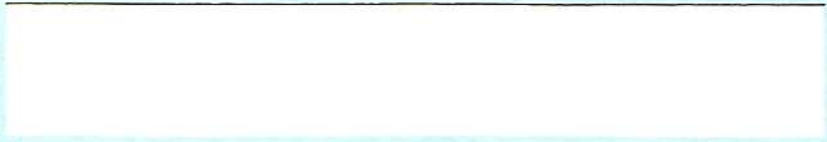


ITEM



MANUFACTURERS OF CATHODE-RAY OSCILLOSCOPES

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067-0608-00 CALIBRATION FIXTURE

Overdrive Recovery



The Tektronix Type 067-0608-00 Calibration Fixture is designed to provide overdrive signals for measuring the overdrive recovery time of Tektronix plug-in amplifiers.

The fixture produces a + or - 11 V overdrive signal with a 7ns falltime (reference to the output and into a 50 pF or less load). It can be switched manually or driven by an external switch-drive source such as a Tektronix Type 106 Squarewave Generator. The BNC output of the fixture is designed to connect directly to the input of the amplifier under test. Power for operating the device is supplied by the 7000-Series Oscilloscope used in the test, via the probe-power-out connector on the rear of the instrument. A separate power source such as a Tektronix Type 1101 is required for operating the fixture with plug-in amplifiers other than 7-Series.



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SECTION 1
CHARACTERISTICS

ELECTRICAL

<u>Characteristic</u>	<u>Performance Requirement</u>	<u>Supplemental Information</u>
Power Requirements		
Voltage	+15 V DC and - 15 V DC	Fixture supplied with power plug for operation with 7000-Series Oscilloscopes.
Current	250 mA each supply	
Switch Drive Requirements		
Voltage	At least 6 V to 60 V or less depending on repetition rate of drive signal	Depends on resonant frequency of particular reed switch used in fixture
Repetition Rate	DC to 800 Hz	
Overdrive Output Signal		
Falltime	7 ns or less into 1 M Ω , 50 pF	
Variations from Zero Level Amplitude	10 μ V or less after 100 ns Continuously variable from +100 mV or less to at least +11 V, or from - 100 mV or less to at least -11 V.	
Output Resistance	50 Ω within 10%	

MECHANICAL

<u>Characteristic</u>	<u>Requirement</u>	<u>Supplemental Information</u>
Construction		
Housing	Cast front and rear sub-panel; blue vinyl painted aluminum, wrap-around cabinet	
Panel	Anodized aluminum	
Circuit Board	Glass-Epoxy Laminate	
Overall Dimensions		
Height	1-15/16 inches	
Width	4-5/8 inches	
Depth	2-1/8 inches	

ENVIRONMENTAL

<u>Characteristic</u>	<u>Requirement</u>	<u>Supplemental Information</u>
Temperature		
Operating Range	0° C to +50° C	
Warmup Time	None	

CONTROLS , SWITCHES AND CONNECTORS

LEVEL Control

Continuously variable control adjusts the amplitude of the overdrive signal.

Polarity Switch

Three-position toggle switch selects a positive-going (+) or negative-going (-) overdrive signal, or turns the overdrive signal OFF.

SWITCH DRIVE

EXT IN Connector

BNC-type connector couples the external SWITCH-DRIVE signal to the fixture. The duration of overdrive signal is determined by the duration of the applied signal.

MANUAL Pushbutton

Pushbutton switch removes the SWITCH DRIVE signal supplied to the EXT IN connector, and applies the overdrive signal as long as the MANUAL pushbutton is depressed.

SIGNAL OUTPUT Connector

BNC-type connector couples the fixture output directly to the input of the amplifier under test.

TRIGGER OUT Connector

Banana-plug jack provides an output signal for externally triggering the Oscilloscope time-base.

POWER Input Plug

Special 4-pin Lemo connector with permanently attached power cord, connects to probe-power-output of the Type 7000-Series Oscilloscope under test.

SECTION 2

OPERATING INSTRUCTIONS

The following procedure describes the basic operation of the Overdrive Recovery Tester when used with a Tektronix 7-series Amplifier Plug-in Unit operating in a 7000-series Oscilloscope. Detailed information for checking the recovery time specified for a particular plug-in amplifier will be found in the instruction manual supplied with the instrument.

