

# Instruction Manual

**Tektronix**

## SG 503 Leveled Sine-Wave Generator

**070-1622-01**

B010100 - B089999

Tillhör  
**TEKTRONIX AB**  
Service  
08-29 21 10

# Instruction Manual

**Tektronix**

## **SG 503 Leveled Sine-Wave Generator**

**070-1622-01**

### **Warning**

The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to the Safety Summary prior to performing service.

**Please check for change information at the rear  
of this manual.**

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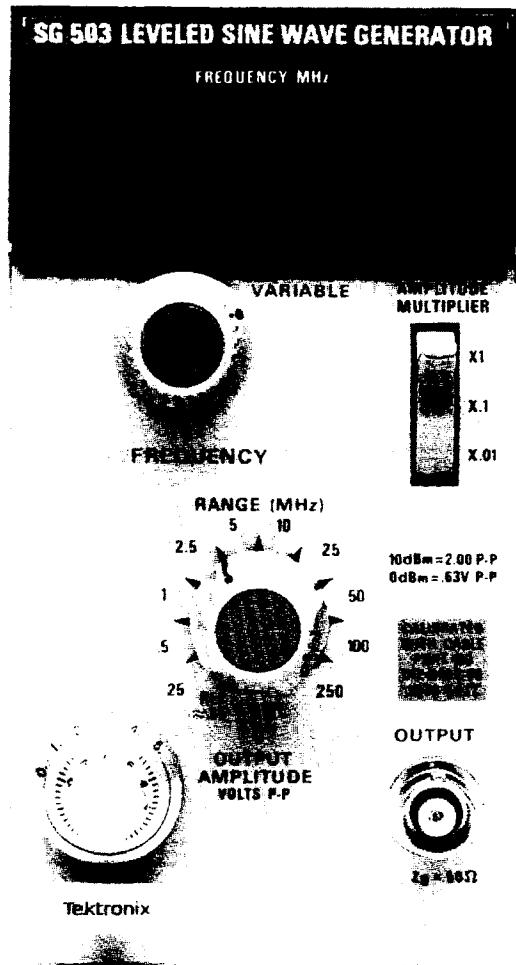
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## **WARNING**

**THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.**

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1622-1A

Fig. 1-1. SG 503 Leveled Sine Wave Generator plug-in module.

# OPERATING INSTRUCTIONS

## INTRODUCTION

### Description

The SG 503 Leveled Sine-Wave Generator provides a regulated, constant-amplitude versus frequency output into a 50-ohm load. The SG 503 is primarily intended to be used as an oscilloscope calibration device for measuring bandwidths up to 250 megahertz. The SG 503 can also be used as a signal source for general electronics design and development.

Nine overlapping ranges cover the frequency band from 250 kilohertz to 250 megahertz, with an additional range reserved for a 50 kilohertz reference frequency.

A digital counter with automatic ranging and a front panel LED readout is used for frequency indication.

### Installation and Removal

#### CAUTION

*Turn the power module off before inserting the plug-in; otherwise, damage may occur to the plug-in circuitry. Because of the high current drawn by the SG 503, it is also recommended that the power module be turned off before removing the SG 503. Refer to Fig. 1-2. Check to see that the plastic barriers on the interconnecting jack of the selected power module compartment match the cut-outs in the SG 503 circuit board edge connector.*

Align the SG 503 chassis with the upper and lower guides of the selected compartment. Push the module in and press firmly to seat the circuit board in the interconnecting jack.

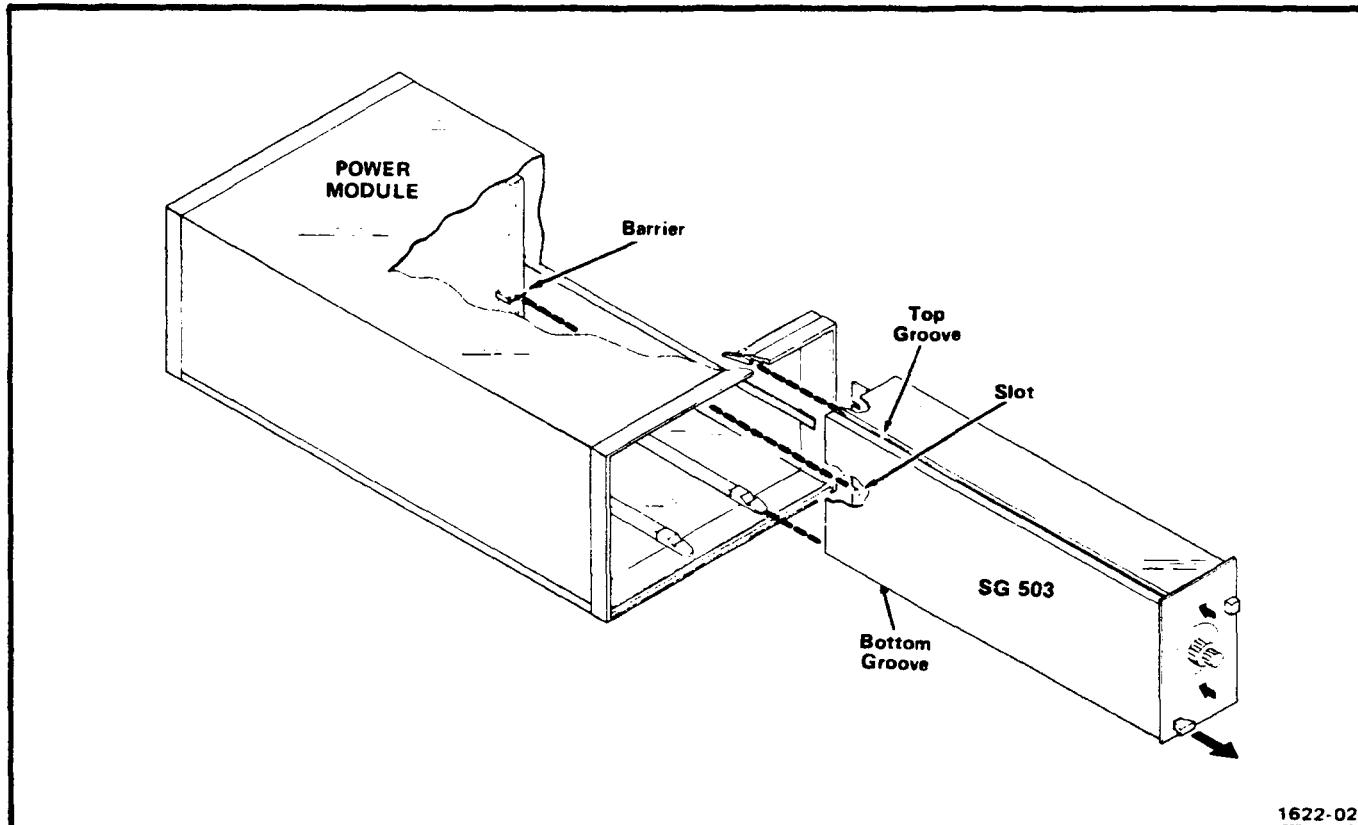
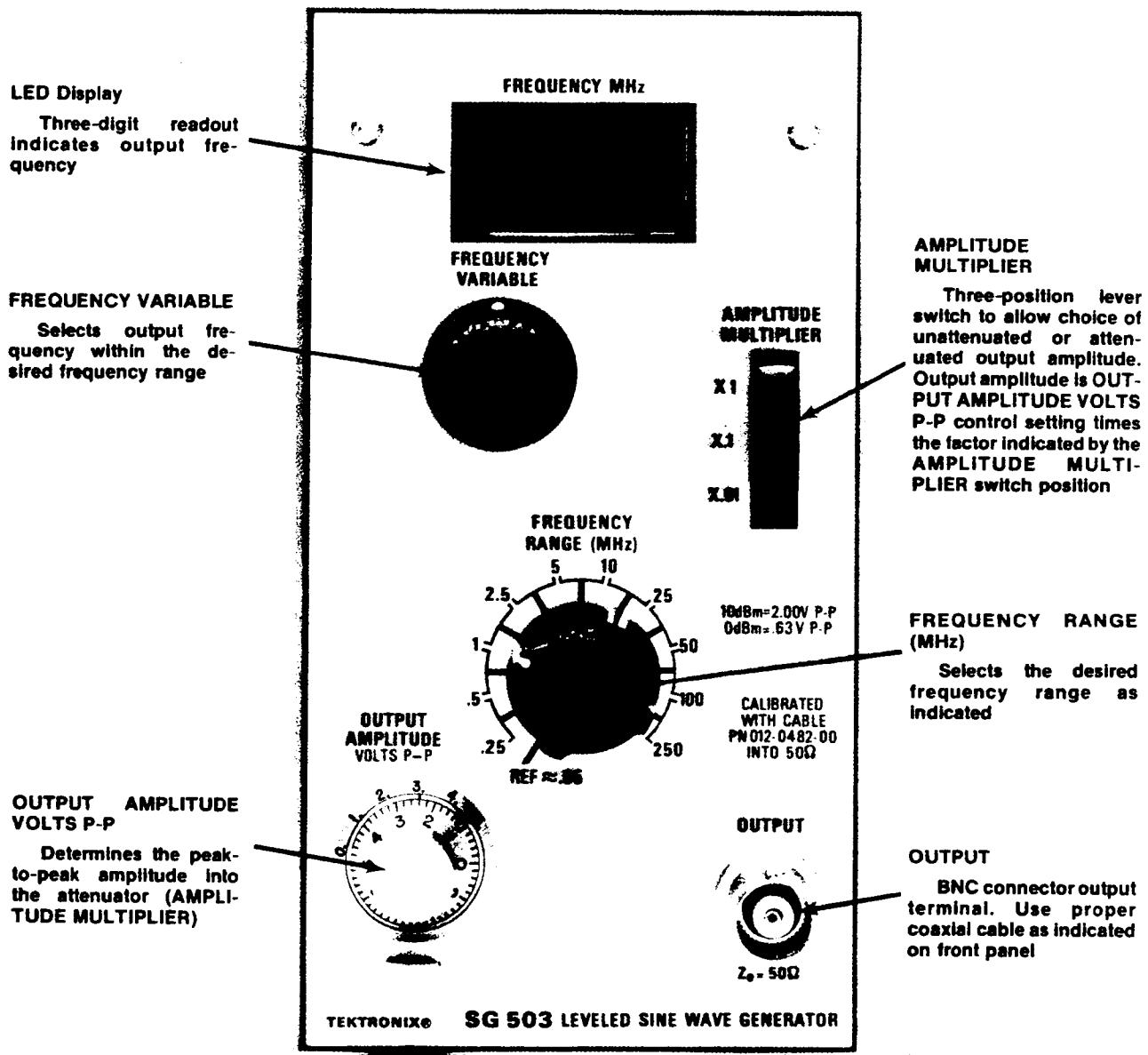


Fig. 1-2. Plug-in installation and removal.



1622-03

Fig. 1-3. SG 503 controls and connectors.

To remove the SG 503, pull on the release latch located in the lower left corner, until the interconnecting jack disengages and the SG 503 will slide out.

Power application to the SG 503 is indicated by the three-digit LED (Light-Emitting Diode) display being lighted. Turn the FREQUENCY RANGE (MHz) control between the detent positions to test the LED's (888 display). Reset the FREQUENCY RANGE (MHz) control to the desired range. Allow 15 to 20 minutes warmup time for all equipment before using the SG 503.

### Overheating

The SG 503 is designed to operate at an ambient temperature from 0°C to +50°C. However, when operating several power supplies in a multi-plug-in power module, especially at low output voltages, or when operating close to other heat-producing equipment, internal temperature may exceed safe limits and actuate a thermal cutout in the power module. Refer to the power module instruction manual for more complete information.

### Controls and Connectors

Refer to Fig. 1-3. Even though the SG 503 is fully calibrated and ready to use, the functions and actions of the controls and connectors should be reviewed before attempting to use it.

#### CAUTION

*If the instrument is operated at the extreme limit of, or beyond a band range, the front-panel display may flash a blinking indication, alerting the user to an unleveled output amplitude condition.*

## OPERATING CONSIDERATIONS

### Introduction

The SG 503 has been designed and calibrated with a high quality coaxial cable (Part Number 012-0482-00) to operate as a closely matched system when terminated into a 50-ohm load. See Fig. 1-4A. The absolute amplitude across the load is directly related to its impedance. Part Number 012-0482-00 should be connected directly to the equipment under test if the input impedance of the equipment is 50 ohms. For equipment with an input impedance much greater than 50 ohms, an accurate 50-ohm termination should be connected between the coaxial cable and the equipment. Tee connectors or wire of any type between the 50-ohm termination and the equipment being tested will produce some variation in the calibrated output amplitude at higher frequencies.

Coaxial cables of lesser quality or cables that are longer or shorter than Part Number 012-0482-00 can be used, but the output amplitude flatness specifications are no longer applicable. Cables that are 2 feet longer or 2 feet shorter

than Part Number 012-0482-00 can cause amplitude variations that are as much as 4% low or 2% high (respectively) when compared to the calibrated amplitudes at 250 megahertz.

Optimum performance is obtained when the setting of the OUTPUT AMPLITUDE control is in the 1.0 to 5.0 range. For example; when an output amplitude of 0.5 volt peak-to-peak is desired, set OUTPUT AMPLITUDE control to 5.0 and AMPLITUDE MULTIPLIER switch to X.1 instead of 0.5 and X1.

The sine-wave output from the SG 503 may be applied to an external dc level that does not exceed  $\pm 1$  volt. At higher dc offset levels, couple the output through a dc blocking capacitor. When operating the SG 503 always consider the total load impedance and its effect on the output amplitude.

### Open-Circuit Operation

When the SG 503 is operating into an impedance much greater than 50 ohms, up to twice the maximum terminated output amplitude can be obtained. Under open-circuit conditions, the actual output amplitude will be two times the amplitude indicated by the front panel controls.

#### NOTE

*The frequency value shown on the display may not be valid unless a 50  $\Omega$  cable is attached (terminated or not) to the OUTPUT connector.*

Open-circuit amplitude flatness is not specified, but is adequate for many applications in the lower frequency bands because the steady state 50-ohm output impedance of the SG 503 reverse-terminates the characteristic impedance of a 50-ohm coaxial cable. The reverse termination keeps the output amplitude constant at the unterminated end of the cable even though standing waves may exist in the coaxial cable.

### Capacitive Loads

The input capacitance of the equipment under test will affect the bandwidth. The equivalent circuits shown in Fig. 1-4B and Fig. 1-4C are useful in estimating the amplitude changes caused by reactive loads. Note that as system input capacitance increases, bandwidth decreases. The bandwidth of an oscilloscope with a high input impedance is usually specified using an equivalent 25-ohm source.

When operating the SG 503 on the higher frequency bands with no output attenuation, the front-panel display may flash, indicating an unleveled output amplitude. Switch the AMPLITUDE MULTIPLIER control to the X.1 position and if the display flashing ceases, the problem may be related to an extreme mismatch between the SG 503 and the load. If the SG 503 is operating into a high SWR, a 3-decibel attenuator inserted between the output and the load may improve the operation at full output amplitude (X1 position of the AMPLITUDE MULTIPLIER switch).

## Operating Instructions—SG 503

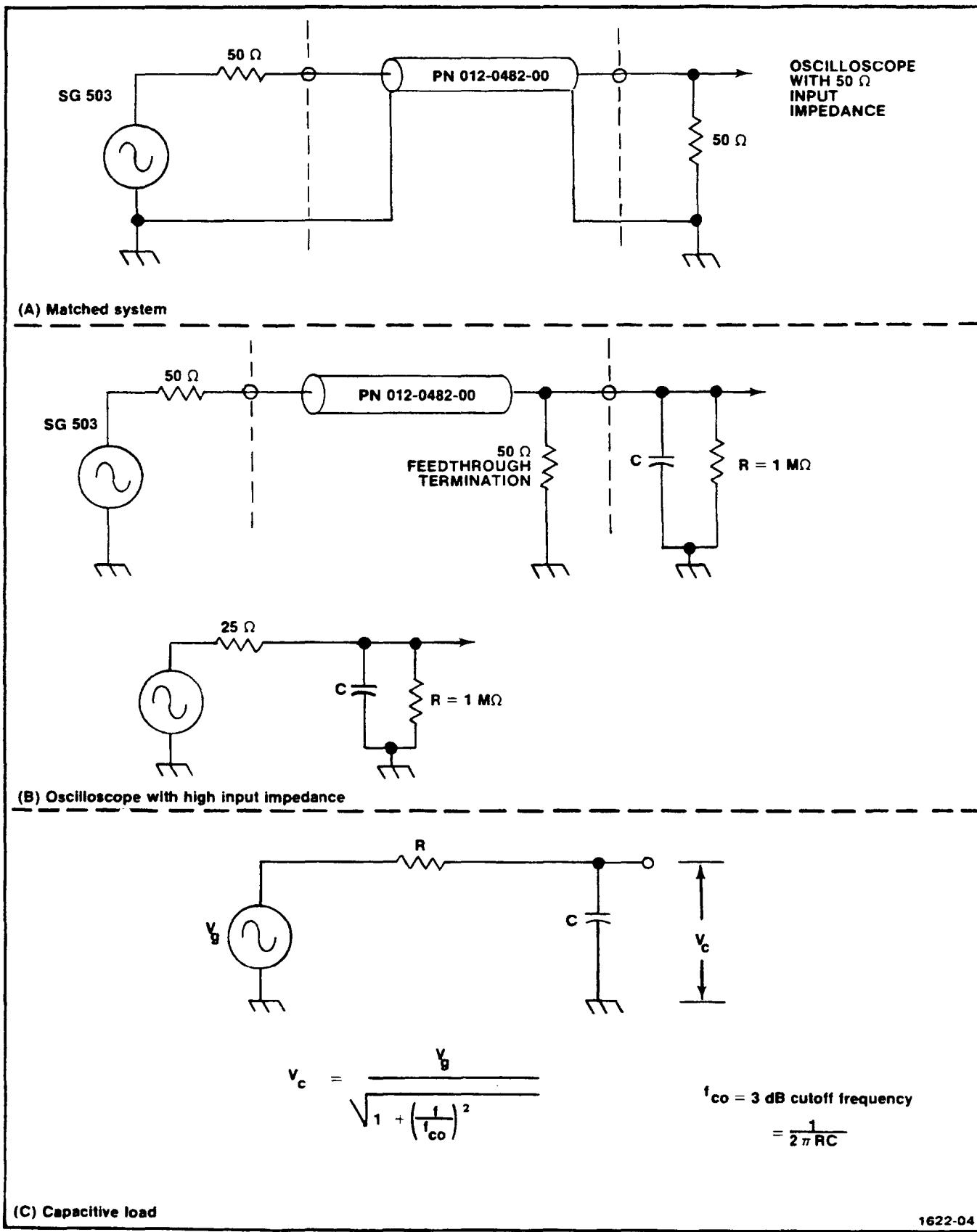


Fig. 1-4. Equivalent circuits for SG 503, 50 ohm coaxial cable and various terminations.

# SPECIFICATION AND PERFORMANCE CHECK

## SPECIFICATION

### Performance Conditions

The electrical characteristics are valid only if the SG 503 has been calibrated at an ambient temperature between +20°C and +30°C and is operating at an ambient temperature between 0°C and +50°C unless otherwise noted.

The SG 503 is calibrated for use with a furnished coaxial cable accessory (See Standard Accessories in Replaceable Mechanical Parts list section) terminated into a 50-ohm load.

Items listed in the Performance Requirements column of the Electrical Characteristics are verified by completing the Performance Check in this manual. Items listed in the Supplemental Information column are not verified in this manual; they are either explanatory notes or performance characteristics for which no limits are specified.

Table 2-1

### ELECTRICAL CHARACTERISTICS

| Characteristics | Performance Requirements  | Supplemental Information  |
|-----------------|---|---|
| Frequency Range | 250 kHz to 250 MHz, plus 50 kHz reference frequency.  |   |
| Output Accuracy | Within $\pm 0.7$ of the least significant displayed digit.  |   |
| Amplitude Range | 5 mV to 5.5 V peak-to-peak over three decade ranges and terminated into a 50- $\Omega$ load.                        |   |
| Accuracy        | At 50 kHz reference frequency; within 3% of indicated amplitude on X1 range, 4% on X.1 range, and 5% on X.01 range. | Accuracy must be set to within 0.3% on X1 range and checked to be within 2.0% on X.1 and X.01 ranges. |

### NOTE

Flatness (Peak-to-Peak) valid only when precision coaxial cable is used. Flatness referenced to NBS corrections of Tektronix standards. NBS uncertainties not included.

**Table 2-1 (cont)**  
**ELECTRICAL CHARACTERISTICS**

| Characteristics   | Performance Requirements  | Supplemental Information  |
|---|---|---|
| Flatness (Peak-to-Peak)<br>Amplitude Multiplier<br>Setting: X1, X.1, X.01 | From 250 kHz output amplitude will not vary more than 1% of the value at 50 kHz. From 100 MHz to 250 MHz amplitude variation is within 3% of the value at 50 kHz. |   |
| Amplitude Multiplier<br>Setting: X1                                       | 50 MHz to 100 MHz range; output amplitude will not vary more than 1% of the value at 50 kHz.  |   |
| Amplitude Multiplier<br>Setting: X.1 and X.01                             | 50 MHz to 100 MHz range; output amplitude will not vary more than +1.5% and -1.0% of the value at 50 kHz.   |   |
| Harmonic Content (relative to fundamental)<br>Multiplier setting: X1      | 2 <sup>nd</sup> harmonic at least 35 db down. 3 <sup>rd</sup> harmonic and all higher order harmonics at least 40 db down.  | Multiplier setting X.01:<br>Harmonics typically 20 db down or more. |
| Multiplier setting: X.1   | 2 <sup>nd</sup> harmonic at least 33 db down. 3 <sup>rd</sup> harmonic and all higher order harmonics at least 38 db down.  |   |

**Table 2-2**  
**ENVIRONMENTAL CHARACTERISTICS**

| Characteristics                          | Performance Requirements   | Supplemental Information |
|--|--|--------------------------|
| Temperature<br>Operating                 | 0°C to +50°C   |                          |
| Storage                                  | -40°C to +75°C.  |                          |
| Altitude<br>Operating                    | To 15,000 feet maximum operating temperature decreased by 1°C/1,000 feet from 5,000 to 15,000 feet.  |                          |
| Storage                                  | To 50,000 feet.  |                          |
| Vibration<br>Operating and Non-operating | With the instrument complete and operating, vibration frequency swept from 10 to 55 to 10 Hz at 1 minute per sweep. Vibrate 15 minutes in each of the three major axes at 0.015 inch total displacement. Hold 10 minutes at any major resonance, or in none, at 55 Hz. Total time, 75 minutes. |                          |
| Shock<br>Operating and Non-operating     | 30 g's 1/2 sine, 11 ms duration, 3 shocks in each direction along 3 major axes, for a total of 18 shocks.  |                          |

Table 2-3

## PHYSICAL CHARACTERISTICS

| Characteristics                                 | Information                    |
|---|--------------------------------|
| Overall Dimensions (measured at maximum points) |                                |
| Height  | 5.0 inches<br>12.7 centimeter  |
| Width   | 2.6 inches<br>6.6 centimeter   |
| Length  | 12.2 inches<br>31.0 centimeter |
| Net Weight (Instrument Only)                    | 2.25 lbs.<br>1.02 kilograms    |

**PERFORMANCE CHECK****Introduction**

This procedure checks the electrical characteristics of the SG 503 that appear in the Specification section of this manual. If the instrument fails to meet the requirements given in this performance check, the calibration procedure should be performed. This procedure can also be used by an incoming inspection facility to determine acceptability of performance.

The electrical characteristics in Section 2 are valid only if the SG 503 is calibrated at an ambient temperature of +20°C to +30°C and operated at an ambient temperature of 0°C to +50°C. Forced air circulation is required for ambient temperature above +40°C.

Tolerances that are specified in this performance check procedure apply to the instrument under test and do not include test equipment error.

**Test Equipment Required**

The test equipment listed in Table 2-4, or equivalent, is required to perform the performance check. Test equipment characteristics listed are the minimum required to verify the performance of the equipment under test. Substitute equipment must meet or exceed the stated requirements. All test equipment is assumed to be operating within tolerance.

Special test devices are used where necessary to facilitate the procedure. Most of these are available from Tektronix, Inc. and can be ordered through your local Tektronix Field Office or representative.

## Specification and Performance Check—SG 503

Table 2-4

## LIST OF TEST EQUIPMENT REQUIREMENTS

| Description                  | Performance Requirements   | Application                                   | Example  |
|------------------------------|--|---|--|
| Oscilloscope                 | Bandwidth, dc to 100 MHz; minimum deflection factor, 1 mV/div with differential comparator; sweep rate, 10 ms/div to 1 $\mu$ s/div; accuracy, within 3%. | Used throughout procedure to provide display. | TEKTRONIX 7603, 7A13, 7B70 Oscilloscope System.          |
| Digital Voltmeter            | Range, 0 to 50 V; accuracy, within 0.1%.   | Output voltage flatness check.                | TEKTRONIX DM 501 Digital Multimeter.*                    |
| Digital Counter              | Range, 50 kHz to 250 MHz.  | Output accuracy                               | TEKTRONIX DC508 Digital Counter.*                        |
| Power Module                 | Three compartments or more.  | All tests.                                    | TEKTRONIX TM 503 or TM 504.                              |
| Calibration Generator        | Amplitude calibration, 5 mV to 5 V; accuracy, $\pm 0.25\%$ into 1 M $\Omega$ ; output, square wave at approximately 1 kHz.                               | Amplitude Set check.                          | TEKTRONIX PG 506 Calibration Generator.*                 |
| Spectrum Analyzer            | Range, 100 kHz to 300 MHz; calibrated levels in decade steps from -45 dB to -35 dB; impedance, 50 $\Omega$ ; accuracy, linear display, within 10%.       | Buffer Distortion, Harmon-Suppression check.  | TEKTRONIX 7L12 Spectrum Analyzer.                        |
| Peak-to-Peak Detector        | Frequency range, 50 Hz to 500 MHz; requires 1.2 V p-p input voltage.   | Output voltage flatness check.                | Tektronix 067-0625-00 Calibration Fixture.               |
| Coaxial cable                | Impedance, 50 $\Omega$ ; length, 36 inches; connectors, bnc; (precision coaxial cable).  | Provides signal interconnection.              | Tektronix Part No. 012-0482-00 (supplied with SG 503).   |
| Patch cord (2 required)      | Bnc to banana plug-jack, 18 inch.  | Provides signal interconnection.              | Tektronix Part No. 012-0090-00 (black) 012-0091-00 (red) |
| Coaxial cable (2 required)   | Impedance, 50 $\Omega$ ; length, 42 inches; connectors, bnc.   | Provides signal interconnection.              | Tektronix Part No. 012-0057-01.                          |
| Attenuator, 2X (2 required). | Impedance, 50 $\Omega$ ; connectors, bnc.  | Output voltage flatness check.                | Tektronix Part No. 011-0069-02.                          |
| Tee connector                | Connectors, bnc.   | Reference amplitude check.                    | Tektronix Part No. 103-0030-00.                          |
| Adapter                      | GR to bnc female.  | Output voltage flatness check.                | Tektronix Part No. 017-0063-00.                          |
| Termination                  | Impedance, 50 $\Omega$ ; connectors, bnc.  | Output termination for signal generator.      | Tektronix Part No. 011-0049-01.                          |
| Resistor                     | Fixed, 2.4 M $\Omega$ , 1/2 W, 5%.   | Output voltage flatness check.                | Tektronix Part No. 301-0245-00.                          |

\*Requires TM 500-Series Power Module.

**Preliminary Procedure**

1. Ensure that all power switches are off.
2. Ensure that all test equipment and the SG 503 under test are suitably adapted to the line voltage to be applied.
3. Install the SG 503 into the power module, and if applicable, install all other TM 500-series test equipment into the power module.
4. Connect the equipment under test and the test equipment to a suitable line voltage source. Turn all equipment on and allow at least 20 minutes for the equipment to warm up and stabilize.

**Initial Control Settings**

Set the following controls during warm-up time:

**SG 503**

|                       |                   |
|-----------------------|-------------------|
| AMPLITUDE MULTIPLIER  | X1                |
| FREQUENCY VARIABLE    | Midrange          |
| FREQUENCY RANGE (MHz) | REF $\approx$ .05 |
| OUTPUT AMPLITUDE      | 5.0               |

**Oscilloscope**

|                  |   |
|------------------|---|
| Intensity, Focus | Set for well-defined trace and normal brightness. |
|------------------|---|

**Differential Comparator**

|                 |                       |
|-----------------|-----------------------|
| Volts/Div       | .1 V                  |
| Variable        | fully clockwise (cal) |
| +Input          | ac                    |
| -Input          | ac                    |
| Bandwidth Limit | 5 MHz                 |

**Time Base Plug-In**

|            |  |
|------------|--|
| Time/Div   | .2 ms  |
| Variable   | (cal in)                                       |
| Triggering |  |
| +Slope     | selected                                       |
| Mode       | P-P Auto                                       |
| Coupling   | ac hf rej                                      |
| Source     | Ext  |
| Position   | Set so trace starts at left side of graticule. |
| Magnifier  | X1   |

**PERFORMANCE CHECK PROCEDURE****NOTE**

The SG 503 must be terminated into an accurate 50-ohm load for all checks. Measure the 50-ohm termination to determine percent of error. A 2% error in the termination (1 ohm) will cause amplitude errors of 1%. For example, a 51-ohm termination causes an amplitude error that is 1% high at 50 kilohertz.

**1. Check Reference Amplitude Accuracy at 0.05 megahertz.**

a. Connect a 1 kilohertz, 5 volt square-wave signal from the calibration generator, through a BNC tee connector, to the + input of the differential comparator, using a 42-inch cable. Connect a 42-inch cable from the tee connector to the time-base unit external trigger input.

b. Connect the precision 50-ohm cable (supplied with SG 503) to the SG 503 OUTPUT connector.

c. Connect a 50-ohm termination to the remaining end of the precision 50-ohm cable; connect the other end of the 50-ohm termination to the - input of the differential comparator.

d. Set the time-base triggering controls for a stable display; a CRT display similar to Fig. 2-1 is obtained.

e. Check—that the corners of the idealized waveform are aligned as illustrated in Fig. 2-1, within 1.5 vertical divisions. Disregard waveform tilt.

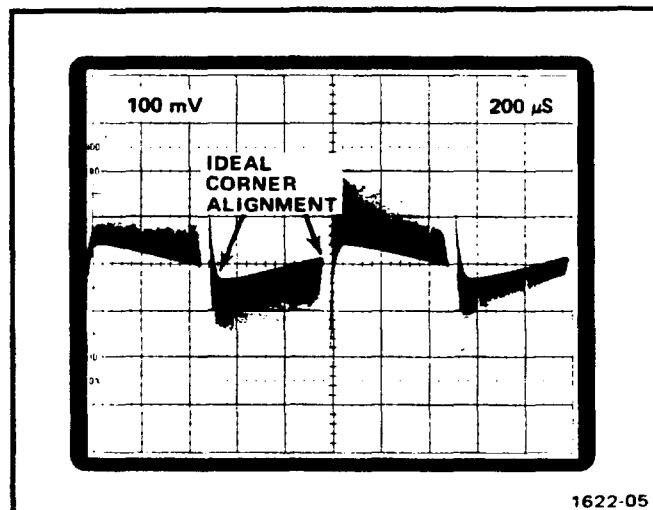


Fig. 2-1. Representation of complex waveform (idealized) with 5 volt reference amplitude at 0.05 MHz, properly set.

f. Set the SG 503 OUTPUT AMPLITUDE control to 0.5; set the calibration generator for a 0.5 volt, 1 kilohertz square-wave signal.

g. Set the differential-comparator deflection factor for 10 mV/div.

h. Check—that the waveform is similar as illustrated in Fig. 2-2, (within 1.5 vertical divisions).

i. Disconnect all cables.

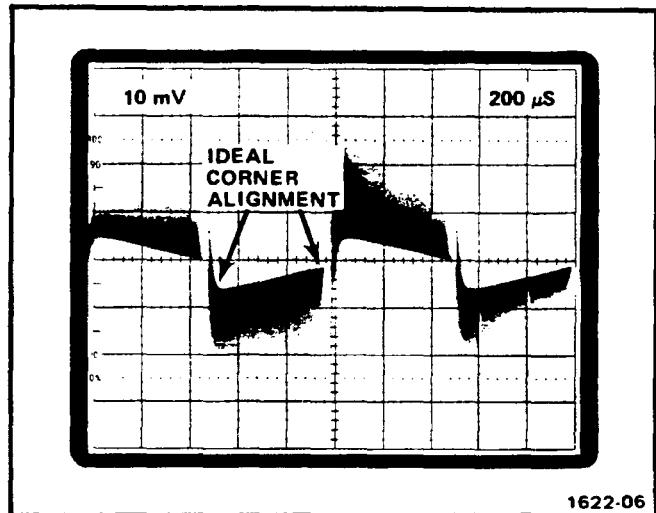


Fig. 2-2. Display of complex waveform (idealized) with 0.5 volt reference amplitude of 0.05 MHz, properly set.

