

# INSTRUCTION MANUAL

Serial Number \_\_\_\_\_

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**TYPE 285**  
**POWER  
SUPPLY**

*Tektronix, Inc.*

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070-0903-00

1168

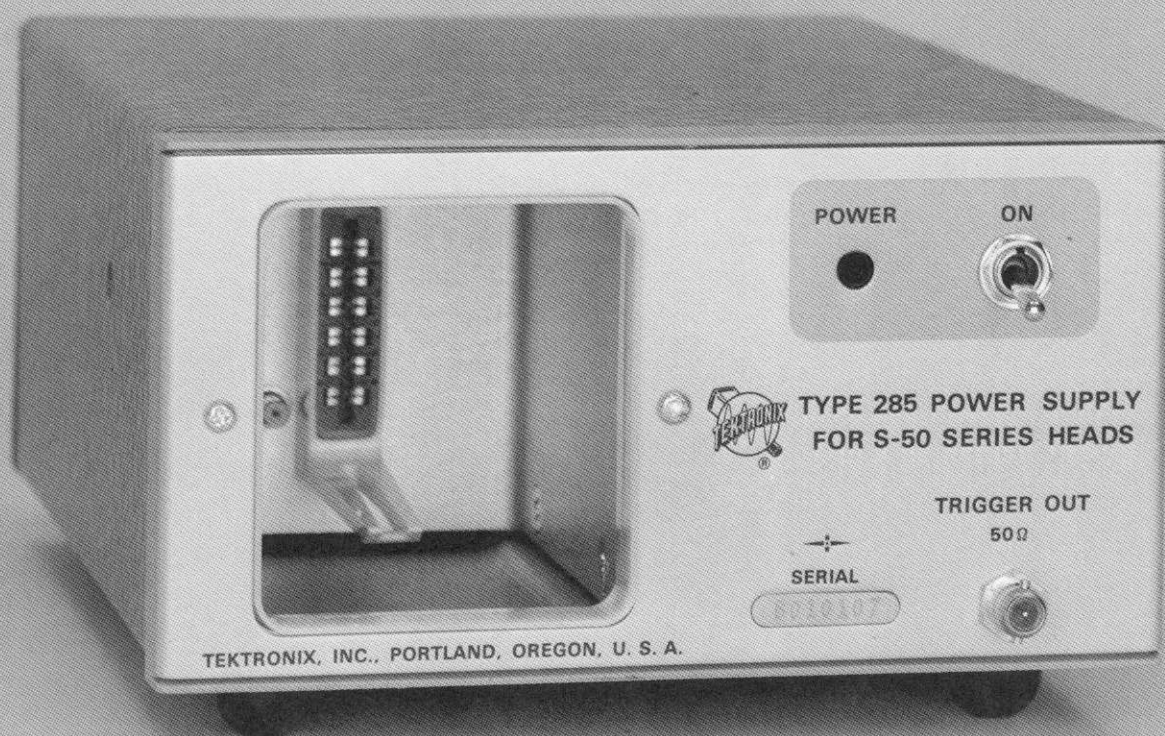


Fig. 1-1. Type 285 Power Supply for S-50 Series Heads.

# SECTION 1

## TYPE 285 SPECIFICATION

### General Information

The Type 285 Power Supply for S-50 Series Heads contains the regulated power supplies for operation of either the Type S-50 Pulse Generator Head or the Type S-51 Trigger Countdown Head. It provides a front panel trigger output jack for the internal trigger pulse of any S-50 series head.

### Characteristics

The following characteristics apply over an ambient temperature range of 0° C to +50° C and after a five-minute warmup, provided the instrument has been calibrated at a temperature between +20° C and +30° C.

### ELECTRICAL CHARACTERISTICS

Characteristic	Performance Requirement
Output Voltage	+15 V within 1% and -12.2 V within 2%
Maximum Output Current	100 mA from each supply
Ripple	1 mV or less
Line Voltage Range	Grounded Neutral Distribution System
115 V	90 VAC to 136 VAC
230 V	180 VAC to 272 VAC
Line Frequency	50 Hz to 400 Hz

### Fuse Data

115 V	1/8 A Slo Blow
230 V	1/16 A Slo Blow

### ENVIRONMENTAL CHARACTERISTICS

Storage	Operating
Temperature-- -40° C to +65° C	Temperature-- As stated above in the Electrical Characteristics table.
Altitude-- To 50,000 feet	Altitude-- to 15,000 feet

### MECHANICAL CHARACTERISTICS

Dimensions-- Height	3 1/8 inches
Width	5 inches
Length	8 inches

Approximate dimensions include switch and cord holders.

Construction-- Aluminum alloy chassis with epoxy laminated circuit boards. Both circuit boards are removable without using a soldering iron. The front panel is anodized aluminum. The textured aluminum cover has blue vinyl paint.

Accessories--- Standard accessories supplied with the Type 285 are listed in the Mechanical Parts List.

## SECTION 2 OPERATING INSTRUCTIONS

### General Information

The Type 285 Power Supply for S-50 Series Heads is intended for use with special heads such as the Type S-50 Pulse Generator Head or the Type S-51 Trigger Countdown Head. The Type 285 provides the regulated supply voltage requirements of one Type S-50 series head.

Regulated voltages are delivered to the S-50 series head through connector J40 at the rear of the plug-in compartment. A coaxial connector, J17, is also located at the rear of the plug-in compartment. A coaxial cable within the Type 285 connects J17 to the TRIGGER OUT connector (J45), on the Type 285 front panel. The signal available at the TRIGGER OUT connector depends on the type of S-50 series head plugged into the Type 285. See the instruction manual for your S-50 series head for further information.

### Operating Information

A line voltage Selector switch on the Type 285 rear panel permits operation from 115 VAC or 230 VAC. Be sure the switch is set to the position corresponding to the line voltage to be utilized, and connect the Type 285 power cord to the AC line.

The S-50 series head is plugged into the compartment provided in the Type 285 front panel. To insert a S-50 series head, slide the unit completely into the compartment in the Type 285, leaving the latch at the bottom of the unit free to move. Push the latch knob to lock the S-50 series head in place. To remove the head, pull the latch knob away from the panel. See Fig. 2-1.

A toggle switch on the front panel of the Type 285 turns the instrument on or off. A POWER indicator lights when the POWER switch is on and the instrument is connected to the line voltage.



Fig. 2-1. S-50 series head installed in the Type 285.