Establishing a Reference Display

Connect the OUTPUT of the fixture to the input of the 7-series amplifier under test. Connect the power plug to the probe-power-out jack located on the rear panel of the oscilloscope. Install a BNC cable on the high amplitude output of a Tektronix Type 106 Squarewave Generator using a GR-to-BNC adapter, 017-0063-00. Connect the other end of the cable to the switch drive EXT IN connector on the fixture. Install a BNC-to-banana plug patch cord, 012-0090-00, from the TRIGGER OUT jack of the fixture to the external-trigger input connector on the oscilloscope time-base (This connection should be made through a X10 attenuator if overdrive signal exceeds 2 V). Set the input coupling switch of the vertical amplifier at DC and deflection factor for 2V/div. Set the horizontal time base at 1 ms/div. Set the fixture polarity switch at + and LEVEL control fully ccw. Set the Type 106 Repetition Rate Range at 100 Hz, Multiplier at 5, Symmetry and Amplitude at midrange, and Hi Amplitude/Fast Rise at Hi Amplitude. Adjust the Type 106 Repetition Rate, and (if necessary) the Amplitude controls for audible reed resonance. CAUTION: Do not exceed the midrange setting of the Type 106 Amplitude control, as excessive amplitude will cause the fixture reed drive coil to overheat. Adjust the fixture LEVEL control to obtain a 5 div. display amplitude. If necessary, adjust the time-base triggering controls for a stable display, as shown in Fig. 1. Using the position controls, position the bottom of the display to coincide with the graticule centerline and to start at the 1-division graticule line as shown in Fig. 2.

Making the Measurement

The amplifier deflection factor and time-base sweep speed used in this portion of the procedure depend on the overdrive recovery characteristic to be checked. For purpose of illustration, we will assume a characteristic of 1 μ s to recover within 1.5 mV.

Set the Time/Div switch to 0.2 μ s, increase the trace intensity and use the time-base Position control to reposition, if necessary, the bottom front corner of the display to start at the 1-division graticule line that will be used as a time reference. Set the Amplifier deflection factor to 1 mV/div. Switch the fixture polarity to '0' and use vertical Position control to reposition the trace to graticule center. This is the zero amplitude reference. Switch the fixture polarity to +. Check the trace for a return to

within 1.5 divisions of the graticule vertical center within a recovery time of $1 \mu\text{s}$ (5 horizontal divisions) as measured from the 1-division line (see Fig. 3).

The overdrive recovery characteristic checked in the preceding example had a relatively short recovery time-duration, hence the Type 106 Squarewave Generator was used to turn the reed switch on and off. For applications involving long recovery time-durations, the MANUAL pushbutton on the fixture can be used, eliminating the need for the drive source.

