

067-0506-00

NOTES

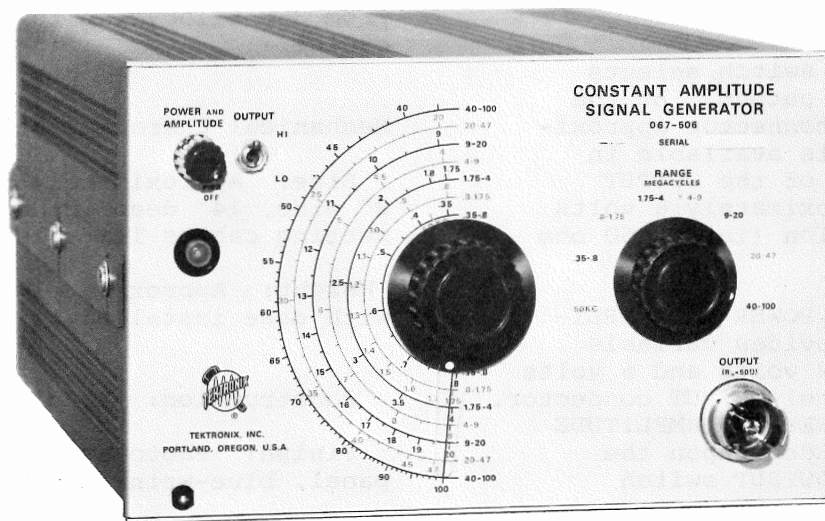
REPLACEMENT

John Mulvey, 9-1-65

Proposed Type 191 expected to be replacement for 067-0506-00.

067-0506-00 CALIBRATION FIXTURE

Constant Amplitude Signal Generator



REF. NO.	PART NO.	SERIAL/MODEL NO.		QTY.	DESCRIPTION
		EFF.	DISC.		
	067-0506-00			-	<p>The 067-0506-00 Constant-Amplitude Signal Generator produces sine waves whose amplitude remains constant as the frequency is varied provided the load limitations of the instrument are not exceeded. A frontpanel switch selects either of two output voltages.</p> <p>This instrument is useful for making frequency - response measurements of broadband devices operating in the frequency range from 350 kilocycles to 100 megacycles. In addition, a 50 kilocycle referency output is provided.</p>



067-0506-00 CALIBRATION FIXTURE

Constant Amplitude Signal Generator

Output Frequency

Continuously variable from 350kc to 100 megacycles in 7 ranges.

Additional setting at 50 kc.

Indication accurate within $\pm 3\%$.

Output Amplitude

A front-panel switch selects either HI or LO output. At the front-panel GR connector approximately 2 volts is available in the LO position of the OUTPUT switch and approximately 6 volts in the HI position (into a 50 ohm load).

A front-panel POWER AND AMPLITUDE control provides variable output between 2 volts and 6 volts at the front-panel OUTPUT connector. Range of the POWER AND AMPLITUDE control is dependent upon the setting of the OUTPUT switch.

Harmonic Content

Typically 5% or less.

Output Connection

Front-panel mounted GR connector.

Output Impedance

Nominal, 50 ohms.

Amplitude Variation

The load resistance should be within $\pm 2\%$ of 50 ohms. The output amplitude varies less than $\pm 2-1/2\%$ from 350 kilocycles to 100 megacycles.

Mechanical Characteristics

Size: Approximately 5" high, 8" wide, 14" deep without connecting cables installed.

Weight: Approximately 9-1/2 lbs. with case installed.

Construction: Aluminum alloy.

Finish: Photo-etched printed panel, blue-wrinkle cabinet.

Power Requirements

105-125 volts or 210-250 volts, 50-60 cycles, approximately 20 watts.

