



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

**SG 503
LEVELED SINE-WAVE
GENERATOR**

INSTRUCTION MANUAL

**Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077**


**070-1622-01
Product Group 75**

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or stamped on the chassis. The first number or letter
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of the serial number are assigned sequentially and are
unique to each instrument. Those manufactured in the
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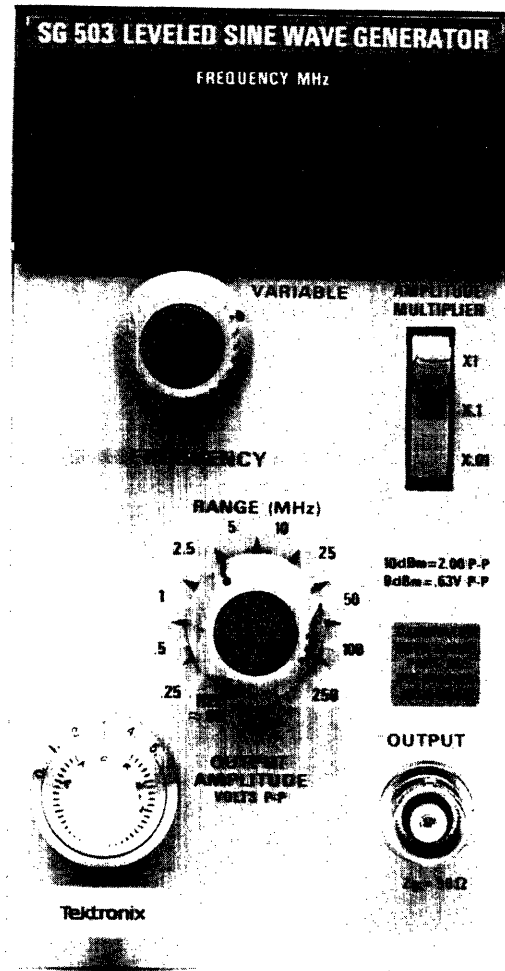
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WARNING

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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CHANGE INFORMATION



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Fig. 1-1. SG 503 Levelled 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.

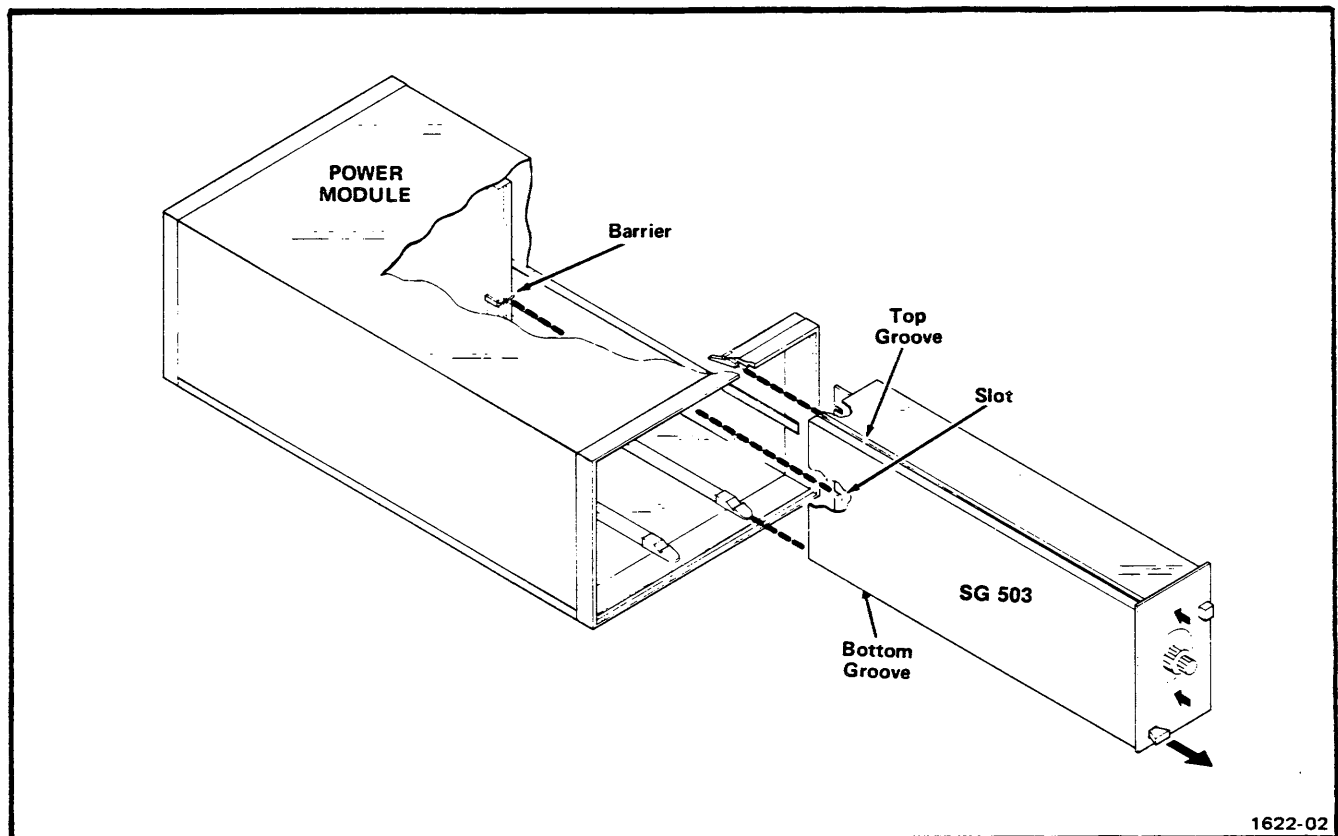


Fig. 1-2. Plug-in installation and removal.

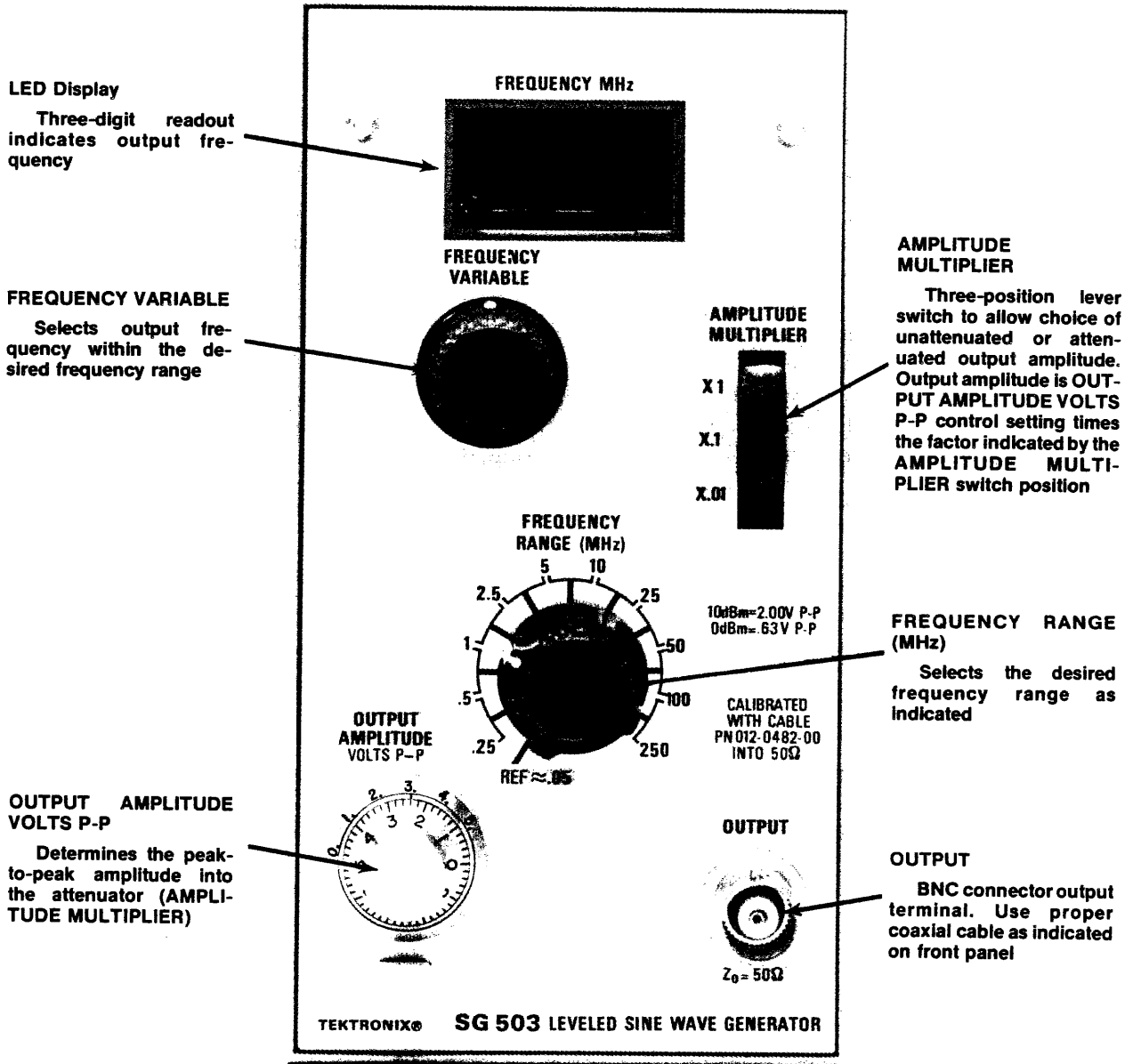


Fig. 1-3. SG 503 controls and connectors.

1622-03

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.



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 unlevelled 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 ± 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 Ω 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 unlevelled 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).

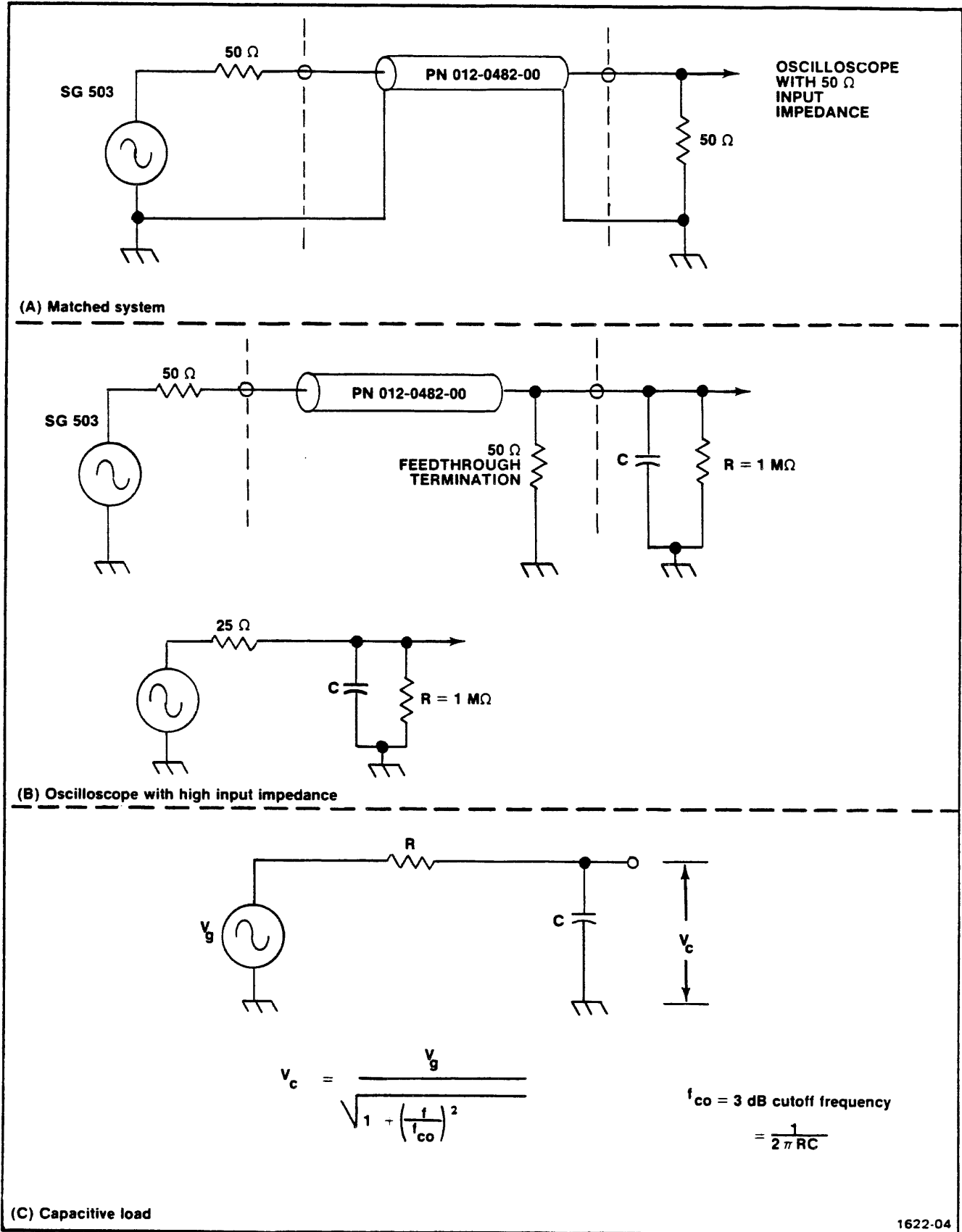


Fig. 1-4. Equivalent circuits for SG 503, 50 ohm coaxial cable and various terminations.

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 ± 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- Ω 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) Amplitude Multiplier 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 50kHz.	
Amplitude Multiplier Setting: X1	50 MHz to 100 MHz range; output amplitude will not vary more than 1% of the value at 50 kHz.	
Amplitude Multiplier 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) Multiplier setting: X1	2 nd harmonic at least 35 db down. 3 rd harmonic and all higher order harmonics at least 40 db down.	Multiplier setting X.01: Harmonics typically 20 db down or more.
Multiplier setting: X.1	2 nd harmonic at least 33 db down. 3 rd harmonic and all higher order harmonics at least 38 db down.	

**Table 2-2
ENVIRONMENTAL CHARACTERISTICS**

Characteristics	Performance Requirements	Supplemental Information
Temperature Operating	0°C to +50°C	
Storage	-40°C to +75°C.	
Altitude 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 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 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 12.7 centimeter
Width	2.6 inches 6.6 centimeter
Length	12.2 inches 31.0 centimeter
Net Weight (Instrument Only)	2.25 lbs. 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.

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 μ 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. ^a
Digital Counter	Range, 50 kHz to 250 MHz.	Output accuracy	TEKTRONIX DC508 Digital Counter. ^a
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 Ω ; output, square wave at approximately 1 kHz.	Amplitude Set check.	TEKTRONIX PG 506 Calibration Generator. ^a
Spectrum Analyzer	Range, 100 kHz to 300 MHz; calibrated levels in decade steps from -45 dB to -35 dB; impedance, 50 Ω ; accuracy, linear display, within 10%.	Buffer Distortion, Harmonic 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 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) 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 check.	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 M Ω , 1/2 W, 5%.	Output voltage flatness check.	Tektronix Part No. 301-0245-00.

^aRequires 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 voltsquare-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.

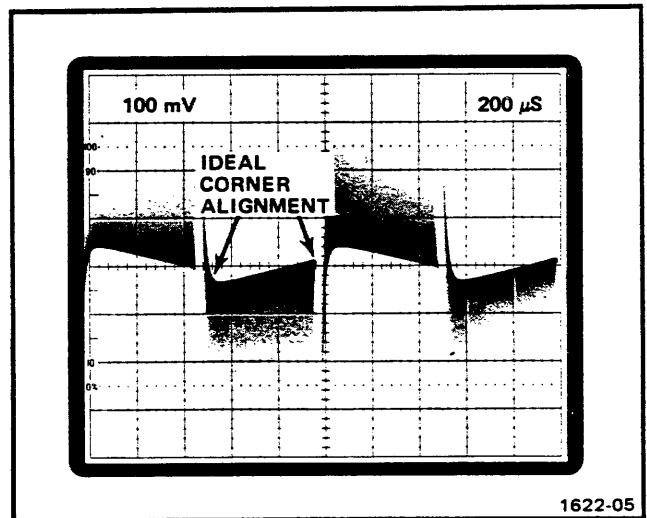


Fig. 2-1. Representation of complex waveform (idealized) with 5 volt reference amplitude at 0.05 MHz, properly set.

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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.

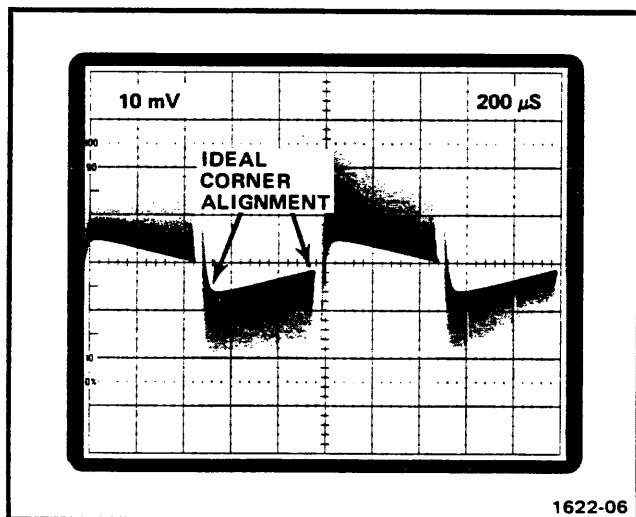


Fig. 2-2. Display of complex waveform (idealized) with 0.5 volt reference amplitude of 0.05 MHz, properly set.

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.