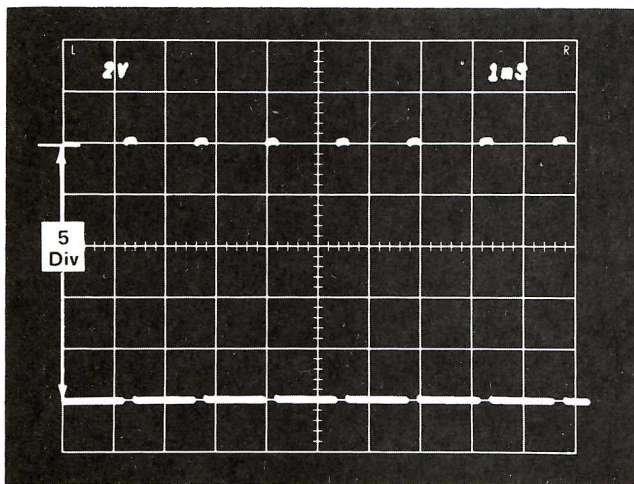


Fig. 1 Reference Amplitude
Sweep-rate: 1 ms/div

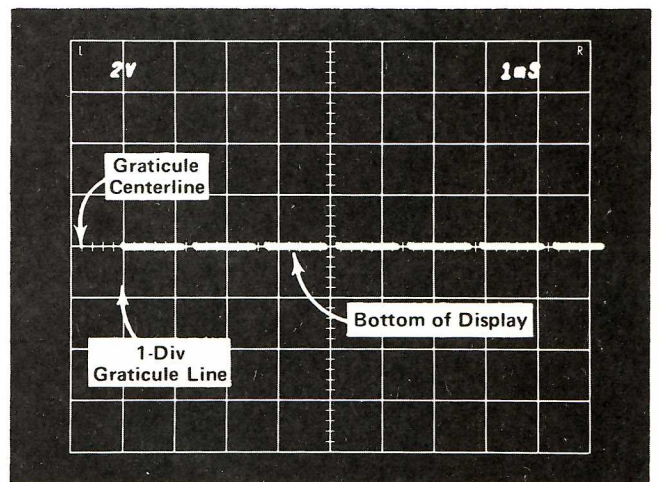


Fig. 2 Display Positioning
Sweep-rate: 1 ms/div

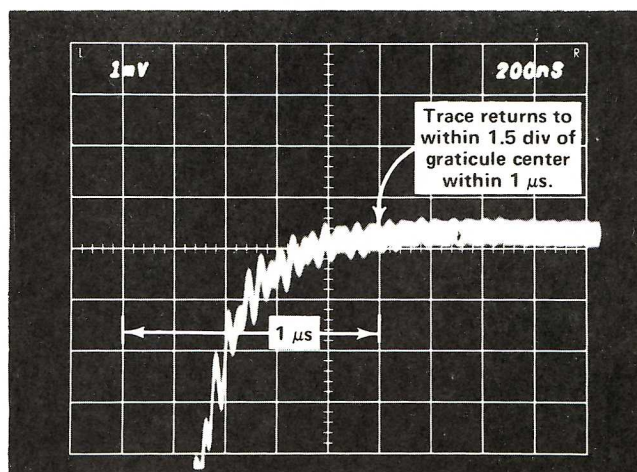


Fig. 3 Overdrive Recovery
Sweep-rate: $0.2 \mu\text{s}/\text{div}$

SECTION 3

CIRCUIT DESCRIPTION

Diodes CR1 and CR2 provide circuit isolation in the event the +15 V and -15 V external power connections are reversed. Inductors L1, L2 and capacitors C1, C2 provide power supply decoupling. Switch S1 selects positive or negative pulse output as determined by the polarity of the 15 volt supply voltage selected. The LEVEL control R3 adjusts the base drive to Q1 and Q2, permitting adjustment of the output voltage. Capacitor C3 is a high frequency bypass.

SECTION 4

MAINTENANCE

Visual Inspection

The instrument should be visually inspected occasionally for such defects as poor connections, broken or damaged parts, improperly seated transistors, and heat damaged parts. The remedy for most of these defects is obvious. A heat damaged part is usually the symptom of some defect that is not obvious. The cause of overheating should be determined and corrected before the part is replaced, otherwise the damage may be repeated.

Transistor Checks

Periodic preventive maintenance checks on the transistors are not recommended. Satisfactory operation of the instrument in all respects is adequate assurance that the transistors are performing properly.

Ordering Parts

Many of the components are standard electronic parts that may be purchased locally. However, all standard parts in the instrument can be obtained from Tektronix through your local Tektronix Field Engineer or Field Office. Before ordering, consult the parts list of this manual to determine the value, tolerance, and rating required. Some of the parts used are not standard parts and may or may not be available for replacement. Consult any particular replacement with your local Tektronix Field Engineer or Field Office.

Caution

When replacing the back cover with a completely new one, also replace the clear tape inside the cover. This tape acts as a component insulator and is necessary for proper operation. The tape may be replaced with any similar tape having adhesive backing.