## SECTION 3

### CIRCUIT DESCRIPTION

The Type 285 Power Supply develops regulated voltages of -12.2 V and +15 V for the Type S-50 series head. The Type 285 Power Supply operates from a 115 VAC or 230 VAC power source. Switch SW2 must be placed in the 115 V position if the power source is 115 VAC. The primary windings of transformer T2 are connected in parallel and fuse F1 protects the Type 285 Power Supply in case of overload. If the power source is 230 VAC, place switch SW2 in the 230 V position. The primary windings of transformer T2 are connected in series. Fuse F2 is connected in series with F1, and F2 is the controlling fuse. A POWER indicator light is connected across the secondary winding of the -12.2 V Power Supply. POWER switch SW1 connects both sides of the power line to the Type 285 Power Supply.

The +15 V Power Supply is composed of transformer T2 secondary winding (terminals 5 and 6 on the transformer), full wave bridge rectifier D20, filter capacitor C20, error signal amplifier Q24, inverter amplifier Q33 and series regulator Q35.

The regulator action is as follows: (Assuming a positive-going change in output voltage.) Q24A is biased at +9 V by Zener diode D22. Q24B base is biased by the voltage divider network R29, R30 and R31. R30 sets the Power Supply output to +15 V. The error signal is applied to Q24B base through the voltage divider R29, R30, and R31. (C29 couples fast-rise signals to Q24B base for greater output from Q24B.) Emitter follower Q24B drives Q24A emitter. The in-phase error output signal at the junction of R26 and R27 drives Q33 base. Q33 inverts and amplifies the signal to drive Q35, which serves as a variable resistor in series with the load. The signal to Q35 reverse biases the transistor to decrease the current through it and the load. The decreased current through the load lowers the load voltage to the desired value.

Turning on the Type 285 with the load connected, at first most of the supply voltage appears across Q35 which is cut off (it has very high resistance); Therefore, the output voltage is about zero volts. Q16 in the -12.2 V Power Supply is also turned off since that

supply does not have the +15 V necessary for proper operation. Network R36, R37, R38 and D37 applies forward bias and turns on Q35. With about zero volts feeding R37, (instead of the normal operating voltage of -12.2 V), approximately -27 volts at the junction of R37-R38, D37 is biased into conduction. The resulting voltage drop across R36 forward biases Q35 into conduction and the +15 volt Power Supply output rises to +15 V at which time the -12.2 V Power Supply operates properly and D37 is reversed biased (cut off).

Components not described above provide the following functions: C22 helps to stabilize Q24A base voltage for high frequency signals and to reduce the noise generated by D22. R26 is a parasitic suppressor. D33 provides temperature compensation for Q33. C39 reduces the high frequency output impedance of the supply.

The -12.2 V Power Supply is composed of transformer T2 secondary winding (terminals 7 and 8 on the transformer), full wave bridge rectifier D4, filter capacitor C4, error signal amplifier Q6, emitter follower Q12 and series regulator Q16.

The regulator action is as follows: (Assume a negative change in output voltage). Q6B base is biased by the voltage divider R10 and R11. R10 is connected to the +15 V reference voltage. The error signal is applied to Q6B by voltage divider R10 and R11. (C11 couples fast rise signals to Q6B base for greater output from Q6B.) Emitter follower Q6B drives Q6A emitter. The in-phase error output signal at the collector of Q6A drives emitter follower Q12. In-phase output from Q12 emitter drives Q16, which serves as a variable resistor in series with the load. The negative-going signal at Q16 base reverse biases the transistor to decrease the current through it and the load. The decreased current through the load raises the voltage back to -12.2 V.

R12 is transistor Q12's dissipation limiting resistor. C18 reduces the high frequency output impedance of the supply.

## SECTION 4 MAINTENANCE

### Removal of the Case

Remove the screws holding the power cord holders and the case will slide off at the rear of the Type 285.

### Parts Removal and Replacement

Whenever a part is replaced, check and adjust the power supplies as necessary; see the Calibration section. Most parts in the Type 285 can be replaced without detailed instructions. Parts ordering information is included immediately preceding the Electrical Parts List section.

#### CAUTION

Disconnect the power cord before removing fuses or other components.

**Transistor Replacement.** Transistors should not be replaced unless they are actually defective. Transistor defects usually take the form of the transistor opening, shorting or developing excessive leakage. To check a transistor for these and other defects, use a transistor curve display instrument such as a Tektronix Type 575. However, if a good transistor checker is not readily available, a defective transistor may be found by making in-circuit voltage checks, or by substitution. The location of all transistors is silk-screened on the circuit board next to the socket or on the chassis for the rear-panel mounted power transistors.

To check transistors using a voltmeter, measure the emitter-to-base and emitter-to-collector voltages and determine whether the voltages are consistent with the normal resistances and currents in the circuit (see Fig. 4-1). Note the lead configuration in Fig. 4-2.

If there is doubt about whether the transistor is good or not, substitute a new transistor, but first be certain the circuit voltages applied to the transistor are correct before making the substitution. If a transistor is substituted without first checking out the circuit, the new transistor may immediately be damaged by some defect in the circuit.

**Parts Replacement.** The replacement of parts soldered to the circuit boards is as follows:

1. Clip the leads of the component to be replaced.
2. Remove the component from the circuit board.
3. Remove the clipped leads individually from the circuit board.

The tip of the soldering iron should be of copper with a chisel or bevel shape. To obtain a low working-tip temperature, consider the following:

1. At slow soldering speeds, a 25-watt iron and 1/8 inch tip.
2. At medium soldering speeds, a 4-watt iron and a 3/16 inch tip.
3. At fast soldering speeds, a 50- or 60-watt iron and a 1/4 inch tip.

Install the new part, with leads bent to fit the holes and clipped so they will just protrude through the board, and apply heat and solder for a firm solder joint.

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

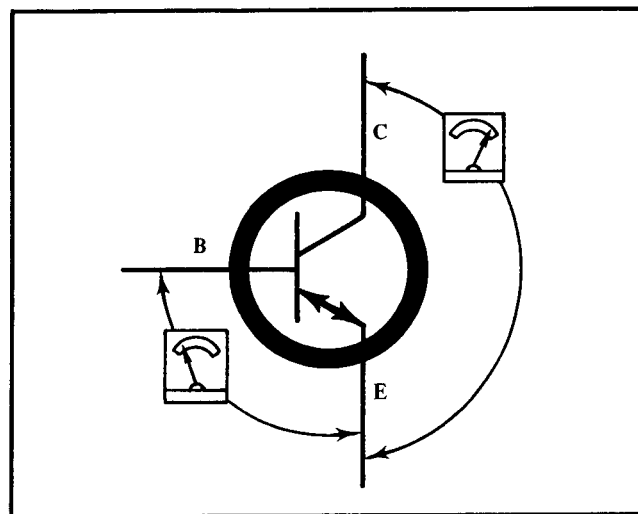


Fig. 4-1. In-circuit voltage checks NPN or PNP transistors.



