q320 goes negative at a rate determined by the timing capacitor and current source Q342, with its variable emitter resistances. As the emitter of Q320 goes negative, it pulls the base of Q294 negative which lowers pin 4 of U300A. When pin 4 reaches the switching threshold ( $\approx 4.0$  V) pin 2 goes low and pin 3 high. The timing capacitor is now discharged through Q320. The monostable delay generator is now reset for the next trigger pulse. Transistor Q290 provides a constant load for the power supplies irrespective of the current flowing through Q294.

Components R304, R306 and C304 provide a delay line for the CONTROL ERROR light. The output from the delay generator is connected to pin 13 of U300C. Pin 15 of U300C is high during the delay time and pin 14 low. Gates U360B and D provide a positive-going trigger at pin 15 of U360D when the delay time ends. Gates U360A and C provide a positive-going trigger at pin 14 when the delay time starts. As the delay time starts, pin 4 of U360A goes low as does pin 11 of U360C. Pin 10 of U360C is low as the anode of CR378 is grounded through the UNDLY switch. The low at pin 11 of U360C allows pin 14 to go high. Pin 14 stays high until the propagation time through gate U360A and the delaying action of R364 and C366 allow the high generated in U360A, from pin 2, to reset U360C through pin 10. This causes pin 14 to return to its low state. The width of the output trigger pulse is about 6 ns.

To obtain the delayed trigger, the anode of CR378 is connected to +5 V disabling gate U360C. The anode of CR382 is grounded through the DLY switch. Gates U360B and U360D now operate in exactly the same manner as U360A and C. A positive trigger pulse appears on pin 15 of U360D when the delay time ends (pin 6 of U360B goes from high to low). In the paired pulse mode both gates operate. Gate U360C provides a positive-going trigger at the start of the delay time and U360D a positive trigger at the end of the delay time.

### Duration Generator

This circuitry generates the duration times. Gate U400B accepts the delayed or undelayed positive triggers from the delay generator. The result is a positive-going pulse at pin 5 of U400A. This triggers the duration generator which operates in the same manner as the delay generator. Refer to the discussion under the heading Delay Generator for a description of the duration generator operation. Gate U400C is an output buffer. Pin

12 goes high during the pulse duration time and if pin 13 is low, pin 15 goes high and pin 14 low. Pin 13 controls U400C in the square wave and external duration modes.

### Duration and Delay Control Error Light Circuitry

This circuitry illuminates the CONTROL ERROR light when the duration or delay times are greater than the periods of their respective triggers. The positive pulse from the duration generator is fed into the D input, pin 10, of U480A. The clock enable line is low. If the duration time is set so that a trigger pulse (connected to the clock in) for the next duration pulse occurs before the output of the duration generator goes low, the high on the D input, pin 10 of U480A, is transferred to the output, pin 1. This high is connected to the set input, pin 5, of U480B which causes the output, pin 2, of U480B to go high illuminating the error light. When the output, pin 2, of U480B goes high, the inputs to U480A and B are disabled through the clock enable line preventing further trigger inputs until both flip flops are reset. When the output, pin 2, of U480B goes and stays high, C487 starts to charge to the voltage on pin 2, through R490. This takes approximately 100 ms. When the reset inputs to U480A and B, pins 13 and 4, reach the high level (about 4.0 V) U480A and B are reset and C487 discharges through R490. When these reset inputs return to the low level both flip flops are ready to accept triggers and the error cycle is ready to repeat. If the delay time is set for a time greater than the period of the delay triggers, the high on pin 7 of U480B transfers to pin 2 directly, and the light is illuminated. Reset takes place in the same manner as described above. Also connected to this circuitry is a line from the transition time board which also lights the CONTROL ERROR light.

The CONTROL ERROR light is also illuminated for certain improper control settings. Fig. 2-1 shows a simplified schematic for the CONTROL ERROR indicator logic and control settings causing illumination.

### Variable Transition Time Circuitry

This circuitry controls the output transition times. Resistors R534 and R536 provide equivalent 50  $\Omega$  termination impedance for the normal (positive-going) input from the duration generator. Also, R520 and R522 provide an identical termination impedance for the complement input (negative-going) from the duration generator. These inputs drive the bases of Q525 and Q530. When the input from the duration generator is high and the complement is low, the collector of Q530 drops from ground to about  $-1/2$  V. This turns Q565 on and Q560 off. The adjustable constant current through Q545, to +15 V, is now passed through R578, from the  $-15$  V supply. Transistor Q560 is turned off as its base is connected to ground. Zener diodes VR620 and VR630 lower the voltage from the bases of Q565 and Q560 to the bases of Q625 and Q630 by about 7.5 V. Transistor Q625 is therefore off and Q630 is conducting. Current flows from  $-15$  V through an

adjustable current source Q635 and then through Q630 to charge the particular capacitor determined by the transition time selected. As the capacitor charges through a constant current source, the junction of CR584 and CR600 goes negative at a linear rate until the diode CR600 turns on. This diode serves as the negative clamp. The voltage at the anode of CR600 is set by R615 through Q608 and Q600. The voltage at the junction of CR584 and CR600 remains low for the pulse duration.

At the end of the pulse duration time, the collector of Q530 goes positive. This action turns Q565 off and Q560 on. Current from the +15 V supply flows through constant current source Q545, then through Q560 raising the junction of CR584 and CR600 at a linear rate determined by the capacitor value and the current available. The junction of CR584 and CR600 goes positive until CR584 turns on. The voltage at the cathode of CR584 is set by R570 through Q575 and Q580. Transistor Q625 is turned on, and Q630 off, passing current from constant current source Q635 through Q625, CR604, and R604 to ground. The leading and trailing transition times are varied independently by varying the amount of current passing through constant current source transistors Q635 and Q545.

The output waveform at the junction of CR584 and CR600 passes to the gate of fet Q680. This fet serves as a source follower for driving Q685 and Q690. These transistors compose a linear differential amplifier. The clamp levels for diodes CR584 and CR600 are set so that Q685 and Q690 are slightly overdriven. This serves to remove any ringing or other signal irregularities at the top and bottom of the waveform. Operational amplifier U665 provides, along with Q660, constant current for Q685 and Q690.

### Transition Time Control Error Light Circuitry

This circuitry illuminates the control error light when the leading transition time is greater than the pulse duration time, or when the trailing transition time is greater than the pulse off time. The inverted signal from the leading and trailing generator appears at the base of Q704 through fet follower Q700. A differential amplifier is formed by Q704 and Q706. The output is taken from the collector of Q706. Transistors Q704 and Q706 are overdriven to reduce the window of comparison. During the pulse on time, the base of Q704 is negative with respect to ground. This action causes the collector of Q706 to also go negative, driving the base of Q715, an emitter follower negative. The emitter of Q715 is connected to pins 7 and 10, the D input of flip flops U720A and B.

The waveforms driving the transition time circuitry are also applied to gates U740A and B. Pin 6 of U740B is high during pulse time while pin 4 of U740A is low. The purpose of the four gates in U740 is to delay the signal ap-

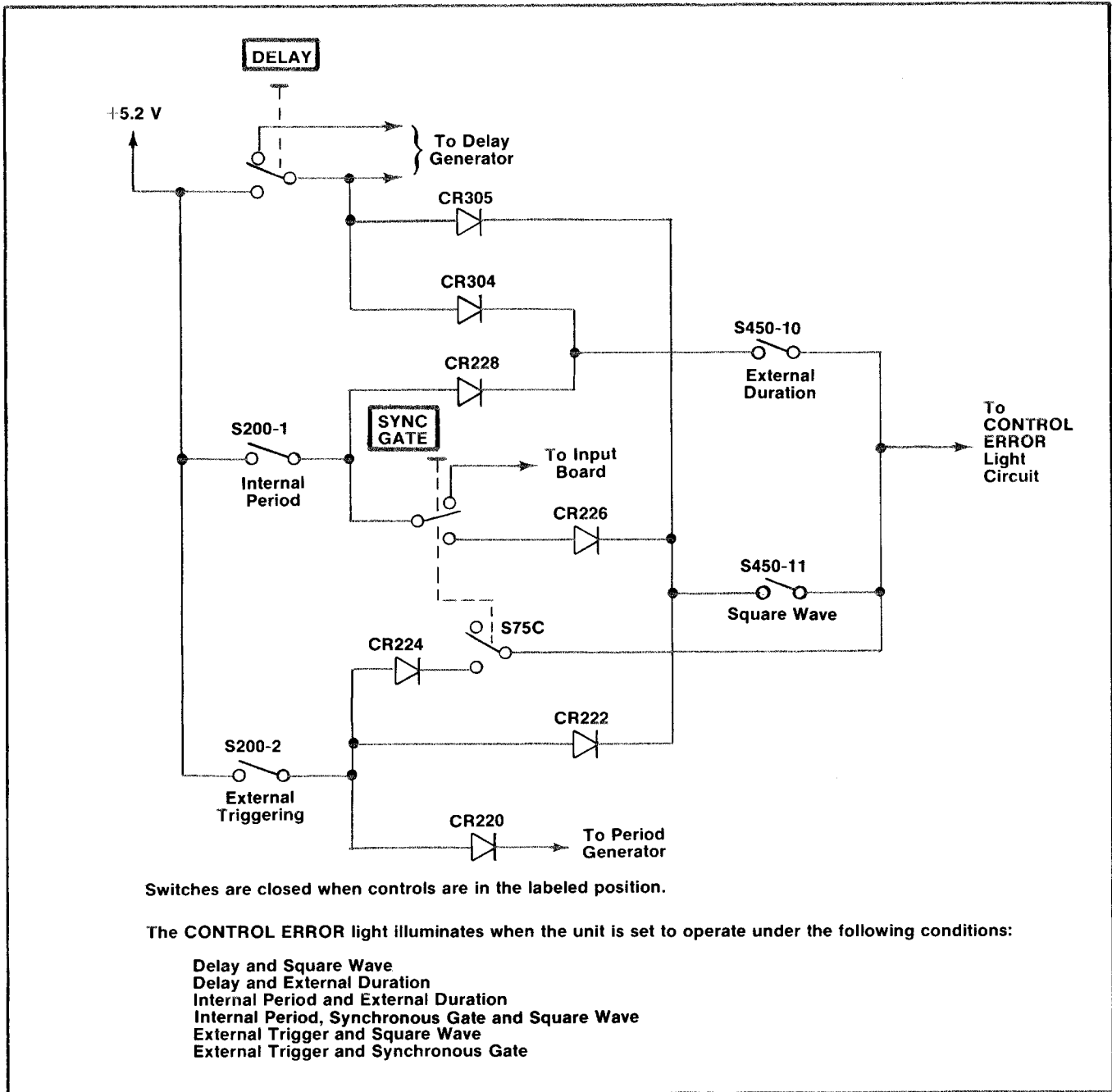


Fig. 2-1. Simplified schematic for CONTROL ERROR indicator logic with control settings causing illumination.

proximately the same amount as the circuitry in the variable transition time generator. The positive-going waveform from pin 14 of U740C is fed through pin 6 to the clock input, pin 6, of flip flop U720A. The negative-going output from pin 15 is fed to the clock input pin 11, of flip flop U720B. Flip flop U720A senses the pulse trailing timing error and U720B, the pulse leading timing error. If the leading time from the output of the variable transition time generator is slow enough so that the D input of U720B has not dropped below approximately the 50% point, when the waveform at the clock input of flip flop

U720B (waveform driving the transition time board) goes positive (end of pulse), the high on D input, pin 10, transfers to the output, pin 15, and the CONTROL ERROR lamp is lit.

When pin 15, of flip flop U720B goes high, C734 starts to charge through R728. When the voltage at pin 13 of U720B and pin 5 of U720A reaches the high level ( $\approx 4.0$  V), both flip flops are reset to their initial conditions and the CONTROL ERROR light goes out. If the trailing time of the

pulse is slow enough so that the D input of flip flop U720A has not reached the high level when the pulse at the clock terminal (pin 6) of flip flop U720A goes high (leading portion of the next pulse driving the transition circuitry) the 0 terminal, pin 3, of flip flop U720A goes high. This high is connected to the set terminal, pin 12, of U720B causing the 1 terminal of U720B to go high illuminating the CONTROL ERROR light. The on time and reset for this error indicating mode now proceeds as previously described.

### Level Control Multiplier

This circuitry provides independent top and bottom level control of the output pulse by controlling the amplitude and offset of the drive signal to the linear output amplifier. Also included is circuitry to accomplish the normal complement function and the preset function. Control voltage clamps to ensure the output amplifier is not over driven are also provided.

Amplitude control of the signal occurs in the analog multiplier, U850. The pulse signal provides the X input, and the level control voltages provide the Y input. The X·Y product of these inputs is converted to a drive current for the output amplifier.

Input and complement pulses from the variable transition time generator are applied to the bases of Q825 and Q840. These transistors form a differential amplifier, supplied by constant current source U800B and Q820. A positive-going signal at the base of Q825, with the complementary (negative-going) signal at the base of Q840 causes the signal current at pin 11 of the multiplier to go negative and the signal current at pin 12 to go positive. When the pulse polarity reverses, at the bases of Q825 and Q840, the signal current also reverses polarity at pins 11 and 12. The difference between the currents at pins 11 and 12 corresponds to the X signal input for the multiplier.

The total current flowing from pins 2 and 3 of U850 is essentially equal to the current required by the constant current source, U895A and Q900. However, the difference in currents between these pins corresponds to the Y input signal for the multiplier.

The amplitude difference of these currents is controlled by U895B. This is a dc differential amplifier which amplifies the difference between the high & low level control voltages to produce the Y input signal. Gain adjustment for the Y input signal is provided by R885.

The high and low level control voltages are determined by their respective front panel controls, R770B and R770A. If the preset function is selected, the preset high and preset low potentiometers, R775 and R785, provide the

control voltages. These voltages are buffered by unity gain amplifiers U780A and U780B. Both control voltages range between 0 and +5.2 V. When the control voltages are equal, the Y input is zero and the multiplier signal output (X·Y) equals zero. A difference of +2.6 V between the high and low level control voltages corresponds to maximum output amplitude from the pulse generator.

The normal complement switch inverts the level control voltage inputs to differential amplifier U895B. However, since the difference between the voltages is unchanged, the control voltage input signal has constant amplitude, but reverses polarity. This complements the pulse generator output. The normal complement balance adjustment, R910, ensures that the Y multiplier input responds equally to changes in either the high or low level control voltages.

The signal current at pins 5 and 6 of U850 is the pulse signal. Since Q845, in conjunction with U800B, provides a constant current sink, the current through R954, from the emitter of common base stage Q954, also contains signal current variations. The current driver for the output amplifier is Q954. The signal currents into pins 8 and 9 of U850 also contain the pulse signal. However constant current sink R847, and common base stage Q950 are included only as a balancing thermal load for the multiplier.

To obtain independent control of the output pulse high and low levels, the control voltages are averaged by resistor network R914, R915, R918 and R920. High and Low tracking potentiometers, R915 and R920, are adjustable to provide minimum interaction between pulse levels. The dc voltage from this network, along with the voltage from the offset adjustment R925, is summed and inverted by U930A. U930B provides further gain and level shifting and, in conjunction with Q945, serves as a level controlled offset generator. A dc current source to the collector of Q954 is provided by Q945. The collector of Q954 is the virtual ground input to the output amplifier.

When the high and low level control potentiometers are both at midrange (+2.6 V zero output) Q945 sources all the quiescent bias current required by Q954, which is approximately 15 mA. Therefore, there is no current drive to the output amplifier through R975 or R1055. If the high level control is turned fully cw (maximum output), the low level control voltage remains at +2.6 V. The high level control voltage increases to +5.2 V. This causes the voltage output of U930A to decrease, causing the offset generator U930B and Q945 to source approximately 20 mA. This is an increase of 5 mA. This difference in control voltage settings also causes maximum difference in the control voltage input signal to the multiplier. This action also causes 10 mA peak to peak signal current variations in the collector current of Q954. Since the signal current



## Theory of Operation—PG 508

variations and dc offset currents are summed at the collectors of Q945 and Q954, the output pulse high level changes to maximum voltage and the low level remains at 0 V.

It follows that any positive increase in either the high or low level control voltages causes an increase in the dc offset current. A decrease in either control voltage causes a decrease in offset current. However, signal current variations respond only to differences between these control voltages. The larger the voltage difference, the larger the signal current amplitude into the output amplifier.

Since the dynamic range of the pulse generator output is + or - 20 V, and the maximum amplitude is only 20 V peak to peak, clamping circuits are provided to prevent the difference between the high and low level control voltages from exceeding +2.6 V, which corresponds to maximum output. A clamping circuit also prevents the high level from becoming less than the low level control voltage.

The level control unity gain amplifiers U780A and U780B contain a precision diode clamp composed of CR782, CR790, R780, and R782. Since the feedback for U780A is taken from the cathode of CR790, the voltage at the junction of CR782 and CR790 is equal to the low level control voltage plus one diode drop (CR790). If the high level attempts to decrease below the low level or attempts to increase above the high level control voltage, CR782 conducts clamping the high level at the low level voltage. Current limiting for U780B, during clamping, is provided by R780.

U800A is also configured as a precision clamping circuit. The output at pin 1 is equal to the low level control voltage plus 2.6 V plus one diode drop. Therefore, if the high level voltage attempts to exceed the low level plus 2.6 volts, or the low level is decreased more than 2.6 V below the high level, CR805 conducts and the high level is clamped at the low level control voltage plus 2.6 volts. The low level control always overrides the high level control. Current limiting for U780B, during clamping, is provided by R780.

### Output Amplifier

The positive and negative dc voltages for this amplifier are provided by dual power supplies which track the high and low level control voltages. These tracking supplies ensure that the positive potential is at least 6 V above the output pulse high level and the negative potential is at least 6 volts below the output pulse low level. This arrangement enables the pulse generator to provide a 40 V dynamic range, with a 20 V peak to peak maximum output pulse, while maintaining minimum power dissipation and

voltage requirements for the amplifier transistors. The range of the positive tracking supply is +6 to +26 V, with a -6 to -26 V range for the negative supply.

The output circuit functions as a linear current driven operational amplifier with a closed loop transresistance gain of 2 V/mA. Negative feedback through R1042 to the input node (collectors of Q945 and Q954) causes a virtual ground at the input. A 10 mA peak to peak input signal creates a 20 V peak to peak output pulse (open circuit).

Since the output amplifier is a complementary circuit, only the operation of one side will be explained.

For a positive-going output pulse, current is driven into the input node. This action causes an increase in base current to Q975 which decreases the base drive to Q980. A cascode circuit is formed by Q980 and Q990, with R985 and L980 serving as a constant current source to the common collector-emitter connection. Therefore, when the base drive to Q980 is decreased, the current in Q990 increases. (The constant current source supplies approximately 60 mA which, with no signal, is equally divided between Q980 and Q990.) Another constant current source, Q1000, causes a 2.0 V drop across R1002. The emitter follower, Q995, buffers this potential and provides a voltage source for the base of the cascode transistor, Q990. An increasing current through Q990 increases the base current from the output parallel emitter followers, Q1010 and Q1015. The emitters of these transistors drive the output positive through a network of resistors and capacitors. Components R1020, R1024, and C1024, in this network, are adjustable to provide an internal resistive 50  $\Omega$  termination for the output. Network C1048 and R1048, with potentiometer R1050, provides transient response peaking for the amplifier.

Equivalent biasing for the complementary output emitter followers is provided by CR990, R990, and CR992. With zero output, the quiescent current in each output follower is approximately 20 mA. The output potential is available at the rear interface connector, pin 25A, for monitoring the output amplitude.

### Power Supply

The +11.5 Vdc from the mainframe provides the raw supply voltage for the series regulated +5.2 Vdc supply. The precision voltage regulator, U1210, includes a temperature compensated voltage reference supply at pin 6. The +5.2 V potentiometer, R1210, with the voltage divider R1209 and R1211 provides the reference input to the non-inverting input, pin 5. The output voltage is applied to the inverting input, pin 4, through R1217. Sensing differences in the two input potentials, the regulator amplifier provides base current drive from pin 10

to the mainframe transistor used as the series pass element, until the inverting and non-inverting inputs are approximately equal. At this condition, the series pass transistor drops the voltage from the raw supply until the output is +5.2 V. Current limiting is provided by R1215. When the current from the supply exceeds approximately 1.1 A, the regulator provides no further base drive current to the series pass element and current limiting occurs.

The +33.5 Vdc from the mainframe is the raw supply for the regulated +15 Vdc. The 3-terminal voltage regulator, U1205, performs the entire regulating function. Current limiting occurs within U1205.

The -33.5 Vdc from the mainframe is the raw supply for the regulated -15 Vdc. As in the +15 Vdc supply a 3-terminal voltage regulator, U1335, provides the regulating function. However, due to additional load considerations, the raw supply is pre-regulated to decrease power dissipated by the integrated circuit. A shunt current path to the load is furnished by VR1330 and R1330. The zener voltage is also used to maintain base drive to the series pass mainframe transistor. This transistor is used as a pre-regulator to drop the voltage across U1335 to approximately 3.6 V. Current limiting is also provided by the regulator, U1335.

The dual tracking supplies provide the positive and negative voltages required by the output amplifier. The voltage at the base of Q1255 varies from 0 V to +5.2 V depending on the setting of the HIGH LEVEL control. When the voltage at the base of Q1255 varies from 0 V to +2.6 V, the voltage at the collector of the series pass transistor is +6 V. As the voltage at the base of Q1255 varies from +2.6 V to +5.2 V, the voltage at the collector of the series pass transistor varies from +6 V to +26 V.

Transistor Q1255 and Q1270 form a differential comparator. The voltage at the base of Q1270 is referenced between the +5.2 V supply, ground and the output

voltage. As the HIGH LEVEL control is moved in the positive direction, the collector of Q1255 goes negative. This increases current flow through Q1280 and therefore the series pass transistor in the mainframe which raises the + tracking supply voltage to the output amplifier. Feedback to the differential comparator is provided by R1275. Transistor Q1265 prevents the +V tracking supply from going lower than about +6 V. The base of Q1265 is set at about 2.6 V. When the base of Q1255 goes more negative than about 2.6 V, Q1265 comes into conduction holding the common emitter circuit at one diode drop from the base of Q1265. If the base of Q1255 is lowered further, Q1255 loses control of the circuit and the supply voltage remains at the level determined by Q1265, +6 V.

Current limiters for this circuit are Q1285, Q1290 and Q1300. A differential comparator is formed by Q1285 and Q1290. If the load on the +V supply exceeds the maximum current allowed for the voltage supplied, the voltage drop across R1282 becomes great enough that Q1285 comes into conduction. This action increases conduction in Q1270 reducing the current flow in Q1255. Finally, the conduction through the series pass transistor is limited to a safe value. The current through Q1300 is determined by the actual supply output voltage. Therefore, the current limit varies proportionally with the supply voltage. In most overload conditions, the supply folds back to minimum current. Diode CR1310 conducts should the +V supply go more negative than ground.

The -V supply operates in the same manner as the +V supply. Only the polarities are reversed. Transistors Q1355 and Q1370 are the basic comparator transistors. The base of Q1355 varies between 0 V and +5.2 V. The -V output is prevented from going more positive than about -6 V by Q1365. The series pass transistor is driven by Q1380. The comparator transistors for the current limiting circuitry are Q1385 and Q1395. The current source for the current comparator is Q1400. Diode CR1410 prevents the -V output from going more positive than ground.

# REPLACEABLE ELECTRICAL PARTS

## PARTS ORDERING INFORMATION

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

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

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

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

## 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           | 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 COMPANY, INDUSTRIAL AND POWER CAPACITOR PRODUCTS DEPARTMENT | JOHN STREET                             | HUDSON FALLS, NY 12839 |
| 01121     | ALLEN-BRADLEY COMPANY  | 1201 2ND STREET SOUTH                   | MILWAUKEE, WI 53204    |
| 01282     | PARKER STEARNS AND CO., INC.   | 300 SHEFFIELD AVENUE                    | BROOKLYN, NY 11207     |
| 03508     | GENERAL ELECTRIC COMPANY, SEMI-CONDUCTOR PRODUCTS DEPARTMENT                 | ELECTRONICS PARK                        | SYRACUSE, NY 13201     |
| 04713     | MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.                                     | 5005 E MCDOWELL RD, PO BOX 20923        | PHOENIX, AZ 85036      |
| 07910     | TELEDYNE SEMICONDUCTOR   | 12515 CHADRON AVE.                      | HAWTHORNE, CA 90250    |
| 12697     | CLAROSTAT MFG. CO., INC.   | LOWER WASHINGTON STREET                 | DOVER, NH 03820        |
| 13511     | AMPHENOL CARDRE DIV., BUNKER RAMO CORP.                                      |   | LOS GATOS, CA 95030    |
| 14752     | ELECTRO CUBE INC.  | 1710 S. DEL MAR AVE.                    | SAN GABRIEL, CA 91776  |
| 24931     | SPECIALTY CONNECTOR CO., INC.  | 3560 MADISON AVE.                       | INDIANAPOLIS, IN 46227 |
| 27014     | NATIONAL SEMICONDUCTOR CORP.   | 2900 SEMICONDUCTOR DR.                  | SANTA CLARA, CA 95051  |
| 32997     | BOURNS, INC., TRIMPOT PRODUCTS DIV.  | 1200 COLUMBIA AVE.                      | RIVERSIDE, CA 92507    |
| 53184     | XCITON CORPORATION   | 5 HEMLOCK STREET                        | LATHAM, NY 12110       |
| 55210     | GETTIG ENG. AND MFG. COMPANY   | PO BOX 85, OFF ROUTE 45                 | SPRING MILLS, PA 16875 |
| 56289     | SPRAGUE ELECTRIC CO.   |   | NORTH ADAMS, MA 01247  |
| 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 |
| 79727     | C-W INDUSTRIES   | 550 DAVISVILLE RD., P O BOX 96          | WARMINISTER, PA 18974  |
| 80009     | TEKTRONIX, INC.  | P O BOX 500                             | BEAVERTON, OR 97077    |
| 80031     | ELECTRA-MIDLAND CORP., MEPCO DIV.  | 22 COLUMBIA ROAD                        | MORRISTOWN, NJ 07960   |
| 90201     | MALLORY CAPACITOR CO., DIV. OF P. R. MALLORY AND CO., INC.                   | 3029 E WASHINGTON STREET<br>P O BOX 372 | INDIANAPOLIS, IN 46206 |
| 91637     | DALE ELECTRONICS, INC.   | P. O. BOX 609                           | COLUMBUS, NE 68601     |

| Kct No. | Tektronix Part No. | Serial/Model No. Eff | Dscont   | Name & Description                       | Mfr Code | Mfr Part Number  |
|---------|--------------------|----------------------|----------|--|----------|------------------|
| A1      | 670-4273-00        | B010100              | B020244  | CKT BOARD ASSY: INPUT                    | 80009    | 670-4273-00      |
| A1      | 670-4273-01        | B020245              |          | CKT BOARD ASSY: INPUT                    | 80009    | 670-4273-01      |
| A2      | 670-4274-00        | B010100              | B020244  | CKT BOARD ASSY:TIMING                    | 80009    | 670-4274-00      |
| A2      | 670-4274-01        | B020245              | B029999  | CKT BOARD ASSY:TIMING                    | 80009    | 670-4274-01      |
| A2      | 670-4274-02        | B030000              |          | CKT BOARD ASSY:TIMING                    | 80009    | 670-4274-02      |
| A3      | 670-4275-00        | B010100              | B020244  | CKT BOARD ASSY:TRANSITION TIMING         | 80009    | 670-4275-00      |
| A3      | 670-4275-01        | B020245              | B029999  | CKT BOARD ASSY:TRANSITION TIMING         | 80009    | 670-4275-01      |
| A3      | 670-4275-02        | B030000              |          | CKT BOARD ASSY:TRANSITION TIMING         | 80009    | 670-4275-02      |
| A4      | 670-4276-00        | B010100              | B020698  | CKT BOARD ASSY:OUTPUT                    | 80009    | 670-4276-00      |
| A4      | 670-4276-01        | B020699              |          | CKT BOARD ASSY:OUTPUT                    | 80009    | 670-4276-01      |
| A5      | 670-4272-00        |                      |          | CKT BOARD ASSY:AUXILIARY                 | 80009    | 670-4272-00      |
| C14     | 281-0518-00        |                      |          | CAP., FXD, CER DI:47PF, +/-9.4PF, 500V   | 72982    | 301-000U2J0470M  |
| C36     | 283-0178-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 100V   | 72982    | 8131N145 E 104Z  |
| C40     | 283-0178-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 100V   | 72982    | 8131N145 E 104Z  |
| C55     | 283-0178-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 100V   | 72982    | 8131N145 E 104Z  |
| C70     | 283-0178-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 100V   | 72982    | 8131N145 E 104Z  |
| C76     | 283-0000-00        |                      |          | CAP., FXD, CER DI:0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C104    | 283-0000-00        |                      |          | CAP., FXD, CER DI:0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C106    | 290-0535-00        |                      |          | CAP., FXD, ELCTLT: 33UF, 20%, 10V        | 56289    | 196D336X0010KA1  |
| C110    | 283-0178-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 100V   | 72982    | 8131N145 E 104Z  |
| C140    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C142    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C154    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C170    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C171    | 281-0540-00        | B010100              | B010124X | CAP., FXD, CER DI: 51PF, 5%, 500V        | 72982    | 301-000U2J0510J  |
| C172    | 283-0111-00        |                      |          | CAP., FXD, CER DI:0.1UF, 20%, 50V        | 72982    | 8121-N088Z5U104M |
| C177    | 283-0663-00        |                      |          | CAP., FXD, MICA D:16.8PF, +/-0.5PF, 500V | 00853    | D155C16.8D0      |
| C180    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C200    | 290-0722-00        |                      |          | CAP., FXD, ELCTLT:100UF, 20%, 10V        | 56289    | 196D107X0010PE3  |
| C201    | 290-0722-00        |                      |          | CAP., FXD, ELCTLT:100UF, 20%, 10V        | 56289    | 196D107X0010PE3  |
| C202    | 290-0722-00        |                      |          | CAP., FXD, ELCTLT:100UF, 20%, 10V        | 56289    | 196D107X0010PE3  |
| C203    | 290-0722-00        |                      |          | CAP., FXD, ELCTLT:100UF, 20%, 10V        | 56289    | 196D107X0010PE3  |
| C205    | 290-0536-00        |                      |          | CAP., FXD, ELCTLT:10UF, 20%, 25V         | 90201    | TDC106M025FL     |
| C206    | 290-0536-00        |                      |          | CAP., FXD, ELCTLT:10UF, 20%, 25V         | 90201    | TDC106M025FL     |
| C207    | 290-0536-00        |                      |          | CAP., FXD, ELCTLT:10UF, 20%, 25V         | 90201    | TDC106M025FL     |
| C208    | 290-0536-00        |                      |          | CAP., FXD, ELCTLT:10UF, 20%, 25V         | 90201    | TDC106M025FL     |
| C210    | 285-0576-00        |                      |          | CAP., FXD, PLSTC:1UF, 10%, 100V          | 56289    | 410P10591        |
| C212    | 285-0703-00        |                      |          | CAP., FXD, PLSTC:0.1UF, 5%, 100V         | 56289    | 410P10451        |
| C214    | 285-0598-00        |                      |          | CAP., FXD, PLSTC:0.01UF, 5%, 100V        | 01002    | 61F10AC103       |
| C216    | 283-0645-00        |                      |          | CAP., FXD, MICA D:790PF, 1%, 100V        | 00853    | D151E791F0       |
| C218    | 281-0540-00        |                      |          | CAP., FXD, CER DI:51PF, 5%, 500V         | 72982    | 301-000U2J0510J  |
| C244    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C260    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C270    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C275    | 283-0636-00        | B010100              | B010124  | CAP., FXD, MICA D:36PF, 1.4%, 100V       | 00853    | D155F360G0       |
| C275    | 283-0634-00        | B010125              |          | CAP., FXD, MICA D:65PF, 1%, 100V         | 00853    | D151E650F0       |
| C277    | 283-0000-00        |                      |          | CAP., FXD, CER DI:0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C279    | 283-0000-00        |                      |          | CAP., FXD, CER DI:0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C296    | 283-0081-00        |                      |          | CAP., FXD, CER DI:0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C300    | 281-0509-00        |                      |          | CAP., FXD, CER DI:15PF, +/-1.5PF, 500V   | 72982    | 301-000C0G0150K  |
| C304    | 283-0634-00        | B010100              | B020244X | CAP., FXD, MICA D:65PF, 1%, 100V         | 00853    | D151E650F0       |
| C317    | 281-0516-00        |                      |          | CAP., FXD, CER DI:39PF, +/-3.9PF, 500V   | 72982    | 301-000U2J0390K  |



Replaceable Electrical Parts—PG 508

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont   | Name & Description                        | Mfr Code | Mfr Part Number  |
|---------|--------------------|----------------------|----------|---|----------|------------------|
| C325    | 281-0504-00        |                      |          | CAP., FXD, CER DI: 10PF, +/-1PF, 500V     | 72982    | 301-055C0G0100F  |
| C326    | 283-0677-00        |                      |          | CAP., FXD, MICA D: 82PF, 1%, 500V         | 00853    | D155E820F0       |
| C328    | 283-0594-00        |                      |          | CAP., FXD, MICA D: 0.001UF, 1%, 100V      | 00853    | D151F102F0       |
| C330    | 285-1049-00        |                      |          | CAP., FXD, PLSTC: 0.01UF, 1%, 200V        | 14752    | 230B1C103F       |
| C332    | 285-0703-00        |                      |          | CAP., FXD, PLSTC: 0.1UF, 5%, 100V         | 56289    | 410P10451        |
| C334    | 285-0576-00        |                      |          | CAP., FXD, PLSTC: 1UF, 10%, 100V          | 56289    | 410P10591        |
| C336    | 290-0536-00        |                      |          | CAP., FXD, ELCTLT: 10UF, 20%, 25V         | 90201    | TDC106M025FL     |
| C338    | 290-0722-00        |                      |          | CAP., FXD, ELCTLT: 100UF, 20%, 10V        | 56289    | 196D107X0010PE3  |
| C346    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C360    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C366    | 283-0635-00        | B010100              | B010124  | CAP., FXD, MICA D: 51PF, 1%, 100V         | 00853    | D151E510F0       |
| C366    | 283-0634-00        | B010125              |          | CAP., FXD, MICA D: 65PF, 1%, 100V         | 00853    | D151E650F0       |
| C375    | 283-0635-00        | B010100              | B010124  | CAP., FXD, MICA D: 51PF, 1%, 100V         | 00853    | D151E510F0       |
| C375    | 283-0634-00        | B010125              |          | CAP., FXD, MICA D: 65PF, 1%, 100V         | 00853    | D151E650F0       |
| C378    | 283-0000-00        |                      |          | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C382    | 283-0000-00        |                      |          | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C385    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C386    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C389    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C400    | 283-0111-00        |                      |          | CAP., FXD, CER DI: 0.1UF, 20%, 50V        | 72982    | 8121-N088Z5U104M |
| C415    | 281-0509-00        |                      |          | CAP., FXD, CER DI: 15PF, +/-1.5PF, 500V   | 72982    | 301-000C0G0150K  |
| C418    | 283-0634-00        | B010100              | B020244X | CAP., FXD, MICA D: 65PF, 1%, 100V         | 00853    | D151E650F0       |
| C432    | 281-0516-00        | B010100              | B010124  | CAP., FXD, CER DI: 39PF, +/-3.9PF, 500V   | 72982    | 301-000U2J0390K  |
| C432    | 281-0509-00        | B010125              | B020244  | CAP., FXD, CER DI: 15PF, +/-1.5PF, 500V   | 72982    | 301-000C0G0150K  |
| C432    | 281-0516-00        | B020245              | B029999  | CAP., FXD, CER DI: 39PF, +/-3.9PF, 500V   | 72982    | 301-000U2J0390K  |
| C432    | 281-0504-00        | B030000              |          | CAP., FXD, CER DI: 10PF, +/-1PF, 500V     | 72982    | 301-055C0G0100F  |
| C433    | 283-0111-00        | XB010125             |          | CAP., FXD, CER DI: 0.1UF, 20%, 50V        | 72982    | 8121-N088Z5U104M |
| C435    | 283-0634-00        |                      |          | CAP., FXD, MICA D: 65PF, 1%, 100V         | 00853    | D151E650F0       |
| C436    | 281-0504-00        |                      |          | CAP., FXD, CER DI: 10PF, +/-1PF, 500V     | 72982    | 301-055C0G0100F  |
| C438    | 283-0594-00        |                      |          | CAP., FXD, MICA D: 0.001UF, 1%, 100V      | 00853    | D151F102F0       |
| C439    | 281-0513-00        |                      |          | CAP., FXD, CER DI: 27PF, +/-5.4PF, 500V   | 72982    | 301-000P2G0270M  |
| C442    | 285-1049-00        |                      |          | CAP., FXD, PLSTC: 0.01UF, 1%, 200V        | 14752    | 230B1C103F       |
| C444    | 285-0703-00        |                      |          | CAP., FXD, PLSTC: 0.1UF, 5%, 100V         | 56289    | 410P10451        |
| C446    | 285-0576-00        |                      |          | CAP., FXD, PLSTC: 1UF, 10%, 100V          | 56289    | 410P10591        |
| C448    | 290-0536-00        |                      |          | CAP., FXD, ELCTLT: 10UF, 20%, 25V         | 90201    | TDC106M025FL     |
| C450    | 290-0722-00        |                      |          | CAP., FXD, ELCTLT: 100UF, 20%, 10V        | 56289    | 196D107X0010PE3  |
| C460    | 283-0111-00        |                      |          | CAP., FXD, CER DI: 0.1UF, 20%, 50V        | 72982    | 8121-N088Z5U104M |
| C462    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C480    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C485    | 283-0111-00        | B010100              | B010169X | CAP., FXD, CER DI: 0.1UF, 20%, 50V        | 72982    | 8121-N088Z5U104M |
| C487    | 290-0530-00        |                      |          | CAP., FXD, ELCTLT: 68UF, 20%, 6V          | 90201    | TDC686M006NLF    |
| C493    | 283-0000-00        | XB010170             | B029999X | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C500    | 283-0000-00        |                      |          | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V | 72982    | 831-516E102P     |
| C502    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C503    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C505    | 283-0081-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 25V    | 56289    | 36C600           |
| C532    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V    | 72982    | 8121N083Z5U0104Z |
| C544    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V    | 72982    | 8121N083Z5U0104Z |
| C555    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V    | 72982    | 8121N083Z5U0104Z |
| C563    | 281-0653-00        |                      |          | CAP., FXD, CER DI: 3.3PF, 30%, 200V       | 72982    | 374000M7J339F    |
| C569    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V       | 72982    | 8121N061Z5U0103M |
| C580    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V       | 72982    | 8121N061Z5U0103M |
| C581    | 290-0527-00        |                      |          | CAP., FXD, ELCTLT: 15UF, 20%, 20V         | 90201    | TDC156M020FL     |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont   | Name & Description                          | Mfr Code | Mfr Part Number  |
|---------|--------------------|----------------------|----------|---|----------|------------------|
| C586    | 285-0934-00        |                      |          | CAP., FXD, PLSTC: 2.2UF, 10%, 200V          | 56289    | 430P238          |
| C588    | 285-0633-00        |                      |          | CAP., FXD, PLSTC: 0.22UF, 20%, 100V         | 56289    | 410P22491        |
| C590    | 285-0566-00        |                      |          | CAP., FXD, PLSTC: 0.022UF, 10%, 200V        | 56289    | 410P22392        |
| C592    | 283-0694-00        |                      |          | CAP., FXD, MICA D: 2240PF, 0.5%, 300V       | 00853    | D193F2241E0      |
| C594    | 283-0625-00        |                      |          | CAP., FXD, MICA D: 220PF, 1%, 500V          | 00853    | D105F221F0       |
| C596    | 281-0544-00        |                      |          | CAP., FXD, CER DI: 5.6PF, 10%, 500V         | 72982    | 301-000C0H0569D  |
| C600    | 290-0527-00        |                      |          | CAP., FXD, ELCTLT: 15UF, 20%, 20V           | 90201    | TDC156M020FL     |
| C601    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C622    | 281-0653-00        |                      |          | CAP., FXD, CER DI: 3.3PF, 30%, 200V         | 72982    | 374000M7J339F    |
| C630    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C643    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C647    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C662    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C665    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C675    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C680    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C682    | 283-0648-00        |                      |          | CAP., FXD, MICA D: 10PF, 5%, 100V           | 00853    | D151C100D0       |
| C697    | 283-0065-00        |                      |          | CAP., FXD, CER DI: 0.001UF, 5%, 100V        | 72982    | 805-518-25D0102J |
| C701    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C708    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C720    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C724    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C734    | 290-0530-00        |                      |          | CAP., FXD, ELCTLT: 68UF, 20%, 6V            | 90201    | TDC686M006NLF    |
| C735    | 283-0024-00        | XB030000             |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C736    | 283-0000-00        | XB020245             | B029999X | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V   | 72982    | 831-516E102P     |
| C740    | 283-0024-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 30V      | 72982    | 8121N08325U0104Z |
| C744    | 281-0187-00        | XB030000             |          | CAP., VAR, PLSTC: 4-40PF, 250V              | 80031    | 2810D00440QN02F0 |
| C749    | 283-0648-00        | B010100              | B029999  | CAP., FXD, MICA D: 10PF, 5%, 100V           | 00853    | D151C100D0       |
| C749    | 281-0187-00        | B030000              |          | CAP., VAR, PLSTC: 4-40PF, 250V              | 80031    | 2810D00440QN02F0 |
| C780    | 283-0178-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 100V     | 72982    | 8131N145 E 104Z  |
| C800    | 283-0178-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 100V     | 72982    | 8131N145 E 104Z  |
| C814    | 283-0000-00        |                      |          | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V   | 72982    | 831-516E102P     |
| C820    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C834    | 281-0604-00        |                      |          | CAP., FXD, CER DI: 2.2PF, +/-0.25PF, 500V   | 72982    | 301-000C0J0229C  |
| C836    | 283-0187-00        |                      |          | CAP., FXD, CER DI: 0.047UF, 10%, 400V       | 72982    | 8131N401X5R0473K |
| C840    | 290-0527-00        |                      |          | CAP., FXD, ELCTLT: 15UF, 20%, 20V           | 90201    | TDC156M020FL     |
| C850    | 283-0752-00        | B010100              | B020698  | CAP., FXD, MICA D: 345PF, 1%, 500V          | 00853    | D155E3450F0      |
| C850    | 283-0638-00        | B020699              |          | CAP., FXD, MICA D: 130PF, 1%, 100V          | 00853    | D151F131F0       |
| C850    | -----              |                      |          | * NOMINAL INSTALLED, TEST SELECTED AS A SET |          |                  |
| C852    | 283-0752-00        | B010100              | B020698  | CAP., FXD, MICA D: 345PF, 1%, 500V          | 00853    | D155E3450F0      |
| C852    | 283-0638-00        | B020699              |          | CAP., FXD, MICA D: 130PF, 1%, 100V          | 00853    | D151F131F0       |
| C852    | -----              |                      |          | * NOMINAL INSTALLED, TEST SELECTED AS A SET |          |                  |
| C854    | 283-0752-00        | B010100              | B020698  | CAP., FXD, MICA D: 345PF, 1%, 500V          | 00853    | D155E3450F0      |
| C854    | 283-0638-00        | B020699              |          | CAP., FXD, MICA D: 130PF, 1%, 100V          | 00853    | D151F131F0       |
| C854    | -----              |                      |          | * NOMINAL INSTALLED, TEST SELECTED AS A SET |          |                  |
| C856    | 283-0752-00        | B010100              | B020698  | CAP., FXD, MICA D: 345PF, 1%, 500V          | 00853    | D155E3450F0      |
| C856    | 283-0638-00        | B020699              |          | CAP., FXD, MICA D: 130PF, 1%, 100V          | 00853    | D151F131F0       |
| C856    | -----              |                      |          | * NOMINAL INSTALLED, TEST SELECTED AS A SET |          |                  |
| C860    | 283-0002-00        |                      |          | CAP., FXD, CER DI: 0.01UF, +80-20%, 500V    | 72982    | 811-546E103Z     |
| C863    | 283-0000-00        |                      |          | CAP., FXD, CER DI: 0.001UF, +100-0%, 500V   | 72982    | 831-516E102P     |
| C879    | 283-0204-00        |                      |          | CAP., FXD, CER DI: 0.01UF, 20%, 50V         | 72982    | 8121N06125U0103M |
| C880    | 283-0002-00        |                      |          | CAP., FXD, CER DI: 0.01UF, +80-20%, 500V    | 72982    | 811-546E103Z     |
| C895    | 283-0178-00        |                      |          | CAP., FXD, CER DI: 0.1UF, +80-20%, 100V     | 72982    | 8131N145 E 104Z  |