CHECK OUT LIST

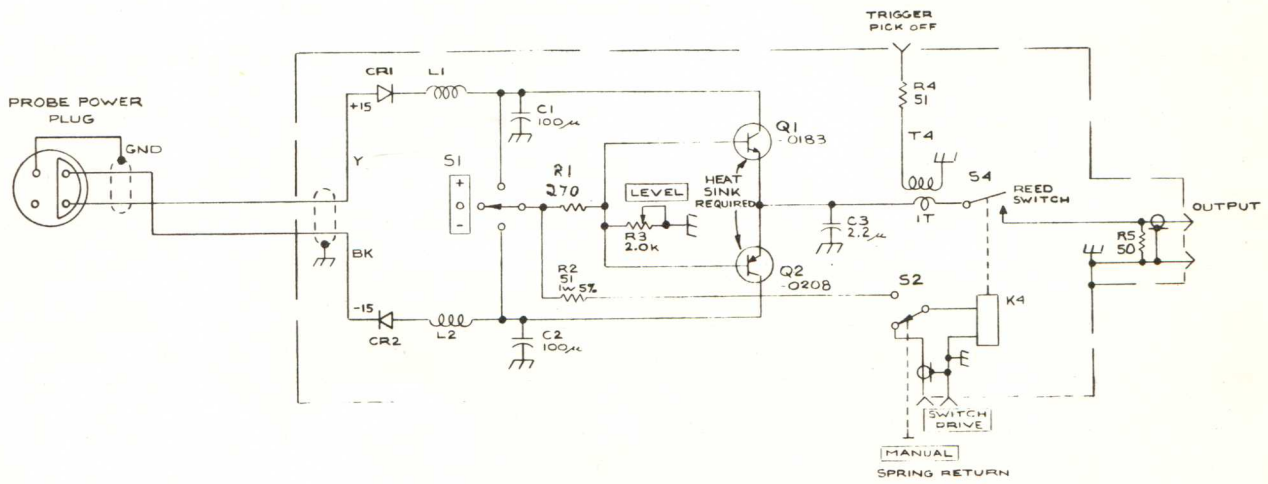
For the following performance checks, the fixture is connected to the input of a Tektronix 7-series Amplifier installed in a 7000-series Oscilloscope, and driven with a Tektronix Type 106 Squarewave Generator as outlined in Section 2, Operation Instructions.

1. Check reed coil operation as indicated by audible resonance.
2. Check LEVEL control and POLARITY switch for + (-) 100 mV or less to at least + (-) 11V as indicated by amplitude displayed. Check switch center OFF.
3. Check MANUAL operation for a DC trace shift when button is depressed.
4. Measure falltime of displayed signal.

NOTES

Lined paper area for writing notes, consisting of multiple horizontal lines.

SECTION 5
SCHEMATIC DIAGRAMS



SECTION 6
ELECTRICAL PARTS LIST

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model Eff No.	Disc	Description
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Resistors

Resistors are fixed, composition, $\pm 10\%$ unless otherwise indicated.

R2	303-0510-00		51 Ω	1 W	5%
R3	311-0949-00		2 k Ω , Var		
R5	307-0086-00		50 Ω	Carbon film	1%

Switches

Wired or Unwired

S1	260-0399-00		Toggle		
S2	260-0689-00		Push		
S4	260-0693-00		Reed		

Circuit Board Assembly

*670-1213-00	Complete Board
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Capacitors

Tolerance $\pm 20\%$ unless otherwise indicated.

C1	290-0309-00	100 μ F	Elect.	25 V
C2	290-0309-00	100 μ F	Elect.	25 V
C3	283-0164-00	2.2 μ F	Cer	25 V

Semiconductor Device, Diodes

CR1	152-0040-00	Rectifier, 1 A, 400 V
CR2	152-0040-00	Rectifier, 1 A, 400 V

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
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Inductors

K4	*108-0600-00			Reed drive
L1	*120-0382-00			Toroid, 14 turns, single
L2	*120-0382-00			Toroid, 14 turns, single
T4	*120-0382-00			Toroid, 14 turns, single

