INSTRUCTION MANUAL

ACCESSORY POWER SUPPLY

015-0073-00

Tektronix, Inc. ● S.W. Millikan Way ● P. O. Box 500 ● Beaverton, Oregon ● Phone MI 4-0161 ● Cables: Tektronix

WARRANTY

All Tektronix instruments are warranted against defective materials and workmanship for one year. Tektronix transformers, manufactured in our own plant, are warranted for the life of the instrument.

Any questions with respect to the warranty mentioned above should be taken up with your Tektronix Field Engineer.

Tektronix repair and replacement-part service is geared directly to the field, therefore all requests for repairs and replacement parts should be directed to the Tektronix Field Office or representative in your area. This procedure will assure you the fastest possible service. Please include the instrument Type and Serial or Model Number with all requests for parts or service.

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ACCESSORY
POWER SUPPLY
TEKTRONIX PART NO. 015-0073-00

Fig. 1. Tektronix 015-0073-00 Accessory Power Supply.

CHARACTERISTICS

General Information

The Accessory Power Supply is a compact voltage supply that provides two regulated voltage outputs of +12.5 and —12.5 volts DC.

ELECTRICAL CHARACTERISTICS.

Characteristic	Performance Requirement	Supplemental Information
+12.5-Volt Output	+12.5 VDC ±5% (+11.87 volts to +13.13 volts)	150 mA load current
—12.5-Volt Output	—12.5 VDC ±5% (—11.87 volts to —13.13 volts)	150 mA load current
Ripple	1.0 mV or less at each output from high line to low line	At 150 mA load current on each supply after ripple adjustment is set at normal line voltage

POWER SOURCE REQUIREMENTS

Characteristic	AC RMS Operating Range	Supplemental Information
Normal Line:		
115 VAC Nominal	103 volts to 127 volts	Normally wired at the factory for this voltage unless directed otherwise
230 VAC Nominal	206 volts to 254 volts	Connections within the power supply must be changed for use with 230-volt nominal line voltage and for high and low line voltages.
Low Line:		
104 VAC Nominal	93 volts to 114 volts	
208 VAC Nominal	186 volts to 254 volts	
High Line:		
127 VAC Nominal	114 volts to 140 volts	
254 VAC Nominal	228 volts to 280 volts	
Line Frequency	50 to 60 Hz	
Power Consumption		14 watts maximum.

ENVIROMENTAL CHARACTERISTICS

Characteristic	Requirement
Temperature	
Operating	Performs within specifications over a range of 0°C to +50°C.
Non-operating	−40°C to +65°C
Altitude	
Operating	Performs within specifications up to 15,000 feet.
Non-operating	50,000 feet maximum
Vibration	
Operating	Performs within specifications after being vibrated for 15 minutes along each axis at a total displacement of 0.015 inch (at 1.9 g max.) with frequencies from 10 to 50 Hz in 1-minute cycles. Held at any resonant point for 3 minutes.
Transportation	
Non-operating	Meets National Safe Transit Test requirements. Package vibration test—One hour at 1 g. Package drop test—30-inch drops on one corner, all edges radiating from that corner and all flat surfaces (total of 10 drops).

MECHANICAL CHARACTERISTICS

Characteristic	Information
Construction	
Chassis	Aluminum alloy
Case	Gray Polyvinyl plastic
Circuit boards	Glass-epoxy laminate
Dimensions	
Height	2-1/2 inches
Width	2-1/2 inches
Depth	2-5/8 inches
Connectors	
Power Output	Keyed 3-terminal female snap-lock type with grounded shield.
AC Power Input	3-terminal male connector on rear plate.

OPERATING INSTRUCTIONS

Power Supply Wiring Connections

The power transformer of the 015-0073-00 Accessory Power Supply can be wired for operation from either a 115-volt or a 230-volt nominal line voltage source. It may also be wired for any one of three regulating ranges—low, normal or high line. Fig. 2 shows the proper power transformer connections for use on the various line voltages.

Connecting to the Load

The power output connector from the Accessory Power Supply is a keyed 3-terminal snap-lock connector with a grounded shield. To connect the Power Supply output to a mating connector, press the two connectors lightly together and rotate them with respect to each other until the key in each connector slides into the slot of the other and the terminals in one connector line up with the receptacles in the other. Press the two connectors firmly together until they are completely engaged.

CAUTION

Forcing the two connectors together when they are not properly aligned may damage the connectors.

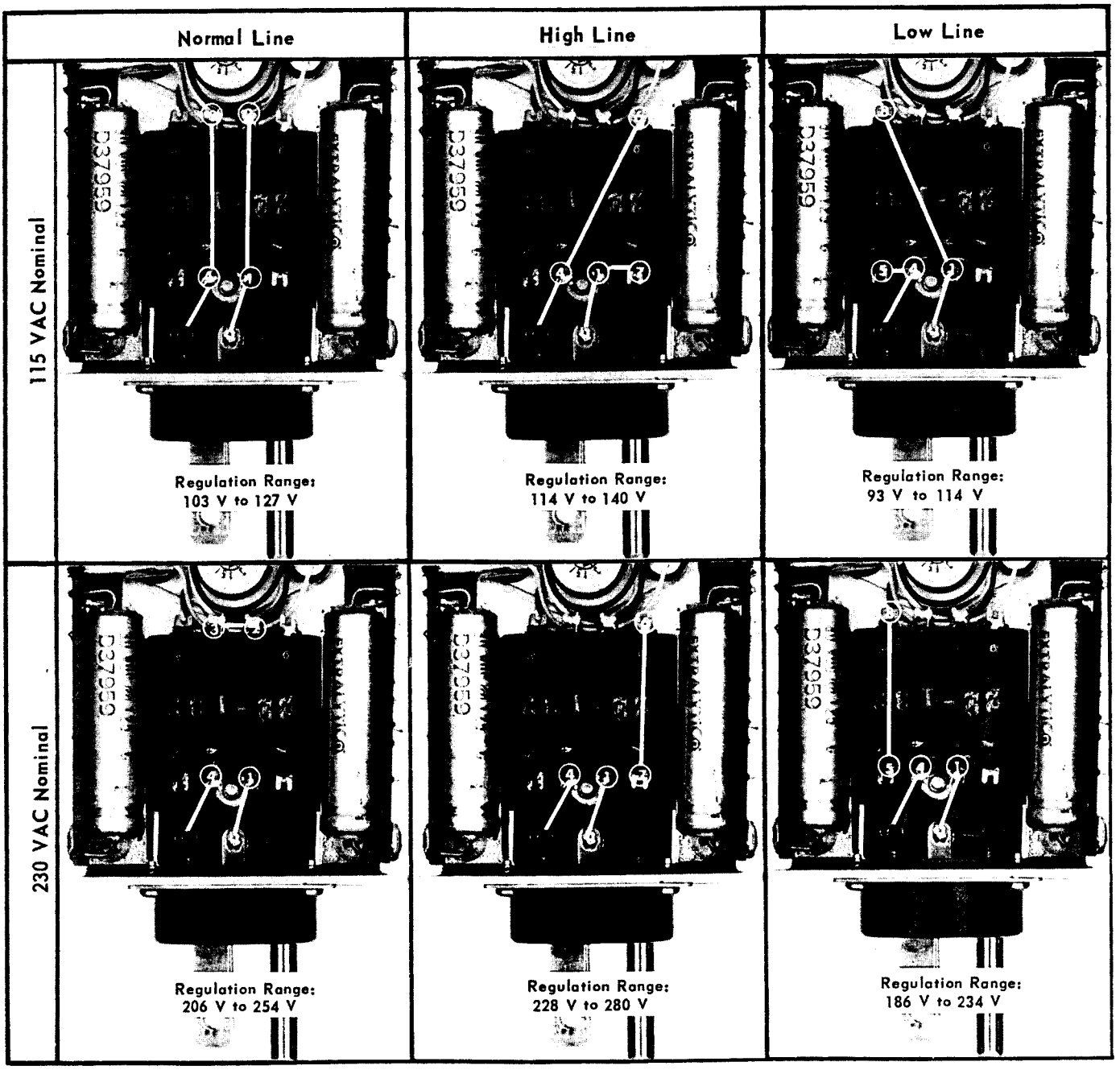


Fig. 2. Power Transformer connections for use on various line voltages.