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|---------|--------------------|----------------------|--------|--|----------|------------------|
| C930    | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C938    | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C958    | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C962    | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C964    | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C966    | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C975    | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C985    | 290-0573-00        |                      |        | CAP., FXD, ELCTLT:2.7UF,20%,50V        | 56289    | 196D275X0050JA1  |
| C989    | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C992    | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C997    | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C1017   | 283-0669-00        |                      |        | CAP., FXD, MICA D:360PF,1%,500V        | 00853    | D155F361FO       |
| C1024   | 281-0092-00        |                      |        | CAP., VAR, CER DI:9-35PF,200V          | 72982    | 538-011 D9-35    |
| C1048   | 285-0598-00        |                      |        | CAP., FXD, PLSTC:0.01UF,5%,100V        | 01002    | 61F10AC103       |
| C1055   | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C1065   | 290-0573-00        |                      |        | CAP., FXD, ELCTLT:2.7UF,20%,50V        | 56289    | 196D275X0050JA1  |
| C1072   | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C1075   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1077   | 283-0204-00        |                      |        | CAP., FXD, CER DI:0.01UF,20%,50V       | 72982    | 8121N061Z5U0103M |
| C1097   | 290-0573-00        |                      |        | CAP., FXD, ELCTLT:2.7UF,20%,50V        | 56289    | 196D275X0050JA1  |
| C1202   | 290-0633-00        |                      |        | CAP., FXD, ELCTLT:2400UF,+75-10%,30V   | 56289    | 39D360           |
| C1205   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1207   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1211   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1217   | 283-0000-00        |                      |        | CAP., FXD, CER DI:0.001UF,+100-0%,500V | 72982    | 831-516E102P     |
| C1219   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1220   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1240   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1242   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1244   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1246   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1248   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1250   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1259   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1280   | 283-0103-00        |                      |        | CAP., FXD, CER DI:180PF,5%,500V        | 56289    | 40C638           |
| C1307   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1308   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1310   | 290-0117-00        |                      |        | CAP., FXD, ELCTLT:50UF,+75-10%,50V     | 56289    | 30D506G050DD9    |
| C1327   | 290-0633-00        |                      |        | CAP., FXD, ELCTLT:2400UF,+75-10%,30V   | 56289    | 39D360           |
| C1335   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1337   | 283-0081-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,25V    | 56289    | 36C600           |
| C1340   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1342   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1344   | 290-0527-00        |                      |        | CAP., FXD, ELCTLT:15UF,20%,20V         | 90201    | TDC156M020FL     |
| C1359   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1380   | 283-0103-00        |                      |        | CAP., FXD, CER DI:180PF,5%,500V        | 56289    | 40C638           |
| C1407   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1408   | 283-0178-00        |                      |        | CAP., FXD, CER DI:0.1UF,+80-20%,100V   | 72982    | 8131N145 E 104Z  |
| C1410   | 290-0117-00        |                      |        | CAP., FXD, ELCTLT:50UF,+75-10%,50V     | 56289    | 30D506G050DD9    |
| CR16    | 152-0141-02        |                      |        | SEMICOND DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02      |
| CR17    | 152-0141-02        |                      |        | SEMICOND DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02      |
| CR25    | 152-0141-02        |                      |        | SEMICOND DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02      |
| CR26    | 152-0141-02        |                      |        | SEMICOND DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02      |

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|---------|--------------------|----------------------|--------|---------------------------------------|----------|-----------------|
| CR80    | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR82    | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR84    | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR86    | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR145   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR147   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR220   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR222   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR224   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR226   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR228   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR296   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR304   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR305   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR378   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR382   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR493   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR495   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR584   | 152-0536-00        |                      |        | SEMICON DEVICE:SILICON,HOT CARRIER,4V | 04713    | MBD101          |
| CR600   | 152-0536-00        |                      |        | SEMICON DEVICE:SILICON,HOT CARRIER,4V | 04713    | MBD101          |
| CR604   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR782   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR790   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR792   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR794   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR805   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR876   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR885   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR958   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR990   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR991   | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR1200  | 152-0488-00        |                      |        | SEMICON DEVICE:SILICON,200V,1500MA    | 80009    | 152-0488-00     |
| CR1202  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1207  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1219  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1225  | 152-0488-00        |                      |        | SEMICON DEVICE:SILICON,200V,1500MA    | 80009    | 152-0488-00     |
| CR1240  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1242  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1244  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1246  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1248  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1250  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1272  | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR1282  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1283  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1306  | 152-0141-02        |                      |        | SEMICON DEVICE:SILICON,30V,150MA      | 80009    | 152-0141-02     |
| CR1310  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1325  | 152-0488-00        |                      |        | SEMICON DEVICE:SILICON,200V,1500MA    | 80009    | 152-0488-00     |
| CR1327  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1337  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1340  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1342  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |
| CR1344  | 152-0066-00        |                      |        | SEMICON DEVICE:SILICON,400V,750MA     | 80009    | 152-0066-00     |

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|---------|--------------------|----------------------|----------|---|----------|-----------------|
| CR1372  | 152-0141-02        |                      |          | SEMICONV DEVICE:SILICON,30V,150MA       | 80009    | 152-0141-02     |
| CR1382  | 152-0066-00        |                      |          | SEMICONV DEVICE:SILICON,400V,750MA      | 80009    | 152-0066-00     |
| CR1383  | 152-0066-00        |                      |          | SEMICONV DEVICE:SILICON,400V,750MA      | 80009    | 152-0066-00     |
| CR1406  | 152-0141-02        |                      |          | SEMICONV DEVICE:SILICON,30V,150MA       | 80009    | 152-0141-02     |
| CR1410  | 152-0066-00        |                      |          | SEMICONV DEVICE:SILICON,400V,750MA      | 80009    | 152-0066-00     |
| DL480   | 119-0755-00        | B010100              | B020244X | DELAY LINE,ELEC:4.75NS,50 OHMS          | 80009    | 119-0755-00     |
| DS110   | 150-1029-00        |                      |          | LAMP,LED:2.0V,GREEN                     | 53184    | XC209G          |
| DS500   | 150-1031-00        |                      |          | LAMP,LED:RED,650NM,40MA MAX             | 53184    | XC209R          |
| DS1250  | 150-1029-00        |                      |          | LAMP,LED:2.0V,GREEN                     | 53184    | XC209G          |
| J10     | 131-0955-00        |                      |          | CONNECTOR,RCPT,:BNC,FEMALE,W/HARDWARE   | 13511    | 31-279          |
| J12     | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J90     | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J140    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J254    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J255    | 131-0955-00        |                      |          | CONNECTOR,RCPT,:BNC,FEMALE,W/HARDWARE   | 13511    | 31-279          |
| J260    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J305    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J450    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J452    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J480    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J481    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J485    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J520    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J522    | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J1024   | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J1025   | 131-1315-00        |                      |          | CONNECTOR,RCPT,:BNC,FEMALE              | 24931    | 28JR235-1       |
| J1200   | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| J1201   | 131-1003-00        |                      |          | CONNECTOR BODY,:CKT BD MT,2 PRONG       | 80009    | 131-1003-00     |
| L240    | 276-0569-00        |                      |          | CORE,TOROID:                            | 80009    | 276-0569-00     |
| L507    | 108-0114-00        | B010100              | B029999X | COIL,RF:6UH                             | 80009    | 108-0114-00     |
| L507    | -----              |                      |          | * ABOVE S/N B030000 REPLACED WITH A #22 |          |                 |
|         | -----              |                      |          | * WIRE STRAP                            |          |                 |
| L980    | 108-0543-00        |                      |          | COIL,RF:FIXED,1.1UH                     | 80009    | 108-0543-00     |
| L1060   | 108-0543-00        |                      |          | COIL,RF:FIXED,1.1UH                     | 80009    | 108-0543-00     |
| LR682   | 108-0328-00        |                      |          | COIL,RF:0.3UH                           | 80009    | 108-0328-00     |
| Q20     | 151-1042-00        |                      |          | SEMICONV DVC SE:MATCHED PAIR FET        | 80009    | 151-1042-00     |
| Q22     |                    |                      |          |   |          |                 |
| Q25     | 151-0221-00        |                      |          | TRANSISTOR:SILICON,PNP                  | 80009    | 151-0221-00     |
| Q26     | 151-0221-00        |                      |          | TRANSISTOR:SILICON,PNP                  | 80009    | 151-0221-00     |
| Q30     | 151-0188-00        |                      |          | TRANSISTOR:SILICON,PNP                  | 80009    | 151-0188-00     |
| Q100    | 151-0333-00        |                      |          | TRANSISTOR:SILICON,NPN,SEL FROM MPS918  | 80009    | 151-0333-00     |
| Q102    | 151-0333-00        |                      |          | TRANSISTOR:SILICON,NPN,SEL FROM MPS918  | 80009    | 151-0333-00     |
| Q110    | 151-0424-00        |                      |          | TRANSISTOR:SILICON,NPN                  | 80009    | 151-0424-00     |
| Q150    | 151-0424-00        |                      |          | TRANSISTOR:SILICON,NPN                  | 80009    | 151-0424-00     |
| Q160    | 151-0424-00        |                      |          | TRANSISTOR:SILICON,NPN                  | 80009    | 151-0424-00     |
| Q175    | 151-0333-00        |                      |          | TRANSISTOR:SILICON,NPN,SEL FROM MPS918  | 80009    | 151-0333-00     |
| Q178    | 151-0221-00        | XB010125             |          | TRANSISTOR:SILICON,PNP                  | 80009    | 151-0221-00     |
| Q240    | 151-0221-00        |                      |          | TRANSISTOR:SILICON,PNP                  | 80009    | 151-0221-00     |
| Q244    | 151-0221-00        |                      |          | TRANSISTOR:SILICON,PNP                  | 80009    | 151-0221-00     |
| Q290    | 151-0424-00        |                      |          | TRANSISTOR:SILICON,NPN                  | 80009    | 151-0424-00     |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description                         | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|--------|--|----------|-----------------|
| Q294    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q320    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q342    | 151-0225-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0225-00     |
| Q406    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q410    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q435    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q460    | 151-0225-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0225-00     |
| Q525    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q530    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q545    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q550    | 151-0190-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0190-00     |
| Q560    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q565    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q575    | 151-0190-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0190-00     |
| Q580    | 151-0301-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 04713    | 2N2907A         |
| Q600    | 151-0302-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0302-00     |
| Q608    | 151-0188-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0188-00     |
| Q625    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q630    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q635    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q640    | 151-0188-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0188-00     |
| Q660    | 151-0282-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0282-00     |
| Q675    | 151-1042-00        |                      |        | SEMICOND DVC SE: MATCHED PAIR FET          | 80009    | 151-1042-00     |
| Q680    |                    |                      |        |  |          |                 |
| Q685    | 151-0282-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0282-00     |
| Q690    | 151-0282-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0282-00     |
| Q700    | 151-1042-00        |                      |        | SEMICOND DVC SE: MATCHED PAIR FET          | 80009    | 151-1042-00     |
| Q701    |                    |                      |        |  |          |                 |
| Q704    | 151-0333-00        |                      |        | TRANSISTOR: SILICON, NPN, SEL FROM MPS918  | 80009    | 151-0333-00     |
| Q706    | 151-0333-00        |                      |        | TRANSISTOR: SILICON, NPN, SEL FROM MPS918  | 80009    | 151-0333-00     |
| Q715    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q820    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q825    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q840    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q845    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q900    | 151-0190-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0190-00     |
| Q945    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q950    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q954    | 151-0221-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0221-00     |
| Q975    | 151-0438-00        |                      |        | TRANSISTOR: SILICON, PNP, SEL FROM SPS6927 | 80009    | 151-0438-00     |
| Q980    | 151-0211-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 01282    | 2N3866          |
| Q990    | 151-0285-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0285-00     |
| Q995    | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q1000   | 151-0302-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0302-00     |
| Q1010   | 151-0411-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0411-00     |
| Q1015   | 151-0411-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0411-00     |
| Q1055   | 151-0424-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 80009    | 151-0424-00     |
| Q1060   | 151-0285-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0285-00     |
| Q1070   | 151-0211-00        |                      |        | TRANSISTOR: SILICON, NPN                   | 01282    | 2N3866          |
| Q1075   | 151-0188-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 80009    | 151-0188-00     |
| Q1080   | 151-0301-00        |                      |        | TRANSISTOR: SILICON, PNP                   | 04713    | 2N2907A         |
| Q1090   | 151-0450-00        |                      |        | TRANSISTOR: SILICON, PNP, SEL FROM 2N5583  | 80009    | 151-0450-00     |
| Q1095   | 151-0450-00        |                      |        | TRANSISTOR: SILICON, PNP, SEL FROM 2N5583  | 80009    | 151-0450-00     |

Replaceable Electrical Parts—PG 508

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont  | Name & Description                     | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|---------|--|----------|-----------------|
| Q1255   | 151-0432-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0432-00     |
| Q1265   | 151-0432-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0432-00     |
| Q1270   | 151-0432-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0432-00     |
| Q1280   | 151-0463-00        |                      |         | TRANSISTOR: SILICON, PNP               | 03508    | D41E7           |
| Q1285   | 151-0350-00        |                      |         | TRANSISTOR: SILICON, PNP               | 80009    | 151-0350-00     |
| Q1295   | 151-0350-00        |                      |         | TRANSISTOR: SILICON, PNP               | 80009    | 151-0350-00     |
| Q1300   | 151-0347-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0347-00     |
| Q1355   | 151-0453-00        |                      |         | TRANSISTOR: SILICON, PNP               | 80009    | 151-0453-00     |
| Q1365   | 151-0453-00        |                      |         | TRANSISTOR: SILICON, PNP               | 80009    | 151-0453-00     |
| Q1370   | 151-0453-00        |                      |         | TRANSISTOR: SILICON, PNP               | 80009    | 151-0453-00     |
| Q1380   | 151-0439-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0439-00     |
| Q1385   | 151-0347-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0347-00     |
| Q1395   | 151-0347-00        |                      |         | TRANSISTOR: SILICON, NPN               | 80009    | 151-0347-00     |
| Q1400   | 151-0453-00        |                      |         | TRANSISTOR: SILICON, PNP               | 80009    | 151-0453-00     |
| R12     | 301-0510-00        |                      |         | RES., FXD, CMPSN: 51 OHM, 5%, 0.50W    | 01121    | EB5105          |
| R14     | 315-0913-00        |                      |         | RES., FXD, CMPSN: 91K OHM, 5%, 0.25W   | 01121    | CB9135          |
| R16     | 315-0914-00        |                      |         | RES., FXD, CMPSN: 910K OHM, 5%, 0.25W  | 01121    | CB9145          |
| R20     | 301-0471-00        |                      |         | RES., FXD, CMPSN: 470 OHM, 5%, 0.50W   | 01121    | EB4715          |
| R22     | 301-0471-00        |                      |         | RES., FXD, CMPSN: 470 OHM, 5%, 0.50W   | 01121    | EB4715          |
| R25     | 315-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W    | 01121    | CB4705          |
| R28     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W    | 01121    | CB1025          |
| R30     | 315-0152-00        |                      |         | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W  | 01121    | CB1525          |
| R32     | 315-0302-00        |                      |         | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W    | 01121    | CB3025          |
| R33     | 315-0512-00        |                      |         | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W  | 01121    | CB5125          |
| R36     | 315-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W    | 01121    | CB4705          |
| R38     | 315-0101-00        |                      |         | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   | 01121    | CB1015          |
| R40     | 321-0302-00        |                      |         | RES., FXD, FILM: 13.7K OHM, 1%, 0.125W | 91637    | MFF1816G13701F  |
| R42     | 321-0327-00        |                      |         | RES., FXD, FILM: 24.9K OHM, 1%, 0.125W | 91637    | MFF1816G24901F  |
| R43     | 321-0289-00        |                      |         | RES., FXD, FILM: 10K OHM, 1%, 0.125W   | 91637    | MFF1816G10001F  |
| R45     | 321-0290-00        |                      |         | RES., FXD, FILM: 10.2K OHM, 1%, 0.125W | 91637    | MFF1816G10201F  |
| R48     | 311-1484-00        |                      |         | RES., VAR, NONWIR: PNL, 2.5K OHM, 1W   | 01121    | 11M110          |
| R52     | 315-0101-00        |                      |         | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   | 01121    | CB1015          |
| R53     | 315-0101-00        |                      |         | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   | 01121    | CB1015          |
| R55     | 315-0182-00        |                      |         | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W  | 01121    | CB1825          |
| R56     | 315-0392-00        |                      |         | RES., FXD, CMPSN: 3.9K OHM, 5%, 0.25W  | 01121    | CB3925          |
| R57     | 315-0242-00        |                      |         | RES., FXD, CMPSN: 2.4K OHM, 5%, 0.25W  | 01121    | CB2425          |
| R60     | 315-0220-00        |                      |         | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W    | 01121    | CB2205          |
| R62     | 315-0271-00        |                      |         | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W   | 01121    | CB2715          |
| R64     | 315-0220-00        |                      |         | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W    | 01121    | CB2205          |
| R66     | 315-0471-00        |                      |         | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W   | 01121    | CB4715          |
| R70     | 315-0151-00        |                      |         | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W   | 01121    | CB1515          |
| R72     | 315-0331-00        |                      |         | RES., FXD, CMPSN: 330 OHM, 5%, 0.25W   | 01121    | CB3315          |
| R73     | 315-0391-00        |                      |         | RES., FXD, CMPSN: 390 OHM, 5%, 0.25W   | 01121    | CB3915          |
| R75     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W    | 01121    | CB1025          |
| R76     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W    | 01121    | CB1025          |
| R78     | 315-0101-00        |                      |         | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   | 01121    | CB1015          |
| R90     | 315-0391-00        |                      |         | RES., FXD, CMPSN: 390 OHM, 5%, 0.25W   | 01121    | CB3915          |
| R92     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W    | 01121    | CB1025          |
| R95     | 315-0561-00        |                      |         | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W   | 01121    | CB5615          |
| R100    | 301-0152-00        |                      |         | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.50W  | 01121    | EB1525          |
| R102    | 315-0331-00        |                      |         | RES., FXD, CMPSN: 330 OHM, 5%, 0.25W   | 01121    | CB3315          |
| R104    | 315-0161-00        |                      |         | RES., FXD, CMPSN: 160 OHM, 5%, 0.25W   | 01121    | CB1615          |
| R106    | 321-0297-00        | B010100              | B020244 | RES., FXD, FILM: 12.1K OHM, 1%, 0.125W | 91637    | MFF1816G12101F  |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont   | Name & Description                      | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|----------|---|----------|-----------------|
| R106    | 321-0322-00        | B020245              |          | RES., FXD, FILM: 22.1K OHM, 1%, 0.125W  | 91637    | MFF1816G22101F  |
| R110    | 315-0331-00        |                      |          | RES., FXD, CMPSN: 330 OHM, 5%, 0.25W    | 01121    | CB3315          |
| R112    | 321-0217-00        |                      |          | RES., FXD, FILM: 1.78K OHM, 1%, 0.125W  | 91637    | MFF1816G17800F  |
| R113    | 321-0255-00        | B010100              | B020244  | RES., FXD, FILM: 4.42K OHM, 1%, 0.125W  | 91637    | MFF1816G44200F  |
| R113    | 321-0269-00        | B020245              |          | RES., FXD, FILM: 6.19K OHM, 1%, 0.125W  | 91637    | MFF1816G61900F  |
| R140    | 315-0131-00        |                      |          | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W    | 01121    | CB1315          |
| R142    | 315-0820-00        |                      |          | RES., FXD, CMPSN: 82 OHM, 5%, 0.25W     | 01121    | CB8205          |
| R145    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R147    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R150    | 315-0121-00        |                      |          | RES., FXD, CMPSN: 120 OHM, 5%, 0.25W    | 01121    | CB1215          |
| R152    | 315-0430-00        |                      |          | RES., FXD, CMPSN: 43 OHM, 5%, 0.25W     | 01121    | CB4305          |
| R154    | 301-0132-00        |                      |          | RES., FXD, CMPSN: 1.3K OHM, 5%, 0.50W   | 01121    | EB1325          |
| R156    | 315-0430-00        |                      |          | RES., FXD, CMPSN: 43 OHM, 5%, 0.25W     | 01121    | CB4305          |
| R160    | 315-0101-00        |                      |          | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W    | 01121    | CB1015          |
| R162    | 315-0242-00        |                      |          | RES., FXD, CMPSN: 2.4K OHM, 5%, 0.25W   | 01121    | CB2425          |
| R165    | 311-1561-00        |                      |          | RES., VAR, NONWIR: 2.5K OHM, 20%, 0.50W | 73138    | 91A R2500       |
| R167    | 315-0112-00        |                      |          | RES., FXD, CMPSN: 1.1K OHM, 5%, 0.25W   | 01121    | CB1125          |
| R169    | 315-0362-00        |                      |          | RES., FXD, CMPSN: 3.6K OHM, 5%, 0.25W   | 01121    | CB3625          |
| R170    | 311-1560-00        |                      |          | RES., VAR, NONWIR: 5K OHM, 5%, 0.50W    | 73138    | 91A R5K         |
| R171    | 315-0430-00        | B010100              | B010124X | RES., FXD, CMPSN: 43 OHM, 5%, 0.25W     | 01121    | CB4305          |
| R172    | 315-0152-00        |                      |          | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W   | 01121    | CB1525          |
| R175    | 315-0431-00        |                      |          | RES., FXD, CMPSN: 430 OHM, 5%, 0.25W    | 01121    | CB4315          |
| R177    | 315-0680-00        |                      |          | RES., FXD, CMPSN: 68 OHM, 5%, 0.25W     | 01121    | CB6805          |
| R178    | 315-0271-00        | XB010125             |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121    | CB2715          |
| R180    | 311-1560-00        |                      |          | RES., VAR, NONWIR: 5K OHM, 5%, 0.50W    | 73138    | 91A R5K         |
| R182    | 315-0683-00        |                      |          | RES., FXD, CMPSN: 68K OHM, 5%, 0.25W    | 01121    | CB6835          |
| R185    | 315-0101-00        |                      |          | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W    | 01121    | CB1015          |
| R186    | 311-1567-00        |                      |          | RES., VAR, NONWIR: TRMR, 100 OHM, 0.50W | 73138    | 91-89-0         |
| R190    | 311-1832-00        |                      |          | RES., VAR, NONWIR: 5K OHM, 10%, 0.50W   | 01121    | 14M395          |
| R192    | 315-0123-00        |                      |          | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W    | 01121    | CB1235          |
| R194    | 315-0432-00        |                      |          | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W   | 01121    | CB4325          |
| R195    | 311-1566-00        |                      |          | RES., VAR, NONWIR: 200 OHM, 20%, 0.50W  | 73138    | 91-88-0         |
| R214    | 307-0113-00        |                      |          | RES., FXD, CMPSN: 5.1 OHM, 5%, 0.25W    | 01121    | CB51G5          |
| R218    | 315-0180-00        |                      |          | RES., FXD, CMPSN: 18 OHM, 5%, 0.25W     | 01121    | CB1805          |
| R219    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121    | CB1005          |
| R224    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R230    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R232    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R234    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R240    | 315-0220-00        |                      |          | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W     | 01121    | CB2205          |
| R242    | 301-0431-00        |                      |          | RES., FXD, CMPSN: 430 OHM, 5%, 0.50W    | 01121    | EB4315          |
| R244    | 301-0431-00        |                      |          | RES., FXD, CMPSN: 430 OHM, 5%, 0.50W    | 01121    | EB4315          |
| R248    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121    | CB1005          |
| R249    | 315-0510-00        |                      |          | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W     | 01121    | CB5105          |
| R252    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121    | CB1005          |
| R253    | 315-0510-00        |                      |          | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W     | 01121    | CB5105          |
| R270    | 315-0271-00        |                      |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121    | CB2715          |
| R272    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R274    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R275    | 315-0680-00        |                      |          | RES., FXD, CMPSN: 68 OHM, 5%, 0.25W     | 01121    | CB6805          |
| R280    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R284    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R290    | 315-0271-00        |                      |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121    | CB2715          |



Replaceable Electrical Parts—PG 508

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont   | Name & Description                           | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|----------|--|----------|-----------------|
| R292    | 315-0111-00        |                      |          | RES., FXD, CMPSN: 110 OHM, 5%, 0.25W         | 01121    | CB1115          |
| R294    | 315-0302-00        |                      |          | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W          | 01121    | CB3025          |
| R296    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W          | 01121    | CB1005          |
| R300    | 315-0121-00        |                      |          | RES., FXD, CMPSN: 120 OHM, 5%, 0.25W         | 01121    | CB1215          |
| R304    | 315-0430-00        | B010100              | B020244X | RES., FXD, CMPSN: 43 OHM, 5%, 0.25W          | 01121    | CB4305          |
| R306    | 315-0151-00        | B010100              | B020244X | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W         | 01121    | CB1515          |
| R310    | 315-0271-00        |                      |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R312    | 315-0271-00        | B010100              | B020244X | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R315    | 315-0390-00        |                      |          | RES., FXD, CMPSN: 39 OHM, 5%, 0.25W          | 01121    | CB3905          |
| R317    | 315-0510-00        |                      |          | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W          | 01121    | CB5105          |
| R320    | 315-0220-00        |                      |          | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W          | 01121    | CB2205          |
| R325    | 315-0270-00        |                      |          | RES., FXD, CMPSN: 27 OHM, 5%, 0.25W          | 01121    | CB2705          |
| R328    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W          | 01121    | CB1005          |
| R342    | 315-0101-00        |                      |          | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W         | 01121    | CB1015          |
| R346    | 315-0202-00        |                      |          | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W          | 01121    | CB2025          |
| R348    | 315-0201-00        |                      |          | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W         | 01121    | CB2015          |
| R350    | 315-0621-00        |                      |          | RES., FXD, CMPSN: 620 OHM, 5%, 0.25W         | 01121    | CB6215          |
| R352    | 311-1562-00        | B010100              | B029999  | RES., VAR, NONWIR: 2K OHM, 20%, 0.50W        | 73138    | 91A R2K         |
| R352    | 311-1560-00        | B030000              |          | RES., VAR, NONWIR: 5K OHM, 5%, 0.50W         | 73138    | 91A R5K         |
| R354    | 315-0124-00        | B010100              | B020244  | RES., FXD, CMPSN: 120K OHM, 5%, 0.25W        | 01121    | CB1245          |
| R354    | 315-0124-00        | B020245              | B029999  | RES., FXD, CMPSN: 120K OHM, (NOM VALUE), SEL | 01121    | CB1245          |
| R354    | 315-0184-00        | B030000              |          | RES., FXD, CMPSN: 180K OHM, 5%, 0.25W        | 01121    | CB1845          |
| R355    | 311-1834-00        |                      |          | RES., VAR, NONWIR: 50K OHM, 10%, 0.50W       | 01121    | 73M4G040L503A   |
| R360    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R362    | 315-0471-00        | B010100              | B020244  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R362    | 315-0471-00        | B020245              |          | RES., FXD, CMPSN: 470 OHM, (NOM VALUE), SEL  | 01121    | CB4715          |
| R364    | 315-0680-00        |                      |          | RES., FXD, CMPSN: 68 OHM, 5%, 0.25W          | 01121    | CB6805          |
| R366    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R368    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R370    | 315-0471-00        | B010100              | B020244  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R370    | 315-0471-00        | B020245              |          | RES., FXD, CMPSN: 470 OHM, (NOM VALUE), SEL  | 01121    | CB4715          |
| R372    | 315-0680-00        |                      |          | RES., FXD, CMPSN: 68 OHM, 5%, 0.25W          | 01121    | CB6805          |
| R375    | 315-0471-00        |                      |          | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R380    | 315-0102-00        |                      |          | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W          | 01121    | CB1025          |
| R400    | 315-0471-00        | B010100              | B010124  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R400    | 315-0271-00        | B010125              |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R402    | 315-0471-00        | B010100              | B010124  | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W         | 01121    | CB4715          |
| R402    | 315-0271-00        | B010125              |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R406    | 315-0271-00        |                      |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R408    | 315-0111-00        |                      |          | RES., FXD, CMPSN: 110 OHM, 5%, 0.25W         | 01121    | CB1115          |
| R410    | 315-0302-00        |                      |          | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W          | 01121    | CB3025          |
| R412    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W          | 01121    | CB1005          |
| R415    | 315-0121-00        |                      |          | RES., FXD, CMPSN: 120 OHM, 5%, 0.25W         | 01121    | CB1215          |
| R420    | 315-0430-00        | B010100              | B020244X | RES., FXD, CMPSN: 43 OHM, 5%, 0.25W          | 01121    | CB4305          |
| R422    | 315-0151-00        | B010100              | B020244X | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W         | 01121    | CB1515          |
| R425    | 315-0271-00        |                      |          | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R426    | 315-0271-00        | B010100              | B020244X | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W         | 01121    | CB2715          |
| R430    | 315-0390-00        |                      |          | RES., FXD, CMPSN: 39 OHM, 5%, 0.25W          | 01121    | CB3905          |
| R432    | 315-0510-00        |                      |          | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W          | 01121    | CB5105          |
| R436    | 315-0270-00        |                      |          | RES., FXD, CMPSN: 27 OHM, 5%, 0.25W          | 01121    | CB2705          |
| R439    | 315-0100-00        |                      |          | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W          | 01121    | CB1005          |
| R455    | 315-0220-00        | B010100              | B020244X | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W          | 01121    | CB2205          |
| R456    | 315-0101-00        |                      |          | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W         | 01121    | CB1015          |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont  | Name & Description                      | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|---------|---|----------|-----------------|
| R460    | 315-0202-00        | B010100              | B020244 | RES., FXD, CMPSN: 2K OHM, 5%, 0.25W     | 01121    | CB2025          |
| R460    | 315-0162-00        | B020245              |         | RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W   | 01121    | CB1625          |
| R465    | 311-1561-00        |                      |         | RES., VAR, NONWIR: 2.5K OHM, 20%, 0.50W | 73138    | 91A R2500       |
| R462    | 315-0201-00        |                      |         | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W    | 01121    | CB2015          |
| R467    | 315-0621-00        |                      |         | RES., FXD, CMPSN: 620 OHM, 5%, 0.25W    | 01121    | CB6215          |
| R470    | 311-1562-00        |                      |         | RES., VAR, NONWIR: 2K OHM, 20%, 0.50W   | 73138    | 91A R2K         |
| R473    | 315-0124-00        | B010100              | B020244 | RES., FXD, CMPSN: 120K OHM, 5%, 0.25W   | 01121    | CB1245          |
| R473    | 315-0124-00        | B020245              | B029999 | RES., FXD, CMPSN: 120K OHM, 5%, 0.25W   | 01121    | CB1245          |
| R473    | 315-0184-00        | B030000              |         | RES., FXD, CMPSN: 180K OHM, 5%, 0.25W   | 01121    | CB1845          |
| R475    | 311-1834-00        |                      |         | RES., VAR, NONWIR: 50K OHM, 10%, 0.50W  | 01121    | 73M4G040L503A   |
| R482    | 315-0102-00        | XB010125             | B020244 | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R482    | 315-0820-00        | B020245              |         | RES., FXD, CMPSN: 82 OHM, 5%, 0.25W     | 01121    | CB8205          |
| R483    | 315-0820-00        | XB030000             |         | RES., FXD, CMPSN: 82 OHM, 5%, 0.25W     | 01121    | CB8205          |
| R484    | 315-0131-00        | XB020245             |         | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W    | 01121    | CB1315          |
| R485    | 315-0102-00        | B010100              | B029999 | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R485    | 315-0131-00        | B030000              |         | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W    | 01121    | CB1315          |
| R487    | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R490    | 315-0152-00        | B010100              | B020244 | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W   | 01121    | CB1525          |
| R490    | 315-0751-00        | B020245              |         | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W    | 01121    | CB7515          |
| R492    | 315-0102-00        | XB010125             | B020244 | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R492    | 315-0820-00        | B020245              |         | RES., FXD, CMPSN: 82 OHM, 5%, 0.25W     | 01121    | CB8205          |
| R493    | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R494    | 315-0131-00        | XB020245             |         | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W    | 01121    | CB1315          |
| R495    | 315-0101-00        |                      |         | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W    | 01121    | CB1015          |
| R500    | 315-0151-00        |                      |         | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W    | 01121    | CB1515          |
| R520    | 315-0131-00        |                      |         | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W    | 01121    | CB1315          |
| R522    | 315-0820-00        |                      |         | RES., FXD, CMPSN: 82 OHM, 5%, 0.25W     | 01121    | CB8205          |
| R525    | 315-0510-00        |                      |         | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W     | 01121    | CB5105          |
| R527    | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R528    | 315-0220-00        |                      |         | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W     | 01121    | CB2205          |
| R530    | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R534    | 315-0820-00        |                      |         | RES., FXD, CMPSN: 82 OHM, 5%, 0.25W     | 01121    | CB8205          |
| R536    | 315-0131-00        |                      |         | RES., FXD, CMPSN: 130 OHM, 5%, 0.25W    | 01121    | CB1315          |
| R538    | 315-0510-00        |                      |         | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W     | 01121    | CB5105          |
| R540    | 311-1833-00        |                      |         | RES., VAR, NONWIR: 50K OHM, 10%, 0.50W  | 01121    | 73A1G040L503A   |
| R542    | 311-1248-00        |                      |         | RES., VAR, NONWIR: 500 OHM, 10%, 0.50W  | 73138    | 72X-23-0-501K   |
| R544    | 315-0111-00        |                      |         | RES., FXD, CMPSN: 110 OHM, 5%, 0.25W    | 01121    | CB1115          |
| R545    | 315-0111-00        |                      |         | RES., FXD, CMPSN: 110 OHM, 5%, 0.25W    | 01121    | CB1115          |
| R547    | 315-0391-00        |                      |         | RES., FXD, CMPSN: 390 OHM, 5%, 0.25W    | 01121    | CB3915          |
| R550    | 315-0271-00        |                      |         | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W    | 01121    | CB2715          |
| R552    | 315-0332-00        |                      |         | RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W   | 01121    | CB3325          |
| R554    | 321-0225-00        |                      |         | RES., FXD, FILM: 2.15K OHM, 1%, 0.125W  | 91637    | MFF1816G21500F  |
| R555    | 321-0297-00        |                      |         | RES., FXD, FILM: 12.1K OHM, 1%, 0.125W  | 91637    | MFF1816G12101F  |
| R560    | 317-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.125W    | 01121    | BB4705          |
| R563    | 317-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.125W    | 01121    | BB4705          |
| R565    | 317-0220-00        |                      |         | RES., FXD, CMPSN: 22 OHM, 5%, 0.125W    | 01121    | BB2205          |
| R569    | 315-0751-00        |                      |         | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W    | 01121    | CB7515          |
| R570    | 311-1237-00        |                      |         | RES., VAR, NONWIR: 1K OHM, 10%, 0.50W   | 32997    | 3386X-T07-102   |
| R571    | 315-0512-00        |                      |         | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W   | 01121    | CB5125          |
| R575    | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R578    | 301-0471-00        |                      |         | RES., FXD, CMPSN: 470 OHM, 5%, 0.50W    | 01121    | EB4715          |
| R585    | 317-0150-00        |                      |         | RES., FXD, CMPSN: 15 OHM, 5%, 0.125W    | 01121    | BB1505          |
| R586    | 317-0150-00        |                      |         | RES., FXD, CMPSN: 15 OHM, 5%, 0.125W    | 01121    | BB1505          |

Replaceable Electrical Parts—PG 508

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont                                | Name & Description                     | Mfr Code      | Mfr Part Number |
|---------|--------------------|----------------------|---------------------------------------|--|---------------|-----------------|
| R600    | 315-0221-00        | XB010125             |                                       | RES., FXD, CMPSN: 220 OHM, 5%, 0.25W   | 01121         | CB2215          |
| R604    | 315-0161-00        |                      | RES., FXD, CMPSN: 160 OHM, 5%, 0.25W  | 01121                                  | CB1615        |                 |
| R608    | 315-0102-00        |                      | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W   | 01121                                  | CB1025        |                 |
| R614    | 315-0152-00        |                      | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W | 01121                                  | CB1525        |                 |
| R615    | 311-1237-00        |                      | RES., VAR, NONWIR: 1K OHM, 10%, 0.50W | 32997                                  | 3386X-T07-102 |                 |
| R616    | 315-0472-00        |                      |                                       | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W  | 01121         | CB4725          |
| R620    | 315-0751-00        |                      |                                       | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W   | 01121         | CB7515          |
| R622    | 317-0470-00        |                      |                                       | RES., FXD, CMPSN: 47 OHM, 5%, 0.125W   | 01121         | BB4705          |
| R625    | 315-0220-00        |                      |                                       | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W    | 01121         | CB2205          |
| R630    | 315-0751-00        |                      |                                       | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W   | 01121         | CB7515          |
| R631    | 317-0470-00        |                      |                                       | RES., FXD, CMPSN: 47 OHM, 5%, 0.125W   | 01121         | BB4705          |
| R635    | 315-0220-00        |                      |                                       | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W    | 01121         | CB2205          |
| R637    | 315-0332-00        |                      |                                       | RES., FXD, CMPSN: 3.3K OHM, 5%, 0.25W  | 01121         | CB3325          |
| R640    | 315-0271-00        |                      |                                       | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W   | 01121         | CB2715          |
| R643    | 321-0297-00        |                      |                                       | RES., FXD, FILM: 12.1K OHM, 1%, 0.125W | 91637         | MFF1816G12101F  |
| R644    | 321-0225-00        |                      |                                       | RES., FXD, FILM: 2.15K OHM, 1%, 0.125W | 91637         | MFF1816G21500F  |
| R647    | 315-0111-00        |                      |                                       | RES., FXD, CMPSN: 110 OHM, 5%, 0.25W   | 01121         | CB1115          |
| R648    | 315-0111-00        |                      |                                       | RES., FXD, CMPSN: 110 OHM, 5%, 0.25W   | 01121         | CB1115          |
| R650    | 311-1248-00        |                      |                                       | RES., VAR, NONWIR: 500 OHM, 10%, 0.50W | 73138         | 72X-23-0-501K   |
| R655    | 311-1833-00        |                      |                                       | RES., VAR, NONWIR: 50K OHM, 10%, 0.50W | 01121         | 73A1G040L503A   |
| R660    | 321-0173-00        |                      |                                       | RES., FXD, FILM: 619 OHM, 1%, 0.125W   | 91637         | MFF1816G619R0F  |
| R662    | 315-0101-00        |                      |                                       | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W   | 01121         | CB1015          |
| R667    | 321-0289-00        |                      |                                       | RES., FXD, FILM: 10K OHM, 1%, 0.125W   | 91637         | MFF1816G10001F  |
| R668    | 321-0282-00        |                      |                                       | RES., FXD, FILM: 8.45K OHM, 1%, 0.125W | 91637         | MFF1816G84500F  |
| R670    | 321-0289-00        |                      |                                       | RES., FXD, FILM: 10K OHM, 1%, 0.125W   | 91637         | MFF1816G10001F  |
| R671    | 321-0282-00        |                      |                                       | RES., FXD, FILM: 8.45K OHM, 1%, 0.125W | 91637         | MFF1816G84500F  |
| R678    | 317-0101-00        |                      |                                       | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W  | 01121         | BB1015          |
| R682    | 315-0151-00        |                      |                                       | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W   | 01121         | CB1515          |
| R685    | 321-0069-00        |                      |                                       | RES., FXD, FILM: 51.1 OHM, 1%, 0.125W  | 91637         | MFF1816G51R10F  |
| R687    | 315-0220-00        |                      |                                       | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W    | 01121         | CB2205          |
| R690    | 321-0069-00        |                      |                                       | RES., FXD, FILM: 51.1 OHM, 1%, 0.125W  | 91637         | MFF1816G51R10F  |
| R692    | 315-0220-00        |                      |                                       | RES., FXD, CMPSN: 22 OHM, 5%, 0.25W    | 01121         | CB2205          |
| R695    | 321-0199-00        |                      |                                       | RES., FXD, FILM: 1.15K OHM, 1%, 0.125W | 91637         | MFF1816G11500F  |
| R697    | 317-0101-00        |                      |                                       | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W  | 01121         | BB1015          |
| R698    | 321-0153-00        |                      |                                       | RES., FXD, FILM: 383 OHM, 1%, 0.125W   | 91637         | MFF1816G383R0F  |
| R700    | 315-0751-00        |                      |                                       | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W   | 01121         | CB7515          |
| R702    | 315-0100-00        |                      |                                       | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W    | 01121         | CB1005          |
| R704    | 315-0162-00        |                      |                                       | RES., FXD, CMPSN: 1.6K OHM, 5%, 0.25W  | 01121         | CB1625          |
| R706    | 315-0100-00        |                      |                                       | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W    | 01121         | CB1005          |
| R708    | 315-0271-00        |                      |                                       | RES., FXD, CMPSN: 270 OHM, 5%, 0.25W   | 01121         | CB2715          |
| R710    | 321-0153-00        |                      |                                       | RES., FXD, FILM: 383 OHM, 1%, 0.125W   | 91637         | MFF1816G383R0F  |
| R712    | 321-0199-00        |                      |                                       | RES., FXD, FILM: 1.15K OHM, 1%, 0.125W | 91637         | MFF1816G11500F  |
| R715    | 315-0431-00        |                      |                                       | RES., FXD, CMPSN: 430 OHM, 5%, 0.25W   | 01121         | CB4315          |
| R722    | 315-0561-00        |                      |                                       | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W   | 01121         | CB5615          |
| R724    | 315-0561-00        |                      |                                       | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W   | 01121         | CB5615          |
| R728    | 315-0152-00        | B010100              | B020244                               | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.25W  | 01121         | CB1525          |
| R728    | 315-0751-00        | B020245              |                                       | RES., FXD, CMPSN: 750 OHM, 5%, 0.25W   | 01121         | CB7515          |
| R730    | 315-0561-00        | B010100              | B029999X                              | RES., FXD, CMPSN: 560 OHM, 5%, 0.25W   | 01121         | CB5615          |
| R732    | 315-0151-00        |                      |                                       | RES., FXD, CMPSN: 150 OHM, 5%, 0.25W   | 01121         | CB1515          |
| R734    | 315-0102-00        |                      |                                       | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W    | 01121         | CB1025          |
| R742    | 315-0471-00        |                      |                                       | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W   | 01121         | CB4715          |
| R743    | 315-0680-00        | XB030000             |                                       | RES., FXD, CMPSN: 68 OHM, 5%, 0.25W    | 01121         | CB6805          |
| R744    | 315-0301-00        |                      | RES., FXD, CMPSN: 300 OHM, 5%, 0.25W  | 01121                                  | CB3015        |                 |

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|----------|--------------------|----------------------|---------|---|----------|-----------------|
| R748     | 315-0471-00        |                      |         | RES., FXD, CMPSN: 470 OHM, 5%, 0.25W    | 01121    | CB4715          |
| R749     | 315-0680-00        |                      |         | RES., FXD, CMPSN: 68 OHM, 5%, 0.25W     | 01121    | CB6805          |
| R750     | 315-0301-00        |                      |         | RES., FXD, CMPSN: 300 OHM, 5%, 0.25W    | 01121    | CB3015          |
| R770A, B | 311-1162-00        |                      |         | RES., VAR, NONWIR: 2 X 10K OHM, 10%, 1W | 12697    | 381-CM39691     |
| R775     | 311-1245-00        |                      |         | RES., VAR, NONWIR: 10K OHM, 10%, 0.50W  | 73138    | 72-28-0         |
| R777     | 315-0105-00        |                      |         | RES., FXD, CMPSN: 1M OHM, 5%, 0.25W     | 01121    | CB1055          |
| R778     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R780     | 315-0182-00        |                      |         | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W   | 01121    | CB1825          |
| R782     | 317-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 0.125W    | 01121    | BB1005          |
| R785     | 311-1245-00        |                      |         | RES., VAR, NONWIR: 10K OHM, 10%, 0.50W  | 73138    | 72-28-0         |
| R787     | 315-0105-00        |                      |         | RES., FXD, CMPSN: 1M OHM, 5%, 0.25W     | 01121    | CB1055          |
| R788     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R790     | 315-0302-00        |                      |         | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W     | 01121    | CB3025          |
| R794     | 315-0302-00        |                      |         | RES., FXD, CMPSN: 3K OHM, 5%, 0.25W     | 01121    | CB3025          |
| R796     | 315-0103-00        |                      |         | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    | 01121    | CB1035          |
| R798     | 315-0103-00        |                      |         | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    | 01121    | CB1035          |
| R800     | 315-0183-00        |                      |         | RES., FXD, CMPSN: 18K OHM, 5%, 0.25W    | 01121    | CB1835          |
| R802     | 315-0223-00        |                      |         | RES., FXD, CMPSN: 22K OHM, 5%, 0.25W    | 01121    | CB2235          |
| R804     | 315-0103-00        |                      |         | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    | 01121    | CB1035          |
| R810     | 321-0289-00        |                      |         | RES., FXD, FILM: 10K OHM, 1%, 0.125W    | 91637    | MFF1816G10001F  |
| R811     | 321-0289-00        |                      |         | RES., FXD, FILM: 10K OHM, 1%, 0.125W    | 91637    | MFF1816G10001F  |
| R814     | 321-0289-00        |                      |         | RES., FXD, FILM: 10K OHM, 1%, 0.125W    | 91637    | MFF1816G10001F  |
| R815     | 321-0289-00        |                      |         | RES., FXD, FILM: 10K OHM, 1%, 0.125W    | 91637    | MFF1816G10001F  |
| R817     | 321-0182-00        |                      |         | RES., FXD, FILM: 768 OHM, 1%, 0.125W    | 91637    | MFF1816G768ROF  |
| R820     | 315-0101-00        |                      |         | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W    | 01121    | CB1015          |
| R825     | 321-0107-00        |                      |         | RES., FXD, FILM: 127 OHM, 1%, 0.125W    | 91637    | MFF1816G127ROF  |
| R827     | 315-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W     | 01121    | CB4705          |
| R830     | 321-0142-00        |                      |         | RES., FXD, FILM: 294 OHM, 1%, 0.125W    | 91637    | MFF1816G294ROF  |
| R832     | 321-0142-00        |                      |         | RES., FXD, FILM: 294 OHM, 1%, 0.125W    | 91637    | MFF1816G294ROF  |
| R834     | 315-0153-00        |                      |         | RES., FXD, CMPSN: 15K OHM, 5%, 0.25W    | 01121    | CB1535          |
| R836     | 315-0303-00        |                      |         | RES., FXD, CMPSN: 30K OHM, 5%, 0.25W    | 01121    | CB3035          |
| R840     | 321-0107-00        |                      |         | RES., FXD, FILM: 127 OHM, 1%, 0.125W    | 91637    | MFF1816G127ROF  |
| R842     | 315-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W     | 01121    | CB4705          |
| R845     | 322-0119-00        |                      |         | RES., FXD, FILM: 169 OHM, 1%, 0.25W     | 91637    | MFF1421G169ROF  |
| R847     | 323-0145-00        |                      |         | RES., FXD, FILM: 316 OHM, 1%, 0.50W     | 91637    | MFF1226G316ROF  |
| R850     | 321-0114-00        | B010100              | B020698 | RES., FXD, FILM: 150 OHM, 1%, 0.125W    | 91637    | MFF1816G150ROF  |
| R850     | 321-0121-00        | B020699              |         | RES., FXD, FILM: 178 OHM, 1%, 0.125W    | 91637    | MFF1816G178ROF  |
| R850     | -----              |                      |         | * NOMINAL VALUE, TEST SELECTED AS A SET |          |                 |
| R852     | 321-0114-00        | B010100              | B020698 | RES., FXD, FILM: 150 OHM, 1%, 0.125W    | 91637    | MFF1816G150ROF  |
| R852     | 321-0121-00        | B020699              |         | RES., FXD, FILM: 178 OHM, 1%, 0.125W    | 91637    | MFF1816G178ROF  |
| R852     | -----              |                      |         | * NOMINAL VALUE, TEST SELECTED AS A SET |          |                 |
| R854     | 321-0114-00        | B010100              | B020698 | RES., FXD, FILM: 150 OHM, 1%, 0.125W    | 91637    | MFF1816G150ROF  |
| R854     | 321-0121-00        | B020699              |         | RES., FXD, FILM: 178 OHM, 1%, 0.125W    | 91637    | MFF1816G178ROF  |
| R854     | -----              |                      |         | * NOMINAL VALUE, TEST SELECTED AS A SET |          |                 |
| R856     | 321-0114-00        | B010100              | B020698 | RES., FXD, FILM: 150 OHM, 1%, 0.125W    | 91637    | MFF1816G150ROF  |
| R856     | 321-0121-00        | B020699              |         | RES., FXD, FILM: 178 OHM, 1%, 0.125W    | 91637    | MFF1816G178ROF  |
| R856     | -----              |                      |         | * NOMINAL VALUE, TEST SELECTED AS A SET |          |                 |
| R860     | 315-0102-00        |                      |         | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W     | 01121    | CB1025          |
| R861     | 315-0222-00        |                      |         | RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W   | 01121    | CB2225          |
| R863     | 315-0201-00        |                      |         | RES., FXD, CMPSN: 200 OHM, 5%, 0.25W    | 01121    | CB2015          |
| R865     | 315-0222-00        |                      |         | RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W   | 01121    | CB2225          |
| R866     | 315-0222-00        |                      |         | RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W   | 01121    | CB2225          |
| R868     | 315-0222-00        |                      |         | RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W   | 01121    | CB2225          |

