INSTRUCTION MANUAL

Serial Number _____

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1101 POWER SUPPLY ACCESSORY

Tektronix, Inc.
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070-0949-00 1069

Fig. 1-1. Type 1101 Accessory Power Supply.

SECTION 1
TYPE 1101 SPECIFICATION

Description

The Type 1101 Accessory Power Supply is designed to furnish power for one to four active probes when used with oscilloscopes that do not have a probe power supply. The Type 1101 provides +15 V, −15 V and +5 V and is short-circuit protected.

Characteristics

The characteristics in this section are categorized as electrical, environmental and physical. The electrical and environmental characteristcis are valid only if the instrument is operated within the limitations described and if the instrument is calibrated.

TABLE 1-1

Electrical Characteristics

Characteristic	Performance Requirement	
Output Voltage		
+15 V	+15 V ±0.75% (Adjustable)	
−15 V	−15 V ±1.5%	
+5 V	+5 V ±2.0%	
Output Current (Maximum)	≥400 mA from each supply, short circuit protected	
Ripple	≤1 mV, each supply with a 400 mA load	
Line Voltage (RMS)	115 VAC	230 VAC
Low Range	90 V to 118 V	180 V to 236 V
High Range	104 V to 136 V	208 V to 272 V
Line Current (RMS)		
Low Range	≤455 mA	
High Range	≤390 mA	
Line Frequency Range	50 Hz to 400 Hz	
Power (Maximum)		
Low Range	47 W at 115 V, 60 Hz	
High Range	39 W at 115 V, 60 Hz	
Fuse Data		
115 V Operation	0.6 A slow-blowing type	
230 V Operation	0.3 A slow-blowing type	

TABLE 1-2

Environmental Characteristics

Characteristic	Performance Requirement
Temperature	
Non-operating	−40°C to +65°C
Operating	0°C to +50°C
Altitude	
Non-operating	To 50,000 feet
Operating	To 15,000 feet
Vibration (Operating)	15 minutes along each axis at 0.015 inch. Vary the frequency from 10 to 50 to 10 c/s in 1 minute cycles. 3 minutes at any resonant point or at 50 c/s.
Shock (Non-operating)	30 g's, ½ sine, 11 ms duration, 2 shocks per axis. Total of 6 shocks.
Transportation	Qualifies under National Safe Transit Committee Test Procedure Category IV (48 inch drop).

TABLE 1-3

Physical Characteristics

Characteristic	Description
Dimensions	
Cabinet	Height: ≈3⅛ inches overall
	Width: ≈5¼ inches
	Length: ≈8¼ inches
Power Cord	≈6 feet
Weight	
Net	≈3½ pounds
Shipping	≈5 pounds

Standard accessories supplied with the Type 1101 are listed in the Mechanical Parts Section.

SECTION 2
OPERATING INSTRUCTIONS

General Information

This section provides the basic information required for operation of the Type 1101 Accessory Power Supply. The unit powers active probes when the oscilloscope does not provide a power source for the probes.

Operating Information

WARNING

The Type 1101 is intended to be connected to an AC-power source which has the neutral wire at ground (earth) potential.

On the right side of the Type 1101, place the LINE VOLTAGE (115/230) selector switch in the position that indicates the line voltage that is to be applied to the Type 1101. Select the position of the LINE VOLTAGE (HI/LO) selector switch according to the line voltage table placed on the back of the unit.

After the LINE VOLTAGE selector switches have been positioned, connect the power cord to the AC-line, connect the power supply lead from the active probe to one of the POWER OUT connectors and place the POWER switch at ON. The POWER indicator will light.

SECTION 3
CIRCUIT DESCRIPTION

The Type 1101 Power Supply provides regulated voltages of +15 V, −15 V and +5 V for active probes when the oscilloscope does not have this provision.

The power supply operates from either a 115 VAC or a 230 VAC power source. The primary windings of transformer T10 are connected in parallel for 115 VAC operation and in series for 230 VAC operation through the voltage selector switch S2. Fuse F1 provides overload protection for 115 VAC operation. Fuse F2, is connected in series with F1 when S2 (voltage selector) is switched to the 230 VAC position, to provide overload protection for 230 VAC operation. The power indicator light DS10 is connected across the secondary winding (terminals 12 and 13) of transformer T10 and indicates when the power supply is on. S3 (HI/LO switch) selects the transformer primary taps. The correct HI/LO position is selected according to the table on the back of the Type 1101.

+15 V Supply

This supply consists of bridge rectifier CR11, CR12, CR13 and CR14 connected across the secondary winding (terminals 10 and 11) of T10, filter capacitors C11, C12 and the voltage regulator circuit containing Q23, Q29, Q33, Q35 and Q38. This supply is the reference supply for the −15 V and +5 V supplies.

The +15 V regulator circuit consists of comparator Q23, error amplifier Q29, and the series regulator Q38. Q33 and Q35 are the active components for an overload protector circuit in the supply. The reference voltage for Q23B is set by the 9 V Zener diode VR20. Q23A samples the +15 V supply through the voltage divider consisting of R15, R17 and +15 V potentiometer R16. A difference between the reference voltage and the sampled voltage from the +15 V supply produces an error signal output on the collector of Q23B which is amplified by Q29 and applied as a corrective signal to regulator Q38. For example, an increased load demand on the +15 V supply produces a negative-going output error signal at the collector of Q23. This signal is amplified and inverted by Q29 and is applied as a positive-going corrective signal to the base of the series regulator Q38. This positive-going signal increases the forward bias of the regulator so the additional current demanded by the load is supplied by the regulator.

The regulator circuit can never completely compensate for any change in output voltage, because there must be an error input for the circuit to operate. However, any error in the output is reduced by a factor equal to the loop gain of the regulator circuit.

An overload on the supply in excess of 400 mA (such as a short circuit) produces a voltage drop across R38 which is sufficient to turn on Q33 and drive Q35 into conduction. When Q35 conducts, the voltage drop at the collector turns on diode CR35 and pulls the base of Q38 down. This decreases the forward bias of the series regulator and limits the current output of the supply to protect the circuit from overload current demands.

The low impedance of CR26 increases the gain of error amplifier Q29. Thermistor RT32 temperature-compensates the current limiting circuitry.

At the time the Type 1101 is turned on with the load connected, most of the supply voltage appears across Q38, which is cut off. Therefore, the output voltage is about zero volts. Q98 in the −15 V Power Supply is also turned off, since that supply does not have the +15 V necessary for proper operation. Network R27, R28, R29 and CR27 applies forward bias and turns on Q38. With about zero volts applied to R27 instead of the normal operating voltage of −15 V, there is approximately −27 V at the junction of R27-R28, and CR27 is biased into conduction. The resulting voltage drop across R29 biases Q38 into conduction and the +15 V Power Supply operates properly. CR27 is now reverse biased.

+5 V Supply

This supply consists of bridge rectifier CR41 through CR44, connected across another secondary winding (terminals 14 and 15) of T10, filter capacitor C41 and the voltage regulator circuit consisting of Q53, Q59, Q63 and Q68.

The +5 V regulator circuit consists of comparator Q53, error amplifier Q59 and series regulator Q68. Q63 provides the overload protection for the supply.