To disconnect the Power Supply from its load, merely pull the two connectors apart. The snap-type lock will release when sufficient pull is applied.

Ripple Null Adjustment

The regulated power supplies of the unit provide outputs that have very little ripple component with the DC output voltage (see ripple characteristics in the Characteristics section). However, a ripple adjustment in the +12.5-volt supply can be adjusted to further reduce ripple on the supplies if the power line voltage to be used is not close to the design-center voltage for which the unit is wired. To adjust R110 RIPPLE NULL, monitor the +12.5-volt power supply ripple with a test oscilloscope (AC coupled) as described in the Performance Check. With the Accessory Power supply connected directly to the power line to be used, adjust R110 (see Fig. 5) for minimum ripple in the test oscilloscope display.

NOTE

If R110 is adjusted for a line voltage that differs greatly from the design-center voltage for which the unit is wired, it may need to be readjusted for

proper operation if the line voltage is changed in the opposite direction from the design-center voltage.

CIRCUIT DESCRIPTION

General

The Accessory Power Supply provides two regulated DC output voltages of +12.5 volts and —12.5 volts, both referenced to chassis ground. Electronic regulation is used to provide stable, low-ripple output voltages.

Power Input

Power for the supply is furnished by a single power transformer, T100. The primary has two equal windings which are connected in parallel for 115-volt operation or may be connected in series for 230-volt operation. Each half of the primary has taps above and below the 115-volt (or 230-volt) nominal point. When the input power is wired to these taps, the effective number of turns on the primary is increased or decreased to allow correct regulation on higher or lower than normal line voltages.

+12.5-Volt Supply

The output from one secondary of T100 is rectified by bridge rectifier D102A-D and filtered by C102-C103. This voltage is applied to the +12.5-volt Series Regulator which provides a stable output voltage. The Series Regulator, Q117, can be compared to a variable resistance which is electronically adjusted to control the output current. Current through the Series Regulator stage is controlled by Error Amplifier Q114 and Ripple Amplifier Q104 to provide the correct regulated output voltage.

Reference voltage for the output of this supply is provided by voltage divider R116-R117 connected between the supply output and ground. The reference voltage for the Error Amplifier (Q114) is provided by zener diode D112 at the emitter of Q114. The feedback voltage from divider R116-R117 is applied to the base of Q114 where it is compared to the voltage (approximately +7.5 volts) at the emitter, setting the current through the transistor. The normal feedback voltage of approximately +8 volts from R116-R117 sets the output level of the supply at +12.5 volts. (Zener diode D112 is selected so that the output voltage is correct.)

The output voltage is regulated to provide a constant voltage to the load by feeding a sample of the output back to the Series Regulator, Q117. For example, assume that the output voltage increases because of a decrease in load or an increase in line voltage. The positive-going voltage level at the output is applied across voltage divider R116-R117 and is felt at the base of Q114 as a positive-going error signal. This signal is amplified and inverted by Q114 and applied to the base of Q113. Bias is reduced on Q113, decreasing current through Series Regulator Q117 and through the output load. As current is reduced through the load, the output voltage decreases to normal.

Ripple on the output voltage is nulled in a similar manner by Ripple Amplifier Q104. Ripple on the rectified voltage from D102 is amplified and inverted by Q104 and applied to the base of Q113. The amplitude of this inverted signal is adjusted by the RIPPLE NULL control, R110, which sets the gain of the Ripple Amplifier.

—12.5-Volt Supply

Rectified voltage for operation of the —12.5-volt supply is provided by bridge rectifier D122A-D. This voltage is filtered by C122-C123 and connected to the —12.5-volt Series Regulator Q137 and Error Amplifier Q134. Series Regulator Q137 can again be compared to a variable resistance which is electronically adjusted to control its output current. The current through Q137 is controlled by Error Amplifier Q134 to provide the correct regulated output voltage.

Reference voltages for this supply are provided by voltage divider R136-R137 and zener diode D132. Operation of the Error Amplifier is similar to that of the +12.5 volt supply.

Regulation of the output voltage is controlled by the —12.5-volt Series Regulator stage in a manner similar to that described for the +12.5-Volt Supply. If the output voltage tends to change, the voltage at the base of Q134 will change a proportional amount. Any change at this base is amplified and applied to the base of Q133 which, in turn, determines the base voltage of Q137. The resulting bias change on Q137 will cause current through Q137 to change in the direction that will bring the output voltage back to —12.5 volts. Since the emitter of Q137 is connected to ground, the current change through the transistor is applied through rectifier D122 to the output of the supply. Output changes due to ripple are also compensated in this manner by the Series Regulator and Error Amplifier stages.

MAINTENANCE

Introduction

This section of the manual contains information for use in preventive maintenance, corrective maintenance and troubleshooting procedures for the Accessory Power Supply.

PREVENTIVE MAINTENANCE

Preventive maintenance consists primarily of cleaning and visual inspection. The severity of the environment to which the Power Supply is subjected will determine the frequency of maintenance required.

Case Removal

The case of the power supply can be easily removed for access to the circuitry for cleaning or troubleshooting. The line power should be disconnected from the unit whenever the case is to be removed. To remove the case, unscrew the two Phillips-head screws from the front end of the unit and slide the case off over the output cable.

If the unit is to be operated with the case removed, it should be set on a insulated surface such as a rubber mat. For normal operation, the case should be left on the unit to keep out dust and to prevent the supply voltages from coming in contact with personnel or conducting surfaces.

Cleaning

The Power Supply should be cleaned as often as operating conditions require. Loose dirt accumulated on the outside

may be removed by wiping with a dry soft cloth. If any dirt remains, it can be removed with a cloth dampened in a solution of mild detergent and water.

Normally, the interior of the instrument will not require cleaning unless the cover has been left off for an extended period of time. Any cleaning on the inside of the unit should be done with a cotton-tipped applicator dampened with a solution of mild detergent in water. After cleaning the interior, allow it to dry thoroughly before applying power to the unit.

CAUTION

Do not clean any plastic materials with organic cleaning solvents such as benzene or acetone. These compounds may damage the plastics.

Visual Inspection

The Power Supply should be inspected occasionally for possible defects such as damaged parts. The procedures for correcting most visible defects are obvious, but particular care should be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument. It is therefore important that the cause of the overheating be found and corrected to prevent a recurrence of the damage.

Transistor Checks

The transistors in the Power Supply should not be checked during periodic servicing of the instrument. The best determination of performance is the actual operation of the component in the circuit. However, if a circuit malfunction occurs, the transistors should be checked as part of the troubleshooting procedure, as described later in this section of the manual.

CORRECTIVE MAINTENANCE

Corrective maintenance generally consists of component replacement and instrument repair. The following paragraphs provide information that may be helpful if parts have to be replaced in the Accessory Power Supply.

Replacement Parts

Replacements for all electrical and mechanical parts used in the Power Supply can be obtained through your local Tektronix field office or representative. Some of the standard electronic components can be obtained more quickly, however, by purchasing them locally. Before ordering or purchasing any replacements parts, refer to the Parts List in this manual for the required characteristics and correct description.

In addition to the standard electronic components, many special parts and components are used in the Power Supply. These parts are manufactured by or for Tektronix or are selected to meet specific requirements. Each of the special electrical components is indicated by an asterisk preceding the part number in the Electrical Parts List. In addition, most of the mechanical parts used in the probe are manufactured by Tektronix and are not available from other sources. Order all special parts directly from your Tektronix field office or representative.

