

TEKTRONIX®

**067-0764-00
LOAD &
CURRENT SHUNT**

INSTRUCTION MANUAL

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077

Serial Number _____

WARRANTY

All TEKTRONIX instruments are warranted against defective materials and workmanship for one year. Any questions with respect to the warranty should be taken up with your TEKTRONIX Field Engineer or representative.

All requests for repairs and replacement parts should be directed to the TEKTRONIX Field Office or representative in your area. This will assure you the fastest possible service. Please include the instrument Type Number or Part Number and Serial Number with all requests for parts or service.

Specifications and price change privileges reserved.

Copyright © 1975 by Tektronix, Inc., Beaverton, Oregon. Printed in the United States of America. All rights reserved. Contents of this publication may not be reproduced in any form without permission of Tektronix, Inc.

U.S.A. and foreign Tektronix products covered by U.S. and foreign patents and/or patents pending.

TEKTRONIX is a registered trademark of Tektronix, Inc.

USAGE

This fixture is intended to be used with RECAL III for the adjustment of the 1140A Programable Power Supply.

FUNCTIONAL DESCRIPTION

The fixture contains passive load resistors and shunts that may be connected across the outputs of the 1140A. A digital voltmeter (DVM) may be connected to the fixture to measure the voltage across the load resistors or shunts.

The **Voltage Supply Loads** section of the fixture is independent of the Current Shunts section. The Voltage Supply Loads section consists of six switch-selectable voltage supply loads and three pairs of terminals for connecting:

1. An external load (EXT LOAD)
2. The voltage source (VOLTAGE SOURCE)
3. A digital voltmeter (DVM).

The **Current Shunts** section consists of eleven switch-selectable current shunts and three pairs of terminals for connecting:

1. An external shunt (EXT SHUNT)
2. The current source (CURRENT SOURCE)
3. A digital voltmeter (DVM).

OPERATION

A voltage supply load resistor is selected by placing the arm of its respective two-position toggle switch toward the labeled resistance value; i.e., 6Ω is selected when the arm of its switch is pointing toward the 6Ω label. The External Load terminals are selected by not selecting a labeled load resistor. When using the Voltage Supply Loads, select only one resistance value at a time. If, inadvertently, multiple resistors are selected, the left-most resistance value is used as the load value. The RECAL R1140A procedure will indicate which resistance value to select during a Recal operation.

NOTE

Connect positive supply and DVM polarities to the red terminals on this fixture.

A current shunt resistor is selected by positioning the arm of its respective toggle switch toward the labeled value of the resistor. The External Shunt terminals are selected by not selecting a labeled shunt resistor. If more than one shunt resistor is selected, the right-most shunt resistor is selected. The RECAL R1140A or ISICAL procedures will indicate which values are to be selected.

NOTE

Connect positive supply and DVM polarities to the red terminals on this fixture.

During a RECAL function, only the VOLTAGE SOURCE terminals are switched to the VOLTAGE SUPPLY LOADS and only the CURRENT SOURCE terminals are switched to the CURRENT SHUNTS.

SPECIFICATIONS

Table 1 lists the uses of the various switch selections.

TABLE 1

Resistor Selection	Use	Notes
Voltage Supply Loads, All values	Used for checking the regulation and AC stability of the 1140A voltage supplies.	High wattage, wire-wound, and not fuse protected.
Current Shunts 1 M Ω , 10 k Ω , 1 k Ω , and 10 Ω	Used for adjusting the 1140 current supply.	Low wattage, precision, fuse protected (see accuracy check procedure)
1 Ω	Used to check the current limits of the 1140A voltage supplies.	Low wattage, precision fuse protected (see accuracy check procedure)
0.8 Ω , 0.4 Ω , 0.2 Ω , 0.1 Ω , 0.5 Ω , and 0.02 Ω	Used for checking the MC-3 current measurement option.	RECAL does not check the MC-3 option.

ACCURACY CHECK

The 1 Ω , 10 Ω , 1 k Ω , and 10 k Ω shunts are used for 1140A calibration adjustments. Accordingly, their accuracies should be checked every six months.

Equipment required:

1. DANA 5900 DVM with Ohms Option 52 or equivalent, accuracy checked within 90 days, traceable to NBS.
2. Four leads for connecting the DVM to the fixture setup:
 - a. Connect current source of DANA 5900 to current source terminals on the fixture.
 - b. Connect voltage sense terminals of DANA 5900 to CURRENT SHUNT DVM terminals on the fixture.

Procedure: (All switches not mentioned in a step are in the off position.)

1. Turn on 1 Ω switch. Verify that the resistance measured with the DANA 5900 on the 10 Ω range is $1 \pm .0015 \Omega$.
2. Turn on 10 Ω switch. Verify that the resistance measured with DANA 5900 on 10 Ω range is $10 \pm .0003 \text{ k}\Omega$.
3. Turn on 1 k switch. Verify that the resistance measured with DANA 5900 on 1 k Ω range is $1 \pm .0003 \text{ k}\Omega$.
4. Turn on 10 k switch. Verify that the resistance measured with DANA 5900 on 10 k Ω range is $10 \pm .0030 \text{ k}\Omega$.
5. Replace any resistors that exceed the specified limits. If several resistors are out of limits, check the accuracy of the DVM.