Replaceable Electrical Parts—PG 508

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|---------|--------------------|----------------------|--------|--|----------|-----------------|
| R869    | 315-0222-00        |                      |        | RES., FXD, CMPSN: 2.2K OHM, 5%, 0.25W      | 01121    | CB2225          |
| R875    | 315-0301-00        |                      |        | RES., FXD, CMPSN: 300 OHM, 5%, 0.25W       | 01121    | CB3015          |
| R876    | 315-0272-00        |                      |        | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W      | 01121    | CB2725          |
| R878    | 315-0510-00        |                      |        | RES., FXD, CMPSN: 51 OHM, 5%, 0.25W        | 01121    | CB5105          |
| R883    | 315-0470-00        |                      |        | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W        | 01121    | CB4705          |
| R885    | 311-1566-00        |                      |        | RES., VAR, NONWIR: 200 OHM, 20%, 0.50W     | 73138    | 91-88-0         |
| R887    | 321-0097-00        |                      |        | RES., FXD, FILM: 100 OHM, 1%, 0.125W       | 91637    | MFF1816G100ROF  |
| R888    | 321-0097-00        |                      |        | RES., FXD, FILM: 100 OHM, 1%, 0.125W       | 91637    | MFF1816G100ROF  |
| R892    | 321-0271-00        |                      |        | RES., FXD, FILM: 6.49K OHM, 1%, 0.125W     | 91637    | MFF1816G64900F  |
| R893    | 321-0289-00        |                      |        | RES., FXD, FILM: 10K OHM, 1%, 0.125W       | 91637    | MFF1816G10001F  |
| R895    | 321-0271-00        |                      |        | RES., FXD, FILM: 6.49K OHM, 1%, 0.125W     | 91637    | MFF1816G64900F  |
| R897    | 321-0289-00        |                      |        | RES., FXD, FILM: 10K OHM, 1%, 0.125W       | 91637    | MFF1816G10001F  |
| R898    | 323-0133-00        |                      |        | RES., FXD, FILM: 237 OHM, 1%, 0.50W        | 75042    | CECT0-2370F     |
| R900    | 315-0101-00        |                      |        | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W       | 01121    | CB1015          |
| R904    | 321-0223-00        |                      |        | RES., FXD, FILM: 2.05K OHM, 1%, 0.125W     | 91637    | MFF1816G20500F  |
| R905    | 321-0324-00        |                      |        | RES., FXD, FILM: 23.2K OHM, 1%, 0.125W     | 91637    | MFF1816G23201F  |
| R908    | 321-0223-00        |                      |        | RES., FXD, FILM: 2.05K OHM, 1%, 0.125W     | 91637    | MFF1816G20500F  |
| R910    | 311-1562-00        |                      |        | RES., VAR, NONWIR: 2K OHM, 20%, 0.50W      | 73138    | 91A R2K         |
| R911    | 321-0322-00        |                      |        | RES., FXD, FILM: 22.1K OHM, 1%, 0.125W     | 91637    | MFF1816G22101F  |
| R914    | 315-0203-00        |                      |        | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W       | 01121    | CB2035          |
| R915    | 311-1559-00        |                      |        | RES., VAR, NONWIR: 10K OHM, 20%, 0.50W     | 73138    | 91A-10001M      |
| R918    | 315-0203-00        |                      |        | RES., FXD, CMPSN: 20K OHM, 5%, 0.25W       | 01121    | CB2035          |
| R920    | 311-1559-00        |                      |        | RES., VAR, NONWIR: 10K OHM, 20%, 0.50W     | 73138    | 91A-10001M      |
| R924    | 315-0273-00        |                      |        | RES., FXD, CMPSN: 27K OHM, 5%, 0.25W       | 01121    | CB2735          |
| R925    | 311-1559-00        |                      |        | RES., VAR, NONWIR: 10K OHM, 20%, 0.50W     | 73138    | 91A-10001M      |
| R930    | 315-0432-00        |                      |        | RES., FXD, CMPSN: 4.3K OHM, 5%, 0.25W      | 01121    | CB4325          |
| R932    | 321-0287-00        |                      |        | RES., FXD, FILM: 9.53K OHM, 1%, 0.125W     | 91637    | MFF1816G95300F  |
| R934    | 321-0260-00        |                      |        | RES., FXD, FILM: 4.99K OHM, 1%, 0.125W     | 91637    | MFF1816G49900F  |
| R936    | 321-0260-00        |                      |        | RES., FXD, FILM: 4.99K OHM, 1%, 0.125W     | 91637    | MFF1816G49900F  |
| R938    | 321-0289-00        |                      |        | RES., FXD, FILM: 10K OHM, 1%, 0.125W       | 91637    | MFF1816G10001F  |
| R942    | 321-0289-00        |                      |        | RES., FXD, FILM: 10K OHM, 1%, 0.125W       | 91637    | MFF1816G10001F  |
| R944    | 315-0101-00        |                      |        | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W       | 01121    | CB1015          |
| R945    | 315-0821-00        |                      |        | RES., FXD, CMPSN: 820 OHM, 5%, 0.25W       | 01121    | CB8215          |
| R947    | 323-0157-00        |                      |        | RES., FXD, FILM: 422 OHM, 1%, 0.50W        | 91637    | MFF1226G422ROF  |
| R950    | 317-0100-00        |                      |        | RES., FXD, CMPSN: 10 OHM, 5%, 0.125W       | 01121    | BB1005          |
| R954    | 317-0100-00        |                      |        | RES., FXD, CMPSN: 10 OHM, 5%, 0.125W       | 01121    | BB1005          |
| R956    | 317-0101-00        |                      |        | RES., FXD, CMPSN: 100 OHM, 5%, 0.125W      | 01121    | BB1015          |
| R958    | 315-0102-00        |                      |        | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W        | 01121    | CB1025          |
| R975    | 315-0100-00        |                      |        | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W        | 01121    | CB1005          |
| R977    | 315-0160-00        |                      |        | RES., FXD, CMPSN: 16 OHM, 5%, 0.25W        | 01121    | CB1605          |
| R978    | 301-0751-00        |                      |        | RES., FXD, CMPSN: 750 OHM, 5%, 0.50W       | 01121    | EB7515          |
| R982    | 321-0001-00        |                      |        | RES., FXD, FILM: 10 OHM, 1%, 0.125W        | 75042    | CEAT0-10R00F    |
| R985    | 322-0051-00        |                      |        | RES., FXD, FILM: 33.2 OHM, 1%, 0.25W       | 75042    | CEBT0-33R20F    |
| R990    | 307-0110-00        |                      |        | RES., FXD, CMPSN: 3 OHM, 5%, 0.25W         | 01121    | CB30G5          |
| R992    | 315-0100-00        |                      |        | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W        | 01121    | CB1005          |
| R995    | 301-0472-00        |                      |        | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.50W      | 01121    | EB4725          |
| R1000   | 321-0218-00        |                      |        | RES., FXD, FILM: 1.82K OHM, 1%, 0.125W     | 91637    | MFF1816G18200F  |
| R1002   | 321-0136-00        |                      |        | RES., FXD, FILM: 255 OHM, 1%, 0.125W       | 91637    | MFF1816G255ROF  |
| R1005   | 315-0430-00        |                      |        | RES., FXD, CMPSN: 43 OHM, (NOM VALUE), SEL | 01121    | CB4305          |
| R1014   | 307-0114-00        |                      |        | RES., FXD, CMPSN: 6.2 OHM, 5%, 0.25W       | 01121    | CB62G5          |
| R1017   | 315-0821-00        |                      |        | RES., FXD, CMPSN: 820 OHM, 5%, 0.25W       | 01121    | CB8215          |
| R1018   | 307-0114-00        |                      |        | RES., FXD, CMPSN: 6.2 OHM, 5%, 0.25W       | 01121    | CB62G5          |
| R1019   | 301-0132-00        |                      |        | RES., FXD, CMPSN: 1.3K OHM, 5%, 0.50W      | 01121    | EB1325          |

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|---------|--------------------|----------------------|---------|---|----------|-----------------|
| R1020   | 311-1563-00        |                      |         | RES., VAR, NONWIR: 1K OHM, 20%, 0.50W   | 73138    | 91A R1K         |
| R1021   | 303-0391-00        |                      |         | RES., FXD, CMPSN: 390 OHM, 5%, 1W       | 01121    | GB3915          |
| R1024   | 311-1567-00        |                      |         | RES., VAR, NONWIR: TRMR, 100 OHM, 0.50W | 73138    | 91-89-0         |
| R1026   | 305-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 2W        | 01121    | HB4705          |
| R1027   | 305-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 2W        | 01121    | HB4705          |
| R1028   | 303-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 1W        | 01121    | GB1005          |
| R1029   | 303-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 1W        | 01121    | GB1005          |
| R1030   | 305-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 2W        | 01121    | HB4705          |
| R1031   | 305-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 2W        | 01121    | HB4705          |
| R1032   | 303-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 1W        | 01121    | GB1005          |
| R1033   | 303-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 1W        | 01121    | GB1005          |
| R1035   | 315-0273-00        |                      |         | RES., FXD, CMPSN: 27K OHM, 5%, 0.25W    | 01121    | CB2735          |
| R1040   | 315-0105-00        |                      |         | RES., FXD, CMPSN: 1M OHM, 5%, 0.25W     | 01121    | CB1055          |
| R1042   | 322-0222-00        |                      |         | RES., FXD, FILM: 2K OHM, 1%, 0.25W      | 75042    | CEBT0-2001F     |
| R1044   | 315-0105-00        |                      |         | RES., FXD, CMPSN: 1M OHM, 5%, 0.25W     | 01121    | CB1055          |
| R1048   | 315-0390-00        |                      |         | RES., FXD, CMPSN: 39 OHM, 5%, 0.25W     | 01121    | CB3905          |
| R1050   | 311-1568-00        |                      |         | RES., VAR, NONWIR: 50 OHM, 20%, 0.50W   | 73138    | 91A R50         |
| R1055   | 315-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121    | CB1005          |
| R1057   | 315-0160-00        |                      |         | RES., FXD, CMPSN: 16 OHM, 5%, 0.25W     | 01121    | CB1605          |
| R1058   | 301-0751-00        |                      |         | RES., FXD, CMPSN: 750 OHM, 5%, 0.50W    | 01121    | EB7515          |
| R1062   | 321-0001-00        |                      |         | RES., FXD, FILM: 10 OHM, 1%, 0.125W     | 75042    | CEAT0-10R00F    |
| R1065   | 322-0051-00        |                      |         | RES., FXD, FILM: 33.2 OHM, 1%, 0.25W    | 75042    | CEBT0-33R20F    |
| R1072   | 315-0100-00        |                      |         | RES., FXD, CMPSN: 10 OHM, 5%, 0.25W     | 01121    | CB1005          |
| R1075   | 301-0472-00        |                      |         | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.50W   | 01121    | EB4725          |
| R1080   | 321-0218-00        |                      |         | RES., FXD, FILM: 1.82K OHM, 1%, 0.125W  | 91637    | MFF1816G18200F  |
| R1082   | 321-0136-00        |                      |         | RES., FXD, FILM: 255 OHM, 1%, 0.125W    | 91637    | MFF1816G255R0F  |
| R1085   | 315-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W     | 01121    | CB4705          |
| R1094   | 307-0114-00        |                      |         | RES., FXD, CMPSN: 6.2 OHM, 5%, 0.25W    | 01121    | CB62G5          |
| R1098   | 307-0114-00        |                      |         | RES., FXD, CMPSN: 6.2 OHM, 5%, 0.25W    | 01121    | CB62G5          |
| R1202   | 315-0272-00        |                      |         | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W   | 01121    | CB2725          |
| R1205   | 308-0179-00        |                      |         | RES., FXD, WW: 5 OHM, 5%, 5W            | 91637    | RS5-D5R000J     |
| R1209   | 321-0209-00        |                      |         | RES., FXD, FILM: 1.47K OHM, 1%, 0.125W  | 91637    | MFF1816G14700F  |
| R1210   | 311-1562-00        |                      |         | RES., VAR, NONWIR: 2K OHM, 20%, 0.50W   | 73138    | 91A R2K         |
| R1211   | 321-0265-00        |                      |         | RES., FXD, FILM: 5.62K OHM, 1%, 0.125W  | 91637    | MFF1816G56200F  |
| R1215   | 308-0245-00        |                      |         | RES., FXD, WW: 0.6 OHM, 5%, 2W          | 91637    | CW-2B30.60HM 5% |
| R1217   | 315-0182-00        |                      |         | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W   | 01121    | CB1825          |
| R1230   | 315-0123-00        |                      |         | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W    | 01121    | CB1235          |
| R1232   | 311-1559-00        |                      |         | RES., VAR, NONWIR: 10K OHM, 20%, 0.50W  | 73138    | 91A-10001M      |
| R1234   | 315-0123-00        |                      |         | RES., FXD, CMPSN: 12K OHM, 5%, 0.25W    | 01121    | CB1235          |
| R1236   | 311-1559-00        |                      |         | RES., VAR, NONWIR: 10K OHM, 20%, 0.50W  | 73138    | 91A-10001M      |
| R1250   | 315-0221-00        |                      |         | RES., FXD, CMPSN: 220 OHM, 5%, 0.25W    | 01121    | CB2215          |
| R1255   | 315-0182-00        |                      |         | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W   | 01121    | CB1825          |
| R1257   | 315-0752-00        | B010100              | B010149 | RES., FXD, CMPSN: 7.5K OHM, 5%, 0.25W   | 01121    | CB7525          |
| R1257   | 315-0512-00        | B010150              |         | RES., FXD, CMPSN: 5.1K OHM, 5%, 0.25W   | 01121    | CB5125          |
| R1259   | 315-0103-00        |                      |         | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    | 01121    | CB1035          |
| R1260   | 315-0103-00        |                      |         | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    | 01121    | CB1035          |
| R1265   | 321-0246-00        |                      |         | RES., FXD, FILM: 3.57K OHM, 1%, 0.125W  | 91637    | MFF1816G35700F  |
| R1266   | 321-0246-00        |                      |         | RES., FXD, FILM: 3.57K OHM, 1%, 0.125W  | 91637    | MFF1816G35700F  |
| R1270   | 315-0103-00        |                      |         | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W    | 01121    | CB1035          |
| R1272   | 321-0238-00        |                      |         | RES., FXD, FILM: 2.94K OHM, 1%, 0.125W  | 91637    | MFF1816G29400F  |
| R1273   | 321-0254-00        |                      |         | RES., FXD, FILM: 4.32K OHM, 1%, 0.125W  | 91637    | MFF1816G43200F  |
| R1275   | 321-0296-00        |                      |         | RES., FXD, FILM: 11.8K OHM, 1%, 0.125W  | 91637    | MFF1816G11801F  |
| R1276   | 315-0470-00        |                      |         | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W     | 01121    | CB4705          |

Replaceable Electrical Parts—PG 508

| Ckt No.  | Tektronix Part No. | Serial/Model No. Eff | Dscont | Name & Description                        | Mfr Code | Mfr Part Number |
|----------|--------------------|----------------------|--------|---|----------|-----------------|
| R1280    | 315-0102-00        |                      |        | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W       | 01121    | CB1025          |
| R1282    | 308-0767-00        |                      |        | RES., FXD, WW: 1.1 OHM, 5%, 1W            | 75042    | BW20-1R100J     |
| R1285    | 315-0272-00        |                      |        | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W     | 01121    | CB2725          |
| R1287    | 315-0103-00        |                      |        | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W      | 01121    | CB1035          |
| R1290    | 315-0101-00        |                      |        | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W      | 01121    | CB1015          |
| R1295    | 301-0152-00        |                      |        | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.50W     | 01121    | EB1525          |
| R1297    | 321-0124-00        |                      |        | RES., FXD, FILM: 191 OHM, 1%, 0.125W      | 91637    | MFF1816G191ROF  |
| R1298    | 315-0392-00        |                      |        | RES., FXD, CMPSN: 3.9K OHM, 5%, 0.25W     | 01121    | CB3925          |
| R1300    | 321-0164-00        |                      |        | RES., FXD, FILM: 499 OHM, 1%, 0.125W      | 91637    | MFF1816G499ROF  |
| R1302    | 321-0326-00        |                      |        | RES., FXD, FILM: 24.3K OHM, 1%, 0.125W    | 91637    | MFF1816G24301F  |
| R1305    | 321-0290-00        |                      |        | RES., FXD, FILM: 10.2K OHM, 1%, 0.125W    | 91637    | MFF1816G10201F  |
| R1306    | 321-0211-00        |                      |        | RES., FXD, FILM: 1.54K OHM, 1%, 0.125W    | 91637    | MFF1816G15400F  |
| R1310    | 315-0472-00        |                      |        | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W     | 01121    | CB4725          |
| R1327    | 315-0272-00        |                      |        | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W     | 01121    | CB2725          |
| R1330    | 305-0471-00        |                      |        | RES., FXD, CMPSN: 470 OHM, 5%, 2W         | 01121    | HB4715          |
| R1355    | 315-0182-00        |                      |        | RES., FXD, CMPSN: 1.8K OHM, 5%, 0.25W     | 01121    | CB1825          |
| R1357    | 321-0277-00        |                      |        | RES., FXD, FILM: 7.5K OHM, 1%, 0.125W     | 91637    | MFF1816G75000F  |
| R1359    | 315-0103-00        |                      |        | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W      | 01121    | CB1035          |
| R1360    | 315-0103-00        |                      |        | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W      | 01121    | CB1035          |
| R1365    | 321-0246-00        |                      |        | RES., FXD, FILM: 3.57K OHM, 1%, 0.125W    | 91637    | MFF1816G35700F  |
| R1366    | 321-0246-00        |                      |        | RES., FXD, FILM: 3.57K OHM, 1%, 0.125W    | 91637    | MFF1816G35700F  |
| R1370    | 315-0103-00        |                      |        | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W      | 01121    | CB1035          |
| R1372    | 321-0236-00        |                      |        | RES., FXD, FILM: 2.8K OHM, 1%, 0.125W     | 91637    | MFF1816G28000F  |
| R1373    | 321-0278-00        |                      |        | RES., FXD, FILM: 7.68K OHM, 1%, 0.125W    | 91637    | MFF1816G76800F  |
| R1375    | 321-0303-00        |                      |        | RES., FXD, FILM: 14K OHM, 1%, 0.125W      | 91637    | MFF1816G14001F  |
| R1376    | 315-0470-00        |                      |        | RES., FXD, CMPSN: 47 OHM, 5%, 0.25W       | 01121    | CB4705          |
| R1380    | 315-0102-00        |                      |        | RES., FXD, CMPSN: 1K OHM, 5%, 0.25W       | 01121    | CB1025          |
| R1382    | 308-0767-00        |                      |        | RES., FXD, WW: 1.1 OHM, 5%, 1W            | 75042    | BW20-1R100J     |
| R1385    | 315-0272-00        |                      |        | RES., FXD, CMPSN: 2.7K OHM, 5%, 0.25W     | 01121    | CB2725          |
| R1387    | 315-0103-00        |                      |        | RES., FXD, CMPSN: 10K OHM, 5%, 0.25W      | 01121    | CB1035          |
| R1390    | 315-0101-00        |                      |        | RES., FXD, CMPSN: 100 OHM, 5%, 0.25W      | 01121    | CB1015          |
| R1395    | 301-0152-00        |                      |        | RES., FXD, CMPSN: 1.5K OHM, 5%, 0.50W     | 01121    | EB1525          |
| R1397    | 321-0124-00        |                      |        | RES., FXD, FILM: 191 OHM, 1%, 0.125W      | 91637    | MFF1816G191ROF  |
| R1398    | 315-0392-00        |                      |        | RES., FXD, CMPSN: 3.9K OHM, 5%, 0.25W     | 01121    | CB3925          |
| R1400    | 321-0164-00        |                      |        | RES., FXD, FILM: 499 OHM, 1%, 0.125W      | 91637    | MFF1816G499ROF  |
| R1402    | 321-0321-00        |                      |        | RES., FXD, FILM: 21.5K OHM, 1%, 0.125W    | 91637    | MFF1816G21501F  |
| R1405    | 321-0306-00        |                      |        | RES., FXD, FILM: 15K OHM, 1%, 0.125W      | 91637    | MFF1816G15001F  |
| R1406    | 321-0204-00        |                      |        | RES., FXD, FILM: 1.3K OHM, 1%, 0.125W     | 91637    | MFF1816G13000F  |
| R1410    | 315-0472-00        |                      |        | RES., FXD, CMPSN: 4.7K OHM, 5%, 0.25W     | 01121    | CB4725          |
| S12      | 260-0723-00        |                      |        | SWITCH, SLIDE: DPDT, 0.5A, 125VAC         | 79727    | GF126-0028      |
| S75A-C   | 260-1723-00        |                      |        | SWITCH, PUSH: 3 BUTTON, 2 POLE            | 80009    | 260-1723-00     |
| S200     | 263-1142-00        |                      |        | SW CAM ACTR AS: PERIOD                    | 80009    | 263-1142-00     |
| S330A, B | 263-1141-00        |                      |        | SW CAM ACTR AS: DELAY                     | 80009    | 263-1141-00     |
| S380A, B | 260-1801-00        |                      |        | SWITCH, PUSH: DPDT, 2 BUTTON              | 80009    | 260-1801-00     |
| S450     | 263-1144-00        |                      |        | SW CAM ACTR AS: DURATION                  | 80009    | 263-1144-00     |
| S590     | 263-1143-00        |                      |        | SW CAM ACTR AS: RANGE                     | 80009    | 263-1143-00     |
| S785     | 260-1453-00        |                      |        | SWITCH, PUSH: 1 BUTTON                    | 80009    | 260-1453-00     |
| S865     | 260-1453-00        |                      |        | SWITCH, PUSH: 1 BUTTON                    | 80009    | 260-1453-00     |
| U40      | 156-0067-00        |                      |        | MICROCIRCUIT, LI: OPERATIONAL AMPLIFIER   | 80009    | 156-0067-00     |
| U60      | 156-0197-00        |                      |        | MICROCIRCUIT, LI: 5 TRANSISTOR ARRAY      | 80009    | 156-0197-00     |
| U70      | 156-0182-00        |                      |        | MICROCIRCUIT, DI: TRIPLE 2-3-2 INPUT GATE | 80009    | 156-0182-00     |
| U140     | 156-0182-00        |                      |        | MICROCIRCUIT, DI: TRIPLE 2-3-2 INPUT GATE | 80009    | 156-0182-00     |
| U270     | 156-0205-00        |                      |        | MICROCIRCUIT, DI: QUAD 2-INPUT NOR GATE   | 80009    | 156-0205-00     |

| Ckt No. | Tektronix Part No. | Serial/Model No. Eff | Dscont  | Name & Description                         | Mfr Code | Mfr Part Number |
|---------|--------------------|----------------------|---------|--|----------|-----------------|
| U300    | 156-0182-00        |                      |         | MICROCIRCUIT,DI:TRIPLE 2-3-2 INPUT GATE    | 80009    | 156-0182-00     |
| U360    | 156-0205-00        |                      |         | MICROCIRCUIT,DI:QUAD 2-INPUT NOR GATE      | 80009    | 156-0205-00     |
| U400    | 156-0182-00        |                      |         | MICROCIRCUIT,DI:TRIPLE 2-3-2 INPUT GATE    | 80009    | 156-0182-00     |
| U480    | 156-0230-00        | B010100              | B029999 | MICROCIRCUIT,DI:DUAL D MA-SLAVE FLIP-FLOP  | 80009    | 156-0230-00     |
| U480    | 156-0880-00        | B030000              |         | MICROCIRCUIT,DI:DUAL D MASTER SLAVE FF     | 80009    | 156-0880-00     |
| U665    | 156-0067-00        |                      |         | MICROCIRCUIT,LI:OPERATIONAL AMPLIFIER      | 80009    | 156-0067-00     |
| U720    | 156-0230-00        | B010100              | B029999 | MICROCIRCUIT,DI:DUAL D MA-SLAVE FLIP-FLOP  | 80009    | 156-0230-00     |
| U720    | 156-0880-00        | B030000              |         | MICROCIRCUIT,DI:DUAL D MASTER SLAVE FF     | 80009    | 156-0880-00     |
| U740    | 156-0205-00        |                      |         | MICROCIRCUIT,DI:QUAD 2-INPUT NOR GATE      | 80009    | 156-0205-00     |
| U780    | 156-0158-00        |                      |         | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 80009    | 156-0158-00     |
| U800    | 156-0158-00        |                      |         | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 80009    | 156-0158-00     |
| U850    | 155-0078-10        |                      |         | MICROCIRCUIT,LI:ML,VERTICAL AMPLIFIER,SEL  | 80009    | 155-0078-10     |
| U895    | 156-0158-00        |                      |         | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 80009    | 156-0158-00     |
| U930    | 156-0158-00        |                      |         | MICROCIRCUIT,LI:DUAL OPERATIONAL AMPLIFIER | 80009    | 156-0158-00     |
| U1205   | 156-0312-00        |                      |         | MICROCIRCUIT,LI:VOLTAGE REGULATOR,15V,1A   | 27014    | LM340T-15       |
| U1210   | 156-0071-00        |                      |         | MICROCIRCUIT,LI:VOLTAGE REGULATOR          | 80009    | 156-0071-00     |
| U1335   | 156-0527-00        |                      |         | MICROCIRCUIT,LI:NEG VOLTAGE REGULATOR,15V  | 80009    | 156-0527-00     |
| VR20    | 152-0127-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,7.5V,5%         | 80009    | 152-0127-00     |
| VR22    | 152-0127-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,7.5V,5%         | 80009    | 152-0127-00     |
| VR65    | 152-0217-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,8.2V,5%         | 80009    | 152-0217-00     |
| VR172   | 152-0279-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,5.1V,5%         | 80009    | 152-0279-00     |
| VR620   | 153-0063-00        |                      |         | SEMICONV DVC SE:MATCHED,50MV AT 10 MA      | 80009    | 153-0063-00     |
| VR630   |                    |                      |         |  |          |                 |
| VR944   | 152-0279-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,5.1V,5%         | 80009    | 152-0279-00     |
| VR975   | 152-0149-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,10V,5%          | 80009    | 152-0149-00     |
| VR1000  | 152-0278-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,3V,5%           | 07910    | 1N4372A         |
| VR1080  | 152-0278-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,3V,5%           | 07910    | 1N4372A         |
| VR1257  | 152-0280-00        | XB010150             |         | SEMICONV DEVICE:ZENER,0.4W,6.2V,5%         | 80009    | 152-0280-00     |
| VR1330  | 152-0395-00        |                      |         | SEMICONV DEVICE:ZENER,0.4W,4.3V,5%         | 04713    | 1N749A          |
| W306    | 131-0566-00        | XB020245             |         | LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L   | 55210    | L-2007-1        |
| W422    | 131-0566-00        | XB020245             |         | LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L   | 55210    | L-2007-1        |
| W455    | 131-0566-00        | XB020245             |         | LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L   | 55210    | L-2007-1        |



# SERVICE INFORMATION

## 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 (μF).
- Resistors = Ohms (Ω).

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

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

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

Abbreviations are based on ANSI Y1.1-1972.

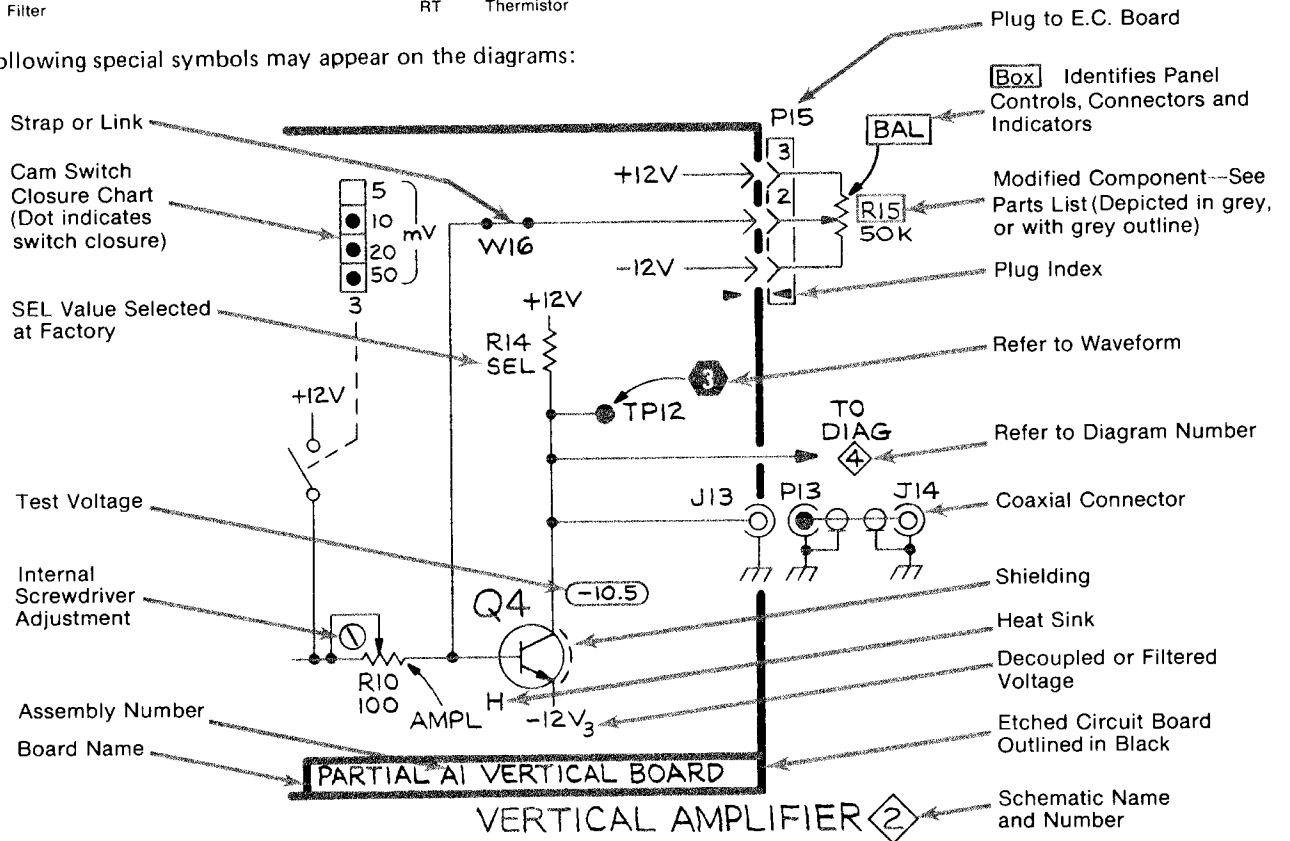
Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

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

The following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

|    |  |    |   |    |  |
|----|--|----|---|----|--|
| A  | Assembly, separable or repairable (circuit board, etc) | H  | Heat dissipating device (heat sink, heat radiator, etc) | S  | Switch or contactor  |
| AT | Attenuator, fixed or variable                          | HR | Heater  | T  | Transformer  |
| B  | Motor  | HY | Hybrid circuit  | TC | Thermocouple   |
| BT | Battery  | J  | Connector, stationary portion                           | TP | Test point   |
| C  | Capacitor, fixed or variable                           | K  | Relay   | U  | Assembly, inseparable or non-repairable (integrated circuit, etc.) |
| CB | Circuit breaker  | L  | Inductor, fixed or variable                             | V  | Electron tube  |
| CR | Diode, signal or rectifier                             | M  | Meter   | VR | Voltage regulator (zener diode, etc.)                              |
| DL | Delay line   | P  | Connector, movable portion                              | W  | Wirestrap or cable   |
| DS | Indicating device (lamp)                               | Q  | Transistor or silicon-controlled rectifier              | Y  | Crystal  |
| E  | Spark Gap, Ferrite bead                                | R  | Resistor, fixed or variable                             | Z  | Phase shifter  |
| F  | Fuse   | RT | Thermistor  |    |  |
| FL | Filter   |    |   |    |  |

The following special symbols may appear on the diagrams:



# GENERAL MAINTENANCE AND ADJUSTMENTS

## Services Available

Tektronix, Inc. provides complete instrument repair and adjustment at local Field Service Centers and at the Factory Service Center. Contact your local Tektronix Field Office or Representative for further information.

## Maintenance

Refer to the TM 500-series power module manuals for complete maintenance information. For replacement of cam switch contacts, cam switch repair kits are available from Tektronix. To obtain the kits, contact your local Tektronix Field Office or representative.

If trouble exists in the output amplifier, remove the + and — tracking power supply jumpers located as shown in the adjustment location illustration. This completely isolates the tracking power supplies from the output circuitry.

## Circuit Board Removal

To remove the output circuit board and gain access to the components on the variable transition timing board, first remove the four screws on the plug-in rear panel and remove the panel. Next remove the TRANSITION TIME knob. Disconnect the coaxial cable plugs and unplug all the wires connected to the output or transition time boards. Finally, remove the four screws holding the output board to the plug-in frame and remove the two boards by sliding toward the rear of the plug-in until the TRANSITION TIME shaft clears the front panel hole. Now lift the boards and remove them from the mainframe. To remove the input board remove the wires and cables to the input board and the two screws holding the board to the chassis. To remove the timing board, first remove the rear panel, as explained above. Then remove the PERIOD, DELAY, and DURATION knobs from their shafts. Disconnect all wires and cables leading to the timing board. Remove the four screws holding the timing board to the spacers. Slide the timing board toward the rear of the plug-in until the shafts clear the front panel and lift the board out.

## Test Equipment

For complete calibration of the PG 508, the following equipment is recommended:

Power module with four compartments or more, TEKTRONIX TM 504.

Digital voltmeter with ranges greater than  $\pm 26$  V, TEKTRONIX DM 502 or equivalent (requires a TM 500-series power module).

Digital counter capable of frequencies to 51 MHz, TEKTRONIX DC 504 (requires a TM 500-series power module).

5 kHz to 500 kHz square-wave generator with variable frequency control and external triggering capabilities, TEKTRONIX PG 501 (requires a TM 500-series power module).

Complete oscilloscope system, sampling and real time, capable of faithful reproduction to at least 500 MHz. TEKTRONIX 5440 mainframe, 5A45 real time vertical amplifier, 5B42 real time delaying sweep plug-in, and 5S14N sampler plug-in suggested.

Two flexible plug-in extender cables, Tektronix Part No. 067-0645-02.

50  $\Omega$  42 inch coaxial cable with bnc connectors, Tektronix Part No. 012-0057-01, or equivalent.

50  $\Omega$  termination, bnc connectors, Tektronix Part No. 011-0049-01, or equivalent.

50  $\Omega$  10X attenuator, bnc connectors, Tektronix Part No. 011-0059-02, or equivalent.

Bnc female to dual banana adapter, Tektronix Part No. 103-0090-00.

## General

For easy access to all adjustments, calibrate the PG 508 using the extender cables. Make certain the cables and plug-in are properly connected; top of each end of extender cable to top of power module and to top of plug-in. Adjustments are located on the output board (right side of instrument), period board (left side and top) and transition board (through the bottom of the instrument). Make adjustments at an ambient temperature between  $+20^{\circ}\text{C}$  and  $+30^{\circ}\text{C}$ . Recommended recalibration interval is 2000 hours of operation or six months, whichever occurs first.

## Output Voltage Control Knob Check or Adjustment

To check or reset the OUTPUT (VOLTS) control knobs, use the following procedure. Connect an oscilloscope to the PG 508 OUTPUT connector. Set the DURATION control to the SQ WAVE position, and the PERIOD control at the 2 ms position. Set the HIGH LEVEL knob for an output level of about +5 V on the oscilloscope, and the LOW LEVEL for 0 V. If the LOW LEVEL knob does not point to 0, loosen the set screw and reset the knob to the 0 mark on the front panel. Now set the LOW LEVEL knob for a reading of about -5 V, and the HIGH LEVEL for 0 V on the oscilloscope. If the HIGH LEVEL knob does not point to 0, loosen the setscrew and readjust.

### 1. Adjust 5.2 V Supply

Connect the + lead from the DVM to the point labeled +5.2 V in the illustration and the — lead to ground. Adjust R1210, 5.2, for a reading of +5.2 V.

### 2. Adjust 2 $\mu\text{s}$ Period

Connect the coaxial cable to the +TRIG OUT connector. Connect the 50  $\Omega$  termination to the other end of the cable and connect the termination to the counter input. Set the counter to read 500 kHz. Set the PERIOD control to the 2  $\mu\text{s}$  position. Make certain the CAL knob is fully ccw. Adjust R186, Per, for a frequency of 500 kHz.

### 3. Adjust Symmetry

Maintain the PERIOD as in the previous step and the CAL knob fully clockwise. Connect the +TRIG OUT through the coaxial cable and termination to the vertical amplifier input of the oscilloscope. Set the oscilloscope sweep rate so that one-half cycle of the waveform is displayed over most of the graticule. While switching from + slope to — slope on the oscilloscope triggering, adjust R180, Sym, so that the waveform transitions occur at exactly the same point on the oscilloscope graticule.

#### 4. Adjust 20 ns Period

Connect the + TRIG OUT through a coaxial cable and termination to the counter set to read 50 MHz. Make certain the CAL knob is in the fully ccw position. Change the PERIOD to the 20 ns position. Now adjust R195, 20 ns Per, for a reading of 50 MHz.

#### 5. Adjust 1st Period 2 $\mu$ s

Set the PERIOD to 2  $\mu$ s and the DURATION to SQ WAVE. Turn the PERIOD CAL control fully cw. Push the correct buttons for SYNC GATE and + SLOPE operation. Connect the + TRIG OUT from the PG 508 to the vertical amplifier of the oscilloscope. Connect the trigger output from the square-wave generator to the external trigger input of the oscilloscope real time base. Connect the output from the square-wave generator to the TRIG/GATE IN connector of the PG 508. Set the square-wave generator for a 5 kHz square wave. Adjust the TRIG/GATE LEVEL control of the PG 508 for gated operation. The TRIG'D/GATED light will flash when the unit is properly triggered. Set the oscilloscope sweep speed at 50  $\mu$ s and trigger the time base externally from the square-wave generator. Now adjust the square-wave generator variable frequency control for a gated burst of about ten cycles from the + TRIG OUT connector on the PG 508. Set the delayed sweep rate for the time base at 5  $\mu$ s and switch the time base to the delayed sweep. Using the delay time multiplier dial, compare the period of the first and fourth cycles in the burst. Adjust R170 1 Per for a first period length matching the fourth period length.

#### 6. Adjust 1st Period 20 ns.

Change the PERIOD to 20 ns. Turn the PERIOD CAL control fully cw. Set the square-wave frequency to 500 kHz. Install the sampling plug-in and connect the +TRIG OUT through the coaxial cable and termination to the sampling plug-in input. Connect the square-wave generator trigger output to the external trigger input of the sampling unit. Set the delayed sweep time to 0.5  $\mu$ s (main sweep time 0.5  $\mu$ s) and adjust the frequency variable control on the square-wave generator for a burst of about ten cycles. Now switch the delayed sweep time to 50 ns. Use the delay time multiplier to compare the periods of the first and fourth cycles in the burst measured at the 50% points. If necessary, adjust R165, 20 ns 1 Per for a first period length matching the fourth period length.

#### 7. Adjust 1 $\mu$ s Duration

Change the DURATION switch to 1  $\mu$ s. Make certain the variable control is fully ccw. Change the PERIOD to 2  $\mu$ s and make certain the variable control is fully ccw. Connect the OUTPUT to the sampling unit's vertical input and the + TRIG OUT to the sampling unit's external trigger input. Make certain the TRANSITION TIME is in the 5 ns position and the LEADING and TRAILING controls are fully ccw. Push the MODE button placing the PG 508 in the UNDLY mode; all other pushbuttons out. Set the sweep rate at 0.2  $\mu$ s. Set the OUTPUT LOW and HIGH LEVEL controls for a convenient vertical deflection of the oscilloscope trace. Now adjust R470, Dur 1  $\mu$ s, for a pulse duration (on time) of exactly five horizontal divisions. Leave all connections as they are for the next step.

#### 8. Adjust 10 ns Duration

Using the same setup as in the previous step, change the PERIOD to 20 ns and the DURATION to 10 ns. Set the period variable (CAL) knob about 45° from the fully ccw position. Change the sweep rate to 2 ns per division. Now adjust R465, Dur 10 ns, for a duration of 10 ns measured at the 50% points on the waveform.

#### 9. Adjust Delay

Set the PERIOD to 2  $\mu$ s and the DURATION to .1  $\mu$ s. Make certain the CAL controls are fully ccw. Set the DELAY to 1  $\mu$ s. Change the sweep rate to 0.2  $\mu$ s per division. Leave all other controls as in the previous step. Note the time position of the pulse on the oscilloscope. Now push the MODE DELAY button and adjust R352, Del, for a pulse delayed exactly 1  $\mu$ s (five divisions) from the previous pulse.

#### 10. Adjust Bottom Level Clamp

Connect the 10X attenuator between the coaxial cable from the OUTPUT connector and the sampling oscilloscope input so that a 10 V p-p signal can conveniently be displayed, on the oscilloscope. Set the OUTPUT (VOLTS) HIGH and LOW LEVEL controls for a display of + and -5 V (maximum output). Set the PERIOD to 2  $\mu$ s and the DURATION to 1  $\mu$ s. Set the TRANSITION TIME to 5 ns and turn the LEADING and TRAILING variable controls fully cw. Leave the other controls as in the previous step. Set the oscilloscope for a 0.2  $\mu$ s sweep rate. Adjust R570, Bot Lvl Clamp, until the transition from the bottom of the waveform to the leading transition portion of the waveform is linear. Improper setting of this adjustment causes either a fast step at the start of the leading transition or a time extension of the transition start.

#### 11. Adjust Top Level Clamp

Leave all controls as in the previous step. Adjust R615, Top Lvl Clamp until the transition from the top of the waveform to the trailing transition is linear. Improper setting of this adjustment causes either a fast fall at the start of the trailing transition or a time extension of the transition start.