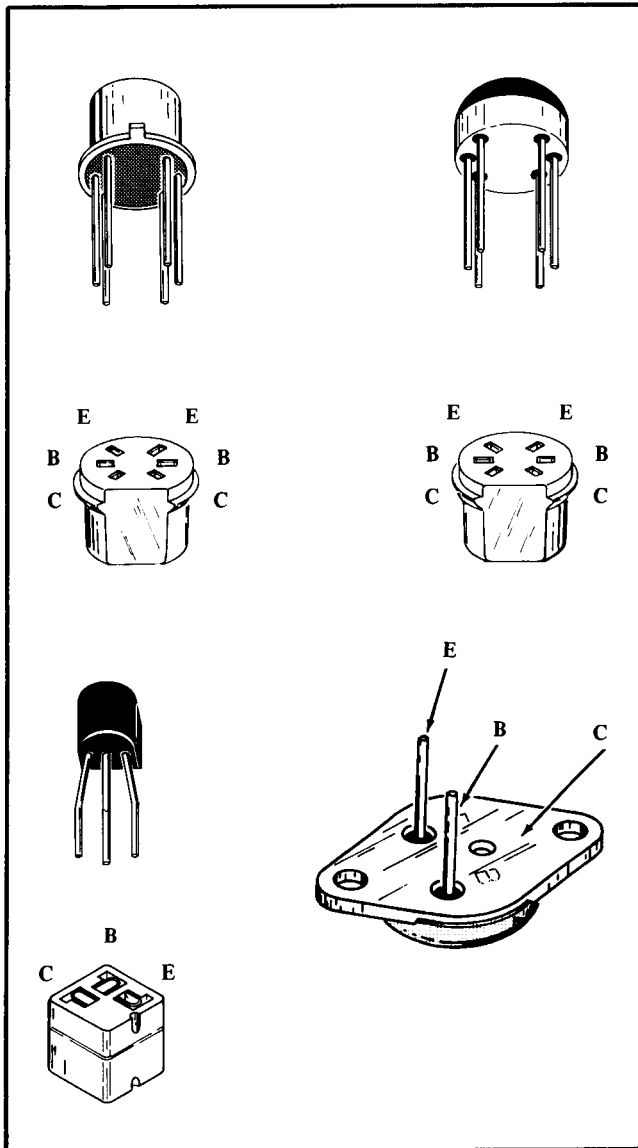


Fig. 4-2. Lead configuration of transistors in the Type 285.

**Circuit Board Replacement.** If a circuit board is damaged and cannot be repaired, the entire board, including all soldered-on components, should be replaced. The part number given in the Mechanical Parts List is for the completely wired board.

Both circuit boards, which are mounted back to back with plastic spacer separation, are secured by 2 chassis mounting screws. Loosen the mounting screws and lift both circuit boards from the chassis. Sepa-

rate the boards by gently pulling the +15 V Regulator board upward from the -12.2 V Regulator board. Color-coded wires are removed from the pins by pulling straight off with long-nosed pliers. The sequence of wires on the -12.2 V Regulator board is listed in Table 4-1.

Table 4-1

Pin A	Red on White
Pin B	Green on White
Pin C	Blue on White
Pin D	Grey on White (2)
Pin E	Violet on White (2)
Pin F	White
Pin G	Yellow on White
Pin H	Orange on White
Pin I	Black on White
Pin J	Brown, Red, Black on White
Pin K	Green, Green, Black on White

To attach the +15 V Regulator board to the -12.2 V Regulator board, align the pins and the mounting screws before easing the board into position. Install the circuit boards and tighten the mounting screws.

## Parts Locations

All components mounted on circuit boards are identified by circuit numbers and shown in the photographs included in the remainder of this section.

## Case Replacement

Align the case so the side adjustment hole will be on the left of the 285, by the head opening, and the feet on the bottom. Slide the case on the Type 285 and attach the cord holders with the mounting screws.

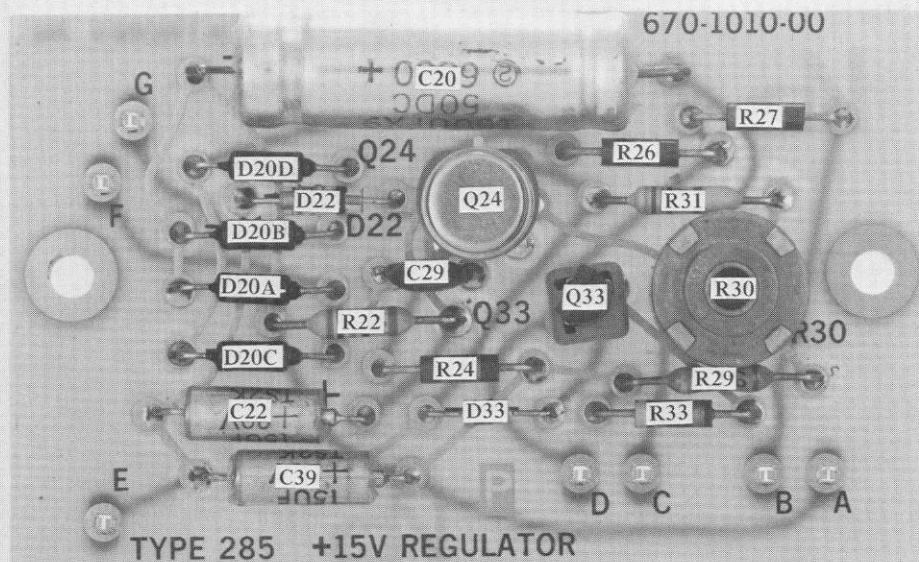


Fig. 4-3. +15 V Regulator circuit board.

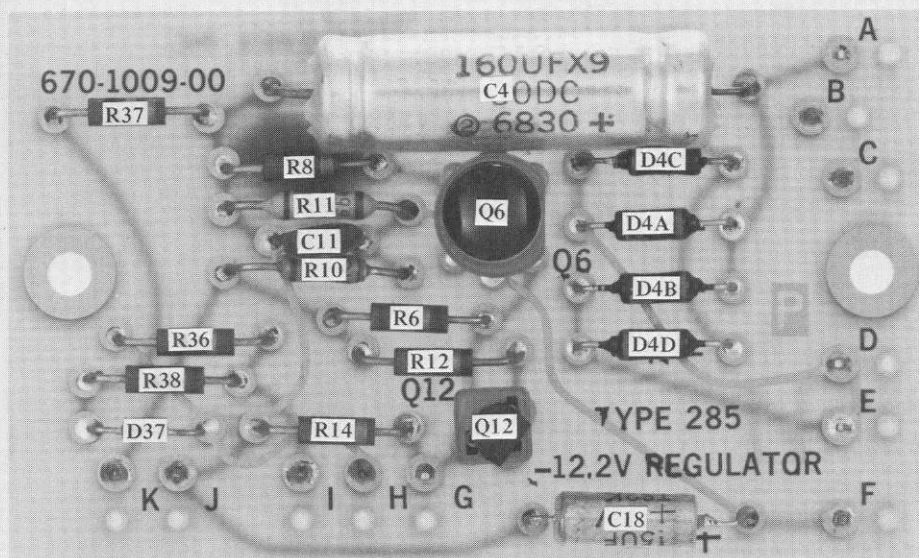


Fig. 4-4. -12.2 V Regulator circuit board.