REPLACEABLE PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000 Part first added at this serial number

00X Part removed after this serial number

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
CKT	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICOND	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	VAR	VARIABLE
INCAND	INCANDESCENT	WW	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
04009	ARROW-HART, INC.	103 HAWTHORNE ST.	HARTFORD, CT 06106
12327	FREEWAY CORP.	9301 ALLEN DR.	CLEVELAND, OH 44125
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
58474	SUPERIOR ELECTRIC CO., THE	383 MIDDLE ST.	BRISTOL, CT 06010
63743	WARD LEONARD ELECTRIC CO., INC.	31 SOUTH ST.	MOUNT VERNON, NY 10550
70485	ATLANTIC INDIA RUBBER WORKS, INC.	571 W. POLK ST.	CHICAGO, IL 60607
71400	BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
75042	TRW ELECTRONIC COMPONENTS, IRC FIXED RESISTORS, PHILADELPHIA DIVISION	401 N. BROAD ST.	PHILADELPHIA, PA 19108
75915	LITTELFUSE, INC.	800 E. NORTHWEST HWY	DES PLAINES, IL 60016
78189	ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
80009	TEKTRONIX, INC.	P. O. BOX 500	BEAVERTON, OR 97077
82389	SWITCHCRAFT, INC.	5555 N. ELSTON AVE.	CHICAGO, IL 60630
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NB 68601

Electrical Parts List—067-0764-00

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
F10	159-0112-00		FUSE, CARTRIDGE: 3AG, 0.01A, 250V, FAST-BLOW	71400	AGC1/100
F20	159-0112-00		FUSE, CARTRIDGE: 3AG, 0.01A, 250V, FAST-BLOW	71400	AGC1/100
F30	159-0061-00		FUSE, CARTRIDGE: 0.031A, 250V, SLOW-BLOW	75915	313-031
F41	159-0028-00		FUSE, CARTRIDGE: 3AG, 0.25A, 250V, FAST-BLOW	71400	AGC 1/4
F50	159-0043-00		FUSE, CARTRIDGE: 3AG, 0.6A, 250V, SLOW-BLOW	71400	MDL 6/10
F60	159-0054-00		FUSE, CARTRIDGE: 3AG, 0.5A, 250V, SLOW-BLOW	71400	MDL15/100
F70	159-0029-00		FUSE, CARTRIDGE: 0.3A, 3AG, SLO-BLOW	71400	MDL3/10
F80	159-0032-00		FUSE, CARTRIDGE: 3AG, 0.5A, SLOW-BLOW	71400	MDL 1/2
F90	159-0019-00		FUSE, CARTRIDGE: 3AG, 1A, 250V, SLOW BLOW	71400	MDL1
F100	159-0021-00		FUSE, CARTRIDGE: 3AG, 2A, 250V, FAST-BLOW	71400	AGC 2
F110	159-0006-00		FUSE, CARTRIDGE: 3AG, 5A, 125V, SLOW-BLOW	71400	MDX5
R200	308-0219-00		RES., FXD, WW: 6 OHM, 5%, 25W	91637	HL2502Z66R000J
R210	308-0219-00		RES., FXD, WW: 6 OHM, 5%, 25W	91637	HL2502Z66R000J
R220	308-0233-00		RES., FXD, WW: 25 OHM, 5%, 25W	91637	HL2517Z625R00J
R230	308-0035-00		RES., FXD, WW: 125 OHM, 5%, 25W	91637	HL2502Z6125R0J
R240	308-0029-00		RES., FXD, WW: 400 OHM, 5%, 2W	91637	HL2502Z6400R0J
R250	308-0037-00		RES., FXD, WW: 1K OHM, 5%, 25W	91637	HL2502Z610000J
S1	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S10	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S20	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S30	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S41	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S50	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S60	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S70	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S80	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S90	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S100	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S110	260-0878-00		SWITCH, SLIDE: 2 SECT, 0.5A, 125 VAC-DC	82389	11E1021A
S200	260-0209-00		SWITCH, TOGGLE: 1A, 250 VAC OR DC	04009	810218JF
S210	260-0209-00		SWITCH, TOGGLE: 1A, 250 VAC OR DC	04009	810218JF
S220	260-0209-00		SWITCH, TOGGLE: 1A, 250 VAC OR DC	04009	810218JF
S230	260-0209-00		SWITCH, TOGGLE: 1A, 250 VAC OR DC	04009	810218JF
S240	260-0209-00		SWITCH, TOGGLE: 1A, 250 VAC OR DC	04009	810218JF
S250	260-0209-00		SWITCH, TOGGLE: 1A, 250 VAC OR DC	04009	810218JF
	670-4223-00		CKT BOARD ASSY: 1140A RECAL CURRENT SHUNT	80009	670-4223-00
R10	321-0481-00		RES., FXD, FILM: 1M OHM, 1%, 0.125W	75042	CEATO-1004F
R20	308-0738-00		RES., FXD, WW: 10K OHM, 0.01%, 0.5W	91637	WWA26-H10001L
R30	308-0737-00		RES., FXD, WW: 1K OHM, 0.01%, 1W	91637	WWA38-H10000L
R40	308-0078-00		RES., FXD, WW: 70 OHM, 5%, 5W	63743	7686
R41	308-0785-00		RES., FXD, WW: 10 OHM, 0.01%, 1W	80009	308-0785-00
R50	308-0770-00		RES., FXD, WW: 1 OHM, 0.1%, 3W	80009	308-0770-00
R60	307-0468-00		RES., FXD, FOIL: 0.8 OHM	80009	307-0468-00
R70	307-0468-00		RES., FXD, FOIL: 0.8 OHM	80009	307-0468-00
R71	307-0468-00		RES., FXD, FOIL: 0.8 OHM	80009	307-0468-00
R80	307-0467-00		RES., FXD, FOIL: 0.2 OHM	80009	307-0467-00
R90	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-00
R100	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-00
R101	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-02
R110	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-02
R111	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-02
R112	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-02
R113	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-02
R114	307-0346-02		RES., FXD, FOIL: 1 OHM, 0.1%	80009	307-0346-02