When ordering parts from Tektronix, always include the following information:

1. The instrument type (015-0073-00 Accessory Power Supply).

2. A complete description of the part as given in the Electrical or Mechanical Parts List. (For an electrical part, also give the circuit number of the component, such as Q117).

The circuit boards in the Power Supply can be ordered either with or without circuit components wired in place. The Tektronix part numbers of the boards are given in the Mechanical Parts List. To obtain a replacement board with the components soldered in place, be sure to order the replacement board assembly.

Soldering

CAUTION

Always disconnect the line power from the power supply before soldering components or leads in the circuitry.

The components mounted on the circuit boards in the Power Supply can be replaced using normal circuit board soldering techniques. Keep the following points in mind when soldering to a circuit board.

1. Use a pencil-type soldering iron with a power rating of from 15 to 50 watts.

2. Apply heat from the soldering iron quickly to the junction between the component and the circuit board.

3. Heat-shunt the leads of the component by means of a pair of long-nosed pliers.

4. Avoid excessive heating of the junction with the circuit board, as this could separate the circuit board wiring from the laminate.

5. Use ordinary 60-40 electronic grade tin-lead solder.

6. Clip off any excess lead length extending beyond the circuit board and clean off any residual flux with a flux-removing solvent. Be careful that the solvent does not remove any printing from the circuit board.

Replacement Procedures

Circuit Boards. To remove either circuit board from the Power Supply, first remove the case as described previously and take out the two screws that fasten the board to the rear plate. The board may then be removed by disconnecting all the wires from the square-pin terminals on the circuit board. When installing the replacement board, use the wiring color code given in Fig. 3 as a guide to connect the wires to the correct square-pin terminals on the board.

Transistors. Since each transistor has its own individual operating characteristics, a transistor should not be replaced unless it is actually defective. Any replacement transistors should be of the original or equivalent type and should be mounted in the same manner as the original transistor. It is necessary to unscrew the particular circuit board in order to gain access to the transistors in either voltage supply.

For a socket-mounted transistor, bend the leads to fit the socket correctly and cut the leads off to a length of approxi-$\frac{1}{4}$ inch (6 mm). Since transistor lead wiring is no longer consistently the same, the lead configuration of the replacement transistor must be known. All of the transistor connections and

sockets in the Power Supply are wired for the standard collector-base-emitter configuration. If the leads of the replacement transistor are not arranged in this sequence, they must be bent into this configuration before being installed in the Power Supply circuitry.

After any transistor has been replaced, the operation of the particular circuit should be checked.

The chassis-mounted power transistors in this instrument use silicone grease to aid in the dissipation of heat. When replacing either of these transistors, apply silicone grease to both sides of the insulating mica washer.

WARNING

Silicone grease should be handled with care and should be kept out of the eyes. Wash your hands throughly after using it.

Fuse. The power-line fuse is located inside the unit near the rear plate. Remove the instrument case for access to the fuse. For 115-volt operation a $\frac{1}{8}$-A fuse is used; for 230-volt operation, a $\frac{1}{16}$-A fuse is used.

CAUTION

Use only the correct value replacement fuse. A larger value will not provide adequate protection

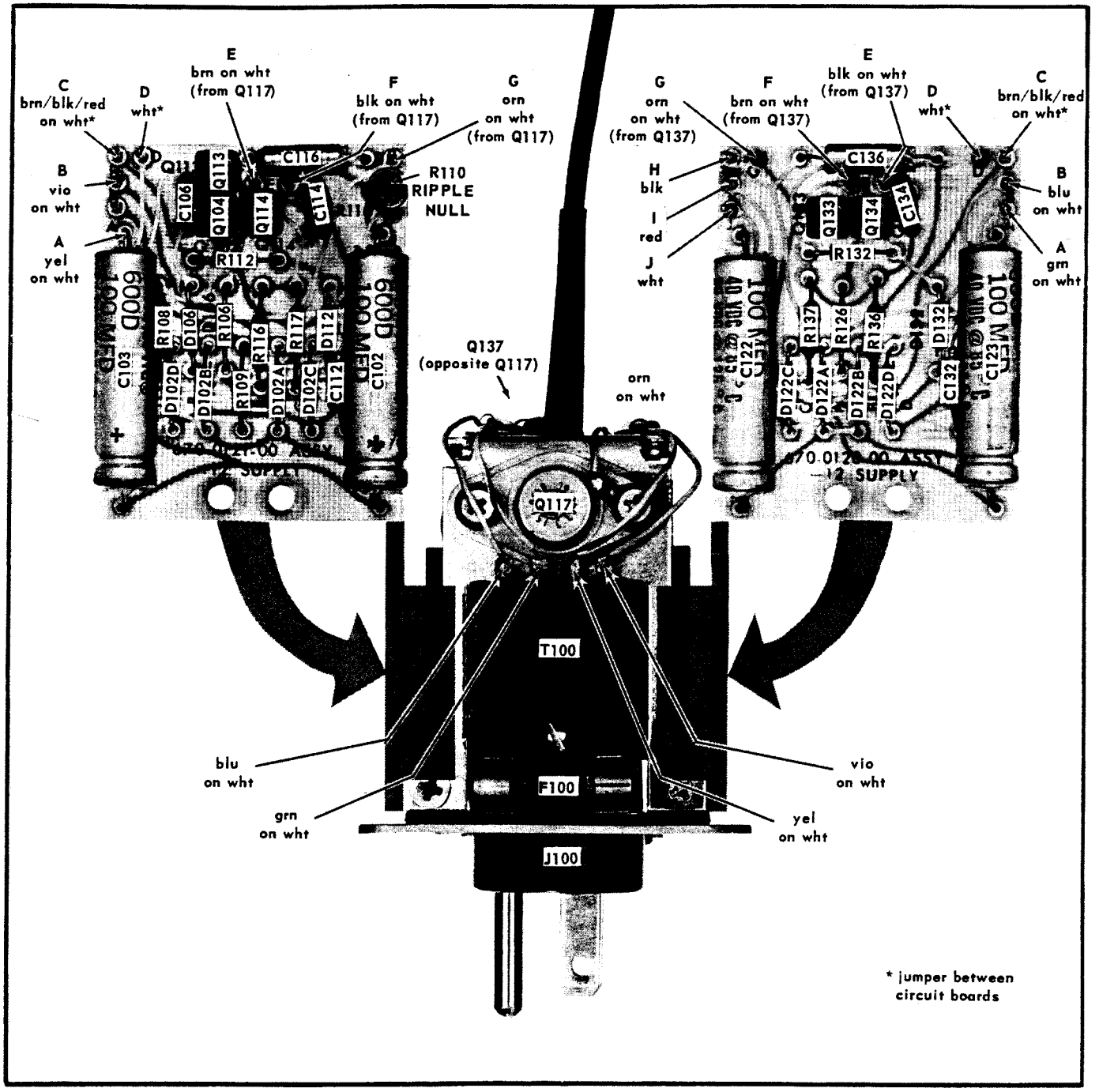


Fig. 3. Component locations and wiring color code on circuit boards and chassis, and board locations as viewed from bottom (fuse side) of chassis.

for the instrument; a smaller value will tend to blow out.

TROUBLESHOOTING

The following information is provided to aid in locating and correcting trouble in the Power Supply. Information found in the Circuit Description and on the circuit diagram may also be helpful when attempting to troubleshoot the instrument.

Troubleshooting Aids

Diagram. The circuit diagram of the Power Supply is given at the rear of this manual. Circuit numbers and electrical values of the components are shown on the diagram. Portions of the circuitry that are mounted on circuit boards are outlined in dashed lines.