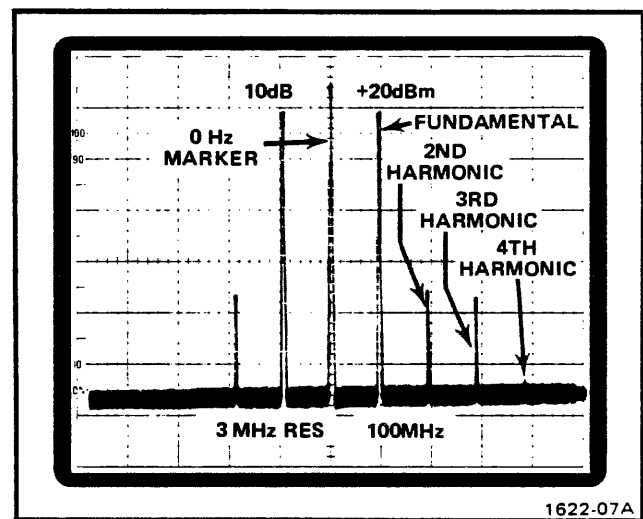


Fig. 2-3. Display of 100 MHz signal and harmonics.

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 unlevelled 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 Ω coax. (Set the counter to 50 Ω .)

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 ± 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 ± 0.000 . 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 $+0.008$ 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.

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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

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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 μ 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 Ω ; 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 Ω ; accuracy, linear display, within 10%.	Buffer Distortion, Harmonic Suppression check.	TEKTRONIX 7L12 Spectrum Analyzer.

*Requires TM 500-Series Power Module.

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) 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 M Ω , 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) 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 \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

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.

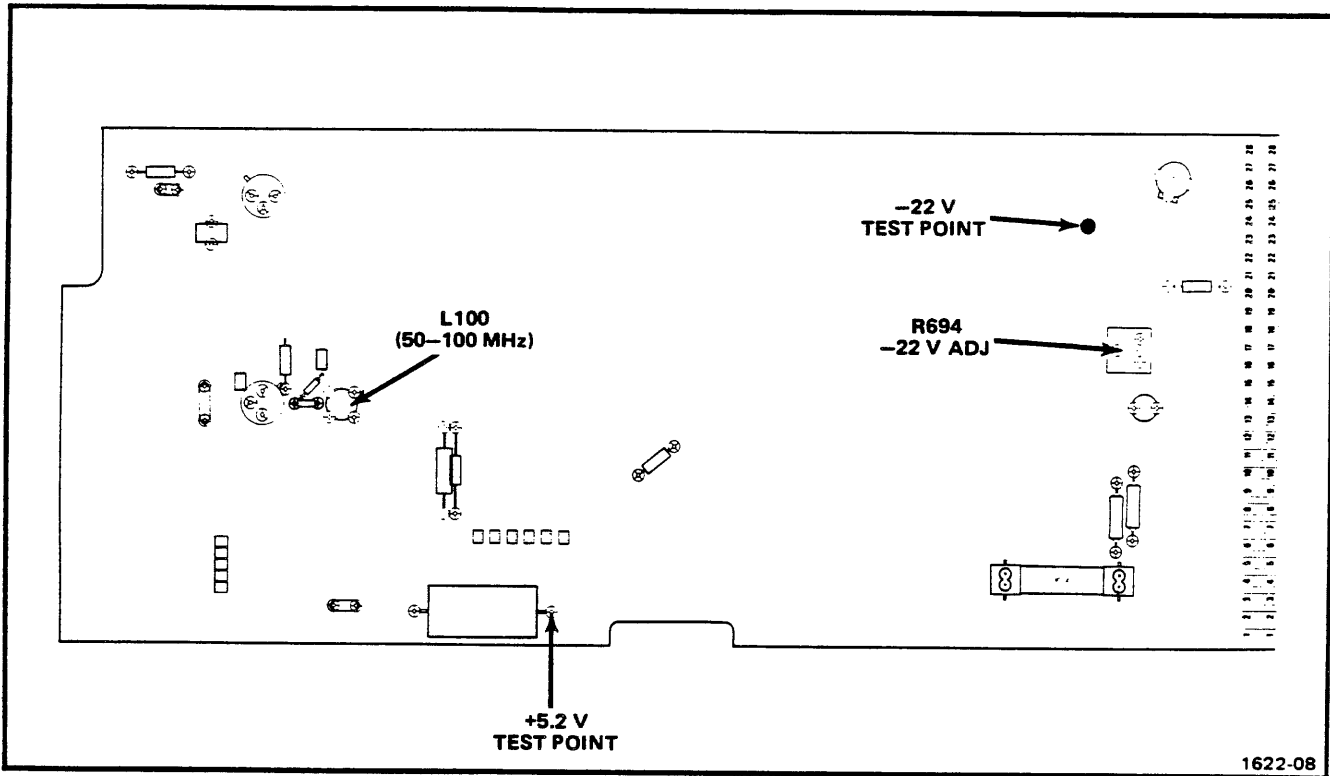


Fig. 3-1. Location of test points, L100, and -22 volt adjustment.

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, ± 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 ± 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.

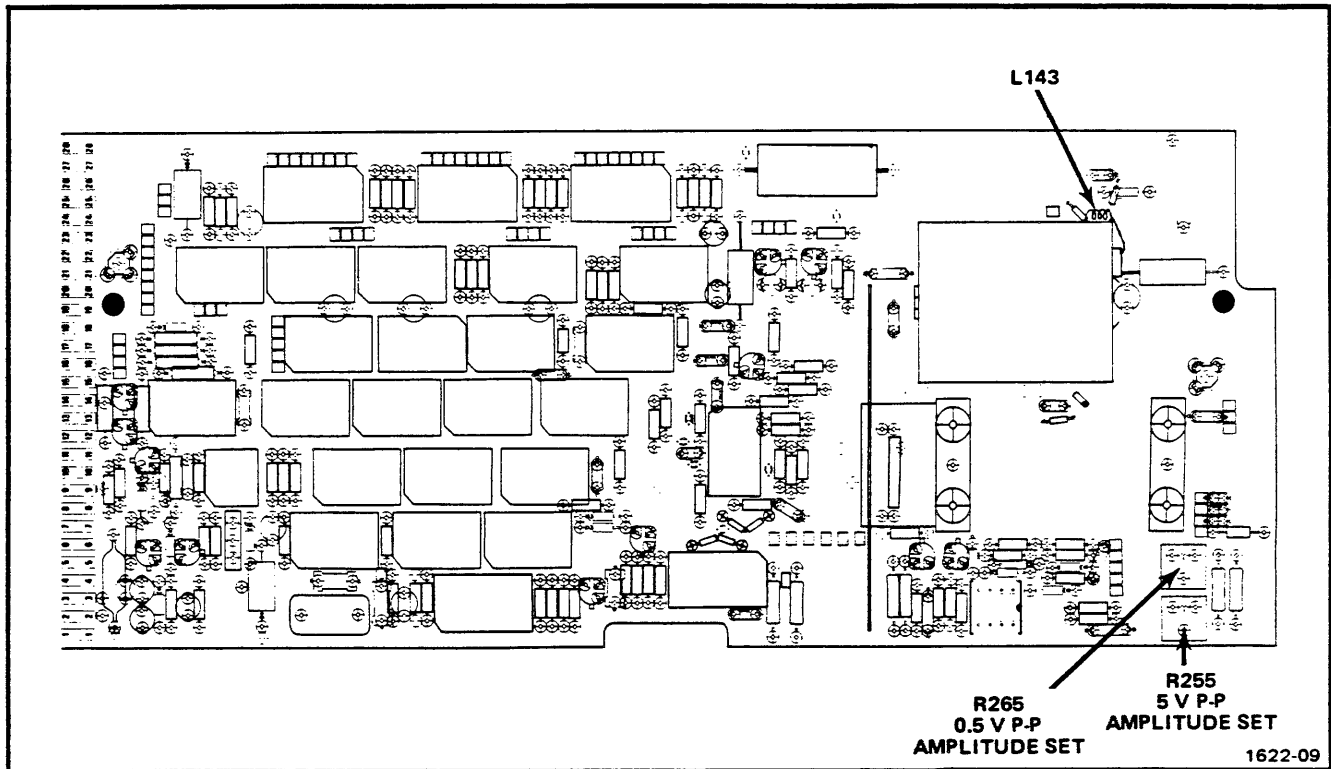


Fig. 3-2. Location of L143, 0.5 V P-P, and 5 V P-P Amplitude Set.

c. Disconnect the digital voltmeter.

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.

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.

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.

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.

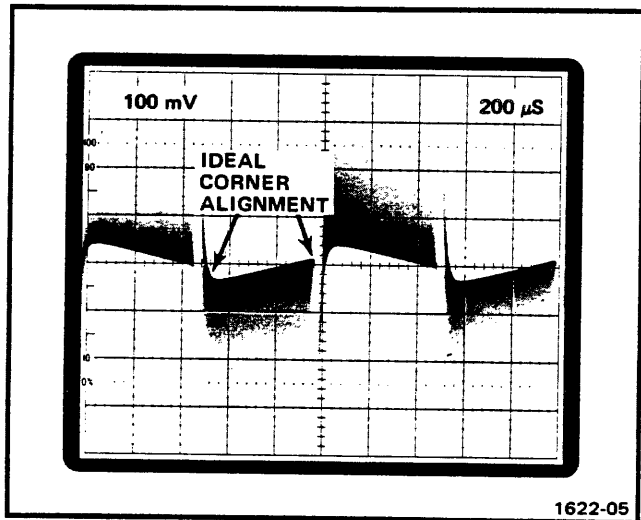


Fig. 3-3. Display of complex waveform (idealized) obtained when the amplitude set controls are properly adjusted at 0.05 MHz.

- 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.

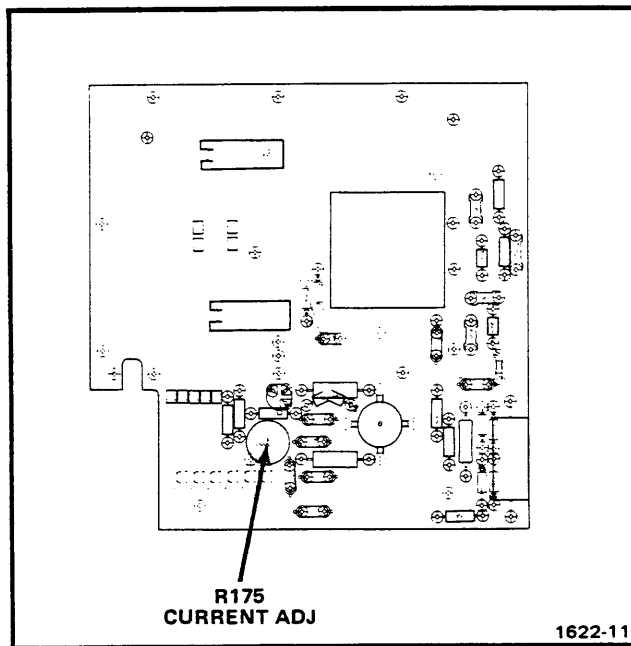


Fig. 3-4. Location of R175 Current Set adjustment.

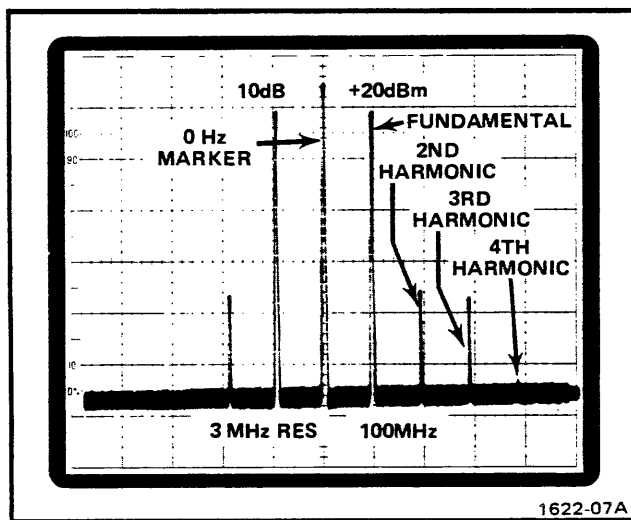


Fig. 3-5. Display of 100 MHz signal and harmonics.

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.

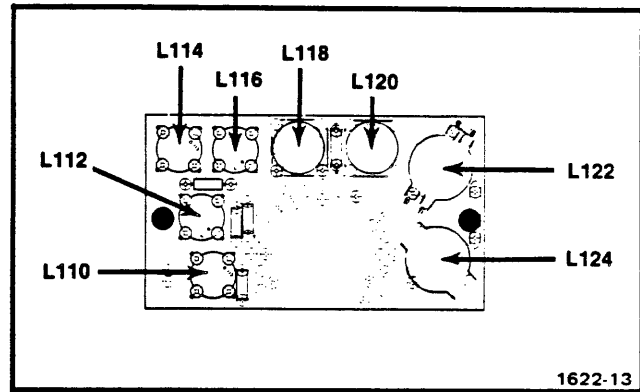


Fig. 3-6. Location of oscillator coils.

Table 3-3

SG 503 FREQUENCY RANGE (MHz)	SG 503 FREQUENCY VARIABLE Typical Displayed Count (Frequency Range) ^a	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 \approx .05	.049 - .051	L124, pot core, fixed

^aThe minimum and maximum displayed count on each range will vary slightly between instruments.

h. Set the SG 503 AMPLITUDE MULTIPLIER to X1.

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 \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 $+0.008$ 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.

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.

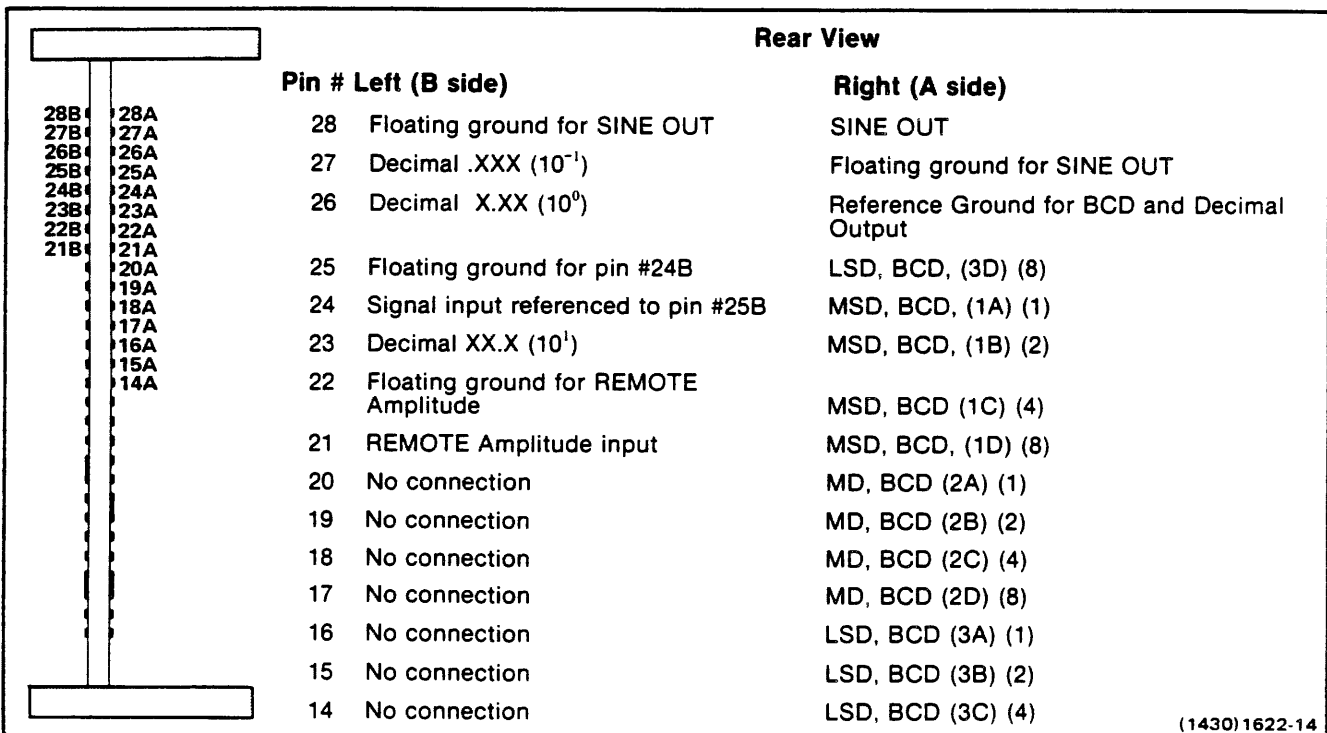
Selected Component Criteria

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 unlevelled 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.



(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



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



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



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.

Circuit Description—SG 503

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 -0.7 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

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

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

(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 milliamps, 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 \approx .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).