Reference voltage for the base of Q53B is set at approximately −2 V by the voltage divider R50, R51 and R52, between the +15 V and −15 V supplies. The base of Q53A is connected through voltage divider network R45 and R46 to the +5 V supply. Any difference between the reference voltage and the sampled +5 V supply results in an error signal output from the compartor. This error signal is amplified by Q59 and is applied as a corrective signal to the base of series regulator Q68. For example, an increased current demand by the load produces a negative-going signal across R46 at the base of comparator Q53A. This results in a negative-going output signal to the base of error amplifier Q59. The amplified and inverted error signal voltage from the error amplifier is applied as a positive-going corrective signal to series regulator Q68, increasing its forward bias and, as a result, the current output of the regulator to the load.

Any overload condition (such as short circuit) produces enough voltage drop across R68 to turn on Q63. The increased current from Q63 through R49 pulls the emitters of comparator Q53 up, which decreases the forward bias on the error amplifier. This reduces the drive to series regulator Q68 and limits the output current.

−15 V Supply

This supply consists of the bridge rectifier, containing the four diodes CR71 through CR74, connected across a

third secondary winding (terminals 12 and 13) of T10, filter capacitors C71, C72 and the voltage regulator circuit containing Q83, Q89, Q93 and Q98.

The —15 V regulator circuit contains comparator Q83, error amplifier Q89 and series regulator Q98. Overload protection for the supply is provided by Q93 and its circuitry.

Operation of the regulator circuit is similar to the +5 V regulator. The voltage divider containing R75 and R76 between the —15 V supply and the +15 V supply samples the —15 V for Q83A. Any error voltage output at the Q83B collector is amplified by Q89 and applied to the base of Q98 as a corrective signal to control the forward bias of the regulator. Overload protection for the supply is very similar to the circuit in the +5 V supply as described previously.

SECTION 4
MAINTENANCE

Introduction

The Type 1101 Power Supply provides reliable service with routine maintenance and periodic checks or adjustment. Servicing and recalibration is recommended every 1000 hour period of operation or very six months if used only occasionally. Checks and servicing should be performed more frequently if the instrument is used under adverse conditions such as high temperature, high humidity, dust, or corrosive atmospheric conditions.

Preventive Maintenance

Preventive mainteance consists of cleaning and inspecting the instrument for visual defects such as poor connections, damaged components and improperly seated transistors. Clean the exterior of the instrument by brushing loose dirt off with a soft cloth or brush. Dirt that remains can be removed with a soft cloth dampened in a mild solution of water and detergent. Abrasive cleaners should not be used.

CAUTION

Avoid the use of chemical cleaning agents which might damage the plastic and paint used in this instrument. Some chemicals to avoid are benzene, toluene, xylene, acetone or similar solvents.

Because of its conductivity in a humid environment, dust in the instrument interior should be removed. Blow accumulated dust off with dry low velocity air, then wipe or brush the remaining dirt off with a soft paint brush or cloth. The cloth may be dampened with a mild detergent and water solution. A cotton tipped swab is handy for cleaning in and around narrow spaces.

After the instrument is cleaned, inspect for such defects as poor connections, damaged parts, improperly seated transistors and overheated components. The remedy for most defects is obvious; however, if damage is due to heat, determine the cause of overheating before replacing heat damaged components, otherwise the new component may also be damaged.

Transistor Checks

Periodic checks which include the removal of transistors and testing them in a tester are not recommended. Circuit operation provides the only satisfactory check of transistor performance. Defective transistors are usually detected when the instrument is calibrated.

If there is any doubt about the tranistor performance, substitute with a new or known good transistor after insuring the circuit voltages are correct. Note the transistor lead configuration (Fig. 4-1) before inserting the replacement transistor in the socket.

Resistor Color-Code

In addition to the brown composition resistors some metal-film resistors are used in the Type 1101. The resistance values

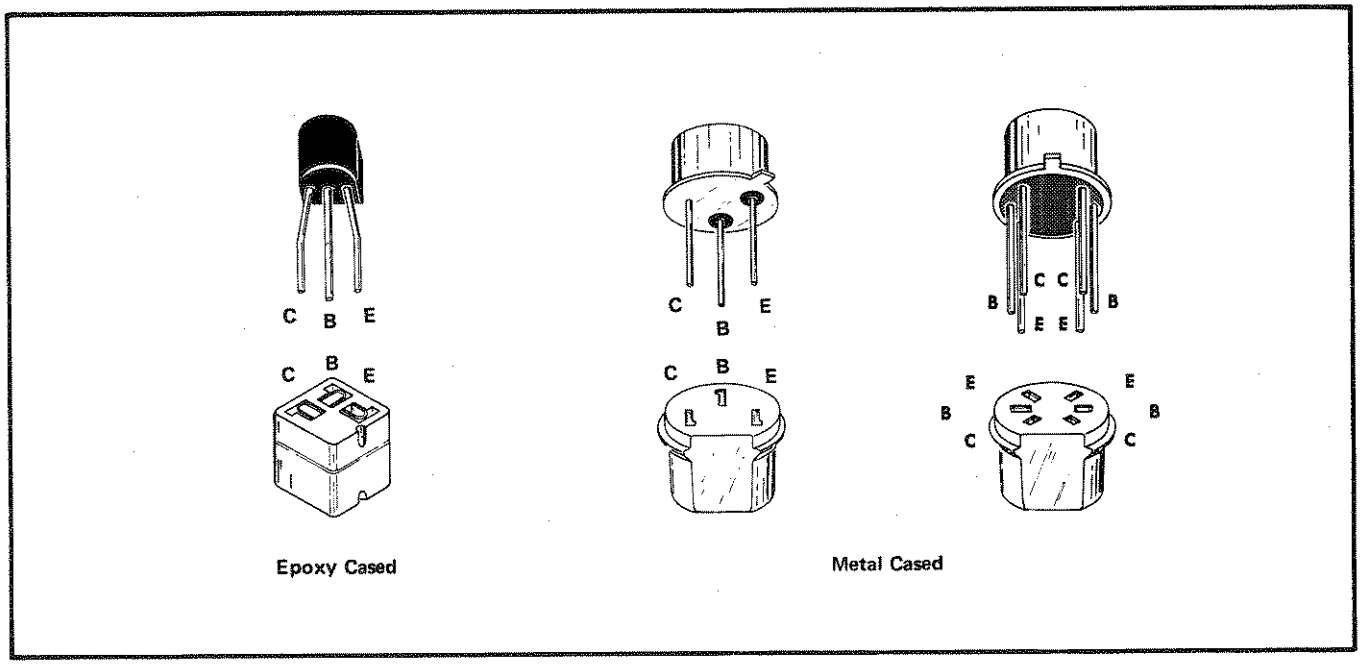
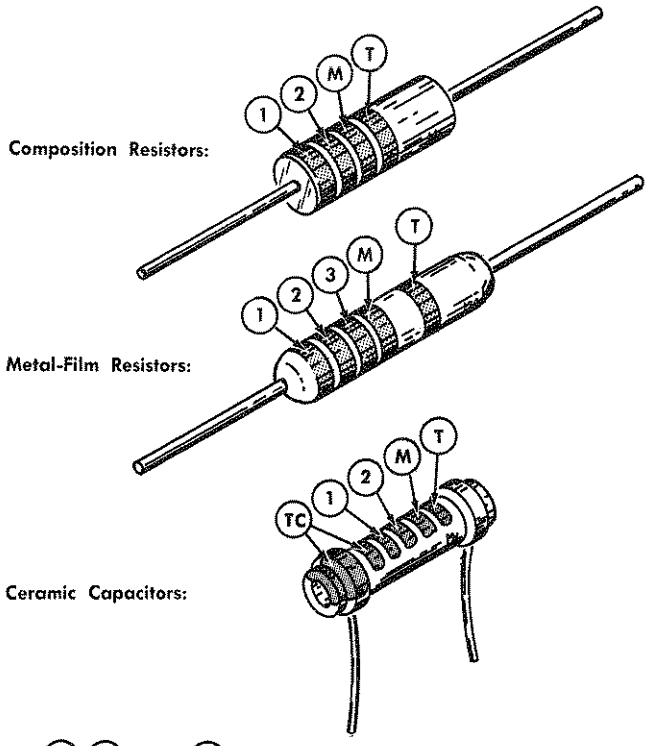


Fig. 4-1. Electrode configuration for socket-mounted transistors.