Circuit Board Illustrations. Most of the electrical components in the Power Supply are mounted on circuit boards. To aid in locating components and identifying supply leads on the circuit boards, Fig. 3 shows the physical locations of all components mounted on the boards and the color code of the connecting wires. The square-pin terminals used for connecting to the circuit boards provide convenient test points for troubleshooting. Test points can also be located where the components are soldered to the boards.

General Troubleshooting

Table 1 relates certain specific trouble symptoms to their probable causes. This table should be used primarily as a guide for troubleshooting, as it does not include all possible troubles that might occur, nor all possible causes for the given symptoms.

TABLE 1

Malfunction Checks

Symptom	Possible Cause	Check
Unit overheats	Wired for low line; operated on high line.	Transformer wired correctly for power line voltage.
	Excessive load on Power Supply outputs.	Output current on each supply does not exceed 150 mA. (Check by disconnecting output lead from circuit board and connecting ammeter in series).
Ripple evident in unit being powered by Power Supply.	Wired for high line; operated on low line.	Transformer wired correctly for power line voltage.
	RIPPLE NULL (R110) misadjusted.	RIPPLE NULL adjustment set correctly for power line voltage.
Incorrect operation of unit being powered by Power Supply.	Incorrect output voltage or voltages.	Supply output voltages and ripple (see Performance Check). If output voltages are incorrect, check other voltages as given on schematic.

The following procedure is suggested for isolation of an apparent malfunction in the Power Supply.

Check Associated Equipment. Verify that the apparent trouble is actually a malfunction of the Power Supply. Check that the voltages from the Power Supply are correct and ripple is not abnormal.

Check Voltages. If the apparent trouble can be isolated to the Power Supply, check through the circuitry for the correct operating voltages as given on the schematic diagram. The circuit boards may be unscrewed and operated in an extended position. If both boards are to be extended at the same time, it may be convenient to make some square-pin extension wires so that the boards can be separated from the chassis.

Check Circuit Visually. After isolating the trouble to a particular part of the circuit, check for damaged parts or connections. A visual inspection may indicate the source of trouble.

Check Semiconductors. A junction diode can be checked for an open or shorted condition by making an ohmmeter check between terminals after unsoldering one end of the component. NPN or PNP transistors can also be checked for open or shorted conditions by treating them as separate diode junctions. Use a resistance scale with an internal voltage source between 800 mV and 3 volts. The resistance should be very high in one direction and very low in the other.

CAUTION

An ohmmeter scale outside of the indicated range (800 mV to 3 volts) will give an incorrect reading and may damage the component.

Check Passive Components. A passive component such as a resistor or capacitor can be checked with an appropriate meter after unsoldering one end of the component to eliminate the effect of the surrounding circuitry.

PERFORMANCE CHECK

Introduction

A complete performance check of the Accessory Power Supply is given in this section. This procedure checks the operation of the instrument to the requirements in the Characteristics section.

Recommended Equipment

The following equipment is recommended for a complete performance check. Specifications given are the minimum necessary to perform this procedure. All equipment is assumed to be calibrated and operating within the given specifications. If equipment is substituted, it must meet or exceed the specifications of the recommended equipment.

1. Test Oscilloscope. Minimum deflection factor 1 mV/cm; sweep rate 5 ms/cm. Tektronix Type 530- or 540- Series oscilloscope with a Type W Plug-In unit recommended.

2. Dummy test load for loading the Power Supply outputs. The dummy load should be designed to draw 150 mA from each supply. This is equivalent to an 80-ohm 2-watt resistor connected from each supply to ground. See Fig. 4 for the required connections. An instrument such as the P6045 Probe that is compatible with the Accessory Power Supply may be substituted but will not completely check the Power Supply according to the 150-mA specification.

3. 1X probe with BNC connector. Tektronix P6028 Probe recommended. Tektronix Part No. 010-0074-00.

4. Variable Autotransformer. Minimum requirements: output voltage variable from 103 volts to 127 volts AC RMS for 115-volt operation or from 206 volts to 254 volts AC RMS for 230-volt operation. If a monitor voltmeter is not included, a separate AC voltmeter is required with an accuracy within 3% over the required range.

5. Three-conductor power cord. Tektronix part number 161-0025-00.

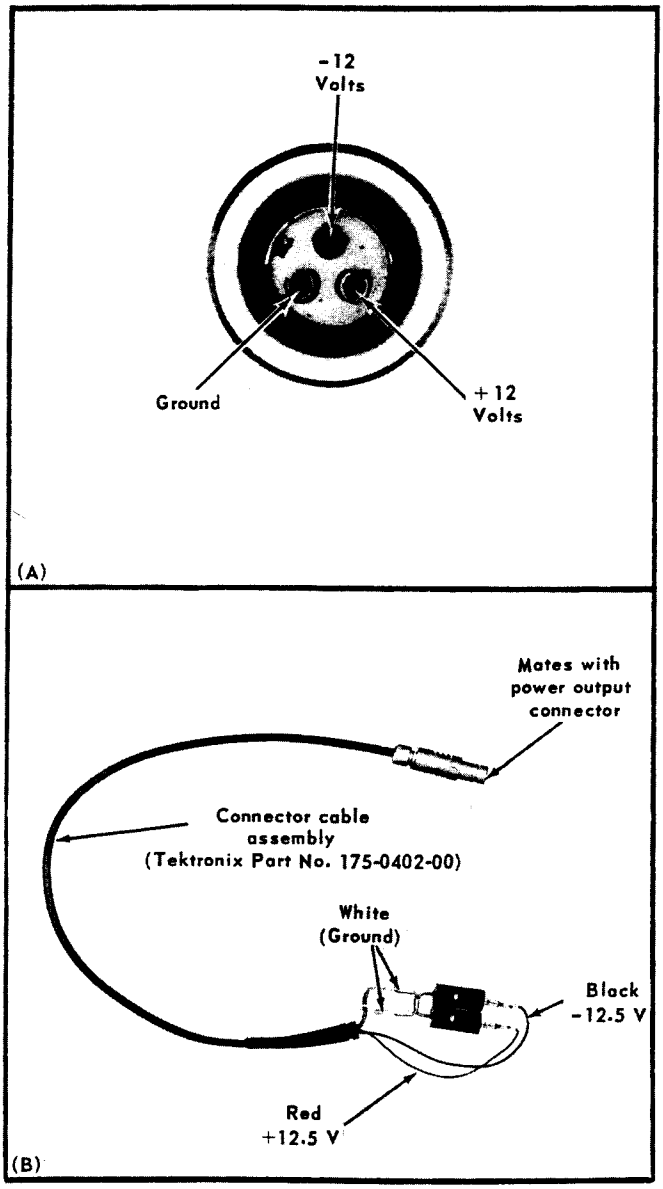


Fig. 4. Power output connector of Accessory Power Supply and suggested 150 mA test load.

PERFORMANCE CHECK PROCEDURE

General

In the following procedure, test equipment connections or control settings should not be changed except as noted. If only a partial check is performed, refer to the preceding steps of the procedure for setup information.

The following procedure uses the equipment listed under Recommended Equipment. If substitute equipment is used, connections or control settings may be altered to meet the requirements of the equipment used.

WARNING

Power should be disconnected whenever handling the Power Supply with the case removed. All voltages are exposed, which may result in a severe shock. Power may be disconnected easily by removing the power cord from the autotransformer output connector.