067-0506-00
Calibration Fixture
FACTORY CALIBRATION PROCEDURE

EQUIPMENT REQUIRED:

- 1 Type 661 Oscilloscope with 4S3 and 5T1A Plug-In Units
- 1 Type 530 or 540 Oscilloscope with vertical Plug-In unit with at least 50 mv/cm sensitivity and 10 MC bandwidth
- 1 X1 Probe
- 1 Type 180A Time Mark Generator
- 1 Diode Mixer, 067-0081-00
- 1 Bench Meter, 20,000 ohms/volt
- 1 Attenuator, X2 GR, 017-0046-00
- 1 Attenuator, X5 GR, 017-0045-00
- 1 Attenuator, X10 GR, 017-0044-00
- 1 Tee, GR 874-T, 017-0069-00
- 1 Adapter, GR to BNC male, 017-0064-00
- 1 Adapter, P6038 to GR, 017-0076-00
- 1 Cable, 5nSec RG8/AU with GR connectors, 017-0502-00
- 2 Cable, 42-inch with BNC connectors, 012-0057-00

1. Visual Inspection and Lead Dress

The following lead dress is important to minimize shunt capacitance to ground:

- a. The two wire-straps on top of C40, the variable air capacitor, should pass 3/16 inch or more over the capacitor frame.
- b. The solder lugs on the bottom of C40 should be bent nearly vertical so as to provide good clearance from the edges of their access holes.
- c. The 470 pf capacitor, C41, on pin 7 of V40 (6DJ8) should be at least 1/2 inch above the chassis.
- d. Wires leading to the RANGE switch should be positioned away from their neighbors.
- e. Inspect for poor solder joints, loose hardware, and proper knob mounting.

2. Index Frequency Dial

Fully mesh the capacitor plates, loosen the shaft set screw behind the front panel, place the dial pointer at the mark which is clockwise from the 40 on the 40-100 range (directly over the 20 on the 20-47 range), and tighten the set screw.

3. Measure Power Supply Resistances

- a. Resistance to ground from the junction of the two 27-ohm resistors on the socket of V83 (7119) should be about 30K ohms.
- b. The resistance between pins 6 and 7 of the transformer should be about 100 ohms.

4. Measure DC Voltages and Ripple

Set the RANGE switch to 50 KC, the OUTPUT switch to LO, the AMPLITUDE control CCW. The following measurements are made on the ceramic strips mounted under V83 (7119):

<u>Location</u>	<u>DC Voltage at 117V Line Voltage</u>	<u>Peak-to- Peak Ripple</u>
Junction of two 27-ohm resistors	420V	100mV
Junction of 20K, 5W and 680, 1/2W	Between 5V and 8V	30mV
Junction of 22K, 1/4W and 360, 1/2W	Between 13.5V and 16.5V	10mV

5. General Calibration Information

The instrument can be calibrated with the case on or off. If it is calibrated with the case off, Table I shows the frequency shift to be expected when the case is installed. Normally, these errors will not be important. If it is desired to calibrate with the case on, a case will need to be modified to provide the access holes required.

TABLE I

<u>Range</u>	<u>Frequency Shift Caused by Installation of the Case</u>
40-100 MC	1%
20-47	1%
9-20	1%
4-9	1%
1.75-4	1%
.8-1.75	1%
.35-.8	1%
50 KC	2%

Figure 1 shows the location of the inductance adjustments.