Resistor and Capacitor Color Code

Color	Significant Figures	Multiplier		Tolerance	
		Resistors	Capacitors	Resistors	Capacitors
Silver	---	10^{-2}	---	±10%	---
Gold	---	10^{-1}	---	±5%	---
Black	0	1	1	---	±20% or 2 pF*
Brown	1	10	10	±1%	±1% or 0.1 pF*
Red	2	10^{2}	10^{2}	±2%	±2%
Orange	3	10^{3}	10^{3}	±3%	±3%
Yellow	4	10^{4}	10^{4}	±4%	+100% −0%
Green	5	10^{5}	10^{5}	±0.5%	±5% or 0.5 pF*
Blue	6	10^{6}	10^{6}	---	---
Violet	7	---	---	---	---
Gray	8	---	10^{-2}	---	+80% −20% or 0.25 pF*
White	9	---	10^{-1}	---	±10% or 1 pF*
(none)	---	---	---	±20%	±10% or 1 pF*

*For capacitance of 10 pF or less.

NOTE: T and/or TC color code for capacitors depends upon manufacturer and capacitor type. May not be present in some cases.

Fig. 4-2. Color code for resistors and ceramic capacitors.

of composition resistors and metal-film resistors are color-coded on the components (some metal film resistors may have the value printed on the body) with EIA color-code. The color-code is read starting with the stripe nearest the end of the resistor. Composition resistors have four stripes which consist of two significant figures, a multiplier and a tolerance value (see Fig. 4-2). Metal-film resistors have five stripes consisting of three significant figures, a multiplier and a tolerance value.

In-Circuit Diode Checks

A diode may be checked in the circuit with a voltmeter. Forward-to-reverse resistance ratios also may be checked by removing appropriate transistors and then using an ohmmeter. The resistance measurements will be affected by other resistors in the circuit. The Zener diode voltage may be checked with a voltmeter after removing Q23.

CAUTION

Do not use an ohmmeter scale that has a high internal current to check the forward-to-back resistance ratio. Do not check the resistance ratio of the zener diode.

Obtaining Replacement Parts

All electrical and mechanical parts for the Type 1101 are obtainable through your local Tektronix Field Office or representative. However, many standard electronic components such as resistors can be purchased locally in less time than is required to order from Tektronix, Inc. Before ordering or purchasing a part, consult the Parts List in sections 6 and 7 for the value, tolerance and rating of the component. The Parts List also contains instructions for ordering the replacement item from Tektronix, Inc.

NOTE

It is important to remember that the physical size and shape of a component may affect circuit performance. This should be considered when a component is to be replaced with a new component.

A circuit board without components or a completely wired circuit board with components may be ordered. See the Mechanical Parts List.

In addition to standard electronic components, some special parts are manufactured or selected by Tektronix, Inc. to meet specific performance requirements. These special parts are indicated in the Parts List by an asterisk preceding the part number. Most mechanical parts used in this instrument have been manufactured by Tektronix, Inc. Order all special and mechanical parts directly from your Tektronix Field Office or representative.

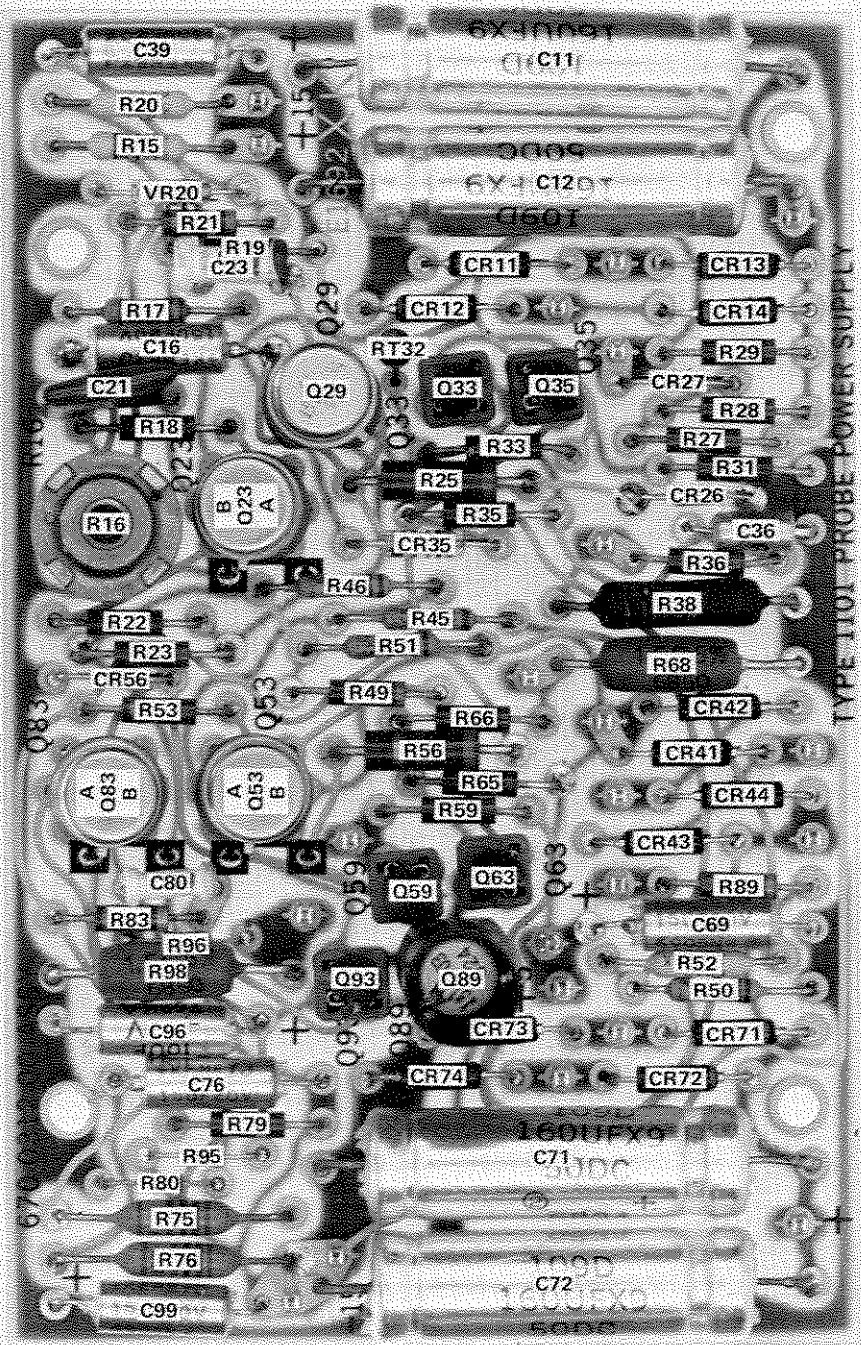


Fig. 4-3. Power supply circuit board.