# SECTION 5

## PERFORMANCE CHECK/CALIBRATION

### Introduction

This section of the manual contains a procedure for checking and calibrating the power supplies of the Type 285. The instrument will not require frequent calibration, but occasional adjustments will be necessary as components age or are replaced.

### Equipment Required

The following equipment or its equivalent is required for calibration of the Type 285.

1. Autotransformer with output voltage variable between 90 and 136 VAC (or 180 to 272 VAC) and a minimum rating of 25 watts. If the autotransformer does not have an AC voltmeter to indicate output voltage, monitor its output with an RMS reading voltmeter with a range of at least 150 (300) volts. For example, General Radio W10MT3W Metered Variac Autotransformer.

2. Oscilloscope, maximum deflection factor of 1 mV/div and comparison voltage for measurement of +15 V and -12.2 V within 0.2%. Tektronix Type W Plug-In Unit with Type 545B Oscilloscope (540 series) or Tektronix Type 3A7 Differential Comparator with Type 3B4 Time Base Unit and Type 561A Oscilloscope (560-Series) meet these requirements.

3. 1X probe, Tektronix P6028. Tektronix Part No. 010-0074-00.

4. If a Type W plug-In Unit is not available, a precision voltmeter is needed that can measure up to +15 or -12.2 V with an accuracy of  $\pm 0.2\%$ . John Fluke Model 801B meets the requirements.

5. Test loads for power supplies:

+15 V supply; a 150  $\Omega$ , 2 watt, composition resistor, 10% tolerance, Tektronix Part No. 306-0151-00.

-12.2 V supply; a 120  $\Omega$ , 2 watt, composition resistor, 10% tolerance, Tektronix Part No. 306-0121-00.

6. Four clips, Mueller #30 miniature, to be attached to the test load resistors. Tektronix Part No. 344-0024-00.

### PRELIMINARY INSTRUCTIONS

1. Disconnect the power cord. Remove the case of the Type 285 by removing the power cord holder screws and sliding the case off to the rear.

2. Connect the 120  $\Omega$  resistor between pin A of J40 and ground. Connect the 150  $\Omega$  resistor between pin 1, opposite pin A, and ground.

3. Connect the Type 285 power cord to the output of the variable autotransformer.

4. Turn on the instrument power and adjust the autotransformer for an output of 115 volts as determined by the LINE VOLTAGE SELECTOR, located on the rear panel.

5. Turn on the oscilloscope. Allow 15 minutes for warmup and stabilization.

6. Set the oscilloscope and Type W controls as follows:

## Performance Check/Calibration-Type 285

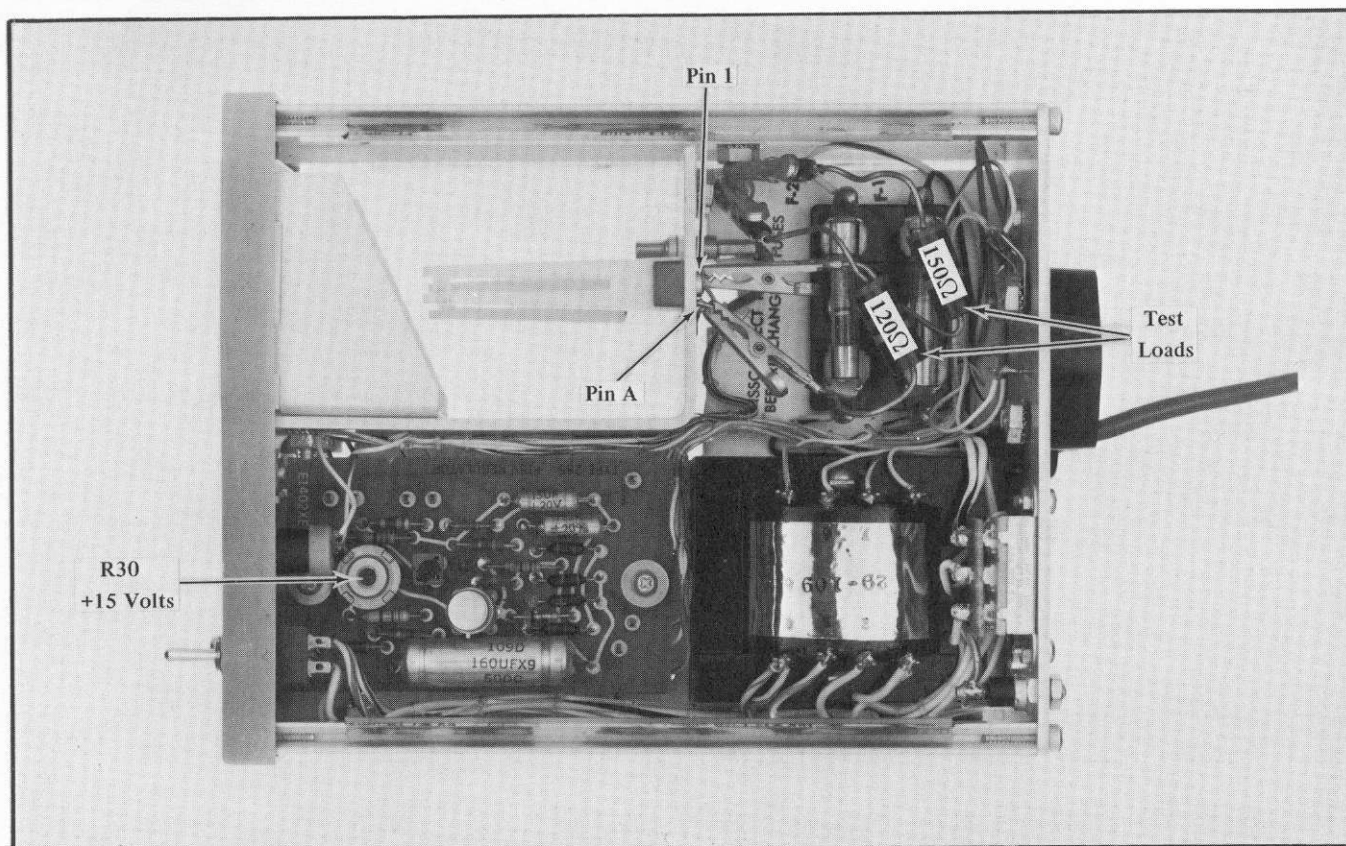


Fig. 5-1. Locations of test points and adjustment.