## 2. Check Harmonic Suppression and Leveling

a. Connect the SG 503 output to the spectrum analyzer input, using the precision 50-ohm cable (supplied with SG 503).

b. Set the SG 503 OUTPUT AMPLITUDE control to 5.5 and the AMPLITUDE MULTIPLIER switch to the X1 position.

c. Set the SG 503 FREQUENCY RANGE (MHz) switch to the 100-250 range.

d. Position the fundamental display to the top graticule line with the spectrum analyzer position control. See Fig. 2-3 for reference.

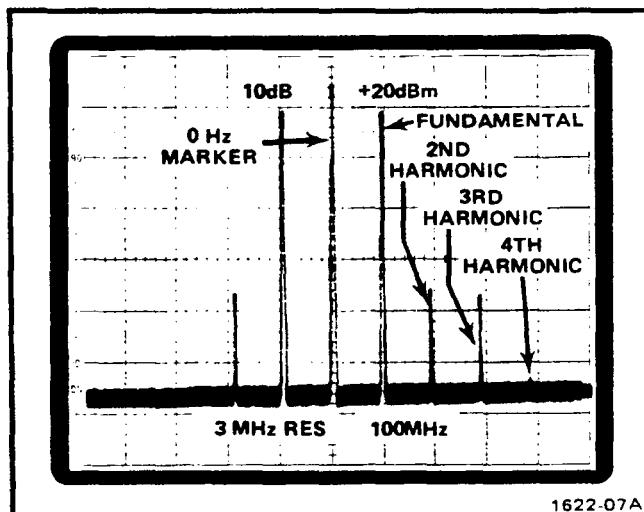


Fig. 2-3. Display of 100 MHz signal and harmonics.

### NOTE

*It will be necessary to change the spectrum analyzer input attenuation (sensitivity) to maintain a reasonable display on screen, with harmonics above the baseline noise level and within the graticule area.*

e. Slowly adjust the SG 503 FREQUENCY VARIABLE control over its entire range and check that the vertical distance (suppression) between the top of the fundamental and second harmonic display is at least 3.5 divisions; the tops of the remaining harmonics are separated at least 4.0 divisions. (Adjust the spectrum analyzer Frequency Span/Div control as necessary to maintain the harmonic display on screen.) See Fig. 2-3.

f. Set the SG 503 FREQUENCY RANGE (MHz) switch to the 50-100 range.

- g. Repeat part e of this step for the remaining frequency ranges. (Suppression limit of 35 decibels down corresponds to 3.5 divisions on the display.)

#### NOTE

*All coil adjustments have been adjusted for minimum harmonic amplitude at the high end of the associated range (worst case harmonic conditions). Check that the output remains leveled (display will blink if unleveled condition occurs) as the SG 503 FREQUENCY VARIABLE control is slowly rotated over its associated frequency range.*

- h. Set the SG 503 AMPLITUDE MULTIPLIER to X.1.
- i. Increase the spectrum analyzer input sensitivity by a factor of 10.
- j. Repeat parts c through g of this step, checking that the vertical distance (suppression) between the top of the fundamental and second harmonic display is at least 3.3 divisions (33 db); the tops of the remaining harmonics are separated at least 3.8 divisions.
- k. Return the SG 503 AMPLITUDE MULTIPLIER to X1 and disconnect the cable from the spectrum analyzer.

### 3. Readout Accuracy

- a. Connect the SG 503 output to the frequency counter using the  $50 \Omega$  coax. (Set the counter to  $50 \Omega$ .)
- b. Set the SG 503 OUTPUT AMPLITUDE to a level that stabilizes the frequency counter display.
- c. Slowly adjust the SG 503 FREQUENCY VARIABLE control over its entire range at each of the frequency range positions of the FREQUENCY RANGE (MHz) switch.
- d. Check that the frequency counter display is within  $\pm 0.7$  of the least significant displayed digit on the SG 503.

### 4. Check Flatness (Peak-to-Peak Amplitude Regulation)

- a. Set the SG 503 controls as follows: FREQUENCY RANGE (MHz) switch to REF  $\approx .05$  position, and the AMPLITUDE MULTIPLIER switch to X1.

- b. Connect a 2.4 megohm, 5% resistor across the digital voltmeter floating input terminals. Connect the SG 503 via the precision cable (012-0482-00) and the bnc female-to-GR adapter to the input of the peak-to-peak detector. Use two bnc to banana-plug-jack patch cords to connect the output of the peak-to-peak detector to the floating input terminals on the digital voltmeter; maintain correct polarity, HI to + and LO to -. Set the digital voltmeter to the 20 volts dc range.

- c. Slowly adjust the SG 503 OUTPUT AMPLITUDE VOLTS P-P control until the digital voltmeter display indicates  $\pm .000$ . Output amplitude from the SG 503 should be about 1.1 to 1.2 volts; this establishes a 0.0% reference setting at .050 megahertz.

- d. Slowly adjust the SG 503 FREQUENCY VARIABLE control over its entire range at each of the frequency range positions of the FREQUENCY RANGE (MHz) switch.

- e. Check—the flatness deviation from 0.25 megahertz to 50 megahertz, must be within 1% of the value at .050 megahertz. The total percentage deviation calculation must include the digital voltmeter reading and the calibration factor of the peak-to-peak detector. For example, a reading of +.008 volt on the digital voltmeter is equivalent to +0.8% deviation. Applying a correction factor of -0.3% results in a total percentage deviation of +0.5%.

- f. Check—the flatness deviation from 50 megahertz to 100 megahertz, must be within 1% of the value at .050 megahertz. The same calculation must be considered for this deviation reading as described in part e of this step.

#### NOTE

*A 1% total percentage deviation ensures flatness specification when the SG 503 is operating at the X.1 and X.01 AMPLITUDE MULTIPLIER switch positions.*

- g. Check—the flatness deviation from 100 megahertz to 250 megahertz, must be within 3% of the value at .050 megahertz. The same calculation must be considered for this deviation reading as described in part e and f of this step.

**Specification and Performance Check—SG 503**

h. To check the flatness deviation at a higher voltage output from the SG 503, insert two 2X attenuators between the SG 503 cable and the peak-to-peak detector. Repeat part c of this step to obtain another 0.0% reference reading of about 4.7 volts output from the SG 503.

i. After obtaining the new 0.0% reference indication on the digital voltmeter, repeat parts e and f of this step to

check flatness deviation for about 4.7 volts output from the SG 503. Tolerance limits are the same as in parts e and f of this step.

j. Disconnect all cables from the SG 503.

This completes the Performance Check procedure of the SG 503 Leveled Sine Wave Generator.

## Warning

*The following servicing instructions are for use only by qualified personnel. To avoid personnel injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer to General Safety Summary and Service Safety Summary prior to performing any service.*

# ADJUSTMENT

## Introduction

This adjustment procedure is to be used to restore the SG 503 to original performance specifications. Adjustment need not be performed unless the instrument fails to meet the Performance Requirements of the Electrical Characteristics listed in the Specification section, or the Performance Check cannot be completed satisfactorily.

Completion of all adjustment steps in this procedure ensures that the instrument will meet the performance requirements listed in the Specification section. However, to fully ensure satisfactory performance, it is recommended that the Performance Check be performed after any adjustment is made.

## 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.

## Test Equipment Required

The test equipment listed in Table 3-1, or equivalent, is required for adjustment of the SG 503. Specifications given for the test equipment are the minimum necessary for accurate adjustment and measurement. All test equipment is assumed to be correctly calibrated and operating within specification.

If other test equipment is substituted, control settings or calibration setup may need to be altered to meet the requirements of the equipment used.

A flexible plug-in extender, Tektronix Part No. 067-0645-02, is useful for troubleshooting or adjusting the SG 503; however, the complete Adjustment Procedure can be performed without use of the extender.

Table 3-1

## LIST OF TEST EQUIPMENT REQUIREMENTS

| Description           | Performance Requirements   | Application  | Example   |
|-----------------------|--|--|---|
| Oscilloscope          | Bandwidth, dc to 100 MHz; minimum deflection factor, 1 mV/div; sweep rate, 10 ms/div to 1 $\mu$ s/div; accuracy, within 3%.                        | Used throughout procedure to provide display.        | TEKTRONIX 7603, 7A13, 7B70 Oscilloscope System. |
| Digital Voltmeter     | Range, 0 to 50 V; accuracy, within 0.1%.   | Voltage measurements. Output voltage flatness check. | TEKTRONIX DM 501 Digital Multimeter.*           |
| Power Module          | Three compartments or more.  | All tests.   | TEKTRONIX TM 503 or TM 504.                     |
| Calibration Generator | Amplitude calibration, 50 mV to 5 V; accuracy, $\pm 0.25\%$ into 1 M $\Omega$ ; output, square wave at approximately 1 kHz.                        | Amplitude Set check and adjustment.                  | TEKTRONIX PG 506 Calibration Generator.*        |
| Spectrum Analyzer     | Range, 100 kHz to 300 MHz; calibrated levels in decade steps from -45 db to -35 db; impedance, 50 $\Omega$ ; accuracy, linear display, within 10%. | Buffer Distortion, Harmonic Suppression check.       | TEKTRONIX 7L12 Spectrum Analyzer.               |

\*Requires TM 500-Series Power Module.

## Adjustment—SG 503

Table 3-1 (cont)

## LIST OF TEST EQUIPMENT REQUIREMENTS

| Description                       | Performance Requirements  | Application   | Example   |
|-----------------------------------|---|---|---|
| Peak-to-Peak Detector             | Frequency range, 50 Hz to 500 MHz; requires 1.2 V p-p input voltage.                                | Output voltage flatness check.                      | Tektronix 067-0625-00 Calibration Fixture.                      |
| Autotransformer with ac voltmeter | Capable of supplying an output voltage from 90 to 132 V, ac; 120 watts of power at the upper limit. | Power supply check.                                 | General Radio W10MTR3W Variac Autotransformer.                  |
| Coaxial cable                     | Impedance, 50 Ω; length, 36 inches; connectors, bnc; (precision coaxial cable).                     | Provides signal interconnection.                    | Tektronix Part No. 012-0482-00 (supplied with SG 503).          |
| Patch cord (2 required)           | Bnc to banana-plug-jack, 18 inch.   | Provides signal interconnection.                    | Tektronix Part No. 012-0090-00 (black)<br>012-0091-00 (red)     |
| Coaxial cable (2 required)        | Impedance, 50 Ω; length, 42 inches; connectors, bnc.  | Provides signal interconnection.                    | Tektronix Part No. 012-0057-01.                                 |
| Attenuator, 2X (2 required)       | Impedance, 50 Ω; connectors, bnc.   | Output voltage flatness check.                      | Tektronix Part No. 011-0069-02.                                 |
| Tee connector                     | Connectors, bnc.  | Reference amplitude check.                          | Tektronix Part No. 103-0030-00.                                 |
| Adapter                           | GR to bnc female.   | Output voltage flatness                             | Tektronix Part No. 017-0063-00.                                 |
| Termination                       | Impedance, 50 Ω connectors, bnc.  | Output termination for signal generator.            | Tektronix Part No. 011-0049-01.                                 |
| Resistor                          | Fixed, 2.4 MΩ, 1/2 W, 5%.   | Output voltage flatness                             | Tektronix Part No. 301-0245-00.                                 |
| Screwdriver                       | Three-inch shaft, 3/32 inch bit.  | Used to adjust variable resistors.                  | Xcelite R-3323.   |
| Alignment tool                    | Fits 5/64-inch (ID) hex cores.  | Used to adjust coils in harmonic suppression check. | Tektronix Part No. 003-0307-00 (handle)<br>003-0310-00 (insert) |
| Alignment tool                    | Five-inch, for slotted cores.   | Used to adjust coils in harmonic suppression check. | Tektronix Part No. 003-0301-00.                                 |

**Preparation**

a. Remove the left and right side covers of the SG 503 to gain access to the component side of the circuit boards. Pull the rear end of the side cover outward from the side of the instrument (the cover snaps into place).

b. Install the SG 503 into the left power module compartment, or if appropriate, connect the SG 503 to the power module by means of the flexible plug-in extender.

c. Set the power module for the line voltage to be applied (see power module manual) and connect it to the variable autotransformer; connect the autotransformer to the line voltage source. Be sure that the power switch is off.

d. Install the TM 500-series equipment, including the SG 503 into the power module.

e. Connect all test equipment to a suitable line voltage source.

f. Turn on all test equipment and allow at least 20 minutes for the equipment to warm up and stabilize.

**Initial Control Settings**

Set the following controls during warm-up time:

**SG 503**

|                       |           |
|-----------------------|-----------|
| AMPLITUDE MULTIPLIER  | X1        |
| FREQUENCY VARIABLE    | Midrange  |
| FREQUENCY RANGE (MHz) | REF ≈ .05 |
| OUTPUT AMPLITUDE      | 5.0       |

**Oscilloscope**

|                  |   |
|------------------|---|
| Intensity, Focus | Set for well-defined trace and normal brightness. |
|------------------|---|

**Differential Comparator**

|                 |                       |
|-----------------|-----------------------|
| Volts/div       | .1 V                  |
| Variable        | fully clockwise (cal) |
| +Input          | ac                    |
| -Input          | ac                    |
| Bandwidth Limit | 5 MHz                 |

**Time Base Plug-In**

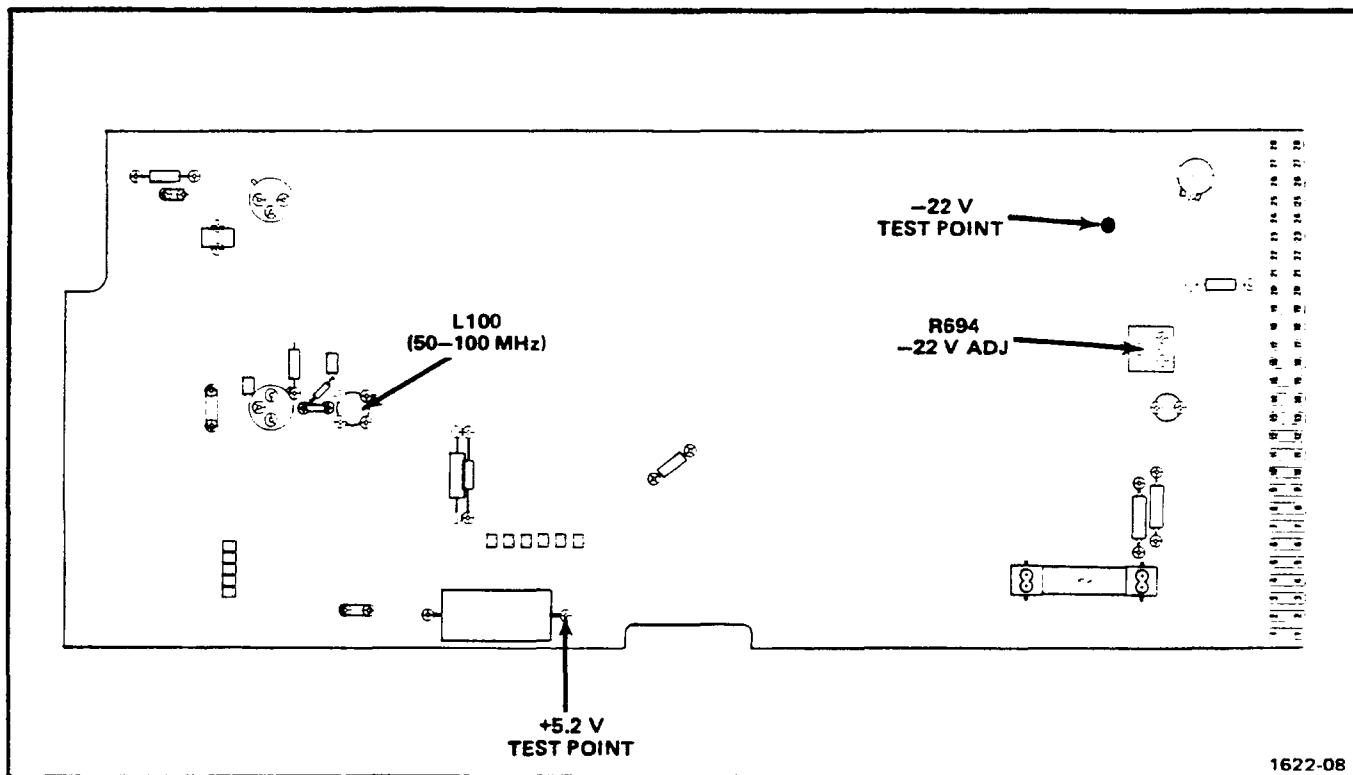
|            |  |
|------------|--|
| Time/Div   | .2 ms  |
| Variable   | (cal in)                                       |
| Triggering |  |
| +Slope     | selected                                       |
| Mode       | P-P Auto                                       |
| Coupling   | ac hf rej                                      |
| Source     | Ext  |
| Position   | Set so trace starts at left side of graticule. |
| Magnifier  | X1   |

**7L12 Spectrum Analyzer**

|                   |              |
|-------------------|--------------|
| Frequency         |              |
| Center            | selected     |
| Coarse            | 0000         |
| Fine              | midrange     |
| 10 dB/div         | selected     |
| Triggering        |              |
| P-P auto          | selected     |
| Free Run          | selected     |
| Level             | midrange     |
| Slope             | +            |
| RF dB             | 50 (on knob) |
| Reference level   | 20           |
| Variable          | CAL (ccw)    |
| Time/Div          | SPECTRUM     |
| Variable          | in           |
| Base Line Clipper | ccw          |
| Horiz Pos         | midrange     |
| Video Filters     | 30 kHz       |
| Video Processor   | not selected |
| Auto Phase Locked | on (up)      |
| Freq Span/Div     | 100 MHz      |
| Hz Resolution     | 3 MHz (3M)   |
| Variable          | Cal          |
| Vert Pos          | midrange     |

**ADJUSTMENT PROCEDURE****NOTE**

The SG 503 must be terminated into an accurate 50-ohm load for all checks and adjustments. Measure the 50-ohm termination to determine percent of error. A 2% error in termination (1 ohm) will cause amplitude errors of 1%. For example, a 51-ohm termination causes an amplitude error that is 1% high at 50 kilohertz.

**Adjustment—SG 503****Fig. 3-1. Location of test points, L100, and -22 volt adjustment.****1. Adjust -22 Volt Power Supply**

a. Connect the digital voltmeter between the -22 V test point on the Main circuit board, and chassis ground. See Fig. 3-1 for voltage test point location.

b. Check—for a meter reading of -22 volts,  $\pm 50$  millivolts.

c. Adjust—-22 V adj. R694, for a meter reading of -22 volts. See Fig. 3-1 for adjustment location.

d. Adjust the autotransformer output voltage from the low limit to the high limit as indicated in Table 3-2. Meter reading should not vary more than  $\pm 50$  millivolts. Return the autotransformer to the nominal line voltage setting.

e. Disconnect the digital voltmeter.

**Table 3-2****POWER MODULE UNIVERSAL TRANSFORMER**

| Line Selector Block Position | Regulating Ranges  |                    |
|------------------------------|--------------------|--------------------|
|                              | 110-Volts Nominal  | 220-Volts Nominal  |
| L                            | 90 Vac to 110 Vac  | 180 Vac to 220 Vac |
| M                            | 99 Vac to 121 Vac  | 198 Vac to 242 Vac |
| H                            | 108 Vac to 132 Vac | 216 Vac to 264 Vac |
| Line Fuse Data               | 1.6 A slow-blow    | 0.8 A slow-blow    |

**2. Check +5.2 Volt Supply**

a. Connect the digital voltmeter between the +5.2 V test point on the Main circuit board, and chassis ground. See Fig. 3-1 for voltage test point location.

b. Check—for meter reading of +5.0 to +5.4 volts.

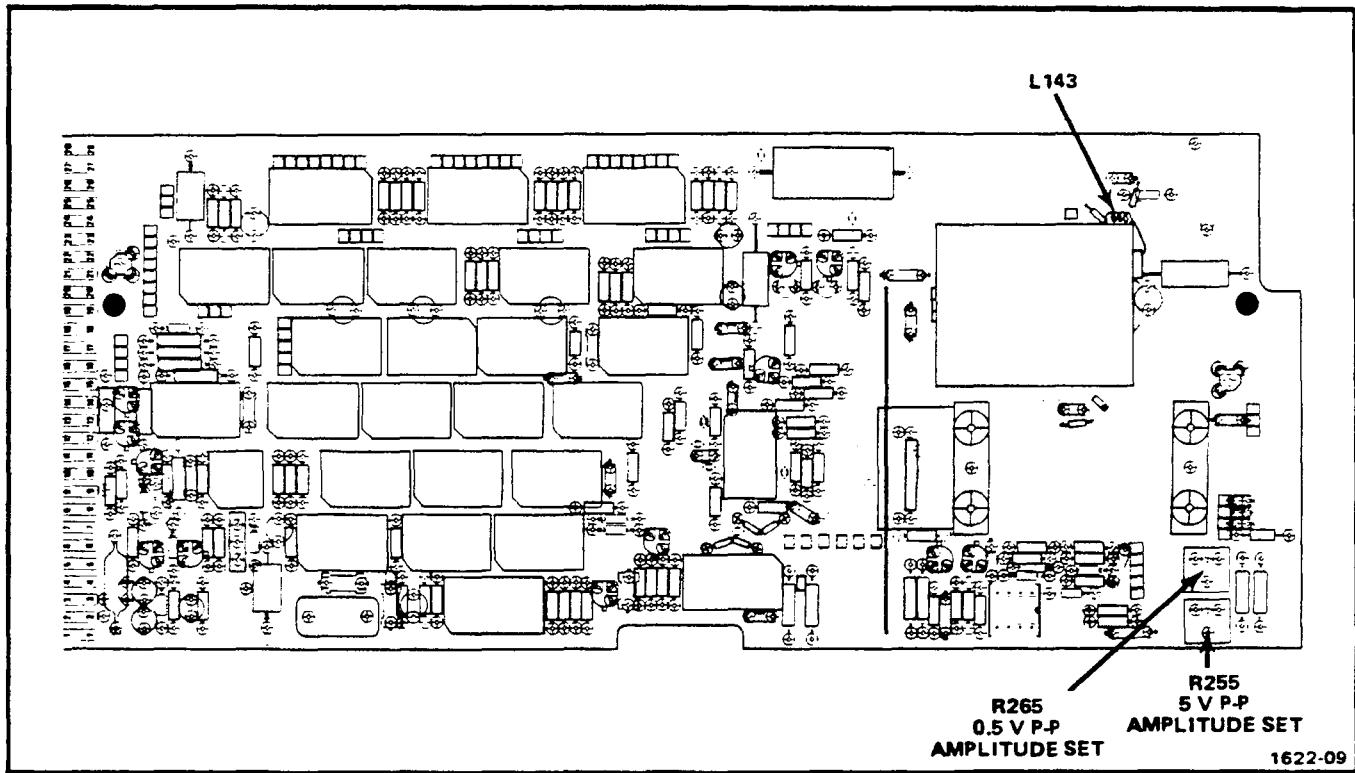


Fig. 3-2. Location of L143, 0.5 V P-P, and 5 V P-P Amplitude Set.

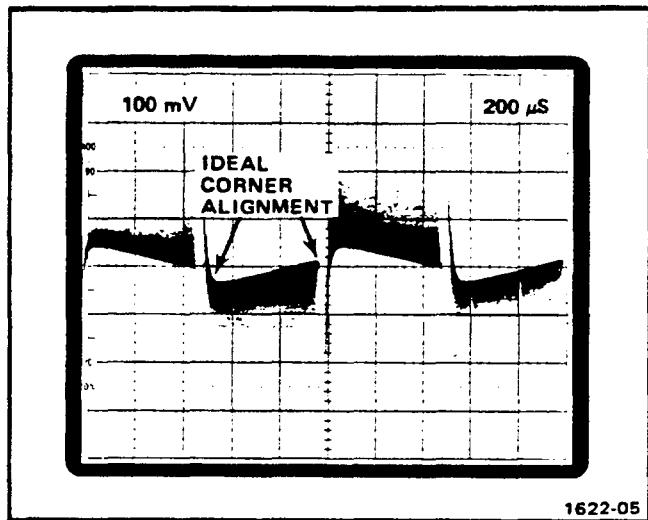
- c. Disconnect the digital voltmeter.
- f. Adjust—5.0 P-P Amplitude Set, R255, so the corners of the idealized waveform are aligned as illustrated in Fig. 3-3. See Fig. 3-2 for adjustment location.
- 3. Adjust .5 V P-P and 5 V P-P Amplitude Set
  - a. Connect a 1 kilohertz, 5 volt square-wave signal from the Standard Ampl Output of the calibration generator, through a tee connector, to the + input of the differential comparator, using a 42-inch cable. Connect a 42-inch cable from the tee connector to the time-base external trigger input.
  - b. Connect the precision 50-ohm cable (supplied with SG 503) to the SG 503 OUTPUT connector.
  - c. Connect a 50-ohm termination to the remaining end of the precision 50-ohm cable; connect the other end of the 50-ohm termination to the – input of the differential comparator.
  - d. Set the time-base triggering controls for a stable display; a crt display similar to Fig. 3-3 is obtained.
  - e. Check—that the corners of the idealized waveform are aligned as illustrated in Fig. 3-3. Disregard waveform tilt.
  - g. Set the SG 503 OUTPUT AMPLITUDE control to 0.5; reduce the calibration generator output for a 0.5 V, 1 kHz square-wave signal.
  - h. Set the differential comparator deflection factor for 10 mV/div.
  - i. Check—that the waveform is similar as illustrated in Fig. 3-3.
  - j. Adjust—0.5 V P-P Amplitude Set, R265, so the corners of the idealized waveform are aligned as illustrated in Fig. 3-3. See Fig. 3-2 for adjustment location.
  - k. Interaction—repeat parts e through j of this step until corners of the idealized waveform are aligned at the 0.5 volt and 5.0 volt settings.

**Adjustment—SG 503****4. Check Amplitude Multiplier Accuracy at 0.05 MHz**

a. Set the SG 503 OUTPUT AMPLITUDE control to 5.0 and the AMPLITUDE MULTIPLIER switch to the X.1 position. Note that the FREQUENCY MHz display reads .050.

b. Set the calibration generator for a 0.5 volt, 1 kilohertz square-wave output signal.

c. Check—that the corners of the idealized waveform are not separated by more than 1.5 vertical divisions. See Fig. 3-3 for waveform illustration.



**Fig. 3-3. Display of complex waveform (idealized) obtained when the amplitude set controls are properly adjusted at 0.05 MHz.**

d. Set the SG 503 AMPLITUDE MULTIPLIER switch to the X.01 position. Do not disturb the SG 503 OUTPUT AMPLITUDE control setting.

e. Set the calibration generator for a 50 millivolt, 1 kilohertz square-wave output signal.

f. Set the differential comparator deflection factor for 1 millivolt/division.

g. Check—that the corners of the idealized waveform are not separated by more than 1.5 vertical divisions. See Fig. 3-3 for waveform illustration.

h. Disconnect all cables and termination.

**5. Adjust Output Buffer Current**

a. Connect the SG 503 output to the Spectrum Analyzer input, using the precision 50-ohm cable (supplied with the SG 503).

b. Set the SG 503 FREQUENCY RANGE (MHz) switch to the 100-250 range; adjust the FREQUENCY VARIABLE control for a display of 100 megahertz.

c. Position the 0 Hz marker display to the center graticule line with the spectrum analyzer position control. See Fig. 3-5 for reference.

d. Position the fundamental to the top graticule line with the spectrum analyzer vertical position control. See Fig. 3-5 for reference.

e. Slowly adjust the SG 503 OUTPUT AMPLITUDE control over the 0.5 volt to 5.5 volt range in both directions and check for at least 3.5 division vertical separation between the top of the fundamental and the top of the second harmonic display (35 decibels down). See Fig. 3-5 for harmonic reference.

**NOTE**

*It will be necessary to change the spectrum analyzer input attenuation (sensitivity) to maintain a reasonable display on screen, with harmonics above the baseline noise level and within the graticule area.*

f. Adjust—Current Adj, R175, for at least 3.5 division vertical separation between the top of the fundamental and the top of the second harmonic display. Repeat part e of this step. See Fig. 3-4 for adjustment location, and Fig. 3-5 for reference.

g. Repeat parts e and f of this step until final adjustment of R175 results in a crt display that shows the vertical separation between the top of the fundamental and second harmonic is at least 3.5 division, and the tops of the remaining harmonics are separated at least 4.0 division.

h. Set the FREQUENCY RANGE (MHz) switch to the 50-100 position; adjust the FREQUENCY VARIABLE control for a display of 100 megahertz.

i. Repeat parts d through g of this step.

**6. Check/Adjust Harmonic Suppression**

a. Set the SG 503 OUTPUT AMPLITUDE control to 5.5 and the AMPLITUDE MULTIPLIER switch to the X1 position.

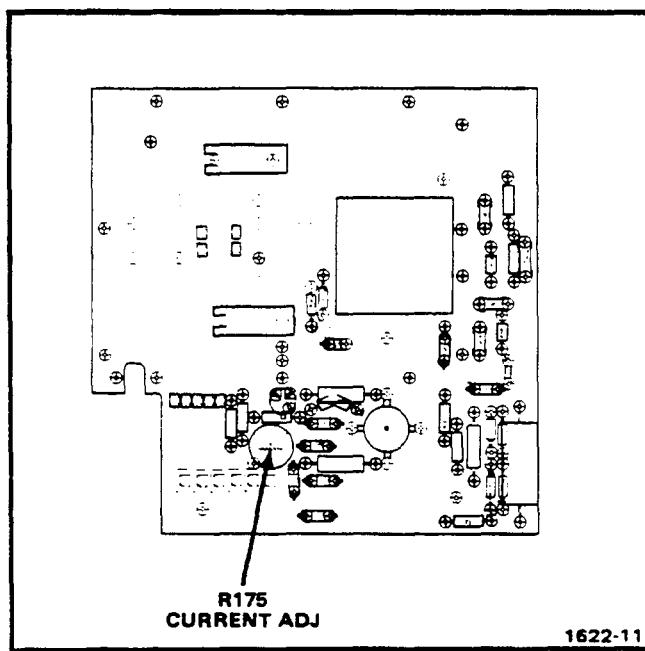


Fig. 3-4. Location of R175 Current Set adjustment.

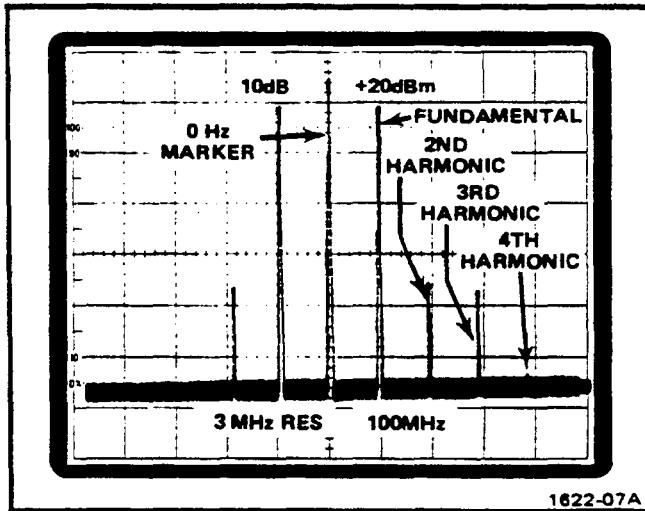


Fig. 3-5. Display of 100 MHz signal and harmonics.

b. Set the SG 503 FREQUENCY RANGE (MHz) switch to the 100-250 range.

**NOTE**

*Adjustment of any coil associated with the oscillator sections is not recommended unless it is definitely proven that the SG 503 does not meet the typical frequency and harmonic suppression requirements as listed in Table 3-1. No coil should be adjusted for more than marginal deviations in frequency range or harmonic suppression. The generation of large harmonic amplitudes or large deviations from the typical frequency range listed in Table 3-1 indicate possible circuit faults, which must be corrected before proceeding further.*

- c. Position the fundamental to the top graticule line with the spectrum analyzer vertical position control. See Fig. 3-5 for reference.

**NOTE**

*Interaction of the harmonic amplitude display will occur with adjustment of any coil. For example, decreasing the second harmonic amplitude will increase the amplitude of the third harmonic. No attempt should be made to adjust coils to obtain an ideal harmonic display (downward slope from the center frequency); instead, coil adjustments should achieve suppression requirements over the entire over-lapping range.*

- d. Slowly adjust the SG 503 FREQUENCY VARIABLE control over its entire range and check that the vertical distance (suppression) between the top of the fundamental and second harmonic display is at least 3.5 division, and the tops of the remaining harmonics are separated at least 4.0 division. (Adjust the spectrum analyzer frequency span/div control as necessary to maintain the harmonic display on screen.)

- e. Adjust—L143, (physically moving coil), to meet the suppression requirement as given in part d of this step. See Fig. 3-2 for adjustment location.

- f. Set the SG 503 FREQUENCY RANGE (MHz) switch to the 50-100 range.

**Adjustment—SG 503**

g. Repeat part d of this step for the remaining frequency ranges, using Table 3-3 as reference. (Suppression limit of 35 decibel down corresponds to 3.5 divisions on the display.) See Fig. 3-6 for adjustment location of coils.