Soldering Technique

The recommended solder for use on the Tektronix circuit boards is a eutectic-type cored-wire solder, size #20 AWG, composed of 63% tin and 37% lead, with a central core of activated rosin flux.

WARNING

Disconnect the instrument from the power source before soldering.

To solder or unsolder any small or short-lead component:

1. Use needle-nose pliers or a hemostat to act as a heat sink between the soldered or soldering point and the component.

2. Use a moderately hot iron for a short period of time.

3. Manipulate your tools with care to avoid damage to small components.

4. Use only enough solder to make a good bond. Use a 35- to 40-watt pencil type soldering iron on the circuit boards. A higher wattage soldering iron may separate the etched wiring from the base material. The tip of the iron should be clean and properly tinned for best heat transfer to the solder joint.

After soldering any connection, clip off the excess length of the soldered leads. Be sure that ends do not drop into the instrument.

The following technique is recommended when replacing a component on a circuit board:

1. Grip the component lead with long-nosed pliers or hemostat. Touch the soledering iron to the lead at the solder connection. (Do not lay the iron directly on the board, as it may damage the board).

2. When the solder begins to melt, gently pull the lead out. This should leave a clean hole in the board. If not, the hole can be cleaned by reheating the solder and placing a sharp object such as a toothpick or enameled wire into the hole.

3. Bend the leads of the new component to fit the holes in the board. If the component is replaced while the board is mounted in the instrument, cut the leads so they just protrude through the board. Insert the leads through the placed holes until the component is firmly seated. If it does not seat properly, heat the solder and gently press the component into place.

4. To protect heat-sensitive components, hold the lead between the component body and the solder joint with a pair of long-nose pliers or other heat sink. Apply the iron to the connection then only enough solder to make a firm solder joint. Too much solder may wick through the eyelet and short to another circuit.

5. Clip off any excess leads that protrude through the board.

6. Clean the area around the solder connection with a flux-remover solvent to maintain good environmental characteristics. Be careful not to remove the information printed on the board.

Observe the following precautions when soldering to metal terminals:

1. Apply only enough heat to make the solder flow freely.

2. Apply only enough solder to form a solid connection.

3. If a wire extends beyond the solder joint clip off excess that protrudes beyond the soldered joint.

4. Clean the flux from the solder joint with a flux-remover solvent to maintain good environmental characteristics.

Circuit Board Removal and Installation

The circuit board is held in position by three plastic clips and one electrical grounding screw. Two of the clips are located on the front edge of the circuit board and the third clip is located on the rear edge of the circuit board. The electrical grounding screw is located on the circuit board near the power transformer.

To remove the circuit board, first remove the electrical grounding screw and then spring the three clips away from the circuit board. The circuit board will be pushed out by springs underneath the circuit board that are on the alignment pins. Be careful not to bend the pins that insert into the circuit board during removal or installation.

Installation of the circuit board requires that the alignment holes in the circuit board be above the alignment pins on the chassis before carefully pressing the circuit board into position.

SECTION 5
PERFORMANCE CHECK / CALIBRATION

Introduction

The following procedure may be used as a front-panel check of the instrument's performance, or as a calibration procedure. When the Performance Check is completed, the instrument is checked to the "Performance Requirements" given in Section 1. Step 1 of the Performance Check/Calibration procedure contains the only calibration adjustment. This adjustment is done only if the instrument does not meet the listed requirement.

The instrument must be calibrated at an ambient temperature between +20°C and +30°C.

EQUIPMENT REQUIRED

The equipment listed below or its equivalent is required for a complete check and calibration of the Type 1101 Accessory Power Supply. Equipment specifications given are the minimum necessary for the particular use of each item. All test equipment must be correctly calibrated. If other equipment is substituted, it must meet or exceed the limits stated below.

1. Oscilloscope, Tektronix Type 7504 with 7B50 Time-base Unit (or Tektronix Type 540-series).

2. Differential Comparator, Tektronix Type 7A13 or other differential comparator (Tektronix Type W Unit) capable of measuring ±15 V ±0.1%.

3. 1×/10× Probe, Tektronix Type P6052 (Tektronix Type P6028 1× Probe).

4. Metered autotransformer with output voltage variable between 90 VAC and 136 VAC or 180 VAC and 272 VAC with a minimum rating of 47 W. For example, General Radio W10MT3W Metered Variac Autotransformer.

5. Test loads for the power supplies:

+15 V and −15 V supplies; (one each) 37.5 Ω, 10 W, 1% tolerance. Tektronix Part No. 308-0635-00.
+5 V supply; 12.5 Ω, 5 W, 1% tolerance. Tektronix Part No. 308-0634-00.

6. Four contact plug connector, Lemo size 0, Tektronix Part No. 131-0778-00.

PERFORMANCE CHECK AND CALIBRATION RECORD INDEX

The following abridged procedure may be used as a performance check or calibration procedure guide by the experienced calibrator, or it may be used as a record. (Tektronix, Inc. authorizes reproduction of the abridged procedure by any user of the equipment.) The step numbers and titles are identical to those used in the complete procedure. When the instrument meets the requirements in the Performance Check steps, the Type 1101 will meet all Electrical Characteristics listed in Section 1.

1. Check/Adjust Output Voltages, R16

+15 V ±0.75%
−15 V ±1.5%
+ 5 V ±2.0%

For all line voltages listed on the back panel of the instrument.

2. Check Output Voltage Ripple Content

Ripple ≤1 mV for each supply with a 400 mA load.

Preliminary Procedure

a. Construct a test load for the Type 1101 using the special connector and the load resistor values given in the test equipment list. Test load resistors (Equipment List item 5) are a 400 mA load for each supply. Connect the test load to one of the output connectors on the Type 1101. Fig. 5-1 shows a typical setup.

b. Place the voltage selector switches on the side of the Type 1101 at 115 V and at HI and then connect the Type 1101 to the variable autotransformer.

NOTE

If the line voltage is 230 V, place the line voltage selector switch at 230 V and use the 230 V portion of the voltage table which is on the back of the Type 1101 for the line voltage variation checks.

c. Turn on the oscilloscope and the autotransformer. Set the autotransformer at 115 V and turn on the Type 1101. Allow a 10 minute equipment warmup.

d. Connect a 1×/10× P6052 Probe to the Type 7A13 +Input and set the probe switch for 10× attenuation.

e. Make the following control settings:

Type 7A13

Vc	+15.00
+Input	DC
−Input	Vc
Volts/Div	10mV
BW	5MHz

Type 7B50

Triggering	
Mode	Auto
Coupling	AC
Source	INT
Magnifier	×1
Display Mode	Time Base
Time/Div	1 ms/Div