Transistors

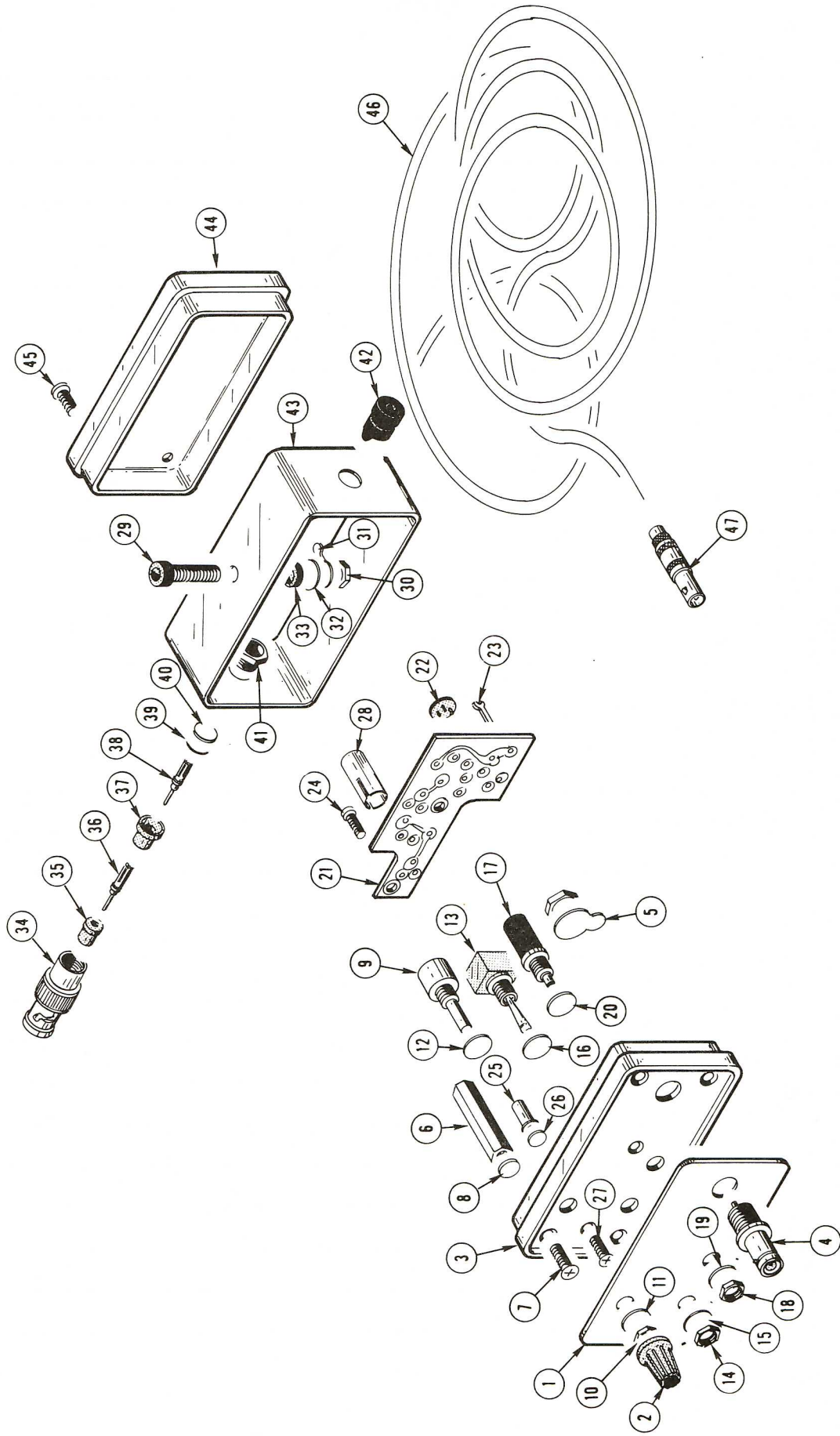
Q1	151-0183-00		Silicon	NPN	TO-5	2N2192
Q2	151-0208-00		Silicon	PNP	TO-5	2N4036

Resistors

Resistors are fixed, composition, $\pm 10\%$ unless otherwise indicated.