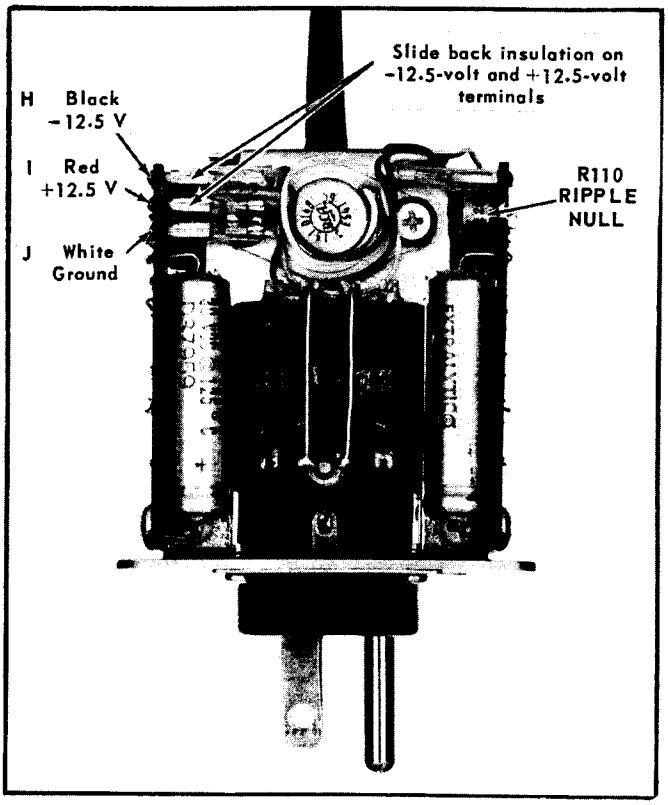


Fig. 5. Location of R110 RIPPLE NULL and test points to be used for +12.5 V and —12.5 V supplies if a small instrument is the power supply load. (See Fig. 7 if a dummy load is to be used.)

Preliminary Procedure

1. Remove the case from the Accessory Power Supply and set the Power Supply on an insulated surface.

2. If a small instrument (e.g., P6045 Probe) is to be used as the load, slide the insulation on connectors H (—12.5 volts) and I (+12.5 volts) approximately 1/8 inch back from the circuit board (see Fig. 5).

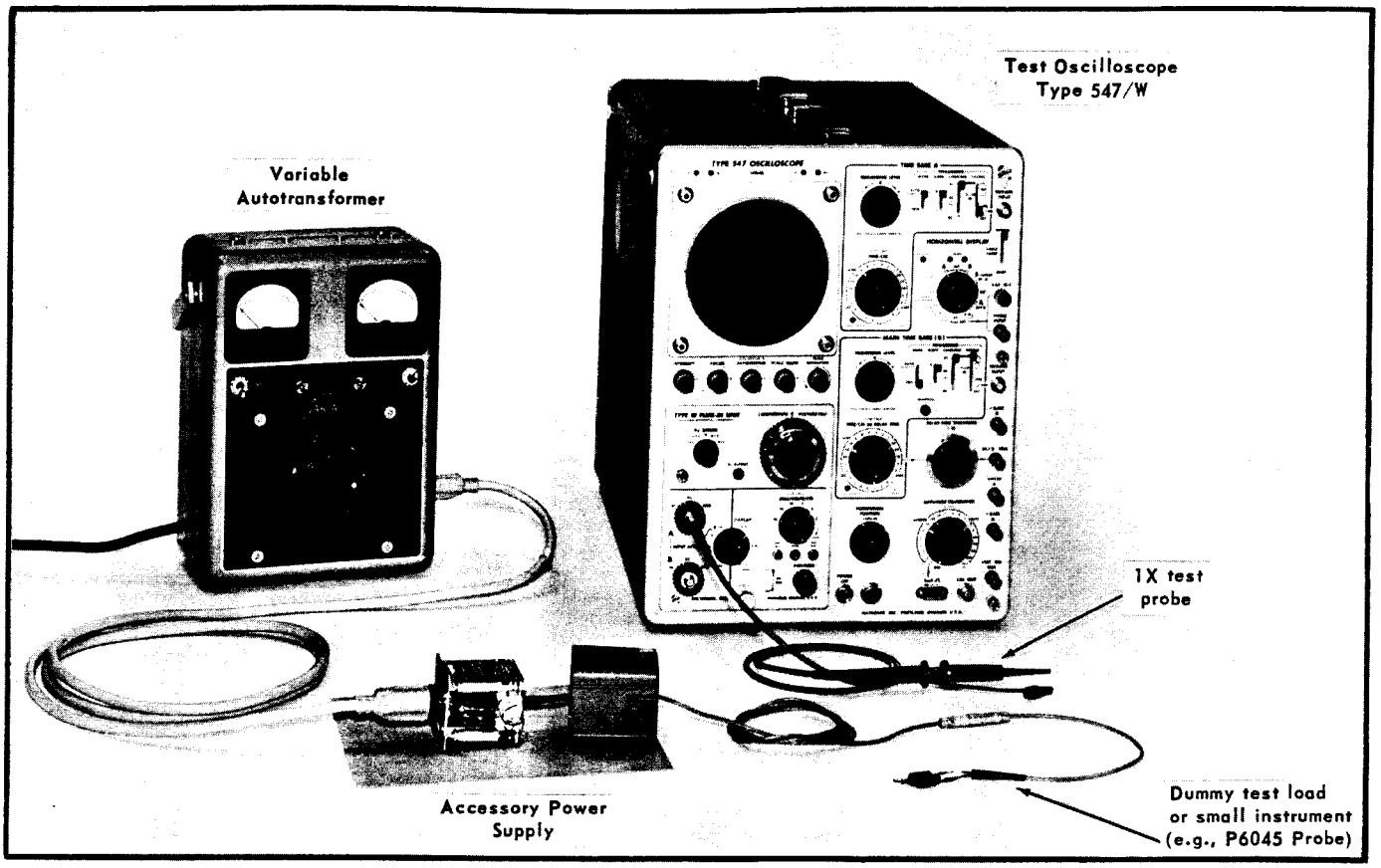


Fig. 6. Initial test equipment setup for performance check procedure.

3. Connect the Accessory Power Supply output to the dummy test load or to the instrument to be used as a load.

4. Connect the autotransformer and oscilloscope to a suitable power source.

5. Turn on the autotransformer and test oscilloscope.

6. Set the autotransformer for a 115-volt output.

7. Connect a 3-wire power cord from the Accessory Power Supply to the autotransformer output.

8. Allow at least 20 minutes warm up at approximately 25°C before making any checks or adjustments.

9. Set the instrument controls as follows:

Control Settings

Test Oscilloscope	
Horizontal Display	A
Time/Cm	5 ms (calibrated)
Triggering	+ Line, Auto
Vertical Unit	
Display	A—Vc
Input Coupling	Gnd
Input Attenuation	10
Millivolts/Cm	50 (calibrated)
Position	midrange
Vc Range	0
Comparison Voltage	1.250

1. Check —12.5-Volt Supply Regulation

Requirement— —12.5 volts DC ±5% (—11.87 V to —13.13 V).

a. Connect the 1X probe to the test oscilloscope channel A vertical input.

CAUTION

If the Power Supply output voltages are checked at the square-pin connectors, power should be disconnected from the Accessory Power Supply while attaching the probe tip or moving it from one test point to another. Shorting between connectors may result in damage to the power supply.

b. Connect the probe tip to the —12.5 V test point at the test load or in the Accessory Power Supply and connect the probe ground clip to the ground terminal as shown in Fig. 7.

c. Position the trace at the center horizontal graticule line with the vertical position control.

d. Set the Vc Range switch to —11.

e. Set the Input Coupling switch to DC.

f. Check—Test oscilloscope trace within ±1.25 cm of the center horizontal graticule line (see Fig. 8).

g. Vary the autotransformer output from 103 volts to 127 volts (206 volts to 254 volts for 230-volt operation).

h. Check—Test oscilloscope trace remains within ±1.25 cm of the center horizontal graticule line.

i. Return the autotransformer output to 115 volts (or 230 volts).