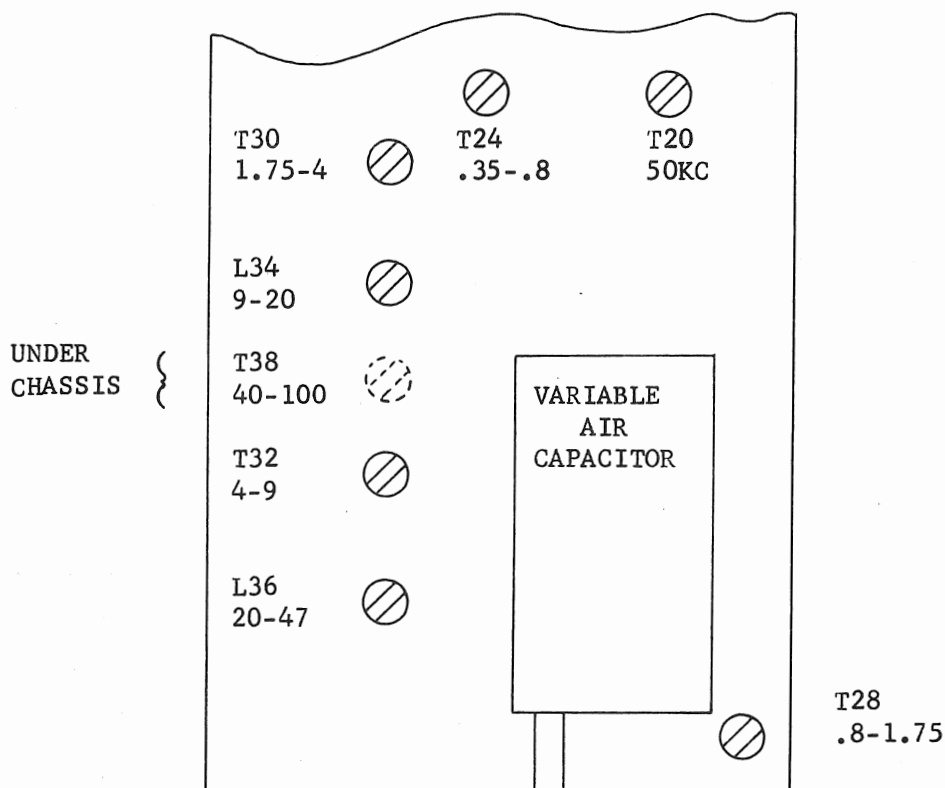


FIG. 1. Coil locations from power transformer side of chassis

6. Rough Frequency Adjustments

Place a X2 attenuator on the OUTPUT of the Constant Amplitude Signal Generator (CASG) and observe output with the test scope. Using Table II, set frequencies by adjusting coil slugs.

TABLE II

<u>Range, MC</u>	<u>Frequency, MC</u>	<u>Test Scope Sweep Speed</u>	<u>Adjust L for</u>
40-100	40	.1 μ s/cm X5	4 cycles in 5cm
20-47	20	.1 μ s/cm X1	2 cycles per cm
9-20	10	.1 μ s/cm	1 cycle per cm
4-9	4	.2 μ s/cm	4 cycle in 5 cm
1.75-4	2	.5 μ s/cm	1 cycle per cm
.8-1.75	.8	1 μ s/cm	4 cycles in 5 cm
.35-.8	.4	2 μ s/cm	4 cycles in 5 cm
50 kc	50 kc	20 μ s/cm	1 cycle per cm

7. 40-100 MC Range

Set this range first because stray capacitance to ground may need to be adjusted which will affect the lower frequency ranges. See Figure 2 for test setup.