**NOTE**

*All coil adjustments should be adjusted for minimum harmonic amplitude at the high end of the associated range (worst case harmonic conditions). Check that the output remains leveled (display will blink if unlevelled condition occurs) as the SG 503 FREQUENCY VARIABLE control is slowly rotated over its associated frequency range.*

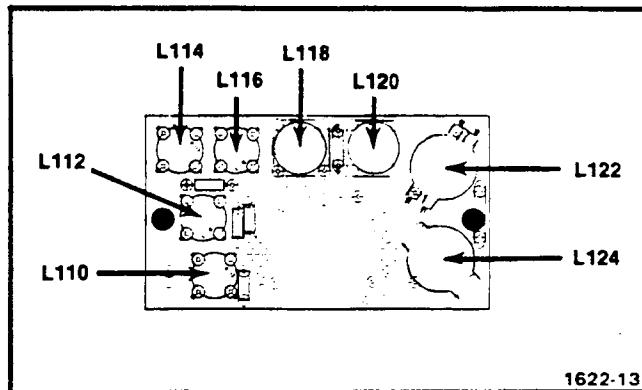


Fig. 3-6. Location of oscillator coils.

Table 3-3

| SG 503<br>FREQUENCY RANGE (MHz) | SG 503<br>FREQUENCY VARIABLE<br>Typical Displayed Count<br>(Frequency Range)* | SG 503 Coil Adjustment |
|---------------------------------|---|------------------------|
| 100 - 250                       | 97.5 - 260  | L143, air core         |
| 50 - 100                        | 41.0 - 109  | L100, slug tuned       |
| 25 - 50                         | 23.7 - 52.5   | L110, slug tuned       |
| 10 - 25                         | 9.09 - 27.3   | L112, slug tuned       |
| 5 - 10                          | 4.70 - 11.1   | L114, slug tuned       |
| 2.5 - 5                         | 2.30 - 5.50   | L116, slug tuned       |
| 1 - 2.5                         | .950 - 2.55   | L118, pot core, fixed  |
| .5 - 1                          | .480 - 1.05   | L120, pot core, fixed  |
| .25 - .5                        | .240 - .520   | L122, pot core, fixed  |
| REF ≈ .05                       | .049 - .051   | L124, pot core, fixed  |

\*The minimum and maximum displayed count on each range will vary slightly between instruments.

- h. Set the SG 503 AMPLITUDE MULTIPLIER to X.1.
- i. Increase the spectrum analyzer input sensitivity by a factor of 10.
- j. Repeat parts b, c, d, f, and g of this step, checking that the vertical distance between the top of the fundamental and the second harmonic display is at least 3.3 divisions (33 db); the tops of the remaining harmonics are separated at least 3.8 divisions.
- k. Disconnect the cable from the spectrum analyzer.

**7. Check Flatness (Peak-to-Peak Amplitude Regulation)**

- a. Set the SG 503 controls as follows: FREQUENCY RANGE (MHz) switch to REF ≈ .05 position, and the AMPLITUDE MULTIPLIER switch to X1.
- b. Connect a 2.4 megohm, 5% resistor across the digital voltmeter floating input terminals. Connect the

SG 503 via the precision cable (012-0482-00) and the bnc female-to-GR adapter to the input of the peak-to-peak detector. Use two bnc to banana-plug-jack patch cords to connect the output of the peak-to-peak detector to the floating input terminals on the digital voltmeter; maintain correct polarity, HI to + and LO to -. Set the digital voltmeter to the 20 volts dc range.

c. Slowly adjust the SG 503 OUTPUT AMPLITUDE VOLTS P-P control until the digital voltmeter display indicates ±.000. Output amplitude from the SG 503 should be about 1.1 to 1.2 volts; this establishes a 0.0% reference setting at .050 megahertz.

d. Slowly adjust the SG 503 FREQUENCY VARIABLE control over its entire range at each of the frequency range positions of the FREQUENCY RANGE (MHz) switch.

e. Check—the flatness deviation from 0.25 megahertz to 50 megahertz, must be within 1% of the value at .050 megahertz. The total percentage deviation calculation must include the digital voltmeter reading and the calibration factor of the peak-to-peak detector. For example, a

reading of +.008 volt on the digital voltmeter is equivalent to +0.8% deviation. Applying a correct factor of -0.3% results in a total percentage deviation of +0.5%.

f. Check—the flatness deviation from 50 megahertz to 100 megahertz, must be within 1% of the value at .050 megahertz. The same calculation must be considered for this deviation reading as described in part e of this step.

**NOTE**

*A 1% total percentage deviation ensures flatness performance requirement when the SG 503 is operating at the X.1 and X.01 AMPLITUDE MULTIPLIER switch positions.*

g. Check—the flatness deviation from 100 megahertz to 250 megahertz, must be within 3% of the value at .050 megahertz. The same calculation must be considered for this deviation reading as described in part e of this step.

h. To check the flatness deviation at a higher voltage output from the SG 503, insert two 2X attenuators between the SG 503 cable and the peak-to-peak detector. Repeat part c of this step to obtain another 0.0% reference reading for approximately 4.7 volts output from the SG 503.

i. After obtaining the new 0.0% reference indication on the digital voltmeter, repeat parts e and f of this step to check flatness deviation for approximately 4.7 volts output from the SG 503. Tolerance limits are the same as in parts e and f of this step.

j. Disconnect all cables from the SG 503.

This completes the Adjustment procedure of the SG 503 Leveled Sine Wave Generator.

# MAINTENANCE AND INTERFACING INFORMATION

## Preventive Maintenance

There are no special preventive maintenance procedures that apply to the SG 503. Refer to the power module instruction manual for general preventive maintenance procedures and instructions.

## Corrective Maintenance

Refer to the power module instruction manual for general corrective maintenance procedures and instructions.

## System Maintenance

System maintenance procedures are provided in the power module manual; i.e., preventive maintenance, troubleshooting aids, parts removal and replacement procedures, parts ordering information, etc.

In certain areas in this instrument, it is not recommended to use a suction type desoldering tool when repairing or replacing parts. Use a soldering wick when removing or replacing oscillator coils or the Output Buffer Amplifier (Q190).

## Oscillator Maintenance

The oscillator sections can be checked out independent of the leveling circuitry (feedback loop) by removing Q300 and connecting a 500-ohm potentiometer between the socket pins for the collector and emitter.

When replacing components for the oscillator sections be certain that they are as close to the original mechanical layout as possible. Lead length for the transistors, Q130 and Q140, should be 0.2 inch. Replace the heat sinks as originally installed (flush with the top of the transistor case). Do not allow any heat sink to touch any other part or the chassis. Distributed capacity from Q140 heat sinks to surroundings determines the upper frequency limit on the 100-250 megahertz range.

The air-core coil for the 100-250 megahertz range should not need adjustment or repair. If it becomes necessary to perform a repair in this area, use extreme caution and do not break or damage the 50 nanofarad disc capacitor that grounds one end of the coil to the variable capacitor.

## Replacing Output Buffer Amplifier

### WARNING

*The ceramic portions of power transistor Q190 contain BERYLLIUM OXIDE as a major ingredient. Beryllium Oxide heat sinks are safe under most conditions. The only hazard is that a toxic effect may occur if fumes or fine particles are inhaled. Grinding, crushing, or heating above 1800°F can produce fumes or fine particles. Avoidance of such action and subsequent inhalation will assure the absence of any hazard. No hazard is present in normal instrument operation or maintenance.*

The Output Buffer Amplifier power transistor (Q190) can be replaced without removing the Attenuator-Output Buffer Amplifier circuit board by unsoldering the leads and removing a 5/16 nut on the mounting stud. Cut the leads of the new transistor to the proper length, keeping note of the position of the collector lead. Apply Dow Corning 4 silicone compound on the under surface of the transistor and about two threads of the mounting stud. Use a very small amount and avoid placing silicone compound on the transistor leads or on the ceramic case. Orient the collector lead toward the rear of the instrument. Seat the transistor to its heat sink and tighten the 5/16 nut on the mounting stud. For efficient heat sinking, the maximum torque for first time replacement should be 6 and 1/2 inch-pounds and 5 inch-pounds for repeated installation of the same transistor. When resoldering the transistor leads to the circuit board, avoid large amounts of solder which may flow through the circuit board holes.

## Removal and Replacement of Attenuator-Output Buffer Circuit Board

Remove metal shield cover for the attenuators. The circuit board is held in place by six screws. Four corner screws hold this circuit board to the main board and two counter-sunk screws hold the Output Buffer Amplifier heat sink bracket to the side rail of the chassis. For removal of this board, it may be necessary to loosen the screws holding the main circuit board to the same side rail so that the heat-sink bracket can be withdrawn.

**Maintenance and Interfacing Information—SG 503****NOTE**

*Do not loosen the three nuts that hold the heat sink bracket to the circuit board. If it becomes necessary to remove this heat sink from the circuit board it is important to reinstall the three 35-mil washers and plastic insulation between the heat sink and the under side of the board.*

When replacing the Attenuator-Output Buffer circuit board, ensure that all pin connections from the main circuit board are aligned and seated properly. Install the six screws, but do not tighten. The two counter-sunk screws on the chassis side rail must be tightened first in order to ensure efficient heat transfer and minimum stress. Tighten the main circuit board screws, and then tighten the four Attenuator-Output Buffer Amplifier circuit board screws last. Replace metal shield.

**Alignment of FREQUENCY RANGE (MHz) Control**

If it becomes necessary to remove this knob from the front panel, or if it becomes loose on the shaft of the high frequency cam switch, alignment upon reinstallation is accomplished by setting the cam switch on the 50-100 megahertz range. This position can be noted by observing when the three switch contacts on the main circuit board first open when rotating the shaft clockwise.

**Selected Component Criteria**

If the 0.5-1.0 MHz frequency range is outside the specified range, C118 may be selected to raise or lower the frequency range. Optimum value is normally 33 pF, with 20 pF to 47 pF as upper and lower limits. An increase in capacitance will lower the frequency.

Resistor R118 is selected for oscillator stability (e.g., the oscillator may break in and out of oscillation). The nominal value is approximately 470 Ω, with a range of values from 300 Ω to 1 kΩ.

Resistor R116 is also selected for oscillator stability with the same range of values as R118.

Resistor R177 is selected for improved oscillator leveling at 250 MHz. If the oscillator at 250 MHz has an unleveled output, a 10 Ω resistor may be installed between the Main Board (A1) and the Attenuator-Output Buffer Board (A3). The only choice for R177 is either a 10 Ω resistor or no resistor at all.

|     |     | <b>Rear View</b>           |   |
|-----|-----|----------------------------|---|
|     |     | <b>Pin # Left (B side)</b> | <b>Right (A side)</b>                       |
| 28B | 28A | 28                         | Floating ground for SINE OUT                |
| 27B | 27A | 27                         | Decimal .XXX ( $10^{-1}$ )                  |
| 26B | 26A | 26                         | Decimal X.XX ( $10^0$ )                     |
| 25B | 25A |                            |   |
| 24B | 24A | 25                         | Floating ground for pin #24B                |
| 23B | 23A | 24                         | Signal input referenced to pin #25B         |
| 22B | 22A | 23                         | Decimal XX.X ( $10^1$ )                     |
| 21B | 21A | 22                         | Floating ground for REMOTE Amplitude        |
|     | 20A | 21                         | REMOTE Amplitude input                      |
|     | 19A | 20                         | No connection                               |
|     | 18A | 19                         | No connection                               |
|     | 17A | 18                         | No connection                               |
|     | 16A | 17                         | No connection                               |
|     | 15A | 16                         | No connection                               |
|     | 14A | 15                         | No connection                               |
|     |     | 14                         | No connection                               |
|     |     |                            | SINE OUT                                    |
|     |     |                            | Floating ground for SINE OUT                |
|     |     |                            | Reference Ground for BCD and Decimal Output |
|     |     |                            | LSD, BCD, (3D) (8)                          |
|     |     |                            | MSD, BCD, (1A) (1)                          |
|     |     |                            | MSD, BCD, (1B) (2)                          |
|     |     |                            | MSD, BCD (1C) (4)                           |
|     |     |                            | MSD, BCD, (1D) (8)                          |
|     |     |                            | MD, BCD (2A) (1)                            |
|     |     |                            | MD, BCD (2B) (2)                            |
|     |     |                            | MD, BCD (2C) (4)                            |
|     |     |                            | MD, BCD (2D) (8)                            |
|     |     |                            | LSD, BCD (3A) (1)                           |
|     |     |                            | LSD, BCD (3B) (2)                           |
|     |     |                            | LSD, BCD (3C) (4)                           |

(1430)1622-14

**Fig. 4-1. Input/Output assignments at rear connector.**

## Troubleshooting

Use the Performance Check, Adjustment Procedure, and Circuit Description as aids to locate trouble in the event of equipment failure. The test equipment listed in the Performance Check and Adjustment Procedure will prove useful in troubleshooting the SG 503.

## Functions Available at Rear Connector

A slot between pins 23 and 24 on the rear connector identifies the SG 503 as a member of the signal source family. Insert a barrier in the corresponding position of the power module jack to prevent other than signal source plug-ins from being used in that compartment. This protects the plug-in should specialized connections be made to that compartment. Consult the Building A System section of the power module manual for further information.

Signal outputs, or other specialized connections, may be made to the rear interface connectors as shown in Fig. 4-1. The instrument is not supplied with these connections. If you wish to wire them to the interface connector, consult your local Tektronix Field Office or representative for further information.

## REPACKAGING FOR SHIPMENT

If the Tektronix instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing: owner (with address) and the name of an individual at your firm that can be contacted. Include complete instrument serial number and a description of the service required.

Save and re-use the package in which your instrument was shipped. If the original packaging is unfit for use or not available, repackage the instrument as follows:

Surround the instrument with polyethylene sheeting to protect the finish of the instrument. Obtain a carton of corrugated cardboard of the correct carton strength and having inside dimensions of no less than six inches more than the instrument dimensions. Cushion the instrument by tightly packing three inches of dunnage or urethane foam between carton and instrument, on all sides. Seal carton with shipping tape or industrial stapler.

The carton test strength for your instrument is 200 pounds.

# CIRCUIT DESCRIPTION

## Introduction

This section of the manual contains a description of the circuitry used in the SG 503 Leveled Sine Wave Generator. Individual descriptions are separated into the following parts: Oscillator Circuits, Output Buffer Amplifier and Filter, Leveling Circuitry, Display Flash Multivibrator, 50 Ohm Wideband Attenuators, and Power Supplies. Diagrams 1 and 2 are segmented with gray-tint blocks according to circuit function. Circuit block titles correspond to those listed in the Block Diagram. Refer to appropriate diagrams in the Diagrams section of this manual while reading the circuit description.

### Oscillator Circuits

**1** **4**

Both oscillator sections, Q130 and Q140, are common-base Hartley configurations with inductive feedback (tapped coils for each frequency range). Amplitude control is accomplished by varying the dc emitter currents. Q300 operates as a variable current source, with its collector current controlled by the output of operational amplifier U280.

The oscillators operate in a non-linear mode (Class C) and the collector current for Q130 or Q140 is a series of pulses at the operating frequency. This series of pulses contain a large number of harmonics and a high Q parallel resonant tank circuit is required to obtain a good sine wave output. The tapped coils allow the highest possible operating Q factor at a given supply voltage and collector-base breakdown rating for the transistors. Spurious oscillations are reduced by the L/R combinations in the collector lead for each transistor.

For those coils that have tuning slugs, the slug position determines the inductance, coupling between windings (leakage inductance) and the Q factor for the oscillating circuit. All of the above factors combine to determine the frequency range, harmonic suppression and maximum available output amplitude.

### Output Buffer Amplifier and Filter

**1**

Signals from the oscillator sections are applied via a 100 ohm strip line to the base of Q190. The output of Q190 feeds a low-pass filter which has a cut-off frequency of about 300 megahertz.

Harmonic distortion is generated in the oscillator circuits and also in the Output Buffer Amplifier. At low frequencies, the Output Buffer Amplifier is practically ideal and contributes negligible distortion. However, at higher frequencies distortion increases and becomes more critically dependent on the collector current operating point for Q190. By choosing a frequency where the oscillator signal is fairly clean, most of the observed distortion will be due to the Output Buffer Amplifier. The collector current can then be set for minimum distortion by the adjustment of R175. Distortion is also somewhat dependent on the drive level to Q190. The final adjustment of R175 should result in minimum distortion over the full amplitude range from 0.5 volt to 5.5 volts, establishing a collector current operating point which falls in the 80 to 110 milliamp range.

### Leveling Circuitry

**1**

The leveling circuitry is composed of a reference voltage divider, a hybrid peak-to-peak detector, temperature compensation diodes CR216-CR218, and error amplifier U280 with its associated components.

The major components of the hybrid peak-to-peak detector (U225) are diodes CR225A and CR225B with their associated storage capacitors, C225A and C225B, coupling capacitor C225C and output resistor R225A. The peak-to-peak detector produces a dc output across C225A and C225B that is approximately equal to the peak-to-peak voltage at the leveling point (junction of C225C and R225A).

To aid in understanding operation of the peak-to-peak detector, assume perfect diodes, 10 volts peak-to-peak at the leveling point and the reference voltage (set by R260) disconnected. C225A would charge by normal rectifier action to -5 volts dc and C225B to +5 volts dc. If the reference voltage level set by R260 is -10 volts and now applied to C225A (series opposing) the dc levels on C225A, C225B and coupling capacitor C225C will shift by an amount equal to one half the peak-to-peak amplitude at the leveling point. There will now be zero volts dc across C225B, -10 volts dc across C225A, and coupling capacitor C225C will be charged to -5 volts dc. The sinewave at the junction of the two diodes is now centered at -5 volts dc. For an actual complete circuit with non-ideal diodes, the potential difference between C225A and C225B is about equal to the peak-to-peak amplitude at the leveling point.

Because the reference voltage and the dc output of the peak-to-peak detector are connected series opposing, any algebraic difference between these two voltages will be applied to the input of error amplifier U280. When the generator output is leveled, equal dc potentials (about .7 volt dc) exist at the – and + input terminals of U280 and the system is stabilized.

If the peak-to-peak output amplitude from an oscillator section changes for any reason, a corresponding change in detector output produces an error signal at the – input terminal of U280 which is converted into a collector current change in Q130 or Q140 in such a direction to restore the original peak-to-peak amplitude at the leveling point.

The high-gain leveling system (closed loop) establishes a steady state impedance point at the junction of C225C and R225A which approaches zero ohms. R225A, therefore, sets the generators output impedance and reverse terminates a 50 ohm coaxial cable.

CR200, CR202, VR200 and VR202 reduce transients which can be caused by sudden load changes, while R278, R276, CR276 and CR274 reduce switching transients when changing frequency ranges.

#### Display Flash Multivibrator 1

Q296 and Q290, with their associated components, is a multivibrator circuit that is held in a normally stable state as long as the sine-wave output amplitude is leveled. If the output is not leveled, pin 6 of U280 swings positive with respect to ground and turns on CR280. The multivibrator then operates as an astable circuit with a period of about 2 hertz. The waveform at the collector of Q290 is applied to pins 6 and 7 of U490 (State Generator). This signal causes binary zeros to be supplied to the Display Drivers, which turns off the display. The result is a visible flashing of the front panel LED display.

#### 50 Ohm Wideband Attenuators 1

In the X1 position of the AMPLITUDE MULTIPLIER switch, the output signal bypasses the hybrid chip attenuators.

The hybrid chip attenuators (U245 and U240) are labeled on the circuit board as "X.1 & X.01" and "FIRST  $\div 10$ , X.01".

In the X.1 position of the AMPLITUDE MULTIPLIER switch, U245 divides the generators output by 10.

In the X.01 position of the AMPLITUDE MULTIPLIER switch, U240 divides the generators output by 10 and then U245 divides again by 10 for a total division of 100.

In the X.1 and X.01 positions of the AMPLITUDE MULTIPLIER switch, the 50 ohm attenuators provide additional isolation between the oscillators and a large mismatched load.

#### Auto-Ranging Counter 2 3

(For Instruments SN B060000-above.) The input circuit to the Auto-Ranging Counter is through emitter-follower Q320, which provides a low impedance drive to Q350. Transistors Q350-Q360 and Q330-Q340 is a dual-differential amplifier that provides high gain in two stages. R351-R361 and R332-R334 are the constant-current sources for the respective amplifier, while C340 and C350 serve to stabilize the operating points of the amplifiers. The output signal amplitudes on pins 6 and 7 are constant-amplitude square waves, regardless of the input amplitude to Q320.

A 1-volt peak-to-peak square-wave signal from Q340 is applied to a divide by 8 prescaling circuit consisting of U390, U400A, and U400B (each IC divides by 2) and to the base of Q410. The positive-going edge of the signal at pin 7 of U390 and the negative-going edge of the signal at the base of Q410 are significant to the counting operation. Signal prescaling does not occur for the 50 kilohertz reference frequency or for other frequencies up to and including .999 megahertz.

(For Instruments SN B059999-below.) The input circuit to the Auto-Ranging Counter is through emitter-follower Q320, which provides a low impedance single-ended drive to U350. U350 is a dual-differential amplifier that provides high gain in two stages. R335 and R342 are the constant-current sources for internal emitter connections and the output voltage on pins 6 and 7 start to limit at low input amplitudes. The emitter currents are set for about 8 millamps, providing symmetrical output signal amplitudes of about 800 millivolts across R358 and R362. L362 is used to boost the high-frequency signal amplitudes to the prescaling circuitry.

Signals from U350 are applied to a divide by 8 prescaling circuit consisting of U390, U400A, and U400B (each IC divides by 2) and to the base of Q410. The positive-going edge of the signal at pin 7 of U390 and the negative-going edge of the signal at the base of Q410 are significant to the counting operation. Signal prescaling does not occur for the 50 kilohertz reference frequency or for other frequencies up to and including .999 megahertz.

A self-biasing arrangement is provided for U390 to ensure that the input bias level on pin 7 is always centered in the hysteresis window. The average of the complementary outputs on pins 2 and 3 is obtained from the junction of R396 and R398 and fed back to pin 7 through L365 and R365 to automatically compensate for any internal temperature drift.

Four counters, U430, U435, U436 and U437 are used for the counting process, but only three decimal digits are displayed on the front panel after the bcd data has been decoded by the bcd-to-Seven Segment Decoder Drivers. U430 frequency divides the input by 10 and its output is used to round off the count held in the remaining counters, allowing a more accurate three-digit display.

The 1 MHz reference clock circuit, U460A and U460B, with inverter U460D, drives U465, which produces two functions. Frequency division by 16 and frequency division by 2 produces a clock signal with a period of 16 microseconds on pin 11 and a clock signal with a period of 2 microseconds on pin 12.

U455B, U455C, U455D, and U460C are positive NAND gates. The logic levels at pin 5 of U455B and pin 10 of U460C determine whether a clock signal with a period of 16 microseconds or 2 microseconds appears at the output of U455D. These logic levels are determined by the output level of positive NAND gate U455C and inverter U455A.

When the FREQUENCY RANGE (MHz) control is in the REF ≈ .05 position, pin 1 of U445A and pin 13 of U445B are held LO (= 0) by the closure of S100-2. This clears U445A and U445B, setting both Q terminals (pin 6 of U445A and pin 8 of U445B) to a HI (= 1) level. A HI level is established on pins 9 and 10 of U455C, setting its output to a LO level. A LO on pin 5 of U455B locks out the clock signal with a 16 microsecond period, while the HI level on pin 10 of U460C allows the 2 microsecond clock to be gated through to the output of U455D.

The HI level on pin 10 of U460C is also transmitted through VR475, reverse biasing CR410 and disabling the divide by 8 signal prescaling circuitry. The 50 kilohertz signal is then processed by Q410 and Q420 with the positive-going edge of the signal at pin 1 of U425A significant to counting operation only during the time that pin 2 of U425A is HI (gating signal).

For 50 kilohertz counting, the  $10^{-1}$  decimal source point (anode of VR475) is always HI and the 2 microsecond clock signal is frequency divided by 1000 by Gate Time Clock Dividers U480, U481, and U482. Positive NAND gates U475A, U475B and U475D are locked out due to the LO levels set at the output of inverting input AND gates

U450B, U450C and U450D. With pins 10, 9 and 13 of U485B set to a HI level by the Q terminals of U445A and U445B, a 2000 microsecond clock signal is gated through U485B and U485A to pin 1 of U490.

(Refer to Fig. 5-1 for waveform time relationships involved with the State Generator circuits.) If the leveling circuitry is operating properly, a HI level is set on pins 6 and 7 of U490, allowing it to count. U490 frequency divides by 5 from pin 1 to 11 and frequency divides by 2 from pin 14 to pin 12. This frequency division produces a signal with a period of 10 milliseconds at pin 11 and a square wave with a period of 20 milliseconds at pin 12. The square wave signal (50% duty cycle) on pin 12 is the reference waveform for the counting period, display time and counter reset time.

The square-wave signal on pin 12 of U490 is applied through inverter U432A to pin 2 of positive NAND gate U425A with the positive half of the square wave acting as a gating signal that allows the counters to count for 50% of the total period (10 milliseconds for 50 kilohertz counting).

If the sine wave output amplitude from the SG 503 is not leveled, pins 6 and 7 of U490 goes negative at approximately a 2 hertz rate. The result is a blinking front-panel display because U490 is cleared to zero. Zeros supplied to pin 10 of the Display Drivers (U510, U520, and U530) causes them to blank the display for about 0.25 second.

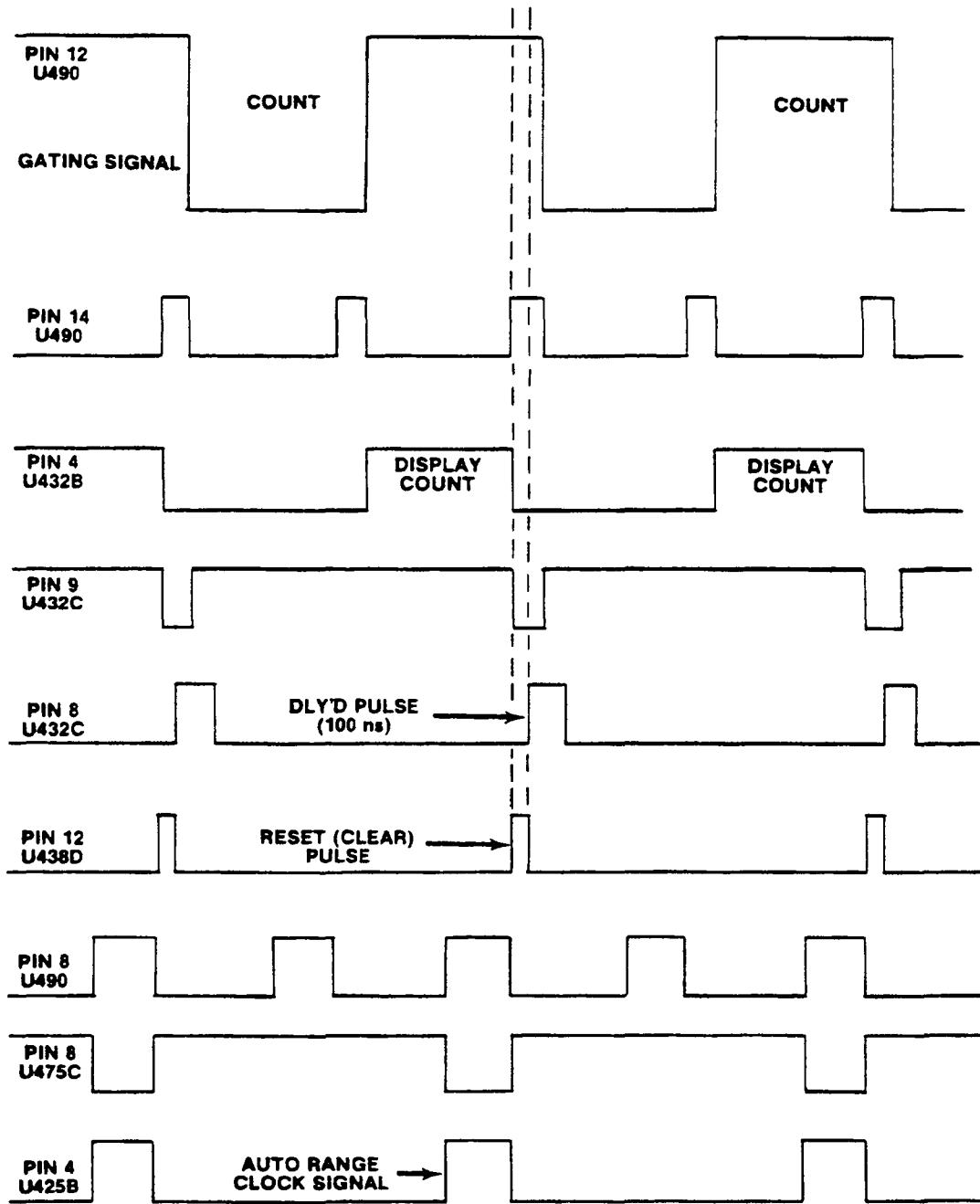
The Auto Ranging circuits operate when S100-2 is open to change the output levels of U455C, U450B, U450C, and U450D at the proper time to set the decimal point in its proper location and to select the proper gate time intervals for the counting, display, and reset process.

Only one decimal point shift (from .999 megahertz to 1.00 megahertz) will be discussed as the operation is similar for other decimal point shifts. Overflow Detector U440A detects when it is necessary to shift the decimal point as frequency is increased, while U440B detects when it is necessary to shift the decimal point as frequency is decreased.

U445A and U445B operate as a 4-bit shift register (memory). Exclusive-OR gates U438A and U438B act as control devices to determine whether the register shifts right or left to produce the proper output data, thereby speeding up the Auto Ranging process.

Frequencies from .250 megahertz up to and including .999 megahertz do not cause the output data from U445A and U445B to change state. Consequently, the output level of U455C remains LO for these frequencies and the gating signal at pin 12 of U490 is the same as for 50 kilohertz counting.

## Circuit Description—SG 503



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Fig. 5-1. State Generator waveform time relationship.

When U436 and U437 contain binary data equivalent to decimal 99, the next input count to U435 causes pin 11 of U436 to go negative and triggers U440B to force pin 9 of U440B to a HI (= 1). When U435, U436 and U437 contain binary data equivalent to decimal 999, the next input count to U435 causes pin 11 of U437 to go negative and triggers U440A to force pin 13 of U440A to a LO (= 0). At the transition point from .999 megahertz to 1.00 megahertz U440B and U440A have been triggered and set.

A HI on pin 9 of U440B along with a HI on pin 6 of U445A and a LO on pin 9 of U445B results (through the action of U438A and U438B) in a HI (= 1) being transferred to the D input terminal (pin 2) of U445A and a LO (= 0) to the D input terminal (pin 12) of U445B. Pin 5 of U425B (Auto Range Clock Enable) has also been set to a HI through the action of U425D.

On the next Auto Range Clock signal from U450A, pin 6 of U425B goes LO and this negative transition triggers both U445A and U445B, transferring the data from the D terminals to the Q terminals. After data transfer, pin 6 of U445A will be LO (= 0) and pin 5 will be a HI (= 1); pin 9 of U445B will be a LO (= 0) and pin 8 will be a HI (= 1). These logic levels are decoded by U455C, U450B, U450C and U450D to shift the decimal point one place to the right, select the proper gating signal from the Gate Time Clock Dividers, and enables the signal prescaling circuitry.

For the logic levels given, the 2 microsecond clock signal is locked out from U460C and the 16 microsecond clock signal is gated through to the output of U455D. After frequency division by 100, a 1600 microsecond signal is gated through U475D and U485A to appear at pin 1 of U490. U475D is enabled because the output of U450B is HI and all other decoding gate output levels are LO. Although new gate time intervals are selected for Auto Ranging, the waveform time relationships remain the same as illustrated in Fig. 5-1.

Due to the change from a HI to a LO on pin 6 of U445A, the output level of U438B goes HI during the count interval. The output of U440A is now at a HI level because it was reset by the clear pulse and not triggered during count time. This results in a LO level at pin 5 of U425B, which locks out the Auto Ranging clock signal, preventing U445A and U445B from being triggered. U445A and U445B will not change their output data unless it again becomes necessary to change the decimal point location.

For the next decimal point shift (for example, from 9.99 megahertz to 10.0 megahertz), the same sequence of events occur with Exclusive-OR gates U438A and U438B sensing the previous output data of the 4-bit register. The proper binary code is then set at the outputs of U445A and U445B (when triggered by the Auto Ranging clock signal) to shift the decimal point one more place to the right.

U475A is enabled by the output level of U450C going HI and a 160 microsecond clock signal is gated through to pin 1 of U490.

## Power Supplies

### 3

The -22 V supply is referenced to ground with a reference voltage point established on pin 5 of voltage regulator U695 by the voltage divider action of R697 and R698. The voltage divider composed of R693, R694 and R695 establishes a voltage sensing point at pin 4 of U695. U695 regulates its output by comparing the voltage level on pin 4 with an internal reference. R694 (-22 V ADJ) sets the quiescent level at the base of Q685 which, in turn, sets the quiescent current level through the PNP series-pass transistor located in the power module mainframe. If the -22 volt output level starts to go positive, this change is sensed at pin 4 of U695 and pin 9 of U695 goes negative. This voltage change is transmitted through emitter-follower Q685 to the base of the PNP series-pass transistor, causing it to increase conduction through the load and return the output level to -22 volts. Q690 operates as a load current limiter with R680 acting as the current sensing element.

