

067-0532-00 CALIBRATION FIXTURE

Constant Amplitude Signal Generator



The Tektronix Type 067-0532-00 Constant Amplitude Signal Generator produces sinewaves whose amplitude remains constant as the frequency is varied. Output frequency is continuously variable from 65 to 500 MHz. The amplitude of the above mentioned sinewaves is referenced to the amplitude of 3 MHz sinewave also available at the output connector. Output amplitude is continuously variable from 0.5 volt to 2.5 volts peak to peak into 50 ohms. The output amplitude is in 0.5 volt steps from 0.5 to 5.0 volts into 50 Ω . It is also continuously variable from 0.5 volt to 5.5 volts. The output remains constant amplitude from 0.5 volt to 5.5 volts from 65 MHz to 300 MHz, and constant amplitude from 0.5 volt to 2.5 volts from 300 MHz to 500 MHz. Cable loss and standing wave errors are essentially eliminated. The amplitude is regulated at the generator end of a 50 ohm resistor physically adjacent to the output connector. The output connector, 50 ohm resistor, and amplitude detector are at the end of an attached 42 inch cable.

CHARACTERISTICS

OUTPUT

CHARACTERISTIC	PERFORMANCE REQUIREMENT	SUPPLEMENTAL INFORMATION
FREQUENCY ACCURACY	Within $\pm 2\%$ of reading	Into a 50 Ω 1% load
AMPLITUDE ACCURACY	Within $\pm 2\%$ of indicated amplitude	Into a 50 Ω 1% load
AMPLITUDE REGULATION	Within $\pm 2\%$ of 3 MHz amplitude from 65 to 300 MHz and 0.5 to 5.5 volts P-P output. Within $\pm 5\%$ of 3 MHz amplitude from 300 to 500 MHz and 0.5 to 2.5 volts P-P output.	Into a 50 Ω 1% load
HARMONIC CONTENT	70 MHz - 500 MHz	Typically less than 2% $\leq -40dB$

3 MHz
POWER REQUIREMENTS

$\leq -36dB$

CHARACTERISTIC	PERFORMANCE REQUIREMENT	SUPPLEMENTAL INFORMATION
LINE VOLTAGES	105 VAC, 115 VAC, 125 VAC 210 VAC, 230 VAC, 250 VAC	Center values available by rear panel switch and transformer wiring
FUSES	Type 3AG 0.4 amperes, Slo-Blo Type 3AG 0.2 amperes, Slo-Blo	115 VAC operation 230 VAC operation
LINE FREQUENCY	50 to 400 Hz	
POWER CONSUMPTION		Approximately 25 watts

MECHANICAL

CHARACTERISTIC	INFORMATION
CONSTRUCTION	Aluminum alloy chassis, panel and cabinet Glass laminated circuit boards Output through a GR Type 874 connector at the end of a 42 inch cable

MECHANICAL (cont)

CHARACTERISTIC	INFORMATION
FINISH	Anodized panel, blue vinyl coated cabinet Painted dial and dial cover
DIMENSIONS	Approximately 15 1/2 (L) x 7 1/4 (H) x 7 7/8 inches
WEIGHT	Approximately 13 pounds

ENVIRONMENTAL

CHARACTERISTIC	PERFORMANCE REQUIREMENT
TEMPERATURE	The above performance requirements apply over an ambient temperature range of 0° to +50°C
WARM UP TIME	Five minutes at 25°C ±5°C

OPERATING INSTRUCTIONS

FUNCTION OF FRONT PANEL CONTROLS AND CONNECTORS

AMPLITUDE

Switch that selects the peak to peak voltage of the output sinewave. Output amplitude into a 50 Ω , 1% load may be read from the front panel when the VARIABLE control is set to CAL.

Output amplitude into an open circuit is approximately twice that of the indicated amplitude when the VARIABLE control is set to CAL.

VARIABLE

Control that allows a continuous increase of the output amplitude so that the ranges indicated on the front panel overlay. When the VARIABLE is set to CAL, the peak to peak output amplitude into 50 Ω is determined by the setting of the AMPLITUDE switch.

FREQUENCY RANGE

Selects the frequency of the output sinewave.

- | | |
|---------------------|---|
| 3 MHz Position | Output is a 3MHz sinewave to be used as the reference frequency. |
| 65-500 MHz Position | Output is a sinewave whose frequency is determined by the FREQUENCY dial setting. |

FREQUENCY

Dial that indicates the frequency of the output sinewave from 65 to 500 MHz when the FREQUENCY RANGE switch is set to 65-500 MHz position.

OUTPUT

A GR Type 874 connector at the end of a 42 inch cable that provides a means for connecting the constant amplitude generator output to the desired external equipment.

POWER

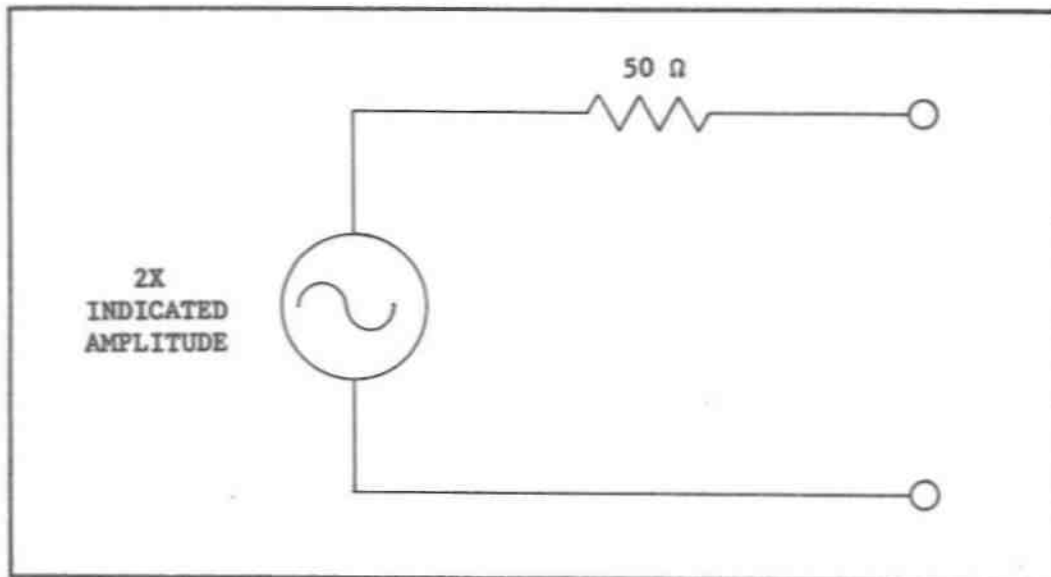
- | | |
|--------|--|
| Switch | Connects the proper AC line voltage to the 067-0532-00 power supply when positioned to ON. |
| Light | Indicates that an AC line voltage is present at the inter-connecting plug and power is being delivered to the 067-0532-00. |

REAR PANEL

- | | |
|----------------|--|
| 115-230 SWITCH | Selects the proper wiring so that the 067-0532-00 may be connected to the 115 or 230 VAC line. |
|----------------|--|

OPERATION

STEADY STATE EQUIVALENT CIRCUIT



The Type 067-0532-00 closely approximates the above equivalent circuit.

To operate the Type 067-0532-00 Calibration Fixture, connect the power cord to the interconnecting plug on the rear panel.

CAUTION

A rear panel switch selects the connection of the primary of the power supply transformer. This switch must be in the proper position in respect with the available line voltage. This instrument is factory wired for 115 or 230 VAC operation unless otherwise requested. The transformer may be wired for 105 or 210 VAC operation or 125 or 250 VAC operation as required by the value of the available line voltage.

Turn POWER switch to ON and allow the unit about five minutes to warm up and stabilize.

Select the desired output amplitude using the AMPLITUDE switch and the VARIABLE control if so desired.