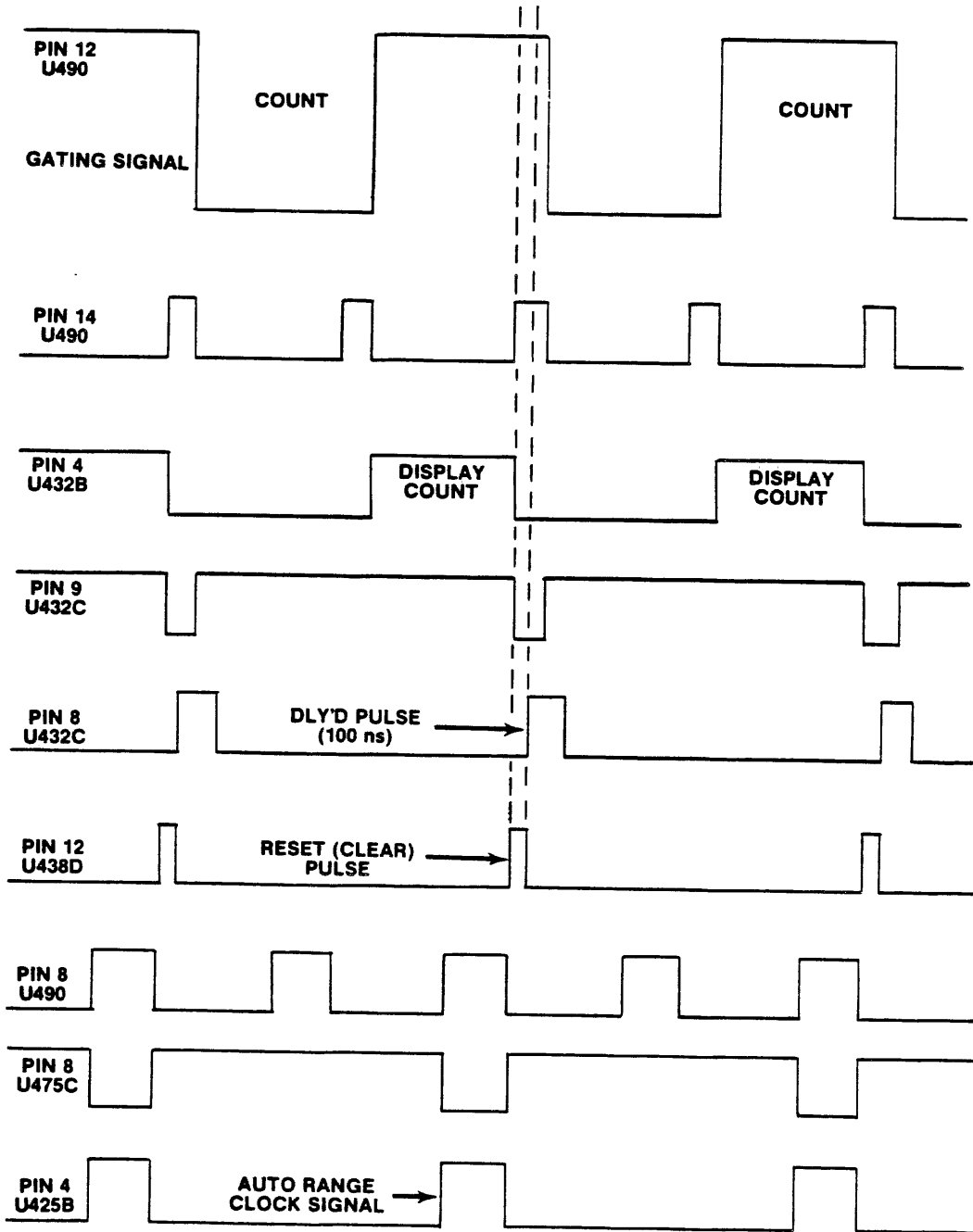
If the sine wave output amplitude from the SG 503 is not leveled, pins 6 and 7 of U490 goes negative at approximately a 2 hertz rate. The result is a blinking front-panel display because U490 is cleared to zero. Zeros supplied to pin 10 of the Display Drivers (U510, U520, and U530) causes them to blank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



1622-15

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^2L 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 k Ω , 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

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 BCD 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 use 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^{-1} , 10^1 , and 10^0 .

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^{-1} , 10^1 , and 10^0 (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 MESTON INC SANGAMO CAPACITOR DIV	SANGAMO RD P O BOX 128	PICKENS SC 29671
01121	ALLEN-BRADLEY CO	1201 SOUTH 2ND ST	MILWAUKEE WI 53204
01295	TEXAS INSTRUMENTS INC SEMICONDUCTOR GROUP	13500 N CENTRAL EXPRESSWAY P O BOX 225012 M/S 49	DALLAS TX 75265
02111	SPECTROL ELECTRONICS CORP SUB OF CARRIER CORP	17070 E GALE AVE P O BOX 1220	CITY OF INDUSTRY CA 91749
02735	RCA CORP SOLID STATE DIVISION	ROUTE 202	SOMERVILLE NJ 08876
03508	GENERAL ELECTRIC CO SEMI-CONDUCTOR PRODUCTS DEPT	W GENESEE ST	AUBURN NY 13021
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC SEMICONDUCTOR GROUP	5005 E MCDOWELL RD	PHOENIX AZ 85008
05397	UNION CARBIDE CORP MATERIALS SYSTEMS DIV	11901 MADISON AVE	CLEVELAND OH 44101
05828	GENERAL INSTRUMENT CORP GOVERNMENT SYSTEMS DIV	600 W JOHN ST	HICKSVILLE NY 11802
07263	FAIRCHILD CAMERA AND INSTRUMENT CORP SEMICONDUCTOR DIV	464 ELLIS ST	MOUNTAIN VIEW CA 94042
07716	TRM INC TRM ELECTRONICS COMPONENTS TRM IRC FIXED RESISTORS/BURLINGTON	2850 MT PLEASANT AVE	BURLINGTON IA 52601
08806	GENERAL ELECTRIC CO MINIATURE LAMP PRODUCTS DEPT	NELA PK	CLEVELAND OH 44112
13454	CRYSTEX CRYSTALS CORP	1000 CRYSTAL DR	FT MYERS FL 33901
14433	ITT SEMICONDUCTORS DIV		NEST PALM BEACH FL
14552	MICRO/SEMICONDUCTOR CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704
18324	SIGNETICS CORP	811 E AROUES	SUNNYVALE CA 94086
19701	MEPCO/ELECTRA INC A NORTH AMERICAN PHILIPS CO	P O BOX 760	MINERAL WELLS TX 76067
31718	FAIRCHILD CAMERA AND INSTRUMENT CORP OPTOELECTRONICS DIV	4001 MIRANDA AVE	PALO ALTO CA 94304
32159	WEST-CAP ARIZONA	2201 E ELVIRA ROAD	TUCSON AZ 85706
32997	BOURNS INC 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 PLESSEY OPTOELECTRONICS AND MICROWAVE	1641 KAISER AVE	IRVINE CA 92714
52763	STETTNER ELECTRONICS INC	6135 AIRWAYS BLVD PO BOX 21947	CHATTANOOGA TN 37421
54583	TK ELECTRONICS CORP	755 EASTGATE BLVD	GARDEN CITY NY 11530
56289	SPRAGUE ELECTRIC CO	87 MARSHALL ST	NORTH ADAMS MA 01247
57668	ROHM CORP	16931 MILLIKEN AVE	IRVINE CA 92713
58361	GENERAL INSTRUMENT CORP OPTOELECTRONICS DIV	3400 HILLVIEW AVE	PALO ALTO CA 94304
59660	TUSONIX INC	2155 N FORBES BLVD	TUCSON, ARIZONA 85705
71400	BUSSMANN MFG CO MCGRAW EDISION CO	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
73138	BECKMAN INSTRUMENTS INC HELIPOT DIV	2500 HARBOR BLVD	FULLERTON CA 92634
75042	TRM INC TRM ELECTRONIC COMPONENTS IRC FIXED RESISTORS PHILADELPHIA DIV	401 N BROAD ST	PHILADELPHIA PA 19108
76493	BELL INDUSTRIES INC MILLER J M DIV	19070 REYES AVE P O BOX 5825	COMPTON CA 90224
78488	STACKPOLE CARBON CO		ST MARYS PA 15857
80009	TEKTRONIX INC	4900 S W GRIFFITH DR 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 SW	80009	672-0447-00
A1	672-0447-01	8070000		CIRCUIT BD ASSY:BAND SW	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 SW	80009	672-0447-00
A1	672-0447-01	8070000		CIRCUIT BD ASSY:BAND SW	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/M00
C100	281-0210-01	8051800		CAP,VAR,AIR DI:3 SECT,5-60,6-80,& 10-410PF	K0099	5318/3/LH/M00
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	D155F471K0
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 (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,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106W025A5
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,ELCTLT:1UF,20%,35V	05397	T3688A105M035AZ
C180	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T3688A105M035AZ
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	2R0PLZ007 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	2R0PLZ007 10P8LC
C208	281-0730-00			CAP,FXD,CER DI:10.8PF,1%,500V	52763	2R0PLZ007 10P8LC
C212	281-0604-00			CAP,FXD,CER DI:2.2PF,+/-0.25PF,500V	52763	2R0PLZ007 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	2R0PLZ007 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

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
C278	283-0111-00			CAP,FXD,CER 01:0.1UF,20%,50V	05397	C330C104M5U1CA
C280	283-0198-00			CAP,FXD,CER 01:0.22UF,20%,50V	05397	C330C224M5U1CA
C282	283-0156-00			CAP,FXD,CER 01:0.001 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 01:0.1UF,20%,50V	05397	C330C104M5U1CA
C323	283-0299-00	8060000		CAP,FXD,CER 01:51PF,5%,500V	51642	200-500-NP0-510J
C324	283-0111-00			CAP,FXD,CER 01:0.1UF,20%,50V	05397	C330C104M5U1CA
C328	283-0111-00	8010100	8059999	CAP,FXD,CER 01:0.1UF,20%,50V	05397	C330C104M5U1CA
C335	283-0204-00	8010100	8059999	CAP,FXD,CER 01:0.01UF,20%,50V	04222	SR155E103MAA
C336	283-0204-00	8060000		CAP,FXD,CER 01:0.01UF,20%,50V	04222	SR155E103MAA
C340	283-0249-00	8060000		CAP,FXD,CER 01:0.068PF,10%,50V	04222	SR305C683KAA
C342	283-0204-00	8010100	8059999	CAP,FXD,CER 01:0.01UF,20%,50V	04222	SR155E103MAA
C345	283-0204-00	8010100	8059999	CAP,FXD,CER 01:0.01UF,20%,50V	04222	SR155E103MAA
C350	283-0249-00	8060000		CAP,FXD,CER 01:0.068PF,10%,50V	04222	SR305C683KAA
C358	283-0175-00			CAP,FXD,CER 01:10PF,5%,200V	05397	C312C10002G5CA 8
C360	283-0197-00	8010100	8059999	CAP,FXD,CER 01:470PF,5%,50V	04222	SR205A471JAA
C365	283-0204-00			CAP,FXD,CER 01:0.01UF,20%,50V	04222	SR155E103MAA
C390	283-0353-00			CAP,FXD,CER 01:0.1UF,10%,50V	04222	12105C104KA2075
C422	281-0629-00			CAP,FXD,CER 01:33PF,5%,600V	52763	2R0PLZ007 33P0JC
C435	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106M025AS
C436	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106M025AS
C445	283-0156-00			CAP,FXD,CER 01:0.001 UF,+80-20%,200V	05397	C315C102Z2R5CA
C448	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C462	281-0511-00			CAP,FXD,CER 01:22PF,+/-2.2PF,500V	52763	2R0PLZ007 22P0KC
C465	281-0504-00			CAP,FXD,CER 01:10PF,+/-1PF,500V	54583	TCC20CH2M100FYA
C480	290-0531-00			CAP,FXD,ELCTLT:100UF,20%,10V	05397	T368C107M010AS
C481	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106M025AS
C490	283-0111-00			CAP,FXD,CER 01:0.1UF,20%,50V	05397	C330C104M5U1CA
C495	281-0536-00			CAP,FXD,CER 01:1000PF,10%,500V	52763	2R0PLZ007 1N00MO
C540	290-0534-00			CAP,FXD,ELCTLT:1UF,20%,35V	05397	T368A105M035AZ
C542	283-0156-00			CAP,FXD,CER 01:0.001 UF,+80-20%,200V	05397	C315C102Z2R5CA
C600	283-0111-00			CAP,FXD,CER 01:0.1UF,20%,50V	05397	C330C104M5U1CA
C610	281-0523-00	8010100	8051229	CAP,FXD,CER 01:100PF,20%,350V	52763	2R0PLZ007 100PMU
C610	281-0204-00	8051230	8066110	CAP,VAR,PLASTIC:2-22PF,100V	80031	2807C00222M0J2
C618	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106M025AS
C619	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106M025AS
C620	290-0536-00			CAP,FXD,ELCTLT:10UF,20%,25V TANTALUM	05397	T3688106M025AS
C630	290-0531-00			CAP,FXD,ELCTLT:100UF,20%,10V	05397	T368C107M010AS
C635	283-0154-00	8030000		CAP,FXD,CER 01:22PF,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 01:1UF,+80-20%,25V	04222	SR302E105ZAATR
C655	283-0177-00			CAP,FXD,CER 01:1UF,+80-20%,25V	04222	SR302E105ZAATR
C660	283-0204-00			CAP,FXD,CER 01:0.01UF,20%,50V	04222	SR155E103MAA
C662	283-0111-00			CAP,FXD,CER 01:0.1UF,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 01:0.01UF,20%,50V	04222	SR155E103MAA
C680	290-0559-00			CAP,FXD,ELCTLT:22UF,20%,35V	05397	T368C226M035AS
C694	281-0523-00			CAP,FXD,CER 01:100PF,20%,350V	52763	2R0PLZ007 100PMU
C697	290-0517-00			CAP,FXD,ELCTLT:6.8UF,20%,35V	05397	T3688685M035AZ
CR130	152-0141-02			SEMICOND DVC,01:SM,SI,30V,150MA,30V	03508	0A2527 (1N4152)
CR200	152-0322-00			SEMICOND DVC,01:SCHOTTKY BARRIER,SI,15V	50434	5082-2672
CR202	152-0322-00			SEMICOND DVC,01:SCHOTTKY BARRIER,SI,15V	50434	5082-2672
CR216	152-0322-00			SEMICOND DVC,01:SCHOTTKY BARRIER,SI,15V	50434	5082-2672
CR218	152-0322-00			SEMICOND DVC,01:SCHOTTKY BARRIER,SI,15V	50434	5082-2672
CR274	152-0141-02			SEMICOND DVC,01:SM,SI,30V,150MA,30V	03508	0A2527 (1N4152)
CR276	152-0246-00			SEMICOND DVC,01:SM,SI,40V,200MA,00-7	14433	MG1537TK

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
CR278	152-0141-02			SEMICON DVC,DI:SM,SI,30V,150MA,30V	03508	DA2527 (1N4152)
CR280	152-0141-02			SEMICON DVC,DI:SM,SI,30V,150MA,30V	03508	DA2527 (1N4152)
CR410	152-0322-00			SEMICON DVC,DI:SCHOTTKY BARRIER,SI,15V	50434	5082-2672
CR600	152-0141-02			SEMICON DVC,DI:SM,SI,30V,150MA,30V	03508	DA2527 (1N4152)
CR612	152-0141-02			SEMICON DVC,DI:SM,SI,30V,150MA,30V	03508	DA2527 (1N4152)
CR640	152-0066-00			SEMICON DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR680	152-0066-00			SEMICON DVC,DI:RECT,SI,400V,1A,DO-41	05828	GP10G-020
CR694	152-0141-02			SEMICON DVC,DI:SM,SI,30V,150MA,30V	03508	DA2527 (1N4152)
CR697	152-0333-00	8064290		SEMICON DVC,DI:SM,SI,55V,200MA,DO-35	07263	FDH-6012
DS500	150-1004-00	8010100	8052649	LT EMITTING DIO:RED,15MA	08806	SSL-12
DS500	150-1040-00	8052650	8078229	LT EMITTING DIO:RED,690NM,40MA MAX	80009	150-1040-00
DS500	150-1011-02	8079230		LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-367
DS510	150-1011-00	8010100	8052549	LAMP,LED RDOUT:RED,7 SEG,RH DECIMAL	31718	FND70
DS510	150-1011-01	8052550	8079229	LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-357
DS510	150-1011-02	8079230		LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-367
DS520	150-1011-00	8010100	8052549	LAMP,LED RDOUT:RED,7 SEG,RH DECIMAL	31718	FND70
DS520	150-1011-01	8052550	8079229	LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-357
DS520	150-1011-02	8079230		LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-367
DS530	150-1011-00	8010100	8052549	LAMP,LED RDOUT:RED,7 SEG,RH DECIMAL	31718	FND70
DS530	150-1011-01	8052550	8079229	LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-357
DS530	150-1011-02	8079230		LAMP,LED RDOUT:RED,7 SEG,1.0 DIGIT	58361	FND-367
F620	159-0021-00			FUSE,CARTRIDGE:3AG,2A,250V,FAST BLOW	71400	AGC-CN-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	8010100	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	8010100	8059999	COIL,RF:FIXED,37NH	80009	108-0606-00
L362	108-0733-00	8060000		COIL,RF:FIXED,113NH	80009	108-0733-00
L365	108-0509-00			COIL,RF:FIXED,2.45UH	TK2042	ORDER BY DESCR
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