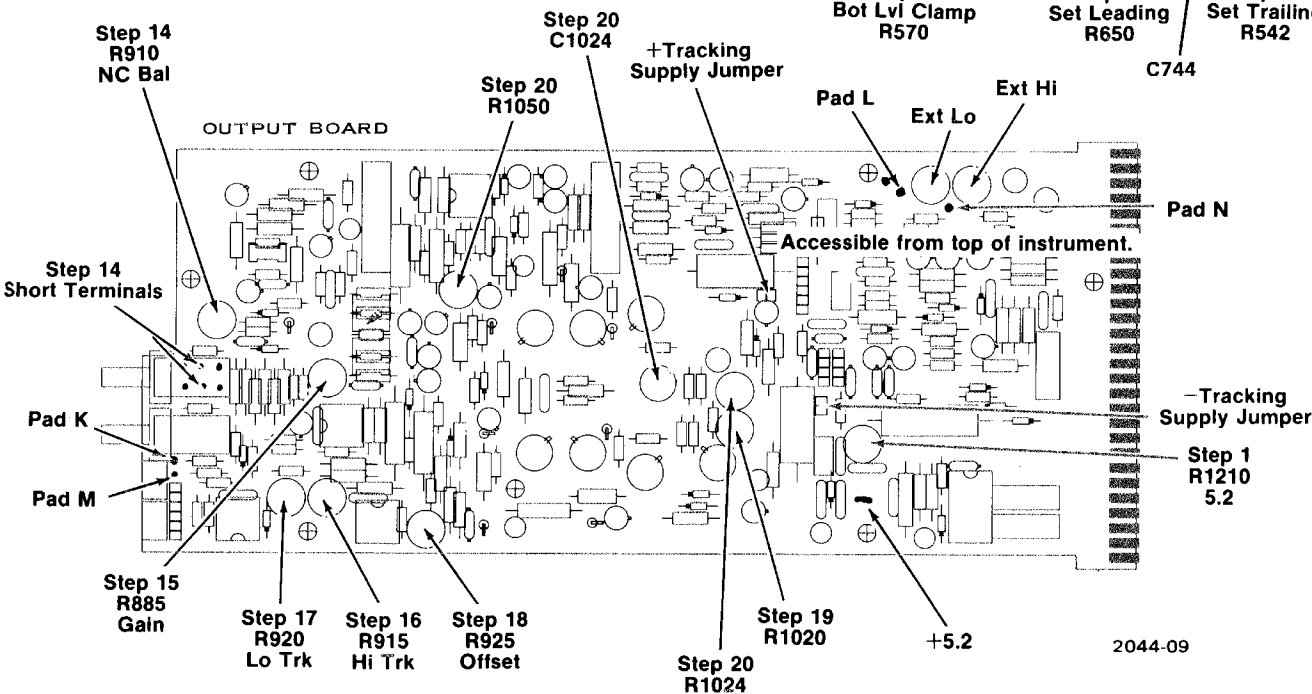
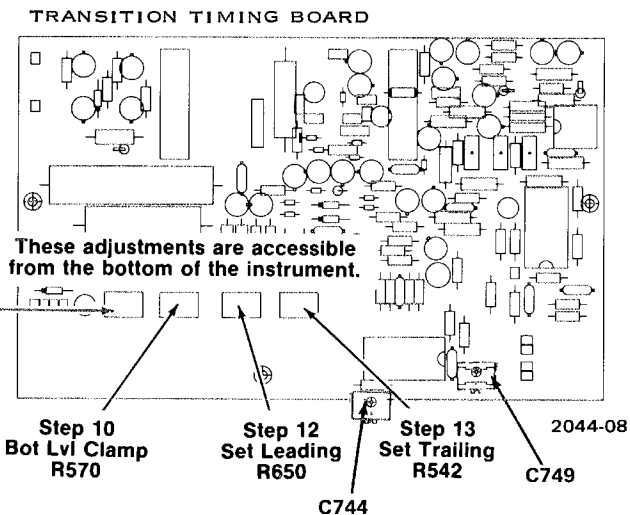
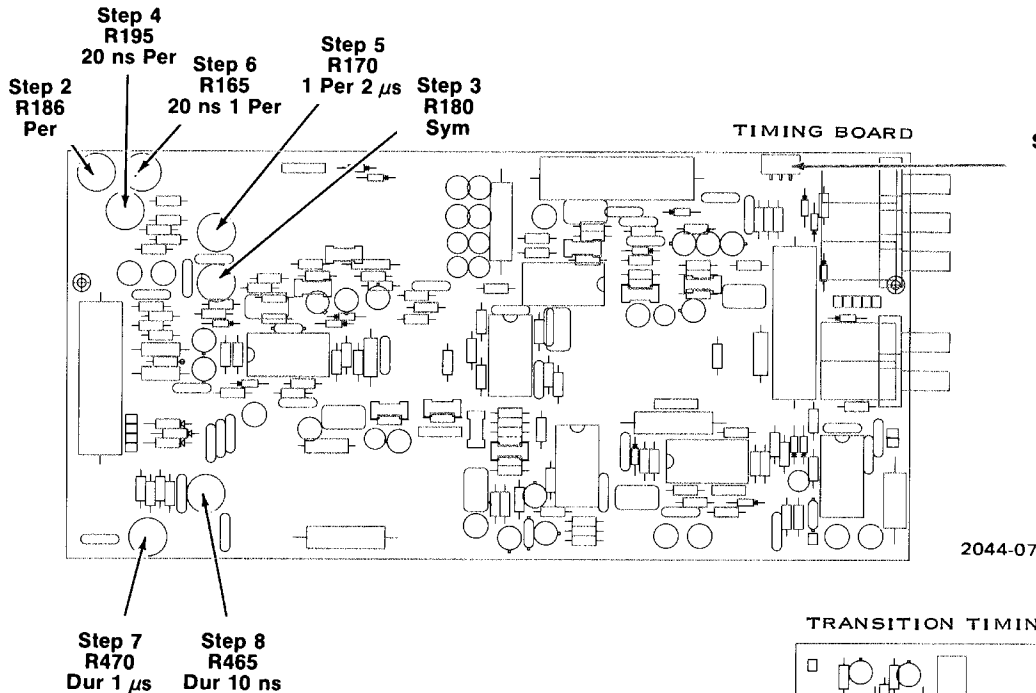
#### 12. Adjust Leading Transition Time

Turn the LEADING and TRAILING controls fully ccw. Change the TRANSITION TIME to 0.5  $\mu$ s and the oscilloscope sweep speed to 0.1  $\mu$ s. Leave all other controls as in the previous step. Adjust the oscilloscope sweep so that the leading waveform transition is visible on the crt. Adjust R650, Set Leading, for a leading transition time of 0.5  $\mu$ s measured from the 10% to the 90% points of the waveform transition.

#### 13. Adjust Trailing Transition Time

Adjust the oscilloscope sweep so that the trailing transition is visible on the crt. Adjust R542, Set Trailing, for a trailing transition time of 0.5  $\mu$ s measured from the 10% to the 90% portion of the transition time.

# INTERNAL ADJUSTMENT PROCEDURE



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**14. Adjust Normal Complement Balance**

Change the oscilloscope sweep speed to  $0.5 \mu\text{s}$ . Set the OUTPUT (VOLTS) HIGH and LOW level controls to their 0 position and set the NORM/COMPLEMENT button out. Short the center terminals of the NORM/COMPLEMENT switch as shown in the illustration. Increase the vertical gain of the oscilloscope by a factor of 10. Now adjust R910, N/C Bal, for equal high and low level output voltages (no signal). Remove the short from the switch terminals.

**15. Adjust Gain**

Using the voltmeter connected to the bottom center terminal of the NORM/COMPLEMENT switch and ground, adjust the OUTPUT (VOLTS) LOW LEVEL control for 1.33 V dc. Now connect the voltmeter to the top center pin of the NORM/COMPLEMENT switch and, without moving the LOW LEVEL control, set the OUTPUT (volts) HIGH LEVEL control for 3.87 V dc. Adjust R885, Gain, for a peak to peak output amplitude of 10 V into  $50 \Omega$ .

**16. Adjust High Level Tracking**

While observing the waveform low level on the oscilloscope, vary the HIGH LEVEL from 0 V amplitude to maximum amplitude (10 V) and adjust R915, Hi Trk, for minimum shift.

**17. Adjust Low Level Tracking**

Observe the waveform high level on the oscilloscope and vary the LOW LEVEL control from 0 V to maximum amplitude. Adjust R920, Lo Trk, for minimum shift.

**18. Adjust Offset**

Connect the voltmeter to the bottom center pin of the NORM/COMPLEMENT switch. Connect the negative lead to ground. Set the LOW LEVEL control for a voltmeter reading of 2.600. Now adjust R925, Offset, until the waveform low level is at 0 V on the oscilloscope.

**19. Adjust Output Impedance**

Set the Period at EXT TRIG OR MAN and the DURATION at EXT DUR. Make certain the TRIG/GATE LEVEL control is turned clockwise enough so the TRIG'D/GATED light is lit. Connect the OUTPUT of the PG 508 to the digital voltmeter through a coaxial cable and bnc female to dual banana adapter. Adjust the HIGH LEVEL for a reading of 10.0 V on the voltmeter. Connect a  $50 \Omega$  termination between the coaxial cable and adapter. Adjust R1020 for a reading of 5.0 V on the voltmeter.

**20. Adjust Output Amplifier**

Connect the OUTPUT terminal of the PG 508 through a coaxial cable and 10X attenuator to the input of the sampling oscilloscope. Set the sampling oscilloscope sweep speed at 20 ns per division. Set the DURATION at  $.1 \mu\text{s}$ , PERIOD at  $.2 \mu\text{s}$  and the TRANSITION TIME at 5 ns. Obtain a free running undelayed output waveform. Adjust the OUTPUT (VOLTS) HIGH LEVEL and LOW LEVEL controls for a 10 V peak to peak output waveform centered around 0 V. Adjust R1050, C1024 and R1024 for the fastest risetime and least aberrations on the trailing transition and corner of the pulse.

**21. Adjust Control Error Light**

Connect the OUTPUT terminal of the PG 508 through a coaxial cable and 50 ohm termination to the input of the real time oscilloscope. Set the oscilloscope for a vertical sensitivity of 1 V with dc coupling and for a 10 ns sweep rate. Set DURATION at 10 ns, PERIOD at 20 ns, TRANSITION TIME at 5 ns, TRAILING and LEADING controls fully ccw, MODE UNDLY button in and MODE DELAY button out. Set all TRIGGERING buttons to out position, NORM/COMPLEMENT button out and PRESET/VAR button out. Adjust the OUTPUT (VOLTS) HIGH LEVEL and LOW LEVEL controls for a display of +2.5 divisions and -2.5 divisions centered around 0 V. Adjust LEADING control cw to where the top of the waveform is decreased in amplitude by 10% (0.5 division). Adjust C749 for a flashing indication of the CONTROL ERROR light.

**NOTE**

*If the CONTROL ERROR light does not flash, adjust LEADING control cw to where the top of waveform is decreased by 5% more (0.25 division); then adjust C749 again for a flashing indication. If the light still cannot be made to flash with adjustment of C749, continue adjusting the LEADING control cw in intervals of a 5% decrease until adjustment of C749 results in a flashing indication of the CONTROL ERROR light (do not exceed a 50% decrease in waveform amplitude).*

Readjust C749 to a point where the CONTROL ERROR light is just extinguished. Return LEADING control to its fully ccw position. Adjust TRAILING control cw to where the bottom of the displayed waveform is decreased in amplitude by 10% (0.5 division). Adjust C744 for a flashing indication of the CONTROL ERROR light.

**NOTE**

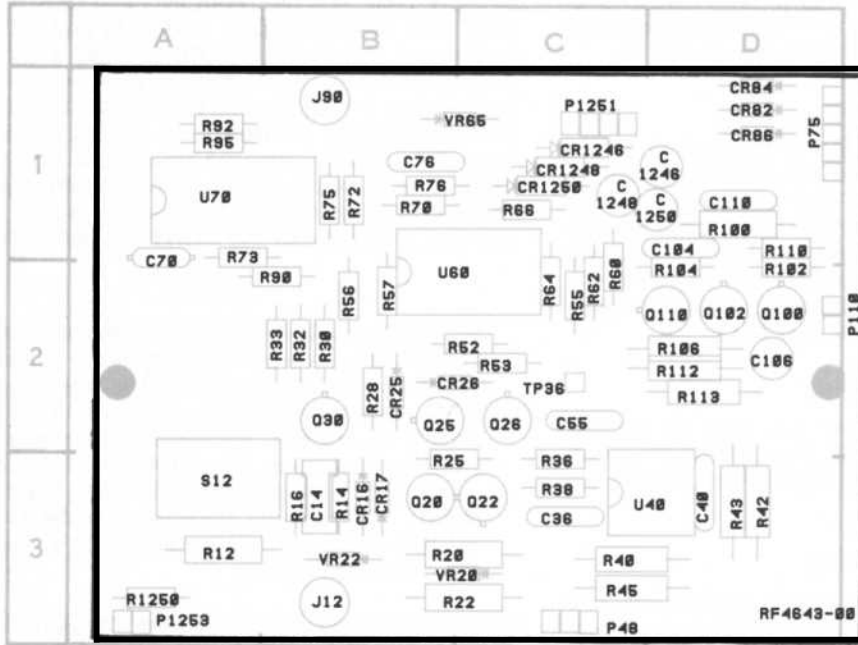
*If the CONTROL ERROR light does not flash, adjust TRAILING control cw to where the bottom of waveform is decreased by 5% more (0.25 division); then adjust C744 again for a flashing indication. If the light still cannot be made to flash with adjustment of C744, continue adjusting the TRAILING control cw in intervals of a 5% decrease until adjustment of C744 results in a flashing indication of the CONTROL ERROR light (do not exceed a 50% decrease in waveform amplitude).*

Readjust C744 to a point where the CONTROL ERROR light is just extinguished. Return TRAILING control to its fully ccw position.

Go back to steps 3, 7, and 8 and perform the adjustments in these steps, if necessary, for optimum performance.

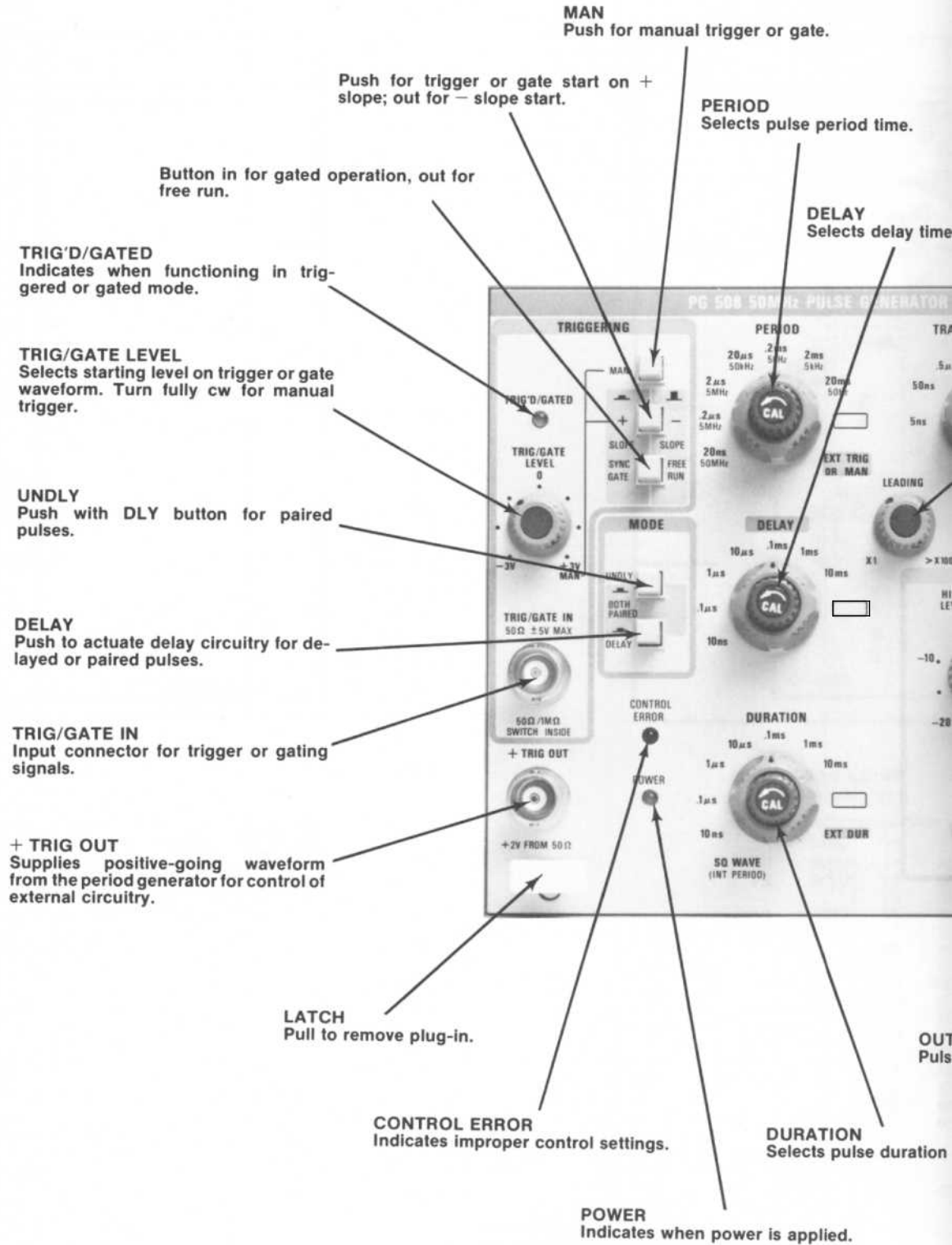
# PARTS LOCATION GRID

INPUT BOARD (A1)



| CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC |
|--------|----------|--------|----------|--------|----------|--------|----------|
| C14    | B3       | P12    | B3       | R32    | B2       | R102   | D2       |
| C36    | C3       | P48    | C3       | R33    | B2       | R104   | D2       |
| C40    | D3       | P75    | D1       | R36    | C3       | R106   | D2       |
| C55    | C2       | P90    | B1       | R38    | C3       | R110   | D1       |
| C70    | A2       | P110   | D2       | R40    | C3       | R112   | D2       |
| C76    | B1       | P1248  | A3       | R42    | D3       | R113   | D2       |
| C104   | D1       | P1251  | C1       | R43    | D3       | R1250  | A3       |
| C106   | D2       | P1253  | A3       | R45    | C3       |        |          |
| C110   | D1       |        |          | R52    | C2       | S12    | A3       |
| C1246  | D1       | Q20    | B3       | R53    | C2       |        |          |
| C1248  | C1       | Q22    | C3       | R55    | C2       | TP36   | C2       |
| C1250  | D1       | Q25    | B2       | R56    | B2       |        |          |
|        |          | Q26    | C2       | R57    | B2       | U40    | D3       |
| CR16   | B3       | Q30    | B2       | R60    | C2       | U60    | C2       |
| CR17   | B3       | Q100   | D2       | R62    | C2       | U70    | A1       |
| CR25   | B2       | Q102   | D2       | R64    | C2       |        |          |
| CR26   | B2       | Q110   | D2       | R66    | C1       | VR20   | C3       |
| CR82   | D1       |        |          | R70    | B1       | VR22   | B3       |
| CR84   | D1       | R12    | A3       | R72    | B1       | VR65   | C1       |
| CR86   | D1       | R14    | B3       | R73    | A1       |        |          |
| CR1246 | C1       | R16    | B3       | R75    | B1       |        |          |
| CR1248 | C1       | R20    | C3       | R76    | B1       |        |          |
| CR1250 | C1       | R22    | C3       | R90    | B2       |        |          |
|        |          | R25    | B3       | R92    | A1       |        |          |
| J12    | B3       | R28    | B2       | R95    | A1       |        |          |
| J90    | B1       | R30    | B2       | R100   | D1       |        |          |

# CONTROLS AND CON



# AND CONNECTORS

er or gate.

DD  
s pulse period time.

**DELAY**  
Selects delay time.

**TRANSITION TIME**  
Selects transition times measured from the 10% to the 90% points.

**LEADING**  
Varies the leading transition time from X1 to >X100.

**TRAILING**  
Varies the trailing transition time from X1 to >X100.

**CUSTOM TIMING POSITION**

Button out selects normal pulse, button in complement pulse.

**OUTPUT (VOLTS) HIGH LEVEL**  
Controls the pulse high level.

**OUTPUT (VOLTS) LOW LEVEL**  
Controls the pulse low level.

Button out selects **OUTPUT HIGH** and **LOW LEVEL** controls for output amplitude; button in selects preset **LEVEL** controls.

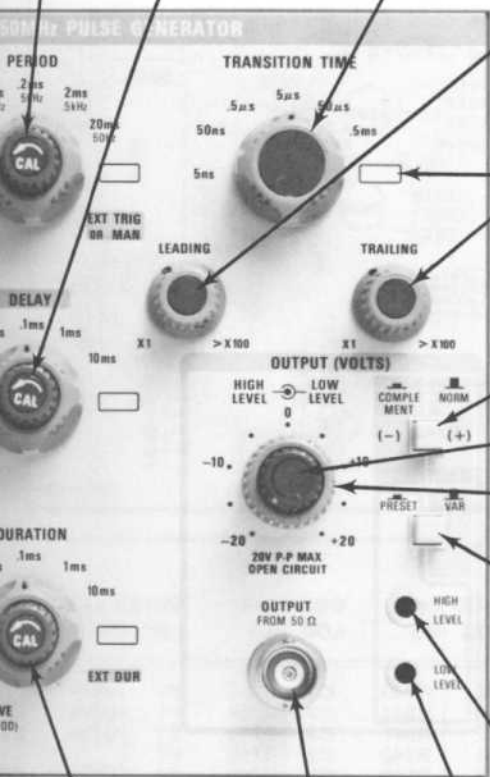
**OUTPUT**  
Pulse output bnc connector.

**HIGH LEVEL**  
Control for preset high level.

**LOW LEVEL**  
Control for preset low level.

**DURATION**  
Selects pulse duration time.

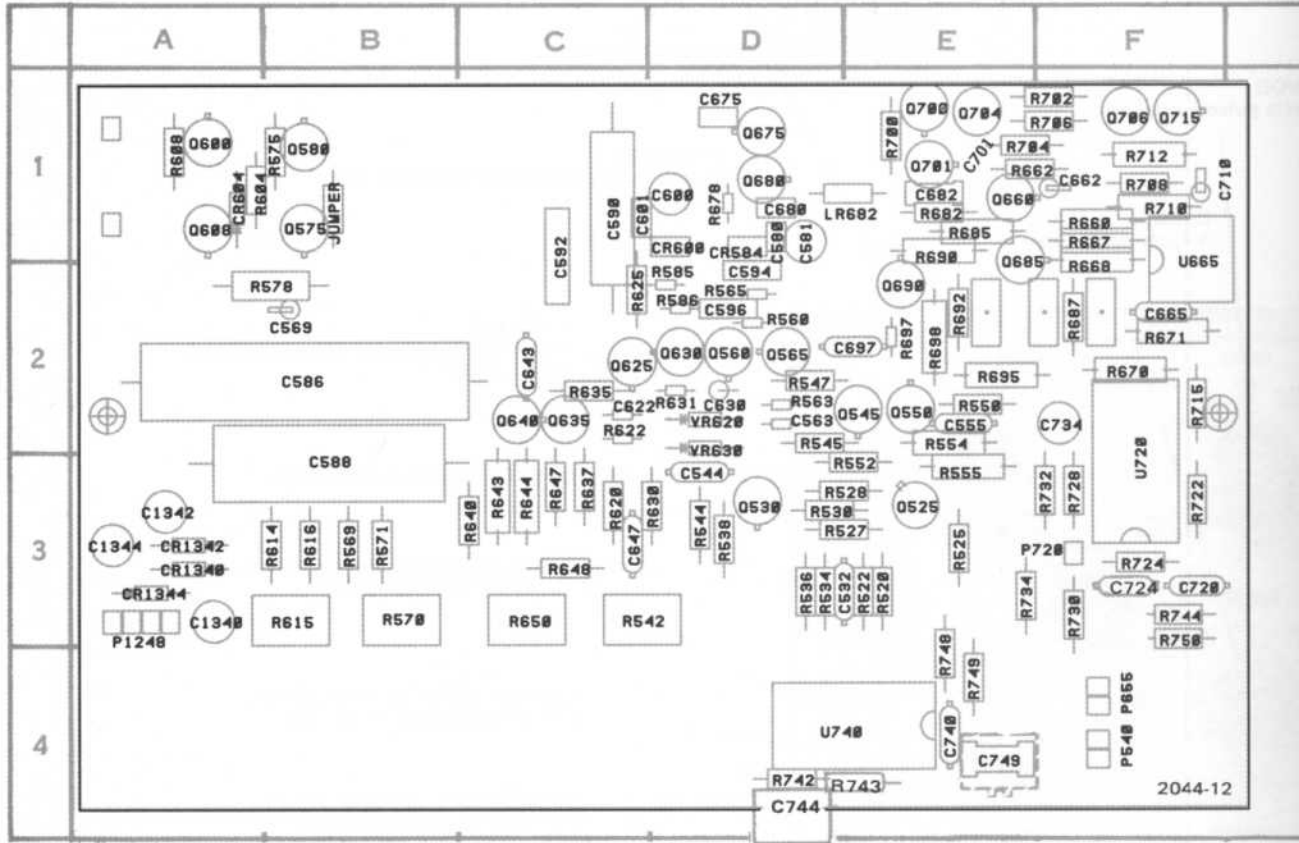
er is applied.





# PARTS LOCATION GRID

## TRANSITION TIMING BOARD (A3)

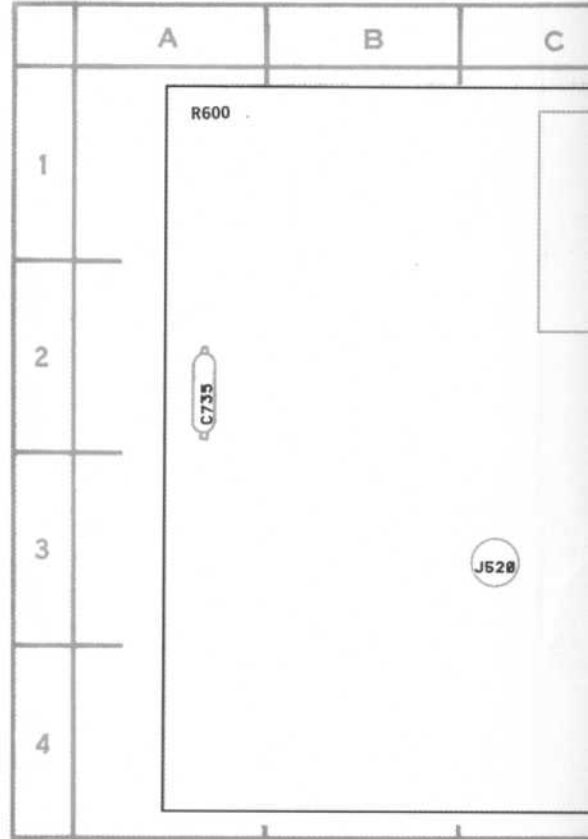
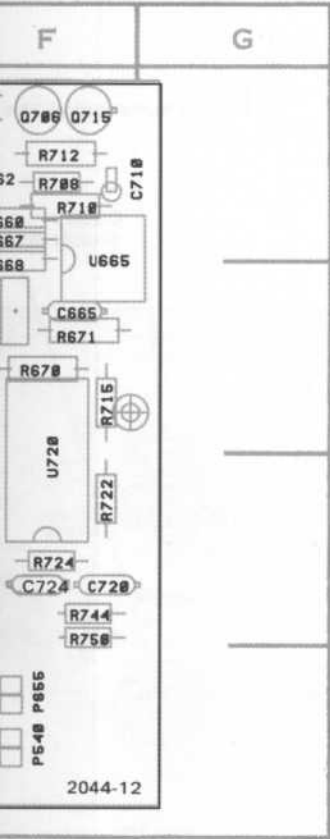


| CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC |
|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| C532   | D3       | C682   | E1       | LR682  | D1       | Q700   | E1       | R560   | D2       | R643   | C3       | R706   | F1       | U665   | F2       |
| C544   | D3       | C697   | E2       |        |          | Q701   | E1       | R563   | D2       | R644   | C3       | R708   | F1       | U720   | F2       |
| C555   | E2       | C701   | E1       |        |          | Q704   | E1       | R565   | D2       | R647   | C3       | R710   | F1       | U740   | E4       |
| C563   | D2       | C708   | F1       | P248   | A3       | Q706   | F1       | R569   | B3       | R648   | C3       | R712   | F1       |        |          |
| C569   | B2       | C720   | F3       | P540   | F4       | Q715   | F1       | R570   | B3       | R650   | C3       | R715   | F2       | VR620  | C2       |
| C580   | D1       | C724   | F3       | P655   | F4       |        |          | R571   | B3       | R660   | F1       | R722   | F3       | VR630  | C2       |
| C581   | D1       | C734   | F2       |        |          | R520   | E3       | R575   | B1       | R662   | E1       | R724   | F3       |        |          |
| C586   | B2       | C735*† | A2       |        |          | R522   | E3       | R578   | A2       | R667   | F1       | R728   | F3       |        |          |
| C588   | B3       |        |          | Q525   | E3       | R525   | E3       | R585   | D2       | R668   | F1       | R730†  | F3       |        |          |
| C590   | C1       | C740   | E4       | Q530   | D3       | R527   | D3       | R586   | D2       | R670   | F2       | R732   | F3       |        |          |
| C592   | C1       | C744†  | D4       | Q545   | E2       | R528   | D3       | R600*† | A1       | R671   | F2       | R734   | E3       |        |          |
| C594   | D2       | C749†  | E4       | Q550   | E2       | R530   | D3       | R604   | A1       | R678   | D1       | R742   | E4       |        |          |
| C596   | D2       |        |          | Q550   | E2       | R534   | D3       | R608   | A1       | R682   | E1       | R743†  | D4       |        |          |
| C600   | D1       | C1340  | A3       | Q560   | D2       | R536   | D3       | R614   | B3       | R685   | E1       | R744   | F3       |        |          |
| C601   | D1       | C1342  | A3       | Q565   | D2       | R538   | D3       | R615   | B3       | R687   | F2       | R748   | E4       |        |          |
| C622   | C2       | C1344  | A3       | Q575   | B1       | R542   | C3       | R616   | B3       | R690   | E1       | R749   | E4       |        |          |
| C630   | D2       |        |          | Q580   | B1       | R544   | D3       | R620   | C3       | R692   | E2       | R750   | F3       |        |          |
| C643   | C2       |        |          | Q600   | A1       | R545   | D2       | R622   | C2       | R695   | E2       |        |          |        |          |
| C647   | C3       | CR584  | D1       | Q608   | A1       | R547   | D2       | R625   | C2       | R697   | E2       |        |          |        |          |
| C662   | F1       | CR600  | D1       | Q625   | C2       | R550   | E2       | R630   | C2       | R698   | E2       |        |          |        |          |
| C665   | F2       | CR604  | A1       | Q630   | D2       | R552   | E3       | R631   | D2       | R700   | E1       | S590   | D1       |        |          |
| C675   | D1       | CR604  | A1       | Q635   | C2       | R554   | E2       | R635   | C2       | R702   | F1       |        |          |        |          |
| C680   | D1       | CR1340 | A3       | Q640   | C2       | R555   | E3       | R637   | C3       | R704   | E1       |        |          |        |          |
|        |          | CR1342 | A3       | Q660   | E1       |        |          | R640   | C3       |        |          |        |          |        |          |
|        |          | CR1344 | A3       | Q675   | D1       |        |          |        |          |        |          |        |          |        |          |
|        |          |        |          | Q680   | D1       |        |          |        |          |        |          |        |          |        |          |
|        |          |        |          | Q685   | E1       |        |          |        |          |        |          |        |          |        |          |
|        |          |        |          | Q690   | E2       |        |          |        |          |        |          |        |          |        |          |
|        |          | J520*  | C3       |        |          |        |          |        |          |        |          |        |          |        |          |
|        |          | J522*  | D3       |        |          |        |          |        |          |        |          |        |          |        |          |



PARTS LOCATION GRID

(BACKSIDE) TRANSITION TIMING BOARD (A3)



| GRID<br>LOC | CKT<br>NO | GRID<br>LOC |
|-------------|-----------|-------------|
| F1          | U665      | F2          |
| F1          | U720      | F2          |
| F1          | U740      | E4          |
| F1          |           |             |
| F2          | VR620     | C2          |
| F3          | VR630     | C2          |
| F3          |           |             |
| F3          |           |             |
| F3          |           |             |
| F3          |           |             |
| E3          |           |             |
| E4          |           |             |
| D4          |           |             |
| F3          |           |             |
| E4          |           |             |
| E4          |           |             |
| F3          |           |             |

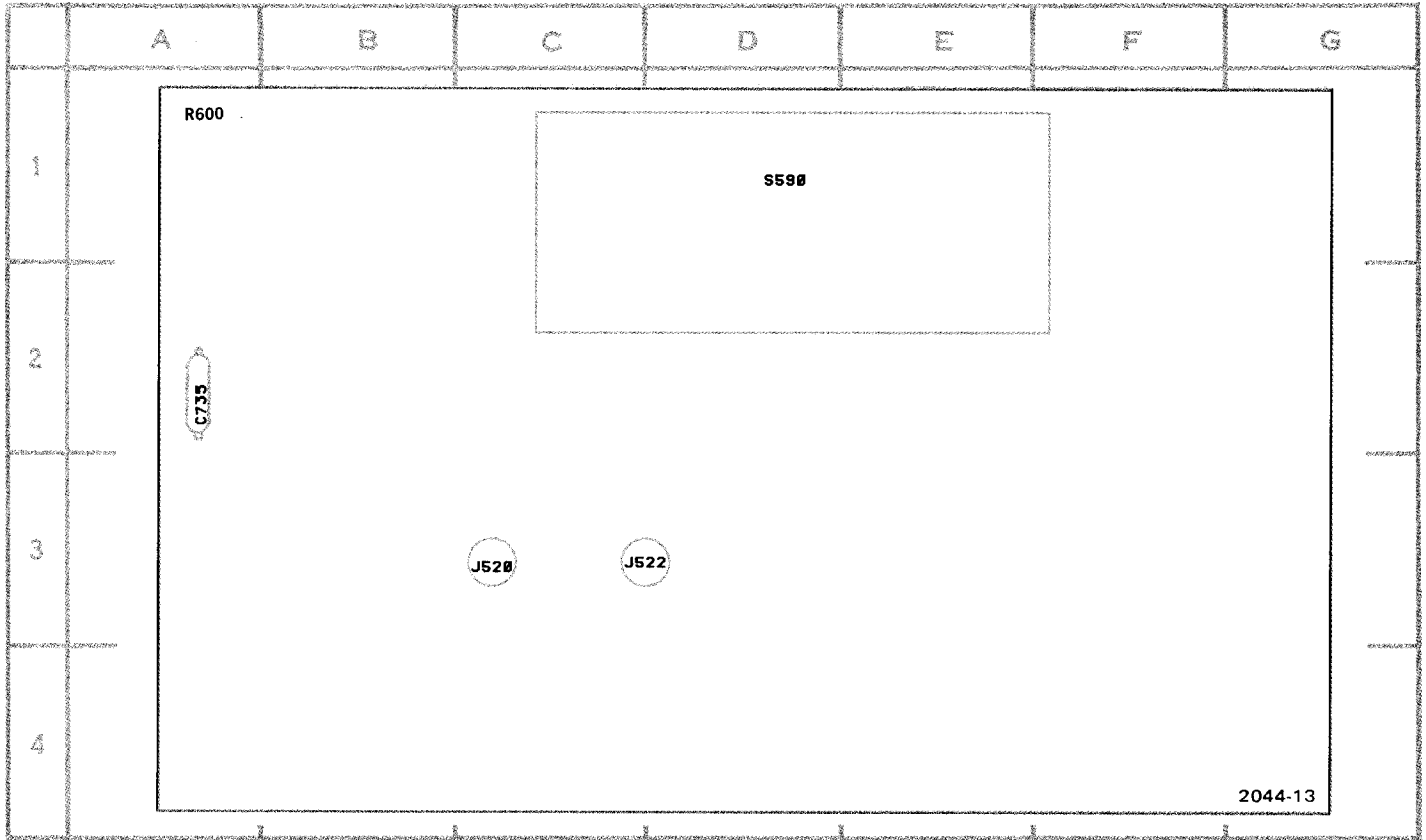
D1

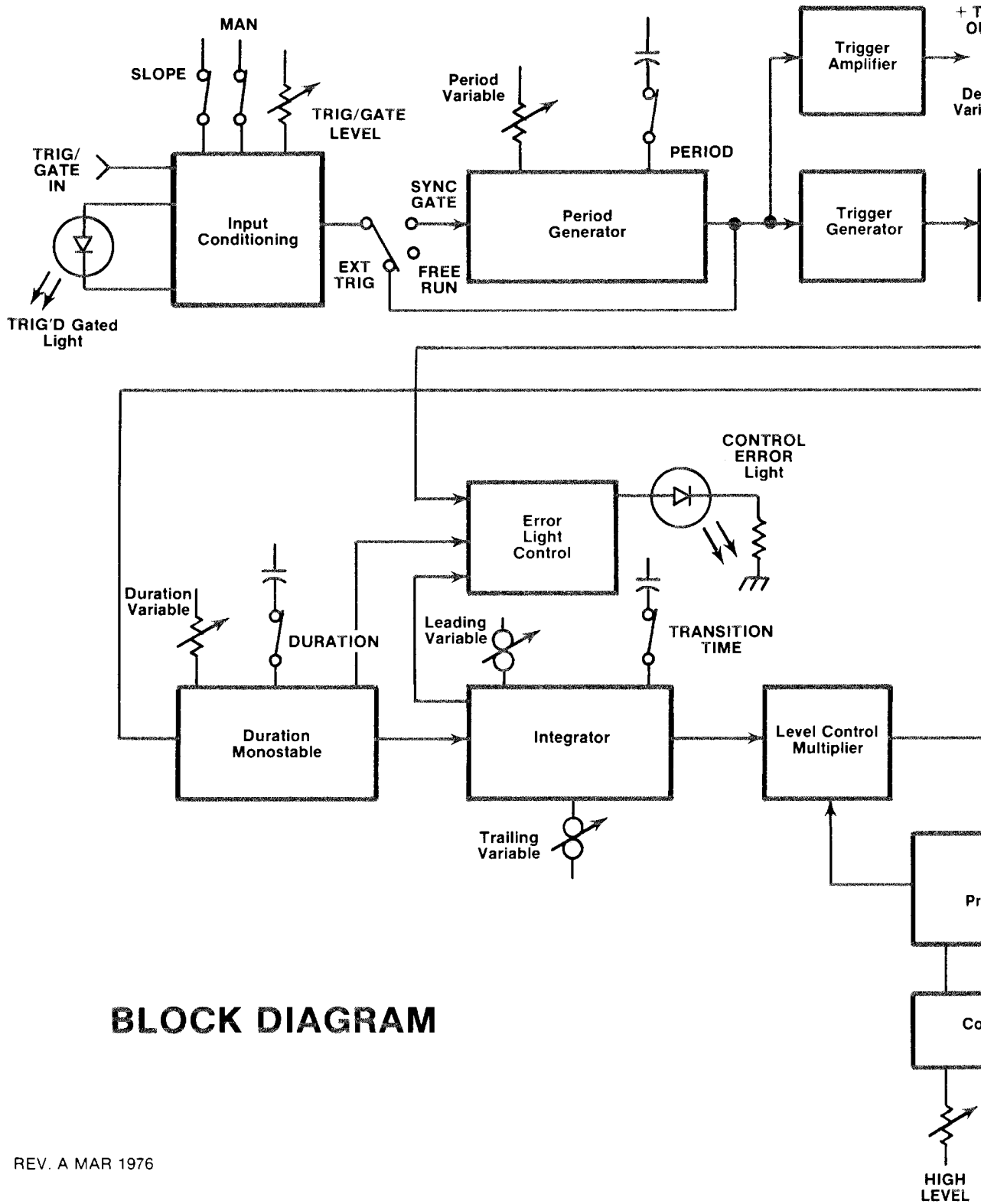
†See Parts List for serial number ranges.

\*On back of board.