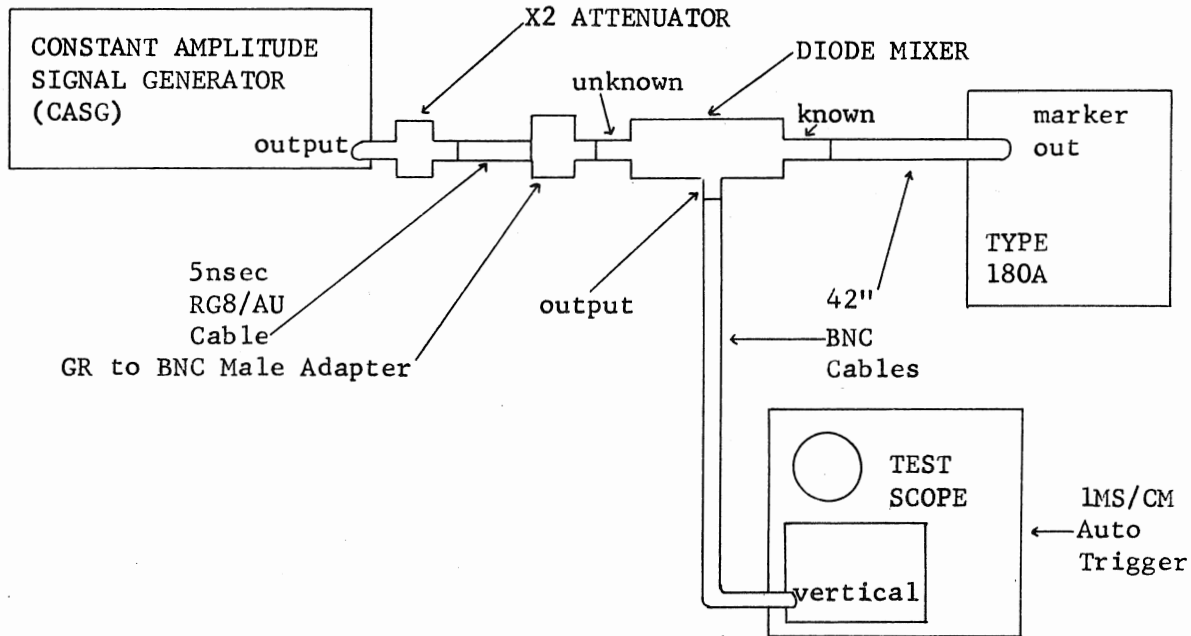


FIG. 2. Test setup for frequency adjustments

- a. Set 80A to 10MC, CASG to 50MC, adjust T38 for zero-beat on test scope. If adjustment can't be made, see that leads from T38 to the switch are as short as possible, recheck lead dress mentioned in step 1, and if necessary, spread the 2 turns of T38 farther apart (less inductance). The adjusting screw of T38 will usually be almost fully inserted into the coil form.
- b. Set CASG to about 90MC. Find at what dial setting zero-beat occurs. This point should be within $\pm 2\%$ of 90MC. If it is not, adjustment of stray capacitance must be made by the methods previously described.

When 50MC and 90MC are both properly adjusted, check for zero-beat within $\pm 2\%$ of the 60, 70, 80, and 100MC dial markings.

8. Precise Frequency Adjustments

For the remaining adjustments a coil will be adjusted for the low-frequency end and a capacitor for the high-frequency end. Interaction will occur, so that it will be necessary to go back and forth several times. When the adjustments are correct, the lock nuts should be tightened and additional frequencies checked for proper tracking across the dial.

TABLE III

<u>Range</u>	<u>Type</u> <u>180A</u>	<u>Low End Setting</u> <u>and Adjustment</u>	<u>High End Setting</u> <u>and Adjustment</u>	<u>Additional</u> <u>Zero-beat</u> <u>Frequencies</u>
20-47	5MC	20MC, L36	45MC, C36	each 5MC
9-20	5MC	10MC, L34	20MC, C34	15MC
4-9	1μsec	4MC, T32	9MC, C32	each 1MC
1.75-4	1μsec	2MC, T30	4MC, C30	3MC
.8-1.75	5μsec	1MC, T28	1.6MC, C28	each .2MC
.35-.8	10μsec	.4MC, T24	.7MC, C24	6MC
50KC	5μsec	50KC, T20		

Tracking should be within $\pm 2\%$ from 1.75-47MC and $\pm 5\%$ from .35-1.75MC.

9. Amplitude Variations

Figure 3 shows the test setup.