Replaceable Electrical Parts - SG 503

Component No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Name & Description	Mfr. Code	Mfr. Part No.
LR114	108-0333-00			COIL,RF:FIXED,910NH	TK1345	108-0333-00
LR130	108-0595-00			COIL,RF:FIXED,49NH	TK1345	108-0595-00
LR135	108-0797-00			COIL,RF:FIXED,2.45UH	TK1345	108-0797-00
LR140	108-0796-00			COIL,RF:FIXED,16NH	TK1345	108-0796-00
LR142	108-0271-00			COIL,RF:FIXED,235NH	80009	108-0271-00
LR150	108-0271-00			COIL,RF:FIXED,235NH	80009	108-0271-00
LR190	108-0797-00			COIL,RF:FIXED,2.45UH	TK1345	108-0797-00
Q130	151-0451-00	8010100	8039999	TRANSISTOR:NPN,SI,TO-39	04713	SRF503
Q130	151-0211-01	8040000		TRANSISTOR:NPN,SI,TO-39	04713	2N3866 (FAMILY)
Q140	151-0451-00			TRANSISTOR:NPN,SI,TO-39	04713	SRF503
Q160	151-0188-00			TRANSISTOR:PMP,SI,TO-92	80009	151-0188-00
Q180	151-0188-00			TRANSISTOR:PMP,SI,TO-92	80009	151-0188-00
Q190	151-0474-00	8010100	8051229	TRANSISTOR:NPN,SI	04713	WRF511
Q190	151-0614-00	8051230		TRANSISTOR:NPN,SI,4 LEAD POWER TOWER,TESTED	80009	151-0614-00
Q290	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q296	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q300	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q320	151-0367-00	8010100	8059999	TRANSISTOR:NPN,SI,X-55	04713	SPS 8811
Q320	151-0402-00	8060000		TRANSISTOR:SELECTED	01295	SKA6814
Q330	151-0402-00	8060000		TRANSISTOR:SELECTED	01295	SKA6814
Q340	151-0402-00	8060000		TRANSISTOR:SELECTED	01295	SKA6814
Q350	151-0402-00	8060000		TRANSISTOR:SELECTED	01295	SKA6814
Q360	151-0402-00	8060000		TRANSISTOR:SELECTED	01295	SKA6814
Q410	151-0367-00			TRANSISTOR:NPN,SI,X-55	04713	SPS 8811
Q420	151-0221-00			TRANSISTOR:PMP,SI,TO-92	80009	151-0221-00
Q600	151-0301-00			TRANSISTOR:PMP,SI,TO-18	04713	ST898
Q610	151-0302-00			TRANSISTOR:NPN,SI,TO-18	04713	ST899
Q620	151-0301-00			TRANSISTOR:PMP,SI,TO-18	04713	ST898
Q640	151-0515-01			SCR:SI,MU-10	04713	SCR1256K
Q685	151-0301-00			TRANSISTOR:PMP,SI,TO-18	04713	ST898
Q690	151-0301-00			TRANSISTOR:PMP,SI,TO-18	04713	ST898
R116	315-0471-00	8040000	8064289	RES,FXD,FILM:470 OHM,5%,0.25M	57668	NTR25J-E470E
R116	315-0471-00	8064290		RES,FXD,FILM:470 OHM,5%,0.25M (NOMINAL VALUE, SELECTED)	57668	NTR25J-E470E
R118	315-0471-00	8051350	8064289	RES,FXD,FILM:470 OHM,5%,0.25M	57668	NTR25J-E470E
R118	315-0471-00	8064290		RES,FXD,FILM:470 OHM,5%,0.25M (NOMINAL VALUE, SELECTED)	57668	NTR25J-E470E
R134	317-0131-00			RES,FXD,CMPSN:130 OHM,5%,0.125M	01121	881315
R138	317-0510-00			RES,FXD,CMPSN:51 OHM,5%,0.125M	01121	885105
R140	301-0750-00			RES,FXD,FILM:75 OHM,5%,0.5M	19701	5053CX75R00J
R145	317-0510-00			RES,FXD,CMPSN:51 OHM,5%,0.125M	01121	885105
R146	317-0510-00			RES,FXD,CMPSN:51 OHM,5%,0.125M	01121	885105
R150	317-0510-00			RES,FXD,CMPSN:51 OHM,5%,0.125M	01121	885105
R160	315-0181-00			RES,FXD,FILM:180 OHM,5%,0.25M	57668	NTR25J-E180E
R162	321-0207-00			RES,FXD,FILM:1.40K OHM,1%,0.125M,TC=TO	19701	5033ED1K400F
R164	321-0319-00			RES,FXD,FILM:20.5K OHM,1%,0.125M,TC=TO	19701	5033ED20K50F
R166	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25M	57668	NTR25J-E03K9
R174	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25M	57668	NTR25J-E1K8
R175	311-1563-00			RES,VAR,NONMM:TRMR,1K OHM,0.5M	32997	3352T-0Y7-102
R176	315-0123-00			RES,FXD,FILM:12K OHM,5%,0.25M	57668	NTR25J-E12K0
R177	-----	8063389		SELECTED		
R180	315-0272-00			RES,FXD,FILM:2.7K OHM,5%,0.25M	57668	NTR25J-E02K7
R184	317-0151-00			RES,FXD,CMPSN:150 OHM,5%,0.125M	01121	881515
R190	301-0560-00			RES,FXD,FILM:56 OHM,5%,0.5M	19701	5053CX56R00J
R192	301-0560-00			RES,FXD,FILM:56 OHM,5%,0.5M	19701	5053CX56R00J
R195	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25M	57668	NTR25J-E470E
R197	315-0471-00	8010100	8039999	RES,FXD,FILM:470 OHM,5%,0.25M	57668	NTR25J-E470E
R197	315-0102-00	8040000		RES,FXD,FILM:1K OHM,5%,0.25M	57668	NTR25JE01K0
R204	317-0181-00			RES,FXD,CMPSN:180 OHM,5%,0.125M	01121	881815

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	C82755
R255	311-1223-00			RES,VAR,NONMM:TRMR,250 OHM,0.5M	32997	3386F-T04-251
R257	321-0224-00	8010100	8079229	RES,FXD,FILM:2.10K OHM,1%,0.125M,TC=T0	07716	CEAD21000F
R257	321-0233-03	8079230		RES,FXD,FILM:2.61K OHM,0.25%,0.125M,TC=T2	01121	ADVISE
R260	311-1531-00	8010100	8079229	RES,VAR,MM:PNL,2K OHM	02111	535-9504
R260	311-2204-00	8079230		RES,VAR,MM:PNL,2.5K OHMS,5%,0.5M	32997	84N10-E26-CA0021
R262	321-0114-00	8010100	8066110	RES,FXD,FILM:150 OHM,1%,0.125 M,TC=T0	19701	5033ED150R0F
R262	321-0636-00	8066111	8079229	RES,FXD,FILM:100 OHM,0.5%,0.125M,TC=T2	91637	CMF551160100R0D
R262	321-0927-07	8079230		RES,FXD,FILM:125 OHM,0.1%,0.125M,TC=T9	19701	5033RE125R0B
R265	311-1221-00	8010100	8066110	RES,VAR,NONMM:TRMR,50 OHM,0.5M	32997	3386F-T04-500
R265	311-1175-00	8066111	8080349	RES,VAR,NONMM:TRMR,100 OHM,0.5M	73138	68WR100-77A
R265	311-1222-00	8080350		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	8060000		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	8060000		RES,FXD,CMPSN:820 OHM,5%,0.125M	01121	B88215
R334	317-0821-00	8060000		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	8010100	8059999	RES,FXD,FILM:470 OHM,5%,0.25M	57668	NTR25J-E470E
R340	315-0332-00	8010100	8059999	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	8010100	8059999	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	8060000		RES,FXD,CMPSN:820 OHM,5%,0.125M	01121	B88215
R352	315-0221-00	8010100	8059999	RES,FXD,FILM:220 OHM,5%,0.25M	57668	NTR25J-E220E
R352	321-0132-00	8060000		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	8010100	8059999	RES,FXD,FILM:51 OHM,5%,0.25M	19701	5043CX51R00J
R361	317-0821-00	8060000		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

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R404	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R410	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25M	19701	5043CX10K00J
R411	315-0103-00			RES,FXD,FILM:10K OHM,5%,0.25M	19701	5043CX10K00J
R412	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R416	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25M	57668	NTR25J-E 100E
R420	315-0150-00			RES,FXD,FILM:15 OHM,5%,0.25M	19701	5043CX15R00J
R422	315-0131-00			RES,FXD,FILM:130 OHM,5%,0.25M	19701	5043CX130R0J
R448	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25M	57668	NTR25J-E390E
R460	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25M	57668	NTR25J-E02K2
R465	315-0222-00			RES,FXD,FILM:2.2K OHM,5%,0.25M	57668	NTR25J-E02K2
R468	315-0301-00			RES,FXD,FILM:300 OHM,5%,0.25M	57668	NTR25J-E300E
R470	315-0511-00			RES,FXD,FILM:510 OHM,5%,0.25M	19701	5043CX510R0J
R475	315-0111-00			RES,FXD,FILM:110 OHM,5%,0.25M	57668	NTR25J-E110E
R477	315-0561-00			RES,FXD,FILM:560 OHM,5%,0.25M	19701	5043CX560R0J
R490	315-0561-00			RES,FXD,FILM:560 OHM,5%,0.25M	19701	5043CX560R0J
R491	315-0561-00			RES,FXD,FILM:560 OHM,5%,0.25M	19701	5043CX560R0J
R495	315-0161-00			RES,FXD,FILM:160 OHM,5%,0.25M	57668	NTR25J-E 160E
R510	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25M	57668	NTR25J-E390E
R512	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R513	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R514	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R515	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R516	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R517	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R518	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R520	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25M	57668	NTR25J-E390E
R522	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R523	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R524	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R525	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R526	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R527	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R528	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R530	315-0391-00			RES,FXD,FILM:390 OHM,5%,0.25M	57668	NTR25J-E390E
R532	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R533	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R534	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R535	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R536	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R537	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R538	315-0271-00			RES,FXD,FILM:270 OHM,5%,0.25M	57668	NTR25J-E270E
R600	315-0472-00	8010100	8051229	RES,FXD,FILM:4.7K OHM,5%,0.25M	57668	NTR25J-E04K7
R600	315-0301-00	8051230		RES,FXD,FILM:300 OHM,5%,0.25M	57668	NTR25J-E300E
R601	301-0220-00	8040000		RES,FXD,FILM:22 OHM,5%,0.5M	19701	5053CX22R00J
R602	315-0182-00			RES,FXD,FILM:1.8K OHM,5%,0.25M	57668	NTR25J-E1K8
R605	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25M	57668	NTR25J-E04K7
R610	321-0306-00			RES,FXD,FILM:15.0K OHM,1%,0.125M,TC=TO	19701	5033E015J00F
R611	315-0562-00	8051230	8066110	RES,FXD,FILM:5.6K OHM,5%,0.25M	57668	NTR25J-E05K6
R612	321-0358-00			RES,FXD,FILM:52.3K OHM,1%,0.125M,TC=TO	07716	CEA052301F
R613	315-0242-00	8066111		RES,FXD,FILM:2.4K OHM,5%,0.25M	57668	NTR25J-E02K4
R615	321-0336-00			RES,FXD,FILM:30.9K OHM,1%,0.125M,TC=TO	19701	5043E030K90F
R616	321-0358-00			RES,FXD,FILM:52.3K OHM,1%,0.125M,TC=TO	07716	CEA052301F
R620	315-0472-00			RES,FXD,FILM:4.7K OHM,5%,0.25M	57668	NTR25J-E04K7
R624	308-0702-00			RES,FXD,MM:0.33 OHM,5%,2M	75042	BMH-R3300J
R626	315-0200-00			RES,FXD,FILM:20 OHM,5%,0.25M	19701	5043CX20R00J
R640	315-0102-00			RES,FXD,FILM:1K OHM,5%,0.25M	57668	NTR25JE01K0
R680	308-0685-00			RES,FXD,MM:1.5 OHM,5%,1M	75042	BM-20-1R500J
R684	315-0560-00			RES,FXD,FILM:56 OHM,5%,0.25M	57668	NTR25J-E56E0
R686	315-0392-00			RES,FXD,FILM:3.9K OHM,5%,0.25M	57668	NTR25J-E03K9

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R690	315-0270-00	B010100	8039999	RES,FXD,FILM:27 OHM,5%,0.25M	19701	5043CX27R00J
R690	315-0471-00	B040000		RES,FXD,FILM:470 OHM,5%,0.25M	57668	NTR25J-E470E
R693	321-0236-00			RES,FXD,FILM:2.80K OHM,1%,0.125M,TC=TO	07716	CEAD28000F
R694	311-1224-00			RES,VAR,NONMM:TRMR,500 OHM,0.5M	32997	3386F-T04-501
R695	321-0236-00			RES,FXD,FILM:2.80K OHM,1%,0.125M,TC=TO	07716	CEAD28000F
R697	321-0236-00			RES,FXD,FILM:2.80K OHM,1%,0.125M,TC=TO	07716	CEAD28000F
R698	321-0304-00			RES,FXD,FILM:14.3K OHM,1%,0.125M,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 SW:OUTPUT ATTEN	80009	105-0588-00
U225	155-0107-00			MICROCKT,LINER: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,LINER:OPNL AMPL,SEL	04713	MC1741CP1
U350	156-0534-00	B010100	8059999	MICROCKT,LINER:DUAL DIFF AMPL	02735	CA7102E-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 F
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 SCRN	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/DRVR	18324	N8T06 N OR F
U520	156-0379-00			MICROCKT,DGTL:BCD TO 7-SEG DCDR/DRVR	18324	N8T06 N OR F
U530	156-0379-00			MICROCKT,DGTL:BCD TO 7-SEG DCDR/DRVR	18324	N8T06 N OR F
U610	156-0067-00			MICROCKT,LINER:OPNL AMPL,SEL	04713	MC1741CP1
U695	156-0071-00			MICROCKT,LINER:VOLTAGE REGULATOR	04713	MC1723CL
VR200	152-0280-00	B010100	8029999	SEMICON DVC,DI:ZEN,S1,6.2V,5%,0.4M,DO-7	04713	1N753A
VR200	152-0337-00	B030000		SEMICON DVC,DI:ZEN,S1,6.3V,3.2%,0.4M,DO-7/ DO-35	04713	SZ6210K
VR202	152-0280-00	B010100	8029999	SEMICON DVC,DI:ZEN,S1,6.2V,5%,0.4M,DO-7	04713	1N753A
VR202	152-0337-00	B030000		SEMICON DVC,DI:ZEN,S1,6.3V,3.2%,0.4M,DO-7/ DO-35	04713	SZ6210K
VR475	152-0278-00			SEMICON DVC,DI:ZEN,S1,3V,5%,0.4M,DO-7	04713	SZ635009K20
VR610	152-0279-00	B010100	8066110	SEMICON DVC,DI:ZEN,S1,5.1V,5%,0.4M,DO-7	14552	T03810989
VR640	152-0280-00			SEMICON DVC,DI:ZEN,S1,6.2V,5%,0.4M,DO-7	04713	1N753A
Y460	158-0014-00			XTAL UNIT,QTZ: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 (pF).
Values less than one are in microfarads (μF).
- Resistors = Ohms (Ω).

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

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

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

Abbreviations are based on ANSI Y1.1-1972.

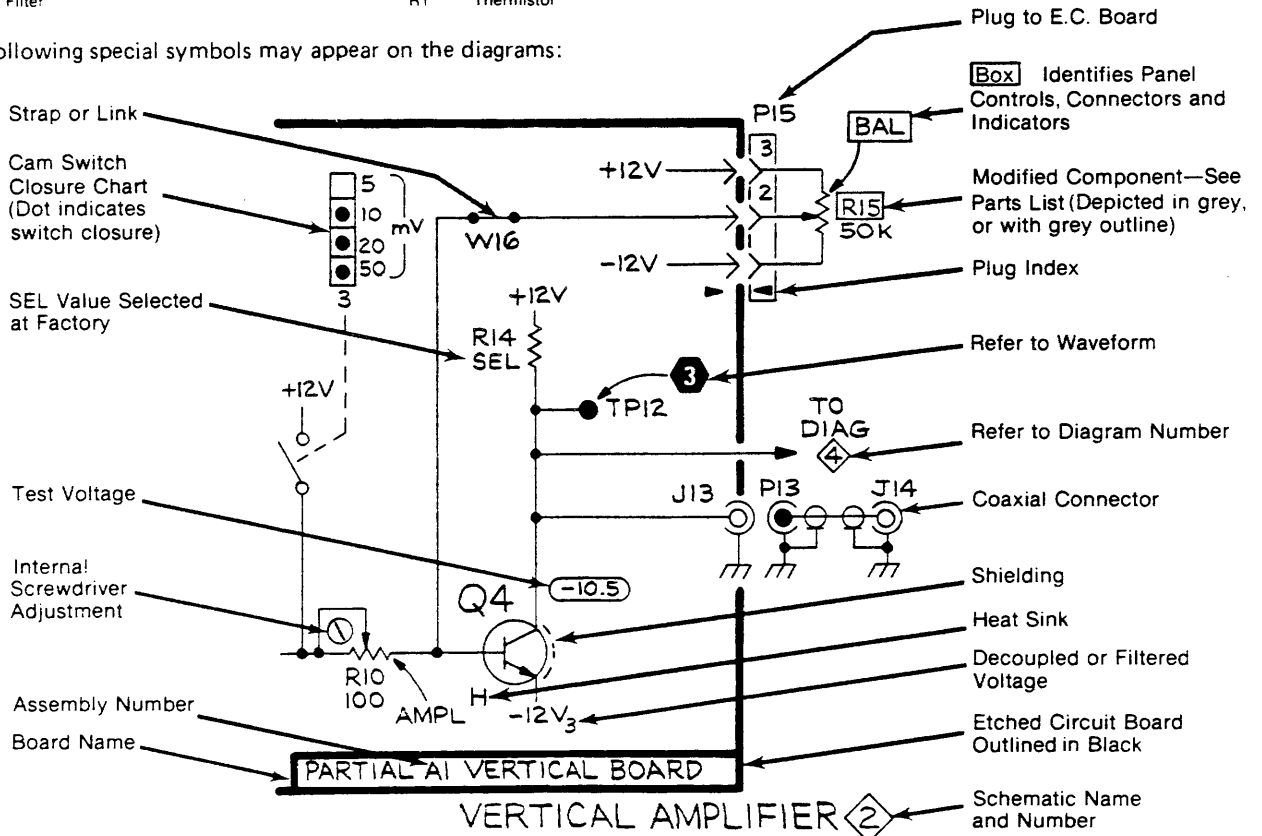
Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