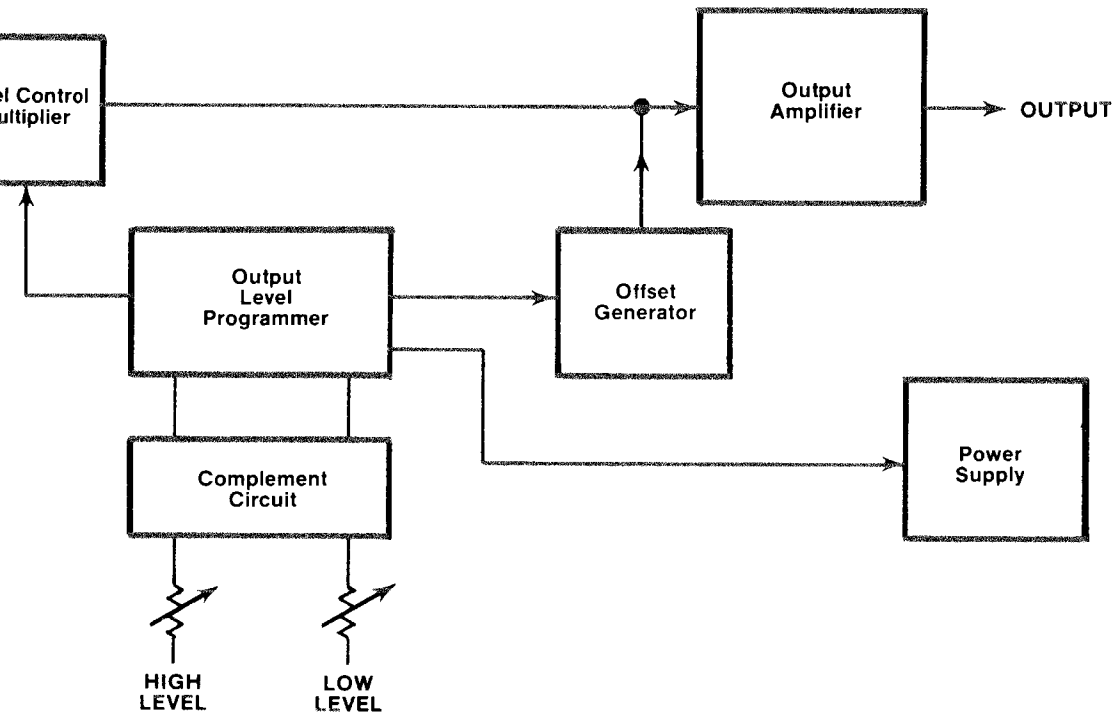
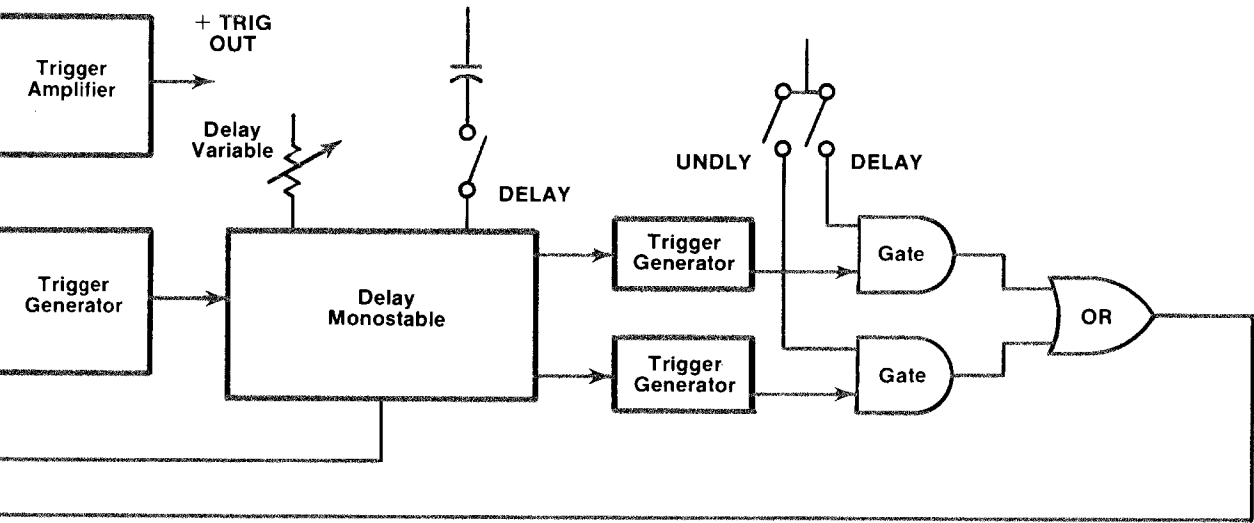
**(BACKSIDE) TRANSITION TIMING BOARD (A3)**





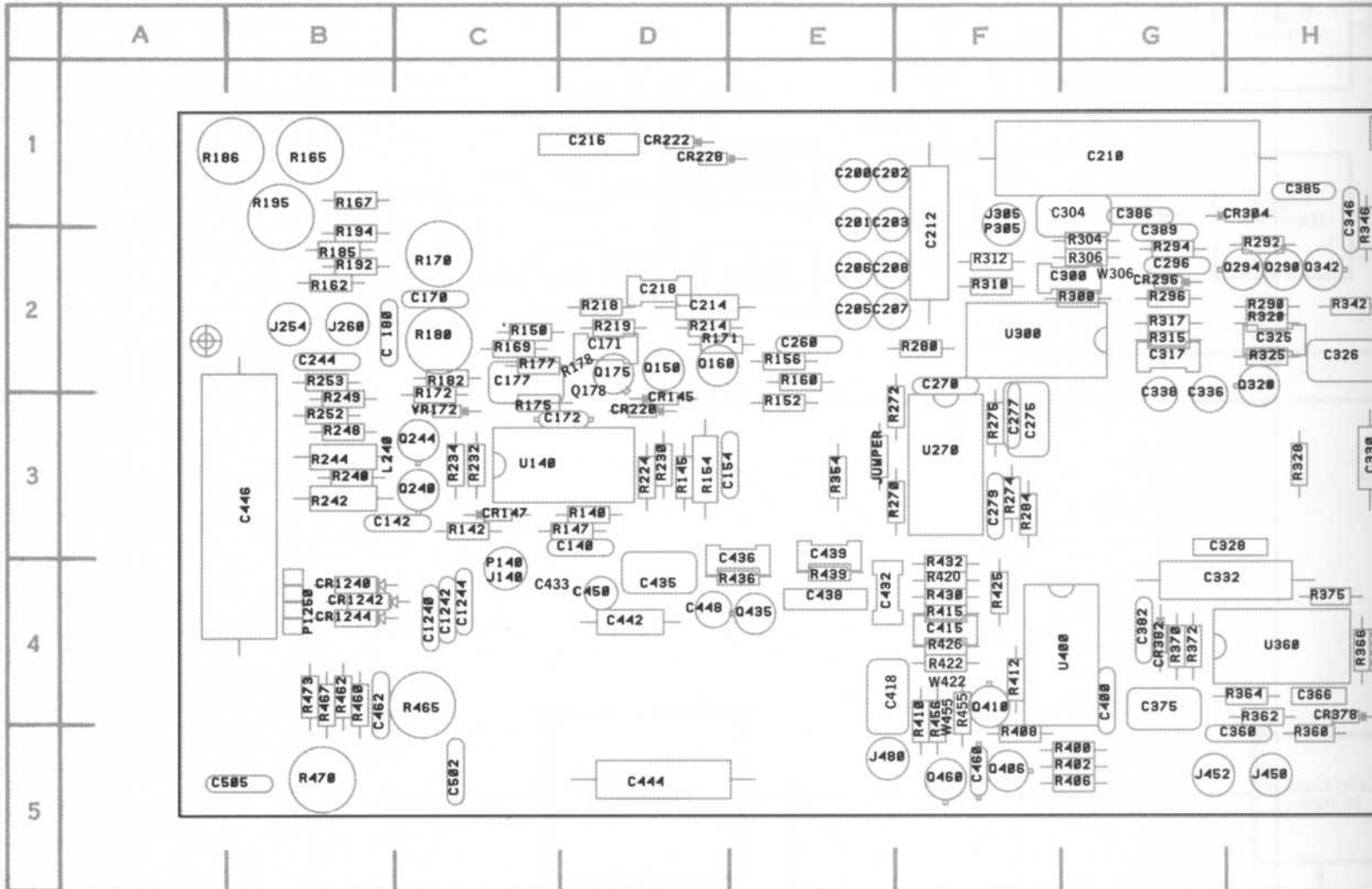
# BLOCK DIAGRAM

REV. A MAR 1976



# PARTS LOCATION GRID

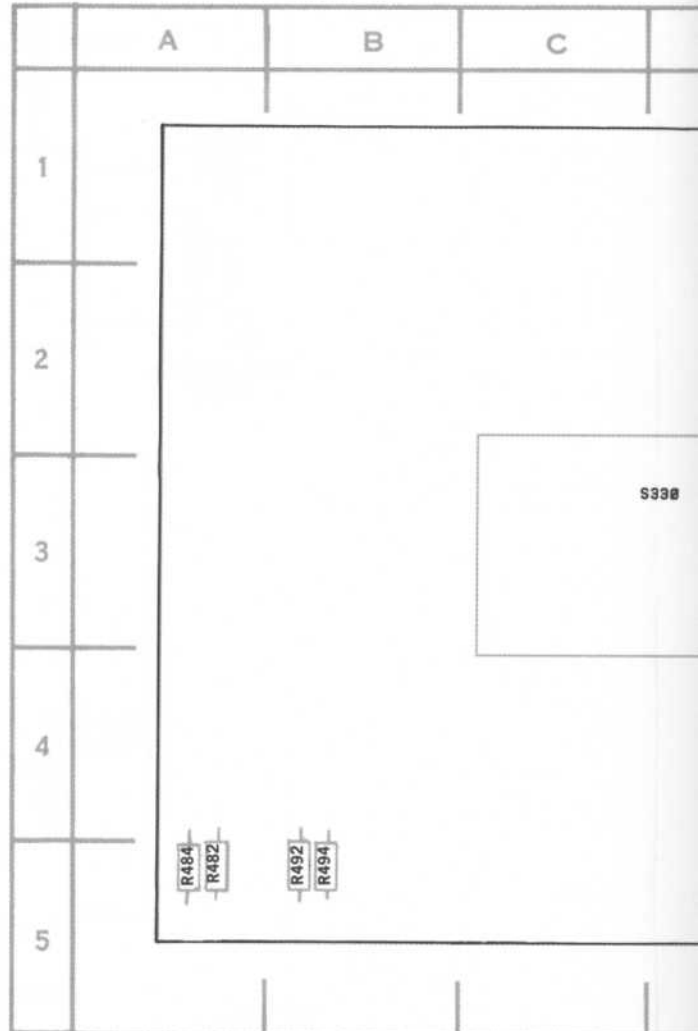
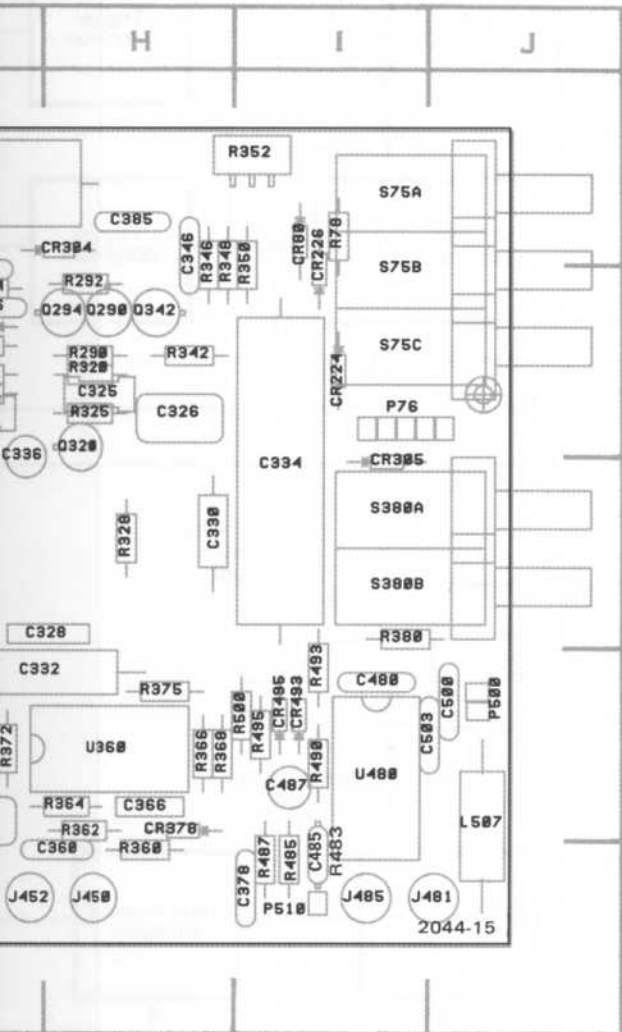
TIMING BOARD (A2)



| CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC |  |
|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--|
| C140   | D3       | C218   | D2       | C360   | H5       | C450   | D4       | CR296  | G2       | L240   | B3       | Q406   | F5       | R171   | D2       | R242   | B3       |        |          |  |
| C142   | B3       | C244   | B2       | C366   | H4       | C460   | F5       | CR304  | H1       | L507†  | J4       | Q410   | F4       | R172   | C3       | R244   | B3       |        |          |  |
| C154   | D3       | C260   | E2       | C375   | G4       | C462   | B4       | CR305  | I2       |        |          | Q435   | E4       | R175   | C3       | R248   | B3       |        |          |  |
| C170   | C2       | C270   | F2       | C378   | I5       | C480   | I4       | CR378  | H4       | P76    | I2       | Q460   | F5       | R177   | C2       | R249   | B3       |        |          |  |
| C171†  | D2       | C275   | F3       | C382   | G4       | C485†  | I5       | CR382  | G4       | P140   | C4       |        |          | R178†  | D2       | R252   | B3       |        |          |  |
| C172   | C3       | C277   | F3       | C385   | H1       | C487   | I4       | CR493  | I4       | P305   | F1       | R78    | I1       | R180   | C2       | R253   | B2       |        |          |  |
| C177   | C2       | C279   | F3       | C386   | G1       | C493†  | I4       | CR495  | I4       | P500   | J4       | R140   | I1       | R182   | C2       | R270   | E3       |        |          |  |
| C180   | B2       | C296   | G2       | C389   | G1       | C500   | J4       | CR1240 | B4       | P510   | I5       | R142   | D3       | R185   | B2       | R272   | E3       |        |          |  |
| C200   | E1       | C300   | G2       | C400   | G4       | C502   | C5       | CR1242 | B4       | P1245* | I4       | R145   | D3       | R186   | A1       | R274   | F3       |        |          |  |
| C201   | E1       | C304†  | G1       | C415   | F4       | C503   | J4       | CR1244 | B4       | P1250  | B4       | R147   | D3       | R190*  | I1       | R275   | F3       |        |          |  |
| C202   | E1       | C317   | G2       | C418†  | E4       | C505   | B5       |        |          |        |          | R150   | C2       | R192   | B2       | R280   | F2       |        |          |  |
| C203   | E1       | C325   | H2       | C432†  | E4       | C1240  | C4       | J140   | C4       | Q150   | B2       | R152   | E3       | R194   | B2       | R284   | F3       |        |          |  |
| C205   | E2       | C326   | H2       | C433†  | C4       | C1242  | C4       | J254   | B2       | Q160   | B2       | R154   | D3       | R195   | B1       | R290   | H2       |        |          |  |
| C206   | E2       | C328   | H3       | C435   | D4       | C1244  | C4       | J260   | B2       | Q175   | B2       | R156   | E2       | R214   | D2       | R292   | H2       |        |          |  |
| C207   | E2       | C330   | H3       | C436   | D3       |        |          | J305   | F1       | Q178†  | D3       | R160   | E2       | R218   | D2       | R294   | G2       |        |          |  |
| C208   | E2       | C332   | G4       | C438   | E4       | CR145  | D3       | J450   | H5       | Q240   | C3       | R162   | B2       | R219   | D2       | R296   | G2       |        |          |  |
| C210   | G1       | C334   | I2       | C439   | E3       | CR147  | C3       | J452   | G5       | Q244   | C3       | R165   | B1       | R224   | D3       | R300   | G2       |        |          |  |
| C212   | F1       | C336   | G2       | C442   | D4       | CR220  | D3       | J480   | E5       | Q290   | H2       | R167   | B1       | R230   | D3       | R304†  | G2       |        |          |  |
| C214   | D2       | C338   | G2       | C444   | D5       | CR222  | D1       | J481   | J5       | Q294   | H2       | R169   | C2       | R232   | C3       | R306†  | G2       |        |          |  |
| C216   | D1       | C346   | H1       | C446   | A3       | CR224  | I2       | J485   | I5       | Q320   | H2       | R170   | C2       | R234   | C3       | R310   | F2       |        |          |  |
|        |          |        |          | C448   | D4       | CR226  | I1       |        |          | Q342   | H2       |        |          | R240   | B3       |        |          |        |          |  |
|        |          |        |          |        |          | CR228  | D1       |        |          |        |          |        |          |        |          |        |          |        |          |  |

TIMING BOARD  
PARTS LOCATION GRID

(BACKSIDE) TIMING BOARD (A2)

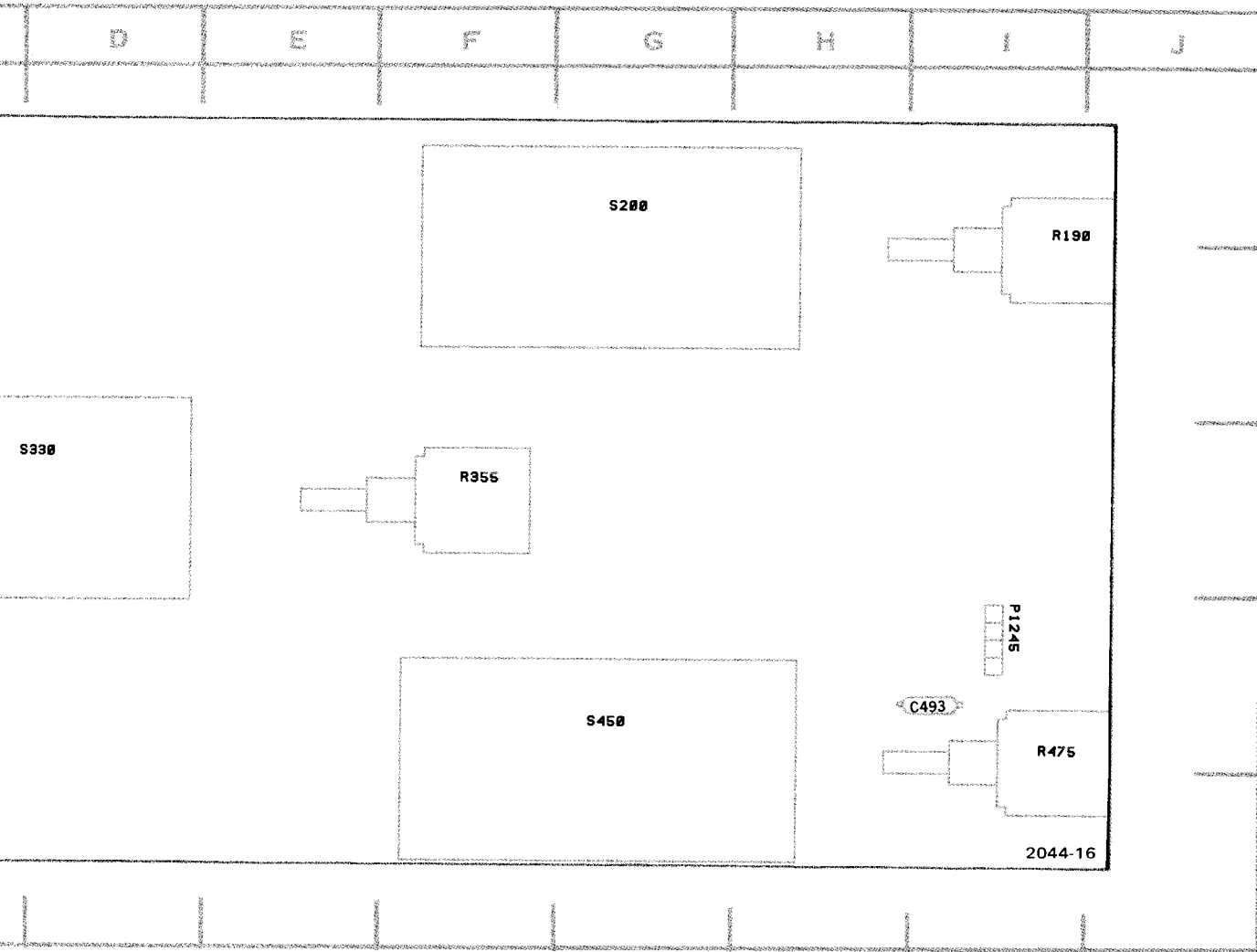


| GRID<br>LOC | CKT<br>NO | GRID<br>LOC | CKT<br>NO | GRID<br>LOC | CKT<br>NO | GRID<br>LOC | CKT<br>NO | GRID<br>LOC | CKT<br>NO | GRID<br>LOC |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
|             | R242      | B3          | R312†     | F2          | R375      | H4          | R462      | B4          | U140      | C3          |
|             | R244      | B3          | R315      | G2          | R380      | I3          | R465      | C4          | U270      | F3          |
|             | R248      | B3          | R317      | G2          | R400      | G5          | R467      | B4          | U300      | F2          |
|             | R249      | B3          | R320      | H2          | R402      | G5          | R470      | B5          | U360      | H4          |
|             | R252      | B3          | R325      | H2          | R406      | G5          | R473†     | B4          | U400      | F4          |
|             | R253      | B2          | R328      | H3          | R408      | F5          | R475*     | I4          | U480      | I4          |
|             | R270      | E3          | R342      | H2          | R410      | F4          | R482††    | I4          |           |             |
|             | R272      | E3          | R346      | H1          | R412      | F4          | R483†     | I5          |           |             |
|             | R274      | F3          | R348      | H1          | R415      | F4          | R484*†    | A5          | VR172     | C3          |
|             | R275      | F3          | R350      | I1          | R420†     | F4          | R485      | I5          |           |             |
|             | R280      | F2          | R352†     | I1          | R422†     | F4          | R487      | I5          |           |             |
|             | R284      | F3          | R354†     | E3          | R425      | F4          | R490      | I4          | W306†     | G2          |
|             | R290      | H2          | R355*     | F3          | R426†     | F4          | R492††    | J4          | W422†     | F4          |
|             | R292      | H2          | R360      | H5          | R430      | F4          | R493      | I4          | W455†     | F4          |
|             | R294      | G2          | R362      | H4          | R432      | F4          | R494*†    | B5          |           |             |
|             | R296      | G2          | R364      | H4          | R436      | E4          | R495      | I4          |           |             |
|             | R300      | G2          | R366      | H4          | R439      | E4          | R500      | I4          |           |             |
|             | R304†     | G2          | R368      | H4          | R455†     | F4          | S75       | I1          |           |             |
|             | R306†     | G2          | R370      | G4          | R456      | F4          | S200*     | G1          |           |             |
|             | R310      | F2          | R372      | G4          | R460      | B4          | S330*     | C3          |           |             |
|             |           |             |           |             |           |             | S380      | I3          |           |             |
|             |           |             |           |             |           |             | S450*     | G4          |           |             |

\*On back of board

†See Parts List for serial number ranges.

††R482 & R492 moved to back of board effective SN B020245.





# Using the Rear Interface Connectors

See the accompanying chart for rear interface connector assignments. For other functions not detailed here the small auxiliary board (E) has numerous connectors available. Use the connections to make custom inputs or outputs to the PG 508 through the Power Module.

## Amplitude Monitor

These pins (25A) are connected to the OUTPUT terminal through a 27 k resistor and ground (26A). To use this function place the PERIOD control in the EXT TRIG OR MAN position and connect an accurate voltmeter to these terminals. Now adjust the TRIG/GATE LEVEL control cw for the high steady state output voltage and ccw for the low steady state output voltage. In this manner the output pulse amplitude levels may be precisely monitored.

## External Level Control Inputs

See the discussion under the heading External Voltage Control in Section 1 of this manual for use of these terminals.

## Trig/Gate Input

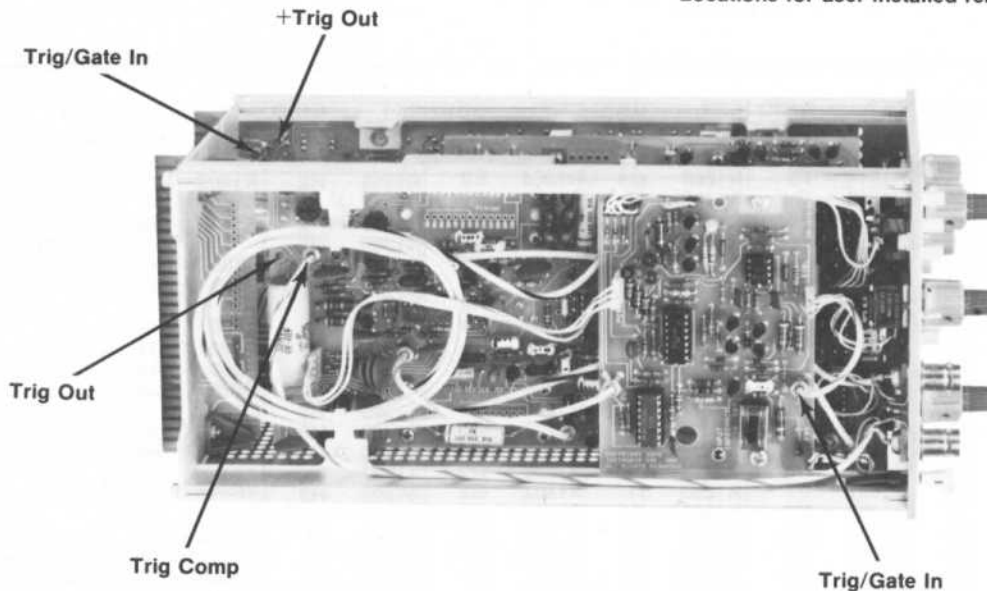
These assignments provide rear interface input capabilities for the front panel TRIG/GATE IN input. The

signal lead (24B) must be user installed but the ground (25B) is factory wired. To make the proper connections remove the cable extending from the TRIG/GATE IN connector to the input board by pulling the end from the socket on the board. Install a twelve inch cable with the proper connectors, Tektronix Part No. 175-1827-00, from the connector on the input circuit board labeled Trig/Gate In to the other connector on the output board labeled Trig/Gate In as shown in the illustration.

## Trigger Output

The hot or signal lead (28B) must be user installed while the ground (27B) is factory wired. To route this function through the rear interface connector remove the plug on the timing circuit board connected to the cable from the + TRIG OUT front panel connector. This plug is shown on the illustration and is labeled Trig Out. Connect a six inch cable with the proper connectors, Tektronix Part No. 175-1824-00, from the connector labeled Trig Out in the illustration to the connector on the output board labeled + Trig Out in the illustration. To obtain the complement trigger out signal connect the coaxial cable to the connector labeled Trig Comp in the illustration. The normal trigger output may be used simultaneously with the complement, through the rear connector, without disturbing the operation of either.

Locations for user installed rear interface connections.



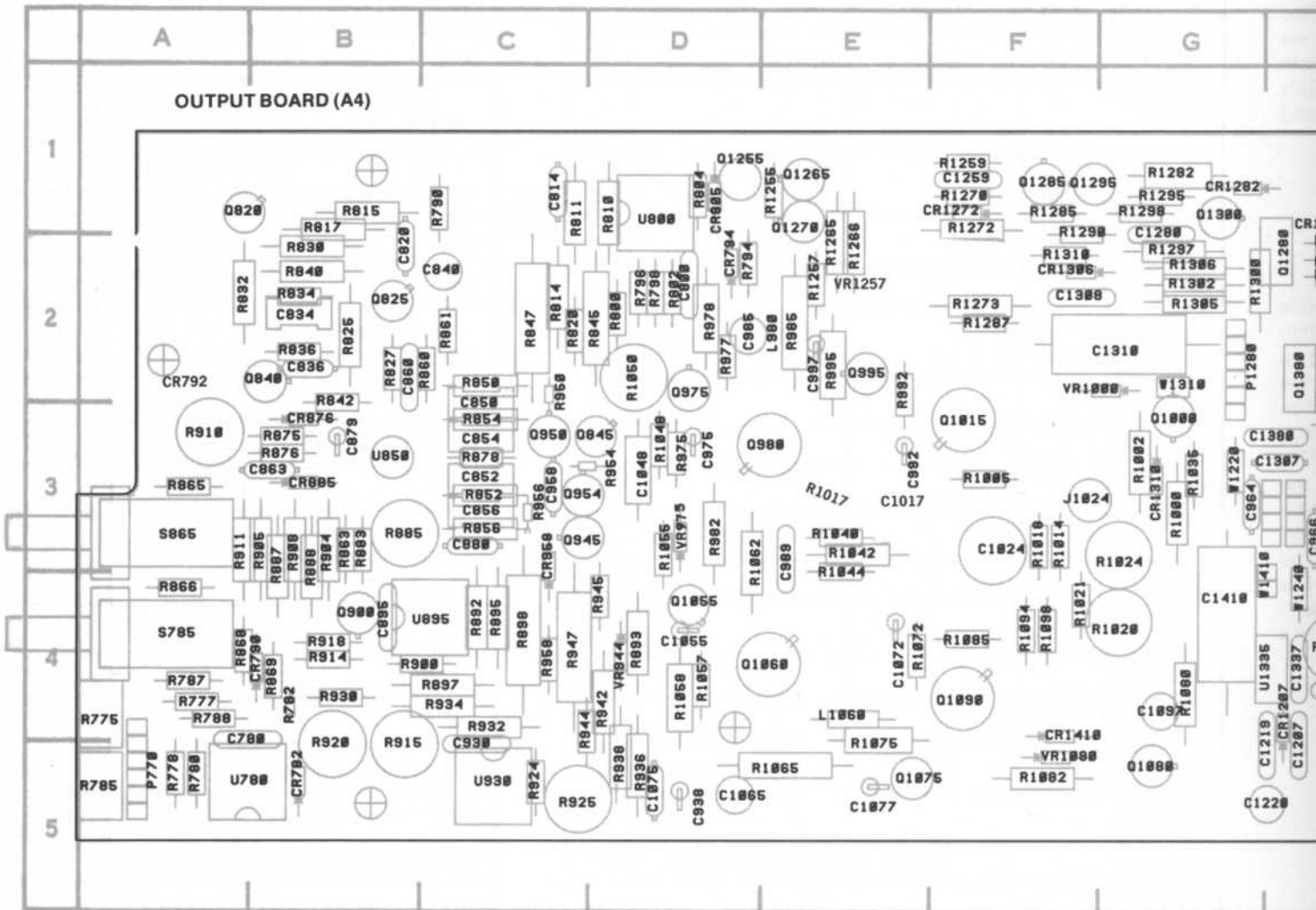
# REAR INTERFACE CONNECTOR ASSIGNMENTS

| Remarks        | Recommended Loads | Output or Input                   | Pin B |                     | Pin A | Output or Input                  | Recommended Loads | Remarks       |
|----------------|-------------------|-----------------------------------|-------|---------------------|-------|----------------------------------|-------------------|---------------|
| Factory Wired  |                   | Trigger Out Common                | 28    | Barrier Slot        | 28    |                                  |                   |               |
| Factory Wired  | 50 Ω              | Trigger Out                       | 27    |                     | 27    |                                  |                   |               |
|                |                   |                                   | 26    |                     | 26    | Amplitude Monitor Ground         |                   | Factory Wired |
| Factory Wired  |                   | Trig/Gate Input Common            | 25    |                     | 25    | Amplitude Monitor                | >1 MΩ             | Factory Wired |
| User installed |                   | Trig/Gate Input                   | 24    |                     | 24    |                                  |                   |               |
|                |                   |                                   | 23    |                     | 23    |                                  |                   |               |
| Factory Wired  |                   | External High Level Control Input | 22    |                     | 22    | External Low Level Control Input |                   | Factory Wired |
|                |                   |                                   | 21    |                     | 21    |                                  |                   |               |
|                |                   |                                   | 20    |                     | 20    |                                  |                   |               |
|                |                   |                                   | 19    |                     | 19    |                                  |                   |               |
|                |                   |                                   | 18    |                     | 18    |                                  |                   |               |
|                |                   |                                   | 17    |                     | 17    |                                  |                   |               |
|                |                   |                                   | 16    |                     | 16    |                                  |                   |               |
|                |                   |                                   | 15    | 15                  |       |                                  |                   |               |
|                |                   |                                   | 14    | 14                  |       |                                  |                   |               |
|                |                   | 25 V ac winding                   | *13   | TM 500 Barrier Slot | *13   | 25 V ac winding                  |                   |               |
|                |                   | +33.5 V filtered dc               | *12   |                     | *12   | +33.5 V filtered dc              |                   |               |
|                |                   | Collector lead of pnp series-pass | **11  |                     | **11  | Base lead of pnp series-pass     |                   |               |
|                |                   | Transformer shield                | 10    |                     | **10  | Emitter lead of pnp series-pass  |                   |               |
|                |                   | ±33.5 V common return             | *9    |                     | *9    | ±33.5 V common return            |                   |               |
|                |                   | -33.5 V filtered dc               | *8    |                     | *8    | -33.5 V common return            |                   |               |
|                |                   | Collector lead of npn series-pass | **7   |                     | **7   | Emitter lead of npn series-pass  |                   |               |
|                |                   | No connection                     | 6     |                     | **6   | Base lead of npn series-pass     |                   |               |
|                |                   | 17.5 V ac winding                 | *5    |                     | *5    | 17.6 V ac winding                |                   |               |
|                |                   | +11.5 V common return             | 4     |                     | 4     | +11.5 V common return            |                   |               |
|                |                   | +11.5 V common return             | *3    |                     | *3    | +11.5 V common return            |                   |               |
|                |                   | +11.5 V filtered dc               | *2    |                     | *2    | +11.5 V filtered dc              |                   |               |
|                |                   | 25 V ac winding                   | *1    |                     | *1    | 25 V ac winding                  |                   |               |
|                |                   |                                   | B     |                     | A     |                                  |                   |               |

Rear View of plug-in

Assignments listed for pins 1A — 13A and 1B — 13B are available in all power modules; however only those pins marked with an asterisk (\*) are used by the PG 508. Those connections marked with a double asterisk (\*\*) are the only connections used on the E board.

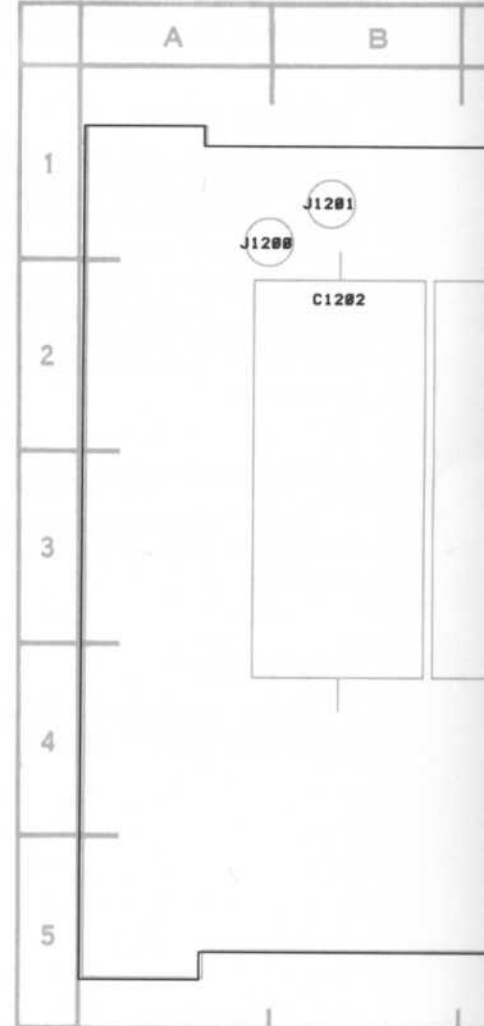
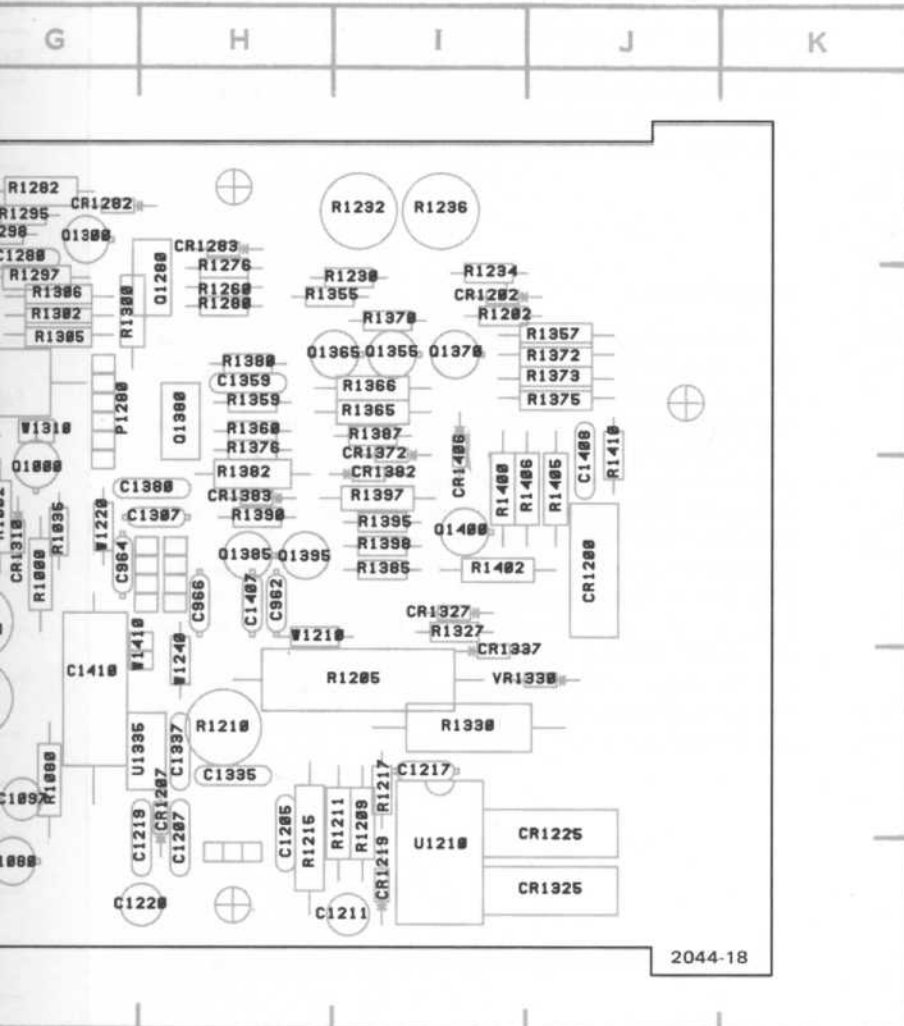
# PARTS LOCATION GRID



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|--------|----------|--------|----------|--------|----------|---------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| C780   | A5       | C962   | H3       | C1211  | I5       | CR782   | B5       | CR1382 | I3       | Q845   | D3       | Q1270  | E1       | R790   | C1       | R845   | D2       |
| C800   | D2       | C964   | G3       | C1217  | I4       | CR790   | B4       | CR1383 | H3       | Q900   | B4       | Q1280  | H2       | R794   | D2       | R847   | C2       |
| C814   | C1       | C966   | H3       | C1219  | H5       | CR792†  | A2       | CR1406 | I2       | Q945   | C3       | Q1285  | F1       | R796   | D2       | R850   | C2       |
| C820   | B2       | C975   | D3       | C1220  | H5       | CR794   | D2       | CR1410 | F4       | Q950   | C3       | Q1295  | F1       | R798   | D2       | R852   | C3       |
| C825   | A2       | C985   | D2       | C1259  | F1       | CR805   | D1       |        |          | Q954   | C3       | Q1300  | G1       | R800   | D2       | R854   | C3       |
| C832   | A2       | C987   | E3       |        |          | CR876   | B3       | J1024  | F3       | Q975   | D2       | Q1355  | I2       | R802   | D2       | R856   | C3       |
| C834   | B2       | C988   | E4       | C1280  | G1       | CR885   | B3       | J1200* | A1       | Q980   | F3       | Q1365  | I2       | R804   | D1       | R860   | C2       |
| C836   | B2       | C989   | E3       | C1307  | H3       | CR958   | C3       | J1201* | B1       | Q990*  | F3       | Q1370  | I2       | R810   | D1       | R861   | C2       |
| C840   | C2       | C992   | E3       | C1308  | F2       | CR1200  | J3       |        |          | Q995   | E2       | Q1380  | H2       | R811   | C1       | R863   | B3       |
| C850   | C2       | C997   | E2       | C1310  | G2       | CR1202* | B2       | L980   | E2       | Q1000  | G3       | Q1385  | H3       | R814   | C2       | R865   | A3       |
| C852   | C3       | C1017† | E3       | C1327* | C2       | CR1207  | H4       | L1060  | E4       | Q1010* | E3       | Q1395  | H3       | R815   | B1       | R866   | A4       |
| C854   | C3       | C1024  | F3       | C1335  | H4       | CR1215  | J4       |        |          | Q1015  | F3       | Q1400  | I3       | R817   | B1       | R868   | A4       |
| C856   | C3       | C1048  | D3       | C1337  | H4       | CR1219  | I5       | P770   | A5       | Q1055  | D4       |        |          | R820   | C2       | R869   | B4       |
| C860   | B2       | C1055  | D4       | C1359  | H2       | CR1225  | J5       | P1205  | H5       | Q1060  | D4       | R775   | A4       | R825   | B2       | R875   | B3       |
| C863   | B3       | C1065  | D5       |        |          | CR1272  | F1       | P1246* | D3       | Q1070* | F4       | R777   | A4       | R827   | B2       | R876   | B3       |
| C879   | B3       | C1072  | E4       | C1380  | H3       | CR1282  | G1       | P1247* | D3       | Q1075  | E5       | R778   | A5       | R830   | B2       | R878   | C3       |
| C880   | C3       | C1075  | D5       | C1407  | H3       | CR1283  | H1       | P1280  | G2       | Q1080  | G5       | R780   | A5       | R832   | A2       | R883   | B3       |
| C895   | B4       | C1077  | E5       | C1408  | J3       | CR1306  | F2       |        |          | Q1090  | F4       | R782   | B4       | R834   | B2       | R885   | B3       |
| C930   | C5       | C1097  | G4       | C1410  | G4       | CR1310  | G3       | Q820   | A1       | Q1095* | E4       | R785   | A5       | R836   | B2       | R887   | B3       |
| C938   | D5       | C1202* | B2       |        |          | CR1325  | J5       | Q825   | B2       | Q1255  | D1       | R787   | A4       | R840   | B2       | R888   | B3       |
| C958   | C3       | C1205  | H5       |        |          | CR1327* | I3       | Q840   | B2       | Q1265  | E1       | R788   | A4       | R842   | B3       | R892   | C4       |
|        |          | C1207  | H5       |        |          | CR1337  | I4       |        |          |        |          |        |          |        |          |        |          |
|        |          |        |          |        |          | CR1372  | I3       |        |          |        |          |        |          |        |          |        |          |

# GRID

## (BACKSIDE) OUTPUT BOARD (A4)

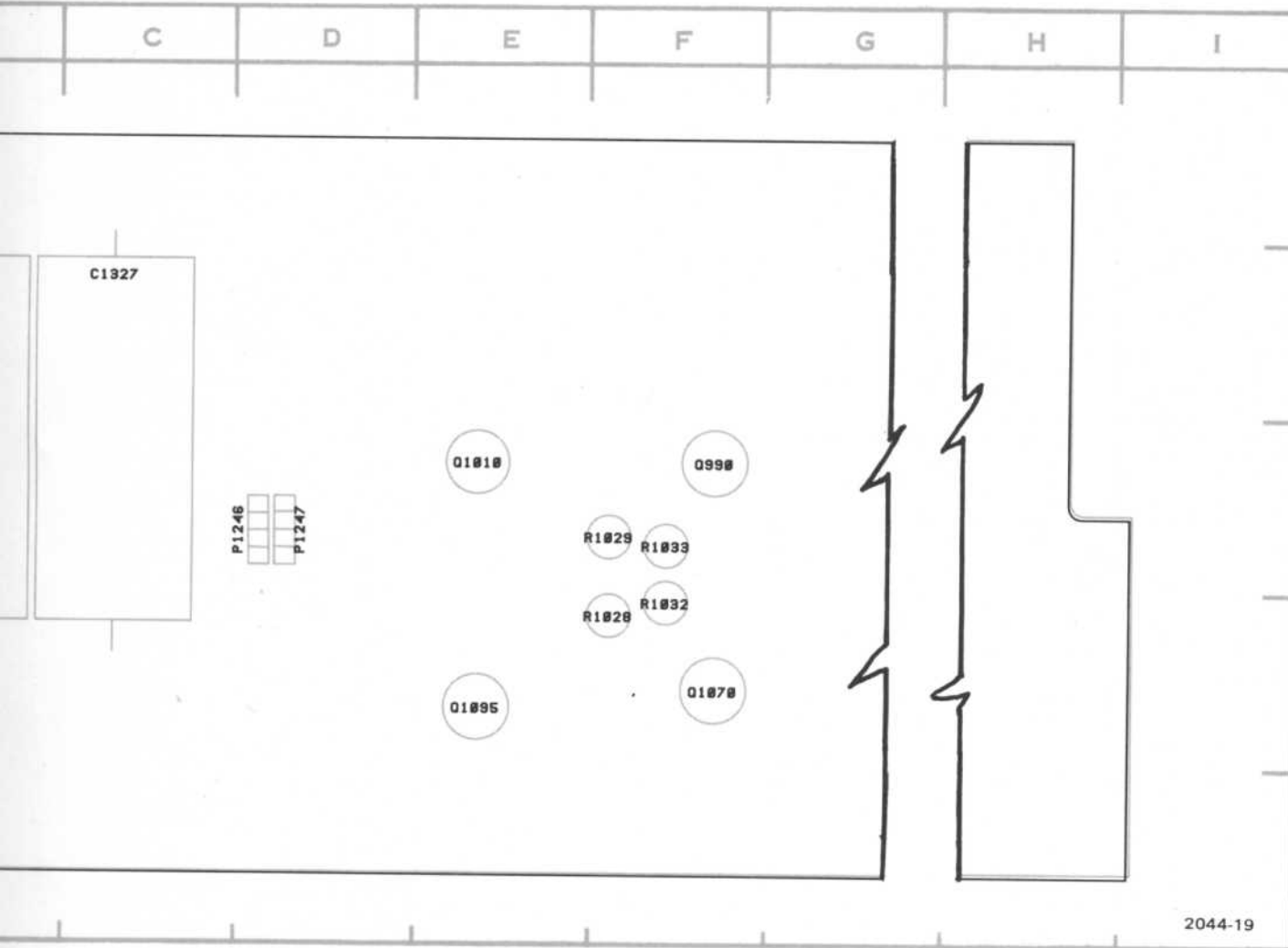


| GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO  | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC |  |
|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|---------|----------|--------|----------|--------|----------|--|
| C1       | R845   | D2       | R893   | D4       | R942   | D4       | R1018  | F3       | R1080  | G4       | R1266  | E2       | R1355  | H2       | R1405   | J3       | W1210  | H3       |        |          |  |
| D2       | R847   | C2       | R895   | C4       | R944   | C4       | R1020  | G4       | R1082  | F5       | R1270  | F1       | R1357  | J2       | R1406   | I3       | W1220  | G3       |        |          |  |
| D2       | R850   | C2       | R897   | C4       | R945   | D4       | R1021  | F4       | R1085  | F4       | R1272  | F1       | R1359  | H2       | R1410   | J3       | W1240  | H4       |        |          |  |
| D2       | R852   | C3       | R898   | C4       | R947   | C4       | R1024  | G3       | R1094  | F4       | R1273  | F2       | R1360  | H2       |         |          | W1310  | G2       |        |          |  |
| D2       | R854   | C3       | R900   | C4       | R950   | C2       | R1028* | F4       | R1098  | F4       |        |          | R1365  | I2       | S785    | A4       | W1410  | G4       |        |          |  |
| D2       | R856   | C3       | R904   | B3       | R954   | D3       | R1029* | F3       | R1202  | I2       | R1276  | H2       | R1366  | I2       | S865    | A3       |        |          |        |          |  |
| D1       | R860   | C2       | R905   | B3       | R956   | C3       | R1032* | F4       | R1205  | I4       | R1280  | H2       | R1370  | I2       |         |          |        |          |        |          |  |
| D1       | R861   | C2       | R908   | B3       | R958   | C4       | R1033* | F3       | R1209  | I4       | R1282  | G1       | R1372  | J2       | U780    | B5       |        |          |        |          |  |
| C1       | R863   | B3       | R910   | A3       | R975   | D3       | R1035  | G3       | R1210  | H4       | R1285  | F1       | R1373  | J2       | U800    | D1       |        |          |        |          |  |
| C2       | R865   | A3       | R911   | A3       | R977   | D2       | R1040  | E3       | R1211  | I4       | R1287  | F2       | R1375  | J2       | U850    | B3       |        |          |        |          |  |
| B1       | R866   | A4       | R914   | B4       | R978   | D2       | R1042  | E3       | R1215  | H5       | R1290  | F2       | R1376  | H2       | U895    | C4       |        |          |        |          |  |
| B1       | R868   | A4       | R915   | B4       | R982   | D3       | R1044  | E4       | R1217  | I5       | R1295  | G1       | R1380  | H2       | U930    | C5       |        |          |        |          |  |
| C2       | R869   | B4       | R918   | B4       | R985   | E2       | R1048  | D3       | R1230  | I2       | R1297  | G2       | R1382  | H3       | U1210   | I5       |        |          |        |          |  |
| B2       | R875   | B3       | R920   | B4       | R987   | E3       | R1050  | D2       | R1232  | I1       | R1298  | G1       | R1385  | I3       | U1335   | H4       |        |          |        |          |  |
| B2       | R876   | B3       | R924   | C5       | R988   | E4       | R1055  | D3       | R1234  | I2       | R1300  | G2       | R1387  | I2       |         |          |        |          |        |          |  |
| B2       | R878   | C3       | R925   | C5       | R992   | E2       | R1057  | D4       | R1236  | I1       | R1302  | G2       | R1390  | H3       | VR944   | D4       |        |          |        |          |  |
| B2       | R883   | B3       | R930   | B3       | R995   | E2       | R1058  | D4       | R1255  | E1       | R1305  | G2       | R1395  | I3       | VR975   | D3       |        |          |        |          |  |
| B2       | R885   | B3       | R932   | C4       | R1000  | G3       | R1062  | D3       | R1257  | E2       | R1306  | G2       | R1397  | I3       | VR1000  | F2       |        |          |        |          |  |
| B2       | R887   | B3       | R934   | C4       | R1002  | G3       | R1065  | E5       | R1259  | F1       | R1310  | F2       | R1398  | I3       | VR1080  | F5       |        |          |        |          |  |
| B2       | R888   | B3       | R936   | D5       | R1005  | F3       | R1072  | E4       | R1260  | H2       | R1327  | I3       | R1400  | I3       | VR1257† | E2       |        |          |        |          |  |
| B3       | R892   | C4       | R938   | D5       | R1014  | F3       | R1075  | E5       | R1265  | E2       | R1330  | I4       | R1402  | I3       | VR1330  | J4       |        |          |        |          |  |
|          |        |          |        |          | R1017† | E3       |        |          |        |          |        |          |        |          |         |          |        |          |        |          |  |

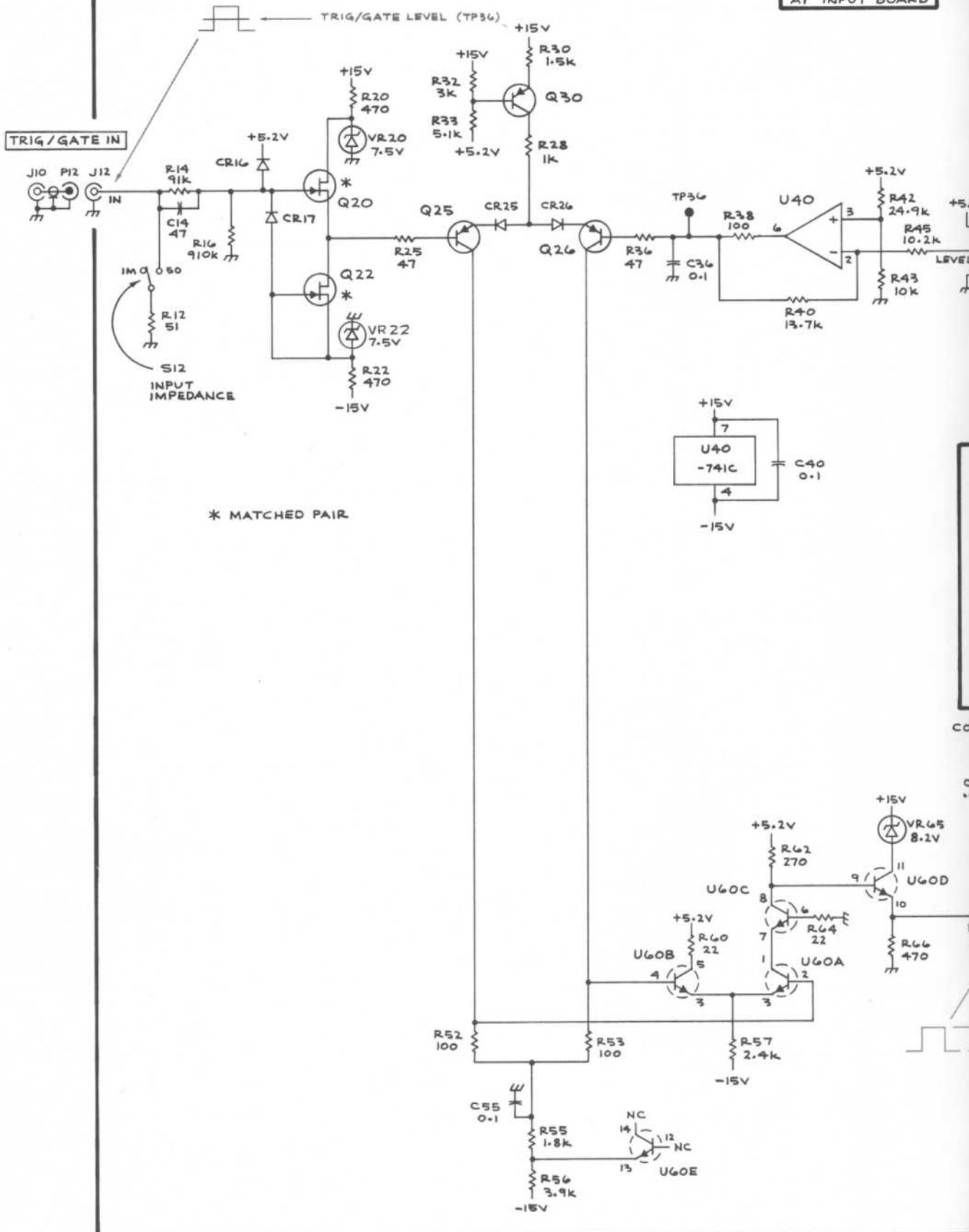
†See Parts List for serial number ranges.