TYPE 067-0532-00

Select the desired frequency by setting the FREQUENCY RANGE to 3 MHz (fixed reference) or 65-500 MHz. Set the output frequency by adjusting the FREQUENCY dial as desired.

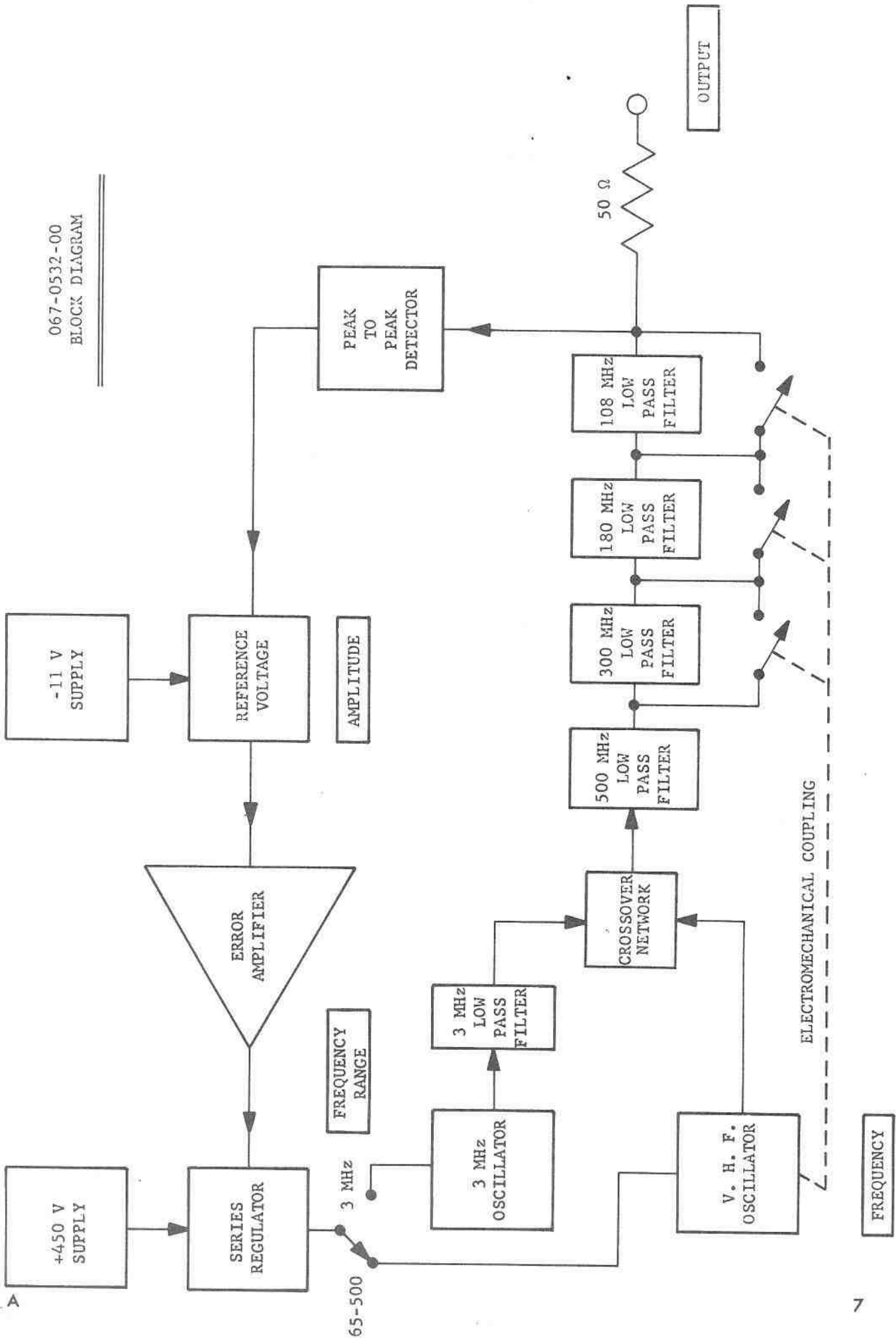
Connect the Type 067-0532-00 to the desired equipment.

It is recommended that General Radio Type 874-G attenuators or equivalent be used where necessary. Connection to high impedance BNC inputs should be made through a Tektronix Part No. 017-0083-00, GR to BNC 50 Ω termination. When small BNC attenuators are used, errors, as great as 1% at 150 MHz to 10% at 500 MHz may result.

It is further recommended that cables not be used except where essential.

For information on the use of the Type 067-0532-00 Constant Amplitude Signal Generator on a specific instrument, please refer to the Maintenance and Calibration section in the instruction manual of the instrument.

067-0532-00
BLOCK DIAGRAM



CALIBRATION PROCEDURE

1. EQUIPMENT REQUIRED
2. PRELIMINARY INSPECTION, ADJUSTMENT
3. PRESET CONTROLS
4. RESISTANCE CHECKS
5. SETUP
6. POWER SUPPLIES

Supply	Regulation	Ripple
-11 V	± 20 mV	3 mV
+6.8 V		10 mV
7. AMPLITUDE

Variable range: 1 volt min

Amplitude accuracy
0.5 - 5V $\pm 2.0\%$
8. 3 MHz FREQUENCY

Accuracy: $\pm 5\%$
9. 65-500 MHz Oscillator Output Coupling
10. 65-500 MHz Frequency

Accuracy: $\pm 2\%$
11. AMPLITUDE REGULATION

Frequency	Regulation
65 MHz - 300 MHz	$\pm 2\%$
300 MHz - 500 MHz	$\pm 5\%$

CALIBRATIONNOTES

1. EQUIPMENT REQUIRED

- 1 TEKTRONIX TYPE 547 OSCILLOSCOPE
or equivalent
- 1 TEKTRONIX TYPE 1A1 DUAL-TRACE
- 1 TEKTRONIX TYPE 1L20 SPECTRUM
ANALYZER
- 1 TEKTRONIX TYPE 184 TIME MARK
GENERATOR
- 1 067-0502-00 STANDARD AMPLITUDE
CALIBRATOR (SAC)
- 1 20,000 ohm/volt multimeter
- 1 DC Voltage bridge
or other inf. impedance.
±0.25% or better meter, 1 V
to 11 V (FLUKE MODEL 601D)
- 1 50 ohm Precision Termination,
selected from GR 874-W50B ±0.5%
- 1 GR to BNC male adapter
(TEKTRONIX P/N 017-0064-00)
- 1 POWER METER (HP MODEL 431B)
- 1 THERMISTOR MOUNT (HP MODEL 478A)
- 1 GR 5X ATTENUATOR
(TEKTRONIX P/N 017-0079-00)
- 1 BNC 50 Ω TERMINATION
(TEKTRONIX P/N 011-0049-00)

2. PRELIMINARY INSPECTION ADJUSTMENT

Check for unsoldered joints, rosin joints, lead dress, and long ends. Check for protruding parts, loose hardware, and foreign material. Check for loose knobs, sufficient clearance of knobs from the front panel and each other, and smooth rotation of the FREQUENCY dial and controls. Correct all defects found.

Inspect the frequency dial and switches S201, S202, S203 to see that they actuate below 108, 180, 300 MHz respectively.

3. PRESET CONTROLS

TYPE 067-0532-00

POWER	off
FREQUENCY dial	100 MHz
FREQUENCY RANGE	3 MHz
AMPLITUDE	0.5
VARIABLE	CAL

CALIBRATION

NOTES

3. PRESET CONTROLS (cont)

115 V/230 V internal adjustments	115 V midr
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Leave controls for any step as they were in the preceding step unless otherwise noted.