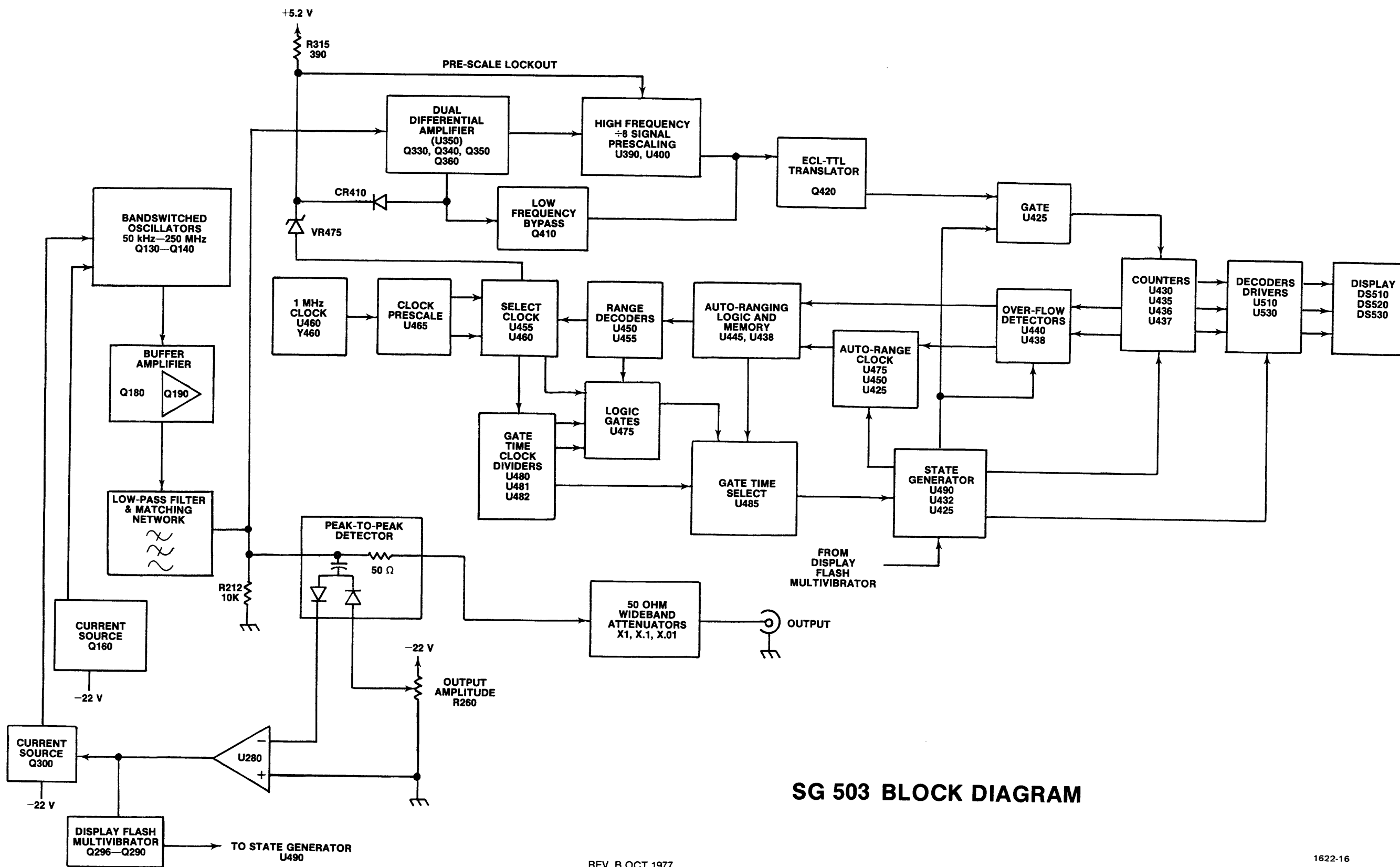
- Y14.15, 1966 Drafting Practices.
- Y14.2, 1973 Line Conventions and Lettering.
- Y10.5, 1968 Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

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

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

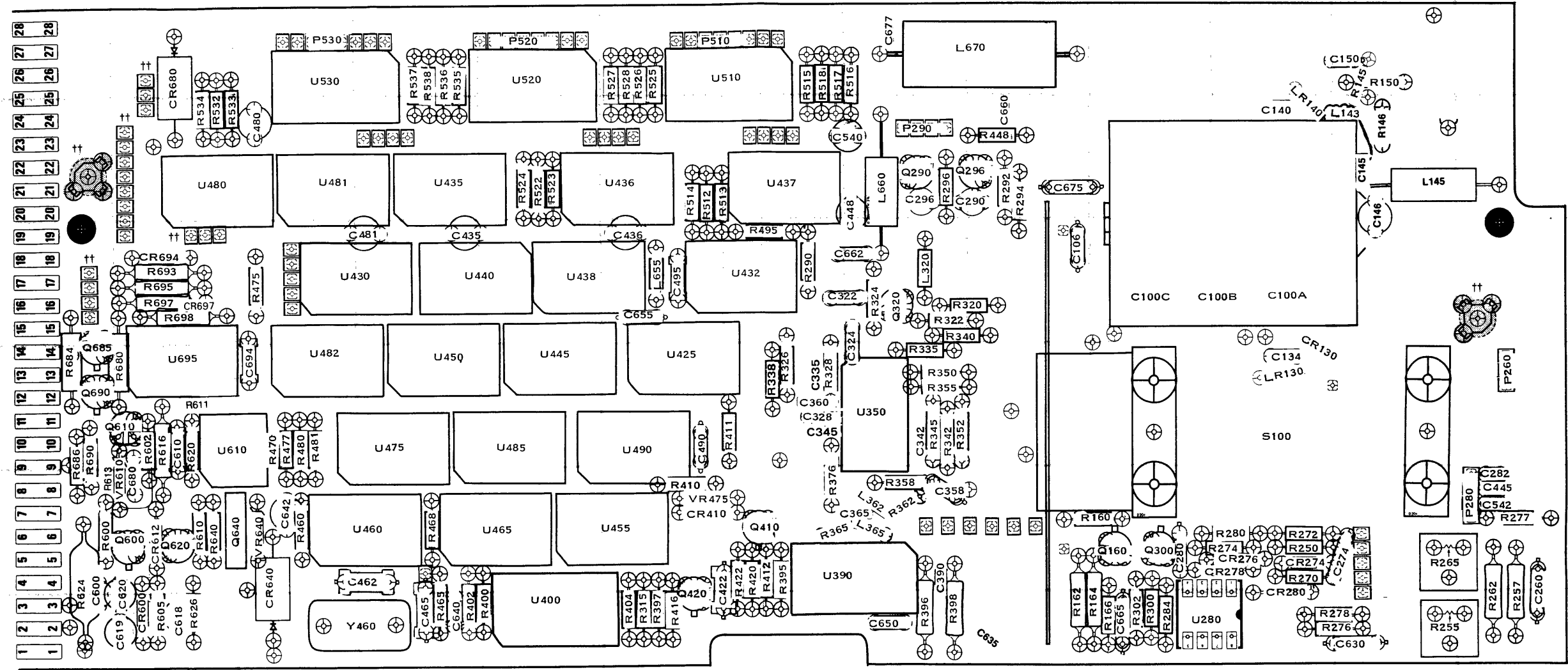
The following special symbols may appear on the diagrams:





SG 503 BLOCK DIAGRAM

REV. B OCT 1977



1622-17A

A1 Main circuit board "A" side.

*See Parts List for
serial number ranges.

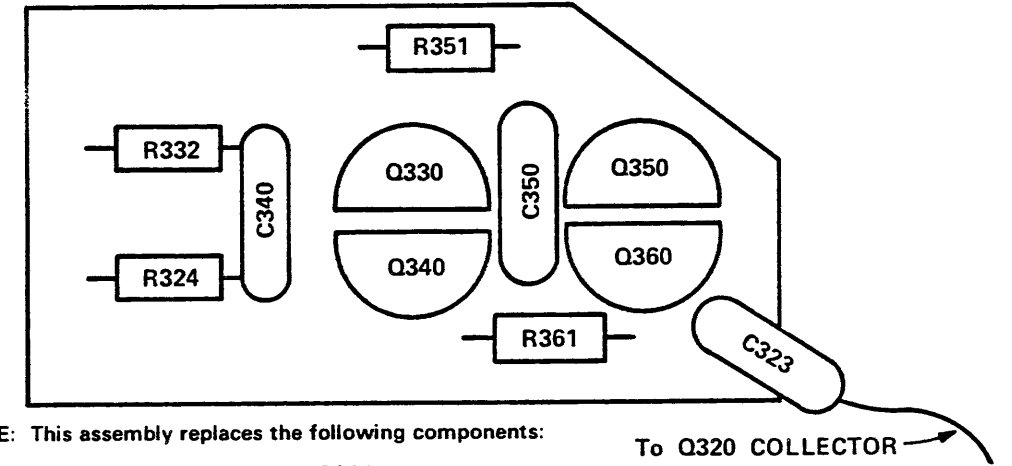
NOTE

The following CKT NO's
are ferrite beads. Refer to
schematic diagrams for
locations.

- L190
- L191
- L245
- L265
- L270
- L280
- L290

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC		
C100A	K3	C324	G4	C480	C2	C655	F3	CR640	C5	P280	M5	Q640	B5	R270	K5	R322	H3	R395	G5	R468	D5	R524	E2	R611*	B4	U350*	H4	U475	D4
C100B	K3	C328*	G4	C481	C3	C660	I2	CR680	B1	P290	H2	Q685	A4	R272	K5	R324	H3	R396	H6	R470	C4	R525	F1	R613	A5	U390	G5	U480	B2
C100C	J3	C335*	G4	C490	F4	C662	G3	CR694	B3	P510	F1	Q690	A4	R274	K5	R326	G4	R397	F6	R475	C3	R526	F1	R616	B4	U400	E6	U481	C2
C106	I3	C342*	H4	C495	F3	C665	J6	CR697*	B3	P520	E1	R145	L1	R276	K6	R328	G4	R398	H6	R477	C4	R527	F1	R620	B4	U425	F4	U482	C4
C134	K4	C345*	G4	C540	G1	C675	I2	L143	L2	P530	C1	R146*	L2	R277	M5	R335	H4	R400	D6	R480	C4	R528	F1	R624	A5	U430	C3	U485	E4
C140	K2	C358	H5	C542	M5	C677	H1	L145*	L2			R145	L1	R278	K6	R338*	G4	R402	D6	R481	C4	R532	B2	R626	B6	U432	G3	U490	F4
C145*	L2	C360*	G4	C600	A5	C680	B5	L320	H3	Q160	J5	R150	L1	R280	K5	R340*	H3	R404	F6	R495	G3	R533	B2	R640	B5	U435	D2	U510	F1
C150	L1	C390	H5	C610	B4	C694	C4	L362	H5	Q290	H2	R160	J5	R284	J6	R342	H4	R410	F5	R512	F2	R534	B2	R680	A4	U436	F2	U520	E1
C260	M6	C422	F6	C619	A5	CR274	K5	L655	F3	Q300	J5	R164	I6	R290	G3	R345*	H4	R411	F4	R402	D6	R481	C4	R528	F1	U430	C3	U485	E4
C274	L5	C435	D3	C620	A5	CR276	K5	L660	H2	Q320	H3	R166	J6	R292	I2	R350	H4	R412	G5	R416	F6	R515	G1	R537	D1	U440	D3	U695	B4
C280	J5	C436	F3	C630	L6	CR278	K5	L670	I1	Q410	G5	R250	K5	R296	H2	R355	H4	R420	G5	R420	G5	R538	D1	R690	A4	U445	E4	VR475	F5
C282	M5	C445	M5	C635*	I6	CR280	K6	LR130	K4	Q420	F6	R255	L6	R300	J6	R358	H5	R422	G5	R422	G5	R517	G1	R600	A5	U450	D4	VR610	A5
C290	H2	C448	G2	C640	D6	CR410	F5	LR140	K2	Q600	B5	R257	M6	R302	J6	R362	H5	R448	I2	R448	I2	R518	G1	R602	B4	U455	F5	VR640	C5
C296	H2	C462	C5	C642	C5	CR600	B6	Q610	A4	R262	M6	R315	F6	R315	F6	R365	G5	R460	C5	R522	E2	R605	B6	R698	B3	U460	D5		
C322	G3	C465	D6	C650	H6	CR612	B5	P260	M4	Q620	B5	R265	L5	R320	H3	R376	G5	R465	D6	R523	E2	R610	B5	U280	J6	U465	E5	Y460	C6

A5 Dual differential Amplifier circuit board.
SN B060000 - up

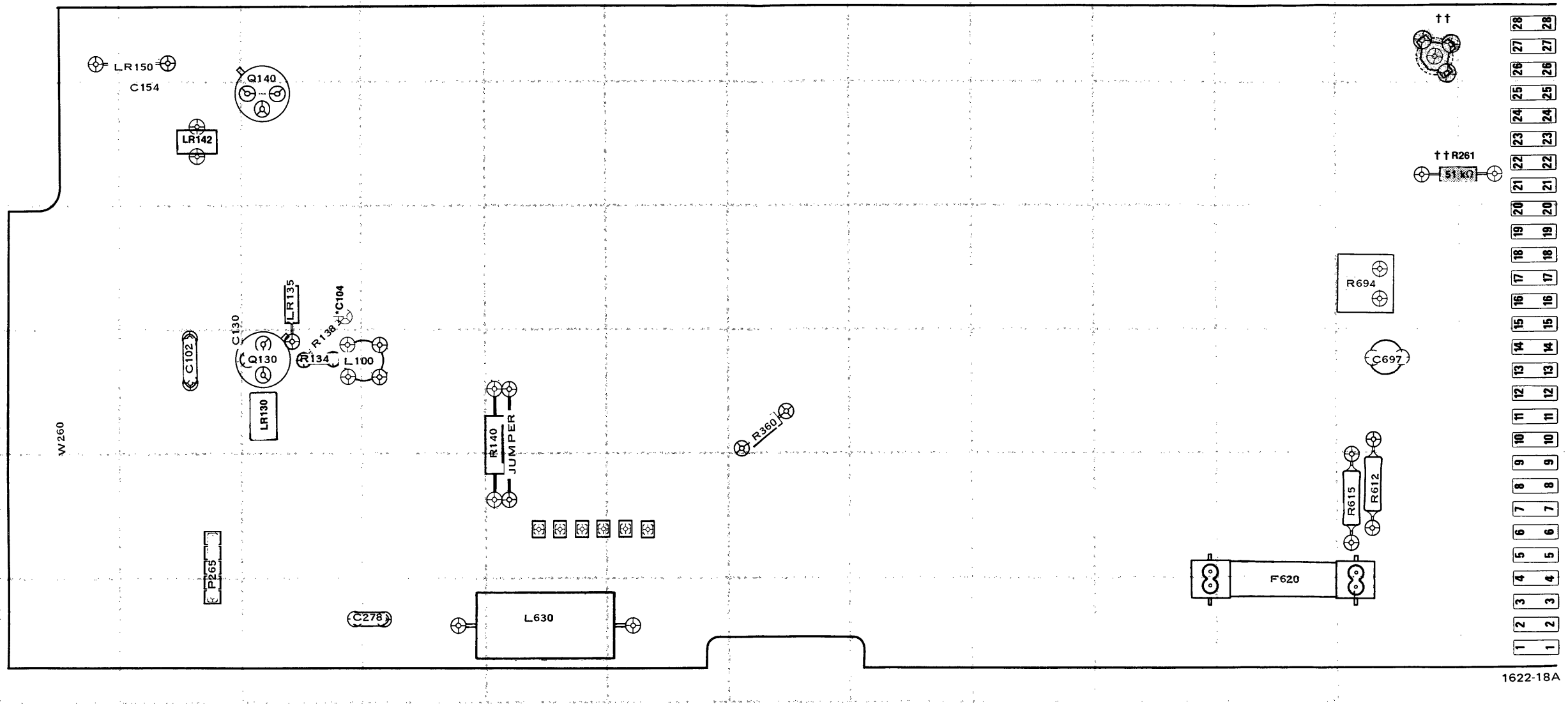


NOTE: This assembly replaces the following components:

- C328, C335, C342, C345, C360
- R338, R340, R345
- U350

To Q320 COLLECTOR →

CUSTOMER MOD



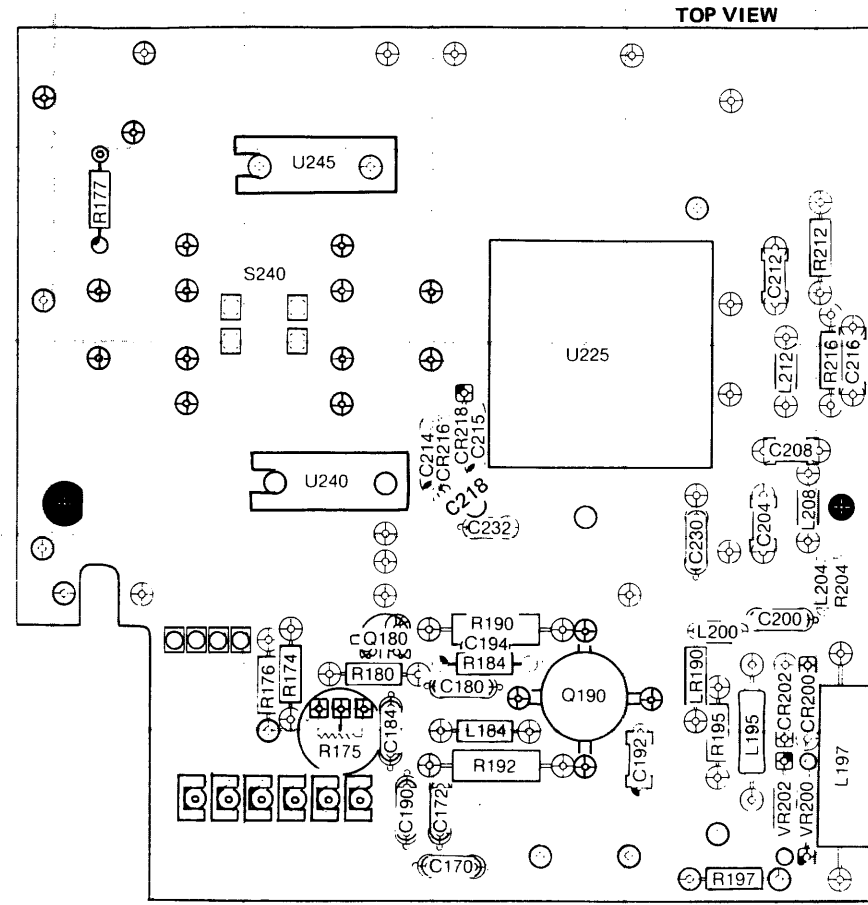
1622-18A

†† Optional

A1 Main circuit board "B" side.