The +5 V supply is referenced to the -22 V supply with the reference voltage point established at pin 3 of U610 by voltage divider R610-R612. This reference level is about -5 volts. In a quiescent state, the voltage on pin 2 of U610 is also about -5 volts. If the +5 volt output level goes more positive, the voltage change appears at pin 2 of U610 which amplifies and inverts the signal to apply a negative change at the base of Q610. VR610 operates only as a dc level shifter. A positive voltage change at the base of Q600 causes the base of the NPN series-pass transistor located in the power module mainframe to decrease conduction through the load, returning the output level to +5 volts. Q620 is for current over-load protection. If the load current exceeds about 1.8 amps, R624 acts as a current sensing element to turn on Q620. If Q620 turns on, its collector goes positive, turning on CR612. A positive voltage change at pin 2 of U610 turns off the NPN series-pass transistor. The non-polarized connections for C620 and C619 integrate T<sup>2</sup>L spikes which may occur on the +5 volt level, preventing them from turning on Q620 and shutting down the power supply during current surges.

CR640 prevents the +5 V supply from going more negative than about -0.7 volt if F620 opens. Q640 protects the load from over-voltage conditions that could occur if the NPN series-pass transistor shorted. If the output level exceeds about 6.2 volts, VR640 conducts, developing a SCR gating signal across R640. This gating signal turns on Q640, clamping the output level to about +0.2 volt.

# OPTIONS

## OPTION 02 INTERFACE NOTES

### General

Pin 26A is the only rear connector pin (from 14 through 28) that is factory wired to internal circuitry. All other inputs and outputs through the rear interface must be user wired when it is desired to interface the SG 503 in a specialized Option 02 Power Module system.

SINE OUT (contact 28A) and GND for SINE OUT (contacts 27A and 28B).

### NOTE

*Flatness specifications for the SG 503 are invalid when the output signal has been transferred from the front panel to the rear interface, because the insertion loss between the output and the 50 Ω load will be different from that of the precision coaxial cable (Tektronix Part Number 012-0482-00) provided with the instrument.*

To transfer the output signal from the front panel to the rear interface, perform the following steps:

1. Remove the short blue cable (with ferrite bead) between the bnc output connector and the Attenuator-Output Buffer Circuit Board (located on the "B" side of the instrument). When this short blue cable is removed, be certain that it is stored in a known location and not misplaced or lost. This cable is mandatory for repairing or recalibrating the instrument.
2. Locate the four holes near pins 27 and 28 on the "B" side of the Main Circuit Board. Install a pin connector socket (Tektronix Part Number 136-0252-01) in the center hole labeled SINE OUT and solder it in place from the "A" side of the board so that connection is made to pin 28A. Install a 3-prong, coaxial-cable receptacle (Tektronix Part Number 131-1003-00) in the remaining three holes and solder it in place from the "A" side of the board so that ground connections are made to pins 27A and 28B.

3. Install a 9.4 inch miniature coaxial cable (blue), with connectors on each end (Tektronix Part Number 175-1554-00), from the output connector on the Attenuator-Output Buffer Circuit Board to the newly installed receptacle for SINE OUT. Dress the blue coaxial cable underneath the lower rear corner of the Attenuator-Output Buffer Circuit Board. Be certain that the center conductor of the blue coaxial cable mates with the center socket pins at each end.

4. Place a tag to the left of the OUTPUT connector on the front panel, labeled: OUTPUT AT REAR CONNECTOR PIN 28A.

### NOTE

*To prevent ground loop currents, GND for SINE OUT (pins 27A and 28B) should not be tied to any other grounds at the rear interface.*

### REMOTE Amplitude Controls (Contacts 21A and 22B)

To transfer the OUTPUT AMPLITUDE control from the front panel to the rear interface, perform the following steps:

1. On the "A" side of the Main Circuit Board, immediately behind the front panel, locate the unused holes labeled REMOTE. Install a pin connector socket (Tektronix Part Number 136-0252-01) in the center hole, and a 3-prong, coaxial-cable receptacle (Tektronix Part Number 131-1003-00) in the remaining holes and solder in place from the "B" side of the instrument.
2. Locate the unused holes labeled REMOTE near rear connector pins 21 and 22 ("A" side, Main Circuit Board). Install a pin connector socket (Tektronix Part Number 136-0252-01) in the center hole, and a 3-prong, coaxial-cable receptacle (Tektronix Part Number 131-1003-00) in the remaining three holes and solder in place from the "B" side of the instrument. Be certain that the center pin socket is connected to pin 21B and that the 3-prong receptacle is providing a ground connection to pin 22B.
3. On the "B" side of the Main Circuit Board, locate W260 (Terminal Link). W260 looks like a solid white dummy resistor and is located immediately behind the front panel. Unsolder both ends of W260 and without bending the leads, move it horizontally to the two unused holes about one-fourth inch closer to the front panel. Resolder W260 (from the "B" side) into the new holes.
4. On the "B" side of the Main Circuit Board add (solder) a resistor; 51 kΩ, 1/4 W, 5%, (Tektronix Part Number 315-0513-00) between the circuit board run connected to pin 21B and the unused hole labeled GND.
5. Install a 12.4 inch miniature coaxial cable (white), with connectors on each end (Tektronix Part Number 175-1555-00), between the two newly installed REMOTE receptacles, making sure that the center conductor mates with the center pin sockets at each end. Dress the white

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coaxial cable between the Coil Circuit Board and the bottom side rail. Do not dress the white coaxial cable along the top side rail. In some instruments, this operation may require loosening screws for the Main Circuit Board and side mount bracket (used as a heat sink); if so, remember to retighten all loosened screws.

6. Check with an ohmmeter to verify that a complete circuit (zero resistance) exists between rear connector pin 21B and pin 4 of P230. P230 is the flat blue plug attached to the Attenuator-Output Buffer Circuit Board on the "B" side of the instrument. Pin 4 is connected to a yellow coded wire. Refer to schematic number 1 in the SG 503 instruction manual.

7. Place a tag above the OUTPUT AMPLITUDE control on the front panel, labeled: OUTPUT AMPLITUDE REMOTE CONTROLLED AT REAR CONNECTOR PIN 21B.

**NOTE**

*A dc voltage of approximately -1 V to -11 V applied to pin 21B (after modification) will control the output amplitude over the range from 0.5 V to 5.5 V (peak-to-peak). GND for REMOTE (pin 22B) should not be tied to any other ground at the rear interface.*

**BCD Outputs (Contacts 14A through 26A)**

The SG 503 can be user wired to provide this type of output data to the rear interface. Each decimal digit displayed on the front panel has its own 4-bit BCD data available from the counters in the form of unused holes (solder pads) on the "A" side of the Main Circuit Board (between the upper two rows of IC's). Each set of four holes are labeled 1A through 1D for the Most Significant Digit (MSD), 2A through 2D for the Middle Digit (MD), and

3A through 3D for the Least Significant Digit (LSD). The rear connector pins (14A through 25A) are also labeled in a one-to-one correspondence with 1A through 3D. It is only necessary to use flat ribbon-wire cable (Tektronix Part Number 175-0827-00) of the proper length to interconnect the counter BDC outputs to the proper solder pads (holes) for the rear connector pins. Solder all connections from the "B" side of the instrument.

The BCD output data uses positive logic and is TTL compatible. The 4-bit data lines have a fanout of 8. External decoding circuitry depends on the desired application. Pin 26A provides an internal ground for the BCD output data.

**Decimal Data Output (Contacts 27B, 26B, and 23B)**

To transfer Decimal Data to the rear interface, perform the following steps:

1. On the "A" side of the Main Circuit Board, just below U480, locate three unused holes (solder pads) labeled 10', 10', and 10'.
2. Use flat ribbon-wire cable (Tektronix Part Number 175-0827-00) to interconnect these pads in a one-to-one correspondence with rear connector solder pads labeled 10', 10', and 10' (just to the left of CR680 and close to rear connector pins 25 and 26). Solder the wire connections to the "B" side of the Main Circuit Board.

Each Decimal Data line will drive only one TTL gate without external buffering. A Decimal Data line goes to an active-high state when the corresponding front-panel decimal point is turned on by the auto-ranging circuitry.

# 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 Code     |
|-----------|--|---|---------------------------|
| 00853     | SANGAMO WESTON INC<br>SANGAMO CAPACITOR DIV                                  | SANGAMO RD<br>P O BOX 128                           | PICKENS SC 29671          |
| 01121     | ALLEN-BRADLEY CO   | 1201 SOUTH 2ND ST                                   | MILWAUKEE WI 53204        |
| 01295     | TEXAS INSTRUMENTS INC<br>SEMICONDUCTOR GROUP                                 | 13500 N CENTRAL EXPRESSWAY<br>P O BOX 225012 M/S 49 | DALLAS TX 75265           |
| 02111     | SPECTROL ELECTRONICS CORP<br>SUB OF CARRIER CORP                             | 17070 E GALE AVE<br>P O BOX 1220                    | CITY OF INDUSTRY CA 91749 |
| 02735     | RCA CORP<br>SOLID STATE DIVISION   | ROUTE 202   | SOMERVILLE NJ 08876       |
| 03508     | GENERAL ELECTRIC CO<br>SEMI-CONDUCTOR PRODUCTS DEPT                          | W GENESSEE ST                                       | AUBURN NY 13021           |
| 04222     | AVX CERAMICS DIV OF AVX CORP   | 19TH AVE SOUTH<br>P O BOX 867                       | MYRTLE BEACH SC 29577     |
| 04713     | MOTOROLA INC<br>SEMICONDUCTOR GROUP  | 5005 E McDONELL RD                                  | PHOENIX AZ 85008          |
| 05397     | UNION CARBIDE CORP MATERIALS SYSTEMS DIV                                     | 11901 MADISON AVE                                   | CLEVELAND OH 44101        |
| 05828     | GENERAL INSTRUMENT CORP<br>GOVERNMENT SYSTEMS DIV                            | 600 W JOHN ST                                       | HICKSVILLE NY 11802       |
| 07263     | FAIRCHILD CAMERA AND INSTRUMENT CORP<br>SEMICONDUCTOR DIV                    | 464 ELLIS ST  | MOUNTAIN VIEW CA 94042    |
| 07716     | TRM INC<br>TRM ELECTRONICS COMPONENTS<br>TRM IRC FIXED RESISTORS/BURLINGTON  | 2850 MT PLEASANT AVE                                | BURLINGTON IA 52601       |
| 08806     | GENERAL ELECTRIC CO<br>MINIATURE LAMP PRODUCTS DEPT                          | NELA PK   | CLEVELAND OH 44112        |
| 13454     | CRYSTEK CRYSTALS CORP  | 1000 CRYSTAL DR                                     | FT MYERS FL 33901         |
| 14433     | ITT SEMICONDUCTORS DIV   | 2830 S FAIRVIEW ST                                  | WEST PALM BEACH FL        |
| 14552     | MICRO/SEMICONDUCTOR CORP   | 811 E ARQUES  | SANTA ANA CA 92704        |
| 18324     | SIGNETICS CORP   | P O BOX 760   | SUNNYVALE CA 94086        |
| 19701     | MEPCO/ELECTRA INC<br>A NORTH AMERICAN PHILIPS CO                             |   | MINERAL WELLS TX 76067    |
| 31718     | FAIRCHILD CAMERA AND INSTRUMENT CORP<br>OPTOELECTRONICS DIV                  | 4001 MIRANDA AVE                                    | PALO ALTO CA 94304        |
| 32159     | WEST-CAP ARIZONA   | 2201 E ELVIRA ROAD                                  | TUCSON AZ 85706           |
| 32997     | BOURNS INC<br>TRIMPOT DIV  | 1200 COLUMBIA AVE                                   | RIVERSIDE CA 92507        |
| 50434     | HEWLETT-PACKARD CO OPTOELECTRONICS DIV                                       | 640 PAGE MILL RD                                    | PALO ALTO CA 94304        |
| 51642     | CENTRE ENGINEERING INC   | 2820 E COLLEGE AVE                                  | STATE COLLEGE PA 16801    |
| 52648     | PLESSEY INC<br>PLESSEY OPTOELECTRONICS AND<br>MICROWAVE                      | 1641 KAISER AVE                                     | IRVINE CA 92714           |
| 52763     | STETTNER ELECTRONICS, INC  | 6135 AIRWAYS BLVD<br>P O BOX 21947                  | CHATTANOOGA TN 37421      |
| 54583     | TDK ELECTRONICS CORP   | 755 EASTGATE BLVD                                   | GARDEN CITY NY 11530      |
| 56289     | SPRAGUE ELECTRIC CO  | 87 MARSHALL ST                                      | NORTH ADAMS MA 01247      |
| 57668     | ROHM CORP  | 16931 WILLIKEN AVE                                  | IRVINE CA 92713           |
| 58361     | GENERAL INSTRUMENT CORP<br>OPTOELECTRONICS DIV                               | 3400 HILLVIEW AVE                                   | PALO ALTO CA 94304        |
| 59660     | TUSONIX INC  | 2155 N FORBES BLVD                                  | TUCSON, ARIZONA 85705     |
| 71400     | BUSSMANN MFG CO<br>MCGRAN EDISON CO  | 114 OLD STATE RD<br>P O BOX 14460                   | ST LOUIS MO 63178         |
| 73138     | BECKMAN INSTRUMENTS INC HELIPOT DIV  | 2500 HARBOR BLVD                                    | FULLERTON CA 92634        |
| 75042     | TRM INC<br>TRM ELECTRONIC COMPONENTS<br>IRC FIXED RESISTORS PHILADELPHIA DIV | 401 N BROAD ST                                      | PHILADELPHIA PA 19108     |
| 76493     | BELL INDUSTRIES INC MILLER J M DIV   | 19070 REYES AVE<br>P O BOX 5825                     | COMPTON CA 90224          |
| 78488     | STACKPOLE CARBON CO  | 4900 S W GRIFFITH DR                                | ST MARYS PA 15857         |
| 80009     | TEKTRONIX INC  | P O BOX 500   | BEAVERTON OR 97077        |
| 80031     | MEPCO/ELECTRA INC  | 22 COLUMBIA RD                                      | MORRISTOWN NJ 07960       |
| 91637     | DALE ELECTRONICS INC   | P O BOX 609   | COLUMBUS NE 68601         |
| K0099     | JACKSON BROTHERS (LONDON) LTD  | 258 BROADWAY  | NEW YORK NY 10007         |
| TK1345    | ZMAN AND ASSOCIATES  | 7633 S 180TH  | KENT WA 98032             |
| TK2042    | ZMAN & ASSOCIATES  | 7633 SO. 180TH                                      | KENT, WA 98032            |

| Component No. | Tektronix Part No. | Serial/Assembly No. | Effective | Dscont | Name & Description                                       | Mfr. Code | Mfr. Part No.    |
|---------------|--------------------|---------------------|-----------|--------|--|-----------|------------------|
| A1            | 672-0447-00        | 8010100             | 8069999   |        | CIRCUIT BD ASSY:BAND SM                                  | 80009     | 672-0447-00      |
| A1            | 672-0447-01        | 8070000             |           |        | CIRCUIT BD ASSY:BAND SM                                  | 80009     | 672-0447-01      |
| A2            | 670-2983-02        |                     |           |        | CIRCUIT BD ASSY:COIL                                     | 80009     | 670-2983-02      |
| A3            | 670-3073-00        | 8010100             | 8029999   |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-00      |
| A3            | 670-3073-01        | 8030000             | 8039999   |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-01      |
| A3            | 670-3073-02        | 8040000             | 8063388   |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-02      |
| A3            | 670-3073-03        | 8063389             |           |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-03      |
| A4            | 670-2954-00        | 8010100             | 8069999   |        | CIRCUIT BD ASSY:DISP                                     | 80009     | 670-2954-00      |
| A4            | 670-2954-02        | 8070000             |           |        | CIRCUIT BD ASSY:DISPLAY                                  | 80009     | 670-2954-02      |
| A5            | 670-5045-00        | 8060000             |           |        | CIRCUIT BD ASSY:DUAL HIGH FREQ DIFF AMPL                 | 80009     | 670-5045-00      |
| A1            | 672-0447-00        | 8010100             | 8069999   |        | CIRCUIT BD ASSY:BAND SM                                  | 80009     | 672-0447-00      |
| A1            | 672-0447-01        | 8070000             |           |        | CIRCUIT BD ASSY:BAND SM                                  | 80009     | 672-0447-01      |
| A2            | 670-2983-02        |                     |           |        | CIRCUIT BD ASSY:COIL                                     | 80009     | 670-2983-02      |
| A3            | 670-3073-00        | 8010100             | 8029999   |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-00      |
| A3            | 670-3073-01        | 8030000             | 8039999   |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-01      |
| A3            | 670-3073-02        | 8040000             | 8063388   |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-02      |
| A3            | 670-3073-03        | 8063389             |           |        | CIRCUIT BD ASSY:ATTENUATOR                               | 80009     | 670-3073-03      |
| A4            | 670-2954-00        | 8010100             | 8069999   |        | CIRCUIT BD ASSY:DISP                                     | 80009     | 670-2954-00      |
| A4            | 670-2954-02        | 8070000             |           |        | CIRCUIT BD ASSY:DISPLAY                                  | 80009     | 670-2954-02      |
| A5            | 670-5045-00        | 8060000             |           |        | CIRCUIT BD ASSY:DUAL HIGH FREQ DIFF AMPL                 | 80009     | 670-5045-00      |
| C100          | 281-0210-00        | 8010100             | 8051799   |        | CAP,VAR,AIR DI:3 SECT 5-60PF,6-80PF,10-40 U F,200V       | K0099     | 5318/3/LH/MOD    |
| C100          | 281-0210-01        | 8051800             |           |        | CAP,VAR,AIR DI:3 SECT,5-60,6-80,& 10-410PF               | K0099     | 5318/3/LH/MOD    |
| C102          | 283-0639-00        |                     |           |        | CAP,FXD,MICA DI:56PF,1%,100V                             | 00853     | D155E560F0       |
| C104          | 283-0353-00        | 8010100             | 8029999   |        | CAP,FXD,CER DI:0.1UF,10%,50V                             | 04222     | 12105C104KA2075  |
| C106          | 283-0177-00        |                     |           |        | CAP,FXD,CER DI:1UF,+80-20%,25V                           | 04222     | SR302E105ZAATR   |
| C112          | 283-0597-00        |                     |           |        | CAP,FXD,MICA DI:470PF,10%,300V                           | 00853     | 0155F471K0       |
| C118          | 283-0615-00        | 8010100             | 8064289   |        | CAP,FXD,MICA DI:33PF,5%,500V                             | 00853     | D155E330J0       |
| C118          | 283-0615-00        | 8064290             |           |        | CAP,FXD,MICA DI:33PF,5%,500V<br>(NOMINAL VALUE,SELECTED) | 00853     | D155E330J0       |
| C124          | 283-0695-00        |                     |           |        | CAP,FXD,MICA DI:4440PF,1%,300V                           | 00853     | D195F4441F0      |
| C130          | 283-0353-00        |                     |           |        | CAP,FXD,CER DI:0.1UF,10%,50V                             | 04222     | 12105C104KA2075  |
| C134          | 283-0177-00        |                     |           |        | CAP,FXD,CER DI:1UF,+80-20%,25V                           | 04222     | SR302E105ZAATR   |
| C140          | 283-0353-00        |                     |           |        | CAP,FXD,CER DI:0.1UF,10%,50V                             | 04222     | 12105C104KA2075  |
| C145          | 283-0064-00        | 8010100             | 8029999   |        | CAP,FXD,CER DI:0.05UF,+80-20%,50V                        | 59660     | 5855-526Y5U0053Z |
| C146          | 290-0536-00        | 8010100             | 8029999   |        | CAP,FXD,ELCLTLT:10UF,20%,25V TANTALUM                    | 05397     | T368B106M025AS   |
| C150          | 283-0299-00        |                     |           |        | CAP,FXD,CER DI:51PF,5%,500V                              | 51642     | 200-500-NPO-510J |
| C154          | 283-0299-00        |                     |           |        | CAP,FXD,CER DI:51PF,5%,500V                              | 51642     | 200-500-NPO-510J |
| C170          | 283-0198-00        |                     |           |        | CAP,FXD,CER DI:0.22UF,20%,50V                            | 05397     | C330C224M5U1CA   |
| C172          | 290-0534-00        |                     |           |        | CAP,FXD,ELCLTLT:1UF,20%,35V                              | 05397     | T368A105M035AZ   |
| C180          | 290-0534-00        |                     |           |        | CAP,FXD,ELCLTLT:1UF,20%,35V                              | 05397     | T368A105M035AZ   |
| C184          | 283-0198-00        |                     |           |        | CAP,FXD,CER DI:0.22UF,20%,50V                            | 05397     | C330C224M5U1CA   |
| C190          | 283-0198-00        |                     |           |        | CAP,FXD,CER DI:0.22UF,20%,50V                            | 05397     | C330C224M5U1CA   |
| C192          | 281-0615-00        | 8051230             |           |        | CAP,FXD,CER DI:3.9PF,+-0.5PF,200V                        | 52763     | 2RDPLZ007 3P900C |
| C194          | 283-0204-00        | 8063389             |           |        | CAP,FXD,CER DI:0.01UF,20%,50V                            | 04222     | SR155E103MAA     |
| C200          | 283-0198-00        |                     |           |        | CAP,FXD,CER DI:0.22UF,20%,50V                            | 05397     | C330C224M5U1CA   |
| C204          | 281-0730-00        |                     |           |        | CAP,FXD,CER DI:10.8PF,1%,500V                            | 52763     | 2RDPLZ007 10P8LC |
| C208          | 281-0730-00        |                     |           |        | CAP,FXD,CER DI:10.8PF,1%,500V                            | 52763     | 2RDPLZ007 10P8LC |
| C212          | 281-0604-00        |                     |           |        | CAP,FXD,CER DI:2.2PF,+-0.25PF,500V                       | 52763     | 2RDPLZ007 2P20CC |
| C214          | 283-0156-00        | 8040000             |           |        | CAP,FXD,CER DI:0.001 UF,+80-20%,200V                     | 05397     | C315C102Z2R5CA   |
| C215          | 283-0156-00        | 8040000             |           |        | CAP,FXD,CER DI:0.001 UF,+80-20%,200V                     | 05397     | C315C102Z2R5CA   |
| C216          | 281-0661-00        |                     |           |        | CAP,FXD,CER DI:0.8PF,+-0.1PF,500V                        | 52763     | 2RDPLZ007 0P80BC |
| C218          | 283-0156-00        | 8010100             | 8039999   |        | CAP,FXD,CER DI:0.001 UF,+80-20%,200V                     | 05397     | C315C102Z2R5CA   |
| C230          | 283-0111-00        |                     |           |        | CAP,FXD,CER DI:0.1UF,20%,50V                             | 05397     | C330C104M5U1CA   |
| C232          | 283-0204-00        |                     |           |        | CAP,FXD,CER DI:0.01UF,20%,50V                            | 04222     | SR155E103MAA     |
| C260          | 283-0111-00        |                     |           |        | CAP,FXD,CER DI:0.1UF,20%,50V                             | 05397     | C330C104M5U1CA   |
| C274          | 283-0111-00        |                     |           |        | CAP,FXD,CER DI:0.1UF,20%,50V                             | 05397     | C330C104M5U1CA   |

## Scan by Zenith

Replaceable Electrical Parts - SG 503

| Component No. | Tektronix Part No. | Serial/Assembly No. | Effective | Dscont | Name & Description                      | Mfr. Code | Mfr. Part No.    |
|---------------|--------------------|---------------------|-----------|--------|---|-----------|------------------|
| C278          | 283-0111-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C280          | 283-0198-00        |                     |           |        | CAP, FXD,CER DI:0.22UF,20%,50V          | 05397     | C330C224M5U1CA   |
| C282          | 283-0156-00        |                     |           |        | CAP, FXD,CER DI:0.001 UF,+80-20%,200V   | 05397     | C315C102Z2R5CA   |
| C290          | 290-0535-00        |                     |           |        | CAP, FXD,ELCTLT:33UF,20%,10V TANTALUM   | 56289     | 1960336X0010KA1  |
| C296          | 290-0535-00        |                     |           |        | CAP, FXD,ELCTLT:33UF,20%,10V TANTALUM   | 56289     | 1960336X0010KA1  |
| C322          | 283-0111-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C323          | 283-0299-00        | 8060000             |           |        | CAP, FXD,CER DI:51PF,5%,50V             | 51642     | 200-500-NP0-510J |
| C324          | 283-0111-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C328          | 283-0111-00        | 8010100             | 8059999   |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C335          | 283-0204-00        | 8010100             | 8059999   |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C336          | 283-0204-00        | 8060000             |           |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C340          | 283-0249-00        | 8060000             |           |        | CAP, FXD,CER DI:0.068PF,10%,50V         | 04222     | SR305C683KAA     |
| C342          | 283-0204-00        | 8010100             | 8059999   |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C345          | 283-0204-00        | 8010100             | 8059999   |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C350          | 283-0249-00        | 8060000             |           |        | CAP, FXD,CER DI:0.068PF,10%,50V         | 04222     | SR305C683KAA     |
| C358          | 283-0175-00        |                     |           |        | CAP, FXD,CER DI:10PF,5%,200V            | 05397     | C312C100D25CA 8  |
| C360          | 283-0197-00        | 8010100             | 8059999   |        | CAP, FXD,CER DI:470PF,5%,50V            | 04222     | SR205A471JAA     |
| C365          | 283-0204-00        |                     |           |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C390          | 283-0353-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,10%,50V           | 04222     | 12105C104KA2075  |
| C422          | 281-0629-00        |                     |           |        | CAP, FXD,CER DI:33PF,5%,600V            | 52763     | 2RDPLZ007 33PDJC |
| C435          | 290-0536-00        |                     |           |        | CAP, FXD,ELCTLT:10UF,20%,25V TANTALUM   | 05397     | T368B106M025AS   |
| C436          | 290-0536-00        |                     |           |        | CAP, FXD,ELCTLT:10UF,20%,25V TANTALUM   | 05397     | T368B106M025AS   |
| C445          | 283-0156-00        |                     |           |        | CAP, FXD,CER DI:0.001 UF,+80-20%,200V   | 05397     | C315C102Z2R5CA   |
| C448          | 290-0534-00        |                     |           |        | CAP, FXD,ELCTLT:1UF,20%,35V             | 05397     | T368A105M035A2   |
| C462          | 281-0511-00        |                     |           |        | CAP, FXD,CER DI:22PF,+/-2.2PF,500V      | 52763     | 2RDPLZ007 22P0KC |
| C465          | 281-0504-00        |                     |           |        | CAP, FXD,CER DI:10PF,+/-1PF,500V        | 54583     | TCC20CH2H100FYA  |
| C480          | 290-0531-00        |                     |           |        | CAP, FXD,ELCTLT:100UF,20%,10V           | 05397     | T368C107M010AS   |
| C481          | 290-0536-00        |                     |           |        | CAP, FXD,ELCTLT:10UF,20%,25V TANTALUM   | 05397     | T368B106M025AS   |
| C490          | 283-0111-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C495          | 281-0536-00        |                     |           |        | CAP, FXD,CER DI:1000PF,10%,500V         | 52763     | 2RDPLZ007 1N00M0 |
| C540          | 290-0534-00        |                     |           |        | CAP, FXD,ELCTLT:1UF,20%,35V             | 05397     | T368A105M035AZ   |
| C542          | 283-0156-00        |                     |           |        | CAP, FXD,CER DI:0.001 UF,+80-20%,200V   | 05397     | C315C102Z2R5CA   |
| C600          | 283-0111-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C610          | 281-0523-00        | 8010100             | 8051229   |        | CAP, FXD,CER DI:100PF,20%,350V          | 52763     | 2RDPLZ007 100PMU |
| C610          | 281-0204-00        | 8051230             | 8066110   |        | CAP, VAR, PLASTIC:2-22PF,100V           | 80031     | 2807C00222MJ02   |
| C618          | 290-0536-00        |                     |           |        | CAP, FXD,ELCTLT:10UF,20%,25V TANTALUM   | 05397     | T368B106M025AS   |
| C619          | 290-0536-00        |                     |           |        | CAP, FXD,ELCTLT:10UF,20%,25V TANTALUM   | 05397     | T368B106M025AS   |
| C620          | 290-0536-00        |                     |           |        | CAP, FXD,ELCTLT:10UF,20%,25V TANTALUM   | 05397     | T368B106M025AS   |
| C630          | 290-0531-00        |                     |           |        | CAP, FXD,ELCTLT:100UF,20%,10V           | 05397     | T368C107M010AS   |
| C635          | 283-0154-00        | 8030000             |           |        | CAP, FXD,CER DI:22PF,5%,50V             | 04222     | SR155A220JAA     |
| C640          | 290-0531-00        |                     |           |        | CAP, FXD,ELCTLT:100UF,20%,10V           | 05397     | T368C107M010AS   |
| C642          | 290-0531-00        |                     |           |        | CAP, FXD,ELCTLT:100UF,20%,10V           | 05397     | T368C107M010AS   |
| C650          | 283-0177-00        |                     |           |        | CAP, FXD,CER DI:1UF,+80-20%,25V         | 04222     | SR302E105ZAATR   |
| C655          | 283-0177-00        |                     |           |        | CAP, FXD,CER DI:1UF,+80-20%,25V         | 04222     | SR302E105ZAATR   |
| C660          | 283-0204-00        |                     |           |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C662          | 283-0111-00        |                     |           |        | CAP, FXD,CER DI:0.1UF,20%,50V           | 05397     | C330C104M5U1CA   |
| C665          | 290-0559-00        |                     |           |        | CAP, FXD,ELCTLT:22UF,20%,35V            | 05397     | T368C226M035AS   |
| C675          | 290-0559-00        |                     |           |        | CAP, FXD,ELCTLT:22UF,20%,35V            | 05397     | T368C226M035AS   |
| C677          | 283-0204-00        |                     |           |        | CAP, FXD,CER DI:0.01UF,20%,50V          | 04222     | SR155E103MAA     |
| C680          | 290-0559-00        |                     |           |        | CAP, FXD,ELCTLT:22UF,20%,35V            | 05397     | T368C226M035AS   |
| C694          | 281-0523-00        |                     |           |        | CAP, FXD,CER DI:100PF,20%,350V          | 52763     | 2RDPLZ007 100PMU |
| C697          | 290-0517-00        |                     |           |        | CAP, FXD,ELCTLT:6.8UF,20%,35V           | 05397     | T368B685M035AZ   |
| CR130         | 152-0141-02        |                     |           |        | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR200         | 152-0322-00        |                     |           |        | SEMICOND DVC,DI:SCHOTTKY BARRIER,SI,15V | 50434     | 5082-2672        |
| CR202         | 152-0322-00        |                     |           |        | SEMICOND DVC,DI:SCHOTTKY BARRIER,SI,15V | 50434     | 5082-2672        |
| CR216         | 152-0322-00        |                     |           |        | SEMICOND DVC,DI:SCHOTTKY BARRIER,SI,15V | 50434     | 5082-2672        |
| CR218         | 152-0322-00        |                     |           |        | SEMICOND DVC,DI:SCHOTTKY BARRIER,SI,15V | 50434     | 5082-2672        |
| CR274         | 152-0141-02        |                     |           |        | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR276         | 152-0246-00        |                     |           |        | SEMICOND DVC,DI:SM,SI,40V,200MA,DO-7    | 14433     | MG1537TK         |

| Component No. | Tektronix Part No. | Serial/Assembly No. | Effective | Discont | Name & Description                      | Mfr. Code | Mfr. Part No.    |
|---------------|--------------------|---------------------|-----------|---------|---|-----------|------------------|
| CR278         | 152-0141-02        |                     |           |         | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR280         | 152-0141-02        |                     |           |         | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR410         | 152-0322-00        |                     |           |         | SEMICOND DVC,DI:SCHOTTKY BARRIER,SI,15V | 50434     | 5082-2672        |
| CR600         | 152-0141-02        |                     |           |         | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR612         | 152-0141-02        |                     |           |         | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR640         | 152-0066-00        |                     |           |         | SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41   | 05828     | GP10G-020        |
| CR680         | 152-0066-00        |                     |           |         | SEMICOND DVC,DI:RECT,SI,400V,1A,DO-41   | 05828     | GP10G-020        |
| CR694         | 152-0141-02        |                     |           |         | SEMICOND DVC,DI:SM,SI,30V,150MA,30V     | 03508     | DA2527 (1N4152)  |
| CR697         | 152-0333-00        | B064290             |           |         | SEMICOND DVC,DI:SM,SI,55V,200MA,DO-35   | 07263     | FDH-6012         |
| DS500         | 150-1004-00        | B010100             | 8052649   |         | LT EMITTING DIO:RED,15MA                | 08806     | SSL-12           |
| DS500         | 150-1040-00        | B052650             | 8078229   |         | LT EMITTING DIO:RED,690NM,40MA MAX      | 80009     | 150-1040-00      |
| DS500         | 150-1011-02        | B079230             |           |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-367          |
| DS510         | 150-1011-00        | B010100             | 8052549   |         | LAMP,LED RROUT:RED,? SEG,RH DECIMAL     | 31718     | FND70            |
| DS510         | 150-1011-01        | B052550             | 8079229   |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-357          |
| DS510         | 150-1011-02        | B079230             |           |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-367          |
| DS520         | 150-1011-00        | B010100             | 8052549   |         | LAMP,LED RROUT:RED,? SEG,RH DECIMAL     | 31718     | FND70            |
| DS520         | 150-1011-01        | B052550             | 8079229   |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-357          |
| DS520         | 150-1011-02        | B079230             |           |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-367          |
| DS530         | 150-1011-00        | B010100             | 8052549   |         | LAMP,LED RROUT:RED,? SEG,RH DECIMAL     | 31718     | FND70            |
| DS530         | 150-1011-01        | B052550             | 8079229   |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-357          |
| DS530         | 150-1011-02        | B079230             |           |         | LAMP,LED RROUT:RED,? SEG,1.0 DIGIT      | 58361     | FND-367          |
| F620          | 159-0021-00        |                     |           |         | FUSE,CARTRIDGE:3AG,2A,250V,FAST BLOW    | 71400     | AGC-CW-2         |
| J240          | 131-1003-00        |                     |           |         | CONN,RCPT,ELEC:CKT BD MT,3 PRONG        | 80009     | 131-1003-00      |
| J245          | 131-1315-01        |                     |           |         | CONN,RCPT,ELEC:BNC,FEMALE               | 80009     | 131-1315-01      |
| L100          | 120-0939-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0939-00      |
| L110          | 120-0938-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0938-00      |
| L112          | 120-0937-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0937-00      |
| L114          | 120-0936-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0936-00      |
| L116          | 120-0935-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0935-00      |
| L118          | 120-0934-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0934-00      |
| L120          | 120-0933-00        |                     |           |         | TRANSFORMER,RF:VARIABLE                 | 80009     | 120-0933-00      |
| L122          | 120-0932-00        |                     |           |         | TRANSFORMER,RF:OSCILLATOR               | 80009     | 120-0932-00      |
| L124          | 120-0931-00        |                     |           |         | TRANSFORMER,RF:                         | 80009     | 120-0931-00      |
| L143          | 108-0794-00        |                     |           |         | COIL,RF:FIXED,44NH                      | TK1345    | 108-0794-00      |
| L145          | 108-0472-00        | B010100             | 8039999   |         | COIL,RF:FIXED,162UH                     | 80009     | 108-0472-00      |
| L184          | 108-0606-00        |                     |           |         | COIL,RF:FIXED,37NH                      | 80009     | 108-0606-00      |
| L190          | 276-0569-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 78488     | 57-9660          |
| L191          | 276-0569-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 78488     | 57-9660          |
| L195          | 108-0317-00        |                     |           |         | COIL,RF:FIXED,15 UH                     | 32159     | 71501M+10PERCENT |
| L197          | 108-0795-00        |                     |           |         | COIL,RF:FIXED,2MH                       | TK1345    | 108-0795-00      |
| L200          | 108-0578-00        |                     |           |         | COIL,RF:FIXED,45NH                      | TK1345    | 108-0578-00      |
| L204          | 108-0578-00        |                     |           |         | COIL,RF:FIXED,45NH                      | TK1345    | 108-0578-00      |
| L208          | 108-0552-00        |                     |           |         | COIL,RF:FIXED,80NH                      | TK1345    | 108-0552-00      |
| L212          | 108-0552-00        |                     |           |         | COIL,RF:FIXED,80NH                      | TK1345    | 108-0552-00      |
| L245          | 276-0647-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 80009     | 276-0647-00      |
| L265          | 276-0576-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 78488     | #57-0047         |
| L270          | 276-0576-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 78488     | #57-0047         |
| L280          | 276-0576-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 78488     | #57-0047         |
| L290          | 276-0576-00        |                     |           |         | CORE,EM:TOROID,FERRITE                  | 78488     | #57-0047         |
| L320          | 108-0733-00        |                     |           |         | COIL,RF:FIXED,113NH                     | 80009     | 108-0733-00      |
| L362          | 108-0606-00        | B010100             | 8059999   |         | COIL,RF:FIXED,37NH                      | 80009     | 108-0606-00      |
| L362          | 108-0733-00        | B060000             |           |         | COIL,RF:FIXED,113NH                     | 80009     | 108-0733-00      |
| L365          | 108-0509-00        |                     |           |         | COIL,RF:FIXED,2.45UH                    | TK2042    | ORDER BY DESCRL  |
| L630          | 108-0795-00        |                     |           |         | COIL,RF:FIXED,2MH                       | TK1345    | 108-0795-00      |
| L655          | 120-0342-00        |                     |           |         | XFMR,TOROID:                            | TK1345    | 120-0342-00      |
| L660          | 108-0472-00        |                     |           |         | COIL,RF:FIXED,162UH                     | 80009     | 108-0472-00      |
| L670          | 108-0205-00        |                     |           |         | COIL,RF:FIXED,1MH                       | 76493     | 8209             |
| LR110         | 108-0408-00        |                     |           |         | COIL,RF:FIXED,100NH                     | TK1345    | 108-0408-00      |
| LR112         | 108-0271-00        |                     |           |         | COIL,RF:FIXED,235NH                     | 80009     | 108-0271-00      |