R1	304-0271-00		270 Ω	1 W		10%
R4	315-0510-00		51 Ω	1/4 W		5%

EXPLODED



SECTION 7
MECHANICAL PARTS LIST
EXPLODED

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description	
				Y	1	2	3	4		5
	067-0608-00			1						OVERDRIVE RECOVERY
	- - - - -			-						overdrive recovery includes:
1	333-1314-00			1						PANEL, front
2	366-1125-00			1						KNOB, gray--LEVEL
	- - - - -			-						knob includes:
	213-0153-00			1						SETScrew, 5-40 x 0.125 inch
3	200-0327-04			1						SUBPANEL, front
4	131-0955-00			1						CONNECTOR, receptacle, electrical,
	- - - - -			-						female, BNC
	- - - - -			-						mounting hardware: (not included
	- - - - -			-						w/connector)
5	210-0255-00			1						LUG, solder, 0.375 inch
6	385-0168-00			4						ROD, spacer, 1.168 inches long
	- - - - -			-						mounting hardware for each: (not included
	- - - - -			-						w/rod)
7	211-0538-00			1						SCREW, 6-32 x 0.312 inch, 100° csk, FHS
8	210-0006-00			1						WASHER, lock, internal, 0.146 ID x 0.283
	- - - - -			-						inch OD
9	- - - - -			1						RESISTOR, variable
	- - - - -			-						mounting hardware: (not included
	- - - - -			-						w/resistor)
10	210-0583-00			1						NUT, hex., 0.25-32 x 0.312 inch
11	210-0940-00			1						WASHER, flat, 0.25 ID x 0.375 inch OD
12	210-0046-00			1						WASHER, lock, internal, 0.26 ID x 0.40
	- - - - -			-						inch OD
13	260-0399-00			1						SWITCH, toggle--OFF
	- - - - -			-						mounting hardware: (not included w/switch
14	210-0583-00			1						NUT, hex., 0.25-32 x 0.312 inch
15	210-0940-00			1						WASHER, flat, 0.25 ID x 0.375 inch OD
16	210-0046-00			1						WASHER, lock, internal, 0.26 ID x 0.40
	- - - - -			-						inch OD
	210-0562-00			1						NUT, hex., 0.25-40 x 0.312 inch
17	260-0689-00			1						SWITCH, push button--MANUAL
	- - - - -			-						mounting hardware: (not included w/switch
18	210-0583-00			1						NUT, hex., 0.25-32 x 0.312 inch
19	210-0940-00			1						WASHER, flat, 0.25 ID x 0.375 inch OD
20	210-0046-00			1						WASHER, lock, internal, 0.26 ID x 0.40
	- - - - -			-						inch OD

EXPLODED (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Q					Description	
				Y	1	2	3	4		5
21	670-1213-00			1						CIRCUIT BOARD ASSEMBLY
	- - - - -			-						circuit board assembly includes:
	388-1563-00			1						BOARD, circuit
22	131-0525-00			1						TERMINAL, stud
23	136-0365-00			2						SOCKET, transistor, 3 pin
	- - - - -			-						mounting hardware: (not included w/
	- - - - -			-						circuit board assembly)
24	211-0007-00			2						SCREW, 4-40 x 0.187 inch, PHS
25	361-0094-00			2						SPACER, stand-off
26	210-0004-00			2						WASHER, lock, internal, 0.12 ID x 0.26
	- - - - -			-						inch OD
27	211-0105-00			2						SCREW, 4-40 x 0.187 inch, 100° csk, FHS
28	214-0269-00			2						HEATSINK
29	136-0138-00			1						BANANA JACK ASSEMBLY
	- - - - -			-						mounting hardware: (not included w/
	- - - - -			-						banana jack assembly)
30	210-0465-00			1						NUT, hex., 0.25-32 x 0.375 inch
31	210-0223-00			1						LUG, solder, 0.25 inch
32	210-1025-00			1						WASHER, flat, 0.312 inch
33	210-0895-00			1						WASHER, insulating, black, plastic
34	134-0044-00			1						PLUG, BNC
35	358-0072-00			1						BUSHING, insulator
36	214-0503-00			1						CONTACT, probe, pin
37	361-0081-00			1						SPACER, support, plastic
38	214-0503-00			1						CONTACT, probe, pin
39	210-0940-00			1						WASHER, flat, 0.25 ID x 0.375 inch OD
40	210-1103-00			1						WASHER, grounding, 0.25 ID x 0.35 inch OD
41	132-0081-00			1						NUT, BNC
42	358-0091-00			1						BUSHING, strain relief
43	380-0212-00			1						HOUSING, wrap-around
44	200-0327-03			1						PANEL, rear
	- - - - -			-						mounting hardware: (not included w/panel)
45	211-0542-00			4						SCREW, 6-32 x 0.312 inch, THS
46	175-0072-00			ft						CABLE, coaxial, 2 conductor (5 feet)
47	131-0778-00			1						CONNECTOR, 4 pin
										STANDARD ACCESSORIES
	062-1127-00			2						MANUAL, instruction (not shown)