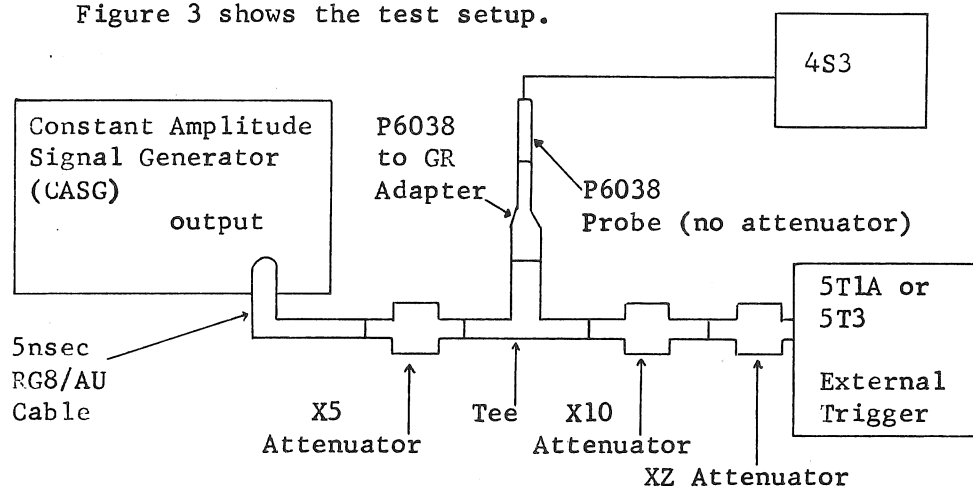


FIG. 3. Test setup for measuring amplitude variations

- Set CASG OUTPUT to LO, AMPLITUDE CCW. Peak-to-peak output at the tee in Fig. 3 should be about 400MV (2V at the CASG).
- Set CASG OUTPUT to HI, AMPLITUDE CW. Peak-to-peak output should be about 1.2V (6V at the CASG). Check AMPLITUDE control for smooth operation and overlap between HI and LO ranges.
- Leave OUTPUT HI, AMPLITUDE CW, set Range to 50KC, Trigger the 5T1A externally, establish an 8cm display. Set 4S3 to FAST RISE and adjust SMOOTHING for the same amplitude display when falsely and properly triggered.
- Switch to .35-.8 range. Vary frequency dial throughout range, keeping the 5T1A or 5T3 triggered and the sweep speed at positions where the shape of the sinewave can be seen. Examine waveform for no significant flat spots or other distortion. Check that peak-to-peak amplitude does not vary more than one minor division from 8cm ($\pm 2.5\%$). Repeat for all other frequency ranges.

067-0506-00

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Mechanical

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
		1	Bracket	Dwg. 1151-B
		1	Plate, Front, Subpanel	Dwg. 1143-C
		1	Chassis, Vertical	Dwg. 1144-C
		1	Plate, Rear Panel	Dwg. 1145-C
		1	Attenuator Mod.	Dwg. 1105-A
		1	Front Panel	Dwg. 1173-C
		1	Pointer, Plastic	Dwg. 1091-A
E-302		1	Printed Circuit Board	
Special		1	Capacitor, 2 x 40 x 500V (Sprague)	
33-120		1	Coil	
33-121B		1	Coil	
33-122		1	Coil	
33-123		1	Coil	
108-0008-00		1	Coil, 15mh	
114-0058-00		1	Coil, 2.4 - 4.0mh	
114-0061-00		1	Coil, 70-99 μ h	
114-0063-00		1	Coil, 1.8-3 μ h	
114-0064-00		1	Coil, .3-.5 μ h	
120-0182-00		1	Transformer	
124-0146-00		2	Strip, Ceramic, 16-Slot	
124-0147-00		2	Strip, Ceramic, 13-Slot	
131-0102-00		1	Connector, Motor Base	
132-0001-00		1	Nut, Coupling	
132-0002-00		1	Sleeve, Outer Conductor	
132-0007-00		1	Ring, Snap	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Mechanical

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
132-0027-00		1	Inner Transition	
132-0028-00		1	Insulator	
132-0029-00		1	Inner Conductor	
132-0040-00		1	Adapter, Panel	
132-0121-00		1	Nut, Retaining	
136-0015-00		2	Socket, Tube, 9-Pin	
136-0181-00		2	Socket, Transistor	
150-0019-00		1	Bulb, Neon	
200-0260-00		1	Cover, Capacitor	
210-0003-00		2	Lockwasher, Ext. #4	
210-0004-00		4	Lockwasher, Int. #4	
210-0006-00		7	Lockwasher, Int. #6	
210-0010-00		4	Lockwasher, Int. #10	
210-0012-00		1	Lockwasher, Pot, Int. 3/8 x 1/2	
210-0046-00		1	Lockwasher, .400 x .261 x .018	
210-0054-00		2	Lockwasher, Split, #4	
210-0202-00		3	Lug, Solder, SE #6	
210-0223-00		1	Lug, Solder, 1/4" hole	
210-0406-00		6	Nut, Hex, 4-40 x 3/16	
210-0407-00		13	Nut, Hex, 6-32 x 1/4	
210-0408-00		7	Nut, Hex, 6-32 x 5/16	
210-0413-00		7	Nut, Hex, 3/8-32 x 1/2	
210-0457-00		3	Nut, Keps, 6-32 x 5/16	
210-0458-00		1	Nut, Keps, 8-32 x 11/32	
210-0562-00		1	Nut, Hex, 1/4-40 x .062	
210-0564-00		4	Nut, Hex, 10-32 x 3/8	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Mechanical