## Scan by Zenith

Replaceable Electrical Parts - SG 503

| Component No. | Tektronix Part No. | Serial/Assembly No.                | Mfr. Code | Mfr. Part No.   |
|---------------|--------------------|------------------------------------|-----------|-----------------|
|               |                    | Effective                          | Code      |                 |
|               |                    | Dscont                             |           |                 |
| LR114         | 108-0333-00        |                                    | TK1345    | 108-0333-00     |
| LR130         | 108-0595-00        |                                    | TK1345    | 108-0595-00     |
| LR135         | 108-0797-00        |                                    | TK1345    | 108-0797-00     |
| LR140         | 108-0796-00        |                                    | TK1345    | 108-0796-00     |
| LR142         | 108-0271-00        |                                    | 80009     | 108-0271-00     |
| LR150         | 108-0271-00        |                                    | 80009     | 108-0271-00     |
| LR190         | 108-0797-00        |                                    | TK1345    | 108-0797-00     |
| Q130          | 151-0451-00        | B010100                            | 04713     | SRF503          |
| Q130          | 151-0211-01        | B040000                            | 04713     | ZN3866 (FAMILY) |
| Q140          | 151-0451-00        |                                    | 04713     | SRF503          |
| Q160          | 151-0188-00        |                                    | 80009     | 151-0188-00     |
| Q180          | 151-0188-00        |                                    | 80009     | 151-0188-00     |
| Q190          | 151-0474-00        | B010100                            | 04713     | MRF511          |
| Q190          | 151-0614-00        | B051230                            | 80009     | 151-0614-00     |
| Q290          | 151-0302-00        |                                    | 04713     | ST899           |
| Q296          | 151-0302-00        |                                    | 04713     | ST899           |
| Q300          | 151-0302-00        |                                    | 04713     | ST899           |
| Q320          | 151-0367-00        | B010100                            | 04713     | SPS 8811        |
| Q320          | 151-0402-00        | B060000                            | 01295     | SKA6814         |
| Q330          | 151-0402-00        | B060000                            | 01295     | SKA6814         |
| Q340          | 151-0402-00        | B060000                            | 01295     | SKA6814         |
| Q350          | 151-0402-00        | B060000                            | 01295     | SKA6814         |
| Q360          | 151-0402-00        | B060000                            | 01295     | SKA6814         |
| Q410          | 151-0367-00        |                                    | 04713     | SPS 8811        |
| Q420          | 151-0221-00        |                                    | 80009     | 151-0221-00     |
| Q600          | 151-0301-00        |                                    | 04713     | ST898           |
| Q610          | 151-0302-00        |                                    | 04713     | ST899           |
| Q620          | 151-0301-00        |                                    | 04713     | ST898           |
| Q640          | 151-0515-01        |                                    | 04713     | SCR1256K        |
| Q685          | 151-0301-00        |                                    | 04713     | ST898           |
| Q690          | 151-0301-00        |                                    | 04713     | ST898           |
| R116          | 315-0471-00        | B040000                            | 57668     | NTR25J-E470E    |
| R116          | 315-0471-00        | B064290                            | 57668     | NTR25J-E470E    |
|               |                    | (NOMINAL VALUE, SELECTED)          |           |                 |
| R118          | 315-0471-00        | B051350                            | 57668     | NTR25J-E470E    |
| R118          | 315-0471-00        | B064290                            | 57668     | NTR25J-E470E    |
|               |                    | (NOMINAL VALUE, SELECTED)          |           |                 |
| R134          | 317-0131-00        |                                    | 01121     | BB1315          |
| R138          | 317-0510-00        |                                    | 01121     | BB5105          |
| R140          | 301-0750-00        |                                    | 19701     | 5053CX75R00J    |
| R145          | 317-0510-00        |                                    | 01121     | BB5105          |
| R146          | 317-0510-00        |                                    | 01121     | BB5105          |
| R150          | 317-0510-00        |                                    | 01121     | BB5105          |
| R160          | 315-0181-00        |                                    | 57668     | NTR25J-E180E    |
| R162          | 321-0207-00        |                                    | 19701     | 5033ED1K400F    |
| R164          | 321-0319-00        |                                    | 19701     | 5033ED20K50F    |
| R166          | 315-0392-00        |                                    | 57668     | NTR25J-E03K9    |
| R174          | 315-0182-00        |                                    | 57668     | NTR25J-E1K8     |
| R175          | 311-1563-00        |                                    | 32997     | 3352T-DY7-102   |
| R176          | 315-0123-00        |                                    | 57668     | NTR25J-E12K0    |
| R177          | -----              | 8063389                            | SELECTED  |                 |
| R180          | 315-0272-00        |                                    | 57668     | NTR25J-E02K7    |
| R184          | 317-0151-00        |                                    | 01121     | BB1515          |
| R190          | 301-0560-00        |                                    | 19701     | 5053CX56R00J    |
| R192          | 301-0560-00        |                                    | 19701     | 5053CX56R00J    |
| R195          | 315-0471-00        |                                    | 57668     | NTR25J-E470E    |
| R197          | 315-0471-00        | B010100                            | 57668     | NTR25J-E470E    |
| R197          | 315-0102-00        | B040000                            | 57668     | NTR25JE01K0     |
| R204          | 317-0181-00        |                                    | 01121     | BB1815          |
|               |                    | RES , FXD , FILM:180 OHM,5%,0.125M |           |                 |

| Component No. | Tektronix Part No. | Serial/Assembly No. | Effective | Dscont  | Name & Description                              | Mfr. Code | Mfr. Part No.    |
|---------------|--------------------|---------------------|-----------|---------|---|-----------|------------------|
| R212          | 315-0103-00        |                     |           |         | RES, FXD, FILM: 10K OHM, 5%, 0.25M              | 19701     | 5043CX10K00J     |
| R216          | 315-0911-00        |                     |           |         | RES, FXD, FILM: 910 OHM, 5%, 0.25M              | 57668     | NTR25J-E910E     |
| R250          | 315-0275-00        |                     |           |         | RES, FXD, FILM: 2.7M OHM, 5%, 0.25M             | 01121     | CB2755           |
| R255          | 311-1223-00        |                     |           |         | RES, VAR, NONMM: TRMR, 250 OHM, 0.5M            | 32997     | 3386F-T04-251    |
| R257          | 321-0224-00        | B010100             |           | B079229 | RES, FXD, FILM: 2.10K OHM, 1%, 0.125M, TC=T0    | 07716     | CE0021000F       |
| R257          | 321-0233-03        | B079230             |           |         | RES, FXD, FILM: 2.61K OHM, 0.25%, 0.125M, TC=T2 | 01121     | ADVISE           |
| R260          | 311-1531-00        | B010100             |           | B079229 | RES, VAR, MM: PNL, 2K OHM                       | 02111     | 535-9504         |
| R260          | 311-2204-00        | B079230             |           |         | RES, VAR, MM: PANEL, 2.5K OHM, 5%, 0.5M         | 32997     | 84N10-E26-CA0021 |
| R262          | 321-0114-00        | B010100             |           | B066110 | RES, FXD, FILM: 150 OHM, 1%, 0.125 M, TC=T0     | 19701     | 5033ED150R0F     |
| R262          | 321-0636-00        | B066111             |           | B079229 | RES, FXD, FILM: 100 OHM, 0.5%, 0.125M, TC=T2    | 91637     | CWF551160100R00  |
| R262          | 321-0927-07        | B079230             |           |         | RES, FXD, FILM: 125 OHM, 0.1%, 0.125M, TC=T9    | 19701     | 5033RE125R0B     |
| R265          | 311-1221-00        | B010100             |           | B066110 | RES, VAR, NONMM: TRMR, 50 OHM, 0.5M             | 32997     | 3386F-T04-500    |
| R265          | 311-1175-00        | B066111             |           | B080349 | RES, VAR, NONMM: TRMR, 100 OHM, 0.5M            | 73138     | 68MR100-77A      |
| R265          | 311-1222-00        | B080350             |           |         | RES, VAR, NONMM: TRMR, 100 OHM, 0.5M            | 32997     | 3386F-T04-101    |
| R270          | 315-0204-00        |                     |           |         | RES, FXD, FILM: 200K OHM, 5%, 0.25M             | 19701     | 5043CX200K0J     |
| R272          | 315-0103-00        |                     |           |         | RES, FXD, FILM: 10K OHM, 5%, 0.25M              | 19701     | 5043CX10K00J     |
| R274          | 315-0103-00        |                     |           |         | RES, FXD, FILM: 10K OHM, 5%, 0.25M              | 19701     | 5043CX10K00J     |
| R276          | 315-0103-00        |                     |           |         | RES, FXD, FILM: 10K OHM, 5%, 0.25M              | 19701     | 5043CX10K00J     |
| R277          | 315-0102-00        |                     |           |         | RES, FXD, FILM: 1K OHM, 5%, 0.25M               | 57668     | NTR25JE01K0      |
| R278          | 315-0513-00        |                     |           |         | RES, FXD, FILM: 51K OHM, 5%, 0.25M              | 57668     | NTR25J-E51K0     |
| R280          | 315-0103-00        |                     |           |         | RES, FXD, FILM: 10K OHM, 5%, 0.25M              | 19701     | 5043CX10K00J     |
| R284          | 315-0123-00        |                     |           |         | RES, FXD, FILM: 12K OHM, 5%, 0.25M              | 57668     | NTR25J-E12K0     |
| R290          | 315-0102-00        |                     |           |         | RES, FXD, FILM: 1K OHM, 5%, 0.25M               | 57668     | NTR25JE01K0      |
| R292          | 315-0562-00        |                     |           |         | RES, FXD, FILM: 5.6K OHM, 5%, 0.25M             | 57668     | NTR25J-E05K6     |
| R294          | 315-0512-00        |                     |           |         | RES, FXD, FILM: 5.1K OHM, 5%, 0.25M             | 57668     | NTR25J-E05K1     |
| R296          | 315-0102-00        |                     |           |         | RES, FXD, FILM: 1K OHM, 5%, 0.25M               | 57668     | NTR25JE01K0      |
| R300          | 315-0103-00        |                     |           |         | RES, FXD, FILM: 10K OHM, 5%, 0.25M              | 19701     | 5043CX10K00J     |
| R302          | 315-0471-00        |                     |           |         | RES, FXD, FILM: 470 OHM, 5%, 0.25M              | 57668     | NTR25J-E470E     |
| R315          | 315-0391-00        |                     |           |         | RES, FXD, FILM: 390 OHM, 5%, 0.25M              | 57668     | NTR25J-E390E     |
| R320          | 315-0181-00        |                     |           |         | RES, FXD, FILM: 180 OHM, 5%, 0.25M              | 57668     | NTR25J-E180E     |
| R322          | 315-0510-00        |                     |           |         | RES, FXD, FILM: 51 OHM, 5%, 0.25M               | 19701     | 5043CX51R00J     |
| R323          | 315-0750-00        | B060000             |           |         | RES, FXD, FILM: 75 OHM, 5%, 0.25M               | 57668     | NTR25J-E75E0     |
| R324          | 315-0272-00        |                     |           |         | RES, FXD, FILM: 2.7K OHM, 5%, 0.25M             | 57668     | NTR25J-E02K7     |
| R326          | 315-0471-00        |                     |           |         | RES, FXD, FILM: 470 OHM, 5%, 0.25M              | 57668     | NTR25J-E470E     |
| R328          | 315-0471-00        |                     |           |         | RES, FXD, FILM: 470 OHM, 5%, 0.25M              | 57668     | NTR25J-E470E     |
| R332          | 317-0821-00        | B060000             |           |         | RES, FXD, CMPSN: 820 OHM, 5%, 0.125M            | 01121     | B88215           |
| R334          | 317-0821-00        | B060000             |           |         | RES, FXD, CMPSN: 820 OHM, 5%, 0.125M            | 01121     | B88215           |
| R335          | 315-0182-00        |                     |           |         | RES, FXD, FILM: 1.8K OHM, 5%, 0.25M             | 57668     | NTR25J-E1K8      |
| R338          | 315-0471-00        | B010100             |           | B059999 | RES, FXD, FILM: 470 OHM, 5%, 0.25M              | 57668     | NTR25J-E470E     |
| R340          | 315-0332-00        | B010100             |           | B059999 | RES, FXD, FILM: 3.3K OHM, 5%, 0.25M             | 57668     | NTR25J-E03K3     |
| R342          | 315-0162-00        |                     |           |         | RES, FXD, FILM: 1.6K OHM, 5%, 0.25M             | 19701     | 5043CX1K600J     |
| R345          | 315-0102-00        | B010100             |           | B059999 | RES, FXD, FILM: 1K OHM, 5%, 0.25M               | 57668     | NTR25JE01K0      |
| R350          | 315-0181-00        |                     |           |         | RES, FXD, FILM: 180 OHM, 5%, 0.25M              | 57668     | NTR25J-E180E     |
| R351          | 317-0821-00        | B060000             |           |         | RES, FXD, CMPSN: 820 OHM, 5%, 0.125M            | 01121     | B88215           |
| R352          | 315-0221-00        | B010100             |           | B059999 | RES, FXD, FILM: 220 OHM, 5%, 0.25M              | 57668     | NTR25J-E220E     |
| R352          | 321-0132-00        | B060000             |           |         | RES, FXD, FILM: 232 OHM, 1%, 0.125M, TC=T0      | 19701     | 5043ED232R0F     |
| R355          | 315-0181-00        |                     |           |         | RES, FXD, FILM: 180 OHM, 5%, 0.25M              | 57668     | NTR25J-E180E     |
| R358          | 315-0101-00        |                     |           |         | RES, FXD, FILM: 100 OHM, 5%, 0.25M              | 57668     | NTR25J-E 100E    |
| R360          | 315-0510-00        | B010100             |           | B059999 | RES, FXD, FILM: 51 OHM, 5%, 0.25M               | 19701     | 5043CX51R00J     |
| R361          | 317-0821-00        | B060000             |           |         | RES, FXD, CMPSN: 820 OHM, 5%, 0.125M            | 01121     | B88215           |
| R362          | 315-0101-00        |                     |           |         | RES, FXD, FILM: 100 OHM, 5%, 0.25M              | 57668     | NTR25J-E 100E    |
| R365          | 315-0181-00        |                     |           |         | RES, FXD, FILM: 180 OHM, 5%, 0.25M              | 57668     | NTR25J-E180E     |
| R376          | 315-0471-00        |                     |           |         | RES, FXD, FILM: 470 OHM, 5%, 0.25M              | 57668     | NTR25J-E470E     |
| R395          | 315-0391-00        |                     |           |         | RES, FXD, FILM: 390 OHM, 5%, 0.25M              | 57668     | NTR25J-E390E     |
| R396          | 321-0126-00        |                     |           |         | RES, FXD, FILM: 200 OHM, 1%, 0.125M, TC=T0      | 19701     | 5033ED200R0F     |
| R397          | 315-0391-00        |                     |           |         | RES, FXD, FILM: 390 OHM, 5%, 0.25M              | 57668     | NTR25J-E390E     |
| R398          | 321-0126-00        |                     |           |         | RES, FXD, FILM: 200 OHM, 1%, 0.125M, TC=T0      | 19701     | 5033ED200R0F     |
| R400          | 315-0271-00        |                     |           |         | RES, FXD, FILM: 270 OHM, 5%, 0.25M              | 57668     | NTR25J-E270E     |
| R402          | 315-0271-00        |                     |           |         | RES, FXD, FILM: 270 OHM, 5%, 0.25M              | 57668     | NTR25J-E270E     |

## Scan by Zenith

Replaceable Electrical Parts - SG 503

| Component No. | Tektronix Part No. | Serial/Assembly No. | Effective | Dscont | Name & Description                           | Mfr. Code | Mfr. Part No. |
|---------------|--------------------|---------------------|-----------|--------|--|-----------|---------------|
| R404          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R410          | 315-0103-00        |                     |           |        | RES, FWD, FILM: 10K OHM, 5%, 0.25W           | 19701     | 5043CX10K00J  |
| R411          | 315-0103-00        |                     |           |        | RES, FWD, FILM: 10K OHM, 5%, 0.25W           | 19701     | 5043CX10K00J  |
| R412          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R416          | 315-0101-00        |                     |           |        | RES, FWD, FILM: 100 OHM, 5%, 0.25W           | 57668     | NTR25J-E 100E |
| R420          | 315-0150-00        |                     |           |        | RES, FWD, FILM: 15 OHM, 5%, 0.25W            | 19701     | 5043CX15R00J  |
| R422          | 315-0131-00        |                     |           |        | RES, FWD, FILM: 130 OHM, 5%, 0.25W           | 19701     | 5043CX13R00J  |
| R448          | 315-0391-00        |                     |           |        | RES, FWD, FILM: 390 OHM, 5%, 0.25W           | 57668     | NTR25J-E390E  |
| R460          | 315-0222-00        |                     |           |        | RES, FWD, FILM: 2.2K OHM, 5%, 0.25W          | 57668     | NTR25J-E02K2  |
| R465          | 315-0222-00        |                     |           |        | RES, FWD, FILM: 2.2K OHM, 5%, 0.25W          | 57668     | NTR25J-E02K2  |
| R468          | 315-0301-00        |                     |           |        | RES, FWD, FILM: 300 OHM, 5%, 0.25W           | 57668     | NTR25J-E300E  |
| R470          | 315-0511-00        |                     |           |        | RES, FWD, FILM: 510 OHM, 5%, 0.25W           | 19701     | 5043CX510R0J  |
| R475          | 315-0111-00        |                     |           |        | RES, FWD, FILM: 110 OHM, 5%, 0.25W           | 57668     | NTR25J-E110E  |
| R477          | 315-0561-00        |                     |           |        | RES, FWD, FILM: 560 OHM, 5%, 0.25W           | 19701     | 5043CX560R0J  |
| R480          | 315-0561-00        |                     |           |        | RES, FWD, FILM: 560 OHM, 5%, 0.25W           | 19701     | 5043CX560R0J  |
| R481          | 315-0561-00        |                     |           |        | RES, FWD, FILM: 560 OHM, 5%, 0.25W           | 19701     | 5043CX560R0J  |
| R495          | 315-0161-00        |                     |           |        | RES, FWD, FILM: 160 OHM, 5%, 0.25W           | 57668     | NTR25J-E 160E |
| R510          | 315-0391-00        |                     |           |        | RES, FWD, FILM: 390 OHM, 5%, 0.25W           | 57668     | NTR25J-E390E  |
| R512          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R513          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R514          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R515          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R516          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R517          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R518          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R520          | 315-0391-00        |                     |           |        | RES, FWD, FILM: 390 OHM, 5%, 0.25W           | 57668     | NTR25J-E390E  |
| R522          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R523          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R524          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R525          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R526          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R527          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R528          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R530          | 315-0391-00        |                     |           |        | RES, FWD, FILM: 390 OHM, 5%, 0.25W           | 57668     | NTR25J-E390E  |
| R532          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R533          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R534          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R535          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R536          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R537          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R538          | 315-0271-00        |                     |           |        | RES, FWD, FILM: 270 OHM, 5%, 0.25W           | 57668     | NTR25J-E270E  |
| R600          | 315-0472-00        | 8010100             | 8051229   |        | RES, FWD, FILM: 4.7K OHM, 5%, 0.25W          | 57668     | NTR25J-E04K7  |
| R600          | 315-0301-00        | 8051230             |           |        | RES, FWD, FILM: 300 OHM, 5%, 0.25W           | 57668     | NTR25J-E300E  |
| R601          | 301-0220-00        | 8040000             |           |        | RES, FWD, FILM: 22 OHM, 5%, 0.5W             | 19701     | 5053CX22R00J  |
| R602          | 315-0182-00        |                     |           |        | RES, FWD, FILM: 1.8K OHM, 5%, 0.25W          | 57668     | NTR25J-E1K8   |
| R605          | 315-0472-00        |                     |           |        | RES, FWD, FILM: 4.7K OHM, 5%, 0.25W          | 57668     | NTR25J-E04K7  |
| R610          | 321-0306-00        |                     |           |        | RES, FWD, FILM: 15.0K OHM, 1%, 0.125W, TC=T0 | 19701     | 5033ED15J00F  |
| R611          | 315-0562-00        | 8051230             | 8066110   |        | RES, FWD, FILM: 5.6K OHM, 5%, 0.25W          | 57668     | NTR25J-E05K6  |
| R612          | 321-0358-00        |                     |           |        | RES, FWD, FILM: 52.3K OHM, 1%, 0.125W, TC=T0 | 07716     | CEA052301F    |
| R613          | 315-0242-00        | 8066111             |           |        | RES, FWD, FILM: 2.4K OHM, 5%, 0.25W          | 57668     | NTR25J-E02K4  |
| R615          | 321-0336-00        |                     |           |        | RES, FWD, FILM: 30.9K OHM, 1%, 0.125W, TC=T0 | 19701     | 5043ED30K90F  |
| R616          | 321-0358-00        |                     |           |        | RES, FWD, FILM: 52.3K OHM, 1%, 0.125W, TC=T0 | 07716     | CEA052301F    |
| R620          | 315-0472-00        |                     |           |        | RES, FWD, FILM: 4.7K OHM, 5%, 0.25W          | 57668     | NTR25J-E04K7  |
| R624          | 308-0702-00        |                     |           |        | RES, FWD, MM: 0.33 OHM, 5%, 2M               | 75042     | BWH-R3300J    |
| R626          | 315-0200-00        |                     |           |        | RES, FWD, FILM: 20 OHM, 5%, 0.25W            | 19701     | 5043CX20R00J  |
| R640          | 315-0102-00        |                     |           |        | RES, FWD, FILM: 1K OHM, 5%, 0.25W            | 57668     | NTR25JE01K0   |
| R680          | 308-0685-00        |                     |           |        | RES, FWD, MM: 1.5 OHM, 5%, 1M                | 75042     | BWH-20-1R500J |
| R684          | 315-0560-00        |                     |           |        | RES, FWD, FILM: 56 OHM, 5%, 0.25W            | 57668     | NTR25J-E56E0  |
| R686          | 315-0392-00        |                     |           |        | RES, FWD, FILM: 3.9K OHM, 5%, 0.25W          | 57668     | NTR25J-E03K9  |

| Component No. | Tektronix Part No. | Serial/Assembly No. | Effective | Dscont | Name & Description                             | Mfr. Code | Mfr. Part No.    |
|---------------|--------------------|---------------------|-----------|--------|--|-----------|------------------|
| R690          | 315-0270-00        | B010100             | B039999   |        | RES,FXD,FILM:27 OHM,5%,0.25W                   | 19701     | 5043CX27R00J     |
| R690          | 315-0471-00        | B040000             |           |        | RES,FXD,FILM:470 OHM,5%,0.25W                  | 57668     | NTR25J-E470E     |
| R693          | 321-0236-00        |                     |           |        | RES,FXD,FILM:2.80K OHM,1%,0.125W,TC=TO         | 07716     | CEAD28000F       |
| R694          | 311-1224-00        |                     |           |        | RES,VAR,NONMM:TRMR,500 OHM,0.5W                | 32997     | 3386F-T04-501    |
| R695          | 321-0236-00        |                     |           |        | RES,FXD,FILM:2.80K OHM,1%,0.125W,TC=TO         | 07716     | CEAD28000F       |
| R697          | 321-0236-00        |                     |           |        | RES,FXD,FILM:2.80K OHM,1%,0.125W,TC=TO         | 07716     | CEAD28000F       |
| R698          | 321-0304-00        |                     |           |        | RES,FXD,FILM:14.3K OHM,1%,0.125W,TC=TO         | 19701     | 5033ED14K30F     |
| S100          | 263-1082-00        |                     |           |        | SM CAM ACTR AS:FREQUENCY RANGE                 | 80009     | 263-1082-00      |
| S240          | 105-0588-00        |                     |           |        | ACTR ASSY,SL SM:OUTPUT ATTN                    | 80009     | 105-0588-00      |
| U225          | 155-0107-00        |                     |           |        | MICROCKT,LINEAR:DIODE LEVELER,HYBRID           | 80009     | 155-0107-00      |
| U240          | 307-1024-00        |                     |           |        | ATTENUATOR,FXD:10X,50 OHM                      | 80009     | 307-1024-00      |
| U245          | 307-1024-00        |                     |           |        | ATTENUATOR,FXD:10X,50 OHM                      | 80009     | 307-1024-00      |
| U280          | 156-0067-00        |                     |           |        | MICROCKT,LINEAR:OPNL AMPL,SEL                  | 04713     | MC1741CP1        |
| U350          | 156-0534-00        | B010100             | B059999   |        | MICROCKT,LINEAR:DUAL DIFF AMPL                 | 02735     | CA3102E-98       |
| U390          | 156-0228-00        |                     |           |        | MICROCKT,DGTL:ECL,MA-SLAVE D FLIP-FLOP         | 52648     | SP1670           |
| U400          | 156-0230-00        |                     |           |        | MICROCKT,DGTL:ECL,DUAL D MASTER-SLAVE FF       | 04713     | MC10131(L OR P)  |
| U425          | 156-0180-04        |                     |           |        | MICROCKT,DGTL:QUAD 2 INP NAND GATE,            | 18324     | N74500(NB OR FB) |
| U430          | 156-0395-00        |                     |           |        | MICROCKT,DGTL:DECade COUNTER                   | 01295     | SN7490A N OR J   |
| U432          | 156-0043-03        |                     |           |        | MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN         | 18324     | N7402(NB OR FB)  |
| U435          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U436          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U437          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U438          | 156-0062-02        |                     |           |        | MICROCKT,DGTL:QUAD 2-INP EXCL-OR GATE,SCRN     | 18324     | N7486(NB OR FB)  |
| U440          | 156-0039-02        |                     |           |        | MICROCKT,DGTL:DUAL J-K MA-SLAVE FF,SCRN        | 01295     | SN7473NP3        |
| U445          | 156-0041-05        |                     |           |        | MICROCKT,DGTL:DUAL D FLIP FLOP SCR             | 01295     | SN7474NP3        |
| U450          | 156-0043-03        |                     |           |        | MICROCKT,DGTL:QUAD 2-INP NOR GATE,SCRN         | 18324     | N7402(NB OR FB)  |
| U455          | 156-0030-03        |                     |           |        | MICROCKT,DGTL:QUAD 2 INPUT NAND GATE,SCRN      | 18324     | N7400(NB OR FB)  |
| U460          | 156-0113-03        |                     |           |        | MICROCKT,DGTL:QUAD 2 INP NAND GATE,SCRN,       | 01295     | SN74L00NP3       |
| U465          | 156-0032-03        |                     |           |        | MICROCKT,DGTL:4 BIT BINARY COUNTER             | 01295     | SN7493NP3        |
| U475          | 156-0030-03        |                     |           |        | MICROCKT,DGTL:QUAD 2 INPUT NAND GATE,SCRN      | 18324     | N7400(NB OR FB)  |
| U480          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U481          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U482          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U485          | 156-0034-02        |                     |           |        | MICROCKT,DGTL:DUAL 4 INP NAND GATE,SCRN        | 18324     | N7420(NB OR FB)  |
| U490          | 156-0079-02        |                     |           |        | MICROCKT,DGTL:DECade Counter,SCREENED          | 01295     | SN7490ANP3       |
| U510          | 156-0379-00        |                     |           |        | MICROCKT,DGTL:BCD TO 7-SEG DCDR/DRV            | 18324     | N8T06 N OR F     |
| U520          | 156-0379-00        |                     |           |        | MICROCKT,DGTL:BCD TO 7-SEG DCDR/DRV            | 18324     | N8T06 N OR F     |
| U530          | 156-0379-00        |                     |           |        | MICROCKT,DGTL:BCD TO 7-SEG DCDR/DRV            | 18324     | N8T06 N OR F     |
| U610          | 156-0067-00        |                     |           |        | MICROCKT,LINEAR:OPNL AMPL,SEL                  | 04713     | MC1741CP1        |
| U695          | 156-0071-00        |                     |           |        | MICROCKT,VOLTAGE REGULATOR                     | 04713     | MC1723CL         |
| VR200         | 152-0280-00        | B010100             | B029999   |        | SEMICOND DVC,DI:ZEN,S1,6.2V,5%,0.4M,DO-7       | 04713     | 1N753A           |
| VR200         | 152-0337-00        | B030000             |           |        | SEMICOND DVC,DI:ZEN,S1,6.3V,3.2%,0.4M,DO-7/-35 | 04713     | SZG210K          |
| VR202         | 152-0280-00        | B010100             | B029999   |        | SEMICOND DVC,DI:ZEN,S1,6.2V,5%,0.4M,DO-7       | 04713     | 1N753A           |
| VR202         | 152-0337-00        | B030000             |           |        | SEMICOND DVC,DI:ZEN,S1,6.3V,3.2%,0.4M,DO-7/-35 | 04713     | SZG210K          |
| VR475         | 152-0278-00        |                     |           |        | SEMICOND DVC,DI:ZEN,S1,3V,5%,0.4M,DO-7         | 04713     | SZG35009K20      |
| VR610         | 152-0279-00        | B010100             | B066110   |        | SEMICOND DVC,DI:ZEN,S1,5.1V,5%,0.4M,DO-7       | 14552     | TD3810989        |
| VR640         | 152-0280-00        |                     |           |        | SEMICOND DVC,DI:ZEN,S1,6.2V,5%,0.4M,DO-7       | 04713     | 1N753A           |
| Y460          | 158-0014-00        |                     |           |        | Xtal Unit,DTZ:1MHZ,+/-0.005%                   | 13454     | 158-0014-00      |

# DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

## Symbols and Reference Designators

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

Capacitors = Values one or greater are in picofarads ( $\mu\text{F}$ ).