\*On back of board.

D (A4)

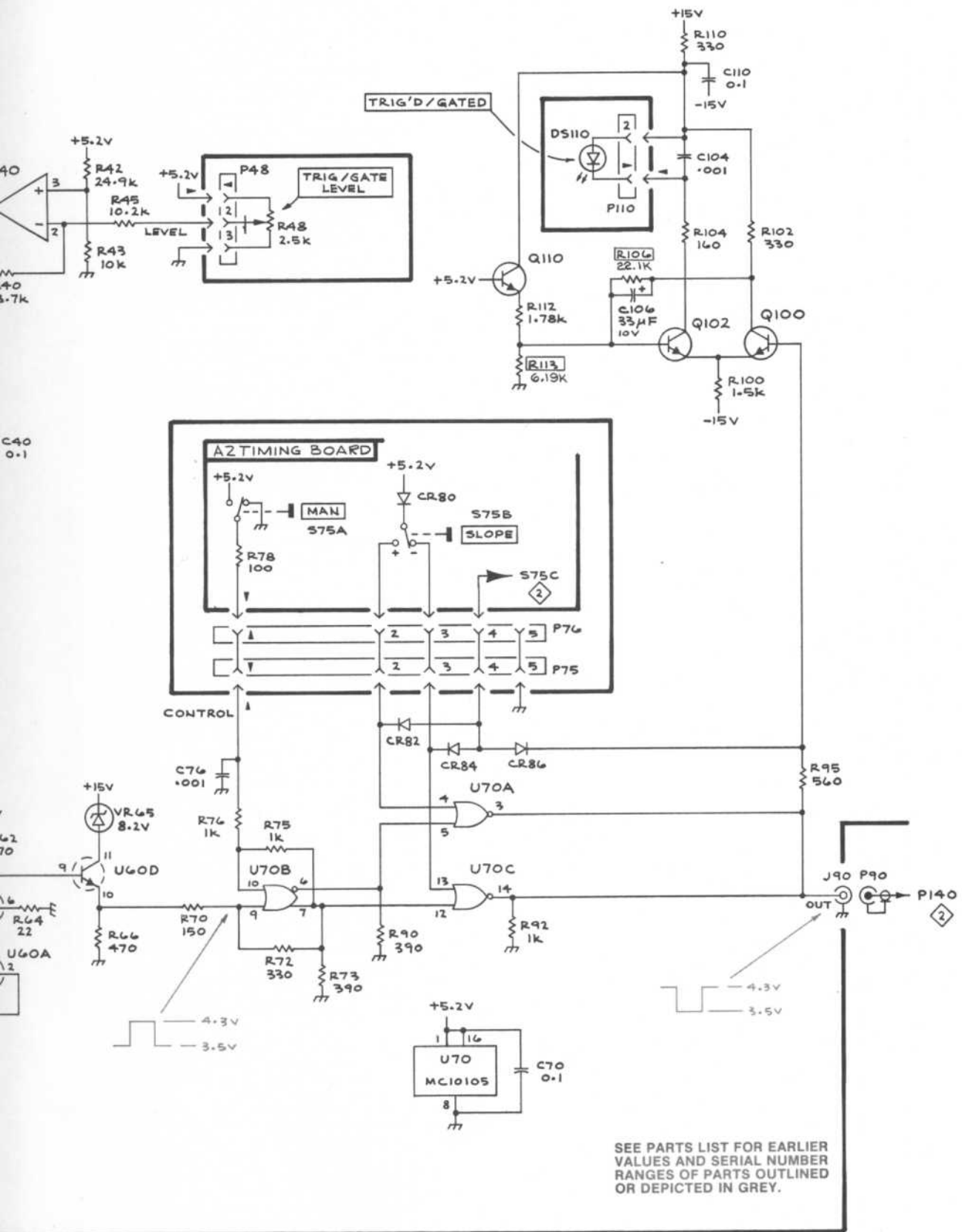


GRID  
LOC



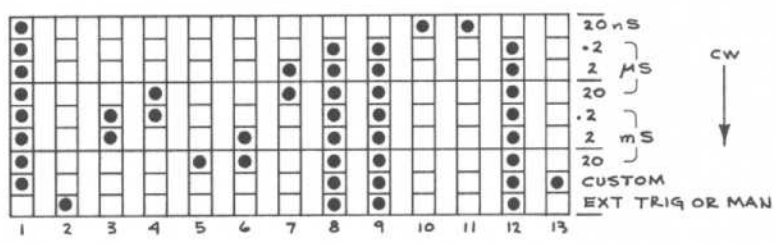
\* MATCHED PAIR

AI INPUT BOARD

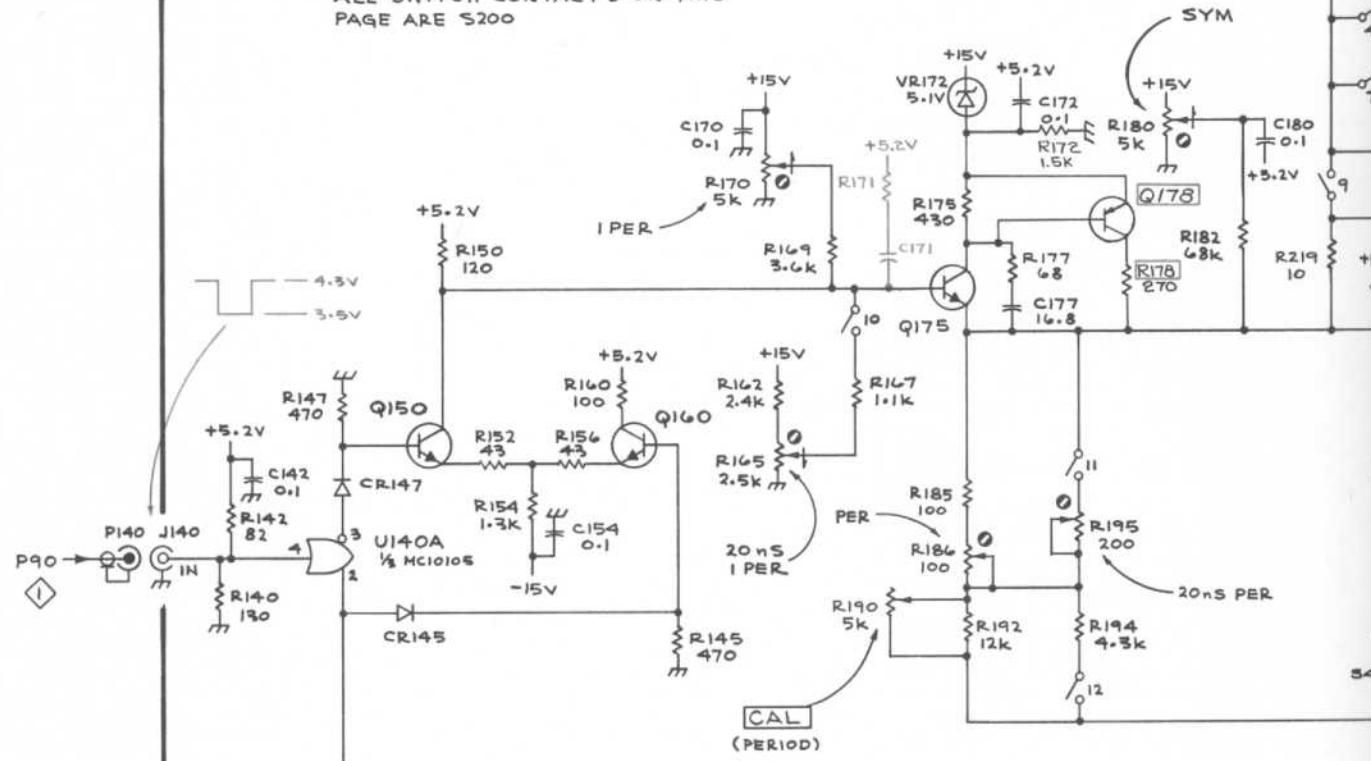


SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

S200  
PERIOD



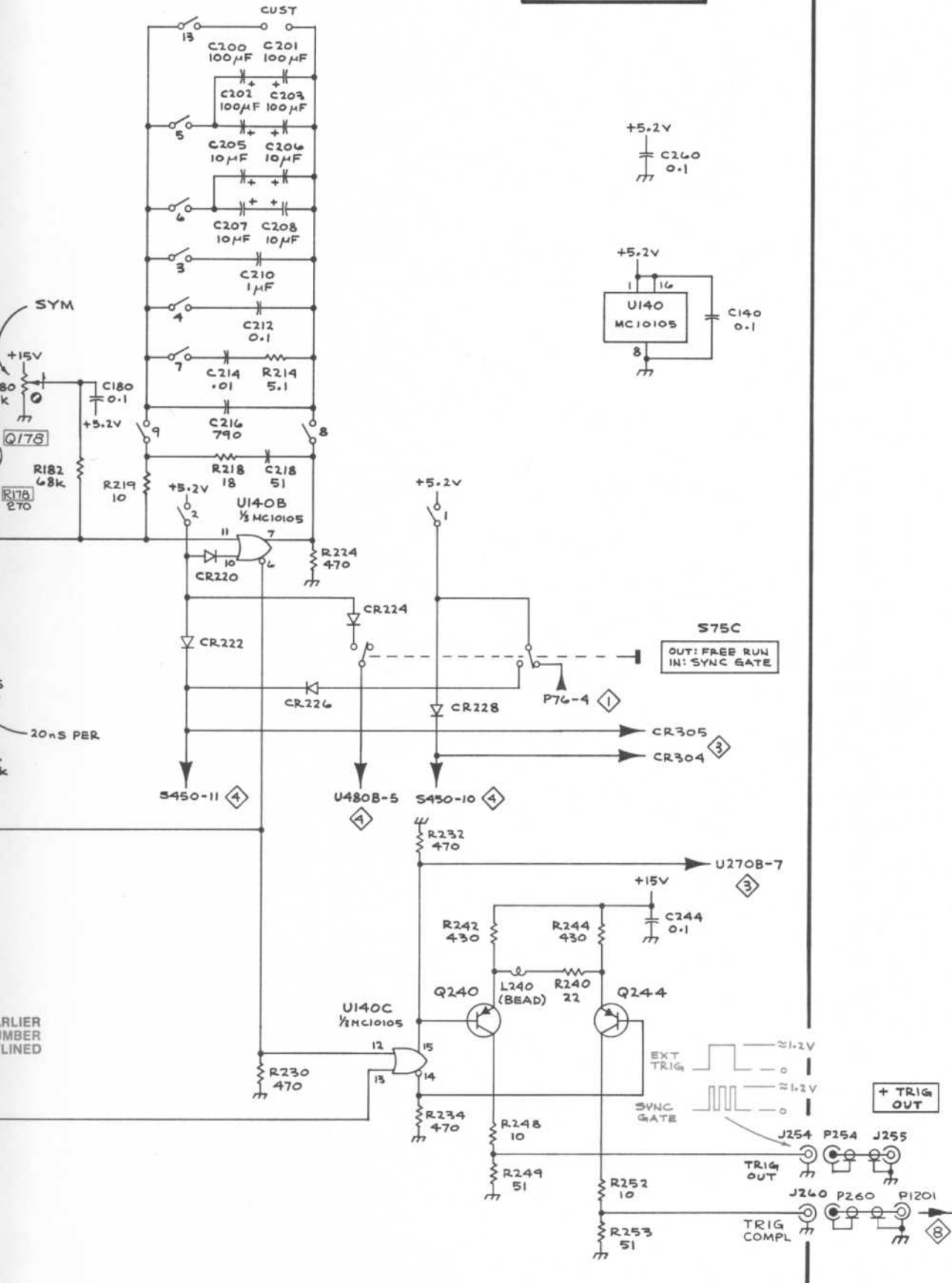
- NOTES:  
 1. ● INDICATES CONTACT CLOSED.  
 2. UNLESS OTHERWISE INDICATED ALL SWITCH CONTACTS ON THIS PAGE ARE S200



SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.



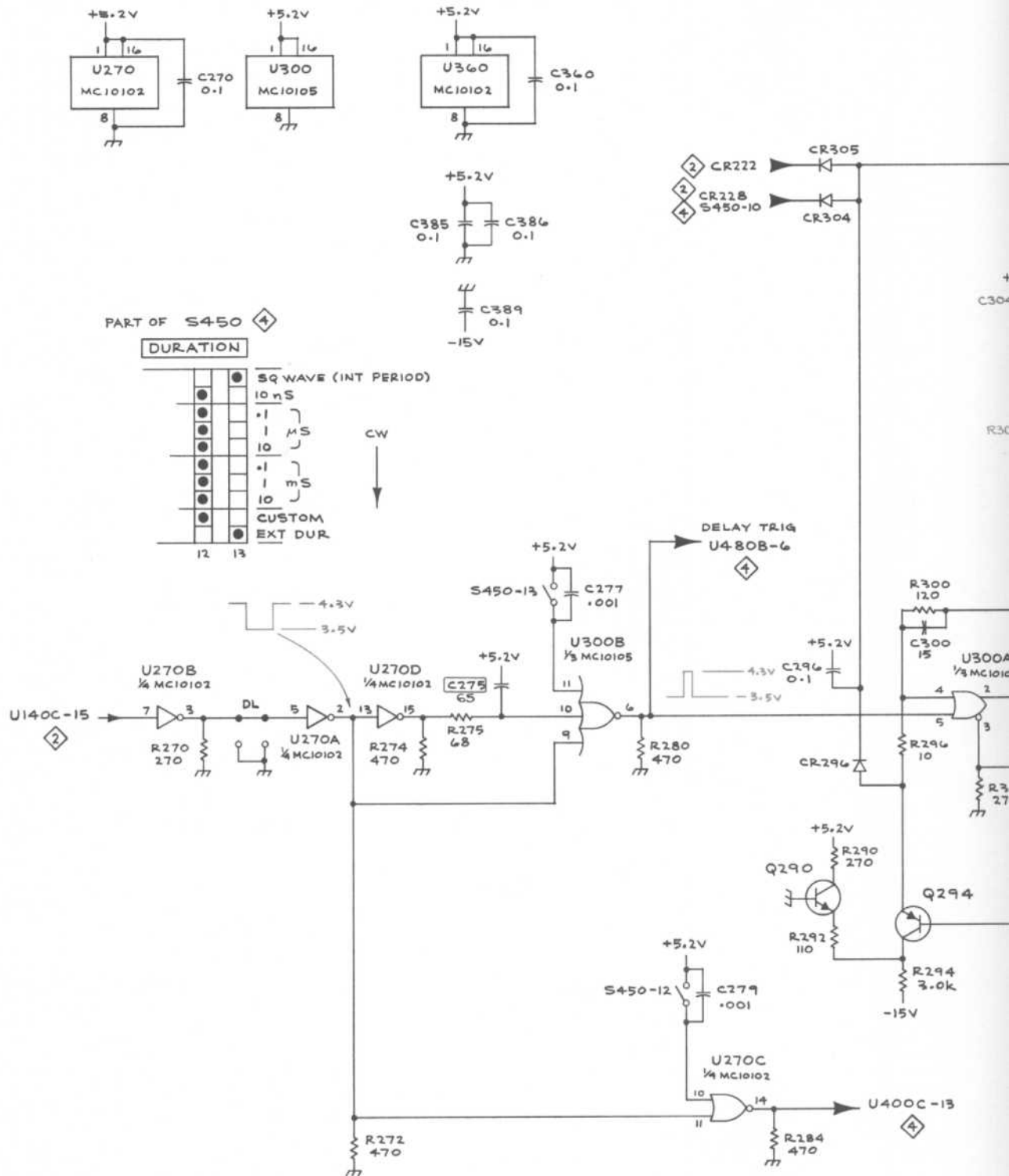
A2 TIMING BOARD



REV. B, APR, 1978  
2044-21

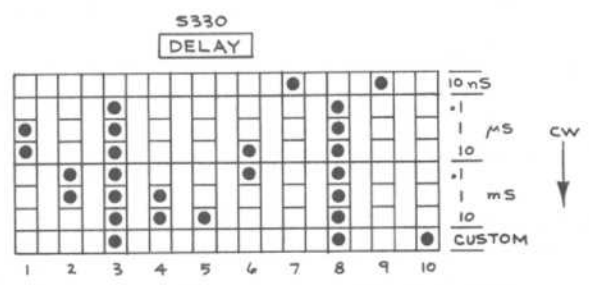
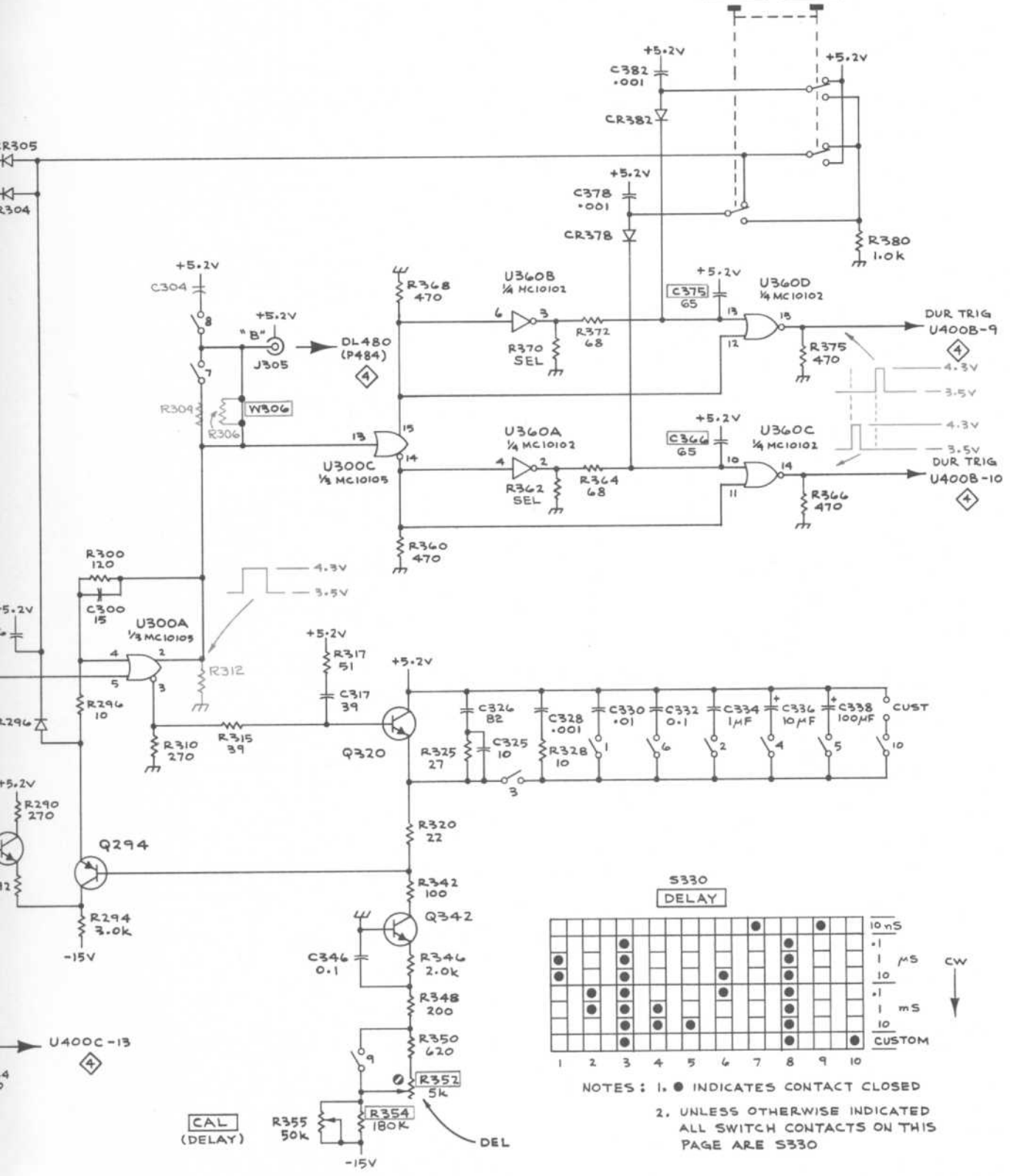
PERIOD GENERATOR

DEH  
1175



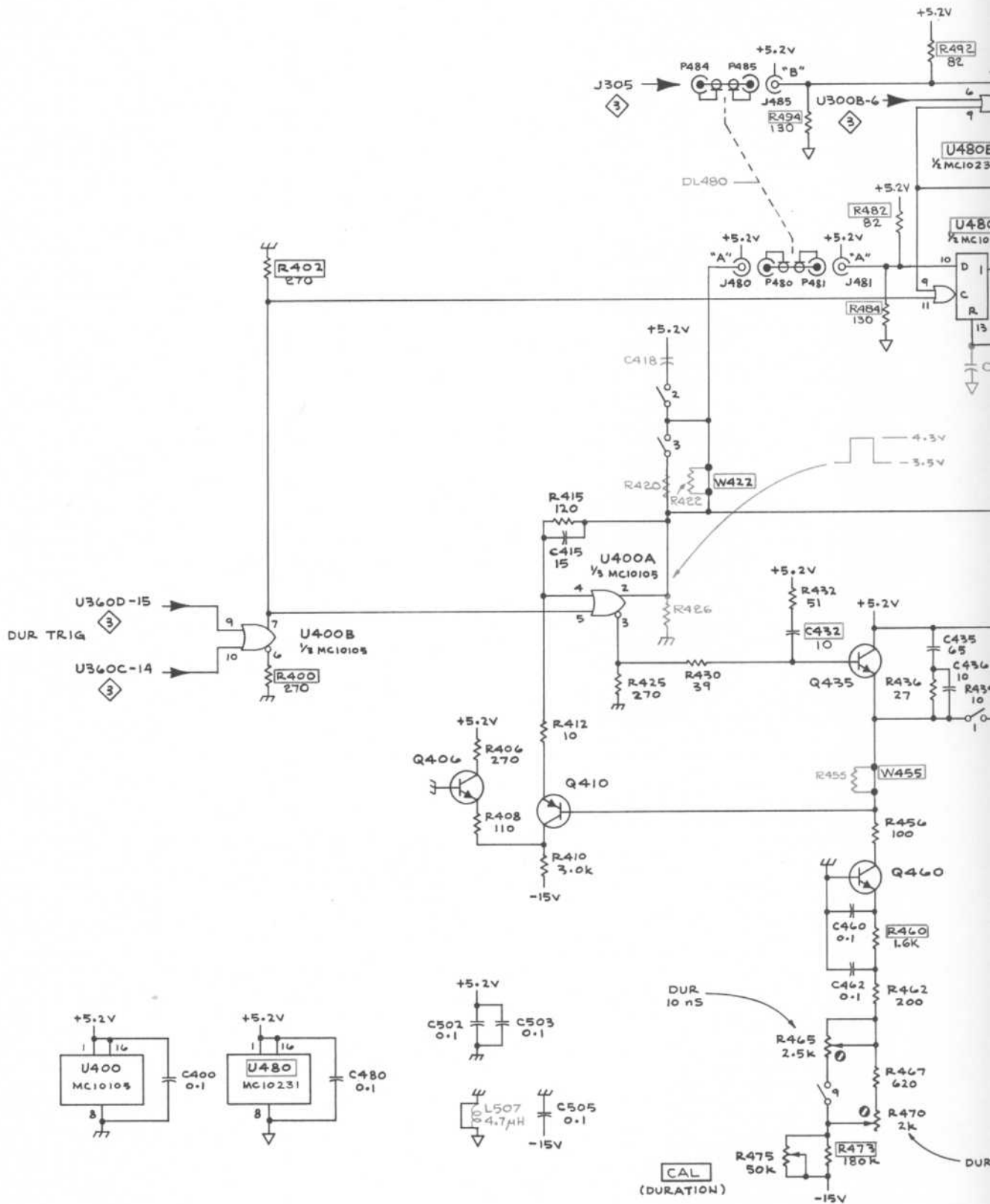
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

S380A UNDLY DELAY S380B

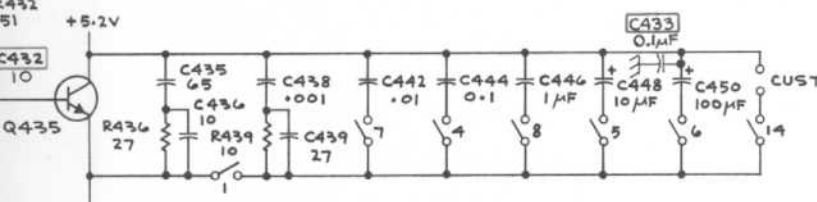
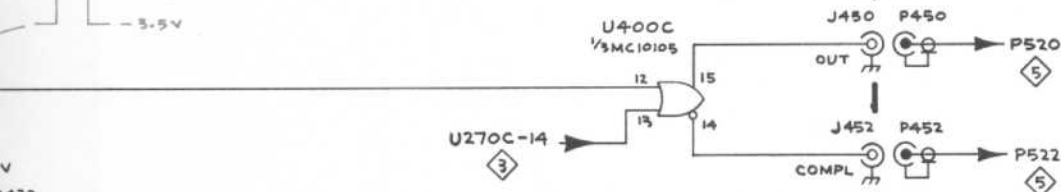
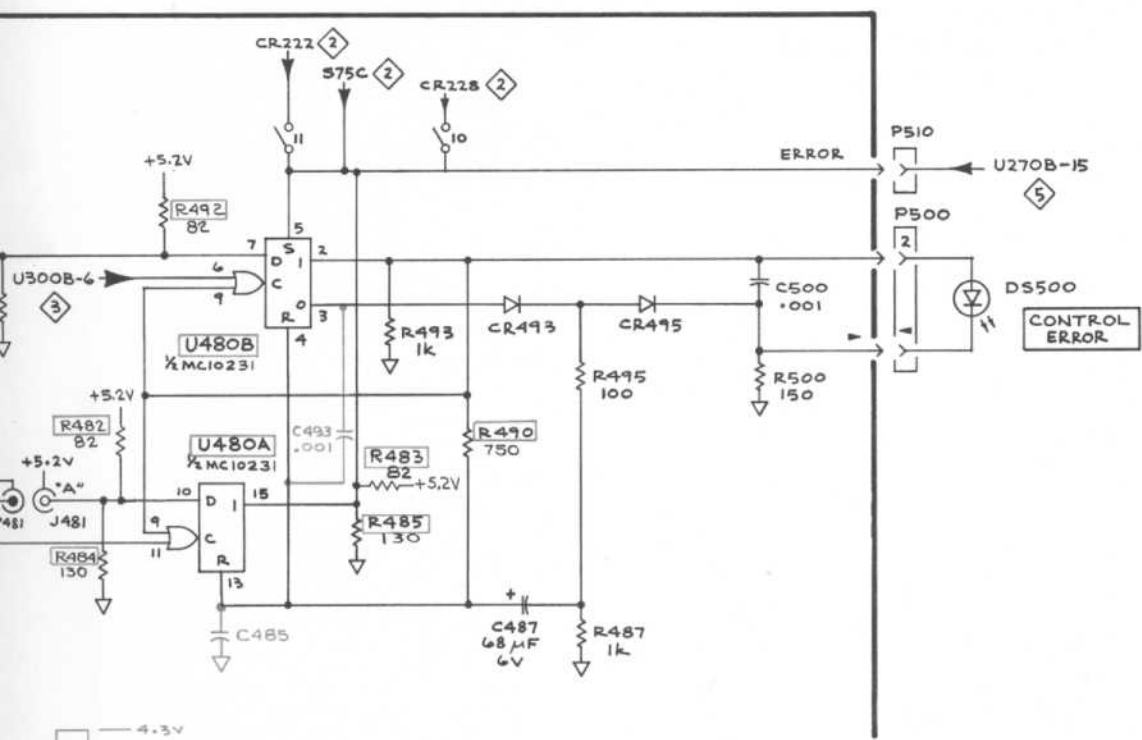


NOTES: 1. ● INDICATES CONTACT CLOSED  
 2. UNLESS OTHERWISE INDICATED ALL SWITCH CONTACTS ON THIS PAGE ARE S330

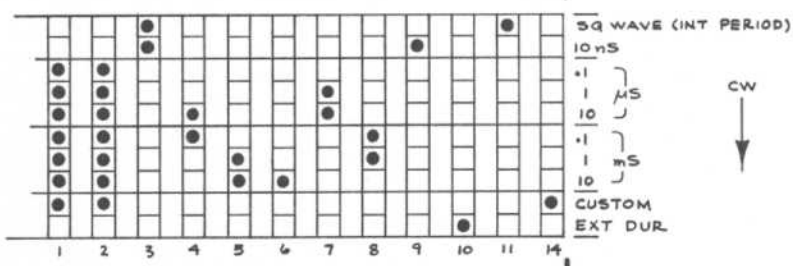
A2 TIMING BOARD



4

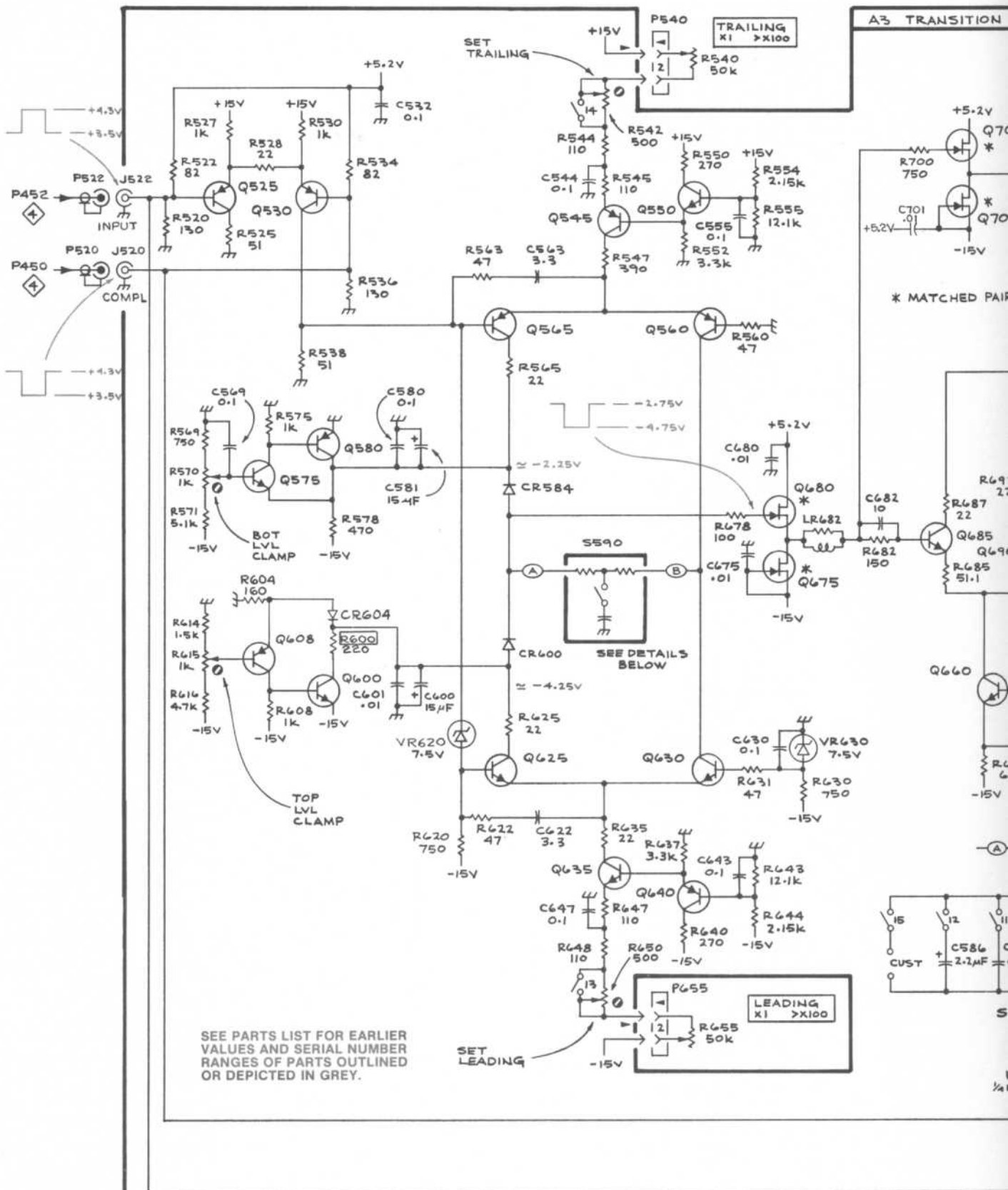


PART OF S450  
DURATION



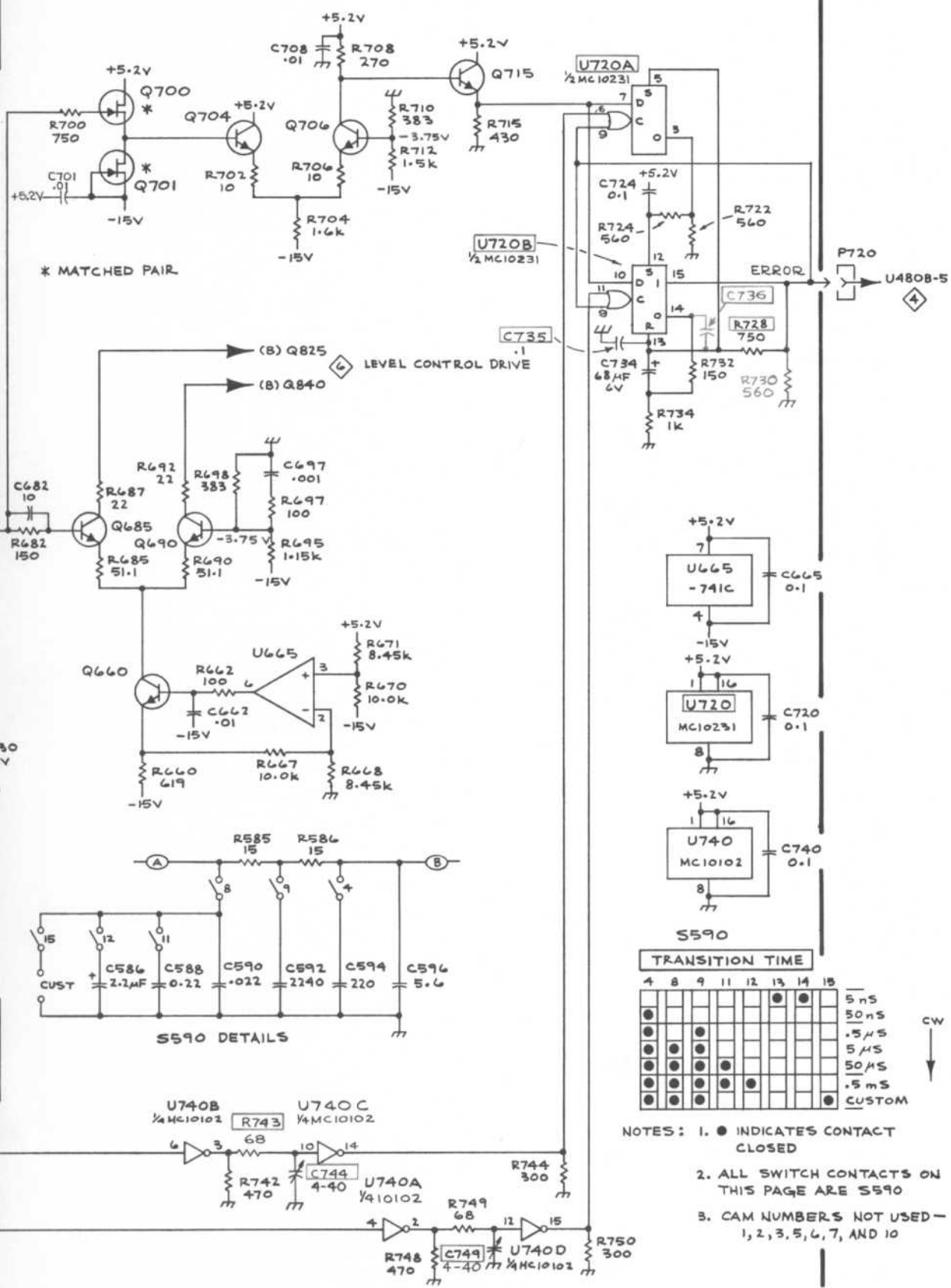
- NOTES: 1. ● INDICATES CONTACT CLOSED  
2. UNLESS OTHERWISE INDICATED ALL SWITCH CONTACTS ON THIS PAGE ARE S450

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.



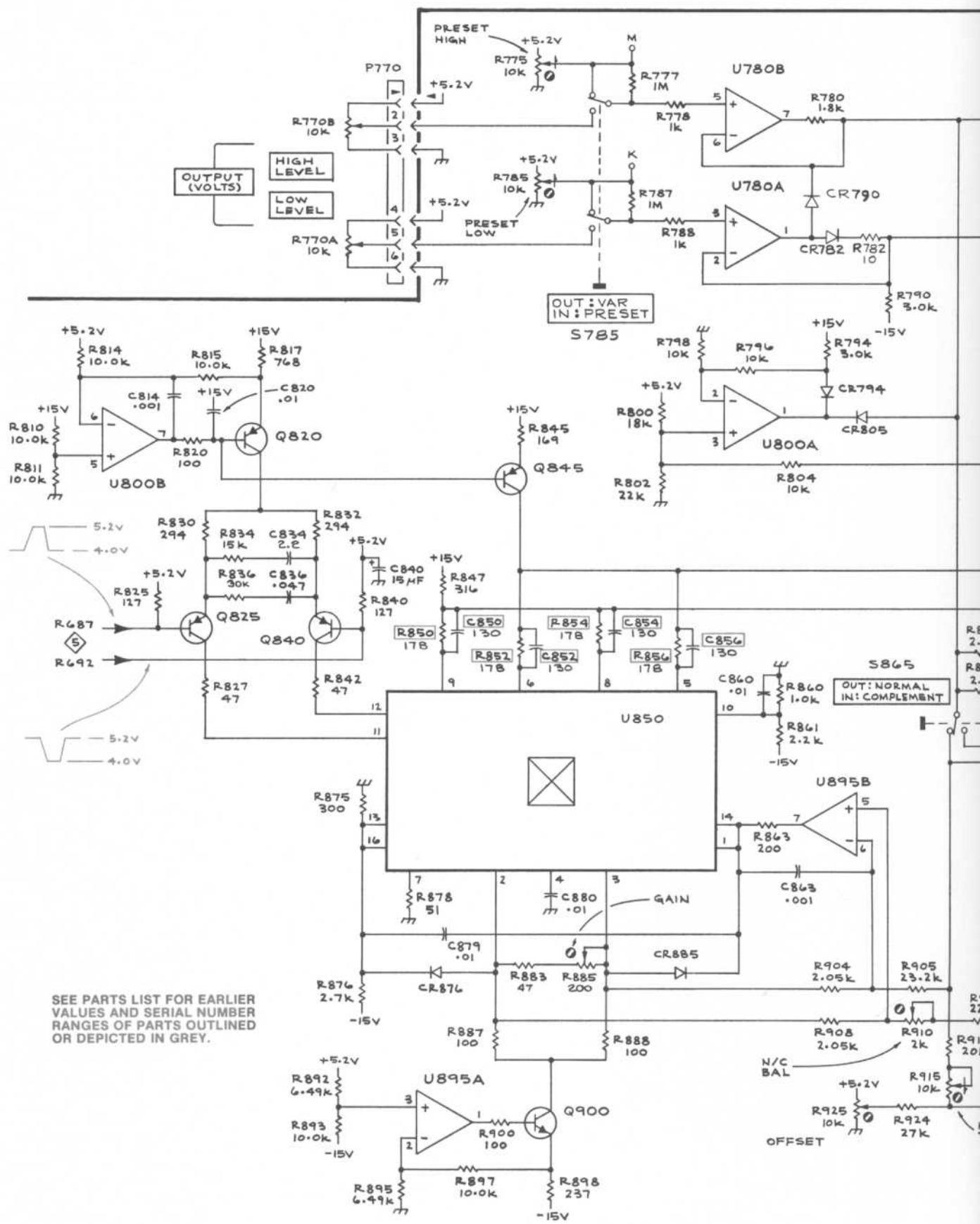
SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.

A3 TRANSITION TIMING BOARD



VARIABLE TRANSITION TIME GENERATOR

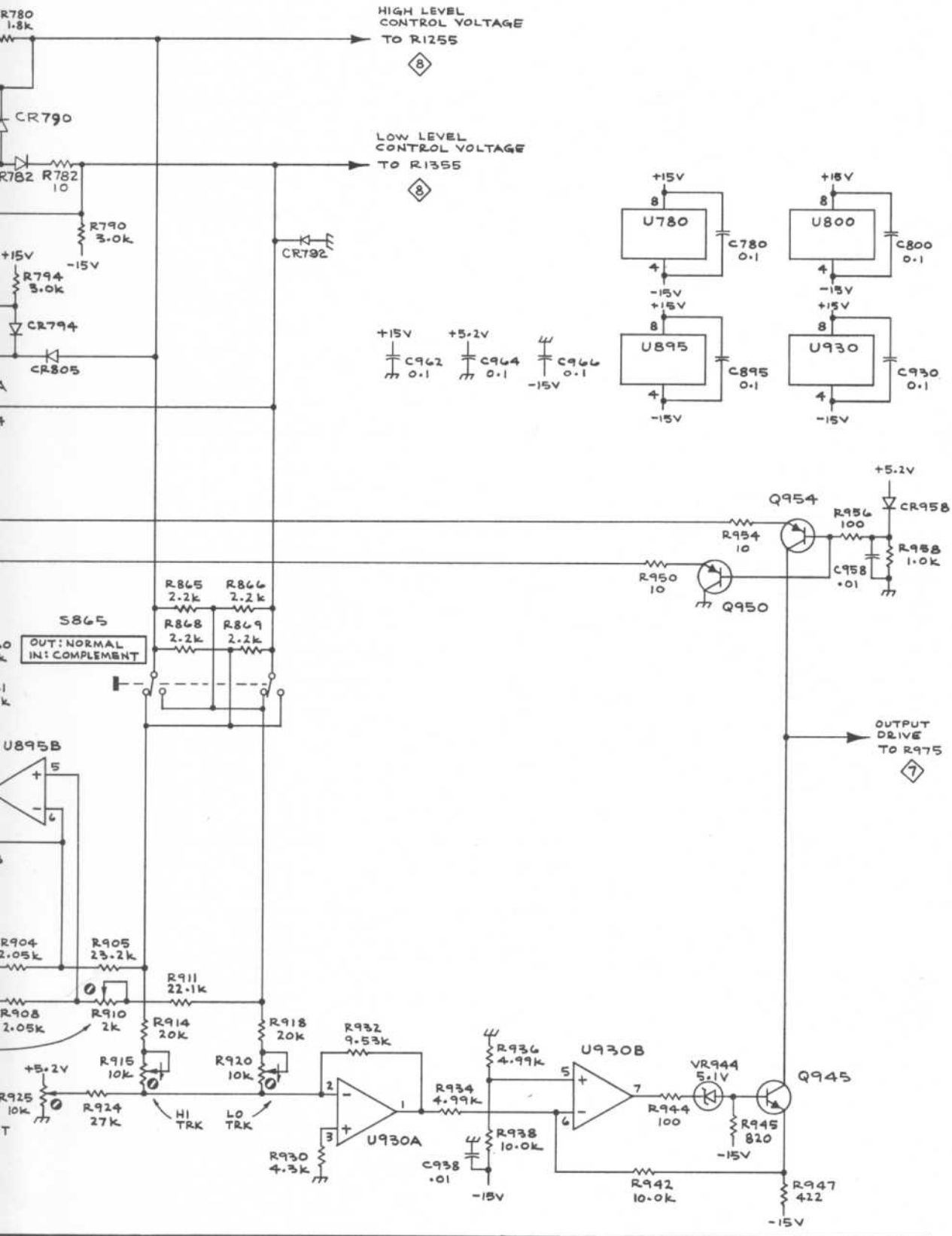
VARIABLE TRANSITION TIME GENERATOR



SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.