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
210-0583-00		1	Nut, Hex, 5/16 x 1/4-32 x 1/16	
210-0586-00		2	Nut, Keps, 4-40 x 1/4	
210-0812-00		8	Washer, Fiber, #10	
210-0840-00		7	Washer, Flat, .390 x 9/16 x .020	
210-0940-00		2	Washer, Flat, 1/4 x 3/8 x .0206	
211-0007-00		2	Screw, 4-40 x 3/16 BHS	
211-0015-00		1	Screw, 4-40 x 1/2 RHS	
211-0020-00		2	Screw, 4-40 x 1 1/8 RHS	
211-0038-00		8	Screw, 4-40 x 5/16 FHS Phil.	
211-0507-00		10	Screw, 6-32 x 5/16 BHS	
211-0510-00		2	Screw, 6-32 x 3/8 BHS	
211-0512-00		2	Screw, 6-32 x 1/2 BHS	
211-0534-00		2	Screw, 6-32 x 5/16 PHS w/lockwasher	
211-0537-00		1	Screw, 6-32 x 3/8 THS Phil.	
211-0591-00		2	Screw, 6-32 x 7/8 hex head	
212-0004-00		2	Screw, 8-32 x 5/16 BHS	
212-0043-00		2	Screw, 8-32 x 1/2 FHS Phil.	
212-0044-00		4	Screw, 8-32 x 1/2 RHS Phil.	
212-0070-00		2	Screw, 8-32 x 5/16 FHS Phil.	
213-0088-00		4	Screw, #4 x 1/4 PHS Phil. Thrd. Form.	
214-0012-00		4	Bolt, Spade, 6-32 x 3/8	
214-0370-00		2	Pin, Guide	
214-0553-00		1	Screw, Lock	
260-0398-00		1	Switch, Toggle	
281-0054-00		1	Capacitor, Air	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Mechanical

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
290-0007-00		1	Capacitor, 2 x 15 x 450 EMC	
311-0422-00		1	Pot, 500Ω	
331-0140-00		1	Reducer, Dial	
334-0679-00		1	Tag, Serial No. Insert	
348-0055-00		1	Grommet, Delrin, 1/4"	
348-0056-00		1	Grommet, Delrin, 3/8"	
348-0067-00		1	Grommet, Delrin, 5/16"	
351-0096-00		1	Rail Extrusion	
352-0010-00		1	Holder, Fuse	
354-0234-00		2	Ring, Retaining, Transistor Socket	
358-0255-00		1	Bushing, Panel	
361-0009-00		8	Spacer, Ceramic Strip	
366-0115-00		1	Knob, Large, Charcoal	(Send to Test Area)
366-0189-00		1	Knob, Small, Red	
384-0615-00		3	Rod, Spacer	
385-0136-00		1	Post, Delrin, 1 1/4"	
386-0253-00		1	Plate, Metal, Cap. Mtg. (Flange)	
386-0254-00		1	Plate, Fiber, Cap. Mtg. (Flange)	
391-0056-00		2	Block, Chassis Mtg.	
432-0048-00		1	Base, Cap. Mtg.	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Kit Prep