Values less than one are in microfarads ( $\mu\text{F}$ ).

Resistors = Ohms ( $\Omega$ ).

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.

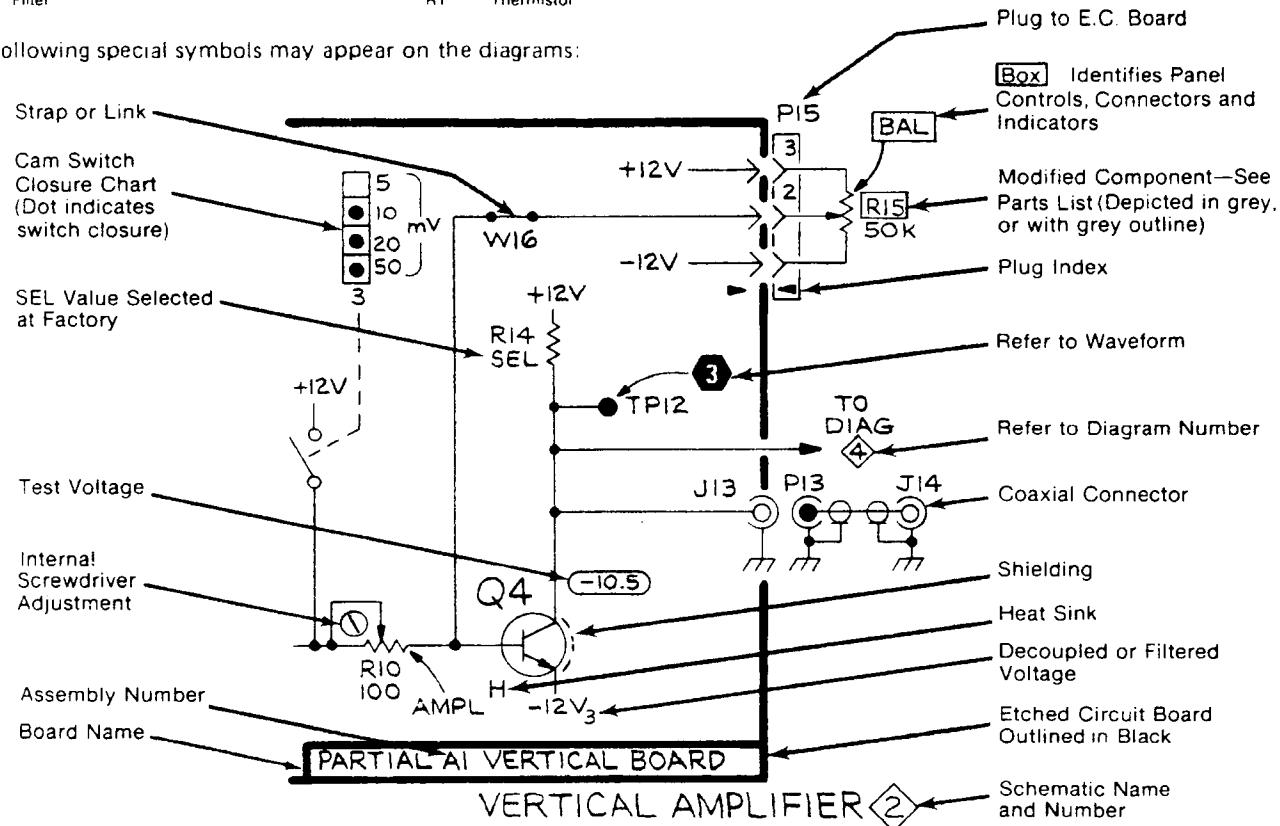
Y14.2, 1973 Line Conventions and Lettering.

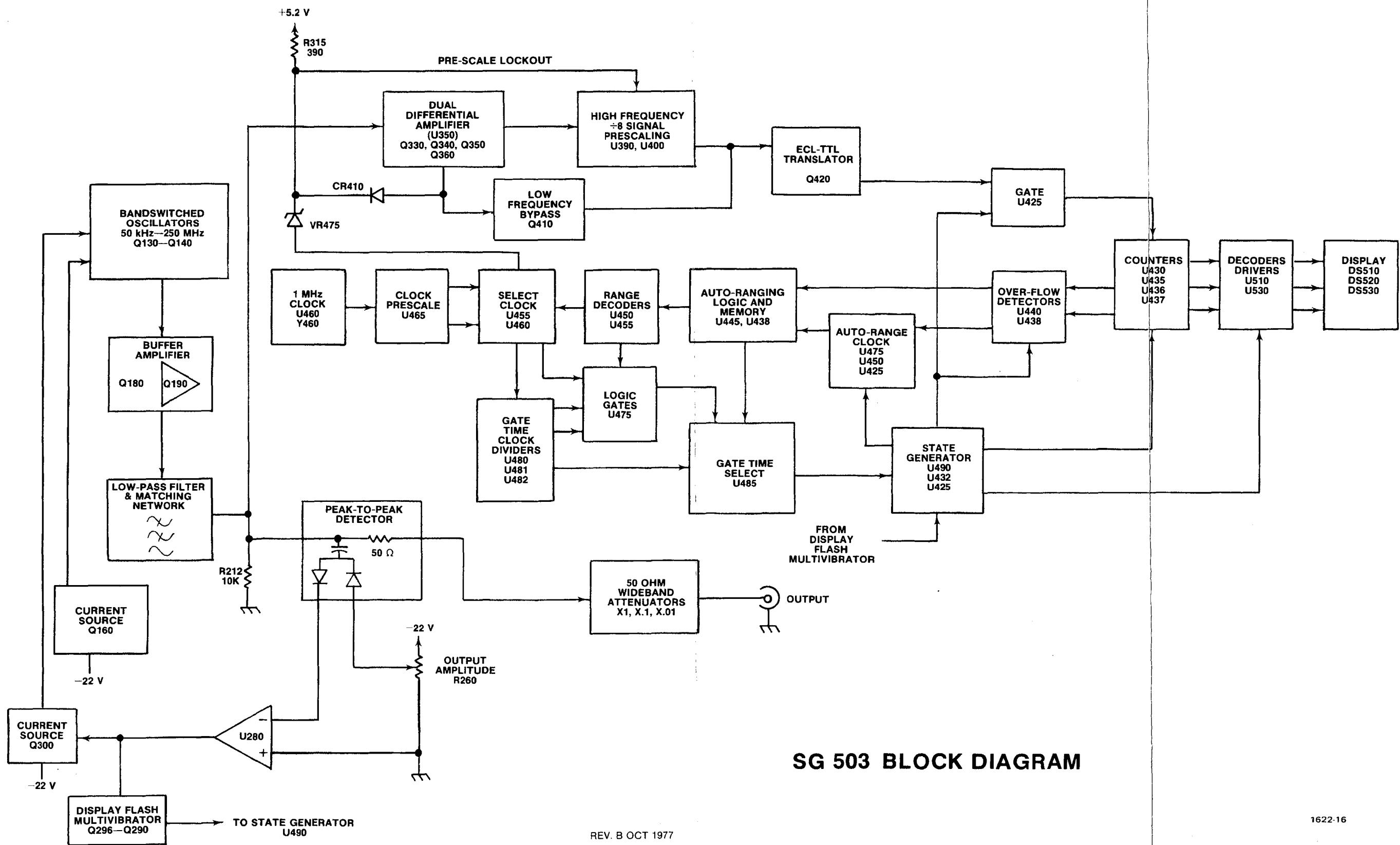
Y10.5, 1968 Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

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

|    |   |    |  |    |  |
|----|---|----|--|----|--|
| A  | Assembly, separable or repairable<br>(circuit board, etc) | H  | Heat dissipating device (heat sink,<br>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<br>(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<br>rectifier              | Y  | Crystal  |
| E  | Spark Gap, Ferrite bead                                   | R  | Resistor, fixed or variable                                | Z  | Phase shifter  |
| F  | Fuse  | RT | Thermistor   |    |  |
| FL | Filter  |    |  |    |  |

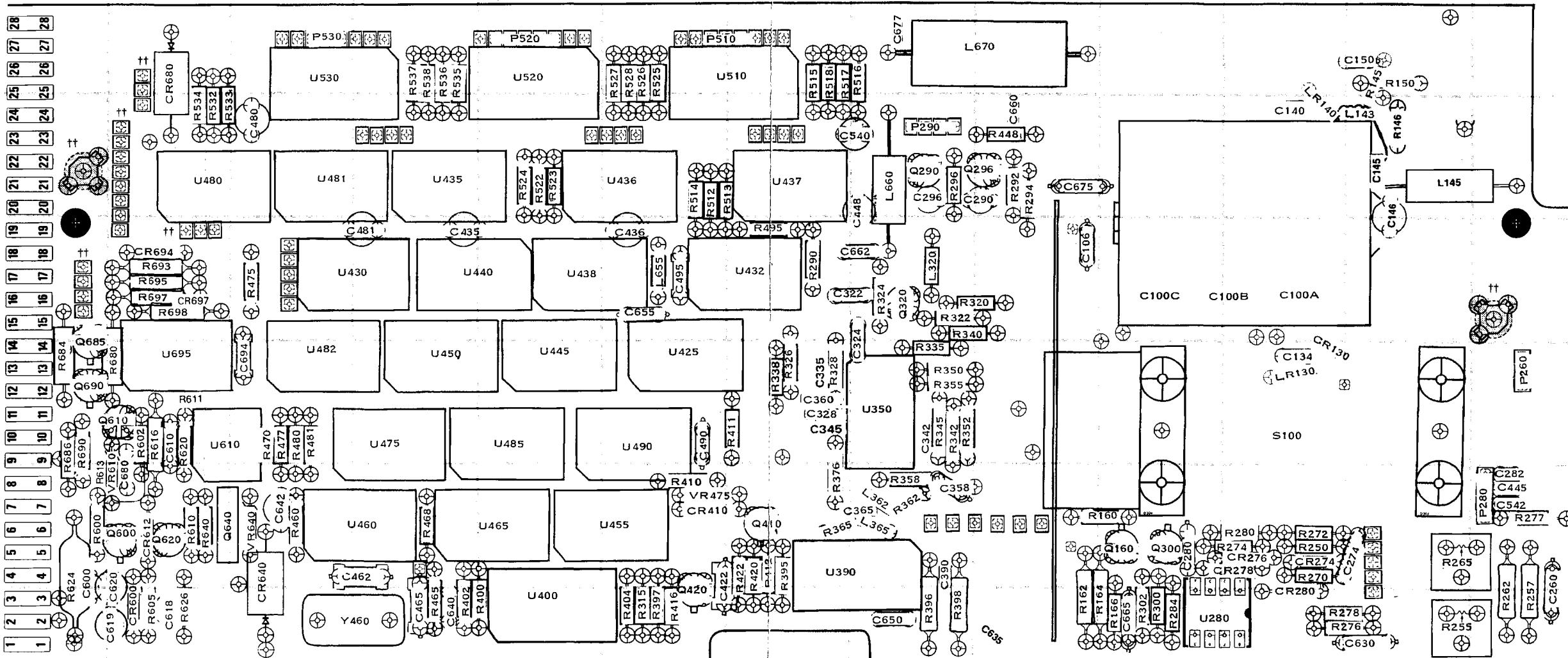
The following special symbols may appear on the diagrams:





**CUSTOMER MOD**

### **ttOptions**

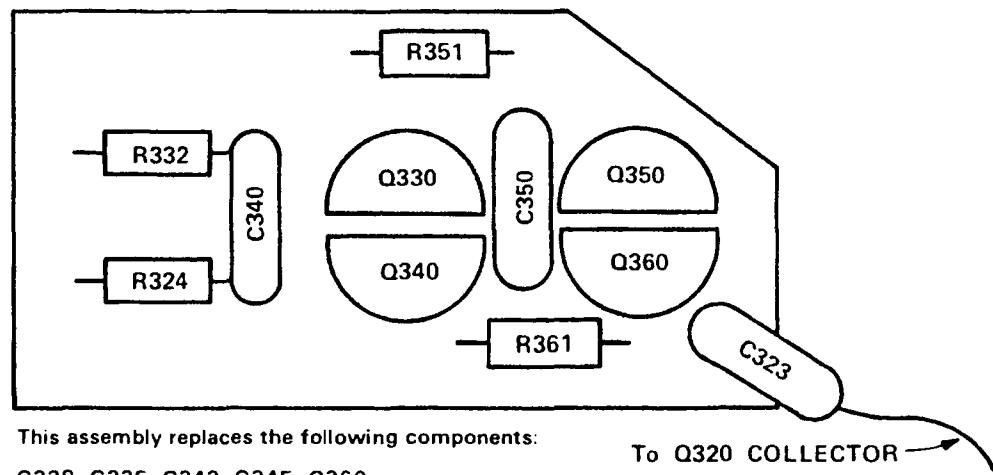


1622-17A

\*See Parts List for  
serial number ranges.

A5 Dual differential Amplifier circuit board.

SN B060000 - up



NOTE: This assembly replaces the following components:

C328, C335, C342, C345, C360

R338, R340, R345

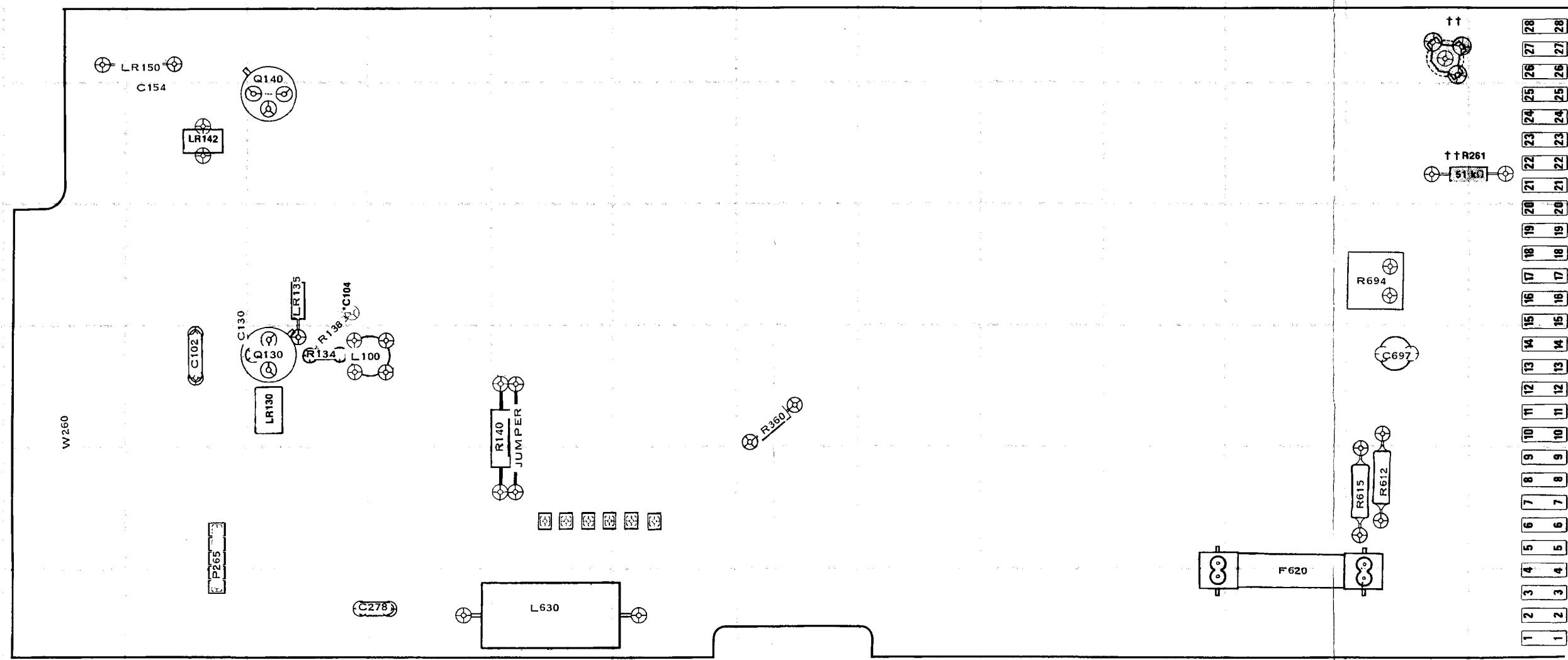
U350

To Q320 COLLECTOR

SG503

Scan by Zenith

## CUSTOMER MOD



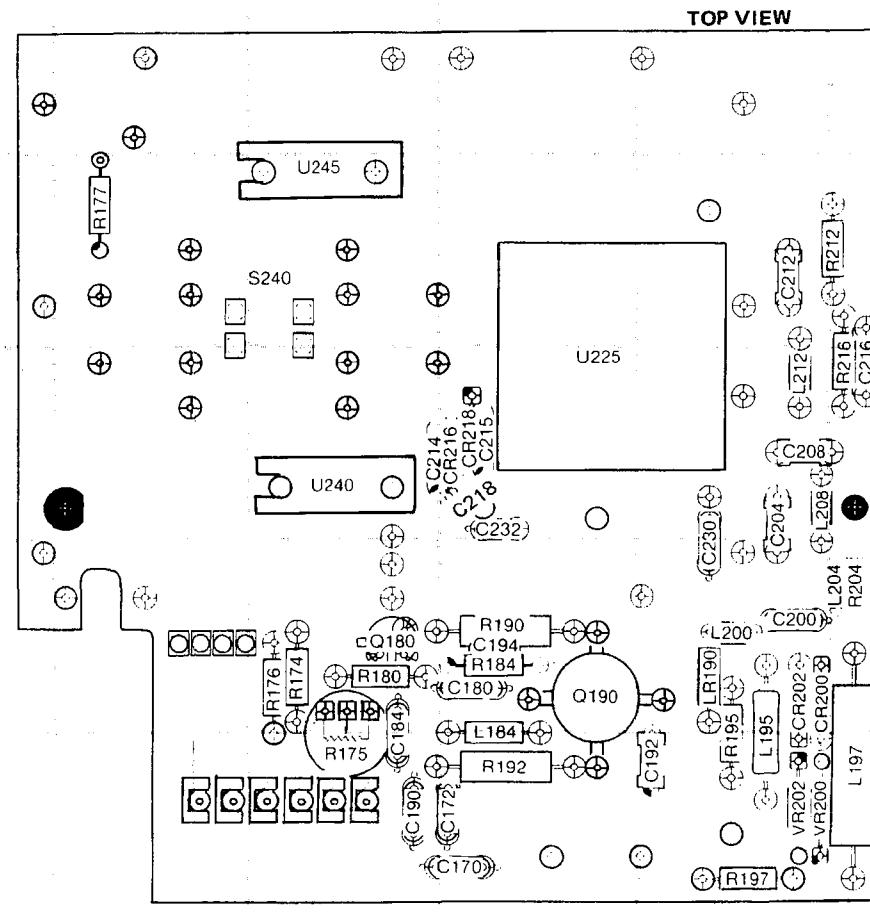
1622-18A

†† Optional

A1 Main circuit board "B" side.

\*See Parts List for  
serial number ranges.

| CKT NO | GRID LOC | CKT NO | GRID LOC | CKT NO | GRID LOC |
|--------|----------|--------|----------|--------|----------|
| C102   | B4       | LR135  | C3       | R615   | L5       |
| C104 * | C3       | LR150  | B1       | R694   | L3       |
| C130   | C3       | Q130   | C4       | W260   | A4       |
| C154   | B2       | Q140   | C2       |        |          |
| C278   | D6       | P265   | B5       |        |          |
| C697   | L4       |        |          |        |          |
| F620   | K5       | R134   | C4       |        |          |
| L100   | D4       | R138   | C4       |        |          |
| L142   | B2       | R140   | E4       |        |          |
| L630   | E6       | R360   | G4       |        |          |
| LR130  | C4       | R612   | L5       |        |          |

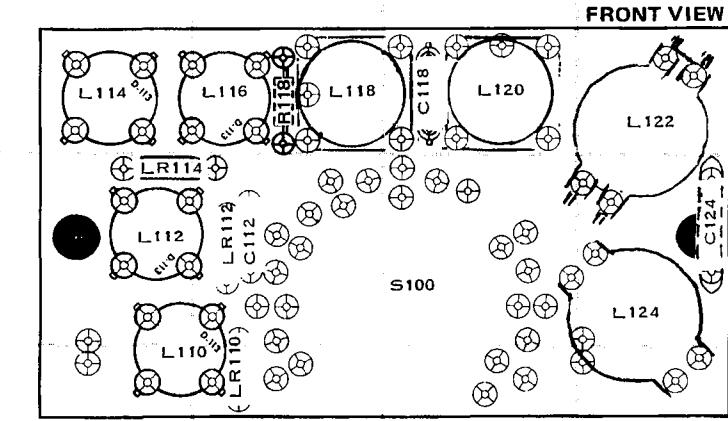


A3 Attenuator circuit bo

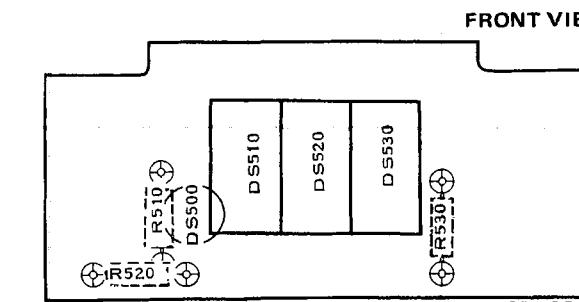
**\*See Parts List for  
serial number ranges**

<sup>†</sup>Located on back of board

‡ Selected component, refer to maintenance section.



## A2 Coil circuit board



1622-20

| CKT NO | GRID LOC |
|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| C112   | K2       | C214*  | C3       | DS510  | I5       | L195   | E4       | R116*† | L1       | R216   | F3       |
| C118*  | L1       | C215*  | D3       | DS520  | I5       | L197   | F5       | R118*† | K1       | R510   | H5       |
| C124   | M2       | C216   | F3       | DS530  | I5       | L200   | E4       | R174   | C4       | R520   | H5       |
| C170   | D5       | C218*  | D3       |        |          | L204   | F4       | R175   | C5       | R530   | J5       |
| C172   | D5       | C230   | E3       | L110   | J3       | L208   | E3       | R176   | C4       |        |          |
| C180   | D4       | C232   | D3       | L112   | J2       | L212   | E3       | R177*‡ | B2       | S100   | L2       |
| C184   | C4       |        |          | L114   | J1       |        |          | R180   | C4       | S240   | C2       |
| C190   | C5       | CR200  | E4       | L116   | K1       | LR110  | K3       | R184   | D4       |        |          |
| C192   | E5       | CR202  | E4       | L118   | K1       | LR112  | K2       | R190   | D4       | U225   | D2       |
| C194*  | D4       | CR216  | C3       | L120   | L1       | LR114  | J2       | R192   | D5       | U240   | C3       |
| C200   | E4       | CR218  | D3       | L122   | M1       | LR190  | E4       | R195   | E4       | U245   | C2       |
| C204   | E3       |        |          | L124   | M2       |        |          | R197   | E5       |        |          |
| C208   | E3       | DS500  | H5       | L184   | D4       | Q180   | C4       | R204   | F4       | VR200  | E5       |
| C212   | E2       |        |          |        |          | Q190   | D4       | R212   | F2       | VR202  | E5       |

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## VOLTAGE AND WAVEFORM CONDITIONS

**WARNING**

*Dangerous potentials exist at several points throughout this instrument. When the instrument is operated with the covers removed, do not touch exposed connections or components. Some transistors have voltages present on their cases. Disconnect the power source before replacing parts.*

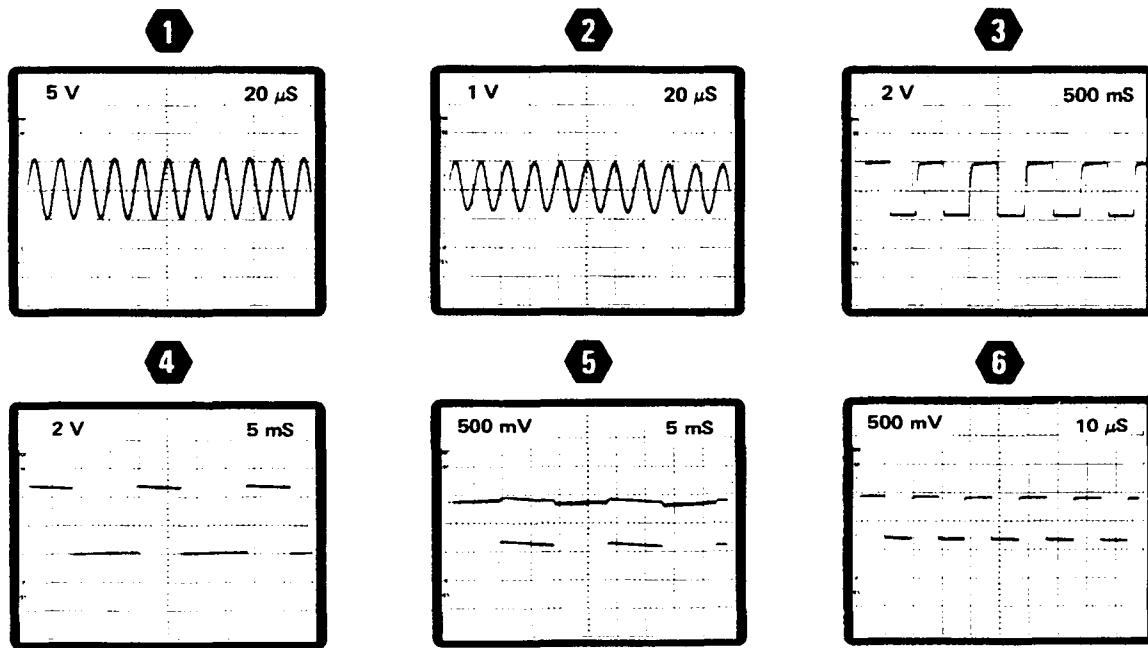
The voltages and waveforms shown on the diagrams were taken with no input signal and the SG 503 front panel controls set as follows:

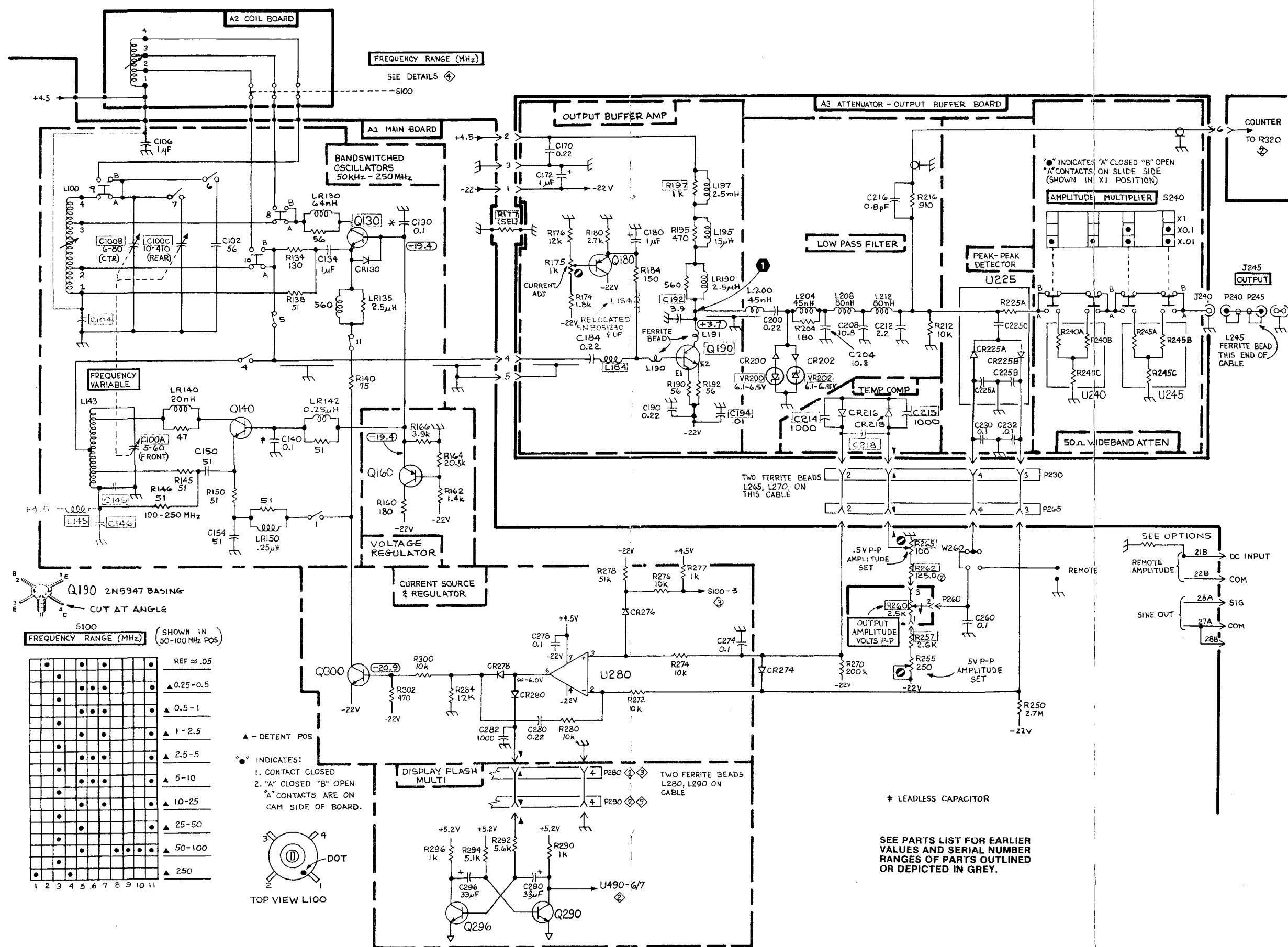
| VOLTAGES              |           | *WAVEFORMS            |           |
|-----------------------|-----------|-----------------------|-----------|
| AMPLITUDE MULTIPLIER  | X1        | AMPLITUDE MULTIPLIER  | X1        |
| FREQUENCY VARIABLE    | Midrange  | FREQUENCY VARIABLE    | Midrange  |
| FREQUENCY RANGE (MHz) | REF ≈ .05 | FREQUENCY RANGE (MHz) | REF ≈ .05 |
| OUTPUT AMPLITUDE      | 5.5       | OUTPUT AMPLITUDE      | 5.5       |