4. RESISTANCE CHECKS

NOTE

Do not have instrument plugged into a line voltage source.

a. +450 unregulated

Measure the resistance from the +450 volt supply to chassis ground. It should read 15 k Ω . Turn POWER on, resistance should be \approx 100 k Ω . Turn POWER off.

b. +6.8 volts: \approx 300 ohms

c. -11 volts: \approx 1.5 k Ω with meter connected for higher reading.

5. SETUP

Plug the TYPE 067-0532-00 into a variable line voltage source and turn POWER on. Turn all test equipment on. Set variable line voltage source to 115 V.

6. POWER SUPPLIES

a. +450 unregulated

Measure the +450 volt supply to chassis ground using the multi-meter. Read approximately 435 volts.

CALIBRATIONNOTES

6. POWER SUPPLIES (cont)

- b. Preset -11 volts and check regulation - Regulation: ± 20 mV

Connect DCVB to -11 V supply and adjust R231 for ≈ -11 V. Vary line voltage source between 103 and 127 volts. Check for regulation with specified limits.

- c. Check -11 volt and +6.2 volt ripple.

Ripple: -11 V, 3 mV P to P max;
+6.8V, 10 mV

Check the -11 volt and +6.8 volt supplies for ripple within specified limits while varying line voltage source from 103 to 127 V.

7. AMPLITUDE

- a. Adjust -11 Volts, Tracking, and Ampl Cal

Since these three adjustments are interacting, the following sequence of steps is to be repeated until all three pots are accurately adjusted.

Accurately calibrate the test scope Channel 1 input to 2 V/cm and Channel 2 input to 0.2 V/cm ($\pm 0.25\%$) using the SAC.

Place variable control in CAL. Connect 067-0532-00 OUTPUT to test scope using the GR to BNC male adapter. Adjust Ampl Cal for exactly 1 volt peak to peak output (5 cm on 0.2 V/cm scale).

CALIBRATIONNOTES

7. AMPLITUDE (cont)

Connect 067-0532-00 OUTPUT to test scope Channel 1. Switch AMPLITUDE to 5.0. Adjust the -11 volts pot for exactly 10 volts peak to peak output (5 cm on 2 V/cm scale).

Disconnect the external grounding strap from the common terminal of the DCVB to enable it to make floating voltage measurements. Connect common terminal to the switch wiper of the front wafer of the AMPLITUDE control. Connect the other terminal to the wiper on the rear terminal. Adjust TRACKING control for exactly -1 volt.

Repeat steps until satisfactory adjustment is attained.

b. Check Variable

VARIABLE RANGE: 1 volt min

Set AMPLITUDE to 5.0 and set accurately calibrated test scope to 2 V/cm. Rotate the VARIABLE cw to the end of its range and observe an increase in amplitude to 5.5 cm minimum on the test scope. Return VARIABLE to CAL.

c. Check AMPLITUDE $\pm 2\%$

Use the SAC to calibrate the appropriate test scope deflection factor and check each position of the 067-0532-00 AMPLITUDE control. Use the selected $\pm 0.5\%$ GR 874-WSOB 50 Ω terminator.

CALIBRATIONNOTES

8. 3 MHz FREQUENCY

Accuracy: $\pm 5\%$

Connect the output of the Type 184 via BNC cable terminated into 50Ω (P/N 011-0049-00) to the other input on the TYPE 1A1. Set VOLTS/CM of both channels 1 and 2 to 2. Select $1 \mu\text{s}$ marker. Switch TYPE 1A1 MODE to ADD, 547 time base triggering to normal internal trigger source. Adjust trigger level to obtain a display of the sum of the time markers and the 3 MHz sinewave. Use TIME/CM settings of $1 \mu\text{s}/\text{cm}$ to adjust T8 for a sum beat of a time marker with every third peak of the sinewave. See figure 1. Change TIME/CM to $10 \mu\text{s}/\text{cm}$ and observe the beat envelope. See figure 2. Check for less than 10 beats in 10 cm (having instrument covers off). Install covers momentarily and check for less than 16 beats in 10 cm. Readjust T8 if necessary.

NOTE

Installing the covers will shift the frequency upwards approximately to kHz. Adjustment should be made accordingly.

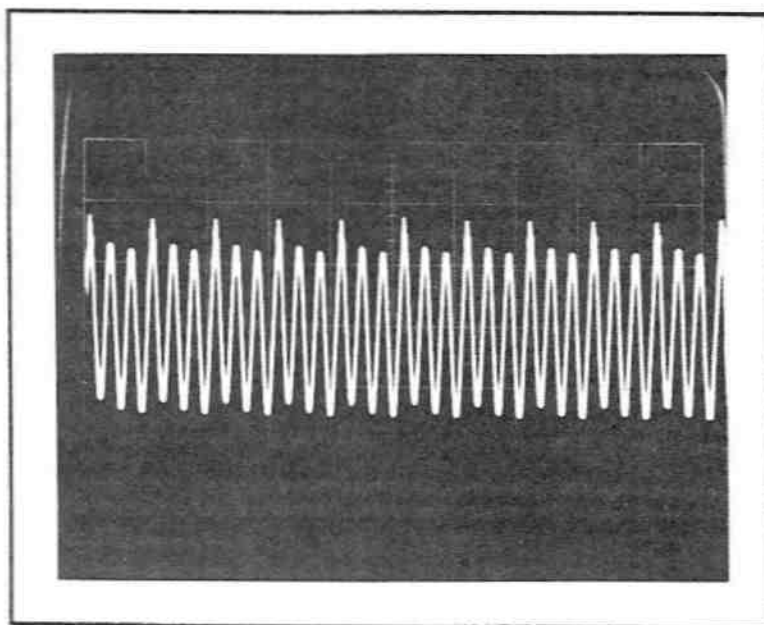


FIG. 1. Sweep speed $1 \mu\text{s}/\text{cm}$ --3 MHz & $1 \mu\text{s}$ Time marker summed in Added Mode.

CALIBRATIONNOTES

8. 3 MHz FREQUENCY (cont.)

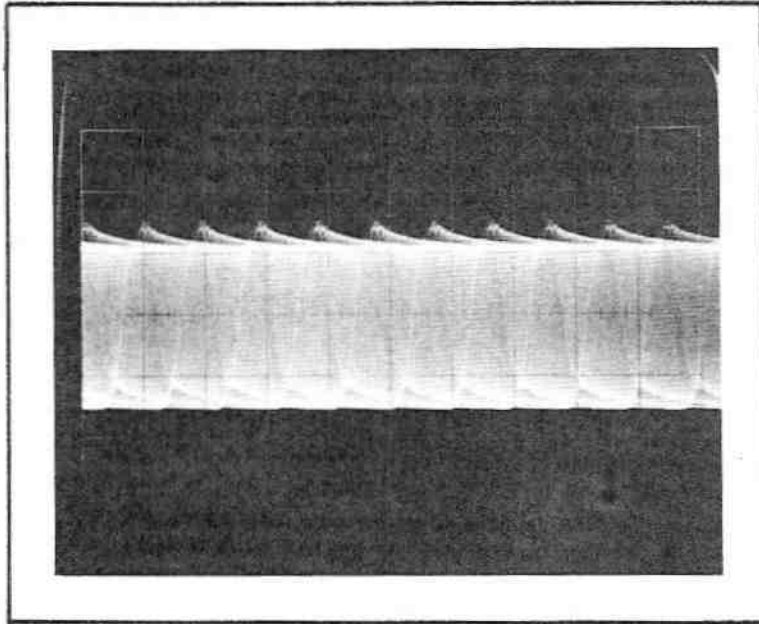


FIG. 2 10 μ s/cm showing 10 beats in less than 10 cm. 3 MHz is approximately 100 kHz high.

9. VHF Oscillator Output Coupling and Grid Current.

Connect the VOM to D88 (300 volt range). Set AMPLITUDE to 5.0; FREQUENCY RANGE to 65-500; dial frequency to 300 MHz. Adjust output coupler and R19 for minimum voltage at D88.