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
Special		1	Switch, Raw	
108-0005-00		1	Coil, 12 μ h	
108-0226-00		1	Coil, 100 μ h	
175-0522-00		1	Wire, Ins., Solid #22 2 1/2"	9-2
175-0522-00		1	Wire, Ins., Solid #22 3 3/4"	9-2
175-0522-00		1	Wire, Ins., Solid #22 4"	9-2
175-0522-00		2	Wire, Ins., Solid #22 4 1/4"	9-2
175-0522-00		1	Wire, Ins., Solid #22 2 3/4"	9-6
175-0522-00		1	Wire, Ins., Solid #22 3"	9-6
175-0522-00		1	Wire, Ins., Solid #22 2 1/2"	9-6
175-0522-00		1	Wire, Ins., Solid #22 5"	9-6
276-0532-00		1	Core, Ferrite	
281-0525-00		1	Capacitor, 470pf	
281-0543-00		1	Capacitor, 270pf	
281-0549-00		1	Capacitor, 68pf	
283-0001-00		1	Capacitor, Discap, .005 μ fd	
283-0010-00		1	Capacitor, Discap, .05 μ fd	
283-0051-00		1	Capacitor, Discap, .0033 μ fd	
301-0510-00		2	Resistor, 50 Ω 1/2W 5%	
316-0120-00		1	Resistor, 12 Ω 1/4W 10%	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Kit Prep

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
Special		1	Cable, Harness	
108-0146-00		1	Coil, 5 μ h	
152-0024-00		1	Diode, 1N1525	
152-0048-00		4	Diode, 1N2864 or equal	
175-0504-00		1	Wire, Ins., Solid #18 9-N 5 1/2"	
175-0522-00		1	Wire, Ins., Solid #22 9-6 4"	
276-0517-00		1	Core, Ferrite	
276-0532-00		3	Core, Ferrite	
281-0027-00		5	Capacitor, Var., .7-3	
281-0060-00		1	Capacitor, Var., 2-8pf	
281-0094-00		1	Capacitor, Var., 5.5-18pf	
281-0525-00		1	Capacitor, 470pf	
283-0001-00		1	Capacitor, Discap, .005 μ fd	
283-0025-00		3	Capacitor, Leadless, 500pf	
283-0026-00		3	Capacitor, .2 μ fd 25V	
283-0068-00		2	Capacitor, Discap, .01 μ fd	
285-0506-00		1	Capacitor, MT, .0047 μ fd 400V	
285-0552-00		1	Capacitor, MT, .018 μ fd 600V	
290-0137-00		1	Capacitor, TANT, 100 μ fd 30V	
290-0145-00		1	Capacitor, EMT, 10 μ fd 50V	
301-0101-00		2	Resistor, 100 Ω 1/2W 5%	
301-0112-00		1	Resistor, 1.1K 1/2W 5%	
301-0241-00		1	Resistor, 240 Ω 1/2W 5%	
301-0361-00		1	Resistor, 360 Ω 1/2W 5%	
301-0910-00		1	Resistor, 91 Ω 1/2W 5%	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