### Oscilloscope

Triggering	Int, +, AC
Stability	Fully clockwise
Time/cm	1 ms

### Type W

Vc Range	0
Comparison Voltage	1500
AC DC GND	GND
Input Atten	10
Display	A-Vc
Millivolts/cm	5
Variable	Calib

b. Set the AC DC GND switch to DC and the Vc Range switch to +11.

c. Check that the trace is at the center line with a comparison Voltage setting between 1515 and 1485 (15 volts  $\pm 1\%$ ).

d. If the Comparison Voltage is not between 1515 and 1485, adjust R30, the +15 volts control, until the trace is at the graticule center line with Comparison Voltage set at 1500.

e. Change the autotransformer output voltage from 90 volts to 136 volts and check that the  $\pm 15$  V supply remains within the 1% tolerance.

f. Set the autotransformer output voltage to 115 volts. Set the Vc Range switch to 0 and the AC DC GND switch to GND. Connect the 1X probe to pin A at the 120  $\Omega$  resistor. Set the trace at the center line.

g. Set the Comparison voltage to 1220. Change the AC DC GND switch to DC and the Vc Range switch to -11.

## PROCEDURE

### 1. Check or Adjust Power Supplies

a. Set the oscilloscope trace at the graticule center line. Connect the 1X probe to pin 1 at the 150  $\Omega$  resistor in the Type 285. Fig. 5-1 shows the locations of test points and the adjustment.

h. Check that the trace is at the center line with a comparison Voltage setting between 124B and 1196 (12.2 volts  $\pm 2\%$ ).

i. Change the autotransformer output voltage from 90 volts to 136 volts and check that the -12.2 volt supply remains within the 2% tolerance.

## 2. Check Ripple

a. Set the Vc Range switch to 0 and the AC DC GND switch to AC. Set the Input Atten switch to 1 and the Millivolts/cm switch to 1.

b. Set the oscilloscope Time/cm switch to 5, the Triggering switch to Auto and the Trigger Slope switch to + line.

c. Change the autotransformer output voltage from 90 volts to 136 volts and check that the ripple as observed on the oscilloscope does not exceed 1 mV (1 division); see Fig. 5-2. Measure from trace bottom at a low point to trace bottom at a high point.

d. Connect the 1X probe to pin 1 at the 150  $\Omega$  resistor.

e. Change the autotransformer output voltage from 90 volts to 136 volts and check that the ripple does not exceed 1 mV (1 division).

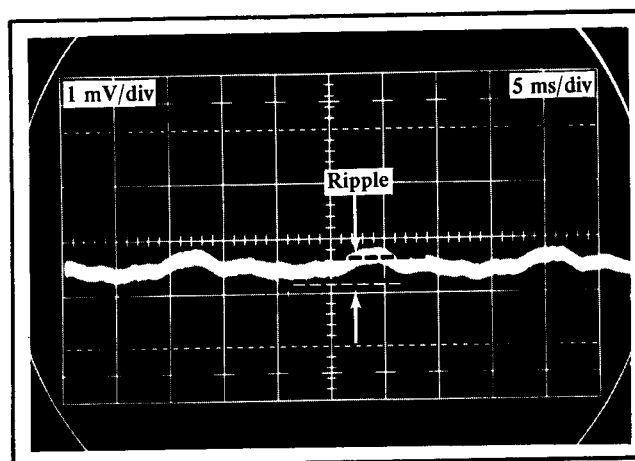


Fig. 5-2. Typical display of ripple.

f. Turn the Type 285 Power Off and disconnect the power cord from the autotransformer.

## 3. Check 230-Volt Operation

a. Set the LINE VOLTAGE SELECTOR switch on the rear panel to 230 V.

b. Connect the Type 285 power cord to a 230 V source and set the Type 285 Power On.

c. Check the +15 volt and -12.2 volt supplies, pin 1, and pin A of J40, as described in step 1. Tolerance on the +15 volt supply is 1% and on the -12.2 volt supply tolerance is 2%. The autotransformer range for checking the regulation is 180 through 272 volts.

## This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no text or other markings on the paper.

# SECTION 6

## ELECTRICAL PARTS LIST

Values are fixed unless marked Variable.

Ckt. No.	Tektronix Part No.	Serial/Model Eff	No. Disc	Description		
Bulb						
B3	150-0088-00			Incandescent 2187D		
Capacitors						
Tolerance $\pm 20\%$ unless otherwise indicated.						
C4	290-0394-00		160 $\mu$ F	Elect.	50 V	10%
C11	283-0032-00		470 pF	Cer	500 V	5%
C18	290-0135-00		15 $\mu$ F	Elect.	20 V	
C20	290-0394-00		160 $\mu$ F	Elect.	50 V	10%
C22	290-0135-00		15 $\mu$ F	Elect.	20 V	
C29	283-0065-00		0.001 $\mu$ F	Cer	100 V	5%
C39	290-0135-00		15 $\mu$ F	Elect.	20 V	
Semiconductor Device, Diodes						
D4 A,B,C,D (4)	*152-0107-00		Silicon	Replaceable by 1N647		
D20 A,B,C,D (4)	*152-0107-00		Silicon	Replaceable by 1N647		
D22	152-0212-00		Zener	1N936 9 V, 5%, TC		
D33	152-0141-02		Silicon	1N4152		
D37	152-0141-02		Silicon	1N4152		
Fuses						
F1	159-0063-00		1/8 A	3AG Slo-Blo		
F2	159-0051-00		1/16 A	Slo-Blo		
Connectors						
J17 <sup>1</sup>						
J40	131-0581-00			12 Pin, Female		
J45 <sup>1</sup>						
Transistors						
Q6	151-0249-00		Silicon	Dual		
Q12	*151-0192-00		Silicon	Replaceable by MPS-6521		
Q16	*151-0148-00		Silicon	Selected from 40250 (RCA)		
Q24	151-0261-00		Silicon	Dual		
Q33	151-0188-00		Silicon	2N3906		
Q35	*151-0148-00		Silicon	Selected from 40250 (RCA)		

<sup>1</sup>See Mechanical Parts List (\*175-1012-00)