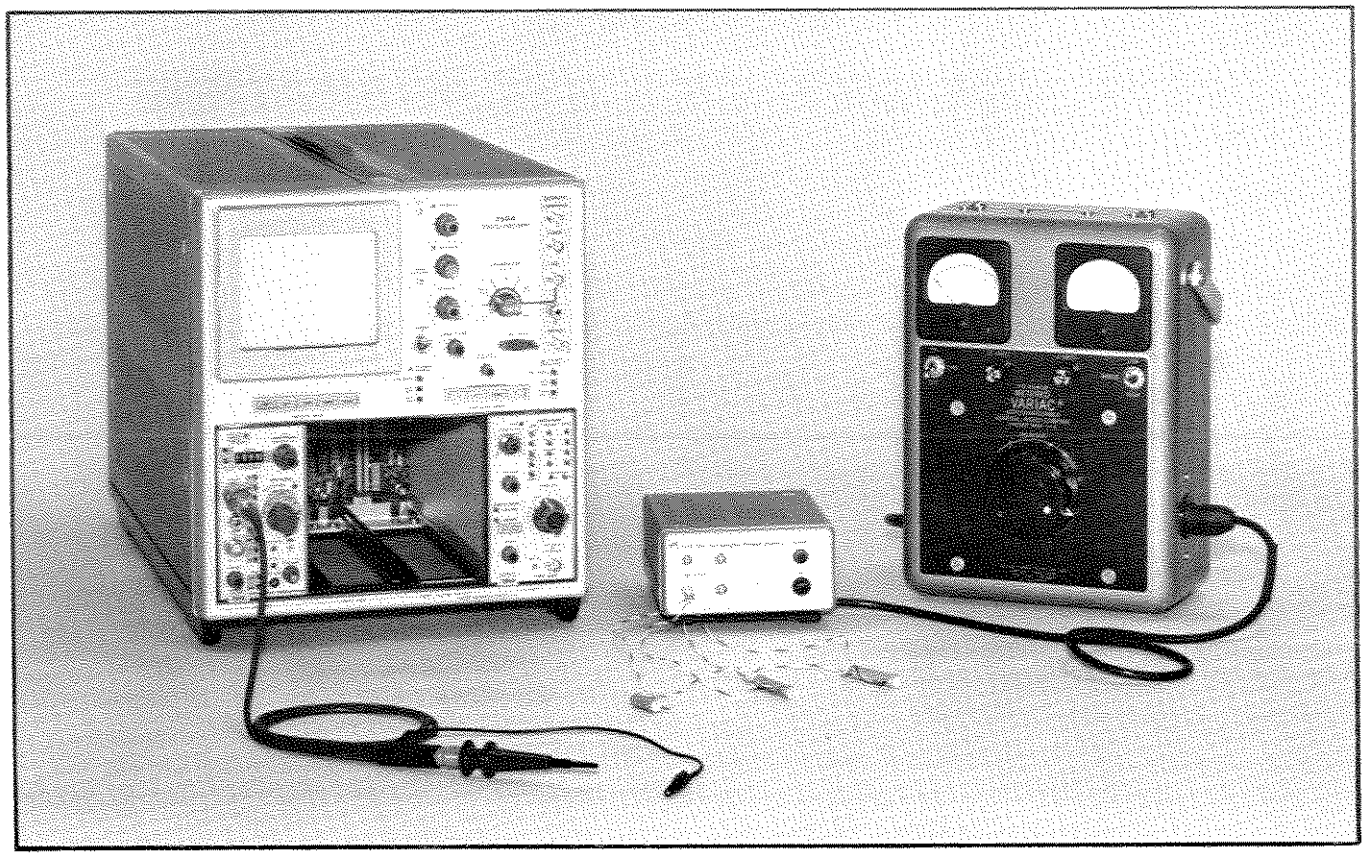


Fig. 5-1. Equipment setup for checking or calibrating the Type 1101.

f. Push the Type 7A13 Vc Ref Ident switch and position the trace at graticule center for a zero reference. After each measurement, check the zero reference for trace shift.

PROCEDURE

1. Check/Adjust Output Voltages, R16

Requirements: +15 V ±0.75%, −15 V ±1.5% and +5 V ±2.0% for the line voltages listed on the back of the Type 1101.

a. Connect the probe to the +15 V line at the load resistor and measure the voltage by adjusting the Comparator Voltage (Vc) to place the trace on the graticule center. The Vc readout range is 14.89 V to 15.11 V. If the supply is out of tolerance, remove the top and adjust R16, which is on the circuit board, to correct the voltage. Adjusting R16 affects all three output voltages.

b. Momentarily short the load resistor with a shorting strap then check that the voltage is in tolerance.

c. Vary the autotransformer output voltage from 90 to 136 V and check that the voltage stays within tolerance. The HI/LO line switch must be in the correct position according to the voltage table on the back of the Type 1101.

d. Push the −Vc Polarity switch and measure the voltage of the −15 V supply at the load resistor. Adjust Vc to place the trace on graticule center. The Vc readout range is 14.77 V to 15.23 V. If the supply is out of tolerance, adjust R16.

e. Repeat parts b and c.

f. Place the Vc at 5.00 V, push the +Vc Polarity switch and measure the voltage of the +5 V supply at the load resistor. Adjust Vc to place the trace on graticule center. The Vc readout range is 4.90 V to 5.10 V. If the supply is out of tolerance, adjust R16.

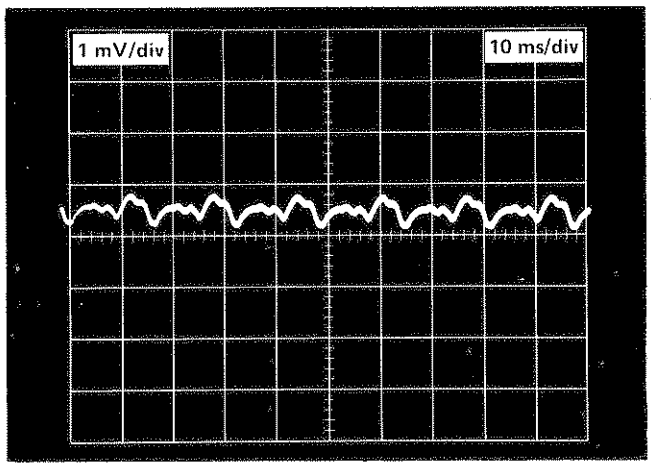


Fig. 5-2. Typical display of ripple.

g. Repeat part b and c.

h. If R16 has been readjusted, repeat the check procedure.

i. Restore the line voltage to 115 V.

2. Check Output Voltage Ripple Content

Requirement: Ripple $\leq$1 mA P-P for each supply with a 400 mA load.

a. Switch the probe to 1× attenuation and attach the probe ground clip to the power supply ground.

b. Place the Volts /Div switch at 1 mV/Div.

c. Place the Time/Div switch at 10 ms/Div.

d. Push the +Input AC switch and the —Input GND switch.

e. Vary the line voltage from 90 V to 136 V (use the correct position of the HI/LO line switch) and check that the output voltage ripple of each supply is $\leq$1 mV. See Fig. 5-2.

SECTION 6
ELECTRICAL PARTS LIST

Values are fixed, unless marked Variable.

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

CHASSIS

Bulb

DS10	150-0033-00			Incandescent, 28 V, green lens

Capacitor

Tolerance ±20% unless otherwise indicated.