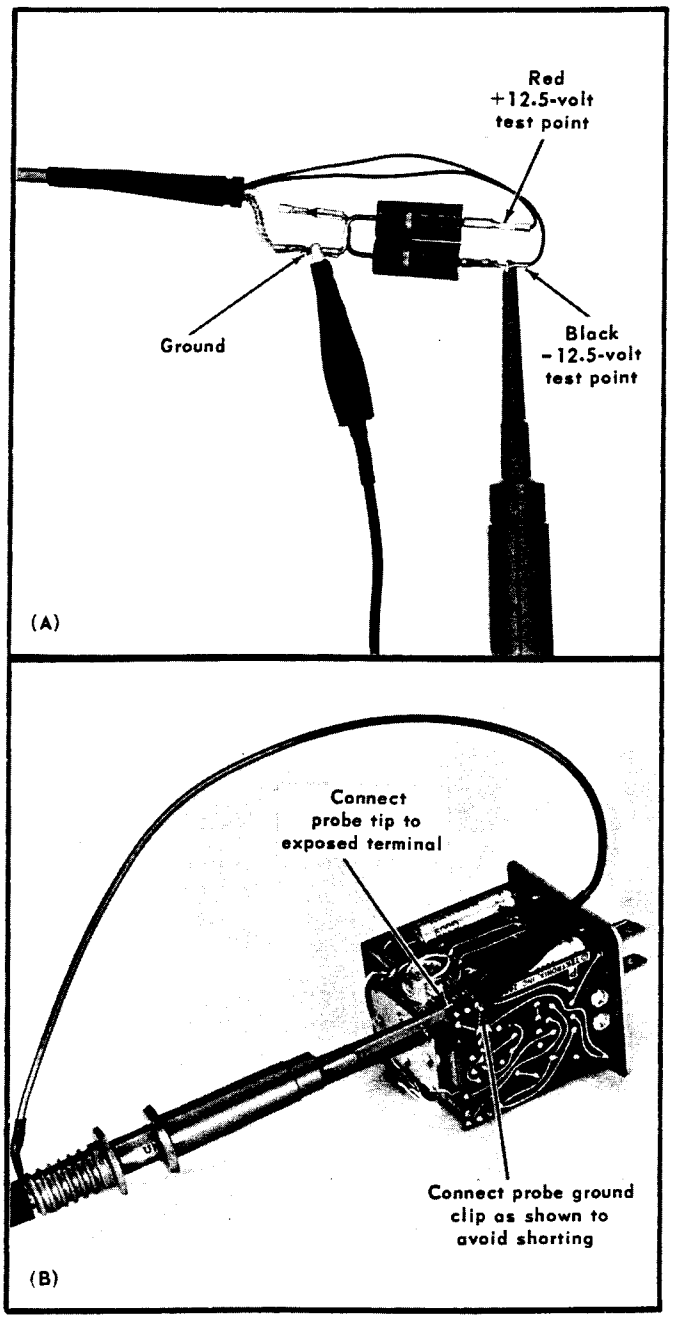


Fig. 7. Connection of test probe tip and ground clip to test point and ground terminal for checking voltage regulation and ripple. (Shown for —12.5-volt supply check.) (A) connections when using the 150-mA dummy test load; (B) connections when using P6045 Probe or other instrument as load.

2. Check +12.5-Volt Supply Regulation

Requirement— +12.5 volts DC ±5% (+11.87 V to +13.13 V).

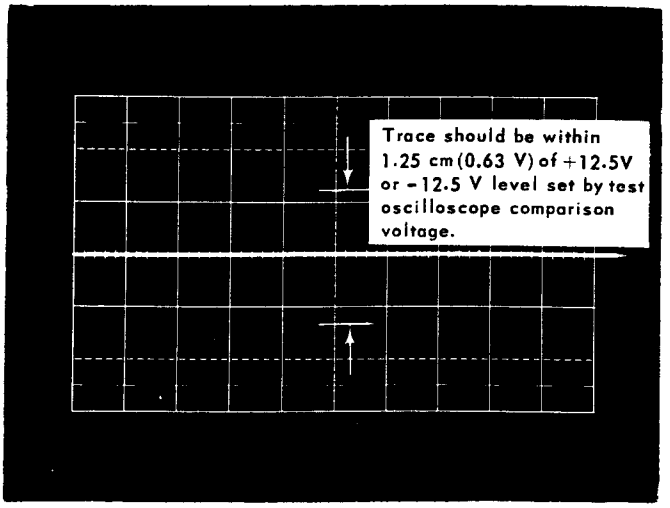


Fig. 8. Typical test oscilloscope display for checking regulation of +12.5-volt and —12.5-volt supplies.

*a. Disconnect the Power Supply power cord from the autotransformer.

b. Move the probe tip to the +12.5-volt test point.

*c. Reconnect the Power Supply to the autotransformer.

d. Set the Vc Range switch to +11.

e. Check—Test oscilloscope trace within ±1.25 cm of the center horizontal graticule line (see Fig. 8).

f. Vary the autotransformer output from 103 volts to 127 volts (206 volts to 254 volts for 230-volt operation).

g. Check—Test oscilloscope trace remains within ±1.25 cm of the center horizontal graticule line.

h. Return the autotransformer output to 115 volts (or 230 volts).

3. Check +12.5-Volt Supply Ripple

Requirement— ≤1 mV ripple on the +12.5-volt supply.

a. Reset the following test oscilloscope controls:

Vc Range	0
Input Coupling	AC
Input Attenuation	1
Millivolts/Cm	2

b. Check—Test oscilloscope display of power supply ripple with an amplitude of 0.5 cm (1 mV) or less (see Fig. 9).

c. Adjust—R110 RIPPLE NULL (see Fig. 5) for minimum ripple if the displayed ripple exceeds 0.5 cm. The measurement should be made with the adjustment tool removed from R110.

d. Vary the autotransformer output from 103 volts to 127 volts (206 volts to 254 volts for 230-volt operation).

e. Check—Test oscilloscope display with 0.5 cm (1 mV) or less of power supply ripple.

f. Set the autotransformer for a 115-volt output.

***This step may be omitted if the dummy test load is used.**

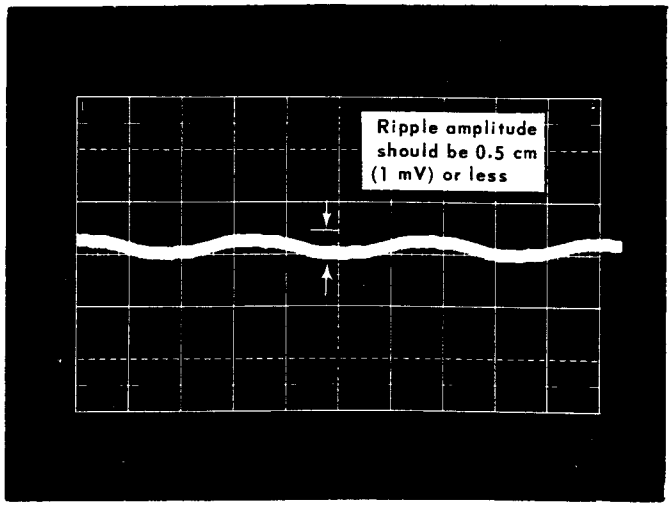


Fig. 9. Typical test oscilloscope display of ripple on +12.5-volt or −12.5-volt supplies.

4. Check −12.5-Volt Supply Ripple

Requirement— ≤1 mV ripple on the −12.5-volt supply.

*a. Disconnect the Power Supply cord from the autotransformer.

b. Move the probe tip to the −12.5-volt test point.

*c. Reconnect the Power Supply to the autotransformer.

d. Check—Test oscilloscope display of power supply ripple with an amplitude of 0.5 cm (1 mV) or less (see Fig. 9).

e. Vary the autotransformer output from 103 volts to 127 volts (206 volts to 254 volts for 230-volt operation).

f. Check—Test oscilloscope display with 0.5 cm (1 mV) or less of power supply ripple.