10. 65 - 500 MHz FREQUENCY $\pm 2\%$

The dial is matched to the oscillator by individual marking by GENERAL RADIO CO.

Adjust the dial at 100 MHz using the Type 1L20 to compare 100 MHz from the 184. Check the dial at multiples of 100 MHz using the 1L20 and appropriate frequencies from the 184. If necessary, adjust 500 MHz by bending the small plate near the tube in the oscillator. Return FREQUENCY RANGE to 3 MHz.

CALIBRATIONNOTES11. AMPLITUDE REGULATION

a. Setup

Turn off the 067-0532-00 power. Connect the 067-0532-00 sampling head through the X5 GR attenuator to the 478A Thermistor Mount and 431B Power Meter. Zero the 431B and return the range switch to +5 dBm. Set the 067-0532-00 dial frequency to 65 MHz and amplitude to 5 volts. Turn the 067-0532-00 power on. After 1 minute warm up, turn the Frequency Range to 65-500 MHz.

b. Check Amplitude Regulation

±2% 65 to 300 MHz (0.5 to 5.5 V)
 ±5% 300 to 500 MHz (0.5 to 2.5 V)

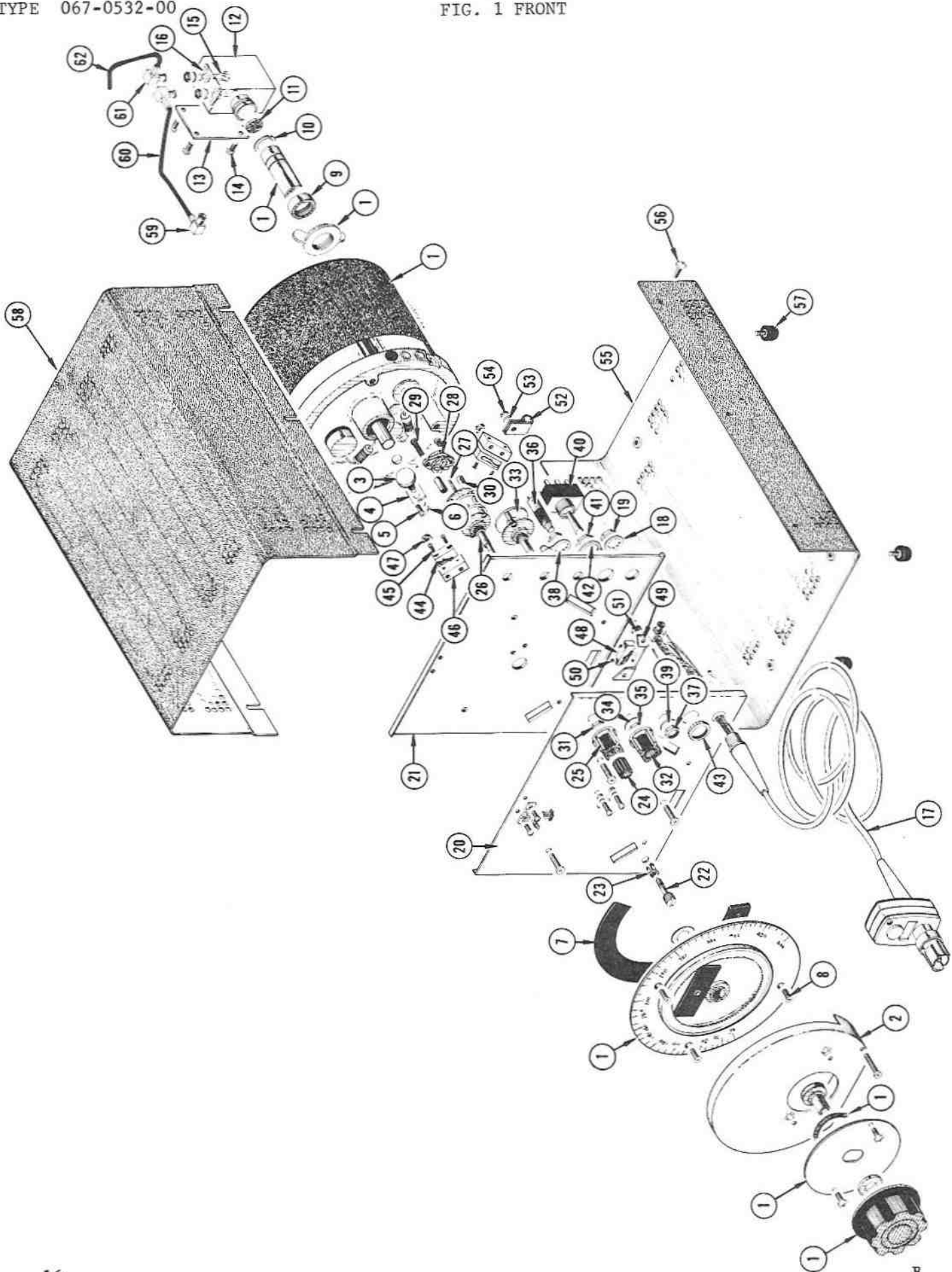
Adjust the 067-0532-00 variable amplitude so the power meter indicates exactly 2.5 mW on the 3 mW scale. Check for no more than ±2% change in amplitude as the frequency is varied from 65 MHz to 300 MHz.

NOTE

The minor division marks that are within + and +3 minor divisions of 2.5 mW are equal to 1% per minor division.

Change the 067-0532-00 amplitude to 2.5 volts and the frequency to 65 MHz. Change the 431B RANGE switch to 0 dBm. Adjust the 067-0532-00 variable amplitude so the 431B indicated 2.5 mW on the 3 mW scale. Check for no more than ±2% change in amplitude as the frequency is varied from 65 MHz to 300 MHz. Check for no more than ±5% change in amplitude as the frequency is varied from 300 MHz to 500 MHz.

FIG. 1 FRONT



MECHANICAL PARTS LIST - 067-0532-00
FIG. 1 FRONT

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				Y	1	2	3	4	
1-1	E119-0132-01			1					OSCILLATOR, RF, 65-500 MHz
	- - - - -			-					oscillator includes:
-2	E132-0132-01			1					COVER, oscillator dial
-3	- - - - -			1					RESISTOR, variable
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/resistor)
-4	E407-0334-00			1					BRACKET, resistor mounting
-5	210-0046-00			1					LOCKWASHER, internal, 1/4 ID x
	- - - - -			-					0.400 inch OD
-6	210-0583-00			1					NUT, hex., 1/4-32 x 5/16 inch
-7	E401-0037-00			1					CAM, control
	- - - - -			-					mounting hardware: (not included w/cam)
-8	211-0105-00			3					SCREW, 4-40 x 3/16 inch, 100° csk, FHS
-9	132-0001-00			1					NUT, coupling
-10	132-0007-00			1					SNAP RING
-11	132-0028-00			1					INSULATOR
-12	E337-1009-00			1					SHIELD, electrical, box
-13	E337-1008-00			1					SHIELD, electrical, cover
	- - - - -			-					mounting hardware: (not included w/shie)
-14	211-0001-00			4					SCREW, 2-56 x 1/4 inch, RHS
-15	131-0372-00			2					CONNECTOR, coaxial, w/hardware
	- - - - -			-					mounting hardware for each:
	- - - - -			-					(not included w/connector)
-16	210-0206-00			1					LUG, solder, SE #10
-17	E175-0434-00			1					CABLE ASSEMBLY, special purpose, output
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/cable assembly)
-18	210-0021-00			1					LOCKWASHER, internal, 0.472 ID x
	- - - - -			-					0.593 inch OD
-19	210-0559-00			1					NUT, hex., 7/16-28 x 9/16 inch
-20	E333-0981-01			1					PANEL, front
-21	E386-1210-00			1					PLATE, sub-panel