C41	290-0445-00			1000 μF	Elect.	20 V +100%—10%

Fuses

F1	159-0043-00			0.6 A 3 AG Slo-Blo
F2	159-0029-00			0.3 A 3 AG Slo-Blo

Connectors

J7	131-0771-00			Receptacle, electrical, 4 contact
J8	131-0771-00			Receptacle, electrical, 4 contact
J9	131-0771-00			Receptacle, electrical, 4 contact
J10	131-0771-00			Receptacle, electrical, 4 contact

Transistors

Q38	*151-0148-00		Silicon	Replaceable by RCA 40250
Q68	*151-0148-00		Silicon	Replaceable by RCA 40250
Q98	151-0227-00		Silicon	2N3741

Switches

	Wired or Unwired			
S1	260-1113-00		Lever	POWER
S2	260-0675-00		Slide	
S3	260-0675-00		Slide	

Transformer

T10	*120-0651-00		Power	

POWER SUPPLY Circuit Board Assembly

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description		
	*670-0312-00			Complete Board		
				Capacitors		
Tolerance ±20% unless otherwise indicated.						
C11	290-0394-00			160 μF	Elect.	50 V	10%
C12	290-0394-00			160 μF	Elect.	50 V	10%
C16	290-0135-00			15 μF	Elect.	20 V	
C21	283-0026-00			0.2 μF	Cer	25 V	
C23	281-0549-00			68 pF	Cer	500 V	10%
C36	290-0183-00			1 μF	Elect.	35 V	10%
C39	290-0135-00			15 μF	Elect.	20 V	
C69	290-0135-00			15 μF	Elect.	20 V	
C71	290-0394-00			160 μF	Elect.	50 V	10%
C72	290-0394-00			160 μF	Elect.	50 V	10%
C76	290-0135-00			15 μF	Elect.	20 V	
C80	281-0651-00			47 pF	Cer		5%
C96	290-0301-00			10 μF	Elect.	20 V	10%
C99	290-0135-00			15 μF	Elect.	20 V	
				Semiconductor Device, Diodes		
CR11	*152-0107-00			Silicon	Replaceable by 1N647		
CR12	*152-0107-00			Silicon	Replaceable by 1N647		
CR13	*152-0107-00			Silicon	Replaceable by 1N647		
CR14	*152-0107-00			Silicon	Replaceable by 1N647		
VR20	152-0212-00			Zener	1N936 500 mW, 9 V, 5%, TC		
CR26	*152-0185-01			Silicon	Replaceable by 1N4152		
CR27	*152-0185-01			Silicon	Replaceable by 1N4152		
CR35	*152-0075-00			Germanium	Tek Spec		
CR41	*152-0107-00			Silicon	Replaceable by 1N647		
CR42	*152-0107-00			Silicon	Replaceable by 1N647		
CR43	*152-0107-00			Silicon	Replaceable by 1N647		
CR44	*152-0107-00			Silicon	Replaceable by 1N647		
CR56	*152-0185-01			Silicon	Replaceable by 1N4152		
CR71	*152-0107-00			Silicon	Replaceable by 1N647		
CR72	*152-0107-00			Silicon	Replaceable by 1N647		
CR73	*152-0107-00			Silicon	Replaceable by 1N647		
CR74	*152-0107-00			Silicon	Replaceable by 1N647		

POWER SUPPLY Circuit Board Assembly (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Serial/Model No. Disc	Description
				Transistors
Q23	*151-0261-00		Silicon	Dual, Tek Spec
Q29	*151-0134-00		Silicon	Replaceable by 2N2905
Q33	151-0188-00		Silicon	2N3906
Q35	*151-0192-00		Silicon	Replaceable by MPS 6521
Q53	151-0232-00		Silicon	Dual
Q59	151-0188-00		Silicon	2N3906
Q63	151-0188-00		Silicon	2N3906
Q83	151-0232-00		Silicon	Dual
Q89	*151-0103-00		Silicon	Replaceable by 2N2219
Q93	*151-0192-00		Silicon	Replaceable by MPS 6521
				Resistors

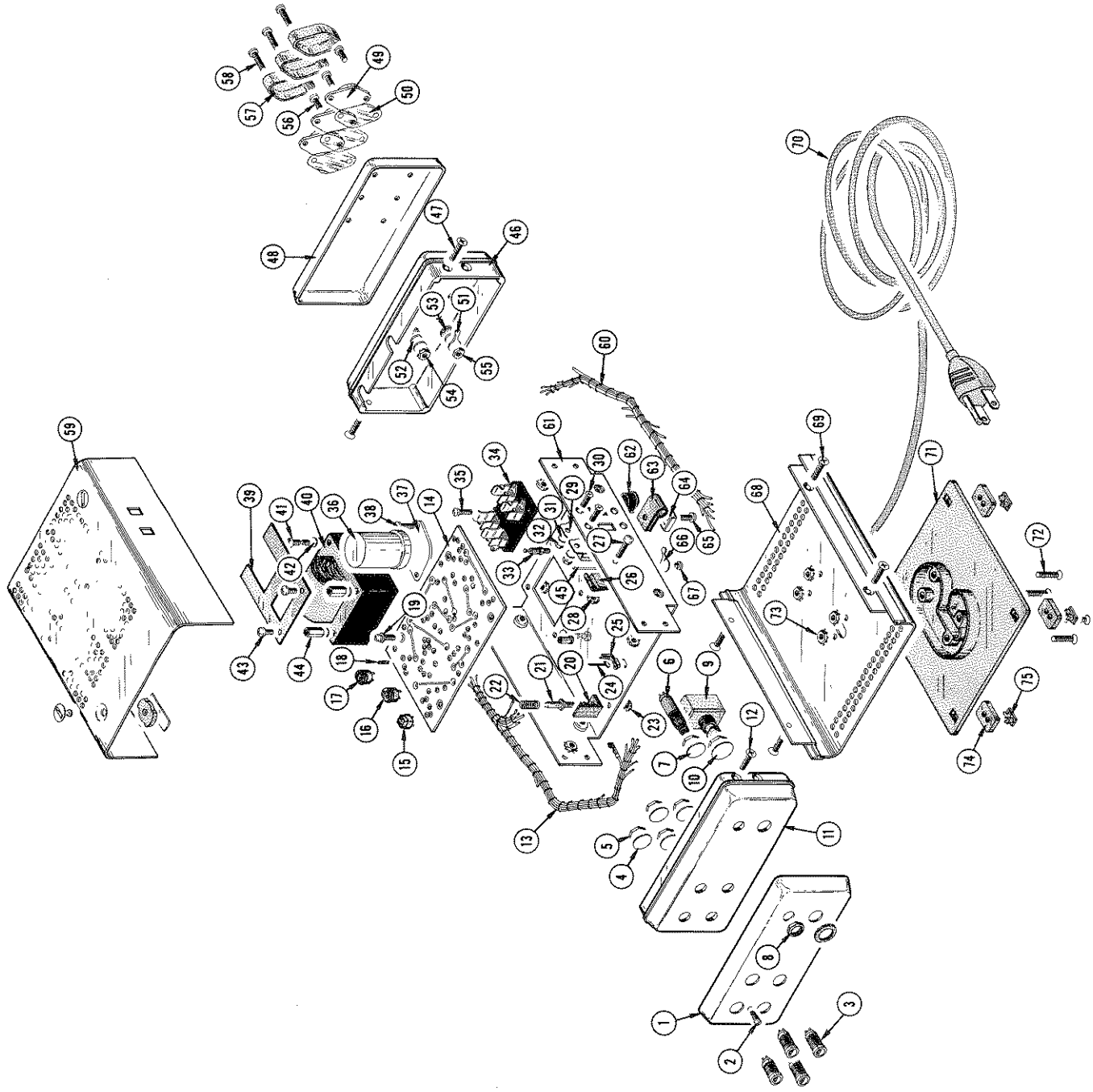
Resistors are fixed composition, ±10% unless otherwise indicated.