This completes the Performance check of the Accessory Power Supply. Disconnect the Power Supply from the autotransformer and disconnect the test load from the Power Supply. Slide the insulation up to the circuit board on the +12.5 volt and −12.5 volt connectors. Replace the Power Supply case. The autotransformer and test oscilloscope may now be turned off.

***This step may be omitted if the dummy test load is used.**

ELECTRICAL PARTS LIST

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.		Description		S/N Range
			Capacitors		
Tolerance ±20% unless otherwise indicated.					
C102	290-0307-00	100 μF	Elect.	40 V	
C103	290-0307-00	100 μF	Elect.	40 V	
C106	283-0107-00	51 pF	Cer	200 V	5%
C112	290-0246-00	3.3 μF	Elect.	15 V	10%
C114	283-0001-00	0.005 μF	Cer	500 V	
C116	290-0167-00	10 μF	Elect.	15 V	
C122	290-0307-00	100 μF	Elect.	40 V	
C123	290-0307-00	100 μF	Elect.	40 V	
C132	290-0246-00	3.3 μF	Elect.	15 V	10%
C134	283-0001-00	0.005 μF	Cer	500 V	
C136	290-0167-00	10 μF	Elect.	15 V	
			Diodes		
D102A,B,C,D(4)	*152-0107-00	Silicon	Replaceable by 1N647		
D106	152-0076-00	Zener	1N4372 0.4 W, 3 V, 10%		
D112	*153-0027-00	Zener	1N755A 0.4 W, 7.5 V, 5%, Selected		
D122A,B,C,D(4)	*152-0107-00	Silicon	Replaceable by 1N647		
D132	*153-0027-00	Zener	1N755A 0.4 W, 7.5 V, 5%, Selected		
			Fuse		
F100	159-0033-00		1/8 A, 8 AG, Fast-Blo		
			Connectors		
J100[1]					
P130	131-0439-00	Plug, 3 contact, female			
			Transistors		
Q104	151-0188-00	Silicon	2N3906		
Q113	*151-0195-00	Silicon	Replaceable by MPS 6515		
Q114	*151-0192-00	Silicon	Replaceable by MPS 6521		
Q117	*151-0148-00	Silicon	Selected RCA 40250		
Q133	*151-0195-00	Silicon	Replaceable by MPS 6515		
Q134	*151-0192-00	Silicon	Replaceable by MPS 6521		
Q137	*151-0148-00	Silicon	Selected RCA 40250		

[1]See Mechancial Parts List.

Resistors

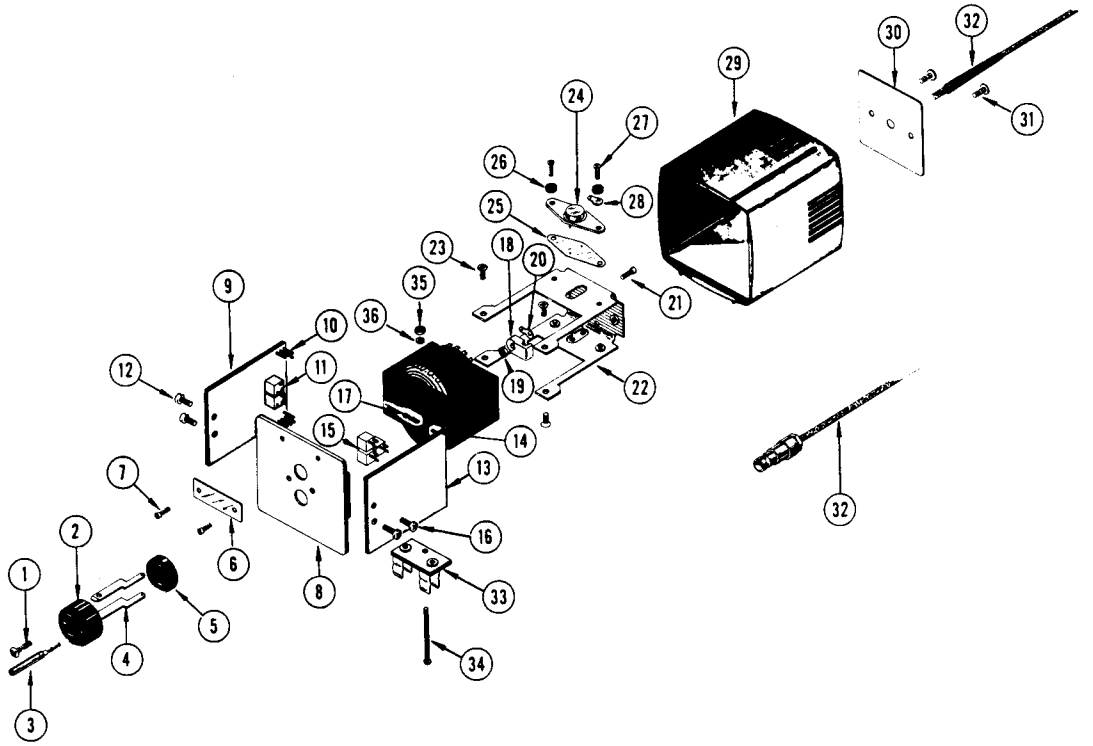
Ckt. No.	Tektronix Part No.	Description			S/N Range
Resistors are fixed, composition, ±10% unless otherwise indicated.					
R106	315-0103-00	10 kΩ	1/4 W		5%
R108	315-0751-00	750 Ω	1/4 W		5%
R109	315-0393-00	39 kΩ	1/4 W		5%
R110	311-0644-00	20 kΩ		Var	
R112	315-0751-00	750 Ω	1/4 W		5%
R116	321-0154-00	392 Ω	1/8 W	Prec	1%
R117	321-0179-00	715 Ω	1/8 W	Prec	1%
R126	315-0103-00	10 kΩ	1/4 W		5%
R132	315-0751-00	750 Ω	1/4 W		5%
R136	321-0154-00	392 Ω	1/8 W	Prec	1%
R137	321-0179-00	715 Ω	1/8 W	Prec	1%