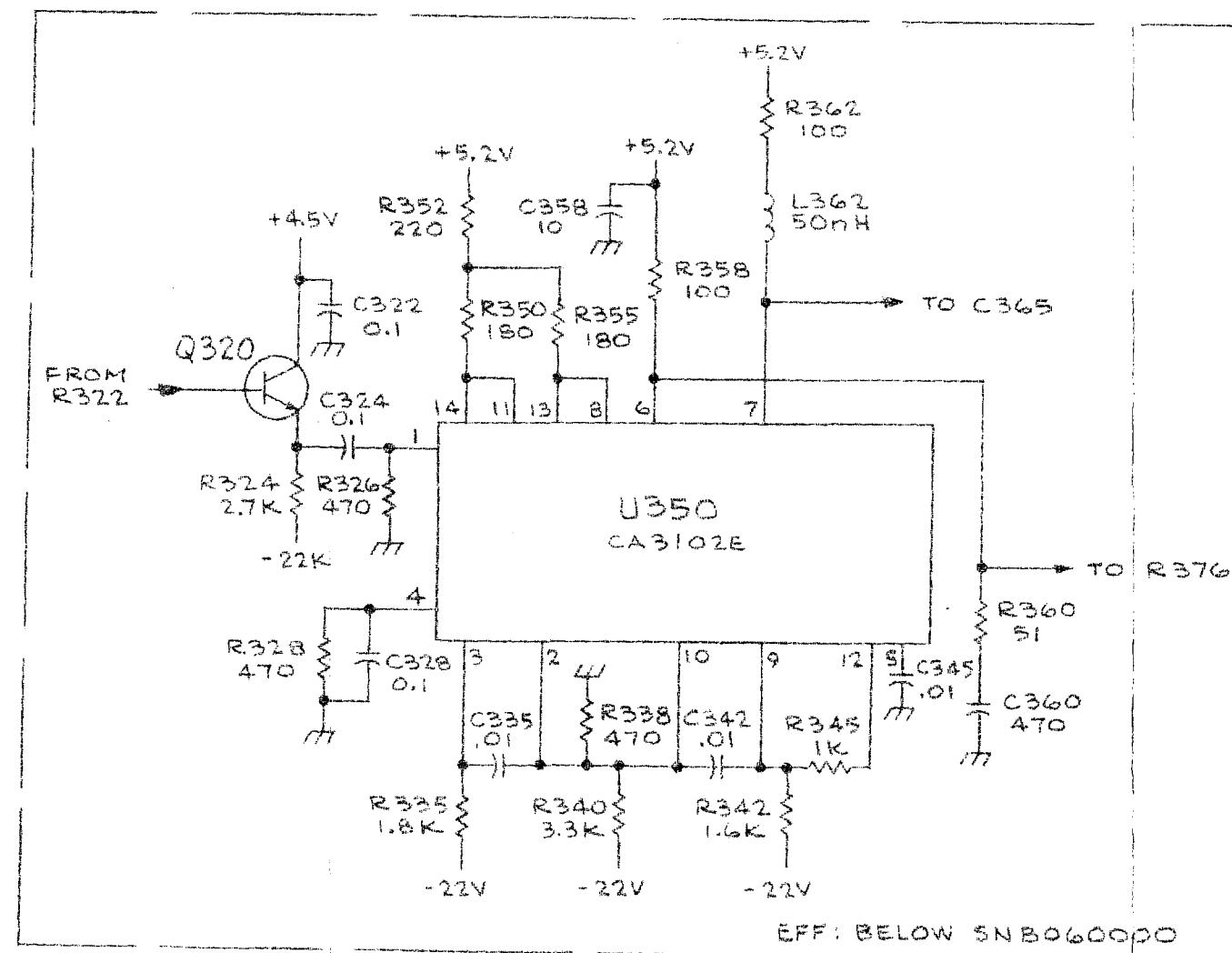
\*gnd reference: center horizontal graticule line

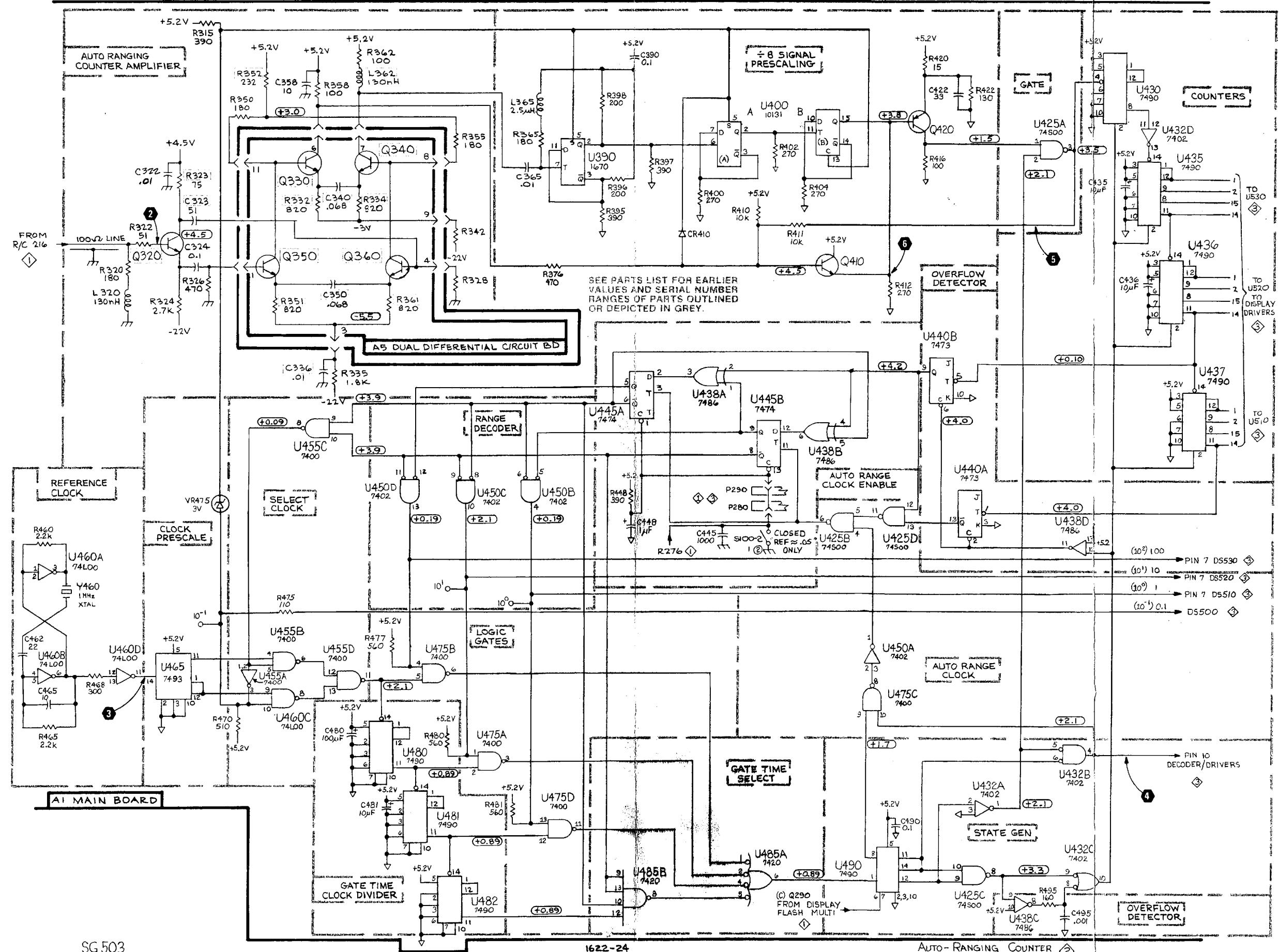
**Voltage Conditions.** The voltages shown on the diagram were obtained using a digital multimeter with a  $10 \text{ M}\Omega$  input impedance (Tektronix DM 501 Digital Multimeter or Tektronix 7D13 Digital Multimeter used with readout equipped, 7000-series oscilloscope).

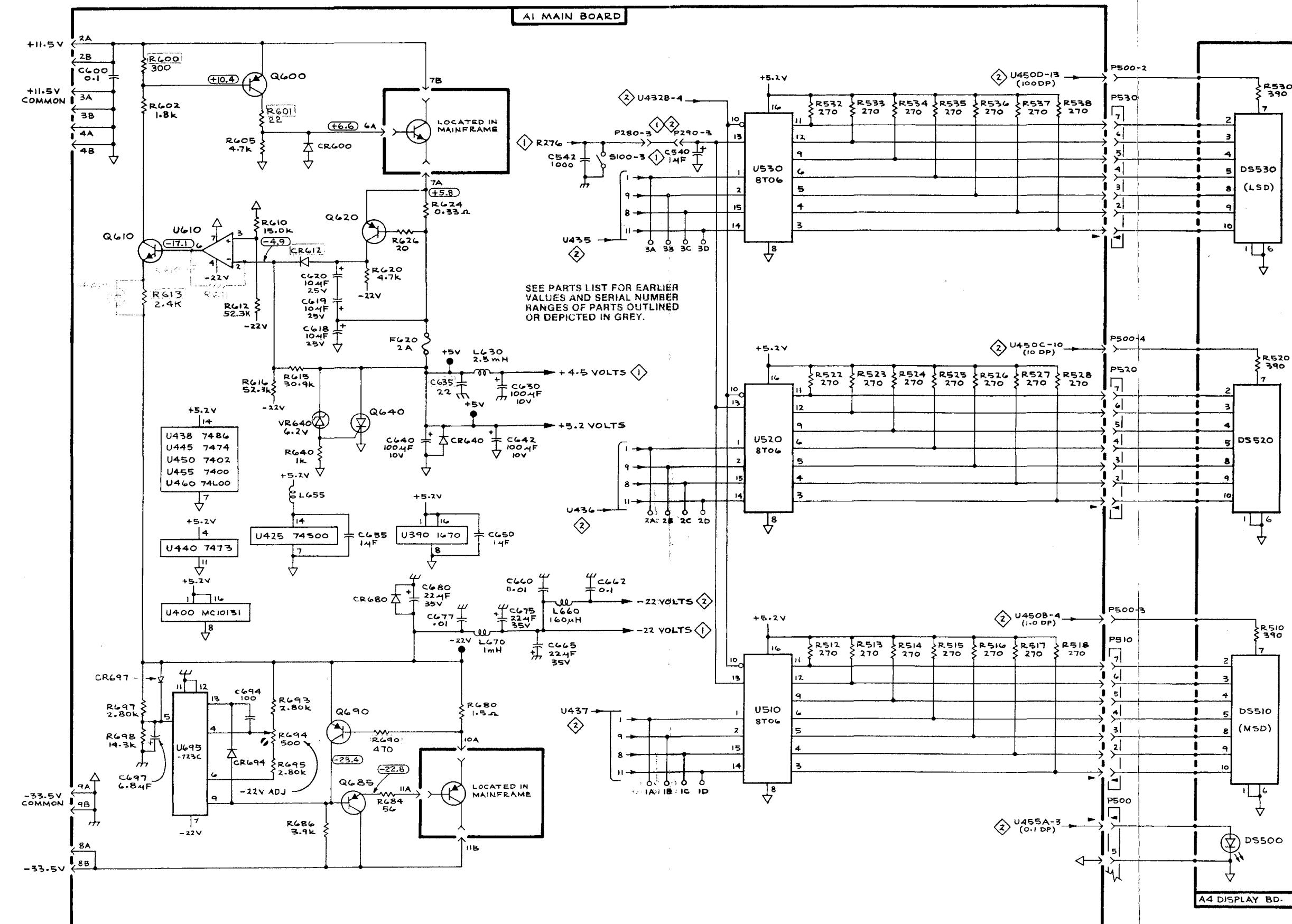
**Waveform Conditions.** The waveforms shown are actual waveform photographs taken with a Tektronix Oscilloscope Camera System and Projected Graticule. Vertical deflection factor shown on the waveform is the actual deflection factor from the probe tip. Voltages and waveforms on the diagrams are not absolute and may vary between instruments because of component tolerances, internal calibration, or front-panel settings. Readouts are simulated in larger-than-normal type.



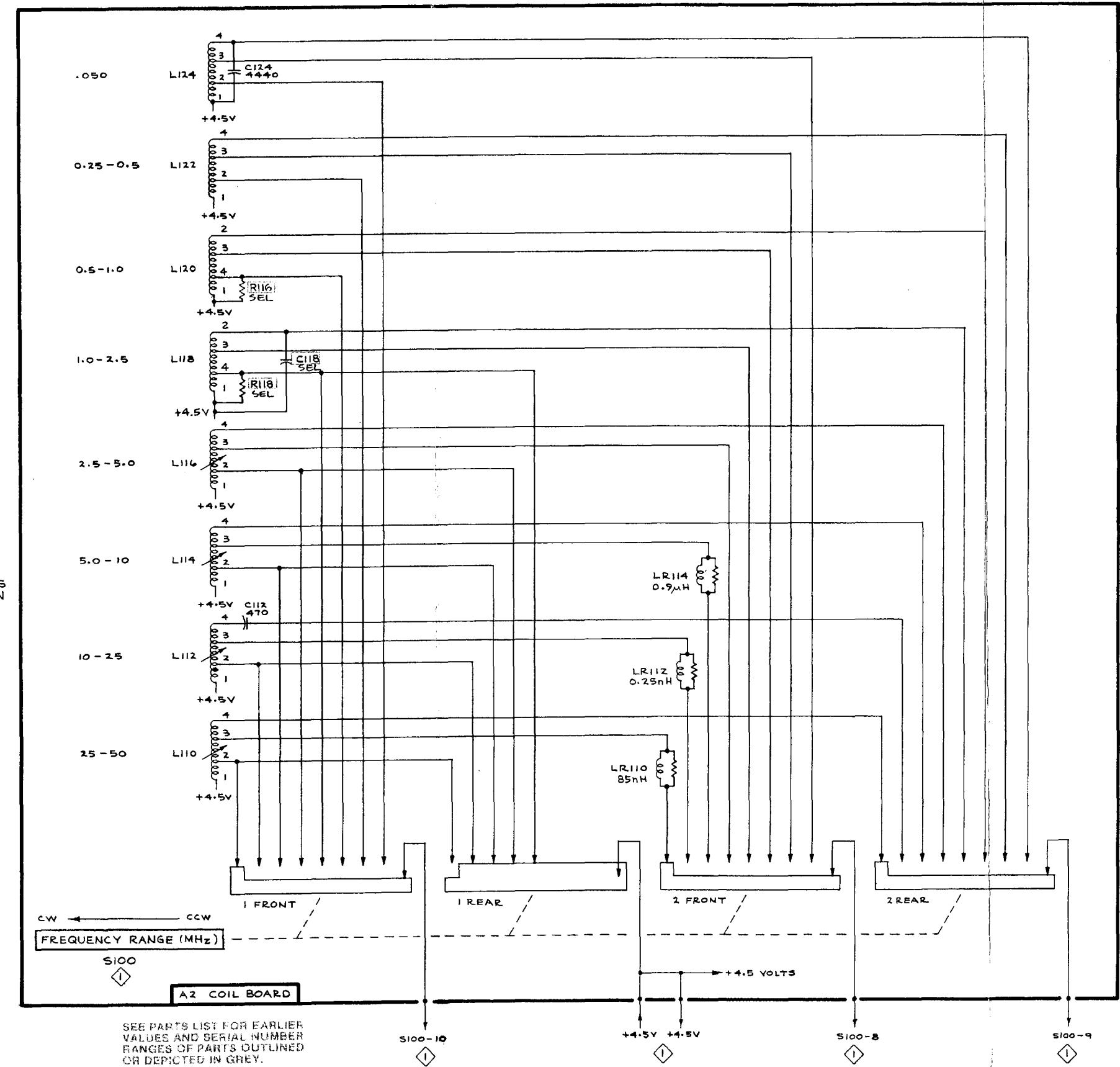
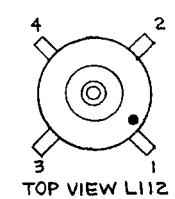
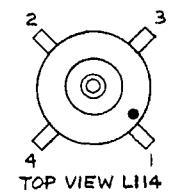
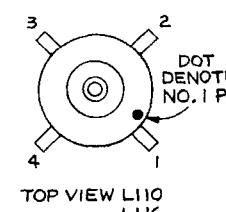
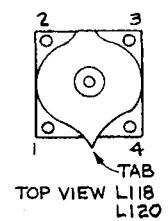
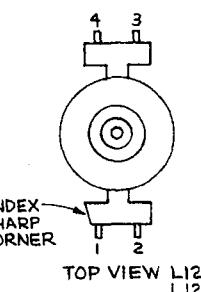








4



# 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                                   |
|-----------|--|
|           | <i>Assembly and/or Component</i>                     |
|           | <i>Attaching parts for Assembly and/or Component</i> |
| ---       | ---  |
|           | <i>Detail Part of Assembly and/or Component</i>      |
|           | <i>Attaching parts for Detail Part</i>               |
| ---       | ---  |
|           | <i>Parts of Detail Part</i>                          |
|           | <i>Attaching parts for Parts of Detail Part</i>      |
| ---       | ---  |

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           | ELCLTLT | ELECTROLYTIC          | INSUL    | INSULATOR            | SEMCOND | SEMICONDUCTOR   |
| ALIGN | ADAPTER            | ELEM    | ELEMENT               | INTL     | INTERNAL             | SHLD    | SHIELD          |
| AL    | ALIGNMENT          | EPL     | ELECTRICAL PARTS LIST | LPHLDLR  | LAMPHOLDER           | SHLDR   | SHOULDERED      |
| ASSEM | ALUMINUM           | EOPT    | EQUIPMENT             | MACH     | MACHINE              | SKT     | SOCKET          |
| ASSY  | ASSEMBLED          | EXT     | EXTERNAL              | MECH     | MECHANICAL           | SL      | SLIDE           |
| ATTEN | ASSEMBLY           | FIL     | FILLISTER HEAD        | MTG      | MOUNTING             | SLFLKG  | SELF-LOCKING    |
| AWG   | ATTENUATOR         | FLEX    | FLEXIBLE              | NIP      | NIPPLE               | SLVG    | SLEEVING        |
| BD    | AMERICAN WIRE GAGE | FLH     | FLAT HEAD             | NON WIRE | NOT WIRE WOUND       | SPR     | SPRING          |
| BRKT  | BOARD              | FLTR    | FILTER                | OBD      | ORDER BY DESCRIPTION | SD      | 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             | IDENT   | 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 Code     |
|-----------|--|-------------------------------------|---------------------------|
| 00261     | GENERAL ELECTRIC CO<br>FOOD SERVICE EQUIPMENT BUSINESS DEPT    | 14TH AND ARNOLD STS                 | CHICAGO HEIGHTS IL 60411  |
| 00779     | AMP INC  | P O BOX 3608                        | HARRISBURG PA 17105       |
| 01536     | TEXTRON INC<br>CAMCAR DIV<br>SEMS PRODUCTS UNIT                | 1818 CHRISTINA ST                   | ROCKFORD IL 61108         |
| 05129     | KILO ENGINEERING CO  | 2015 D                              | LA VERNE CA 91750         |
| 05820     | EG AND G WAKEFIELD ENGINEERING                                 | 60 AUDUBON RD                       | WAKEFIELD MA 01880        |
| 06090     | RAYCHEM CORP   | 300 CONSTITUTION DRIVE              | MENLO PARK CA 94025       |
| 06950     | VSI CORP<br>SCREMCORP DIVISION                                 | 13001 E TEMPLE AVE                  | CITY OF INDUSTRY CA 91746 |
| 08261     | SPECTRA-STRIP AN ELTRA CO                                      | 7100 LAMPSON AVE                    | GARDEN GROVE CA 92642     |
| 09922     | BURNNDY CORP   | RICHARDS AVE                        | NORMALK CT 06852          |
| 12327     | FREEMAY CORP   | 9301 ALLEN DR                       | CLEVELAND OH 44125        |
| 22526     | DU PONT E I DE NEMOURS AND CO INC<br>DU PONT CONNECTOR SYSTEMS | 30 HUNTER LANE                      | CAMP HILL PA 17011        |
| 24546     | CORNING GLASS WORKS  | 550 HIGH ST                         | BRADFORD PA 16701         |
| 42838     | NATIONAL RIVET AND MFG CO                                      | 21 EAST JEFFERSON ST                | MAUPUN MI 53963           |
| 45722     | USM CORP., PARKER-KALON FASTENER DIV                           |                                     | CAMPBELLSVILLE, KY 42718  |
| 61957     | USM CORP<br>SUB OF EMHART INDUSTRIES INC                       | 140 FEDERAL ST                      | BOSTON MA 02107           |
| 73743     | FISCHER SPECIAL MFG CO   | 446 MORGAN ST                       | CINCINNATI OH 45206       |
| 74445     | HOLD-KRONE CO  | 31 BROOK ST                         | WEST HARTFORD CT 06110    |
| 76854     | OAK SWITCH SYSTEMS INC<br>SUB OF OAK TECHNOLOGY INC            | 100 S MAIN ST                       | CRYSTAL LAKE IL 60014     |
| 77900     | SHAKEPROOF<br>DIV OF ILLINOIS TOOL WORKS                       | SAINT CHARLES RD                    | ELGIN IL 60120            |
| 78189     | ILLINOIS TOOL WORKS INC<br>SHAKEPROOF DIVISION                 | ST CHARLES ROAD                     | ELGIN IL 60120            |
| 80009     | TEKTRONIX INC  | 4900 S W GRIFFITH DR<br>P O BOX 500 | BEAVERTON OR 97077        |
| 83385     | MICRODOT MANUFACTURING INC<br>GREER-CENTRAL DIV                | 3221 W BIG BEAVER RD                | TROY MI 48098             |
| 83486     | ELCO INDUSTRIES INC  | 1101 SAMUELSON RD                   | ROCKFORD IL 61101         |
| 86113     | MICRODOT MFG INC CENTRAL SCREW-<br>KEENE DIV                   | 149 EMERALD ST                      | KEENE NH 03431            |
| 86928     | SEASTROM MFG CO INC  | 701 SONORA AVE                      | GLENDALE CA 91201         |
| 93907     | TEXTRON INC<br>CAMCAR DIV                                      | 600 18TH AVE                        | ROCKFORD IL 61101         |
| 97464     | INDUSTRIAL RETAINING RING CO                                   | 57 CORDIER ST                       | IRVINGTON NJ 07111        |
| K0099     | JACKSON BROTHERS (LONDON) LTD                                  | 258 BROADWAY                        | NEW YORK NY 10007         |
| TK0392    | NORTHWEST FASTENER SALES INC                                   | 7923 SW CIRRUS DRIVE                | BEAVERTON OR 97005        |
| TK0433    | PORTLAND SCREW CO  | 6520 N BASIN                        | PORTLAND OR 97217         |
| TK0435    | LEMIS SCREW CO   | 4114 S PEORIA                       | CHICAGO IL 60609          |
| TK0507    | O HARA METAL PRODUCTS CO                                       | 542 BRANNAN ST                      | SAN FRANCISCO CA 94107    |
| TK0845    | PARKER PRECISION PRODUCTS INC                                  | 1897 RIVER ROAD                     | CASTLETON NY 12033        |
| TK1452    | SHELLY-RAGON INC   | 8219 SW CIRRUS                      | BEAVERTON OR 97005        |

| Fig. & Index No. | Tektronix Part No. | Serial/Assembly No. | Effective | Dscont | Qty | 12345 | Name & Description   | Mfr. Code | Mfr. Part No.       |
|------------------|--------------------|---------------------|-----------|--------|-----|-------|--|-----------|---------------------|
| 1-1              | 337-1399-02        | 8010100             | B079229   |        | 1   |       | SHIELD,ELEC:<br>(SEE FIG. 2)   | 80009     | 337-1399-02         |
| -2               | 342-0196-00        |                     |           |        | 1   |       | .INSULATOR,PLATE:PUSH SMITCH,MYLAR   | 80009     | 342-0196-00         |
| -3               | 337-1399-00        | 8010100             | B029999   |        | 1   |       | SHIELD,ELEC:SIDE   | 80009     | 337-1399-00         |
|                  | 337-1399-02        | 8030000             | B079229   |        | 1   |       | SHIELD,ELEC:   | 80009     | 337-1399-02         |
| -4               | 366-1527-00        | 8010100             | B079229   |        | 1   |       | KNOB:GY,0.312 ID X 0.706 OD X 0.6 H  | 80009     | 366-1527-00         |
|                  | 366-1861-02        | 8079230             |           |        | 1   |       | KNOB:GY,0.252 ID X 0.706 OD X 0.612 H  | 80009     | 366-1861-02         |
|                  | 213-0153-00        |                     |           |        | 2   |       | .SETSCREW:5-40 X 0.125,STL   | TK0392    | ORDER BY DESCRIPTOR |
| -5               | 366-1190-00        | 8010100             | B079229   |        | 1   |       | KNOB:GY,0.252 ID X 0.706 OD X 0.6 H  | 80009     | 366-1190-00         |
|                  | 366-1190-02        | 8079230             |           |        | 1   |       | KNOB:GY,0.252 ID X 0.706 OD X 0.6 H  | 80009     | 366-1190-02         |
|                  | 213-0153-00        |                     |           |        | 2   |       | .SETSCREW:5-40 X 0.125,STL   | TK0392    | ORDER BY DESCRIPTOR |
| -6               | 366-1422-01        | 8010100             | B063069   |        | 1   |       | KNOB:LATCH   | 80009     | 366-1422-01         |
|                  | 366-1690-00        | 8063070             | B079229   |        | 1   |       | KNOB,LATCH:SIL GY,0.53 X 0.23 X 1.059<br>(SEE FIG. 2)<br>(ATTACHING PARTS)           | 80009     | 366-1690-00         |
| -7               | 214-1840-00        | 8010100             | B063069   |        | 1   |       | PIN,KNOB SECRG:0.12 L X 0.094-0.1 OD,ACETAL<br>(END ATTACHING PARTS)                 | 80009     | 214-1840-00         |
| -8               | 331-0360-00        |                     |           |        | 1   |       | DIAL,CONTROL:5 TURN,0 THRU 5.0   | 05129     | 771-S5              |
| -8.1             | 210-0940-00        |                     |           |        | 1   |       | MASHER,FLAT:0.25 ID X 0.375 OD X 0.02,STL  | 12327     | ORDER BY DESCRIPTOR |
| -9               | -----              |                     |           |        | 1   |       | RESISTOR,VARIABLE:(SEE R260 REPL)  |           |                     |
| -10              | 131-1315-00        | 8010100             | B065059   |        | 1   |       | CONN,RCPT,ELEC:BNC,FEMALE  | 80009     | 131-1315-00         |
|                  | 131-1315-01        | 8065060             |           |        | 1   |       | CONN,RCPT,ELEC:BNC,FEMALE  | 80009     | 131-1315-01         |
| -11              | 401-0270-00        |                     |           |        | 1   |       | GR ASSY,SP RDCN:5 TO 1   | K0099     | 4112/P/MOD          |
| -12              | 333-1864-00        | 8010100             | B079229   |        | 1   |       | PANEL,FRONT:<br>(SEE FIG. 2)<br>(ATTACHING PARTS)                                    | 80009     | 333-1864-00         |
| -13              | 211-0034-00        | 8010100             | B079229   |        | 2   |       | SCREW,MACHINE:2-56 X 0.5,PNH,STL   | 06950     | ORDER BY DESCRIPTOR |
| -14              | 210-0405-00        | 8010100             | B079229   |        | 2   |       | NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL   | 73743     | 12157-50            |
|                  | 211-0244-00        | 8079230             |           |        | 2   |       | SCR,ASSEM MSHR:4-40 X 0.312,PNH STL<br>(END ATTACHING PARTS)                         | 01536     | ORDER BY DESCRIPTOR |
| -15              | 214-1513-01        | 8010100             | B063069   |        | 1   |       | LCH,PL-IN RTNG:PLASTIC   | 80009     | 214-1513-01         |
|                  | 105-0719-00        | 8063070             | B079229   |        | 1   |       | LATCH,RETAINING:PLUG-IN<br>(SEE FIG. 2)<br>(ATTACHING PARTS)                         | 80009     | 105-0719-00         |
| -16              | 213-0254-00        | 8010100             | B079229   |        | 1   |       | SCREW,TPG,TF:2-32 X 0.25,TYPE B,FLH,100 DEG<br>(SEE FIG. 2)<br>(END ATTACHING PARTS) | 45722     | ORDER BY DESCRIPTOR |
|                  | 105-0718-00        | 8063070             | B064589   |        | 1   |       | BAR,LATCH RLSE:  | 80009     | 105-0718-00         |
|                  | 105-0718-01        | 8064590             | B079229   |        | 1   |       | BAR,LATCH RLSE:<br>(SEE FIG. 2)  | 80009     | 105-0718-01         |
| -17              | 386-2848-00        | 8010100             | B079229   |        | 1   |       | SUBPANEL,FRONT:<br>(SEE FIG. 2)<br>(ATTACHING PARTS)                                 | 80009     | 386-2848-00         |
| -18              | 213-0229-00        | 8010100             | B064869   |        | 4   |       | SCREW,TPG,TF:6-20 X 0.375,TYPE B,FLH,STL   | 93907     | ORDER BY DESCRIPTOR |
|                  | 213-0123-00        | 8064870             | B079229   |        | 4   |       | SCREW,TPG,TF:6-32 X 0.375,SPCL TYPE,FLH<br>(END ATTACHING PARTS)                     | 93907     | 234-21940-026       |
| -19              | 337-1956-00        | 8064870             | B079229   |        | 1   |       | SHIELD,ELEC:REAR SUBPANEL<br>(SEE FIG. 2)  | 80009     | 337-1956-00         |
| -20              | 337-2171-00        |                     |           |        | 1   |       | SHIELD,ELEC:CAPACITOR<br>(ATTACHING PARTS)   | 80009     | 337-2171-00         |
| -21              | 211-0116-00        | 8010100             | B067249   |        | 1   |       | SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP   | 77900     | ORDER BY DESCRIPTOR |
|                  | 211-0292-00        | 8067250             |           |        | 1   |       | SCR,ASSEM MSHR:4-40 X 0.29,PNH,BRS NI PL   | 78189     | 51-040445-01        |
| -22              | 210-0406-00        |                     |           |        | 1   |       | NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL   | 73743     | 12161-50            |
| -23              | 211-0030-00        |                     |           |        | 1   |       | SCREW,MACHINE:2-56 X 0.25,FLH,82 DEG,STL   | TK0435    | ORDER BY DESCRIPTOR |
| -24              | 210-0405-00        |                     |           |        | 1   |       | NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL   | 73743     | 12157-50            |
| -25              | 210-0001-00        |                     |           |        | 1   |       | MASHER,LOCK:#2 INTL,0.013 THK,STL  | 77900     | 1202-00-00-0541C    |
| -26              | 213-0206-00        |                     |           |        | 1   |       | SCREW,TPG,TF:6-32 X 1.25,SPCL TYPE,PNH,STL<br>(END ATTACHING PARTS)                  | 86113     | ORDER BY DESCRIPTOR |
| -27              | 361-0516-00        |                     |           |        | 1   |       | SPACER,SLEEVE:0.986 L X 0.157 ID,BRS   | 80009     | 361-0516-00         |
| -28              | 214-1989-00        | 8010100             | B079229   |        | 1   |       | LEVER,SLIDE SM:  | 80009     | 214-1989-00         |
|                  | 214-1989-01        | 8079230             |           |        | 1   |       | LEVER,SLIDE SM:<br>(ATTACHING PARTS)   | 80009     | 214-1989-01         |
| -29              | 354-0165-00        |                     |           |        | 1   |       | RING,RETAINING:TYPE E EXT,U/O 0.156 OD SFT<br>(END ATTACHING PARTS)                  | 97464     | 1000-15-ZD          |
| -30              | 211-0116-00        | 8010100             | B067249   |        | 1   |       | SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP   | 77900     | ORDER BY DESCRIPTOR |
|                  | 211-0292-00        | 8067250             |           |        | 1   |       | SCR,ASSEM MSHR:4-40 X 0.29,PNH,BRS NI PL   | 78189     | 51-040445-01        |
| -31              | 343-0470-00        |                     |           |        | 1   |       | RTNR,PIVOT PIN:STAINLESS STEEL   | 80009     | 343-0470-00         |