R15	321-0163-00	487 Ω	1/8 W	Prec	1%
R16	311-0442-00	250 Ω, Var			
R17	321-0183-00	787 Ω	1/8 W	Prec	1%
R18	315-0201-00	200 Ω	1/4 W		5%
R19	315-0132-00	1.3 kΩ	1/4 W		5%
R20	321-0184-00	806 Ω	1/8 W	Prec	1%
R21	315-0391-00	390 Ω	1/4 W		5%
R22	315-0201-00	200 Ω	1/4 W		5%
R23	315-0752-00	7.5 kΩ	1/4 W		5%
R26	301-0821-00	820 Ω	1/2 W		5%
R27	315-0103-00	10 kΩ	1/4 W		5%
R28	315-0102-00	1 kΩ	1/4 W		5%
R29	315-0102-00	1 kΩ	1/4 W		5%
R31	315-0270-00	27 Ω	1/4 W		5%
RT32	307-0127-00	1 kΩ	Thermal		
R33	315-0131-00	130 Ω	1/4 W		5%
R35	315-0512-00	5.1 kΩ	1/4 W		5%
R36	315-0101-00	100 Ω	1/4 W		5%
R38	308-0459-00	1.1 Ω	3 W	WW	5%
R45	321-0199-06	1.15 kΩ	1/8 W	Prec	1/4 %
R46	321-0225-06	2.15 kΩ	1/8 W	Prec	1/4 %
R49	315-0622-00	6.2 kΩ	1/4 W		5%
R50	321-0822-06	1.76 kΩ	1/8 W	Prec	1/4 %
R51	321-0225-06	2.15 kΩ	1/8 W	Prec	1/4 %
R52	321-0823-01	3.425 kΩ	1/8 W	Prec	1/2 %
R53	315-0153-00	15 kΩ	1/8 W		5%
R56	301-0621-00	620 Ω	1/2 W		5%
R59	315-0102-00	1 kΩ	1/4 W		5%
R65	315-0182-00	1.8 kΩ	1/4 W		5%
R66	315-0121-00	120 Ω	1/4 W		5%

POWER SUPPLY Circuit Board Assembly (cont)

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Serial/Model No. Disc	Description			
				Resistors (cont)			
R68	308-0365-00			1.5 Ω	3 W	WW	5%
F75	322-0210-00			1.5 kΩ	1/4 W	Prec	1%
R76	322-0210-00			1.5 kΩ	1/4 W	Prec	5%
R79	315-0242-00			2.4 kΩ	1/4 W		5%
R80	317-0751-00			750 Ω	1/8 W		5%
R83	315-0472-00			4.7 kΩ	1/4 W		5%
R89	315-0331-00			330 Ω	1/4 W		5%
R95	317-0472-00			4.7 kΩ	1/8 W		5%
R96	317-0121-00			120 Ω	1/4 W		5%
R98	308-0365-00			1.5 Ω	3 W	WW	5%

FIGURE 1 EXPLODED



SECTION 7
MECHANICAL PARTS LIST

FIGURE 1 EXPLODED

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Serial/Model No. Disc	Qty 1 2 3 4 5	Description
1-1	333-1223-01			1	PANEL, front
	- - - - - -			-	mounting hardware: (not included w/panel)
-2	211-0079-00			1	SCREW, 2-56 x 3/16 inch, PHS
-3	131-0771-00			4	CONNECTOR, receptacle, electrical, 4 contact
	- - - - - -			-	mounting hardware for each: (not included w/connector)
-4	210-0012-00			1	WASHER, lock, internal, 3/8 ID x 1/2 inch OD
-5	220-0551-00			1	NUT, hex., 9 mm threads
-6	136-0164-00			1	SOCKET, lamp
	- - - - - -			-	mounting hardware: (not included w/socket)
-7	210-0012-00			1	WASHER, lock, internal, 3/8 ID x 1/2 inch OD
-8	220-0480-02			1	NUT, dodecagon
-9	260-1113-00			1	SWITCH, lever—POWER
	- - - - - -			-	mounting hardware: (not included w/switch)
-10	210-0021-00			1	WASHER, lock, shakeproof
-11	386-1597-03			1	SUBPANEL, front
	- - - - - -			-	subpanel includes:
	354-0329-00			1	RING, ornamental
	- - - - - -			-	mounting hardware: (not included w/subpanel)
	210-0457-00			4	NUT, keps, 6-32 x 5/16 inch
-12	211-0559-00			4	SCREW, 6-32 x 3/8 inch, 100° csk, FHS
-13	179-1421-00			1	WIRING HARNESS, power
	- - - - - -			-	wiring harness includes:
	131-0512-00			22	CONNECTOR, terminal
-14	670-0312-00			1	ASSEMBLY, circuit board—1101 POWER SUPPLY
	- - - - - -			-	assembly includes:
	388-1329-00			1	BOARD, circuit
-15	136-0220-00			5	SOCKET, transistor, 3 pin, square shape
-16	136-0183-00			2	SOCKET, transistor, 3 pin
-17	136-0235-00			3	SOCKET, transistor, 6 pin
-18	136-0263-01			22	SOCKET, pin terminal
	- - - - - -			-	mounting hardware: (not included w/assembly)
-19	211-0116-00			1	SCREW, sems, 4-40 x 5/16 inch, PHB
-20	344-0147-00			3	CLIP, circuit board, angle shape, plastic
	- - - - - -			-	mounting hardware for each: (not included w/clip)
-21	214-0967-00			1	PIN, guide, 1.035 inches long
-22	214-0966-00			1	SPRING, helical, compression
-23	210-0586-00			1	NUT, keps, 4-40 x 1/4 inch

FIGURE 1 EXPLODED (cont)