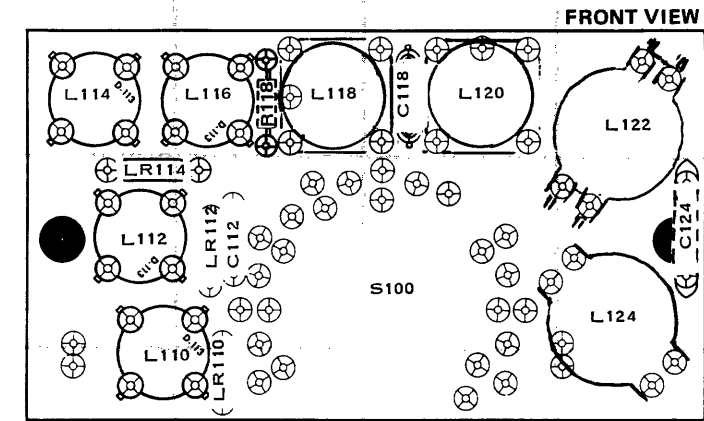
*See Parts List for serial number ranges.

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				
C154	B2	Q130	C4	W260	A4
C278	D6	Q140	C2		
C697	L4				
F620	K5	P265	B5		
L100	D4	R134	C4		
L142	B2	R138	C4		
L630	E6	R140	E4		
LR130	C4	R360	G4		
		R612	L5		



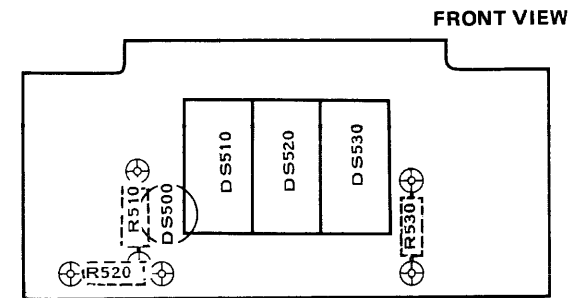
A3 Attenuator circuit board

1622-19A



A2 Coil circuit board

1622-21



A4 Display circuit board

1622-20

*See Parts List for serial number ranges.

† Located on back of board.

‡ Selected component, refer to maintenance section.

CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	CKT NO	GRID LOC	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	S100	L2
C180	D4	C232	D3	L112	J2	L212	E3	R177*‡	B2	S240	C2
C184	C4			L114	J1			R180	C4		
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

REV F JUL 1980

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.

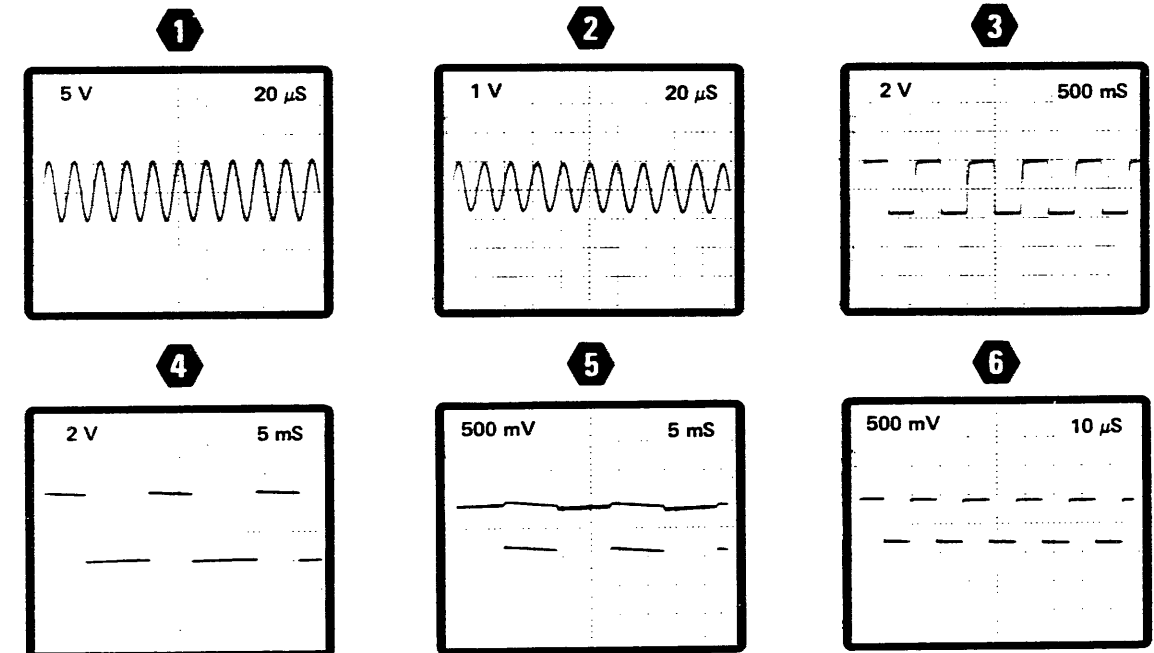
The voltages and waveforms shown on the diagrams were taken with no input signal and the SG 503 front panel controls set as follows:

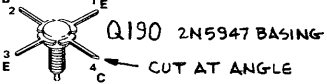
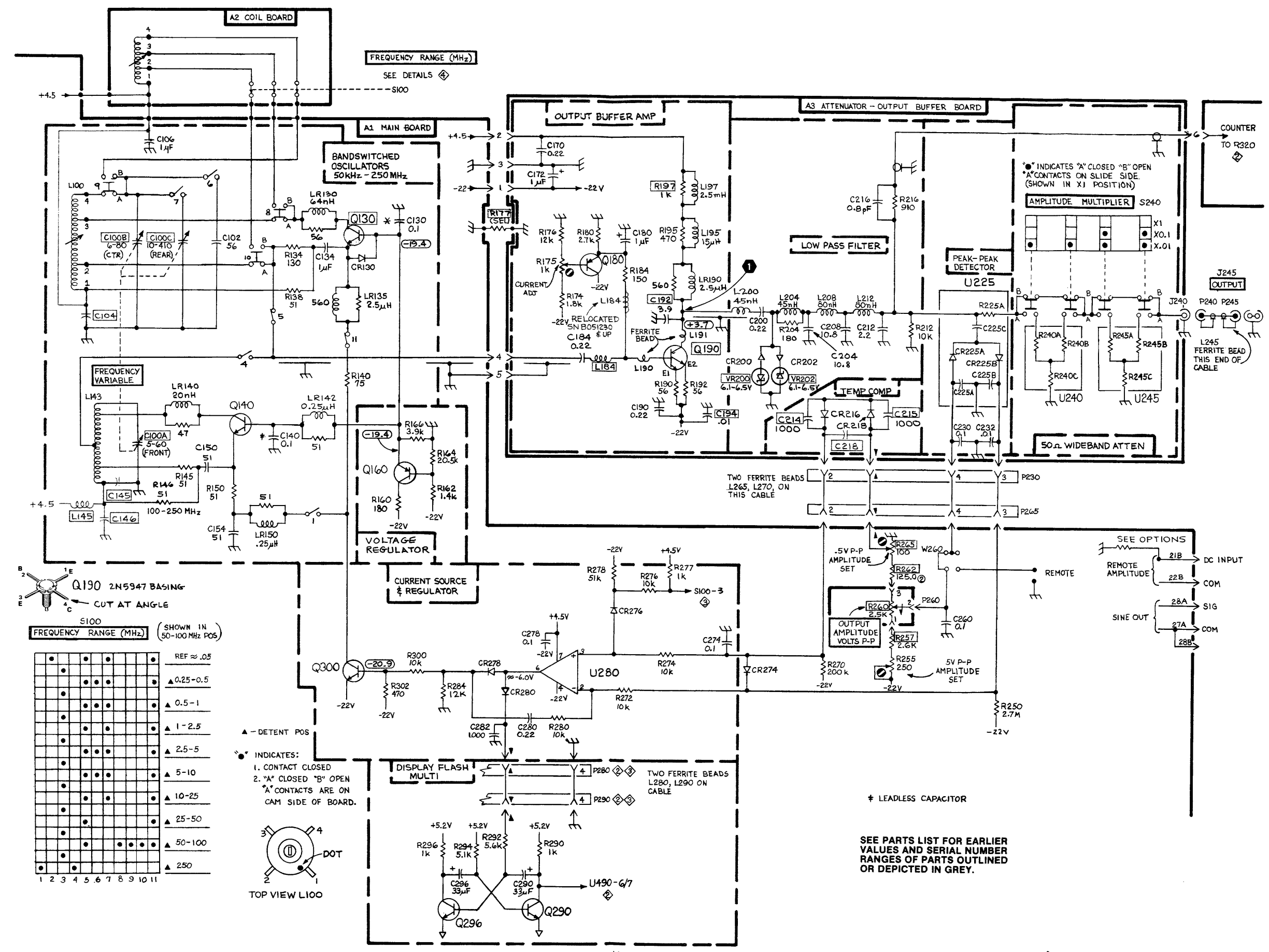
VOLTAGES		*WAVEFORMS	
AMPLITUDE MULTIPLIER	X1	AMPLITUDE MULTIPLIER	X1
FREQUENCY VARIABLE	Midrange	FREQUENCY VARIABLE	Midrange
FREQUENCY RANGE (MHz)	REF \approx .05	FREQUENCY RANGE (MHz)	REF \approx .05
OUTPUT AMPLITUDE	5.5	OUTPUT AMPLITUDE	5.5

*gnd reference: center horizontal graticule line

Voltage Conditions. The voltages shown on the diagram were obtained using a digital multimeter with a 10 M Ω 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.

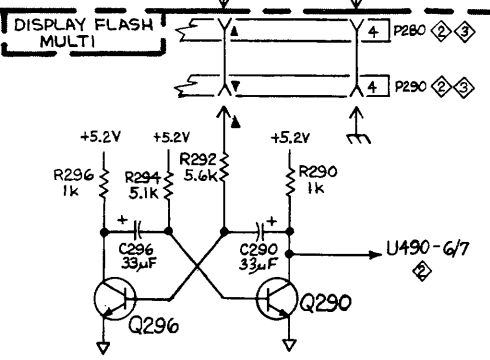
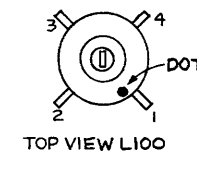




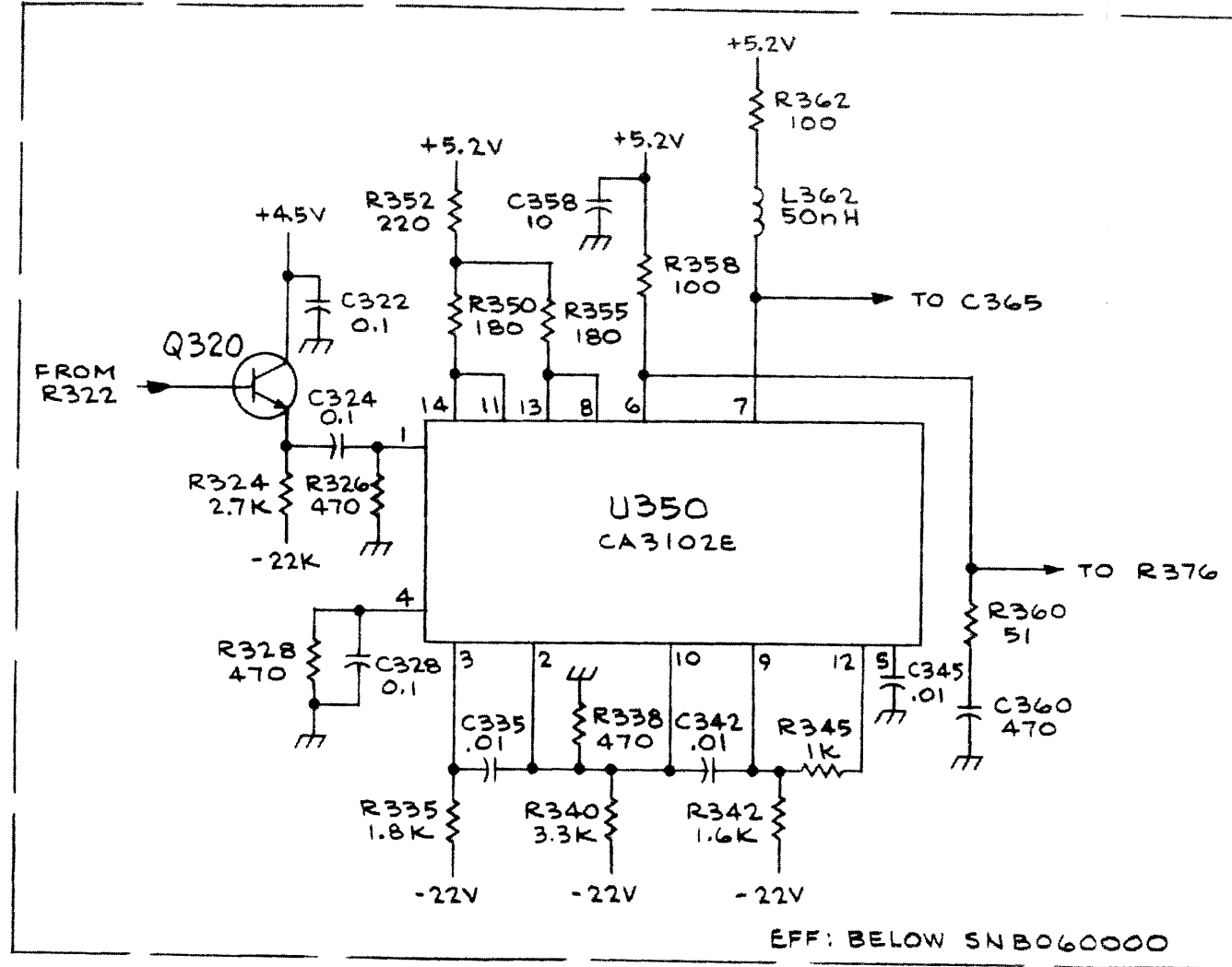
S100 FREQUENCY RANGE (MHz) (SHOWN IN 50-100 MHz POS)

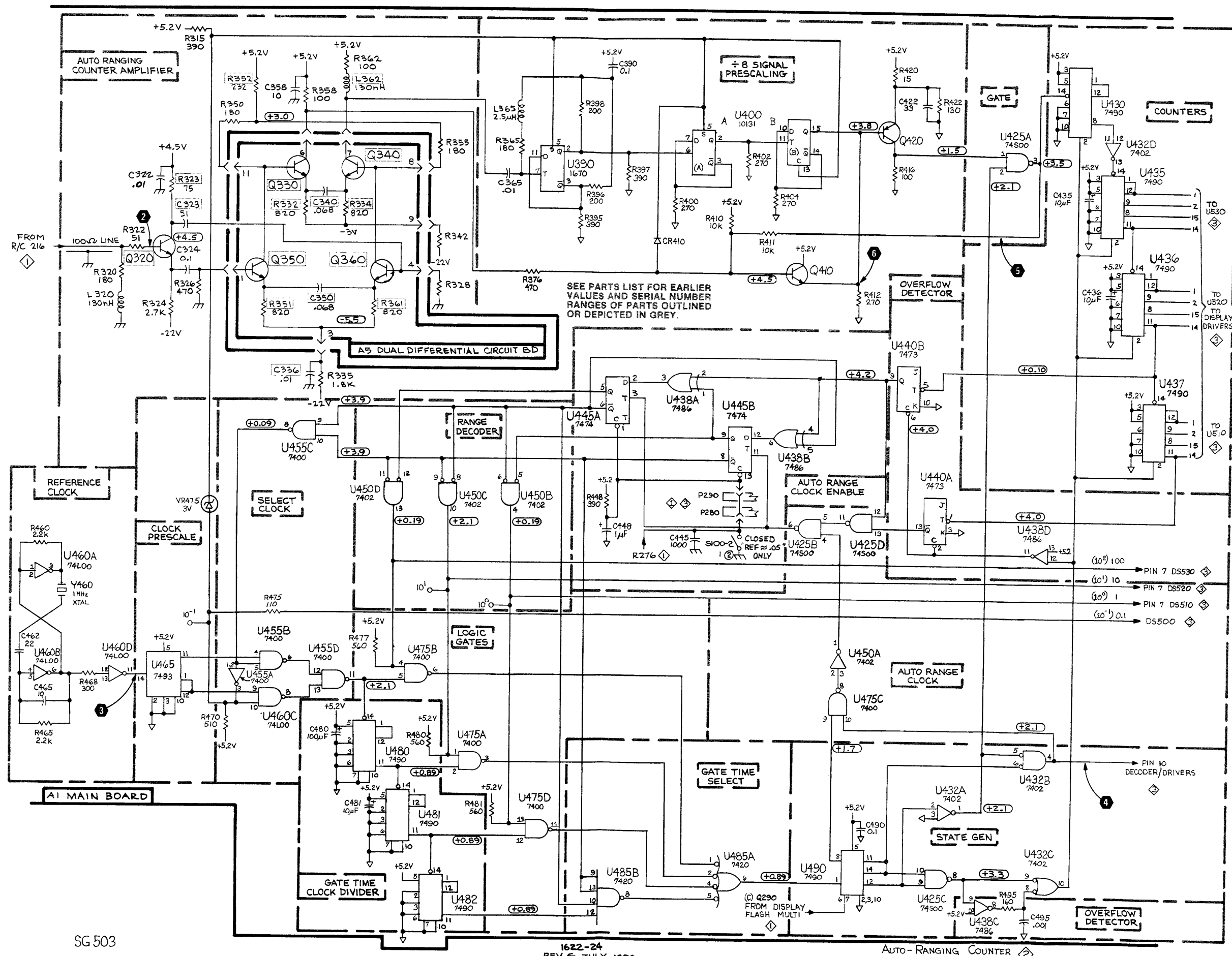
REF	≈	.05
▲	0.25-0.5	
▲	0.5-1	
▲	1-2.5	
▲	2.5-5	
▲	5-10	
▲	10-25	
▲	25-50	
▲	50-100	
▲	250	