## Mechanical Parts List—Type 285

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff Disc	Description
<b>Resistors</b>			
Resistors are fixed, composition, $\pm 10\%$ unless otherwise indicated.			
R6	315-0183-00	18 k $\Omega$	1/4 W 5%
R8	315-0752-00	7.5 k $\Omega$	1/4 W 5%
R9	315-0224-00	220 k $\Omega$	1/4 W 5%
R10	321-0230-00	2.43 k $\Omega$	1/8 W Prec 1%
R11	321-0221-00	1.96 k $\Omega$	1/8 W Prec 1%
R12	315-0182-00	1.8 k $\Omega$	1/4 W 5%
R14	315-0752-00	7.5 k $\Omega$	1/4 W 5%
R22	321-0184-00	806 $\Omega$	1/8 W Prec 1%
R24	315-0132-00	1.3 k $\Omega$	1/4 W 5%
R26	315-0101-00	100 $\Omega$	1/4 W 5%
R27	315-0622-00	6.2 k $\Omega$	1/4 W 5%
R29	321-0163-00	487 $\Omega$	1/8 W Prec 1%
R30	311-0442-00	250 $\Omega$ , Var	
R31	321-0183-00	787 $\Omega$	1/8 W Prec 1%
R33	315-0432-00	4.3 k $\Omega$	1/4 W 5%
R36	315-0102-00	1 k $\Omega$	1/4 W 5%
R37	315-0103-00	10 k $\Omega$	1/4 W 5%
R38	315-0102-00	1 k $\Omega$	1/4 W 5%
<b>Switches</b>			
Wired or Unwired			
SW1	260-0834-00	Toggle	POWER
SW2	260-0675-00	Slide	115/ V 230 V
<b>Transformer</b>			
T2	*120-0581-00	Power	

# SECTION 7

## MECHANICAL PARTS LIST

FIG. 1 EXPLODED VIEW

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q † y	1	2	3	4	5	Description
		Eff	Disc							
1-1	175-1012-00			1						CABLE ASSEMBLY, RF: 50 $\Omega$ coaxial, 8.5 inches
	- - - - -			-						w/snap-on connector 1 end, male BNC opposite
-2	260-0834-00			1						SWITCH, toggle (w/hardware)--ON
	- - - - -			-						mounting hardware: (not included w/switch)
-3	210-0940-00			1						WASHER, flat, 1/4 ID x 3/8 inch OD
-4	333-1102-01			1						PANEL, front
	- - - - -			-						mounting hardware: (not included w/panel)
-5	213-0055-00			2						SCREW, 2-32 x 3/16 inch, thread forming, PHS
-6	352-0084-00			1						HOLDER, neon
-7	378-0541-01			1						FILTER, lens, neon
-8	200-0609-00			1						CAP, lamp holder
-9	200-0895-00			1						BEZEL, 2.344 x 1.995 x 0.46 inch, plastic
-10	386-1516-01			1						SUB-PANEL, front
	- - - - -			-						mounting hardware: (not included w/sub-panel)
-11	213-0192-00			4						SCREW, 6-32 x 1/2 inch, Fil HS
-12	343-0189-00			2						CLAMP, rim clenching
-13	426-0440-00			2						FRAME, side, left & right
-14	255-0249-00			4						CHANNEL, extrusion, 4 1/2 inches, Black Plastic
-15	407-0546-00			1						BRACKET, connector
	- - - - -			-						mounting hardware: (not included w/bracket)
-16	211-0538-00			4						SCREW, 6-32 x 5/16 inch, 100° csk, FHS
-17	210-0457-00			4						NUT, keps, 6-32 x 5/16 inch
-18	407-0545-00			1						BRACKET, support
	- - - - -			-						mounting hardware: (not included w/bracket)
-19	211-0538-00			2						SCREW, 6-32 x 5/16 inch, 100° csk, FHS
-20	211-0507-00			1						SCREW, 6-32 x 5/16 inch, PHS
-21	210-0457-00			3						NUT, keps, 6-32 x 5/16 inch
-22	131-0581-00			1						CONNECTOR, chassis mounting, 12 contact, male
-23	351-0132-00			1						GUIDE, clip
	- - - - -			-						mounting hardware: (not included w/guide)
-24	213-0082-00			2						SCREW, 4-40 x 1/2 inch, thread forming, PHS

FIG. 1 EXPLODED VIEW (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No.		Q t y						Description
		Eff	Disc		1	2	3	4	5	
1-25	352-0025-00			1						HOLDER, fuse,dual
	- - - - -			-						mounting hardware: (not included w/holder)
-26	211-0510-00			2						SCREW, 6-32 x 3/8 inch, PHS
-27	210-0457-00			2						NUT, keps, 6-32 x 5/16 inch
-28	- - - - -			1						TRANSFORMER
	- - - - -			-						mounting hardware: (not included w/transformer)
-29	211-0021-00			2						SCREW, 4-40 x 1 1/4 inches, RHS
-30	210-0586-00			2						NUT, keps, 4-40 x 1/4 inch
-31	343-0088-00			1						CLAMP, cable, plastic
-32	441-0808-00			1						CHASSIS, main
	- - - - -			-						mounting hardware: (not included w/chassis)
-33	210-0457-00			4						NUT, keps, 6-32 x 5/16 inch
-34	211-0538-00			2						SCREW, 6-32 x 5/16 inch, 100° csk, FHS
-35	211-0514-00			2						SCREW, 6-32 x 3/4 inch, PHS
-36	386-1457-00			1						PANEL, rear
	- - - - -			-						mounting hardware: (not included w/panel)
-37	213-0192-00			4						SCREW, 6-32 x 1/2 inch, Fil HS
-38	129-0006-00			1						POST, connecting, insulated
	- - - - -			-						mounting hardware: (not included w/post)
-39	210-0006-00			1						LOCKWASHER, internal, #6
-40	210-0407-00			1						NUT, hex., 6-32 x 1/4 inch
-41	337-1036-00			1						SHIELD, switch, fiber board
-42	260-0675-00			1						SWITCH, slide--LINE VOLTAGE SELECTOR
	- - - - -			-						mounting hardware: (not included w/switch)
-43	210-0406-00			2						NUT, hex., 4-40 x 3/16 inch
-44	211-0097-00			2						SCREW, 4-40 x 5/16 inch, PHS
-45	200-0669-00			1						COVER, transistor
-46	- - - - -			1						TRANSISTOR
	- - - - -			-						mounting hardware: (not included w/transistor)
-47	386-0143-00			1						PLATE, insulator
-48	211-0510-00			1						SCREW, 6-32 x 3/8 inch, PHS
-49	211-0511-00			1						SCREW, 6-32 x 1/2 inch, PHS
-50	210-0811-00			2						WASHER, fiber, #6
-51	210-0202-00			1						LUG, solder, #6
-52	210-0457-00			2						NUT, keps, 6-32 x 5/16 inch
-53	200-0669-00			1						COVER, transistor
-54	- - - - -			1						TRANSISTOR
	- - - - -			-						mounting hardware: (not included w/transistor)