FIG. 1 FRONT (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				y	1	2	3	4	
1-22	214-0553-00			1					LATCH SCREW, 1.388 inches long
-23	358-0255-00			1					BUSHING, latch, plastic
-24	366-0189-00			1					KNOB, red--VARIABLE
	- - - - -			-					knob includes:
	213-0020-00			1					SCREW, set, 6-32 x 1/8 inch, HSS
-25	366-0322-00			1					KNOB, charcoal--AMPLITUDE
	- - - - -			-					knob includes:
	213-0004-00			1					SCREW, set, 6-32 x 3/16 inch, HSS
-26	262-0745-00			1					SWITCH, wired--AMPLITUDE
	- - - - -			-					switch includes:
	260-0770-00			1					SWITCH, unwired
-27	384-0358-01			1					ROD, extension
-28	- - - - -			1					RESISTOR, variable
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/resistor)
-29	211-0016-00			2					SCREW, 4-40 x 5/8 inch, RHS
-30	166-0026-00			2					TUBE, spacer, 3/8 inch long
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/switch)
-31	210-0413-00			1					NUT, hex., 3/8-32 x 1/2 inch
-32	366-0322-01			1					KNOB, charcoal--FREQUENCY RANGE
	- - - - -			-					knob includes:
	213-0004-00			1					SCREW, set, 6-32 x 3/16 inch, HSS
-33	260-0462-00			1					SWITCH, unwired--FREQUENCY RANGE
	- - - - -			-					mounting hardware: (not included w/sw
-34	210-0840-00			1					WASHER, flat, 0.390 ID x 9/16 inch OD
-35	210-0413-00			1					NUT, hex., 3/8-32 x 1/2 inch
-36	136-0164-00			1					SOCKET, lamp
	- - - - -			-					mounting hardware: (not included w/so
-37	210-0413-00			2					NUT, hex., 3/8-32 x 1/2 inch
-38	210-0255-00			1					LUG, solder, 3/8 inch ID
-39	210-0840-00			1					WASHER, flat, 0.390 ID x 9/16 inch OD
-40	260-0014-00			1					SWITCH, toggle--POWER ON
	- - - - -			-					mounting hardware: (not included w/sw
-41	210-0414-00			1					NUT, hex., 15/32-32 x 9/16 inch
-42	354-0055-00			1					RING, locking
-43	210-0473-00			1					NUT, 12 sided, 15/32-32 x 0.634 inch

FIG. 1 FRONT (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				Y	1	2	3	4	
1-44	E260-0516-01			2					SWITCH, push (Micro Type)
	- - - - -			-					mounting hardware for each:
	- - - - -			-					(not included w/switch)
-45	211-0112-00			2					SCREW, 2-56 x 3/8 inch, 100° csk, FHS
-46	E407-0332-01			1					BRACKET, switch
-47	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch
-48	E260-0516-01			1					SWITCH, push (Micro Type)
	- - - - -			-					mounting hardware: (not included w/switch)
-49	E407-0333-00			1					BRACKET, switch, angle
-50	211-0112-00			2					SCREW, 2-56 x 3/8 inch, 100° csk, FHS
-51	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch
-52	343-0002-00			1					CLAMP, cable, plastic, 3/16 inch
	- - - - -			-					mounting hardware: (not included w/clamp)
-53	210-0851-00			1					WASHER, flat, 0.119 ID x 3/8 inch OD
-54	210-0586-00			1					NUT, keps, 4-40 x 1/4 inch
-55	E386-1216-00			1					CABINET, bottom
-56	211-0565-00			6					SCREW, 6-32 x 1/4 inch, THS
-57	348-0048-00			4					FOOT, black, plastic
-58	E386-1217-00			1					CABINET, top
-59	131-0375-00			2					CONNECTOR, right angle, 50 Ω
-60	175-0055-00			ft					CABLE, coaxial, 6 inch
-61	131-0375-00			1					CONNECTOR, right angle, 50 Ω
-62	175-0055-00			ft					CABLE, coaxial, 16 inches