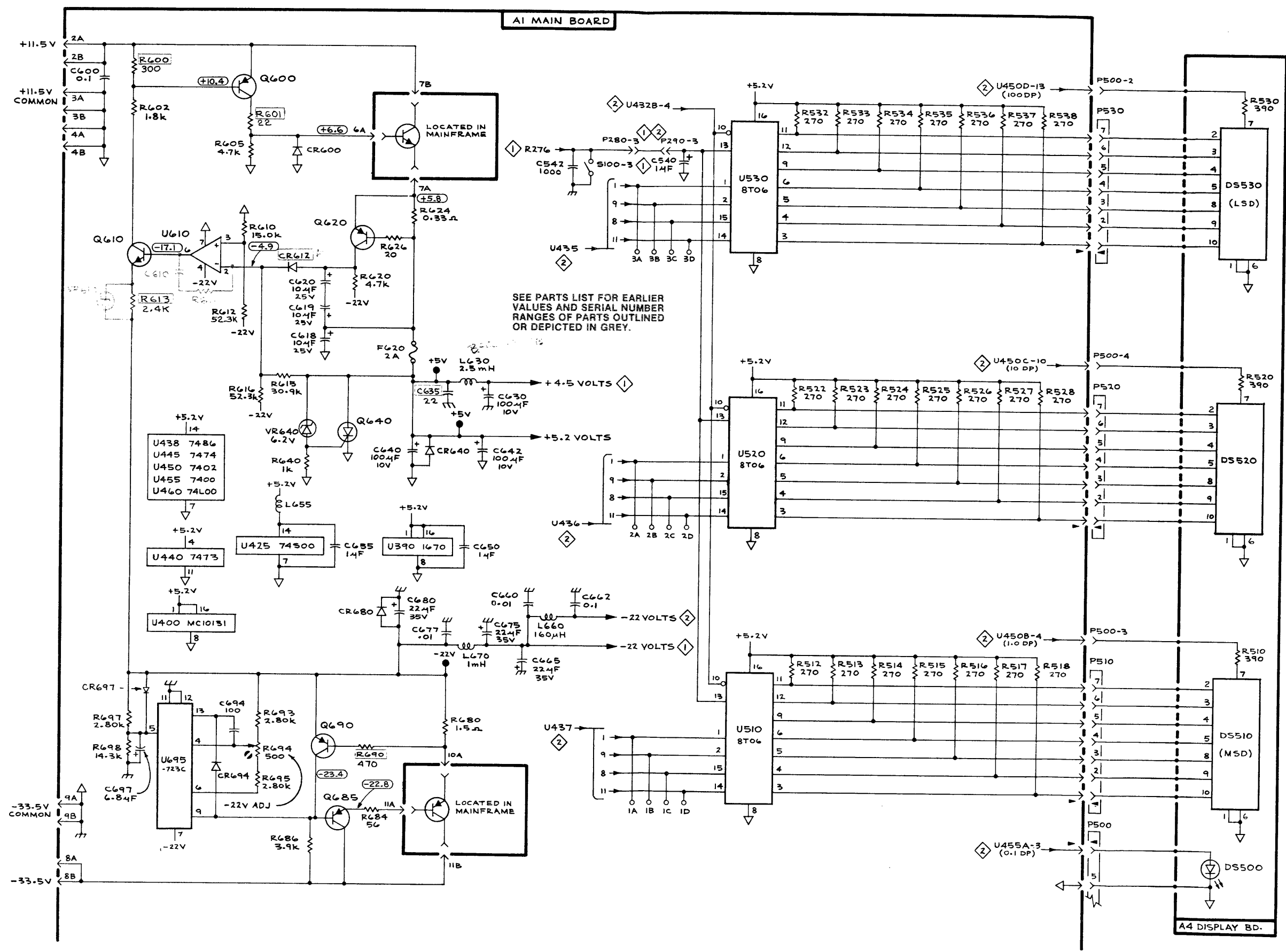
▲ - DETENT POS
 * INDICATES:
 1. CONTACT CLOSED
 2. "A" CLOSED "B" OPEN
 "A" CONTACTS ARE ON CAM SIDE OF BOARD.

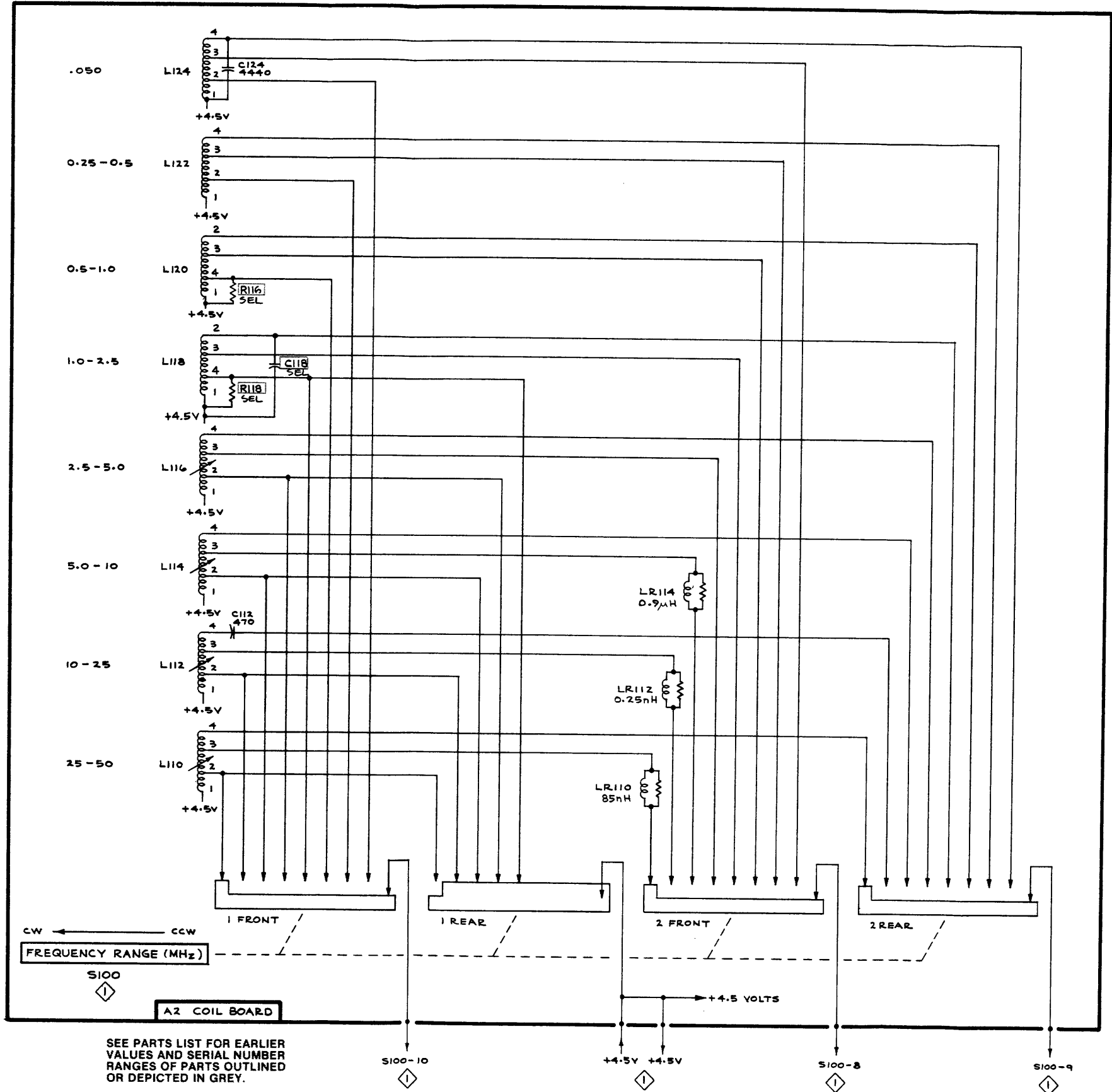
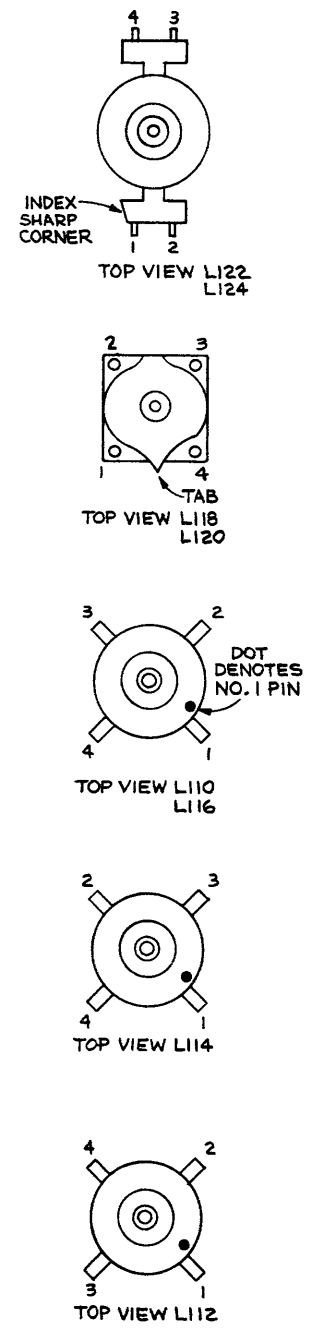


SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER RANGES OF PARTS OUTLINED OR DEPICTED IN GREY.