FIG. 1 EXPLODED VIEW (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff Disc	Q † y	1	2	3	4	5	Description
1-	211-0510-00		1						SCREW, 6-32 x 3/8 inch, PHS
-55	211-0511-00		1						SCREW, 6-32 x 1/2 inch, PHS
-56	210-0202-00		1						LUG, solder, #6
-57	210-0457-00		2						NUT, keps, 6-32 x 5/16 inch
-58	358-0091-00		1						BUSHING, strain relief
-59	161-0052-00		1						CORD, power, 3 conductor, 8 feet long
-60	334-1205-00		1						cord includes: SLEEVE, marker, cable
-61	179-0318-00		1						CABLE HARNESS
-62	131-0512-00		13						cable harness includes: CONNECTOR, cable
-63	179-1317-00		1						CABLE HARNESS, power
-64	670-1010-00		1						ASSEMBLY circuit board--15 V REGULATOR
-65	388-1086-00		1						assembly includes: BOARD, circuit
-66	136-0263-01		7						board includes: SOCKET, connector pin
-67	136-0220-00		1						SOCKET, transistor, 3 pin
-68	136-0235-00		1						SOCKET, transistor, 6 pin
-69	670-1009-00		1						ASSEMBLY, circuit board--12.5 V REGULATOR
-70	388-1085-00		1						assembly includes: BOARD, circuit
-71	136-0220-00		1						SOCKET, transistor, 3 pin
-72	136-0235-00		1						SOCKET, transistor, 6 pin
-73	131-0590-00		7						PIN, circuit board terminal
-74	131-0608-00		4						PIN, circuit board terminal
-75	351-0155-00		11						GUIDE, terminal lead
-76	211-0152-00		2						mounting hardware: (not included w/assembly) SCREW, 4-40 x 5/8 inch, PHS
-77	361-0212-00		2						SPACER, sleeve, plastic
-78	390-0055-00		1						CABINET, wraparound
-79	348-0138-00		4						FOOT, rubber
-80	210-0006-00		4						mounting hardware for each: (not included w/foot) LOCKWASHER, internal, #6
-81	211-0503-00		4						SCREW, 6-32 x 3/16 inch, PHS
-82	386-1458-00		1						PANEL, cabinet, rear
-83	348-0172-00		2						FOOT, cabinet, blue
-84	211-0514-00		2						mounting hardware for each: (not included w/foot) SCREW, 6-32 x 3/4 inch, PHS
-85	103-0013-00		1						ADAPTER, power cord, 3 to 2 wire
-86	012-0127-00		1						CABLE ASSEMBLY, RF, 18.5 inches long
-87	070-0903-00		2						MANUAL, instruction (not shown)

## STANDARD ACCESSORIES

## NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



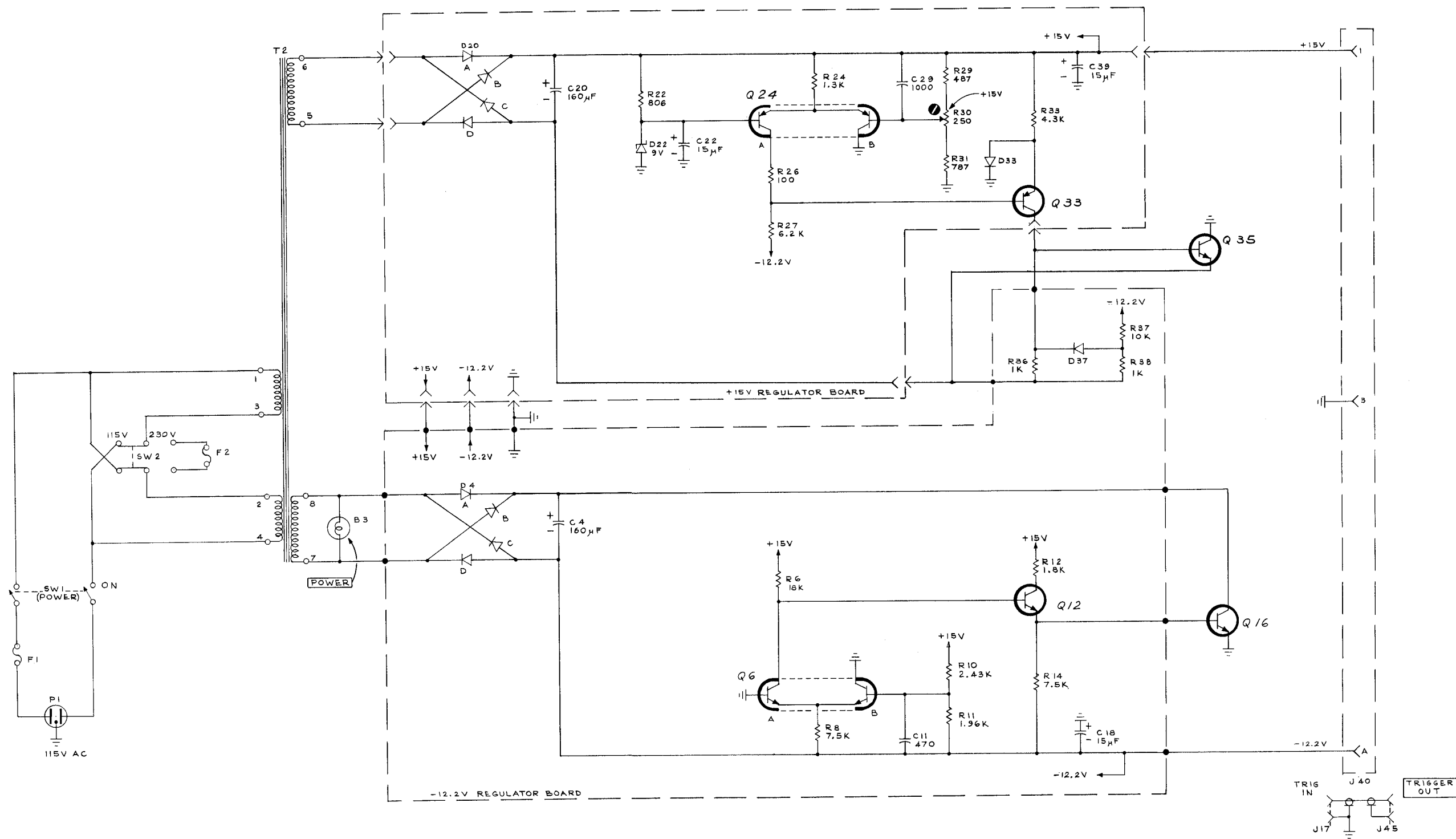
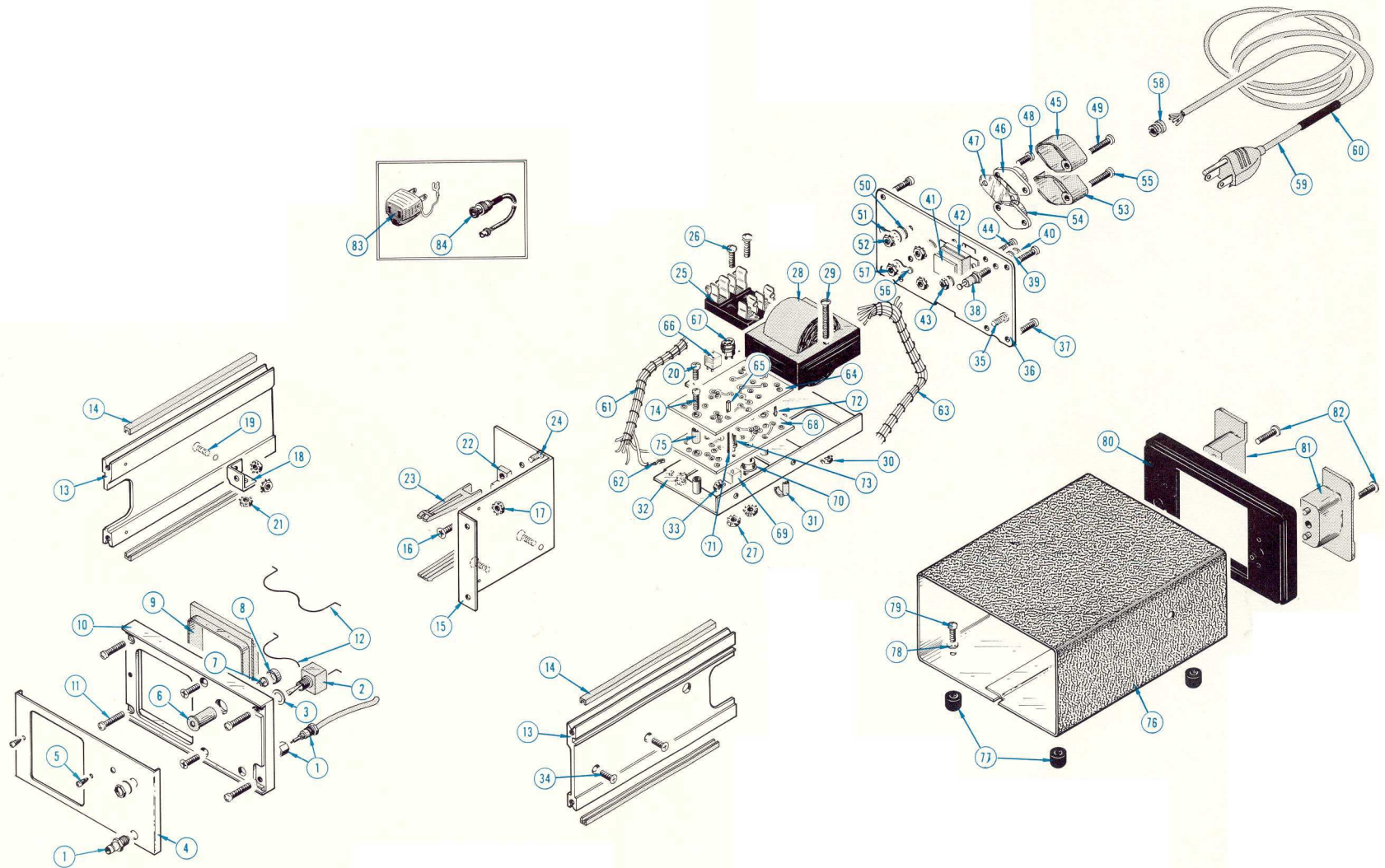