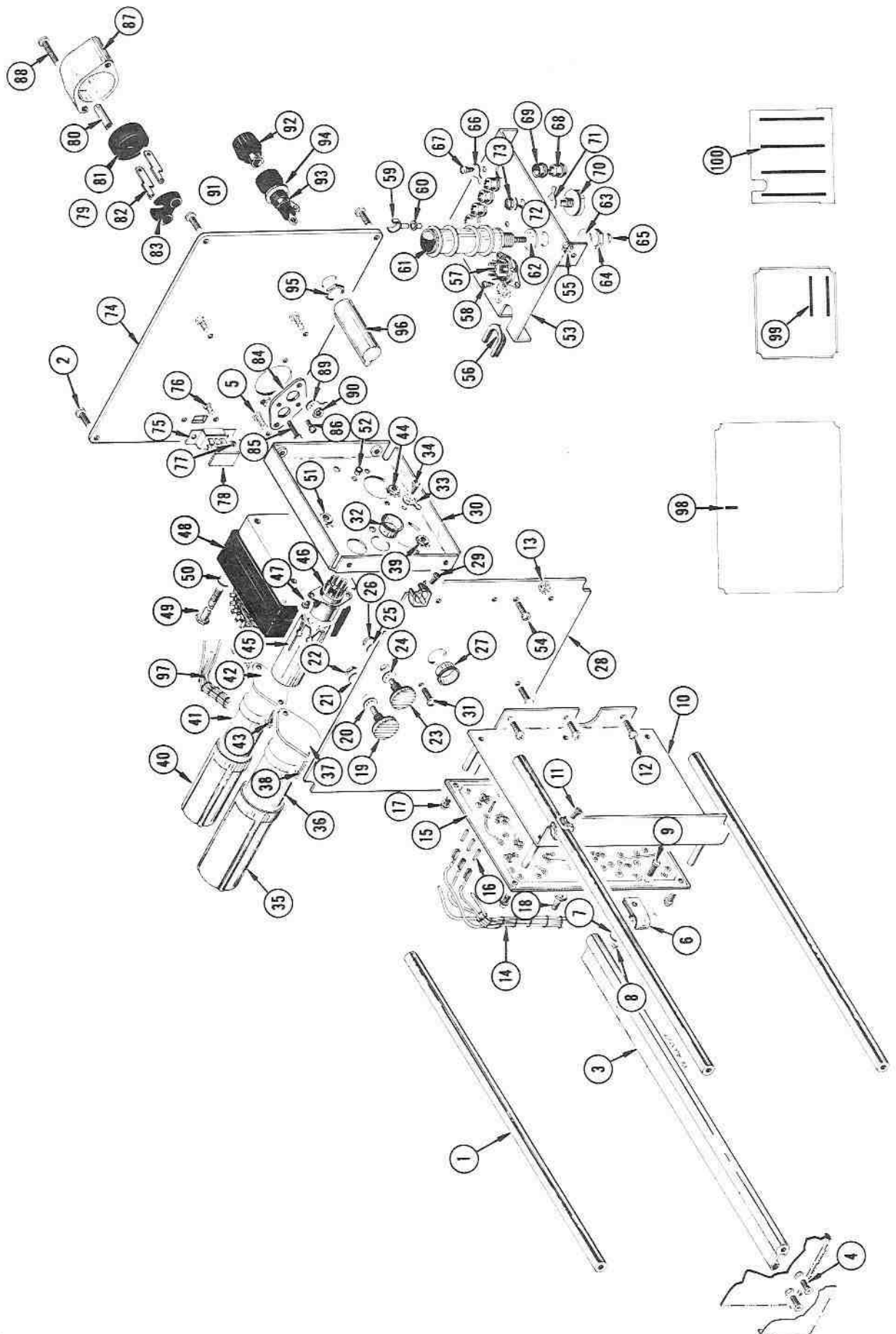


FIG. 2 REAR

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q r y	1 2 3 4 5					Description
					1	2	3	4	5	
2-1	384-0615-00			3						ROD, spacer
	- - - - -			-						mounting hardware for each:
	- - - - -			-						(not included w/rod)
-2	212-0044-00			1						SCREW, 8-32 x 1/2 inch, PHS
-3	351-0096-00			1						GUIDE, rail
	- - - - -			-						mounting hardware: (not included w/guide)
-4	211-0538-00			2						SCREW, 6-32 x 5/16 inch, 100° csk, PHS
-5	212-0044-00			2						SCREW, 8-32 x 1/2 inch, PHS
-6	343-0002-00			1						CLAMP, cable, plastic, 3/16 inch
	- - - - -			-						mounting hardware: (not included w/clamp)
-7	210-0802-00			1						WASHER, flat, 0.150 ID x 5/16 inch OD
-8	210-0457-00			1						NUT, keps, 6-32 x 5/16 inch
-9	211-0507-00			1						SCREW, 6-32 x 5/16 inch, PHS
-10	E441-0726-00			1						CHASSIS, circuit board
	- - - - -			-						chassis includes:
-11	211-0094-00			2						SCREW, 4-40 x 1/2 inch, PHS
	- - - - -			-						mounting hardware: (not included w/chass)
-12	211-0507-00			3						SCREW, 6-32 x 5/16 inch, PHS
-13	210-0457-00			3						NUT, keps, 6-32 x 5/16 inch
-14	E179-1168-00			1						CABLE HARNESS, filter
	- - - - -			-						cable harness includes:
	131-0049-00			6						CONNECTOR, cable
-15	E388-0850-00			1						BOARD, circuit--FILTER
	- - - - -			-						board includes:
-16	214-0506-00			19						PIN, connector
	- - - - -			-						mounting hardware: (not included w/board)
-17	211-0116-00			5						SCREW, sems, 4-40 x 5/16 inch, PHB
-18	131-0391-00			2						CONNECTOR, coaxial, male
-19	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware: (not included w/resis)
-20	210-0223-00			1						LUG, solder, 1/4 ID x 7/16 inch OD, SE
-21	210-0940-00			1						WASHER, flat, 1/4 ID x 3/8 inch OD
-22	210-0583-00			1						NUT, hex., 1/4-32 x 5/16 inch

FIG. 2 REAR (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				y	1	2	3	4	
2-23	- - - - -			1					RESISTOR, variable
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/resistor)
-24	210-0012-00			1					LOCKWASHER, internal, 3/8 ID x 1/2 i
-25	210-0940-00			1					WASHER, flat, 1/4 ID x 3/8 inch OD
-26	210-0583-00			1					NUT, hex., 1/4-32 x 5/16 inch
-27	348-0063-00			1					GROMMET, plastic, 1/2 inch diameter
-28	E386-1209-00			1					PLATE, chassis support
	- - - - -			-					plate includes:
-29	211-0094-00			4					SCREW, 4-40 x 1/2 inch, PHS
-30	E441-0724-00			1					CHASSIS, power supply
	- - - - -			-					mounting hardware: (not included w/c
-31	211-0507-00			4					SCREW, 6-32 x 5/16 inch, PHS
-32	348-0063-00			1					GROMMET, plastic, 1/2 inch diameter
-33	210-0201-00			2					LUG, solder, SE #4
	- - - - -			-					mounting hardware for each:
	- - - - -			-					(not included w/lug)
-34	213-0044-00			1					SCREW, thread forming, 5-32 x 3/16 ir
-35	200-0258-00			1					COVER, capacitor, plastic, 1.365 ID x
	- - - - -			-					3 1/32 inches long
-36	- - - - -			1					CAPACITOR
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/capacitor)
-37	386-0254-00			1					PLATE, fiber, large
-38	211-0507-00			2					SCREW, 6-32 x 5/16 inch, PHS
-39	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch
-40	200-0255-00			1					COVER, capacitor, plastic, 1 ID x
	- - - - -			-					3 1/2 inches long
-41	- - - - -			1					CAPACITOR
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/capacitor)
-42	386-0252-00			1					PLATE, fiber, small
-43	211-0507-00			2					SCREW, 6-32 x 5/16 inch, PHS
-44	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch

FIG. 2 REAR (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description
				Y	1	2	3	4	
2-45	337-0810-00			1					SHIELD, tube
-46	136-0022-00			1					SOCKET, tube, 9 pin, w/shield
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/socket)
-47	213-0044-00			2					SCREW, thread forming, 5-32 x 3/16 inch,
-48	- - - - -			1					TRANSFORMER
	- - - - -			-					transformer includes:
-49	212-0515-00			4					SCREW, 10-32 x 2 1/4 inches, HHS
-50	210-0812-00			4					WASHER, fiber, #10
	- - - - -			-					mounting hardware:
	- - - - -			-					(not included w/transformer)
-51	220-0410-00			4					NUT, keps, 10-32 x 3/8 inch
-52	348-0031-00			1					GROMMET, plastic, 5/32 inch diameter
-53	E441-0725-00			1					CHASSIS, amplifier
	- - - - -			-					mounting hardware: (not included w/chassis)
-54	211-0507-00			2					SCREW, 6-32 x 5/16 inch, PHS
-55	210-0457-00			2					NUT, keps, 6-32 x 5/16 inch
-56	358-0215-00			1					BUSHING, plastic
-57	136-0015-00			1					SOCKET, tube, 9 pin, w/ground lugs
	- - - - -			-					mounting hardware: (not included w/socket)
-58	213-0044-00			2					SCREW, thread forming, 5-32 x 3/16 inch,
-59	426-0121-00			1					HOLDER, toroid
	- - - - -			-					mounting hardware: (not included w/holder)
-60	361-0007-00			1					SPACER, plastic, 1/16 inch long
-61	- - - - -			1					COIL
	- - - - -			-					mounting hardware: (not included w/coil)
-62	210-0012-00			1					LOCKWASHER, internal, 3/8 ID x 1/2 inch OD
-63	210-0840-00			1					WASHER, flat, 0.390 ID x 9/16 inch OD
-64	210-0413-00			1					NUT, hex., 3/8-32 x 1/2 inch
-65	210-0407-00			1					NUT, hex., 6-32 x 1/4 inch
-66	210-0201-00			3					LUG, solder, SE #4
	- - - - -			-					mounting hardware for each:
	- - - - -			-					(not included w/lug)
-67	213-0044-00			1					SCREW, thread forming, 5-32 x 3/16 inch,

FIG. 2 REAR (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description	
				Y	1	2	3	4		5
2-68	136-0181-00			7						SOCKET, transistor, 3 pin
	- - - - -			-						mounting hardware for each:
	- - - - -			-						(not included w/socket)
-69	354-0234-00			1						RING, socket mounting
	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware:
	- - - - -			-						(not included w/resistor)
-71	210-0223-00			1						LUG, solder, 1/4 ID x 7/16 inch OD, S
-72	210-0940-00			1						WASHER, flat, 1/4 ID x 3/8 inch OD
-73	210-0583-00			1						NUT, hex., 1/4-32 x 5/16 inch
-74	E386-1208-00			1						PLATE, rear
-75	260-0675-00			1						SWITCH, slide
	- - - - -			-						mounting hardware: (not included w/s
-76	211-0008-00			2						SCREW, 4-40 x 1/4 inch, PHS
-77	210-0406-00			2						NUT, hex., 4-40 x 3/16 inch
-78	337-1036-00			1						SHIELD, solder
-79	131-0102-01			1						CONNECTOR, 3 wire, male
	- - - - -			-						connector includes:
-80	129-0041-01			1						POST, ground
-81	200-0185-01			1						COVER, black plastic
-82	214-0078-00			2						PIN, connecting
-83	377-0051-00			1						INSERT, black plastic
-84	386-0933-00			1						PLATE
-85	211-0132-00			1						SCREW, sems, 4-40 x 1/2 inch, PHS
-86	213-0088-00			1						SCREW, thread forming, #4 x 1/4 inc
	- - - - -			-						mounting hardware:
	- - - - -			-						(not included w/connector)
-87	337-0955-00			1						SHIELD, plastic
-88	211-0514-00			2						SCREW, 6-32 x 3/4 inch, PHS
-89	210-0202-00			2						LUG, solder, SE #6
-90	210-0457-00			2						NUT, keps, 6-32 x 5/16 inch
-91	352-0002-00			1						ASSEMBLY, fuse holder
	- - - - -			-						assembly includes:
-92	200-0582-00			1						CAP, fuse
-93	352-0010-00			1						HOLDER, fuse
-94	210-0873-00			1						WASHER, rubber, 1/4 ID x 11/16 inch
-95	- - - - -			1						NUT