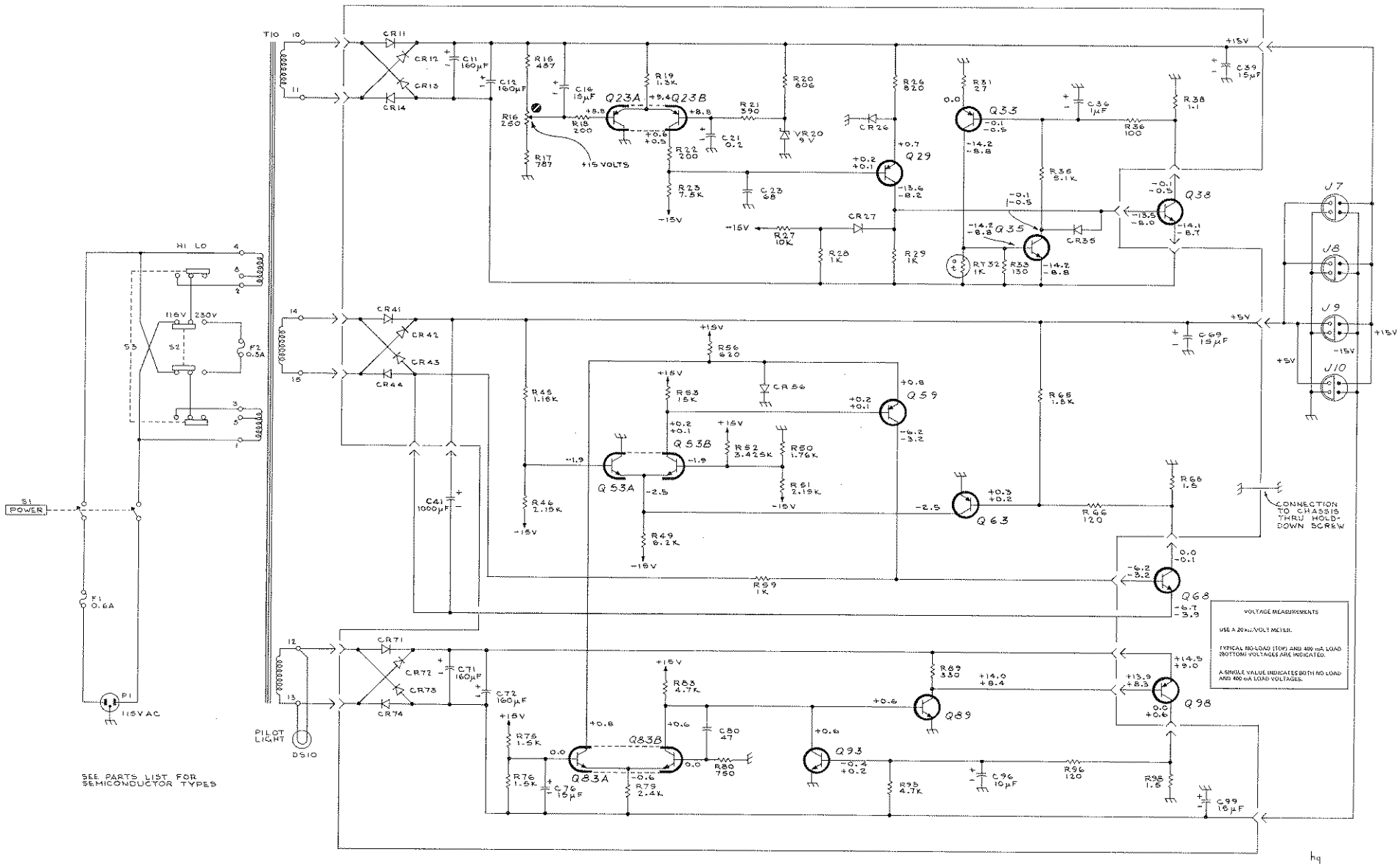
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Qty	1 2 3 4 5	Description
1-24	131-0513-00			22		TERMINAL, feed thru, 0.83 inch long
-25	358-0329-00			22		BUSHING, feed thru terminal, plastic
-26	343-0081-00			1		CLAMP, cable, black plastic
	- - - - - -			-		mounting hardware: (not included w/clamp)
-27	211-0504-00			1		SCREW, 6-32 x 1/4 inch, PHS
-28	210-0457-00			1		NUT, keps, 6-32 x 5/16 inch
-29	260-0675-00			2		SWITCH, slide
	- - - - - -			-		mounting hardware for each: (not included w/switch)
-30	211-0101-00			2		SCREW, 4-40 x 1/4 inch, 100° csk, FHS
-31	210-0054-00			2		WASHER, split, #4
-32	210-0406-00			2		NUT, hex., 4-40 x 3/16 inch
-33	131-0373-00			1		CONNECTOR, stand-off, insulated
	- - - - - -			-		mounting hardware: (not included w/connector)
	210-0001-00			1		WASHER, lock, internal, #2
	210-0405-00			1		NUT, hex., 2-56 x 3/16 inch
-34	352-0025-00			1		HOLDER, fuse, dual
	- - - - - -			-		mounting hardware: (not included w/holder)
-35	211-0510-00			2		SCREW, 6-32 x 3/8 inch, PHS
	210-0457-00			2		NUT, keps, 6-32 x 5/16 inch
-36	- - - - - -			1		CAPACITOR
	- - - - - -			-		mounting hardware: (not included w/capacitor)
-37	386-0252-00			1		PLATE, fiber, small
-38	211-0507-00			2		SCREW, 6-32 x 5/16 inch, PHS
	210-0457-00			2		NUT, keps, 6-32 x 5/16 inch
-39	337-1261-00			1		SHIELD, transformer
-40	- - - - - -			1		TRANSFORMER
	- - - - - -			-		mounting hardwware: (not included w/transformer)
-41	211-0552-00			4		SCREW, 6-32 x 2 inches, PHS
-42	210-0823-00			4		WASHER, fiber, 1/8 ID x 1/4 inch OD
-43	211-0503-00			2		SCREW, 6-32 x 3/16 inch, PHS
-44	385-0080-00			2		ROD, hex., 1/4 x 7/16 inch
	210-0055-00			2		WASHER, split, #6
-45	337-1036-00			2		SHIELD, solder, switch
-46	386-1597-06			1		SUBPANEL, rear
	- - - - - -			-		subpanel includes:
	354-0329-00			1		RING, ornamental
	- - - - - -			-		mounting hardware: (not included w/subpanel)
-47	211-0559-00			3		SCREW, 6-32 x 3/8 inch, 100° csk, FHS
	210-0457-00			3		NUT, keps, 6-32 x 5/16 inch

FIGURE 1 EXPLODED (cont)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Qty 1 2 3 4 5	Description
1-48	333-1222-01			1	PANEL, rear
-49	- - - - - -			3	TRANSISTOR
	- - - - - -			-	mounting hardware for each: (not included w/transistor)
-50	386-0143-00			1	PLATE, mica, insulator
-51	210-0202-00			1	LUG, solder, SE #6
-52	210-0802-00			2	WASHER, flat, 6S x 5/16 inch
-53	210-0811-00			2	WASHER, fiber, shouldered
-54	210-0457-00			1	NUT, keps, 6-32 x 5/16 inch
-55	210-0407-00			1	NUT, hex., 6-32 x 1/4 inch
-56	211-0511-00			1	SCREW, 6-32 x 1/2 inch, PHS
-57	200-0669-00			1	COVER, transistor insulating
-58	211-0513-00			1	SCREW, 6-32 x 5/8 inch, PHS
-59	390-0109-00			1	CABINET, top
	- - - - - -			-	cabinet includes:
	214-0603-01			2	PIN, securing
	214-0604-00			2	SPRING, latch
	386-0227-00			2	PLATE, latch, plastic
	386-1151-00			2	PLATE, latch locking
-60	179-1420-00			1	WIRING HARNESS, AC
-61	441-0889-00			1	CHASSIS, power supply
-62	348-0063-00			1	GROMMET, 1/2 inch diameter, plastic
-63	343-0136-00			1	CLAMP, cable, 1/4 inch, plastic
	- - - - - -			-	mounting hardware: (not included w/clamp)
-64	210-0863-00			1	WASHER, D shape, #10
-65	211-0507-00			1	SCREW, 6-32 x 5/16 inch, PHS
-66	210-0201-00			1	LUG, solder, SE #4
	- - - - - -			-	mounting hardware: (not included w/lug)
-67	213-0088-00			1	SCREW, thread forming, #4 x 1/4 inch
-68	390-0110-00			1	CABINET, bottom
	- - - - - -			-	mounting hardware: (not included w/cabinet)
-69	211-0541-00			4	SCREW, 6-32 x 1/4 inch, 100° csk, FHS
-70	161-0038-01			1	CABLE ASSEMBLY, power
-71	432-0065-00			1	BASE, power supply
	- - - - - -			-	mounting hardware: (not included w/base)
-72	211-0522-00			4	SCREW, 6-32 x 5/8 inch, 100° csk, FHS
-73	210-0457-00			4	NUT, keps, 6-32 x 5/16 inch
-74	348-0202-00			4	FOOT, cabinet, rubber
	- - - - - -			-	mounting hardware for each: (not included w/foot)
-75	386-1618-00			1	PLATE, retaining, cabinet foot

STANDARD ACCESSORIES

	103-0013-00			1	ADAPTER, 2 to 3 wire (not shown)
	070-0949-00			2	MANUAL, instruction (not shown)



TYPE 1101 Ⓐ PROBE POWER SUPPLY

hq
1069