Transformer

T100	*120-0453-00	Power

MECHANICAL PARTS LIST

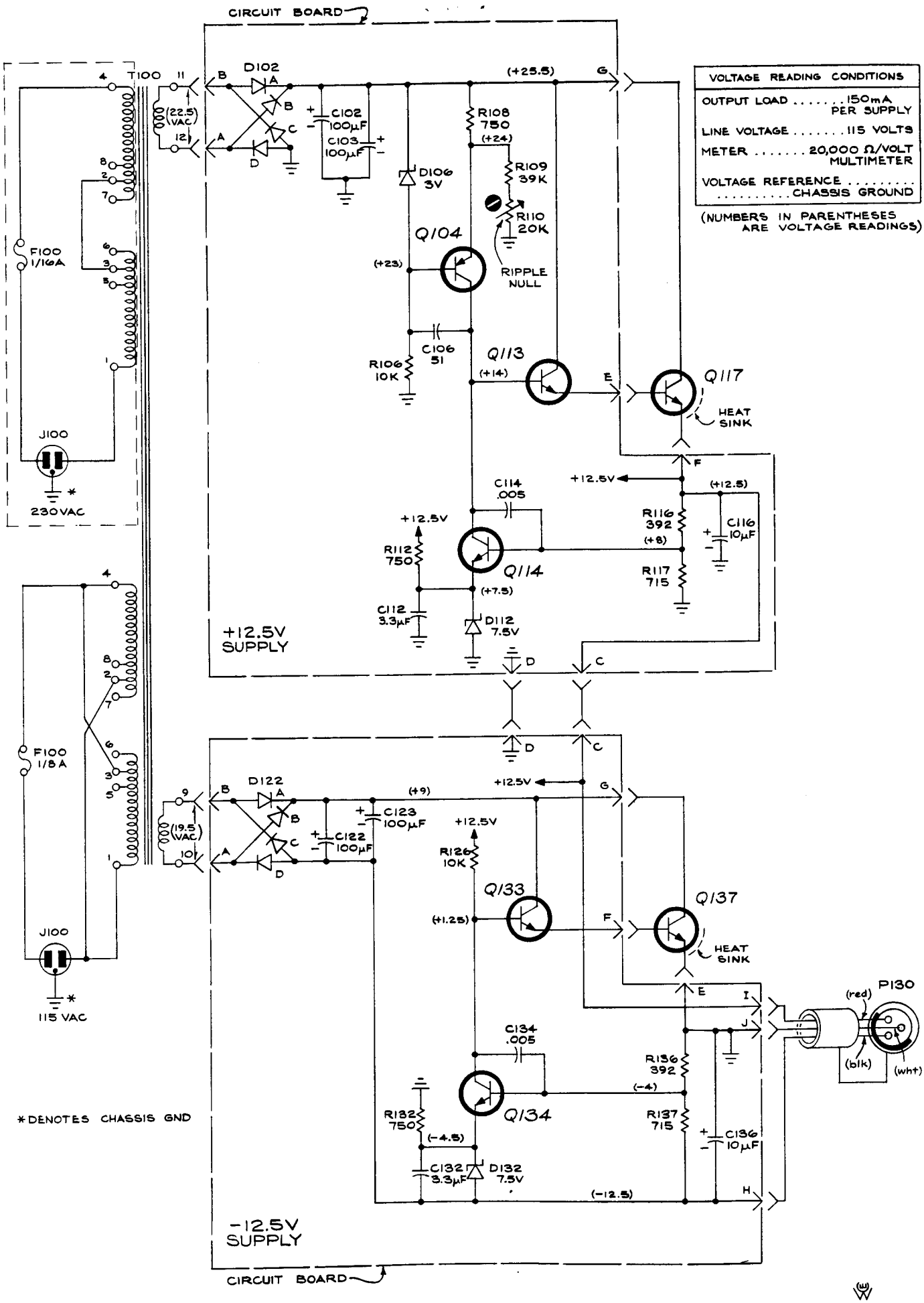
015-0073-00 ACCESSORY POWER SUPPLY



Ref. No.	Tektronix Part No.	Serial/Model No. Eff	Serial/Model No. Disc	Qty	Description 1 2 3 4 5
	015-0073-00			1	ACCESSORY PROBE POWER SUPPLY
	- - - - - -			-	power supply includes:
1	211-0015-00			1	SCREW, 4-40 x 1/2 inch, RHS
2	200-0185-00			1	COVER, black plastic
3	129-0060-00			1	POST, ground
4	214-0078-00			2	PIN, connecting
5	377-0041-00			1	INSERT
6	334-1067-00			1	TAG, voltage
	- - - - - -			-	mounting hardware: (not included w/tag)
7	213-0055-00			2	SCREW, thread forming, 2-32 x 3/16 inch, PHS
8	426-0307-01			1	BASE, mounting, power supply
9	670-0120-00			1	ASSEMBLY, circuit, board, —12 V

017-0073-00 ACCESSORY POWER SUPPLY *(cont)*

Ref. No.	Tektronix Part No.	Serial/Model No. Eff	Serial/Model No. Disc	Qty	Description 1 2 3 4 5
	- - - - - -			-	assembly includes:
	388-0761-00			1	BOARD, circuit, unwired
	- - - - - -			-	board includes:
10	214-0506-00			10	PIN, connector, straight
11	136-0220-00			2	SOCKET, 3 pin transistor
	- - - - - -			-	mounting hardware for each: (not included w/assembly)
12	211-0504-00			2	SCREW, 6-32 x 1/4 inch, PHS
13	670-0121-00			1	ASSEMBLY, circuit, board, +12 V
	- - - - - -			-	assembly includes:
	388-0762-00			1	BOARD, circuit, +12 V, unwired
	- - - - - -			-	board includes:
14	214-0506-00			7	PIN, connector, straight
15	136-0220-00			3	SOCKET, 3 pin transistor
	- - - - - -			-	mounting hardware: (not included w/assembly)
16	211-0504-00			2	SCREW, 6-32 x 1/4 inch, PHS
17	131-0371-00			10	CONNECTOR, single contact
18	343-0132-00			1	CLAMP, cable, molded plastic
	- - - - - -			-	mounting hardware: (not included w/clamp)
19	210-0405-00			1	NUT, hex., 2-56 x 3/16 inch
20	210-0259-00			1	LUG, solder, #2
21	211-0122-00			1	SCREW, 2-56 x 0.312 inch, OHS
22	407-0266-00			1	BRACKET, transformer
	- - - - - -			-	mounting hardware: (not included w/bracket)
23	211-0541-00			4	SCREW, 6-32 x 1/4 inch, 100° csk, FHS
24	- - - - - -			2	TRANSISTOR
	- - - - - -			-	mounting hardware for each: (not included w/transistor)
25	386-0143-00			1	PLATE, mica, insulator
26	358-0288-00			2	BUSHING, insulator, 0.115 inch ID
27	211-0038-00			2	SCREW, 4-40 x 5/16 inch, 100° csk, FHS
28	210-0261-00			1	LUG, solder, 0.270 inch diameter
29	200-0691-00			1	COVER, power supply
30	334-1092-00			1	TAG, identification
	- - - - - -			-	mounting hardware: (not included w/plate)
31	211-0542-00			2	SCREW, 6-32 x 5/16 inch, THS
32	175-0401-00			1	CABLE ASSEMBLY
	- - - - - -			-	cable assembly includes:
	131-0371-00			3	CONNECTOR, single contact
33	352-0103-00			1	HOLDER, fuse
	- - - - - -			-	mounting hardware: (not included w/holder)
34	211-0021-00			1	SCREW, 4-40 x 1/4 inch, RHS
35	210-0406-00			1	NUT, hex., 4-40 x 3/16 inch
36	210-0054-00			1	LOCKWASHER, split, #4
					STANDARD ACCESSORIES
	103-0013-00			1	ADAPTER, power cord, 3 wire to 2 wire (not shown)
	161-0025-00			1	CORD, power, 28 inch long, 3 wire (not shown)



015-0073-00

A

ACCESSORY POWER SUPPLY

015-0073-00 (Accessory Power Supply)

MANUAL CHANGE

Change all references to the power supply voltages from +12.5 V ±5% and -12.5 V ±5% to +12 V ±1% and -12 V ± 1%

PARTS LIST CORRECTION

CHANGE TO:

R116	321-0149-00	348Ω (Sel)	1/8 W	Prec	1%
R136	321-0153-00	383Ω (Sel)	1/8 W	Prec	1%

Accessory Power Supply (015-0073-00)

ACCESSORY KIT CHANGE

		Date Code
CABLE, assembly	161-0032-01	6710 - up
Includes:		
CORD, power, black	161-0032-00	6710 - up
SPRING, power cord gnd	214-0698-00	6710 - up

Accessory Power Supply

015-0073-00

PARTS LIST CORRECTION

CHANGE TO:

F100 (115 V operation)	159-0020-00	1/4 A, 8 AG, Fast-Blo
F100 (230 V operation)	152-0033-00	1/8 A, 8 AG, Fast-Blo

M13,248/1167

Accessory Power Supply

015-0073-00

PARTS LIST CORRECTION

CHANGE TO:

F100 (115 V operation)	159-0020-00	1/4 A, 8 AG, Fast-Blo
F100 (230 V operation)	152-0033-00	1/8 A, 8 AG, Fast-Blo

M13,248/1167

Accessory Power Supply Date Code 6746

PARTS LIST CORRECTION

CHANGE TO:

D112	152-0326-00	Zener	1N755A	0.4 W, 7.5 V, 5%
D132	152-0326-00	Zener	1N755A	0.4 W, 7.5 V, 5%