REPLACEABLE MECHANICAL PARTS

PARTS ORDERING INFORMATION

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

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

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

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

SPECIAL NOTES AND SYMBOLS

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

FIGURE AND INDEX NUMBERS

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

INDENTATION SYSTEM

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

```

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

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

Attaching parts must be purchased separately, unless otherwise specified.

ITEM NAME

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

ABBREVIATIONS

INCH	ELECTRN	ELECTRON	IN	INCH	SE	SINGLE END
* NUMBER SIZE	ELEC	ELECTRICAL	INCAND	INCANDESCENT	SECT	SECTION
ACTR ACTUATOR	ELECTLT	ELECTROLYTIC	INSUL	INSULATOR	SEMICONO	SEMICONDUCTOR
ADPTR ADAPTER	ELEM	ELEMENT	INTL	INTERNAL	SHLD	SHIELD
ALIGN ALIGNMENT	EPL	ELECTRICAL PARTS LIST	LPHLDR	LAMPHOLDER	SHLDR	SHOULDERED
AL ALUMINUM	EQPT	EQUIPMENT	MACH	MACHINE	SKT	SOCKET
ASSEM ASSEMBLED	EXT	EXTERNAL	MECH	MECHANICAL	SL	SLIDE
ASSY ASSEMBLY	FIL	FILLISTER HEAD	MTG	MOUNTING	SLFLKG	SELF-LOCKING
ATTEN ATTENUATOR	FLEX	FLEXIBLE	NIP	NIPPLE	SLVG	SLEEVING
AWG AMERICAN WIRE GAGE	FLH	FLAT HEAD	NON WIRE	NOT WIRE WOUND	SPR	SPRING
BD BOARD	FLTR	FILTER	OBD	ORDER BY DESCRIPTION	SQ	SQUARE
BRKT BRACKET	FR	FRAME or FRONT	OD	OUTSIDE DIAMETER	SST	STAINLESS STEEL
BRS BRASS	FSTNR	FASTENER	OVH	OVAL HEAD	STL	STEEL
BRZ BRONZE	FT	FOOT	PH BRZ	PHOSPHOR BRONZE	SW	SWITCH
BSHG BUSHING	FXD	FIXED	PL	PLAIN or PLATE	T	TUBE
CAB CABINET	GSKT	GASKET	PLSTC	PLASTIC	TERM	TERMINAL
CAP CAPACITOR	HDL	HANDLE	PN	PART NUMBER	THD	THREAD
CER CERAMIC	HEX	HEXAGON	PNH	PAN HEAD	THK	THICK
CHAS CHASSIS	HEX HD	HEXAGONAL HEAD	PWR	POWER	TNSN	TENSION
CKT CIRCUIT	HEX SOC	HEXAGONAL SOCKET	RCPT	RECEPTACLE	TPG	TAPPING
COMP COMPOSITION	HLCPS	HELICAL COMPRESSION	RES	RESISTOR	TRH	TRUSS HEAD
CONN CONNECTOR	HLEXT	HELICAL EXTENSION	RGD	RIGID	V	VOLTAGE
COV COVER	HV	HIGH VOLTAGE	RLF	RELIEF	VAR	VARIABLE
CPLG COUPLING	IC	INTEGRATED CIRCUIT	RTNR	RETAINER	W/	WITH
CRT CATHODE RAY TUBE	ID	INSIDE DIAMETER	SCH	SOCKET HEAD	WSHR	WASHER
DEG DEGREE	IDNT	IDENTIFICATION	SCOPE	OSCILLOSCOPE	XFMR	TRANSFORMER
DWR 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 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 CAMCAR DIV SEMS PRODUCTS UNIT	1818 CHRISTINA ST	ROCKFORD IL 61108
05129	KILO ENGINEERING CO	2015 D	LA VERNE CA 91750
05820	EG AND G MAKEFIELD ENGINEERING	60 AUDUBON RD	MAKEFIELD MA 01880
06090	RAYCHEM CORP	300 CONSTITUTION DRIVE	MENLO PARK CA 94025
06950	VSI CORP 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	BURNDY CORP	RICHARDS AVE	NORMAL CT 06852
12327	FREEMAY CORP	9301 ALLEN DR	CLEVELAND OH 44125
22526	DU PONT E I DE NEMOURS AND CO INC 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 SUB OF EMHART INDUSTRIES INC	140 FEDERAL ST	BOSTON MA 02107
73743	FISCHER SPECIAL MFG CO	446 MORGAN ST	CINCINNATI OH 45206
74445	HOLD-KROME CO	31 BROOK ST	WEST HARTFORD CT 06110
76854	OAK SWITCH SYSTEMS INC SUB OF OAK TECHNOLOGY INC	100 S MAIN ST	CRYSTAL LAKE IL 60014
77900	SHAKEPROOF DIV OF ILLINOIS TOOL WORKS	SAINT CHARLES RD	ELGIN IL 60120
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIVISION	ST CHARLES ROAD	ELGIN IL 60120
80009	TEKTRONIX INC	4900 S M GRIFFITH DR P O BOX 500	BEAVERTON OR 97077
83385	MICRODOT MANUFACTURING INC GREER-CENTRAL DIV	3221 M BIG BEAVER RD	TROY MI 48098
83486	ELCO INDUSTRIES INC	1101 SAMUELSON RD	ROCKFORD IL 61101
86113	MICRODOT MFG INC CENTRAL SCREM- KEENE DIV	149 EMERALD ST	KEENE NH 03431
86928	SEASTROM MFG CO INC	701 SONORA AVE	GLENDALE CA 91201
93907	TEXTRON INC 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 SM CIRRHUS DRIVE	BEAVERTON OR 97005
TK0433	PORTLAND SCREM CO	6520 N BASIN	PORTLAND OR 97217
TK0435	LEMIS SCREM CO	4114 S PEDRIA	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 SM CIRRHUS	BEAVERTON OR 97005

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No.		Qty	12345 Name & Description	Mfr.	
		Effective	Dscont			Code	Mfr. Part No.
1-1	337-1399-02	B010100	B079229	1	SHIELD,ELEC: (SEE FIG. 2)	80009	337-1399-02
-2	342-0196-00			1	.INSULATOR,PLATE:PUSH SWITCH,MYLAR	80009	342-0196-00
-3	337-1399-00	B010100	B029999	1	SHIELD,ELEC:SIDE	80009	337-1399-00
	337-1399-02	B030000	B079229	1	SHIELD,ELEC:	80009	337-1399-02
-4	366-1527-00	B010100	B079229	1	KNOB:GY,0.312 ID X 0.706 OD X 0.6 H	80009	366-1527-00
	366-1861-02	B079230		1	KNOB:GY,0.252 ID X 0.706 OD X 0.612 H	80009	366-1861-02
	213-0153-00			2	.SETSCREM:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-5	366-1190-00	B010100	B079229	1	KNOB:GY,0.252 ID X 0.706 OD X 0.6 H	80009	366-1190-00
	366-1190-02	B079230		1	KNOB:GY,0.252 ID X 0.706 OD X 0.6 H	80009	366-1190-02
	213-0153-00			2	.SETSCREM:5-40 X 0.125,STL	TK0392	ORDER BY DESCR
-6	366-1422-01	B010100	B063069	1	KNOB:LATCH	80009	366-1422-01
	366-1690-00	B063070	B079229	1	KNOB,LATCH:SIL GY,0.53 X 0.23 X 1.059 (SEE FIG. 2) (ATTACHING PARTS)	80009	366-1690-00
-7	214-1840-00	B010100	B063069	1	PIN,KNOB SECRG:0.12 L X 0.094-0.1 OD,ACETAL (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 DESCR
-9	-----			1	RESISTOR,VARIABLE:(SEE R260 REPL)		
-10	131-1315-00	B010100	B065059	1	CONN,RCPT,ELEC:BNC,FEMALE	80009	131-1315-00
	131-1315-01	B065060		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	B010100	B079229	1	PANEL,FRONT: (SEE FIG. 2) (ATTACHING PARTS)	80009	333-1864-00
-13	211-0034-00	B010100	B079229	2	SCREM,MACHINE:2-56 X 0.5,PNH,STL	06950	ORDER BY DESCR
-14	210-0405-00	B010100	B079229	2	NUT,PLAIN,HEX:2-56 X 0.188,BRS CD PL	73743	12157-50
	211-0244-00	B079230		2	SCR,ASSEM MSHR:4-40 X 0.312,PNH STL (END ATTACHING PARTS)	01536	ORDER BY DESCR
-15	214-1513-01	B010100	B063069	1	LCH,PL-IN RTNG:PLASTIC	80009	214-1513-01
	105-0719-00	B063070	B079229	1	LATCH,RETAINING:PLUG-IN (SEE FIG. 2) (ATTACHING PARTS)	80009	105-0719-00
-16	213-0254-00	B010100	B079229	1	SCREM,TPG,TF:2-32 X 0.25,TYPE B,FLH,100 DEG (SEE FIG. 2) (END ATTACHING PARTS)	45722	ORDER BY DESCR
	105-0718-00	B063070	B064589	1	BAR,LATCH RLSE:	80009	105-0718-00
	105-0718-01	B064590	B079229	1	BAR,LATCH RLSE: (SEE FIG. 2)	80009	105-0718-01
-17	386-2848-00	B010100	B079229	1	SUBPANEL,FRONT: (SEE FIG. 2) (ATTACHING PARTS)	80009	386-2848-00
-18	213-0229-00	B010100	B064869	4	SCREM,TPG,TF:6-20 X 0.375,TYPE B,FLH,STL	93907	ORDER BY DESCR
	213-0123-00	B064870	B079229	4	SCREM,TPG,TF:6-32 X 0.375,SPCL TYPE,FLH (END ATTACHING PARTS)	93907	234-21940-026
-19	337-1956-00	B064870	B079229	1	SHIELD,ELEC:REAR SUBPANEL (SEE FIG. 2)	80009	337-1956-00
-20	337-2171-00			1	SHIELD,ELEC:CAPACITOR (ATTACHING PARTS)	80009	337-2171-00
-21	211-0116-00	B010100	B067249	1	SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP	77900	ORDER BY DESCR
	211-0292-00	B067250		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	SCREM,MACHINE:2-56 X 0.25,FLH,82 DEG,STL	TK0435	ORDER BY DESCR
-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	SCREM,TPG,TF:6-32 X 1.25,SPCL TYPE,PNH,STL (END ATTACHING PARTS)	86113	ORDER BY DESCR
-27	361-0516-00			1	SPACER,SLEEVE:0.986 L X 0.157 ID,BRS	80009	361-0516-00
-28	214-1989-00	B010100	B079229	1	LEVER,SLIDE SM:	80009	214-1989-00
	214-1989-01	B079230		1	LEVER,SLIDE SM: (ATTACHING PARTS)	80009	214-1989-01
-29	354-0165-00			1	RING,RETAINING:TYPE E EXT,U/O 0.156 OD SFT (END ATTACHING PARTS)	97464	1000-15-ZD
-30	211-0116-00	B010100	B067249	1	SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP	77900	ORDER BY DESCR
	211-0292-00	B067250		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

Replaceable Mechanical Parts - SG 503

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-32	214-2036-00			1	PIN,PIVOT:SWITCH LEVER	80009	214-2036-00
-33	376-0154-00			1	ADAPTER,SM 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	8010100	8063299	1	LENS-HLDR,IND L:	80009	378-0746-00
	378-0746-01	8063300		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) (ATTACHING PARTS)		
-39	211-0101-00			2	SCREW,MACHINE:4-40 X 0.25,FLH,100 DEG,STL (END ATTACHING PARTS) CKT BOARD ASSY INCLUDES:	TK0435	ORDER BY DESCR
-40	211-0116-00	8010100	8067249	4	.SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP	77900	ORDER BY DESCR
	211-0292-00	8067250		4	.SCR,ASSEM MSHR:4-40 X 0.29,PNH,BRS NI PL	78189	51-040445-01
	210-1171-00	8030000	8063379	1	.MASHER,SHLDR:0.12 ID X 0.143 OD,NYLON	00261	A7148516P2
-41	337-2016-00			1	.SHIELD,ELEC:HIGH FREQUENCY OSCILLATOR (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 DESCR
-43	210-0259-00			1	.TERMINAL,LUG:0.099 ID,LOCKING,BRS CD PL (END ATTACHING PARTS)	80009	210-0259-00
	105-0588-00			1	.ACTR ASSY,SL SM: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 SM: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,SMITCH:OUTPUT ATTEN	80009	105-0511-00
-48	-----			1	.TRANSISTOR:(SEE Q190 REPL) (ATTACHING PARTS)		
-49	220-0555-00			1	.NUT,PLAIN,HEX:8-32 X 0.25 HEX,STL CD PL	TK0433	ORDER BY DESCR
	210-0224-00	8010100	8063379	1	.TERMINAL,LUG:0.2 ID,PLAIN,BRS TIN PL	86928	A373-148-1
-50	210-0804-00			1	.MASHER,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 (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/M 0.0.19 DIA PINS	00779	1-332095-2
-54	131-1030-00			4	.CONT ASSY,ELEC:CAM SWITCH,BOTTOM	80009	131-1030-00
-55	131-1031-00			4	.CONT ASSY,ELEC:CAM SWITCH,TOP	80009	131-1031-00
-56	210-0779-00	8010100	8066396	4	.RIVET,TUBULAR:0.115 L X 0.05 OD,DBL END	42838	RA-29952715
	210-3082-00	8066397		4	.EYELET,METALLIC:0.047 OD X 0.133 L,BRS NP	61957	56494 (MODIFIED)
-57	136-0327-01	8010100	8051399	10	.SOCKET,PIN TERM:0.067 INCH DIA	00779	86281-2
	136-0263-04	8051400		10	.SOCKET,PIN TERM:U/M 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 (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	.MASHER,LOCK:#4 SPLIT,0.025 THK STL	78189	ORDER BY DESCR
-62	210-0956-00			3	.MASHER,FLAT:0.12 ID X 0.25 OD X 0.034,SST (END ATTACHING PARTS)	80009	210-0956-00
-63	-----			2	.ATTENUATOR,FXD:(SEE U240 & U245) (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 (END ATTACHING PARTS)	80009	344-0248-00
-66	-----			1	.MICROCIRCUIT,01:(SEE U225 REPL) (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 (END ATTACHING PARTS)	TK0435	ORDER BY DESCR
-69	337-2017-00			1	.SHIELD,ELEC:HIGH FREQUENCY OSCILLATOR	80009	337-2017-00
-70	-----			1	CKT BOARD ASSY:COIL(SEE A2 REPL) (ATTACHING PARTS)		
-71	213-0146-00			3	SCREW,TPG,TF:6-20 X 0.312,TYPE B,PNH,STL	83385	ORDER BY DESCR
	210-0261-00	8010100	8029999	1	TERMINAL,LUG:0.14 ID,PLAIN,BRASS (END ATTACHING PARTS) CKT BOARD ASSY INCLUDES: .SM CAM ACTR AS:(SEE S100 REPL) (ATTACHING PARTS)	80009	210-0261-00
-72	211-0116-00	8010100	8062809	4	.SCR,ASSEM MSHR:4-40 X 0.312,PNH,BRS,NP	77900	ORDER BY DESCR

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No. Effective	Dscont	Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
1-	211-0292-00	B062810		4	.SCR,ASSEM MSHR:4-40 X 0.29,PNH,BRS NI PL .(END ATTACHING PARTS)	78189	51-040445-01
-73	200-1647-00			1	..ACTUATOR ASSY INCLUDES: ..COVER,CAM SM:11 ELEMENTS ..(ATTACHING PARTS)	80009	200-1647-00
-74	211-0008-00			3	..SCREW,MACHINE:4-40 X 0.25,PNH,STL	93907	ORDER BY DESCR
-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 DESCR
-77	210-0994-00			1	..WASHER,FLAT:0.125ID X 0.2500 X 0.022	86928	A371-283-20
-78	343-0144-00			1	..CLAMP,LOOP:0.125 ID,NYLON ..(END ATTACHING PARTS)	TK1452	ORDER BY DESCR
-79	131-0963-00			2	..CONTACT,ELEC:GROUNDING,PH BRZ,W/BRACKET	TK0507	ORDER BY DESCR
-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 SM:FRONT M/O MOUNTING BOSSES	80009	401-0081-02
-85	263-0521-00			1	...SM SECTION,RTRY:HYBRID,BAND CAM SM	76854	ORDER BY DESCR
-86	386-3069-00			1	..PLATE,SM MTG:BAND ..(ATTACHING PARTS)	80009	386-3069-00
-87	211-0022-00			2	..SCREW,MACHINE:2-56 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-88	210-0001-00			2	..WASHER,LOCK:#2 INTL,0.013 THK,STL ..(END ATTACHING PARTS)	77900	1202-00-00-0541C
-89	105-0599-00			1	..ACTUATOR,CAM SM:BAND SWITCH	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 SM:M/INSERT	80009	401-0113-01
-92	-----	B060000		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 ..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	OMA 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 SWITCH,BOTTOM	80009	131-1030-00
-99	131-1031-00			11	..CONT ASSY,ELEC:CAM SWITCH,TOP	80009	131-1031-00
-100	210-0779-00	B010100	B066396	11	..RIVET,TUBULAR:0.115 L X 0.05 OD,DBL END	42838	RA-29952715
	210-3082-00	B066397		11	..EYELET,METALLIC:0.047 OD X 0.133 L,BRS NP	61957	S6494 (MODIFIED)
-101	136-0252-04	B010100	B059999	73	..SOCKET,PIN TERM:U/M 0.016-0.018 DIA PINS	22526	75060-007
	136-0252-04	B060000		66	..SOCKET,PIN TERM:U/M 0.016-0.018 DIA PINS	22526	75060-007
-102	136-0514-00	B010100	B068599	2	..SKT,PL-IN ELEK:MICROCIRCUIT,8 DIP	09922	D1LB8P-108
	136-0727-00	B068600		2	..SKT,PL-IN ELEK:MICROCKT,8 CONTACT	09922	D1LB8P-108
-103	136-0260-02	B010100	B068599	3	..SKT,PL-IN ELEK:MICROCKT,16 DIP,LOW CL	09922	D1LB16P-108T
-104	136-0269-02	B010100	B068599	18	..SKT,PL-IN ELEK:MICROCIRCUIT,14 DIP	09922	D1LB14P-108T
	136-0728-00	B068600		1	..SKT,PL-IN ELEK:MICROCKT,14 CONTACT	09922	D1LB14P-108
-105	376-0011-01	B010100	B057799	1	..CPLG,SHAFT,FLEX:0.252 ID X 0.438 OD,NYLON	80009	376-0011-01
	213-0048-00	B010100	B057799	2	...SETSCREW:4-40 X 0.125,STL	TK0392	ORDER BY DESCR
	376-0172-00	B057800		1	..CPLG,SHAFT,RGD:0.25 ID X 0.75 OD,DELRLIN	K0099	5610/4-40
-106	213-0075-00	B057800		4	...SETSCREW:4-40 X 0.094,STL	74445	ORDER BY DESCR
-107	-----			1	..CAPACITOR,VAR AIR:(SEE C100 REPL) ..(ATTACHING PARTS)		
-108	211-0503-00			2	..SCREW,MACHINE:6-32 X 0.188,PNH,STL	TK0435	ORDER BY DESCR
-109	210-0801-00			2	..WASHER,FLAT:0.14 ID X 0.281 OD X 0.25,BRS ..(END ATTACHING PARTS)	12327	31724-000
-110	214-1292-00			2	..HEAT SINK,XSTR:TO-5,SIL BRZ PTD BLACK	05820	20558
-111	344-0154-00			2	..CLIP,ELECTRICAL:FUSE,CKT BD MT	80009	344-0154-00
-112	337-2264-00	B030000		1	..SHIELD,ELEC:CIRCUIT BOARD	80009	337-2264-00
-113	214-1061-00	B010100	B079229	1	CONTACT,ELEC:GROUNDING,CU BE (SEE FIG. 2)	80009	214-1061-00
-114	426-0725-05	B010100	B079229	1	FR SECT,PLUG-IN:TOP (SEE FIG. 2)	80009	426-0725-05
-115	386-3657-00	B063090	B065150	2	SUPPORT,PLUG-IN:	80009	386-3657-00
	386-3657-01	B065151		2	SUPPORT,PLUG-IN:	93907	ORDER BY DESCR
-116	210-1270-00	B063090	B079229	2	WASHER,FLAT:0.141 ID X 0.219 OD X 0.04,AL	80009	210-1270-00
-117	426-0724-08	B010100	B079229	1	FR SECT,PLUG-IN:BOTTOM (SEE FIG. 2)	80009	426-0724-08
	198-2210-00			1	WIRE SET,ELEC:	80009	198-2210-00
-118	210-0774-00			2	.EYELET,METALLIC:0.152 OD X 0.218 L	80009	210-0774-00

Replaceable Mechanical Parts - SG 503

Fig. & Index No.	Tektronix Part No.	Serial/Assembly No.		Qty	12345	Name & Description	Mfr. Code	Mfr. Part No.	
		Effective	Dscont						
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. & Index No.	Tektronix Part No.	Serial/Assembly No.		Qty	12345 Name & Description	Mfr. Code	Mfr. Part No.
		Effective	Dscont				
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: (ASSY;INCLUDES LATCH AND FASTENER)	80009	337-3211-00
-4	366-1851-01			1	KNOB,LATCH:IVORY GY,D.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 M,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,TPG,TF:6-32 X 0.4375,TAPTITE,FILH	83486	239-006-406043

Replaceable Mechanical Parts - SG 503

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

ACCESSORIES

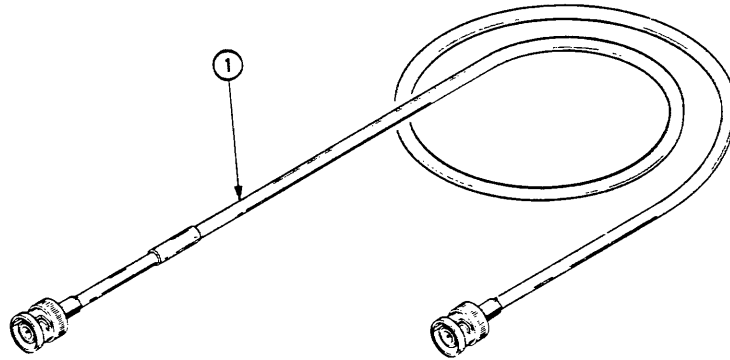
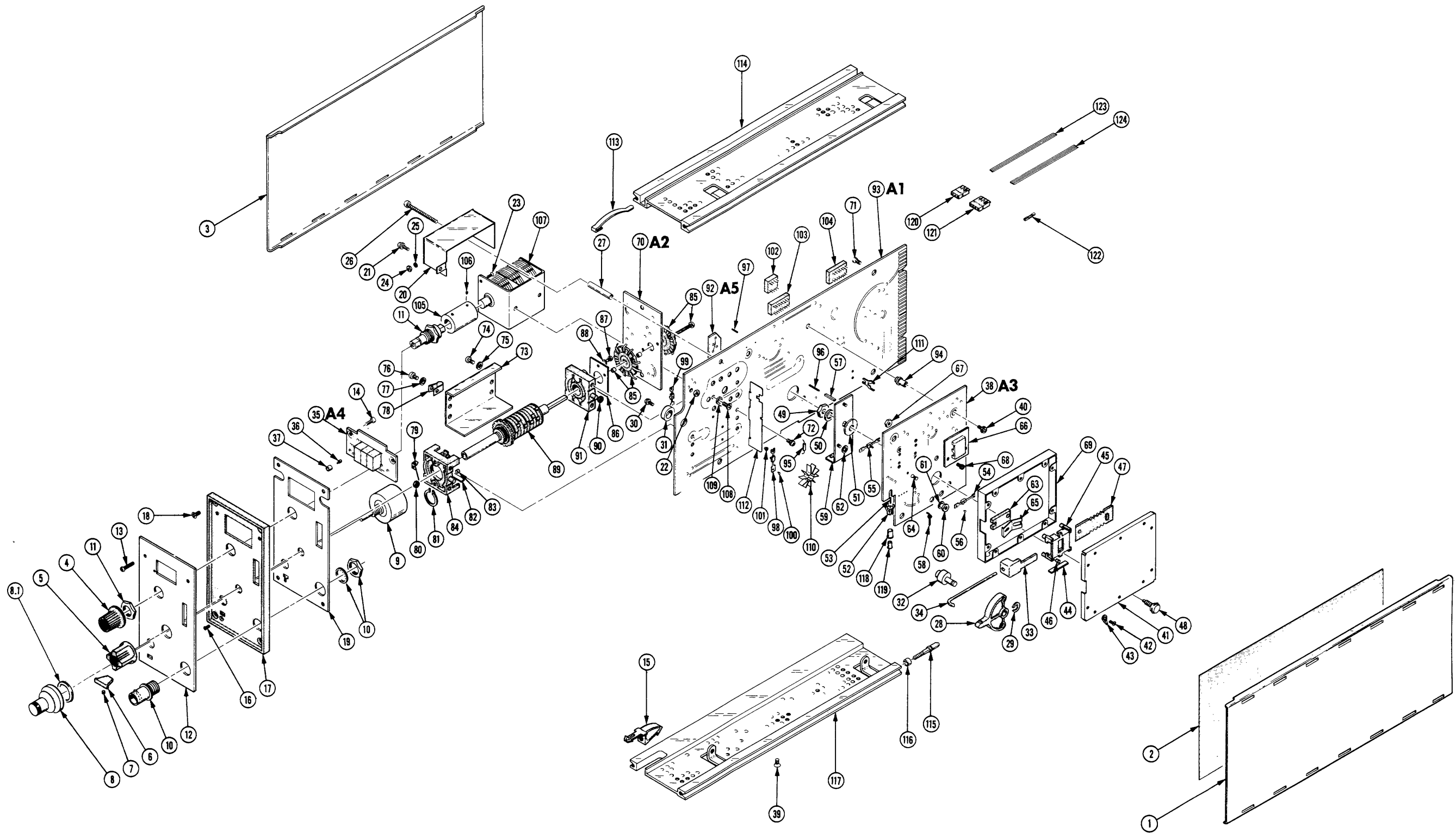


Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscnt	Qty						Name & Description	Mfr Code	Mfr Part Number	
					1	2	3	4	5				
2-1	012-0482-00			1						CABLE,ASSY:MALE BNC EA END	80009	012-0482-00	
	070-1622-01			1						MANUAL,TECH:INSTRUCTION	80009	070-1622-01	

FIG. 1 EXPLODED



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FIG. 2 CABINET