## Scan by Zenith

Replaceable Mechanical Parts - SG 503

| Fig. &<br>Index<br>No. | Tektronix<br>Part No. | Serial/Assembly No.<br>Effective | Qty | 12345   | Name & Description | Mfr.<br>Code | Mfr. Part No.       |
|------------------------|-----------------------|----------------------------------|-----|---|--------------------|--------------|---------------------|
| 1-32                   | 214-2036-00           |                                  | 1   | PIN,PIVOT:SWITCH LEVER  |                    | 80009        | 214-2036-00         |
| -33                    | 376-0154-00           |                                  | 1   | ADAPTER,SW ACTR:OUTPUT ATTEN  |                    | 80009        | 376-0154-00         |
| -34                    | 384-1223-00           |                                  | 1   | EXTENSION SHAFT:LEVER SWITCH  |                    | 80009        | 384-1223-00         |
| -35                    | -----                 |                                  | 1   | CKT BOARD ASSY:DISPLAY(SEE A4 REPL)                                 |                    |              |                     |
| -36                    | 378-0746-00           | B010100                          | 1   | LENS-HLDR,IND L:  |                    | 80009        | 378-0746-00         |
|                        | 378-0746-01           | B063299                          | 1   | .LENS-HLDR,IND L:   |                    | 80009        | 378-0746-01         |
| -37                    | 162-0589-00           |                                  | AR  | .INSUL SLVG,ELEC:HT SHRINK,0.125 ID                                 |                    | 06090        | VERSAFIT            |
| -38                    | -----                 |                                  | 1   | CKT BOARD ASSY:ATTENUATOR(SEE A3 REPL)<br>(ATTACHING PARTS)         |                    |              |                     |
| -39                    | 211-0101-00           |                                  | 2   | SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL<br>(END ATTACHING PARTS)  |                    | TK0435       | ORDER BY DESCRIPTOR |
|                        |                       |                                  |     | CKT BOARD ASSY INCLUDES:  |                    |              |                     |
| -40                    | 211-0116-00           | B010100                          | 4   | .SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP                             |                    | 77900        | ORDER BY DESCRIPTOR |
|                        | 211-0292-00           | B067250                          | 4   | .SCR,ASSEM MSHR:4-40 X 0.29,PNH,BRS NI PL                           |                    | 78189        | 51-040445-01        |
|                        | 210-1171-00           | B030000                          | 1   | .WASHER,SHLDR:0.12 ID X 0.143 OD,NYLON                              |                    | 00261        | A7148516P2          |
| -41                    | 337-2016-00           |                                  | 1   | .SHIELD,ELEC:HIGH FREQUENCY OSCILLATOR<br>(ATTACHING PARTS)         |                    | 80009        | 337-2016-00         |
| -42                    | 213-0055-00           |                                  | 10  | .SCREW,TPG,TF:2-32 X 0.188,TYPE B,PNH,STL                           |                    | 93907        | ORDER BY DESCRIPTOR |
| -43                    | 210-0259-00           |                                  | 1   | .TERMINAL,LUG:0.099 ID,LOCKING,BRS CD PL<br>(END ATTACHING PARTS)   |                    | 80009        | 210-0259-00         |
|                        | 105-0588-00           |                                  | 1   | .ACTR ASSY,SL SW:OUTPUT ATTEN                                       |                    | 80009        | 105-0588-00         |
| -44                    | 214-1126-01           |                                  | 2   | .SPRING,FLAT:0.7 X 0.125,CU BE GRN CLR                              |                    | 80009        | 214-1126-01         |
| -45                    | 351-0355-00           |                                  | 1   | .GUIDE,SLIDE SW:GRAY POLYCARBONATE                                  |                    | 80009        | 351-0355-00         |
| -46                    | 214-1127-00           |                                  | 2   | .ROLLER,DETENT:0.125 DIA X 0.125,SST                                |                    | 80009        | 214-1127-00         |
| -47                    | 105-0511-00           |                                  | 1   | .ACTUATOR,SWITCH:OUTPUT ATTEN                                       |                    | 80009        | 105-0511-00         |
| -48                    | -----                 |                                  | 1   | .TRANSISTOR:(SEE Q190 REPL)<br>(ATTACHING PARTS)                    |                    |              |                     |
| -49                    | 220-0555-00           |                                  | 1   | .NUT,PLAIN,HEX:8-32 X 0.25 HEX,STL CD PL                            |                    | TK0433       | ORDER BY DESCRIPTOR |
|                        | 210-0224-00           | B010100                          | 1   | .TERMINAL,LUG:0.2 ID,PLAIN,BRS TIN PL                               |                    | 86928        | A373-148-1          |
| -50                    | 210-0804-00           |                                  | 1   | .WASHER,FLAT:0.17 ID X 0.375 OD,STL                                 |                    | 86928        | 76430-000           |
| -51                    | 342-0265-00           |                                  | 1   | .INSULATOR,MSHR:0.322 ID X 0.75 OD X 0.17<br>(END ATTACHING PARTS)  |                    | TK0845       | 140A362H09          |
| -52                    | 131-1003-00           |                                  | 1   | .CONN,RCPT,ELEC:CKT BD MT,3 PRONG                                   |                    | 80009        | 131-1003-00         |
| -53                    | 136-0252-01           |                                  | 1   | .SOCKET,PIN TERM:U/W D.0.19 DIA PINS                                |                    | 00779        | 1-332095-2          |
| -54                    | 131-1030-00           |                                  | 4   | .CONT ASSY,ELEC:CAM SMITCH,BOTTOM                                   |                    | 80009        | 131-1030-00         |
| -55                    | 131-1031-00           |                                  | 4   | .CONT ASSY,ELEC:CAM SMITCH,TOP                                      |                    | 80009        | 131-1031-00         |
| -56                    | 210-0779-00           | B010100                          | 4   | .RIVET,TUBULAR:0.115 L X 0.05 OD,08L END                            |                    | 42838        | RA-29952715         |
|                        | 210-3082-00           | B066397                          | 4   | .EYELET,METALLIC:0.047 OD X 0.133 L,BRS NP                          |                    | 61957        | S6494 (MODIFIED)    |
| -57                    | 136-0327-01           | B010100                          | 10  | .SOCKET,PIN TERM:0.067 INCH DIA                                     |                    | 00779        | 86281-2             |
|                        | 136-0263-04           | B051400                          | 10  | .SOCKET,PIN TERM:U/W 0.025 SQ PIN                                   |                    | 22526        | 75377-001           |
| -58                    | 131-0589-00           |                                  | 4   | .TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ                              |                    | 22526        | 48283-029           |
| -59                    | 214-2132-00           |                                  | 1   | .HEAT SINK,XSTR:(2)NUTS,(2)STUDS<br>(ATTACHING PARTS)               |                    | 80009        | 214-2132-00         |
| -60                    | 210-0406-00           |                                  | 3   | .NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL                               |                    | 73743        | 12161-50            |
| -61                    | 210-0054-00           |                                  | 3   | .WASHER,LOCK:#4 SPLIT,0.025 THK STL                                 |                    | 78189        | ORDER BY DESCRIPTOR |
| -62                    | 210-0956-00           |                                  | 3   | .WASHER,FLAT:0.12 ID X 0.25 OD X 0.034,SST<br>(END ATTACHING PARTS) |                    | 80009        | 210-0956-00         |
| -63                    | -----                 |                                  | 2   | .ATTENUATOR,FXD:(SEE U240 & U245)<br>(ATTACHING PARTS)              |                    |              |                     |
| -64                    | 214-1797-00           |                                  | 4   | .PIN,ATTEN CLIP:  |                    | 80009        | 214-1797-00         |
| -65                    | 344-0248-00           |                                  | 2   | .CLIP,ATTENUATOR:0.866 L,CU BE<br>(END ATTACHING PARTS)             |                    | 80009        | 344-0248-00         |
| -66                    | -----                 |                                  | 1   | .MICROCIRCUIT,DI:(SEE U225 REPL)<br>(ATTACHING PARTS)               |                    |              |                     |
| -67                    | 210-0405-00           |                                  | 2   | .NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL                               |                    | 73743        | 12157-50            |
| -68                    | 211-0180-00           |                                  | 2   | .SCR,ASSEM MSHR:2-56 X 0.25,PNH,BRS,NP,POZ<br>(END ATTACHING PARTS) |                    | TK0435       | ORDER BY DESCRIPTOR |
| -69                    | 337-2017-00           |                                  | 1   | .SHIELD,ELEC:HIGH FREQUENCY OSCILLATOR                              |                    | 80009        | 337-2017-00         |
| -70                    | -----                 |                                  | 1   | CKT BOARD ASSY:COIL(SEE A2 REPL)<br>(ATTACHING PARTS)               |                    |              |                     |
| -71                    | 213-0146-00           | B010100                          | 3   | SCREW,TPG,TF:6-20 X 0.312,TYPE B,PNH,STL                            |                    | 83385        | ORDER BY DESCRIPTOR |
|                        | 210-0261-00           | B029999                          | 1   | TERMINAL,LUG:0.14 ID,PLAIN,BRASS<br>(END ATTACHING PARTS)           |                    | 80009        | 210-0261-00         |
|                        |                       |                                  |     | .SM CAM ACTR AS:(SEE S100 REPL)<br>(ATTACHING PARTS)                |                    |              |                     |
| -72                    | 211-0116-00           | B010100                          | 4   | .SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP                             |                    | 77900        | ORDER BY DESCRIPTOR |

Fig. &amp;

| Index<br>No. | Tektronix<br>Part No. | Serial/Assembly No.<br>Effective | Dscont  | Qty | 12345 | Name & Description  | Mfr.<br>Code | Mfr. Part No.       |
|--------------|-----------------------|----------------------------------|---------|-----|-------|---|--------------|---------------------|
| 1-           | 211-0292-00           | 8062810                          |         | 4   |       | .SCR,ASSEM MSHR:4-40 X 0.29,PNH,BRS NI PL<br>.END ATTACHING PARTS<br>.ACTUATOR ASSY INCLUDES: | 78189        | 51-040445-01        |
| -73          | 200-1647-00           |                                  |         | 1   |       | .COVER,CAM SW:11 ELEMENTS<br>.ATTACHING PARTS   | 80009        | 200-1647-00         |
| -74          | 211-0008-00           |                                  |         | 3   |       | .SCREW,MACHINE:4-40 X 0.25,PNH,STL  | 93907        | ORDER BY DESCRIPTOR |
| -75          | 210-0004-00           |                                  |         | 3   |       | .WASHER,LOCK:#4 INTL,0.015 THK,STL  | 77900        | 1204-00-00-0541C    |
| -76          | 211-0097-00           |                                  |         | 1   |       | .SCREW,MACHINE:4-40 X 0.312,PNH,STL   | TK0435       | ORDER BY DESCRIPTOR |
| -77          | 210-0994-00           |                                  |         | 1   |       | .WASHER,FLAT:0.125ID X 0.250D X 0.022   | 86928        | A371-283-20         |
| -78          | 343-0144-00           |                                  |         | 1   |       | .CLAMP,LOOP:0.125 ID,NYLON<br>.END ATTACHING PARTS  | TK1452       | ORDER BY DESCRIPTOR |
| -79          | 131-0963-00           |                                  |         | 2   |       | .CONTACT,ELEC:GROUNDING,PH BRZ,W/BRACKET  | TK0507       | ORDER BY DESCRIPTOR |
| -80          | 210-0406-00           |                                  |         | 2   |       | .NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL   | 73743        | 12161-50            |
| -81          | 354-0391-00           |                                  |         | 1   |       | .RING,RETAINING:EXT,U/O 0.438 DIA SFT   | 80009        | 354-0391-00         |
| -82          | 214-1139-03           |                                  |         | 2   |       | .SPRING,FLAT:0.885 X 0.156 CU BE RED CLR  | 80009        | 214-1139-03         |
| -83          | 214-1127-00           |                                  |         | 2   |       | .ROLLER,DETENT:0.125 DIA X 0.125,SST  | 80009        | 214-1127-00         |
| -84          | 401-0081-02           |                                  |         | 1   |       | .BEARING,CAM SW:FRONT W/O MOUNTING BOSSES   | 80009        | 401-0081-02         |
| -85          | 263-0521-00           |                                  |         | 1   |       | .SM SECTION,RTRY:HYBRID,BAND CAM SW   | 76854        | ORDER BY DESCRIPTOR |
| -86          | 386-3069-00           |                                  |         | 1   |       | .PLATE,SM MTG:BAND<br>.ATTACHING PARTS  | 80009        | 386-3069-00         |
| -87          | 211-0022-00           |                                  |         | 2   |       | .SCREW,MACHINE:2-56 X 0.188,PNH,STL   | TK0435       | ORDER BY DESCRIPTOR |
| -88          | 210-0001-00           |                                  |         | 2   |       | .WASHER,LOCK:#2 INTL,0.013 THK,STL<br>.END ATTACHING PARTS                                    | 77900        | 1202-00-00-0541C    |
| -89          | 105-0599-00           |                                  |         | 1   |       | .ACTUATOR,CAM SW:BAND SMITCH  | 80009        | 105-0599-00         |
| -90          | 210-0406-00           |                                  |         | 4   |       | .NUT,PLAIN,HEX:4-40 X 0.188,BRS CD PL   | 73743        | 12161-50            |
| -91          | 401-0113-01           |                                  |         | 1   |       | .BEARING,CAM SW:W/INSERT  | 80009        | 401-0113-01         |
| -92          | -----                 | 8060000                          |         | 1   |       | .CKT BOARD ASSY:DUAL H.F.DIFF(SEE A5 REPL)  |              |                     |
| -93          | -----                 |                                  |         | 1   |       | .CKT BOARD ASSY:MAIN(SEE A1 REPL)   |              |                     |
| -94          | 129-0455-00           |                                  |         | 4   |       | .SPACER,POST:0.305 L,4-40 THRU,BRS,CU SN<br>.ZN PL,0.25 OD                                    | 80009        | 129-0455-00         |
| -95          | 131-0566-00           |                                  |         | 3   |       | .BUS,COND:DUMMY RES,0.094 OD X 0.225L   | 24546        | 0MA 07              |
| -96          | 131-0589-00           |                                  |         | 14  |       | .TERMINAL,PIN:0.46 L X 0.025 SQ PH BRZ  | 22526        | 48283-029           |
| -97          | 131-0608-00           |                                  |         | 33  |       | .TERMINAL,PIN:0.365 L X 0.025 BRZ GLD PL  | 22526        | 48283-036           |
| -98          | 131-1030-00           |                                  |         | 11  |       | .CONT ASSY,ELEC:CAM SMITCH,BOTTOM   | 80009        | 131-1030-00         |
| -99          | 131-1031-00           |                                  |         | 11  |       | .CONT ASSY,ELEC:CAM SMITCH,TOP  | 80009        | 131-1031-00         |
| -100         | 210-0779-00           | 8010100                          | 8066396 | 11  |       | .RIVET,TUBULAR:0.115 L X 0.05 OD,DBL END  | 42838        | RA-29952715         |
|              | 210-3082-00           | 8066397                          |         | 11  |       | .EYELET,METALLIC:0.047 OD X 0.133 L,BRS NP  | 61957        | S6494 (MODIFIED)    |
| -101         | 136-0252-04           | 8010100                          | B059999 | 73  |       | .SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS   | 22526        | 75060-007           |
|              | 136-0252-04           | 8060000                          |         | 66  |       | .SOCKET,PIN TERM:U/W 0.016-0.018 DIA PINS   | 22526        | 75060-007           |
| -102         | 136-0514-00           | 8010100                          | B068599 | 2   |       | .SKT,PL-IN ELEC:MICROCIRCUIT,8 DIP  | 09922        | DILB8P-108          |
|              | 136-0727-00           | 8068600                          |         | 2   |       | .SKT,PL-IN ELEC:MICROCKT,8 CONTACT  | 09922        | DILB8P-108          |
| -103         | 136-0260-02           | 8010100                          | B068599 | 3   |       | .SKT,PL-IN ELEC:MICROCKT,16 DIP,LOM CL  | 09922        | DILB16P-108T        |
| -104         | 136-0269-02           | 8010100                          | B068599 | 18  |       | .SKT,PL-IN ELEC:MICROCIRCUIT,14 DIP   | 09922        | DILB14P-108T        |
|              | 136-0728-00           | 8068600                          |         | 1   |       | .SKT,PL-IN ELEC:MICROCKT,14 CONTACT   | 09922        | DILB14P-108         |
| -105         | 376-0011-01           | 8010100                          | B057799 | 1   |       | .CPLG,SHAFT,FLEX:0.252 ID X 0.438 OD,NYLON  | 80009        | 376-0011-01         |
|              | 213-0048-00           | 8010100                          | B057799 | 2   |       | .SETSCREW:4-40 X 0.125,STL  | TK0392       | ORDER BY DESCRIPTOR |
|              | 376-0172-00           | 8057800                          |         | 1   |       | .CPLG,SHAFT,RGD:0.25 ID X 0.75 OD,DELRIN  | K0099        | 5610/4-40           |
| -106         | 213-0075-00           | 8057800                          |         | 4   |       | .SETSCREW:4-40 X 0.094,STL  | 74445        | ORDER BY DESCRIPTOR |
| -107         | -----                 |                                  |         | 1   |       | .CAPACITOR,VAR AIR:(SEE C100 REPL)<br>.ATTACHING PARTS  |              |                     |
| -108         | 211-0503-00           |                                  |         | 2   |       | .SCREW,MACHINE:6-32 X 0.188,PNH,STL   | TK0435       | ORDER BY DESCRIPTOR |
| -109         | 210-0801-00           |                                  |         | 2   |       | .WASHER,FLAT:0.14 ID X 0.281 OD X 0.25,BRS<br>.END ATTACHING PARTS                            | 12327        | 31724-000           |
| -110         | 214-1292-00           |                                  |         | 2   |       | .HEAT SINK,XSTR:T0-5,SIL BRZ PTD BLACK  | 05820        | 205SB               |
| -111         | 344-0154-00           |                                  |         | 2   |       | .CLIP,ELECTRICAL:FUSE,CKT BD MT   | 80009        | 344-0154-00         |
| -112         | 337-2264-00           | 8030000                          |         | 1   |       | .SHIELD,ELEC:CIRCUIT BOARD  | 80009        | 337-2264-00         |
| -113         | 214-1061-00           | 8010100                          | B079229 | 1   |       | CONTACT,ELEC:GROUNDING,CU BE<br>(SEE FIG. 2)  | 80009        | 214-1061-00         |
| -114         | 426-0725-05           | 8010100                          | B079229 | 1   |       | FR SECT,PLUG-IN:TOP<br>(SEE FIG. 2)   | 80009        | 426-0725-05         |
| -115         | 386-3657-00           | 8063090                          | B065150 | 2   |       | SUPPORT,PLUG-IN:  | 80009        | 386-3657-00         |
|              | 386-3657-01           | 8065151                          |         | 2   |       | SUPPORT,PLUG-IN:  | 93907        | ORDER BY DESCRIPTOR |
| -116         | 210-1270-00           | 8063090                          | B079229 | 2   |       | WASHER,FLAT:0.141 ID X 0.219 OD X 0.04,AL   | 80009        | 210-1270-00         |
| -117         | 426-0724-08           | 8010100                          | B079229 | 1   |       | FR SECT,PLUG-IN:BOTTOM<br>(SEE FIG. 2)  | 80009        | 426-0724-08         |
|              | 198-2210-00           |                                  |         | 1   |       | MIRE SET,ELEC:  | 80009        | 198-2210-00         |
| -118         | 210-0774-00           |                                  |         | 2   |       | EYELET,METALLIC:0.152 OD X 0.218 L  | 80009        | 210-0774-00         |

## Scan by Zenith

Replaceable Mechanical Parts - SG 503

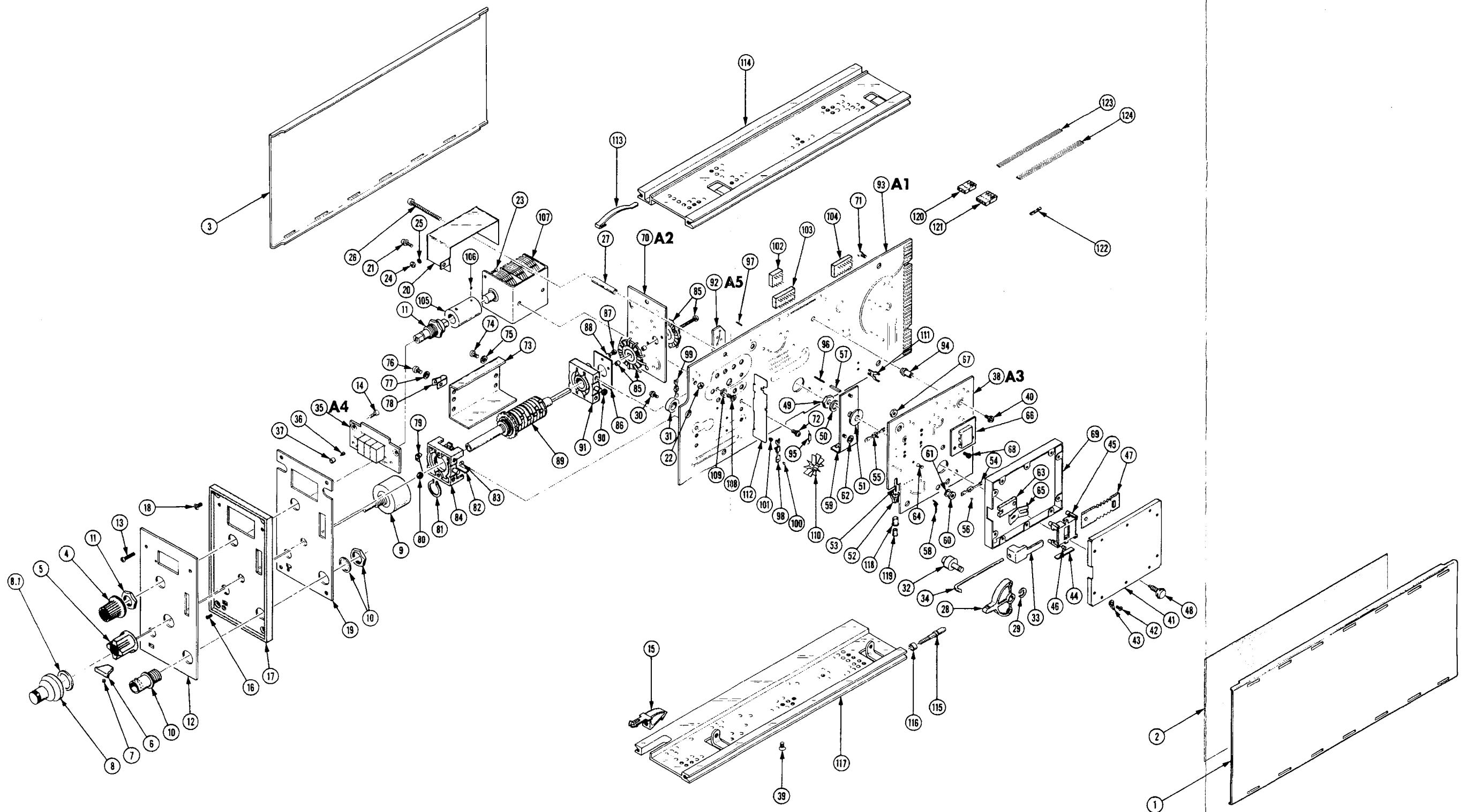
Fig. &amp;

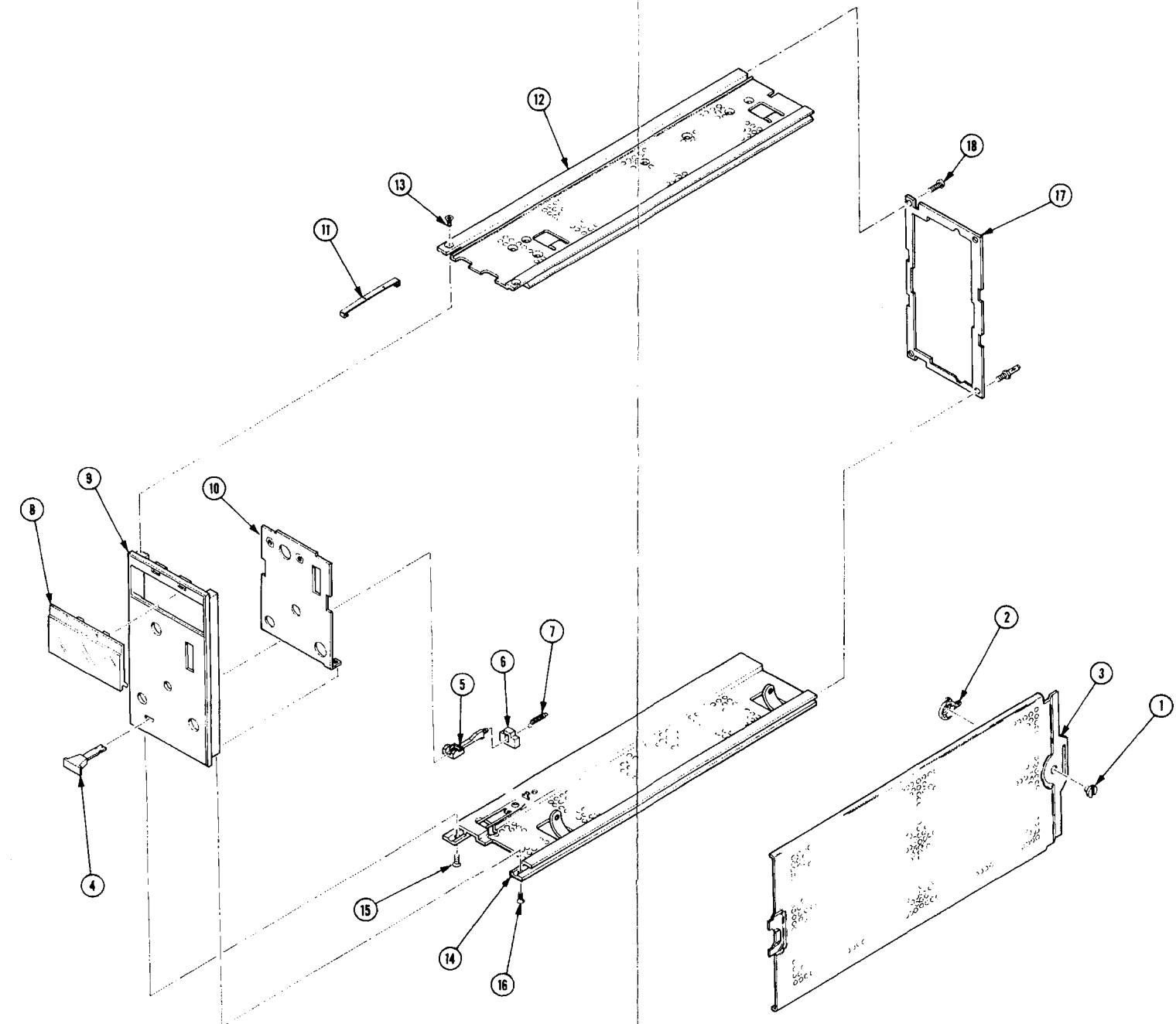
| Index<br>No. | Tektronix<br>Part No. | Serial/Assembly No.<br>Effective | Dscont | Qty                                      | 12345                                    | Name & Description | Mfr.<br>Code | Mfr. Part No. |
|--------------|-----------------------|----------------------------------|--------|--|--|--------------------|--------------|---------------|
| 1-119        | 210-0775-00           |                                  |        | 2  | .EYELET,METALLIC:0.126 OD X 0.205 L      |                    | 80009        | 210-0775-00   |
| -120         | 352-0161-03           |                                  |        | 1  | .HLDR,TERM CONN:3 WIRE,ORANGE            |                    | 80009        | 352-0161-03   |
| -121         | 352-0162-01           |                                  |        | 1  | .HLDR,TERM CONN:4 WIRE,BROWN             |                    | 80009        | 352-0162-01   |
|              | 352-0162-06           |                                  |        | 2  | .HLDR,TERM CONN:4 WIRE,BLUE              |                    | 80009        | 352-0162-06   |
| -122         | 131-0707-00           |                                  |        | 11                                       | .CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL |                    | 22526        | 47439-000     |
|              | 352-0165-04           |                                  |        | 1  | .HLDR,TERM CONN:7 WIRE,YELLOW            |                    | 80009        | 352-0165-04   |
| -123         | 175-0826-00           |                                  | AR     | CABLE,SP,ELEC:3,26 AWG,STRD,PVC JKT,RBN  |  |                    | 80009        | 175-0826-00   |
| -124         | 175-0827-00           |                                  | AR     | .CABLE,SP,ELEC:4,26 AWG,STRD,PVC JKT,RBN |  |                    | 08261        | 111-2699-954  |
|              | 175-5369-00           |                                  |        | 1  | CA ASSY,SP,ELEC:5,26 AWG,13.0 L,RIBBON   |                    | 80009        | 175-5369-00   |
|              | 131-0707-00           |                                  |        | 5  | .CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL |                    | 22526        | 47439-000     |
|              | 352-0163-01           |                                  |        | 1  | .HLDR,TERM CONN:5 WIRE,BROWN             |                    | 80009        | 352-0163-01   |
|              | 175-5370-00           |                                  |        | 1  | CA ASSY,SP,ELEC:7,26 AWG,11.0 L,RIBBON   |                    | 80009        | 175-5370-00   |
|              | 131-0707-00           |                                  |        | 7  | .CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL |                    | 22526        | 47439-000     |
|              | 352-0165-02           |                                  |        | 1  | .HLDR,TERM CONN:7 WIRE,RED               |                    | 80009        | 352-0165-02   |
|              | 175-5976-00           |                                  |        | 1  | CA ASSY,SP,ELEC:26 AWG,10.0 L,RIBBON     |                    | 80009        | 175-5976-00   |
|              | 131-0707-00           |                                  |        | 7  | .CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL |                    | 22526        | 47439-000     |
|              | 352-0165-04           |                                  |        | 1  | .HLDR,TERM CONN:7 WIRE,YELLOW            |                    | 80009        | 352-0165-04   |
|              | 175-5977-00           |                                  |        | 1  | CA ASSY,SP,ELEC:26 AWG,8.0 L,RIBBON      |                    | 80009        | 175-5977-00   |
|              | 131-0707-00           |                                  |        | 7  | .CONTACT,ELEC:22-26 AWG,BRS,CU BE GLD PL |                    | 22526        | 47439-000     |
|              | 352-0165-05           |                                  |        | 1  | .HLDR,TERM CONN:7 WIRE,GREEN             |                    | 80009        | 352-0165-05   |

| Fig. &<br>Index<br>No. | Tektronix<br>Part No. | Serial/Assembly No.<br>Effective | Dscont | Qty | 12345 | Name & Description                                 | Mfr.<br>Code | Mfr.<br>Part No., |
|------------------------|-----------------------|----------------------------------|--------|-----|-------|--|--------------|-------------------|
| 2-1                    | 105-0932-00           |                                  |        | 2   |       | LATCH,PANEL:SIDE                                   | 80009        | 105-0932-00       |
| -2                     | 214-3364-00           |                                  |        | 2   |       | FASTENER,LATCH:ACETAL,SIL GRAY                     | 80009        | 214-3364-00       |
| -3                     | 337-3211-00           |                                  |        | 2   |       | SHIELD,ELEC:<br>(ASSY;INCLUDES LATCH AND FASTENER) | 80009        | 337-3211-00       |
| -4                     | 366-1851-01           |                                  |        | 1   |       | KNOB,LATCH:IVORY GY,0.625 X 0.25 X 1.09            | 80009        | 366-1851-01       |
| -5                     | 105-0865-00           |                                  |        | 1   |       | BAR,LATCH RLSE:                                    | 80009        | 105-0865-00       |
| -6                     | 105-0866-00           |                                  |        | 1   |       | LATCH,RETAINING:SAFETY                             | 80009        | 105-0866-00       |
| -7                     | 214-3143-00           |                                  |        | 1   |       | SPRING,HLEXT:0.125 OD X 0.545 L,XLOOP              | 80009        | 214-3143-00       |
| -8                     | 378-2030-08           |                                  |        | 1   |       | LENS,LED DSPL:RED,PRINTED                          | 80009        | 378-2030-08       |
| -9                     | 333-3051-00           |                                  |        | 1   |       | PANEL,FRONT:                                       | 80009        | 333-3051-00       |
| -10                    | 337-3065-00           |                                  |        | 1   |       | SHIELD,ELEC:FRONT SUBPANEL                         | 80009        | 337-3065-00       |
| -11                    | 214-3406-00           |                                  |        | 1   |       | SPRING,FLAT:1.48 L X 0.125 W,CU BE                 | 80009        | 214-3406-00       |
| -12                    | 426-0725-24           |                                  |        | 1   |       | FR SECT,PLUG-IN:TOP                                | 80009        | 426-0725-24       |
| -13                    | 211-0101-00           |                                  |        | 2   |       | SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL          | TK0435       | ORDER BY DESCR    |
| -14                    | 426-0724-25           |                                  |        | 1   |       | FR SECT,PLUG-IN:BOTTOM                             | 80009        | 426-0724-25       |
| -15                    | 211-0101-00           |                                  |        | 1   |       | SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL          | TK0435       | ORDER BY DESCR    |
| -16                    | 211-0025-00           |                                  |        | 1   |       | SCREW,MACHINE:4-40 X 0.375,FLH,100 DEG             | TK0435       | ORDER BY DESCR    |
| -17                    | 386-4866-00           |                                  |        | 1   |       | SUPPORT,FRAME:REAR,AL                              | 80009        | 386-4866-00       |
| -18                    | 213-0793-00           |                                  |        | 2   |       | SCREW,TGP,TF:6-32 X 0.4375,TAPTITE,FILH            | 83486        | 239-006-406043    |

## Replaceable Mechanical Parts - SG 503

| Fig. &<br>Index<br>No. | Tektronix<br>Part No.      | Serial/Assembly No.<br>Effective | Dscont | Qty | 12345                            | Name & Description   | Mfr.<br>Code | Mfr.        | Part No. |
|------------------------|----------------------------|----------------------------------|--------|-----|----------------------------------|----------------------|--------------|-------------|----------|
| 3-                     |                            |                                  |        |     |                                  | STANDARD ACCESSORIES |              |             |          |
| -1                     | 012-0482-00<br>070-1622-01 |                                  |        | 1   | CABLE ASSY,RF:50 OHM COAX,36.0 L |                      | 80009        | 012-0482-00 |          |
|                        |                            |                                  |        | 1   | MANUAL,TECH:INSTRUCTION          |                      | 80009        | 070-1622-01 |          |





## ACCESSORIES

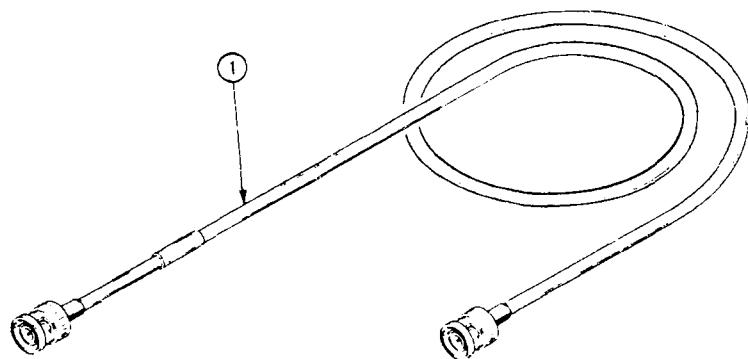


Fig. &amp;

| Index<br>No. | Tektronix<br>Part No.      | Serial/Model No.<br>Eff | Qty | 1 2 3 4 5                  | Name & Description | Mfr<br>Code | Mfr Part Number |
|--------------|----------------------------|-------------------------|-----|----------------------------|--------------------|-------------|-----------------|
| 2-1          | 012-0482-00<br>070-1622-01 |                         | 1   | CABLE,ASSY:MALE BNC EA END |                    | 80009       | 012-0482-00     |
|              |                            |                         | 1   | MANUAL,TECH:INSTRUCTION    |                    | 80009       | 070-1622-01     |