A4 OUTPUT BOARD



LEVEL CONTROL MULTIPLIER

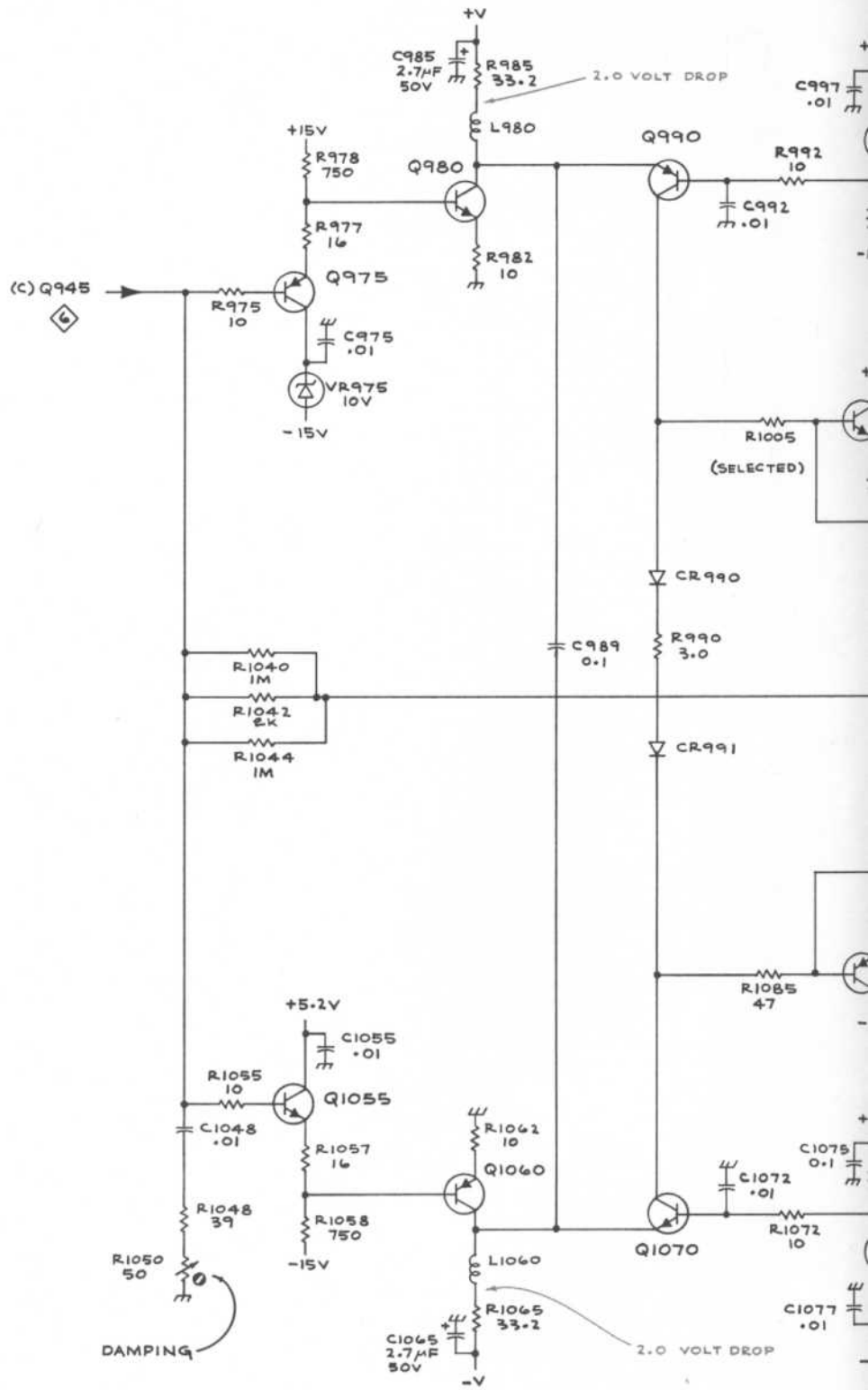
6

R, 1978  
25

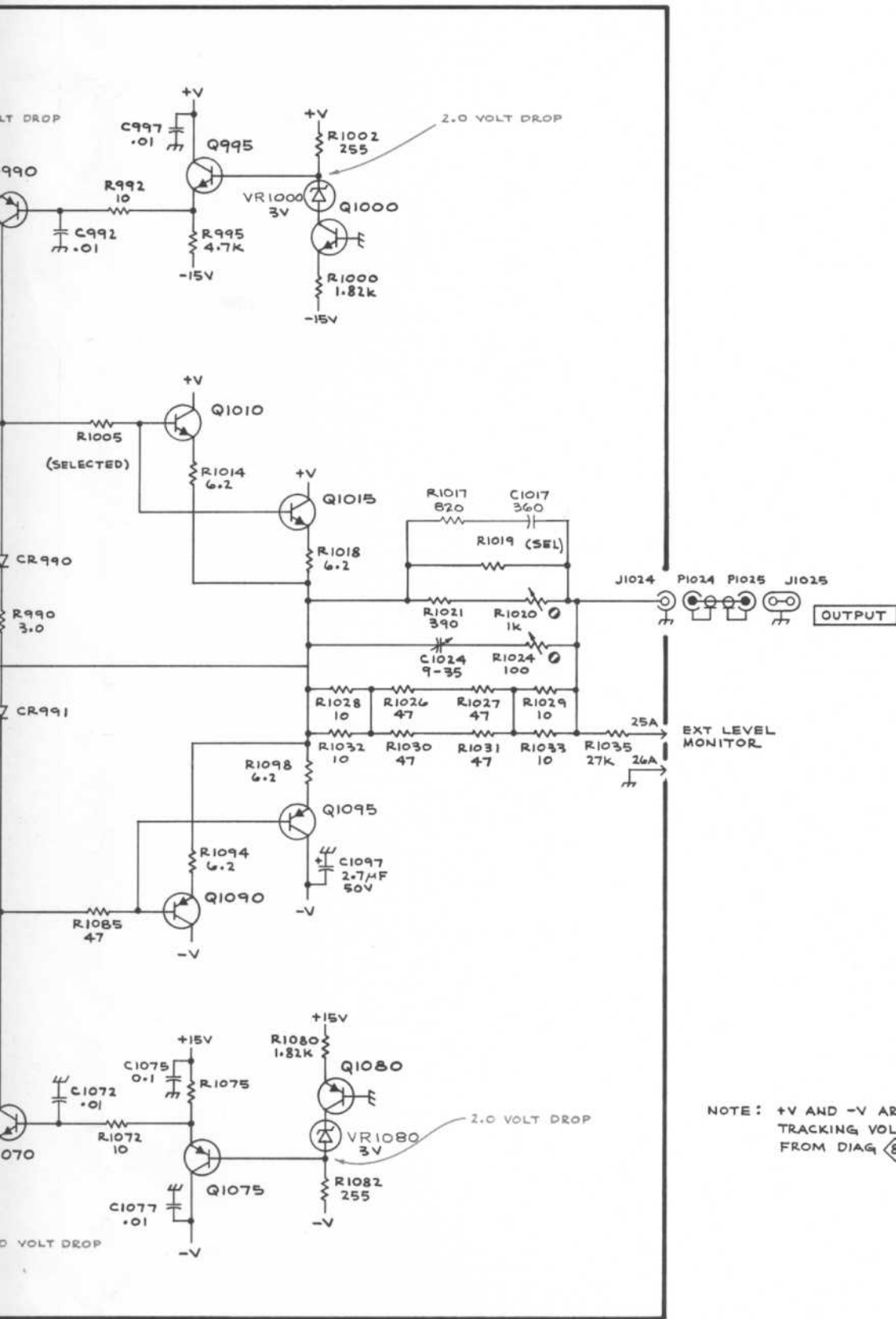
LEVEL CONTROL MULTIPLIER

DEH  
1175

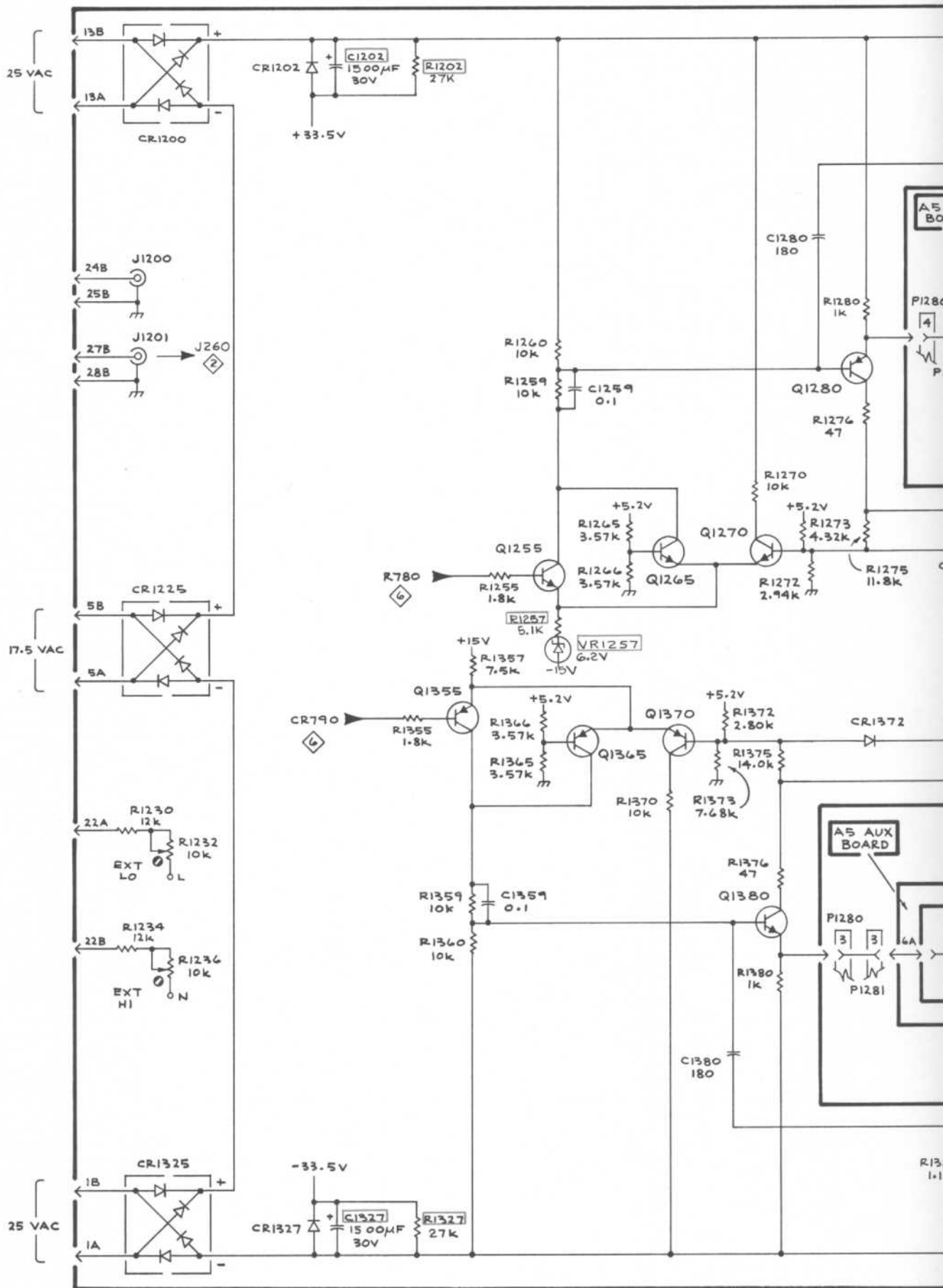
A4 OUTPUT BOARD



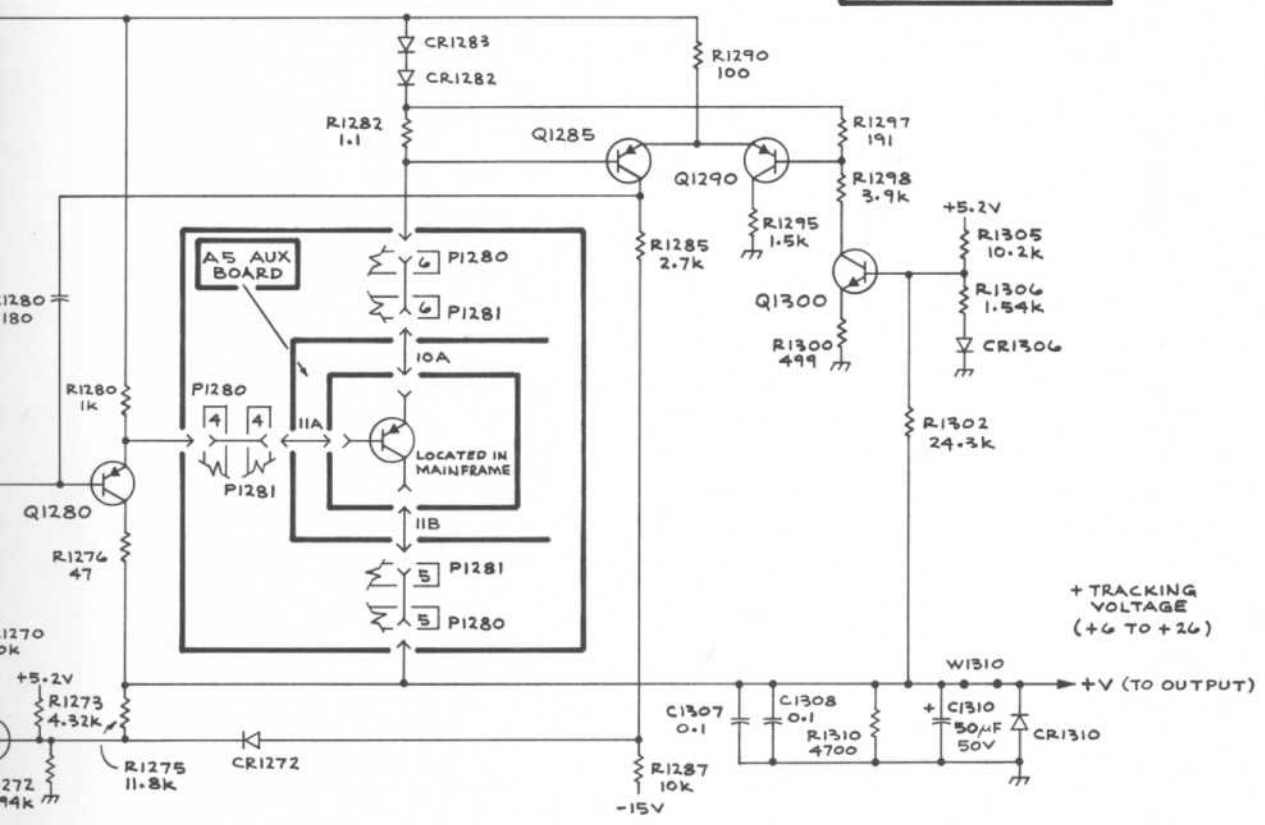
REV. C, APR, 1978  
2044-26



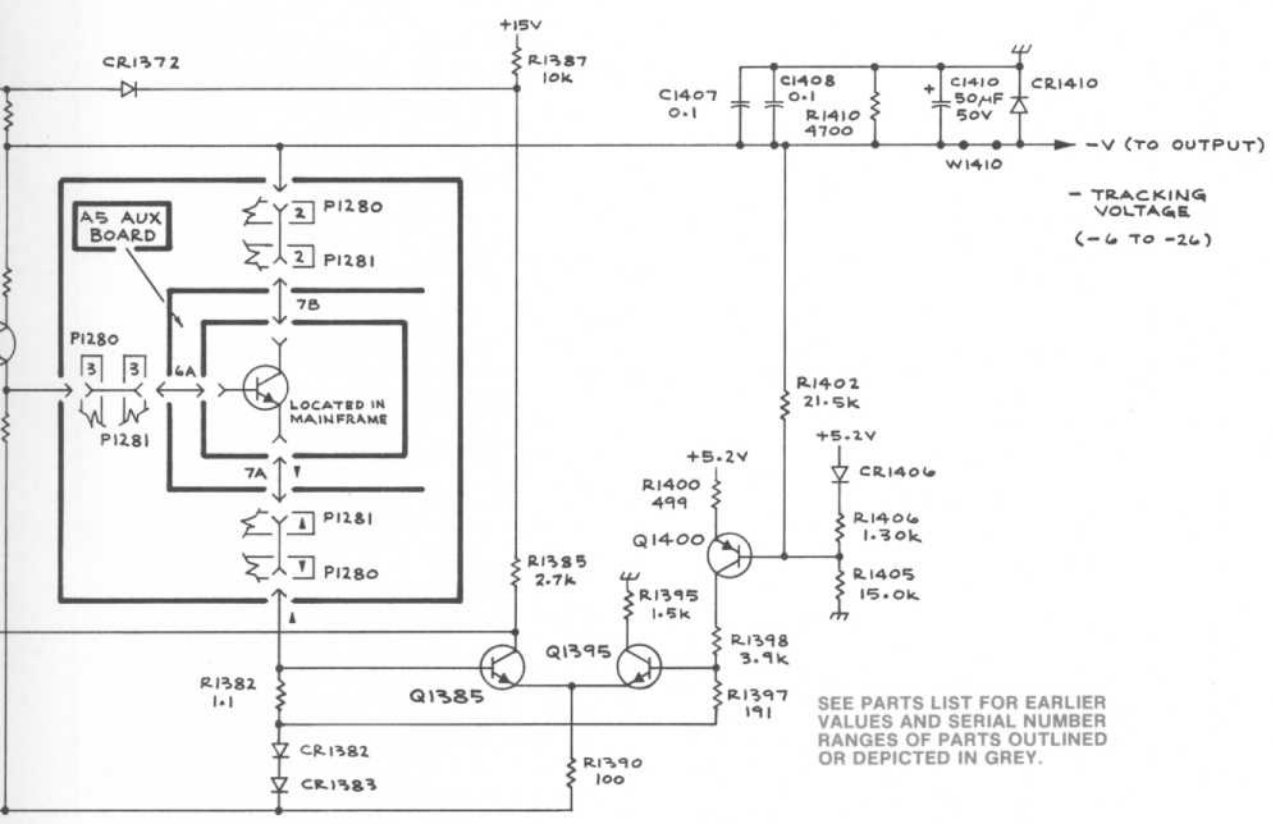
NOTE: +V AND -V ARE + AND - TRACKING VOLTAGES FROM DIAG 8



A4 OUTPUT BOARD

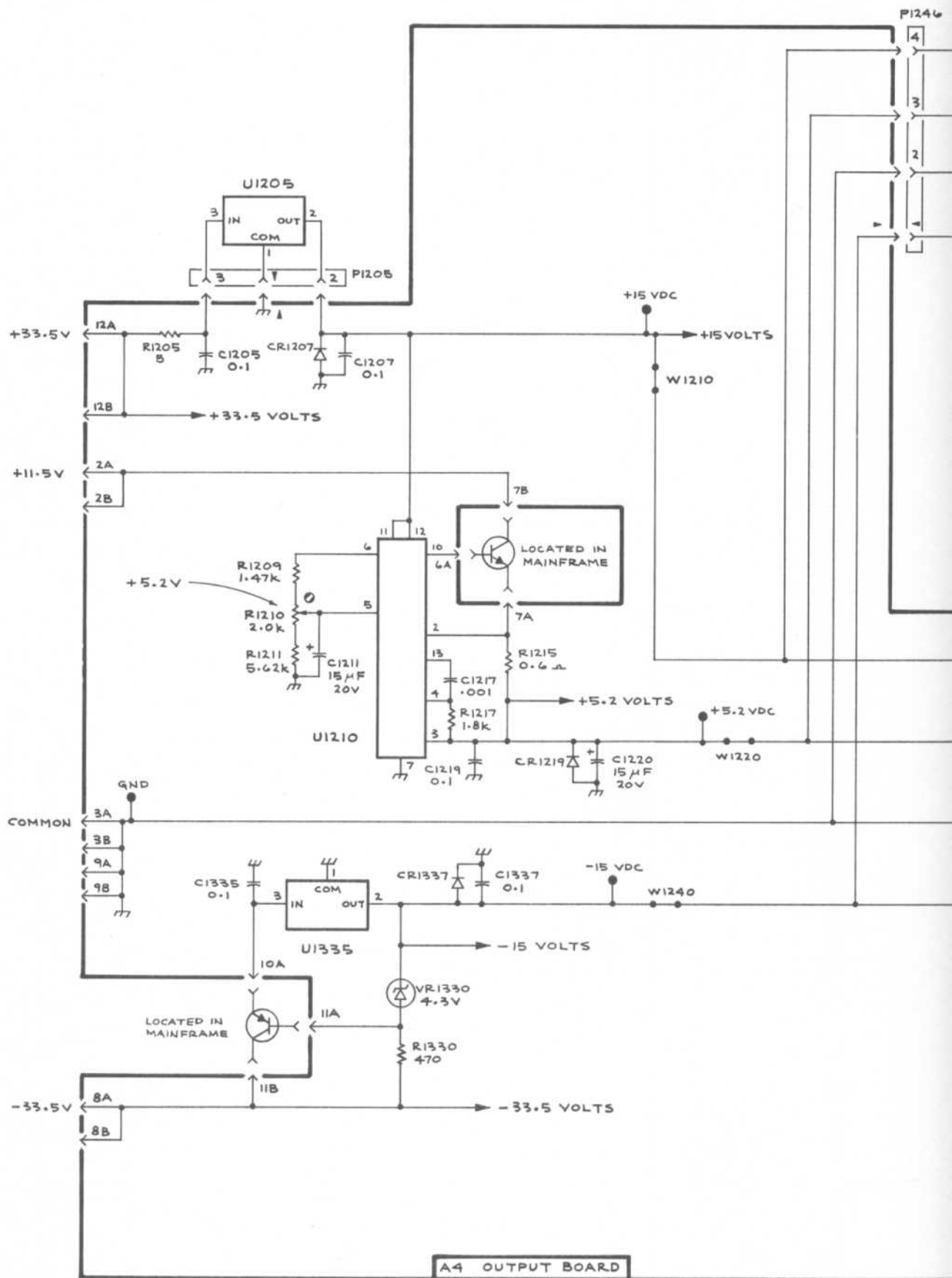


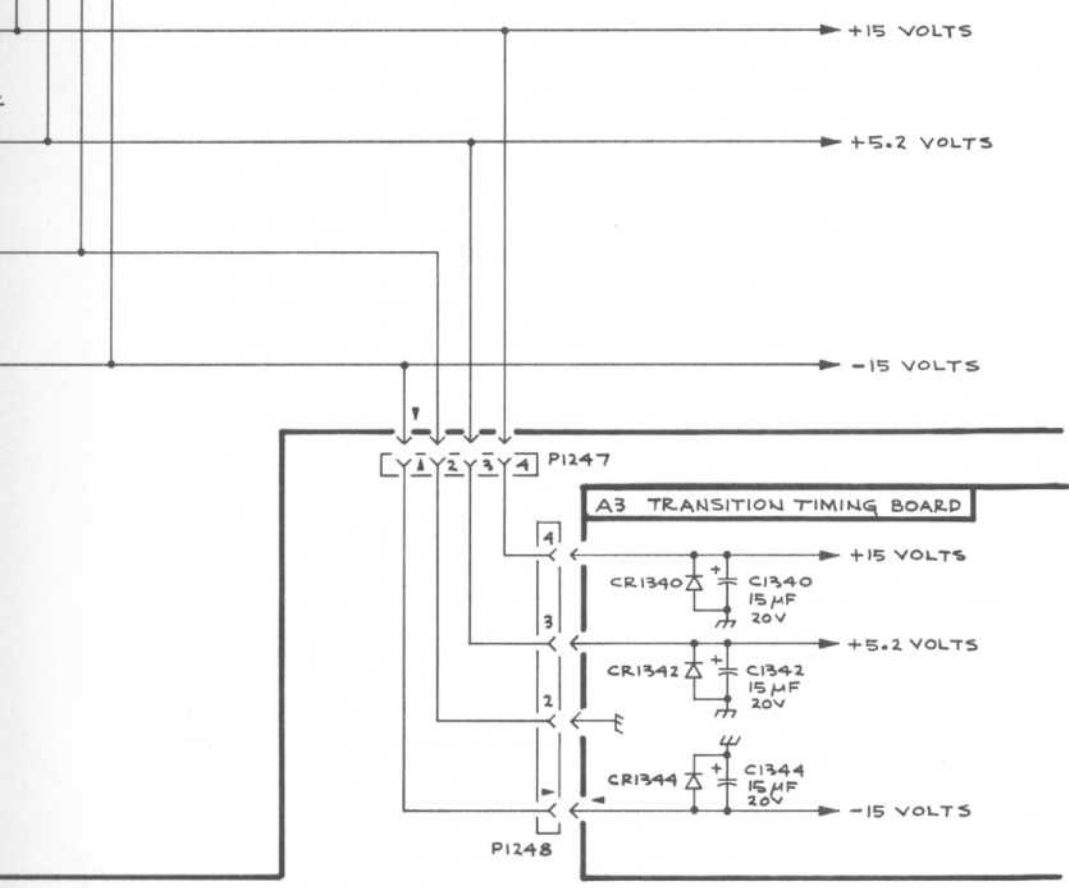
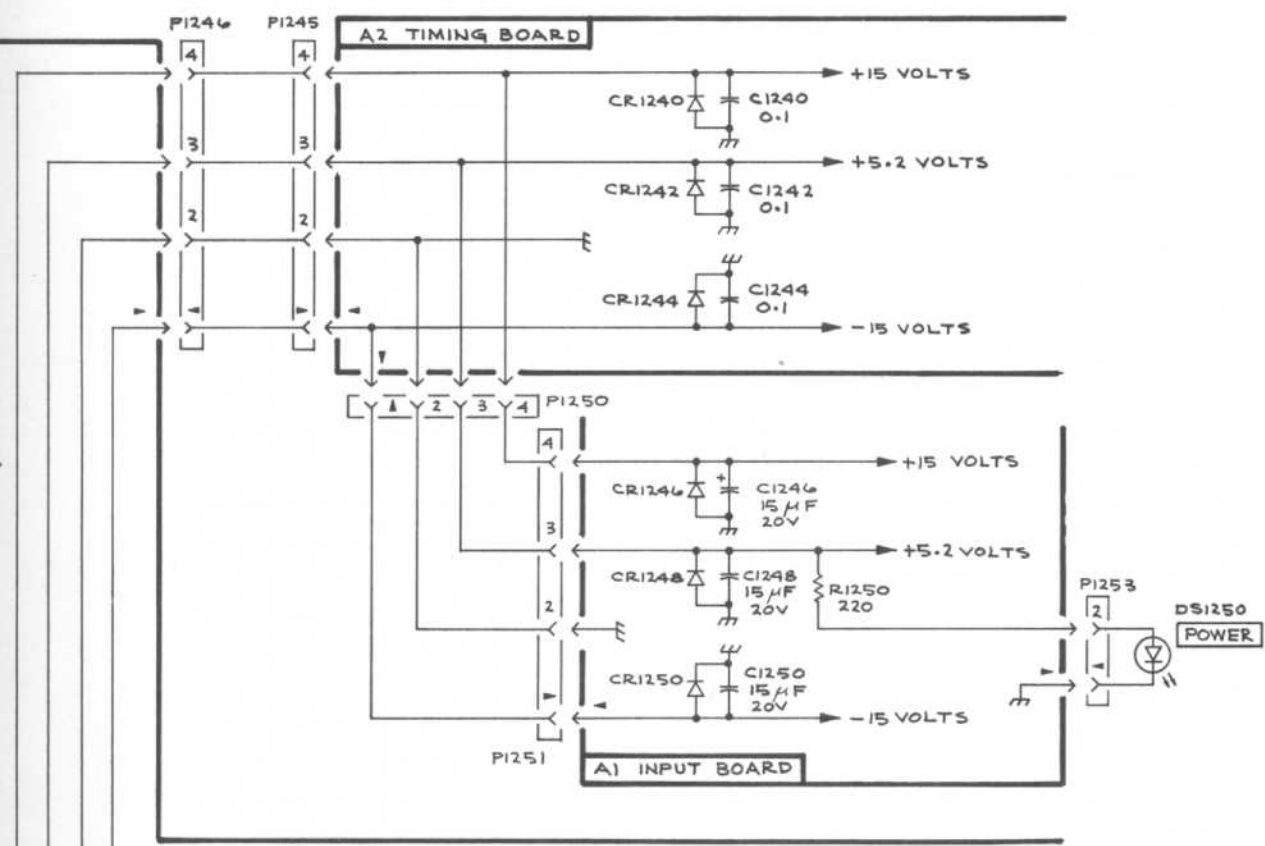
+ TRACKING VOLTAGE (+6 TO +26)



- TRACKING VOLTAGE (-6 TO -26)

SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.





# REPLACEABLE MECHANICAL PARTS

## PARTS ORDERING INFORMATION

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

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

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

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

## SPECIAL NOTES AND SYMBOLS

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

## FIGURE AND INDEX NUMBERS

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

## INDENTATION SYSTEM

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

```

1 2 3 4 5           Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
    ---*---
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
    ---*---
Parts of Detail Part
Attaching parts for Parts of Detail Part
    ---*---
  
```

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

**Attaching parts must be purchased separately, unless otherwise specified.**

## ITEM NAME

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

## ABBREVIATIONS

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



CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

| Mfr. Code | Manufacturer  | Address                                  | City, State, Zip           |
|-----------|---|--|----------------------------|
| 000CY     | NORTHWEST FASTENER SALES, INC.                      | 7923 SW CIRBUS DRIVE                     | BEAVERTON, OREGON 97005    |
| 00779     | AMP, INC.   | P O BOX 3608                             | HARRISBURG, PA 17105       |
| 01295     | TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP        | P O BOX 5012, 13500 N CENTRAL EXPRESSWAY | DALLAS, TX 75222           |
| 05820     | WAKEFIELD ENGINEERING, INC.                         | AUDUBON ROAD                             | WAKEFIELD, MA 01880        |
| 08261     | SPECTRA-STRIP CORP.                                 | 7100 LAMPSON AVE.                        | GARDEN GROVE, CA 92642     |
| 11897     | PLASTIGLIDE MFG. CORPORATION                        | P O BOX 867, 1757 STANFORD ST.           | SANTA MONICA, CA 90406     |
| 13103     | THERMALLOY COMPANY, INC.                            | 2021 W VALLEY VIEW LANE                  | DALLAS, TEXAS 75234        |
|           |   | P O BOX 34829                            | LOS GATOS, CA 95030        |
| 13511     | AMPHENOL CARDRE DIV., BUNKER RAMO CORP.             | YOUK EXPRESSWAY                          | NEW CUMBERLAND, PA 17070   |
| 22526     | BERG ELECTRONICS, INC.                              | 3560 MADISON AVE.                        | INDIANAPOLIS, IN 46227     |
| 24931     | SPECIALTY CONNECTOR CO., INC.                       |  |                            |
| 26365     | GRIES REPRODUCER CO., DIV. OF COATS AND CLARK, INC. | 125 BEECHWOOD AVE.                       | NEW ROCHELLE, NY 10802     |
| 42838     | NATIONAL RIVET AND MFG. CO.                         | 1-21 EAST JEFFERSON ST.                  | WAUPUN, WI 53963           |
| 55210     | GETTIG ENG. AND MFG. COMPANY                        | PO BOX 85, OFF ROUTE 45                  | SPRING MILLS, PA 16875     |
| 59730     | THOMAS AND BETTS COMPANY                            | 36 BUTLER ST.                            | ELIZABETH, NJ 07207        |
| 73743     | FISCHER SPECIAL MFG. CO.                            | 446 MORGAN ST.                           | CINCINNATI, OH 45206       |
| 74445     | HOLO-KROME CO.                                      | 31 BROOK ST. WEST                        | HARTFORD, CT 06110         |
| 78189     | ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION       | ST. CHARLES ROAD                         | ELGIN, IL 60120            |
| 78471     | TILLEY MFG. CO.                                     | 900 INDUSTRIAL RD.                       | SAN CARLOS, CA 94070       |
| 79136     | WALDES, KOHINOOR, INC.                              | 47-16 AUSTEL PLACE                       | LONG ISLAND CITY, NY 11101 |
| 79807     | WROUGHT WASHER MFG. CO.                             | 2100 S. O BAY ST.                        | MILWAUKEE, WI 53207        |
| 80009     | TEKTRONIX, INC.                                     | P O BOX 500                              | BEAVERTON, OR 97077        |
| 82647     | TEXAS INSTRUMENTS, INC., CONTROL PRODUCTS DIV.      | 34 FOREST ST.                            | ATTLEBORO, MA 02703        |
| 83385     | CENTRAL SCREW CO.                                   | 2530 CRESCENT DR.                        | BROADVIEW, IL 60153        |
| 86928     | SEASTROM MFG. COMPANY, INC.                         | 701 SONORA AVENUE                        | GLENDALE, CA 91201         |
| 87308     | N. L. INDUSTRIES, INC., SOUTHERN SCREW DIV.         | P. O. BOX 1360                           | STATESVILLE, NC 28677      |
| 93907     | CAMCAR SCREW AND MFG. CO.                           | 600 18TH AVE.                            | ROCKFORD, IL 61101         |

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description   | Mfr Code | Mfr Part Number  |
|------------------|--------------------|-----------------------------|-----|---|---|---|---|---|--|----------|------------------|
| 1-1              | 337-1399-04        |                             | 2   |   |   |   |   |   | SHIELD,ELEC:SIDE   | 80009    | 337-1399-04      |
| -2               | 200-1837-00        | B010100 B021213             | 2   |   |   |   |   |   | COVER,PLUG-IN:TOP AND BOTTOM                                       | 80009    | 200-1837-00      |
|                  | 200-1837-01        | B021214                     | 2   |   |   |   |   |   | COVER,PLUG-IN:TOP & BOTTOM<br>(ATTACHING PARTS)                    | 80009    | 200-1837-01      |
| -3               | 211-0503-00        |                             | 2   |   |   |   |   |   | SCREW,MACHINE:6-32 X 0.188 INCH,PNH STL                            | 83385    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
| -4               | 366-1520-02        | B010100 B021102             | 1   |   |   |   |   |   | KNOB:GRAY  | 80009    | 366-1520-02      |
|                  | 366-1690-00        | B021103                     | 1   |   |   |   |   |   | KNOB,LATCH:<br>(ATTACHING PARTS)                                   | 80009    | 366-1690-00      |
| -5               | 214-1840-00        | B010100 B021102X            | 1   |   |   |   |   |   | PIN,KNOB SECRG:0.094 OD X 0.120 INCH LONG                          | 80009    | 214-1840-00      |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
| -6               | 366-1464-01        |                             | 3   |   |   |   |   |   | KNOB:GRAY  | 80009    | 366-1464-01      |
|                  |                    |                             |     |   |   |   |   |   | . EACH KNOB INCLUDES:  |          |                  |
|                  | 213-0153-00        |                             | 1   |   |   |   |   |   | . SETSCREW:5-40 X 0.125,STL BK OXD,HEX                             | 000CY    | OBD              |
| -7               | 366-1170-03        |                             | 3   |   |   |   |   |   | KNOB:GRAY,0.25 ID X 0.706 OD,0.6H                                  | 80009    | 366-1170-03      |
|                  |                    |                             |     |   |   |   |   |   | . EACH KNOB INCLUDES:  |          |                  |
|                  | 213-0153-00        |                             | 2   |   |   |   |   |   | . SETSCREW:5-40 X 0.125,STL BK OXD,HEX                             | 000CY    | OBD              |
| -8               | 366-1514-01        |                             | 1   |   |   |   |   |   | KNOB:GRAY,0.81 ID X 0.392 OD,0.466 H                               | 80009    | 366-1514-01      |
|                  | 213-0048-00        |                             | 1   |   |   |   |   |   | . SETSCREW:4-40 X 0.125 INCH,HEX SOC STL                           | 74445    | OBD              |
| -9               | 366-1517-01        |                             | 1   |   |   |   |   |   | KNOB:GRAY,0.126 ID X 0.588 OD,0.6H                                 | 80009    | 366-1517-01      |
|                  | 213-0153-00        |                             | 1   |   |   |   |   |   | . SETSCREW:5-40 X 0.125,STL BK OXD,HEX                             | 000CY    | OBD              |
| -10              | 366-1190-02        |                             | 1   |   |   |   |   |   | KNOB:0.252 ID X 0.706 OD,0.6H                                      | 80009    | 366-1190-02      |
|                  | 213-0153-00        |                             | 1   |   |   |   |   |   | . SETSCREW:5-40 X 0.125,STL BK OXD,HEX                             | 000CY    | OBD              |
| -11              | 366-0494-05        |                             | 3   |   |   |   |   |   | KNOB:GRAY,0.127 ID X 0.5 OD,0.531H                                 | 80009    | 366-0494-05      |
|                  |                    |                             |     |   |   |   |   |   | . EACH KNOB INCLUDES:  |          |                  |
|                  | 213-0153-00        |                             | 1   |   |   |   |   |   | . SETSCREW:5-40 X 0.125,STL BK OXD,HEX                             | 000CY    | OBD              |
| -12              | 366-1559-00        |                             | 7   |   |   |   |   |   | PUSH BUTTON:GRAY   | 80009    | 366-1559-00      |
| -13              | 131-0955-00        |                             | 2   |   |   |   |   |   | CONNECTOR,RCPT,:BNC,FEMALE,W/HARDWARE                              | 13511    | 31-279           |
| -14              | 210-0255-00        |                             | 2   |   |   |   |   |   | TERMINAL,LUG:0.391" ID INT TOOTH                                   | 80009    | 210-0255-00      |
| -15              | 131-1315-00        |                             | 1   |   |   |   |   |   | CONNECTOR,RCPT,:BNC,FEMALE   | 24931    | 28JR235-1        |
| -16              |                    |                             | 1   |   |   |   |   |   | RESISTOR,VAR:(SEE R48 EPL)<br>(ATTACHING PARTS)                    |          |                  |
| -17              | 210-0583-00        |                             | 1   |   |   |   |   |   | NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS                            | 73743    | 2X20224-402      |
| -18              | 210-0940-00        |                             | 1   |   |   |   |   |   | WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL                            | 79807    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
| -19              |                    |                             | 1   |   |   |   |   |   | RESISTOR,VAR:(SEE R540 AND R655 EPL)<br>(ATTACHING PARTS FOR EACH) |          |                  |
| -20              | 210-0583-00        |                             | 1   |   |   |   |   |   | NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS                            | 73743    | 2X20224-402      |
| -21              | 210-0940-00        |                             | 1   |   |   |   |   |   | WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL                            | 79807    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
| -22              |                    |                             | 1   |   |   |   |   |   | RESISTOR,VAR:(SEE R770A AND B EPL)<br>(ATTACHING PARTS)            |          |                  |
| -23              | 210-0583-00        |                             | 1   |   |   |   |   |   | NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS                            | 73743    | 2X20224-402      |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
| -24              | 358-0029-00        |                             | 4   |   |   |   |   |   | BSHG,MACH. THD:HEX,0.375-32 X 0.438"LONG<br>(ATTACHING PARTS)      | 80009    | 358-0029-00      |
| -25              | 210-0413-00        |                             | 4   |   |   |   |   |   | NUT,PLAIN,HEX.:0.375-32 X 0.50 INCH,STL                            | 73743    | 3145-402         |
| -26              | 210-0978-00        |                             | 3   |   |   |   |   |   | WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL                            | 78471    | OBD              |
| -27              | 210-0012-00        |                             | 1   |   |   |   |   |   | WASHER,LOCK:INTL,0.375 ID X 0.50" OD STL                           | 78189    | 1220-02-00-0541C |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
| -28              | 344-0195-01        |                             | 4   |   |   |   |   |   | CLIP,ELECTRICAL:CAM SHAFT  | 80009    | 344-0195-01      |
| -29              | 358-0378-00        |                             | 2   |   |   |   |   |   | BUSHING,SLEEVE:PRESS MOUNT   | 80009    | 358-0378-00      |
| -30              | 426-1072-00        |                             | 7   |   |   |   |   |   | FRAME,PUSH BTN:PLASTIC   | 80009    | 426-1072-00      |
| -31              | 333-2106-00        |                             | 1   |   |   |   |   |   | PANEL,FRONT:   | 80009    | 333-2106-00      |
| -32              | 214-1513-01        | B010100 B021102             | 1   |   |   |   |   |   | LCH,PLUG-IN RET:   | 80009    | 214-1513-01      |
|                  | 105-0719-00        | B021103                     | 1   |   |   |   |   |   | LATCH,RETAINING:PLUG-IN<br>(ATTACHING PARTS)                       | 80009    | 105-0719-00      |
| -33              | 213-0113-00        |                             | 1   |   |   |   |   |   | SCR,TPG,THD FOR:2-32 X 0.312 INCH,PNH STL                          | 93907    | OBD              |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -  |          |                  |
|                  | 105-0718-00        | XB021103 B032369            | 1   |   |   |   |   |   | BAR,LATCH RLSE:  | 80009    | 105-0718-00      |
|                  | 105-0718-01        | B032370                     | 1   |   |   |   |   |   | BAR,LATCH RLSE:  | 80009    | 105-0718-01      |
| -34              | 386-3468-00        | B010100 B021213             | 1   |   |   |   |   |   | SUBPANEL,FRONT:  | 80009    | 386-3468-00      |