FIG. 1 EXPLODED



## **MANUAL CHANGE INFORMATION**

At Tektronix, we continually strive to keep up with latest electronic developments by adding circuit and component improvements to our instruments as soon as they are developed and tested.

Sometimes, due to printing and shipping requirements, we can't get these changes immediately into printed manuals. Hence, your manual may contain new change information on following pages.

A single change may affect several sections. Sections of the manual are often printed at different times, so some of the information on the change pages may already be in your manual. Since the change information sheets are carried in the manual until ALL changes are permanently entered, some duplication may occur. If no such change pages appear in this section, your manual is correct as printed.

TYPE 285

ELECTRICAL PARTS LIST CORRECTION

CHANGE TO:

R9

315-0224-00

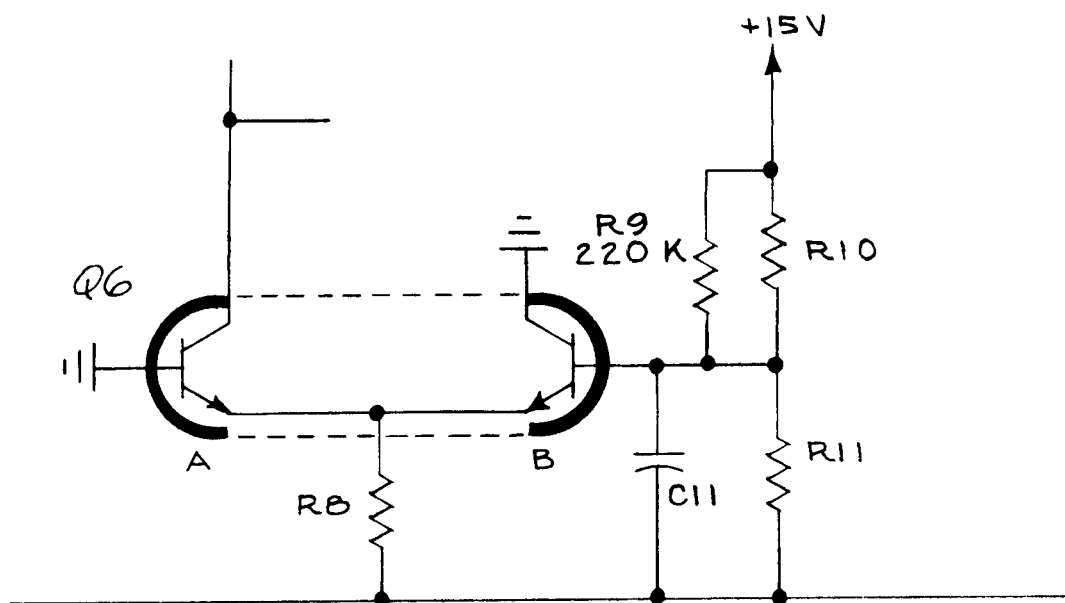
220 k $\Omega$

1/4 W

5%

SCHEMATIC CORRECTION

PARTIAL  
-12.2 V REGULATOR



M14,721/1268