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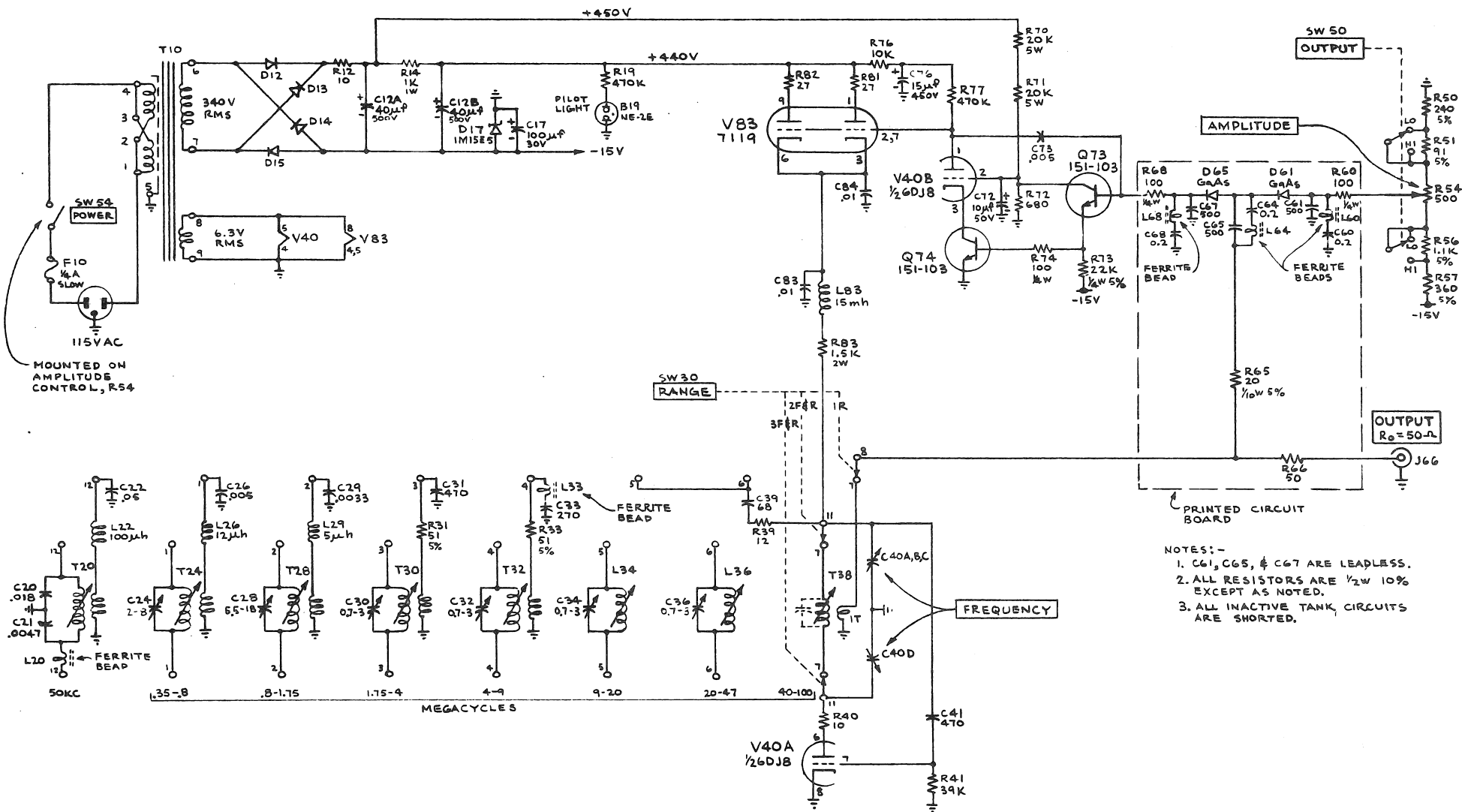
Kit Prep

PART NUMBER	TOTAL QUANT	QTY PER	DESCRIPTION	CIRCUIT #
302-0100-00		2	Resistor, 10Ω 1/2W 10%	
302-0103-00		1	Resistor, 10K 1/2W 10%	
302-0270-00		2	Resistor, 27Ω 1/2W 10%	
302-0393-00		1	Resistor, 39K 1/2W 10%	
302-0474-00		2	Resistor, 470K 1/2W 10%	
302-0681-00		1	Resistor, 680Ω 1/2W 10%	
304-0102-00		1	Resistor, 1K 1W 10%	
306-0152-00		1	Resistor, 1.5K 2W 10%	
307-0079-00		1	Resistor, 50Ω Leadless	
308-0272-00		2	Resistor, W.W., 20K 5W 5%	
315-0223-00		1	Resistor, 22K 1/4W 5%	
316-0101-00		1	Resistor, 100Ω 1/4W 10%	
317-0220-00		1	Resistor, 22Ω 1/10W 5%	
344-0188-00		4	Clip Diode Mtg	
352-0041-00		3	Clip, Tunnel Diode Mtg.	
151-0069-00		1	Transistor, 2N1304	
151-0103-00		1	Transistor, NPN	
152-0206-00		2	Diode, GA-AS	
154-0187-00		1	Tube, 6DJ8	
154-0340		1	Tube, 7119	
159-0022-00		1	Fuse, 1 AMP	
200-0582-00		1	Cap, Fuse	
366-0117-00		1	Knob, Large, Charcoal	

CONSTANT AMPLITUDE SIGNAL GENERATOR PARTS LIST

Cabinetizing

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06T-0506-00 CONSTANT AMPLITUDE SIGNAL GENERATOR
1260-B