Replaceable Mechanical Parts—PG 508

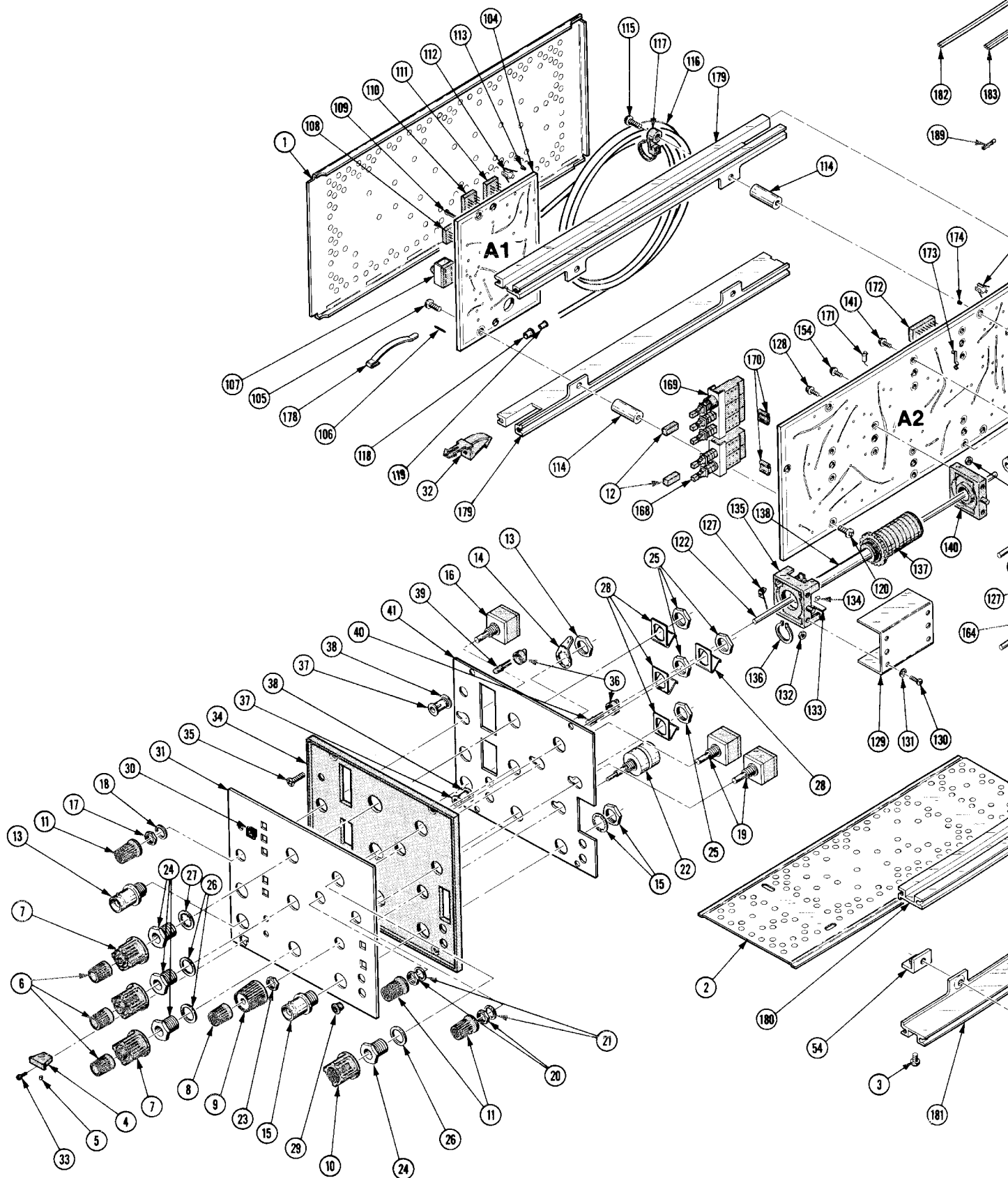
| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff | Dscont  | Qty | 1 2 3 4 5 | Name & Description   | Mfr Code | Mfr Part Number |
|------------------|--------------------|----------------------|---------|-----|-----------|--|----------|-----------------|
| 1-               | 386-3468-01        | B021214              |         | 1   |           | SUBPANEL, FRONT:<br>(ATTACHING PARTS)                                    | 80009    | 386-3468-01     |
| -35              | 213-0229-00        | B010100              | B021213 | 4   |           | SCR,TPG,THD FOR:6-20 X0.375"100 DEG,FLH STL                              | 93907    | OBD             |
|                  | 213-0227-00        | B021214              |         | 8   |           | SCR,TPG,THD FOR:6-32 X 0.50 DEG,FLH ST<br>- - - * - - -                  | 83385    | OBD             |
| -36              | 200-0935-00        |                      |         | 3   |           | BASE, LAMPHOLDER:0.29 OD X 0.19 CASE                                     | 80009    | 200-0935-00     |
| -37              | 352-0157-00        |                      |         | 3   |           | LAMPHOLDER:WHITE PLASTIC   | 80009    | 352-0157-00     |
| -38              | 210-1258-00        |                      |         | 3   |           | WASHER,FLAT:0.265 ID X 0.375 OD INCH AL                                  | 86928    | 5712-71-32      |
| -39              | -----              |                      |         | 2   |           | LAMP,LED:(SEE DS110 AND DS1250 EPL)                                      |          |                 |
| -40              | -----              |                      |         | 1   |           | LAMP,LED:(SEE DS500 EPL)   |          |                 |
| -41              | 337-2273-00        | B010100              | B021213 | 1   |           | SHIELD,ELEC:REAR SUBPANEL  | 80009    | 337-2273-00     |
|                  | 337-2273-01        | B021214              |         | 1   |           | SHIELD,ELEC:REAR SUBPANEL  | 80009    | 337-2273-01     |
| -42              | -----              |                      |         | 1   |           | CKT BOARD ASSY:AUXILLARY(SEE A5 EPL)                                     |          |                 |
| -43              | 131-0608-00        |                      |         | 6   |           | . TERMINAL,PIN:0.365 L X 0.25 PH,BRZ,GOLD PL                             | 22526    | 47357           |
| -44              | 351-0449-00        |                      |         | 2   |           | GUIDE,CKT BOARD:<br>(ATTACHING PARTS FOR EACH)                           | 80009    | 351-0449-00     |
| -45              | 211-0062-00        |                      |         | 2   |           | SCREW,MACHINE:2-56 X 0.312 INCH,RDH STL                                  | 83385    | OBD             |
| -46              | 210-0405-00        |                      |         | 2   |           | NUT,PLAIN,HEX.:2-56 X 0.188 INCH,BRS                                     | 73743    | 2X12157-402     |
| -47              | 210-0053-00        |                      |         | 2   |           | WASHER,LOCK:INTL,0.092 ID X 0.175"OD,STL<br>- - - * - - -                | 83385    | OBD             |
| -48              | 255-0334-00        |                      |         | FT  |           | PLASTIC CHANNEL:   | 11897    | 122-37-2500     |
| -49              | 334-2208-00        |                      |         | 1   |           | MARKER,IDENT:WARNING   | 80009    | 334-2208-00     |
| -50              | 386-3356-00        | B010100              | B021213 | 1   |           | PANEL,REAR:  | 80009    | 386-3356-00     |
|                  | 333-2380-00        | B021214              |         | 1   |           | PANEL,REAR:<br>(ATTACHING PARTS)   | 80009    | 333-2380-00     |
| -51              | 213-0192-00        |                      |         | 6   |           | SCR,TPG,THD FOR:6-32 X 0.50 INCH,PNH STL<br>- - - * - - -                | 87308    | OBD             |
| -52              | -----              |                      |         | 1   |           | CKT BOARD ASSY:MAIN(SEE A4 EPL)<br>(ATTACHING PARTS)                     |          |                 |
| -53              | 211-0510-00        |                      |         | 4   |           | SCREW,MACHINE:6-32 X 0.375 INCH,PNH STL                                  | 83385    | OBD             |
| -54              | 407-1693-00        |                      |         | 4   |           | BRACKET,COVER:TOP AND BOTTOM   | 80009    | 407-1693-00     |
| -55              | 211-0244-00        |                      |         | 4   |           | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL                                 | 78189    | OBD             |
| -56              | 211-0558-00        |                      |         | 1   |           | SCREW,MACHINE:6-32 X 0.250 BDGH,NYL,SLOT                                 | 26365    | 921-1150-0014   |
| -57              | 211-0008-00        |                      |         | 1   |           | SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                                   | 83385    | OBD             |
| -58              | 210-0586-00        |                      |         | 1   |           | NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL<br>- - - * - - -                    | 78189    | 211-041800-00   |
| -59              | -----              |                      |         | -   |           | . CKT BOARD ASSY INCLUDES:   |          |                 |
| -60              | -----              |                      |         | 1   |           | . MICROCIRCUIT,DI:(SEE U1205 EPL)  |          |                 |
| -61              | 361-0385-00        |                      |         | 4   |           | . SWITCH,PUSH:(SEE S785 AND S865 EPL)                                    | 80009    | 361-0385-00     |
| -62              | 136-0514-00        |                      |         | 4   |           | . SPACER,PB SW:0.164 INCH LONG   | 82647    | C93-08-18       |
| -63              | 214-1291-00        |                      |         | 4   |           | . SOCKET,PLUG IN:MICROCIRCUIT,8 CONTACT                                  | 05820    | 207-AB          |
| -64              | 342-0324-00        |                      |         | 8   |           | . HEAT SINK,ELEC:XSTR,0.72 OD X 0.375"H                                  | 13103    | 7717-5N-BLUE    |
| -65              | 214-1254-00        |                      |         | 4   |           | . INSULATOR,DISC:TO-5 TRANSISTOR   | 05820    | 209-AB          |
| -66              | 131-1003-00        |                      |         | 3   |           | . HEAT SINK,ELEC:0.422 H X 1.240 INCH OD                                 | 80009    | 131-1003-00     |
| -67              | 136-0252-04        |                      |         | 21  |           | . CONNECTOR BODY,:CKT BD MT,2 PRONG                                      | 22526    | 75060           |
| -68              | 131-0608-00        |                      |         | 27  |           | . SOCKET,PIN TERM:0.188 INCH LONG  | 22526    | 47357           |
| -69              | 136-0269-02        |                      |         | 1   |           | . TERMINAL,PIN:0.365 L X 0.25 PH,BRZ,GOLD PL                             | 01295    | C95140          |
| -70              | 214-0579-00        |                      |         | 4   |           | . SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE                                | 80009    | 214-0579-00     |
| -71              | 131-0566-00        |                      |         | 3   |           | . TERM.,TEST PT:BRS CD PL  | 55210    | L-2007-1        |
| -72              | 131-0993-00        |                      |         | 2   |           | . LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L                               | 00779    | 530153-2        |
| -73              | 343-0149-00        |                      |         | 2   |           | . LINK,TERM.CONNE:2 WIRE BLACK   | 80009    | 343-0149-00     |
| -74              | 214-1967-00        |                      |         | 1   |           | . CLAMP,LOOP:NYLON<br>. HEAT SINK,DIODE:FINGER TYPE<br>(ATTACHING PARTS) | 13103    | 6107B-14        |
| -75              | 211-0008-00        |                      |         | 1   |           | . SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                                 | 83385    | OBD             |
| -76              | 210-0586-00        |                      |         | 1   |           | . NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL<br>- - - * - - -                  | 78189    | 211-041800-00   |
| -77              | -----              |                      |         | 1   |           | . MICROCIRCUIT,LI:(SEE U1335 EPL)  |          |                 |
| -78              | 131-0595-00        |                      |         | 3   |           | . CONTACT,ELEC:1.37 INCH LONG  | 22526    | 47355           |
| -79              | 352-0161-02        |                      |         | 1   |           | . CONN BODY,PL,EL:3 WIRE RED   | 80009    | 352-0161-C2     |
| -80              | 131-0707-00        |                      |         | 3   |           | . CONNECTOR,TERM.:0.48" L,22-26AWG WIRE                                  | 22526    | 75691-005       |
| -81              | 385-0016-00        |                      |         | 1   |           | SPACER,POST:1.0 L W/6-32 THD THRU,NYLON<br>(ATTACHING PARTS)             | 80009    | 385-0016-00     |
| -82              | 211-0504-00        |                      |         | 1   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL<br>- - - * - - -                  | 83385    | OBD             |

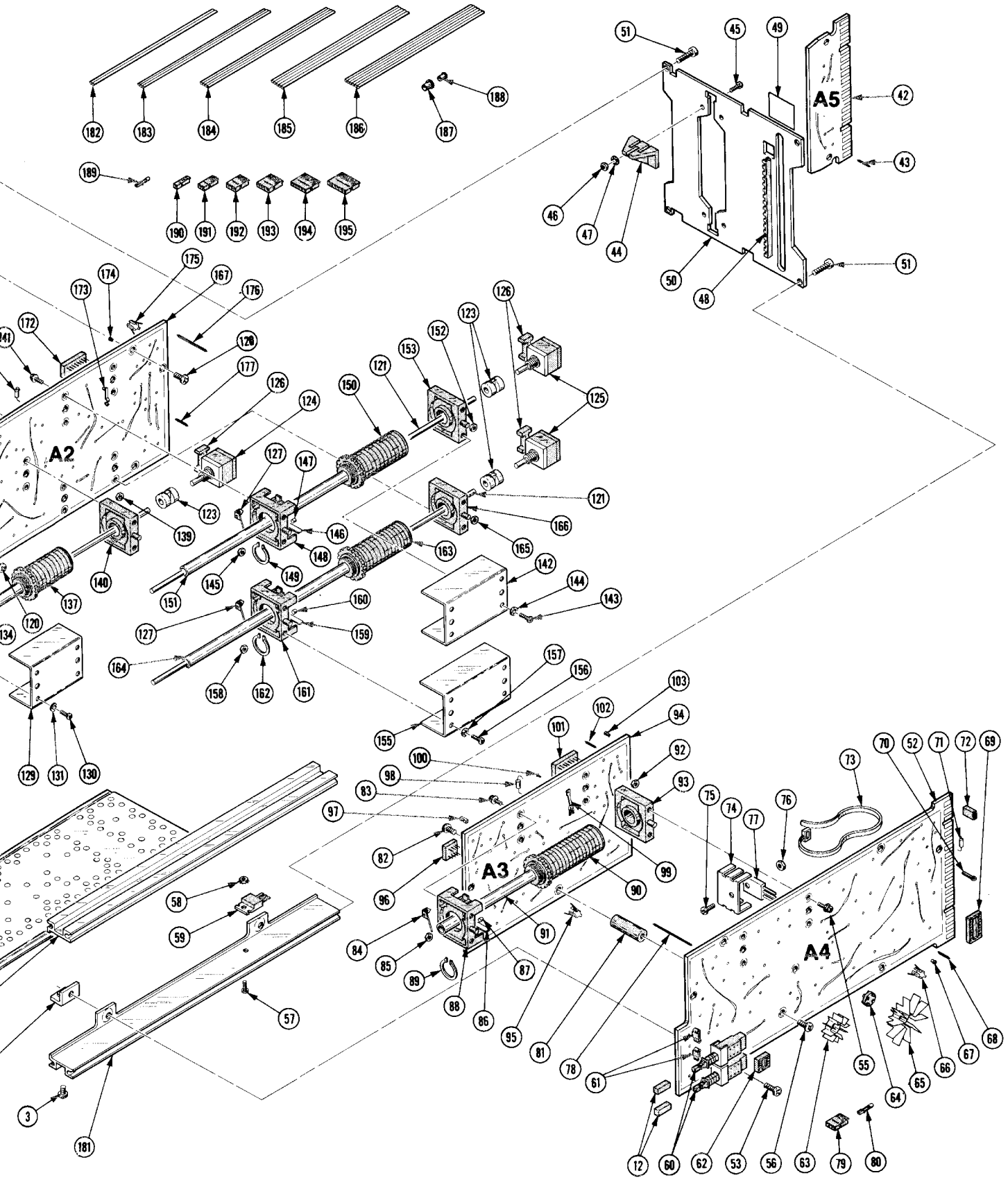
| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 2 3 4 5 | Name & Description   | Mfr Code | Mfr Part Number |
|------------------|--------------------|-----------------------------|-----|-----------|--|----------|-----------------|
| 1-               | 672-0558-00        |                             | 1   |           | CKT BOARD ASSY:MAIN W/CAM SW   | 80009    | 672-0558-00     |
|                  | 131-0963-00        |                             | 1   |           | . CONTACT,ELEC:GROUNDING   | 80009    | 131-0963-00     |
|                  |                    |                             | 1   |           | . ACTR ASSY CAM S:RANGE(SEE S590 EPL)<br>(ATTACHING PARTS)             |          |                 |
| -83              | 211-0244-00        |                             | 4   |           | . SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL<br>- - - * - - -            | 78189    | OBD             |
|                  |                    |                             | -   |           | . . . ACTUATOR ASSEMBLY INCLUDES:                                      |          |                 |
| -84              | 131-0963-00        |                             | 1   |           | . . CONTACT,ELEC:GROUNDING   | 80009    | 131-0963-00     |
| -85              | 210-0406-00        |                             | 2   |           | . . NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                               | 73743    | 2X12161-402     |
| -86              | 214-1139-02        |                             | 1   |           | . . SPRING,FLAT:GREEN COLORED  | 80009    | 214-1139-02     |
|                  | 214-1139-03        |                             | 1   |           | . . SPRING,FLAT:RED COLORED  | 80009    | 214-1139-03     |
| -87              | 214-1752-00        |                             | 2   |           | . . ROLLER,DETENT  | 80009    | 214-1752-00     |
| -88              | 401-0180-00        |                             | 1   |           | . . BEARING,CAM SW:FRONT<br>(ATTACHING PARTS)                          | 80009    | 401-0180-00     |
| -89              | 354-0390-00        |                             | 1   |           | . . RING,RETAINING:0.338 ID X 0.025" THK,STL                           | 79136    | 5100-37MD       |
| -90              | 105-0709-00        |                             | 1   |           | . . ACTUATOR,CAM SW:RANGE  | 80009    | 105-0709-00     |
| -91              | 384-0878-02        |                             | 1   |           | . . SHAFT,CAM SW:  | 80009    | 384-0878-02     |
| -92              | 210-0406-00        |                             | 4   |           | . . NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                               | 73743    | 2X12161-402     |
| -93              | 401-0178-00        |                             | 1   |           | . . BEARING,CAM SW:CENTER/REAR   | 80009    | 401-0178-00     |
| -94              |                    |                             | 1   |           | . CKT BOARD ASSY:RISE AND FALL(SEE A3 EPL)                             |          |                 |
| -95              | 131-1003-00        |                             | 2   |           | . . CONNECTOR BODY,:CKT BD MT,2 PRONG                                  | 80009    | 131-1003-00     |
| -96              | 136-0514-00        |                             | 1   |           | . . SOCKET,PLUG IN:MICROCIRCUIT,8 CONTACT                              | 82647    | C93-08-18       |
| -97              | 136-0263-04        |                             | 3   |           | . . SOCKET,PIN TERM:FOR 0.025 INCH SQUARE PIN                          | 22526    | 48059           |
| -98              | 131-0566-00        |                             | 1   |           | . . LINK,TERM.CONNE:0.086 DIA X 2.375 INCH L                           | 55210    | L-2007-1        |
| -99              | 131-1031-00        |                             | 8   |           | . . CONTACT ASSY,EL:CAM SWITCH,TOP                                     | 80009    | 131-1031-00     |
| -100             | 210-0779-00        |                             | 8   |           | . . RIVET,TUBULAR:0.051 OD X 0.115 INCH LONG                           | 42838    | RA-29952715     |
| -101             | 136-0260-02        |                             | 2   |           | . . SOCKET,PLUG-IN:16 CONTACT,LOW CLEARANCE                            | 82647    | C9316-18        |
| -102             | 131-0608-00        |                             | 9   |           | . . TERMINAL,PIN:0.365 L X 0.25 PH,BRZ,GOLD PL                         | 22526    | 47357           |
| -103             | 136-0252-04        |                             | 6   |           | . . SOCKET,PIN TERM:0.188 INCH LONG                                    | 22526    | 75060           |
| -104             |                    |                             | 1   |           | CKT BOARD ASSY:INPUT(SEE A1 EPL)<br>- - - * - - -                      |          |                 |
| -105             | 211-0507-00        |                             | 2   |           | SCREW,MACHINE:6-32 X 0.312 INCH,PNH STL<br>(ATTACHING PARTS)           | 83385    | OBD             |
|                  |                    |                             | -   |           | . CKT BOARD ASSEMBLY INCLUDES:   |          |                 |
| -106             | 131-0608-00        |                             | 16  |           | . TERMINAL,PIN:0.365 L X 0.25 PH,BRZ,GOLD PL                           | 22526    | 47357           |
| -107             |                    |                             | 1   |           | . SWITCH,SLIDE:(SEE S12 EPL)   |          |                 |
| -108             | 136-0514-00        |                             | 1   |           | . SOCKET,PLUG IN:MICROCIRCUIT,8 CONTACT                                | 82647    | C93-08-18       |
| -109             | 214-0579-00        |                             | 1   |           | . TERM.,TEST PT:BRS CD PL  | 80009    | 214-0579-00     |
| -110             | 136-0269-02        |                             | 1   |           | . SOCKET,PLUG-IN:14 CONTACT,LOW CLEARANCE                              | 01295    | C95140          |
| -111             | 136-0260-02        |                             | 1   |           | . SOCKET,PLUG-IN:16 CONTACT,LOW CLEARANCE                              | 82647    | C9316-18        |
| -112             | 131-1003-00        |                             | 2   |           | . CONNECTOR BODY,:CKT BD MT,2 PRONG                                    | 80009    | 131-1003-00     |
| -113             | 136-0252-04        |                             | 2   |           | . SOCKET,PIN TERM:0.188 INCH LONG                                      | 22526    | 75060           |
| -114             | 385-0160-00        |                             | 4   |           | SPACER,POST:0.812 L W/6-32 THD THRU,AL<br>(ATTACHING PARTS)            | 80009    | 385-0160-00     |
| -115             | 211-0510-00        |                             | 2   |           | SCREW,MACHINE:6-32 X 0.375 INCH,PNH STL<br>- - - * - - -               | 83385    | OBD             |
| -116             |                    | B010100 B020244             | 1   |           | DELAY LINE:(SEE DL480 EPL)   |          |                 |
| -117             | 346-0121-00        | B010100 B020244             | 2   |           | . STRAP,ELEC COMP:TIE DOWN,5.0 LONG                                    | 59730    | T4-34M          |
| -118             | 210-0775-00        | B010100 B020244             | 4   |           | . EYELET,METALLIC:0.126 OD X 0.23 INCH L,BRS                           | 80009    | 210-0775-00     |
| -119             | 210-0774-00        | B010100 B020244             | 4   |           | . EYELET,METALLIC:0.152 OD X 0.245 INCH L,BRS                          | 80009    | 210-0774-00     |
|                  | 175-1825-00        | B020245                     | 2   |           | CABLE ASSY,RF:50 OHM COAX,8.0 LONG                                     | 80009    | 175-1825-00     |
|                  |                    |                             | -   |           | . EACH CABLE ASSY INCLUDES:  |          |                 |
|                  | 210-0775-00        | B020245                     | 1   |           | . EYELET,METALLIC:0.126 OD X 0.23 INCH L,BRS                           | 80009    | 210-0775-00     |
|                  | 210-0774-00        | B020245                     | 1   |           | . EYELET,METALLIC:0.152 OD X 0.245 INCH L,BRS                          | 80009    | 210-0774-00     |
|                  | 672-0557-00        |                             | 1   |           | CKT BOARD ASSY:TIMING W/CAM SW<br>(ATTACHING PARTS)                    | 80009    | 672-0557-00     |
| -120             | 211-0504-00        |                             | 4   |           | SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL<br>- . CKT BOARD ASSY INCLUDES: | 83385    | OBD             |
| -121             | 384-1415-00        |                             | 2   |           | . EXTENSION SHAFT:8.905 L X 0.125 DIA,AL,CRM                           | 80009    | 384-1415-00     |
| -122             | 384-1416-00        |                             | 1   |           | . EXTENSION SHAFT:5.58 L X 0.125 DIA,AL,CRM                            | 80009    | 384-1416-00     |
| -123             | 376-0051-01        |                             | 3   |           | . CPLG,SHAFT,FLEX:FOR 0.125 INCH DIA SHAFTS                            | 80009    | 376-0051-01     |
|                  | 213-0048-00        |                             | 4   |           | . . SETSCREW:4-40 X 0.125 INCH,HEX SOC STL                             | 74445    | OBD             |

Replaceable Mechanical Parts--PG 508

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                                    | Mfr Code | Mfr Part Number  |
|------------------|--------------------|-----------------------------|-----|---|---|---|---|---|---|----------|------------------|
| 1-124            | -----              |                             | 1   | . | . | . | . | . | RESISTOR,VAR:(SEE R190 EPL)                           |          |                  |
| -125             | -----              |                             | 2   | . | . | . | . | . | RESISTOR,VAR:(SEE R355 AND R475 EPL)                  |          |                  |
| -126             | 361-0515-00        |                             | 3   | . | . | . | . | . | SPACER,SWITCH:PLASTIC                                 | 80009    | 361-0515-00      |
| -127             | 131-0963-00        |                             | 3   | . | . | . | . | . | CONTACT,ELEC:GROUNDING                                | 80009    | 131-0963-00      |
|                  | -----              |                             | 1   | . | . | . | . | . | ACTR ASSY CAM S:(SEE S200 EPL)<br>(ATTACHING PARTS)   |          |                  |
| -128             | 211-0244-00        |                             | 4   | . | . | . | . | . | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL              | 78189    | OBD              |
|                  | -----              |                             | -   | . | . | . | . | . | ACTR ASSY INCLUDES:                                   |          |                  |
| -129             | 200-1935-00        |                             | 1   | . | . | . | . | . | COVER,CAM SW:1.85 L X 0.876 H,AL<br>(ATTACHING PARTS) | 80009    | 200-1935-00      |
| -130             | 211-0008-00        |                             | 4   | . | . | . | . | . | SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                | 83385    | OBD              |
| -131             | 210-0004-00        |                             | 4   | . | . | . | . | . | WASHER,LOCK:#4 INTL,0.015THK,STL CD PL                | 78189    | 1204-00-00-0541C |
|                  | -----              |                             |     | . | . | . | . | . | CONTACT,ELEC:GROUNDING                                | 80009    | 131-0963-00      |
| -132             | 210-0406-00        |                             | 2   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -133             | 214-1139-02        |                             | 1   | . | . | . | . | . | SPRING,FLAT:GREEN COLORED                             | 80009    | 214-1139-02      |
|                  | 214-1139-03        |                             | 1   | . | . | . | . | . | SPRING,FLAT:RED COLORED                               | 80009    | 214-1139-03      |
| -134             | 214-1752-00        |                             | 2   | . | . | . | . | . | ROLLER,DETENT:  | 80009    | 214-1752-00      |
| -135             | 401-0180-00        |                             | 1   | . | . | . | . | . | BEARING,CAM SW:FRONT<br>(ATTACHING PARTS)             | 80009    | 401-0180-00      |
| -136             | 354-0390-00        |                             | 1   | . | . | . | . | . | RING,RETAINING:0.338 ID X 0.025" THK,STL              | 79136    | 5100-374D        |
|                  | -----              |                             | -   | . | . | . | . | . | ACTUATOR,SWITCH:CAM SWITCH                            | 80009    | 105-0710-00      |
| -137             | 105-0710-00        |                             | 1   | . | . | . | . | . | SHAFT,CAM SW:OUTER CONCENTRIC,W/DRIVER                | 80009    | 384-0878-10      |
| -138             | 384-0878-10        |                             | 4   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -139             | 210-0406-00        |                             | 4   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -140             | 401-0178-01        |                             | 1   | . | . | . | . | . | BEARING,CAM SW:CENTER/REAR                            | 80009    | 401-0178-01      |
|                  | 263-1141-00        |                             | 1   | . | . | . | . | . | SW CAM ACTR AS:DELAY<br>(ATTACHING PARTS)             | 80009    | 263-1141-00      |
| -141             | 211-0244-00        |                             | 4   | . | . | . | . | . | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL              | 78189    | OBD              |
|                  | -----              |                             | -   | . | . | . | . | . | ACTR ASSY INCLUDES:                                   |          |                  |
| -142             | 200-1934-00        |                             | 1   | . | . | . | . | . | COVER,CAM SW:1.55 L X 0.876 H,AL<br>(ATTACHING PARTS) | 80009    | 200-1934-00      |
| -143             | 211-0008-00        |                             | 4   | . | . | . | . | . | SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                | 83385    | OBD              |
| -144             | 211-0004-00        |                             | 4   | . | . | . | . | . | SCREW,MACHINE:3-48 X 0.125,PNH,STL                    | 83385    | OBD              |
|                  | -----              |                             |     | . | . | . | . | . | CONTACT,ELEC:GROUNDING                                | 80009    | 131-0963-00      |
| -145             | 210-0406-00        |                             | 2   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -146             | 214-1139-02        |                             | 1   | . | . | . | . | . | SPRING,FLAT:GREEN COLORED                             | 80009    | 214-1139-02      |
|                  | 214-1139-03        |                             | 1   | . | . | . | . | . | SPRING,FLAT:RED COLORED                               | 80009    | 214-1139-03      |
| -147             | 214-1752-00        |                             | 2   | . | . | . | . | . | ROLLER,DETENT:  | 80009    | 214-1752-00      |
| -148             | 401-0180-00        |                             | 1   | . | . | . | . | . | BEARING,CAM SW:FRONT<br>(ATTACHING PARTS)             | 80009    | 401-0180-00      |
| -149             | 354-0390-00        |                             | 1   | . | . | . | . | . | RING,RETAINING:0.338 ID X 0.025" THK,STL              | 79136    | 5100-37MD        |
|                  | -----              |                             | -   | . | . | . | . | . | ACTUATOR,SWITCH:CAM SWITCH                            | 80009    | 105-0708-00      |
| -150             | 105-0708-00        |                             | 1   | . | . | . | . | . | SHAFT,CAM SW:W/DRIVER                                 | 80009    | 384-0878-00      |
| -151             | 384-0878-00        |                             | 4   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -152             | 210-0406-00        |                             | 4   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -153             | 401-0178-01        |                             | 1   | . | . | . | . | . | BEARING,CAM SW:CENTER/REAR                            | 80009    | 401-0178-01      |
|                  | -----              |                             | 1   | . | . | . | . | . | ACTR ASSY,CAM S:(SEE S450 EPL)<br>(ATTACHING PARTS)   |          |                  |
| -154             | 211-0244-00        |                             | 4   | . | . | . | . | . | SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH STL              | 78189    | OBD              |
|                  | -----              |                             | -   | . | . | . | . | . | ACTR ASSY INCLUDES:                                   |          |                  |
| -155             | 200-1936-00        |                             | 1   | . | . | . | . | . | COVER,CAM SW:1.95 L X 0.876 H,AL<br>(ATTACHING PARTS) | 80009    | 200-1936-00      |
| -156             | 211-0008-00        |                             | 4   | . | . | . | . | . | SCREW,MACHINE:4-40 X 0.25 INCH,PNH STL                | 83385    | OBD              |
| -157             | 210-0004-00        |                             | 4   | . | . | . | . | . | WASHER,LOCK:#4 INTL,0.015THK,STL CD PL                | 78189    | 1204-00-00-0541C |
|                  | -----              |                             |     | . | . | . | . | . | CONTACT,ELEC:GROUNDING                                | 80009    | 131-0963-00      |
| -158             | 210-0406-00        |                             | 2   | . | . | . | . | . | NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS                  | 73743    | 2X12161-402      |
| -159             | 214-1139-02        |                             | 1   | . | . | . | . | . | SPRING,FLAT:GREEN COLORED                             | 80009    | 214-1139-02      |

| Fig. & Index No. | Tektronix Part No. | Serial/Model No. Eff Dscont | Qty | 1 | 2 | 3 | 4 | 5 | Name & Description                             | Mfr Code | Mfr Part Number |
|------------------|--------------------|-----------------------------|-----|---|---|---|---|---|--|----------|-----------------|
| 1-               | 214-1139-03        |                             | 1   | . | . | . | . | . | SPRING, FLAT: RED COLORED                      | 80009    | 214-1139-03     |
| -160             | 214-1752-00        |                             | 2   | . | . | . | . | . | ROLLER, DETENT:                                | 80009    | 214-1752-00     |
| -161             | 401-0180-00        |                             | 1   | . | . | . | . | . | BEARING, CAM SW: FRONT                         | 80009    | 401-0180-00     |
|                  |                    |                             |     |   |   |   |   |   | (ATTACHING PARTS)                              |          |                 |
| -162             | 354-0390-00        |                             | 1   | . | . | . | . | . | RING, RETAINING: 0.338 ID X 0.025" THK, STL    | 79136    | 5100-37MD       |
|                  |                    |                             |     |   |   |   |   |   | - - - * - - -                                  |          |                 |
| -163             | 105-0711-00        |                             | 1   | . | . | . | . | . | ACTUATOR, SWITCH: CAM SWITCH                   | 80009    | 105-0711-00     |
| -164             | 384-0878-11        |                             | 1   | . | . | . | . | . | SHAFT, CAM SW: OUTER CNCTRC, W/DRIVER          | 80009    | 384-0878-11     |
| -165             | 210-0406-00        |                             | 4   | . | . | . | . | . | NUT, PLAIN, HEX.: 4-40 X 0.188 INCH, BRS       | 73743    | 2X12161-402     |
| -166             | 401-0178-01        |                             | 1   | . | . | . | . | . | BEARING, CAM SW: CENTER/REAR                   | 80009    | 401-0178-01     |
| -167             | -----              |                             | 1   | . | . | . | . | . | CKT BOARD ASSY: TIMING (SEE A2 EPL)            |          |                 |
| -168             | -----              |                             | 1   | . | . | . | . | . | SWITCH, PUSH: (SEE S380A, B EPL)               |          |                 |
| -169             | -----              |                             | 1   | . | . | . | . | . | SWITCH, PUSH: (SEE S380A, B, C EPL)            |          |                 |
| -170             | 361-0382-00        |                             | 8   | . | . | . | . | . | SPACER, PB SW: BROWN, 0.275 INCH LONG          | 80009    | 361-0382-00     |
| -171             | 131-0566-00        | B010100 B020244             | 1   | . | . | . | . | . | LINK, TERM. CONNE: 0.086 DIA X 2.375 INCH L    | 55210    | L-2007-1        |
|                  | 131-0566-00        | B020245                     | 4   | . | . | . | . | . | LINK, TERM. CONNE: 0.086 DIA X 2.375 INCH L    | 55210    | L-2007-1        |
| -172             | 136-0260-02        |                             | 6   | . | . | . | . | . | SOCKET, PLUG-IN: 16 CONTACT, LOW CLEARANCE     | 82647    | C9316-18        |
| -173             | 131-0604-00        |                             | 37  | . | . | . | . | . | CONTACT, ELEC: CKT BD SW, SPR, CU BE           | 80009    | 131-0604-00     |
| -174             | 136-0252-04        |                             | 9   | . | . | . | . | . | SOCKET, PIN TERM: 0.188 INCH LONG              | 22526    | 75060           |
| -175             | 131-1003-00        |                             | 9   | . | . | . | . | . | CONNECTOR BODY, : CKT BD MT, 2 PRONG           | 80009    | 131-1003-00     |
| -176             | 131-0827-00        |                             | 4   | . | . | . | . | . | CONTACT, ELEC: 0.55 INCH LONG                  | 22526    | 47349           |
| -177             | 131-0608-00        |                             | 8   | . | . | . | . | . | TERMINAL, PIN: 0.365 L X 0.25 PH, BRZ, GOLD PL | 22526    | 47357           |
| -178             | 214-1061-00        |                             | 1   | . | . | . | . | . | SPRING, GROUND: FLAT                           | 80009    | 214-1061-00     |
|                  | 386-3657-00        | XB021113                    | 2   | . | . | . | . | . | SUPPORT, PLUG-IN:                              | 80009    | 386-3657-00     |
| -179             | 426-1245-00        | B010100 B021223             | 2   | . | . | . | . | . | FR SECT, PLUG-IN: LEFT SIDE, TOP AND BOTTOM    | 80009    | 426-1245-00     |
|                  | 426-1245-00        | B021224                     | 1   | . | . | . | . | . | FR SECT, PLUG-IN: LEFT SIDE, TOP AND BOTTOM    | 80009    | 426-1245-00     |
|                  | 426-1245-01        | B021224                     | 1   | . | . | . | . | . | FR SECT, PLUG-IN: TOP LEFT                     | 80009    | 426-1245-01     |
| -180             | 426-1246-00        |                             | 1   | . | . | . | . | . | FR SECT, PLUG-IN: RIGHT SIDE, TOP AND BOTTOM   | 80009    | 426-1246-00     |
| -181             | 426-1246-01        |                             | 1   | . | . | . | . | . | FR SECT, PLUG-IN: RIGHT SIDE, TOP AND BOTTOM   | 80009    | 426-1246-01     |
| -182             | 175-0825-00        |                             | FT  | . | . | . | . | . | WIRE, ELECTRICAL: 2 WIRE RIBBON                | 80009    | 175-0825-00     |
| -183             | 175-0826-00        |                             | FT  | . | . | . | . | . | WIRE, ELECTRICAL: 3 WIRE RIBBON                | 80009    | 175-0826-00     |
| -184             | 175-0827-00        |                             | FT  | . | . | . | . | . | WIRE, ELECTRICAL: 4 WIRE RIBBON                | 08261    | SS-0426-710610C |
| -185             | 175-0828-00        |                             | FT  | . | . | . | . | . | WIRE, ELECTRICAL: 5 WIRE RIBBON                | 08261    | OBD             |
| -186             | 175-0829-00        |                             | FT  | . | . | . | . | . | WIRE, ELECTRICAL: 6 WIRE RIBBON                | 08261    | SS-0626-710610C |
| -187             | 210-0775-00        |                             | 1   | . | . | . | . | . | EYELET, METALLIC: 0.126 OD X 0.23 INCH L, BRS  | 80009    | 210-0775-00     |
| -188             | 210-0774-00        |                             | 1   | . | . | . | . | . | EYELET, METALLIC: 0.152 OD X 0.245 INCH L, BRS | 80009    | 210-0774-00     |
| -189             | 131-0707-00        |                             | 81  | . | . | . | . | . | CONNECTOR, TERM.: 0.48" L, 22-26AWG WIRE       | 22526    | 75691-005       |
| -190             | 352-0171-01        |                             | 2   | . | . | . | . | . | CONN BODY, PL, EL: 1 WIRE BROWN                | 80009    | 352-0171-01     |
| -191             | 352-0169-00        |                             | 1   | . | . | . | . | . | CONN BODY, PL, EL: 2 WIRE BLACK                | 80009    | 352-0169-00     |
|                  | 352-0169-02        |                             | 2   | . | . | . | . | . | CONN BODY, PL, EL: 2 WIRE RED                  | 80009    | 352-0169-00     |
|                  | 352-0169-03        |                             | 1   | . | . | . | . | . | CONN BODY, PL, EL: 2 WIRE ORANGE               | 80009    | 352-0169-03     |
| -192             | 352-0161-04        |                             | 1   | . | . | . | . | . | CONN BODY, PL, EL: 3 WIRE YELLOW               | 80009    | 352-0161-04     |
| -193             | 352-0162-04        |                             | 4   | . | . | . | . | . | CONN BODY, PL, EL: 4 WIRE YELLOW               | 80009    | 352-0162-04     |
|                  | 352-0162-05        |                             | 2   | . | . | . | . | . | CONN BODY, PL, EL: 4 WIRE GREEN                | 80009    | 352-0162-05     |
| -194             | 352-0163-05        |                             | 2   | . | . | . | . | . | CONN BODY, PL, EL: 5 WIRE GREEN                | 80009    | 352-0163-05     |
| -195             | 352-0164-06        |                             | 3   | . | . | . | . | . | CONN BODY, PL, EL: 6 WIRE BLUE                 | 80009    | 352-0164-06     |







| Fig. &<br>Index<br>No. | Tektronix<br>Part No. | Serial/Model No.<br>Eff | No.<br>Dscont | Qty | 1 2 3 4 5 | Name & Description        | Mfr   |                 |
|------------------------|-----------------------|-------------------------|---------------|-----|-----------|---------------------------|-------|-----------------|
|                        |                       |                         |               |     |           |                           | Code  | Mfr Part Number |
| 2-                     | 070-2044-00           |                         |               | 1   |           | MANUAL, TECH: INSTRUCTION | 80009 | 070-2044-00     |

FIG. 2 ACCESSORIES

## **MANUAL CHANGE INFORMATION**

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

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

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

## **SERVICE NOTE**

Because of the universal parts procurement problem, some electrical parts in your instrument may be different from those described in the Replaceable Electrical Parts List. The parts used will in no way alter or compromise the performance or reliability of this instrument. They are installed when necessary to ensure prompt delivery to the customer. Order replacement parts from the Replaceable Electrical Parts List.

# CALIBRATION TEST EQUIPMENT REPLACEMENT

## Calibration Test Equipment Chart

This chart compares TM 500 product performance to that of older Tektronix equipment. Only those characteristics where significant specification differences occur, are listed. In some cases the new instrument may not be a total functional replacement. Additional support instrumentation may be needed or a change in calibration procedure may be necessary.

### Comparison of Main Characteristics

|                                 |  |   |
|---------------------------------|--|---|
| DM 501 replaces 7D13            |  |   |
| PG 501 replaces 107             | PG 501 - Risetime less than 3.5 ns into 50 $\Omega$ .  | 107 - Risetime less than 3.0 ns into 50 $\Omega$ .  |
| 108                             | PG 501 - 5 V output pulse; 3.5 ns Risetime   | 108 - 10 V output pulse<br>1 ns Risetime  |
| PG 502 replaces 107             |  |   |
| 108                             | PG 502 - 5 V output  | 108 - 10 V output   |
| 111                             | PG 502 - Risetime less than 1 ns; 10 ns Pretrigger pulse delay   | 111 - Risetime 0.5 ns; 30 to 250 ns<br>Pretrigger pulse delay   |
| PG 508 replaces 114             | Performance of replacement equipment is the same or better than equipment being replaced.                            |   |
| 115                             |  |   |
| 2101                            |  |   |
| PG 506 replaces 106             | PG 506 - Positive-going trigger output signal at least 1 V; High Amplitude output, 60 V.                             | 106 - Positive and Negative-going trigger output signal, 50 ns and 1 V; High Amplitude output, 100 V.           |
| 067-0502-01                     | PG 506 - Does not have chopped feature.  | 0502-01 - Comparator output can be alternately chopped to a reference voltage.                                  |
| SG 503 replaces 190, 190A, 190B | SG 503 - Amplitude range 5 mV to 5.5 V p-p.  | 190B - Amplitude range 40 mV to 10 V p-p.   |
| 191                             | SG 503 - Frequency range 250 kHz to 250 MHz.   | 0532-01 - Frequency range 65 MHz to 500 MHz.  |
| 067-0532-01                     |  |   |
| SG 504 replaces 067-0532-01     | SG 504 - Frequency range 245 MHz to 1050 MHz.  | 0532-01 - Frequency range 65 MHz to 500 MHz.  |
| 067-0650-00                     |  |   |
| TG 501 replaces 180, 180A       | TG 501 - Trigger output-slaved to marker output from 5 sec through 100 ns. One time-mark can be generated at a time. | 180A - Trigger pulses 1, 10, 100 Hz; 1, 10, and 100 kHz. Multiple time-marks can be generated simultaneously.   |
| 181                             | TG 501 - Trigger output-slaved to market output from 5 sec through 100 ns. One time-mark can be generated at a time. | 181 - Multiple time-marks   |
| 184                             |  | 184 - Separate trigger pulses of 1 and 0.1 sec; 10, 1, and 0.1 ms; 10 and 1 $\mu$ s.                            |
| 2901                            | TG 501 - Trigger output-slaved to marker output from 5 sec through 100 ns. One time-mark can be generated at a time. | 2901 - Separate trigger pulses, from 5 sec to 0.1 $\mu$ s. Multiple time-marks can be generated simultaneously. |

**NOTE: All TM 500 generator outputs are short-proof. All TM 500 plug-in instruments require TM 500-Series Power Module.**

Date: 9-13-79

Change Reference: M30603

Product: PG 508 EFF SN B043259

Manual Part No.: 070-2044-00

**DESCRIPTION**

## ELECTRICAL PARTS LIST AND SCHEMATIC CHANGES

## CHANGE TO:

|       |             |                                     |
|-------|-------------|-------------------------------------|
| A2    | 670-4274-03 | CKT BOARD ASSY:TIMING               |
| A4    | 670-4276-02 | CKT BOARD ASSY:OUTPUT               |
| C432  | 281-0167-00 | CAP.,VAR,CER DI:9-45PF,200V         |
| C1202 | 290-0786-00 | CAP.,FXD,ELCTLT:1500UF,+50-10%,75V  |
| C1207 | 283-0080-00 | CAP.,FXD,CER DI:0.022UF,+80-20%,25V |
| C1219 | 283-0080-00 | CAP.,FXD,CER DI:0.022UF,+80-20%,25V |
| C1327 | 290-0786-00 | CAP.,FXD,ELCTLT:1500UF,+50-10%,75V  |
| C1335 | 283-0080-00 | CAP.,FXD,CER DI:0.022UF,+80-20%,25V |
| C1337 | 283-0080-00 | CAP.,FXD,CER DI:0.022UF,+80-20%,25V |
| L240  | 276-0569-00 | CORE,TOROID:TEST SELECTED AS NEEDED |
| Q435  | 151-0427-00 | TRANSISTOR:SILICON,NPN              |
| R462  | 315-0391-00 | RES.,FXD,CMPSN:390 OHM,5%,0.25W     |
| R467  | 315-0391-00 | RES.,FXD,CMPSN:390 OHM,5%,0.25W     |
| R1202 | 315-0273-00 | RES.,FXD,CMPSN:27K OHM,5%,0.25W     |
| R1327 | 315-0273-00 | RES.,FXD,CMPSN:27K OHM,5%,0.25W     |

## ADD:

|       |             |                                   |
|-------|-------------|-----------------------------------|
| C778  | 283-0204-00 | CAP.,FXD,CER DI:0.01UF,20%,50V    |
| C782  | 283-0177-00 | CAP.,FXD,CER DI:1UF,+80-20%,25V   |
| C788  | 283-0204-00 | CAP.,FXD,CER DI:0.01UF,20%,50V    |
| C945  | 283-0024-00 | CAP.,FXD,CER DI:0.1UF,+80-20%,50V |
| R434  | 317-0100-00 | RES.,FXD.,CMPSN:10 OHM,5%,0.125W  |
| R1214 | 301-0101-00 | RES.,FXD.,CMPSN:100 OHM,5%,0.50W  |

Foldout page "Internal Adjustment Procedure", Step 8. Adjust 10 ns Duration  
Change the last sentence to read:

Adjust R465 (Dur 10 ns) for a duration of 10 ns measured at the waveform 50%  
points. For serial number B043259 and above: Rotate R465 (Dur 10 ns) to mid-  
range; adjust C432 for a duration 10% above 10 ns. Adjust R465 for a duration  
of 10 ns measured at the waveform 50% points.

### DESCRIPTION

#### SCHEMATIC CHANGES

DIAGRAM 4 DURATION GENERATOR - Partial

DIAGRAM 9 POWER SUPPLY - Partial

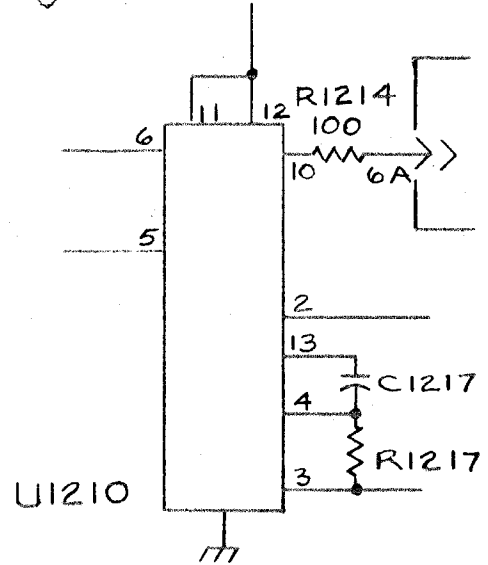
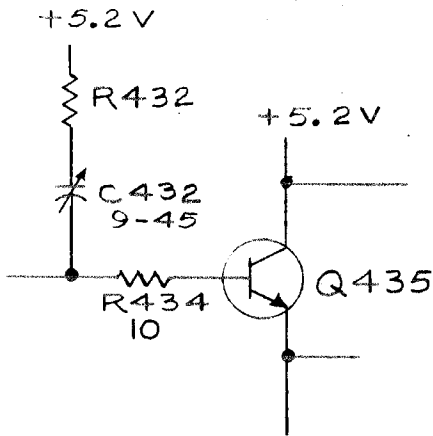


DIAGRAM 6 LEVEL CONTROL MULTIPLIER - Partial