FIG. 2 REAR (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description	
				t	y	1	2	3		4
2-96	200-0237-00			1						COVER, fuse holder
-97	E179-1167-00			1						CABLE HARNESS, main
-98	124-0162-00			1						STRIP, ceramic, 7/16 inch h, w/4 notches
	- - - - -			-						strip includes:
	355-0046-00			1						STUD, plastic
	- - - - -			-						mounting hardware: (not included w/strip)
	361-0007-00			1						SPACER, plastic, 7/16 inch long
-99	124-0146-00			2						STRIP, ceramic, 7/16 inch h, w/16 notches
	- - - - -			-						each strip includes:
	355-0046-00			2						STUD, plastic
	- - - - -			-						mounting hardware for each:
	- - - - -			-						(not included w/strip)
	361-0009-00			2						SPACER, plastic, 9/32 inch long
-100	124-0145-00			4						STRIP, ceramic, 7/16 inch h, w/20 notches
	- - - - -			-						each strip includes:
	355-0046-00			2						STUD, plastic
	- - - - -			-						mounting hardware for each:
	- - - - -			-						(not included w/strip)
	361-0009-00			2						SPACER, plastic, 9/32 inch long

ELECTRICAL PARTS LIST - 067-0532-00

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
BULB				
B209	150-0068-00			Pilot Light
CAPACITORS				
Tolerance $\pm 20\%$ unless otherwise indicated.				
C4	281-0623-00		650 pF	Cer 500 V
C6	281-0524-00		150 pF	Cer 500 V
C7	281-0519-00		47 pF	Cer 500 V
C9	283-0078-00		0.001 μ F	Cer 500 V
C12	281-0523-00		100 pF	Cer 350 V
C22	283-0072-01		0.01 μ F	Cer
C24	283-0072-01		0.01 μ F	Cer
C25	283-0072-01		0.01 μ F	Cer
C42	283-0083-00		0.0047 μ F	Cer 500 V
C72	283-0081-00		0.1 μ F	Cer 25 V
C75	283-0078-00		0.001 μ F	Cer 500 V
C77	283-0078-00		0.001 μ F	Cer 500 V
C88	290-0145-00		10 μ F	Elect. 50 V
C102	281-0610-00		2.2 pF	Cer 200 V
C103	281-0626-00		3.3 pF	Cer 500 V
C105	281-0610-00		2.2 pF	Cer 200 V
C106	281-0626-00		3.3 pF	Cer 500 V
C108	281-0610-00		2.2 pF	Cer 200 V
C109	281-0626-00		3.3 pF	Cer 500 V
C112	283-0003-00		0.01 μ F	Cer 150 V
C113	283-0003-00		0.01 μ F	Cer 150 V
C115	281-0626-00		3.3 pF	Cer 500 V
C119	281-0601-00		7.5 pF	Cer 500 V
C120	281-0601-00		7.5 pF	Cer 500 V
C121	281-0610-00		2.2 pF	Cer 200 V
C122	281-0601-00		7.5 pF	Cer 500 V
C123	281-0610-00		2.2 pF	Cer 200 V
C125	281-0601-00		7.5 pF	Cer 500 V
C126	281-0626-00		3.3 pF	Cer 500 V
C127	283-0003-00		0.01 μ F	Cer 150 V

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
CAPACITORS (CONT)						
C128	283-0003-00		0.01 μ F	Cer	150 V	
C142	283-0003-00		0.01 μ F	Cer	150 V	
C143	283-0003-00		0.01 μ F	Cer	150 V	
C144	281-0503-00		8.0 pF	Cer	500 V	± 0.5
C145	281-0503-00		8.0 pF	Cer	500 V	± 0.5
C147	281-0592-00		4.7 pF	Cer		± 0.5
C148	281-0601-00		7.5 pF	Cer	500 V	± 0.5
C150	281-0572-00		6.8 pF	Cer	500 V	10%
C151	281-0504-00		10 pF	Cer	500 V	10%
C153	281-0572-00		6.8 pF	Cer	500 V	10%
C154	281-0504-00		10 pF	Cer	500 V	10%
C156	281-0572-00		6.8 pF	Cer	500 V	10%
C157	281-0504-00		10 pF	Cer	500 V	10%
C159	281-0592-00		4.7 pF	Cer		± 0.5
C160	281-0601-00		7.5 pF	Cer	500 V	± 0.5
C162	281-0503-00		8.0 pF	Cer	500 V	± 0.5
C163	281-0503-00		8.0 pF	Cer	500 V	± 0.5
C167	283-0003-00		0.01 μ F	Cer	150 V	
C168	283-0003-00		0.01 μ F	Cer	150 V	
C171	283-0003-00		0.01 μ F	Cer	150 V	
C172	283-0003-00		0.01 μ F	Cer	150 V	
C173	281-0577-00		14 pF	Cer	500 V	5%
C174	281-0557-00		1.8 pF	Cer	500 V	
C176	281-0504-00		10 pF	Cer	500 V	10%
C177	281-0576-00		11 pF	Cer	500 V	5%
C179	281-0504-00		10 pF	Cer	500 V	10%
C180	281-0578-00		18 pF	Cer	500 V	5%
C182	281-0504-00		10 pF	Cer	500 V	10%
C183	281-0578-00		18 pF	Cer	500 V	5%
C185	281-0504-00		10 pF	Cer	500 V	10%
C186	281-0578-00		18 pF	Cer	500 V	5%
C188	281-0504-00		10 pF	Cer	500 V	10%
C189	281-0576-00		11 pF	Cer	500 V	5%
C192	281-0557-00		1.8 pF	Cer	500 V	5%
C193	281-0577-00		14 pF	Cer	500 V	

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
CAPACITORS (CONT)				
C197	283-0003-00		0.01 μ F	Cer 150 V
C198	283-0003-00		0.01 μ F	Cer 150 V
C201	283-0078-00		0.001 μ F	Cer 500 V
C202	283-0078-00		0.001 μ F	Cer 500 V
C219	290-0277-00		2x140 μ F	Elect. 100 V
C236	283-0002-00		0.01 μ F	Cer 500 V
C239	290-0209-00		50 μ F	Elect. 25 V
C254 A,B	290-0262-00		2x40 μ F	Elect. 500 V
DIODES				
D24	*152-0205-00		GaAs	Tek made
D25	*152-0205-00		GaAs	Tek made
D27	*152-0185-00		Silicon	Replaceable by 1N4152
D28	*152-0185-00		Silicon	Replaceable by 1N4152
D70	*152-0185-00		Silicon	Replaceable by 1N4152
D73	152-0299-00		Zener	1N3920B 1.5 W, 200 V,
D74	152-0247-00		Zener	1N989B 0.4 W, 150 V,
D81	*152-0185-00		Silicon	Replaceable by 1N4152
D88	152-0067-00		Zener	1M25Z10 1 W, 25 V, 10
D212 A, B C, D (4)	*152-0107-00		Silicon	Replaceable by 1N647
D223	*152-0185-00		Silicon	Replaceable by 1N4152
D224	*152-0185-00		Silicon	Replaceable by 1N4152
D225	152-0166-00		Zener	1N753A 0.4 W, 6.2 V,
D235	152-0166-00		Zener	1N753A 0.4 W, 6.2 V,
D253 A, B C, D (4)	*152-0208-00	219	Silicon	Replaceable by 1N3194
+D253 D253	152-0232-00 152-0477-00	220	Silicon	Full Wave Bridge 10DB6 600V 2A
FUSES				
F201	159-0031-00		0.4 A 3AG Slo-Blo	115 V Operation
F201	159-0044-00		0.2 A 3AG Slo-Blo	230 V Operation

+ Polarity is critical for proper operation of diodes.

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
CONNECTORS				
J11	131-0372-00			Coaxial
J12	131-0372-00			Coaxial
J100	131-0371-00			Single Contact, male
J199	131-0371-00			Single Contact, male
RELAYS				
K111	*108-0358-00			Coil, Reed (typical resistance 900 Ω)
K111-A	260-0721-00			Reed
K129	*108-0358-00			Coil, Reed (typical resistance 900 Ω)
K129-A	260-0721-00			Reed
K141	*108-0358-00			Coil, Reed (typical resistance 900 Ω)
K141-A	260-0721-00			Reed
K169	*108-0358-00			Coil, Reed (typical resistance 900 Ω)
K169-A	260-0721-00			Reed
K171	*108-0358-00			Coil, Reed (typical resistance 900 Ω)
K171-A	260-0721-00			Reed
K199	*108-0358-00			Coil, Reed (typical resistance 900 Ω)
K199-A	260-0721-00			Reed
INDUCTORS				
L9	*108-0103-00			2.5 μ H
L12	*108-0095-00			1.4 μ H
L13	276-0507-00			Core, Ferramic Suppressor
L14	276-0507-00			Core, Ferramic Suppressor
L72	276-0507-00			Core, Ferramic Suppressor
L101	*108-0313-00			0.05 μ H
L104	E*108-0434-00			0.06 μ H
L107	E*108-0434-00			0.06 μ H
L109	*108-0313-00			0.05 μ H
L115	*108-0313-00			0.05 μ H
L117	*108-0319-00			0.08 μ H
L119	E*108-0433-00			0.09 μ H
L121	E*108-0433-00			0.09 μ H
L123	E*108-0433-00			0.09 μ H
L125	*108-0319-00			0.08 μ H

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
INDUCTORS (CONT)				
L126	*108-0313-00		0.05 μ H	
L145	*108-0313-00		0.05 μ H	
L148	E*108-0435-00		0.16 μ H	
L151	E*108-0435-00		0.16 μ H	
L154	E*108-0435-00		0.16 μ H	
L157	E*108-0435-00		0.16 μ H	
L162	*108-0313-00		0.05 μ H	
L173	*108-0319-00		0.08 μ H	
L177	E*108-0436-00		0.26 μ H	
L180	E*108-0436-00		0.26 μ H	
L183	E*108-0436-00		0.26 μ H	
	E*108-0436-00		0.26 μ H	
L192	*108-0319-00		0.08 μ H	
TRANSISTORS				
Q43	*151-0155-00		Silicon	Replaceable by 2N2925
Q54	*151-0155-00		Silicon	Replaceable by 2N2925
Q63	*151-0155-00		Silicon	Replaceable by 2N2925
Q74	151-0169-00		Silicon	2N3439
Q224	*151-0096-00		Silicon	Selected from 2N1893
Q234	*151-0155-00		Silicon	Replaceable by 2N2925
Q237	151-0164-00		Silicon	2N3702
RESISTORS				
Resistors are fixed, composition, $\pm 10\%$ unless otherwise indicated.				
R3	308-0234-00		5 k Ω	8 W
R4	315-0563-00		56 k Ω	1/4 W
R9	315-0151-00		150 Ω	1/4 W
R17	315-0471-00		470 Ω	1/4 W
R19	311-0458-00		5 k Ω , Var	
R20	307-0079-00		50 Ω	
R21	315-0152-00		1.5 k Ω	1/4 W
R24	315-0101-00		100 Ω	1/4 W
R25	315-0101-00		100 Ω	1/4 W
R31	*311-0586-00		1 k Ω , Var	

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
RESISTORS (CONT)						
R33	311-0404-00			1 k Ω , Var		
R34	321-0174-00			634 Ω	1/8 W	Prec 1%
R36	311-0344-00			100 Ω , Var		
R37	321-0129-00			215 Ω	1/8 W	Prec 1%
R38A	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38B	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38C	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38D	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38E	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38F	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38G	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38H	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38J	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38K	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R38L	322-0649-00			266 Ω	1/4 W	Prec 1/2%
R41	315-0101-00			100 Ω	1/4 W	5%
R42	302-0125-00			1.2 M Ω	1/4 W	
R46	315-0103-00			10 k Ω	1/4 W	5%
R51	315-0103-00			10 k Ω	1/4 W	5%
R53	315-0821-00		219	820 Ω	1/4 W	5%
R53	315-0681-00	220		680 Ω	1/4 W	5%
R58	315-0123-00			12 k Ω	1/4 W	5%
R63	315-0272-00			2.7 k Ω	1/4 W	5%
R66	315-0203-00			20 k Ω	1/4 W	5%
R74	304-0474-00			470 k Ω	1 W	
R77	315-0102-00			1 k Ω	1/4 W	5%
R82	302-0270-00			27 Ω	1/2 W	
R83	302-0270-00			27 Ω	1/2 W	
R85	302-0474-00			470 k Ω	1/2 W	
R130	315-0471-00		279	470 Ω	1/4 W	5%
R130	301-0471-00	280		470 Ω	1/2 W	5%
R140	315-0471-00		279	470 Ω	1/4 W	5%
R140	301-0471-00	280		470 Ω	1/2 W	5%
R190	315-0431-00		279	430 Ω	1/4 W	5%
R190	301-0471-00	280		430 Ω	1/2 W	5%
R210	315-0100-00			10 Ω	1/4 W	5%
R211	315-0100-00			10 Ω	1/4 W	5%
R221	302-0123-00			12 k Ω	1/2 W	

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
RESISTORS (CONT)				
R226	323-0150-00		357 Ω	1/2 W Prec 1%
R231	311-0404-00		1 k Ω , Var	
R232	321-0206-00		1.37 k Ω	1/8 W Prec 1%
R233	321-0239-00		3.01 k Ω	1/8 W Prec 1%
R235	321-0184-00		806 Ω	1/8 W Prec 1%
R237	316-0271-00		270 Ω	1/4 W
R241	301-0104-00		100 k Ω	1/2 W 5%
R251	302-0100-00		10 Ω	1/2 W
R255	304-0271-00		270 Ω	1 W
R257	304-0153-00		15 k Ω	1 W
R258	306-0184-00		180 k Ω	2 W
R259	321-0039-00		24.9 Ω	1/8 W Prec 1%
SWITCHES				
	Unwired	Wired		
SW1	260-0462-00		Rotary	FREQUENCY RANGE
SW36	260-0770-00		Rotary	AMPLITUDE
SW130	E*260-0516-01		Micro	
SW140	E*260-0516-01		Micro	
SW190	E*260-0516-01		Micro	
SW201	260-0014-00		Toggle	POWER
SW202	260-0675-00		Slide	115 V/230 V
TRANSFORMERS				
T8	*114-0061-00		70-99 μ H, Var	Core 276-0508-00
T40	276-0525-00		Core, Ferrite	
T201	E*120-0474-00		L.V. Power	
ELECTRON TUBES				
V10	154-0187-00		6DJ8	
V83	154-0340-00		7119	
OSCILLATOR				
	E119-0132-01		Oscillator	