1140A LOAD & CURRENT SHUNT

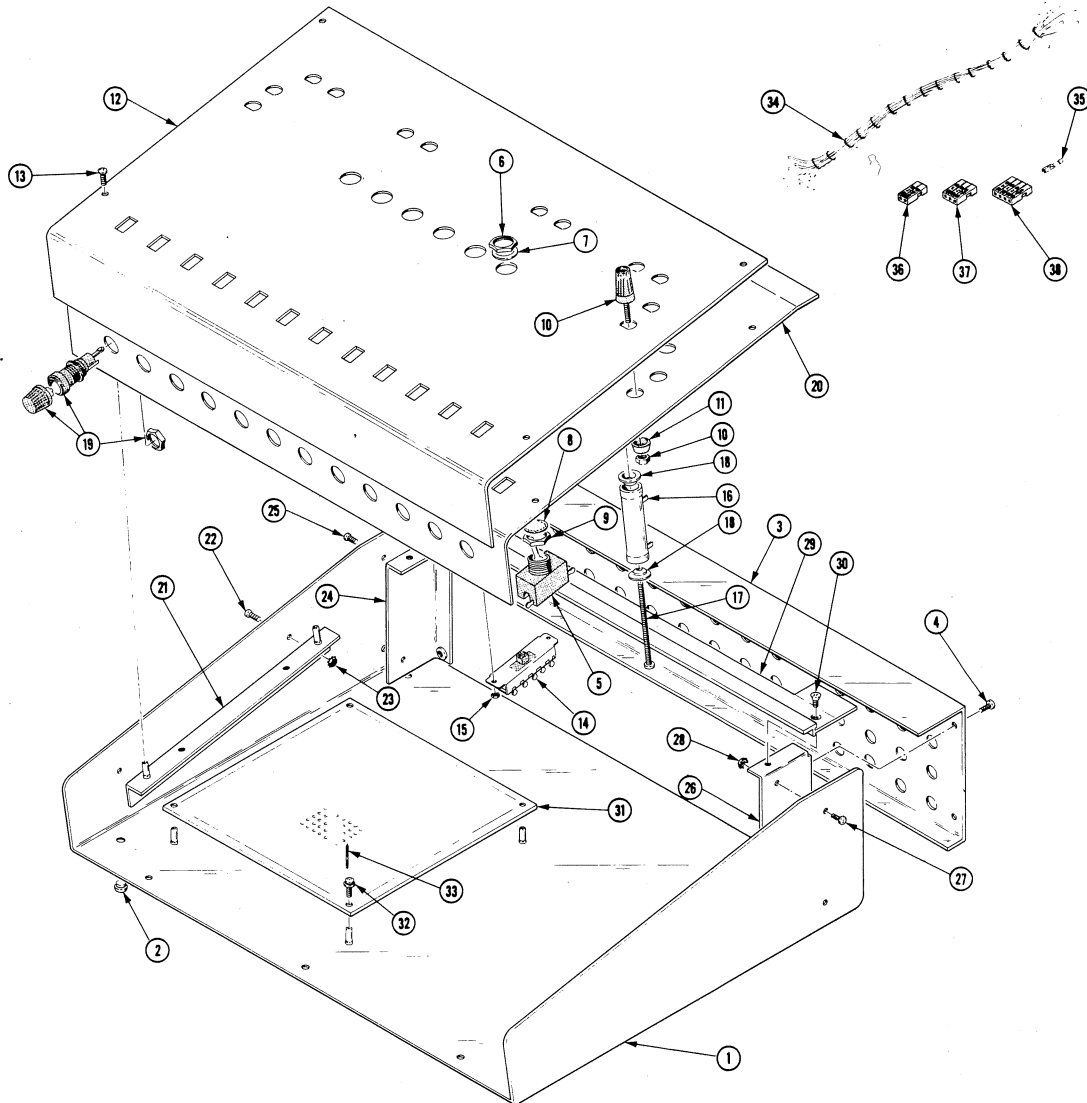
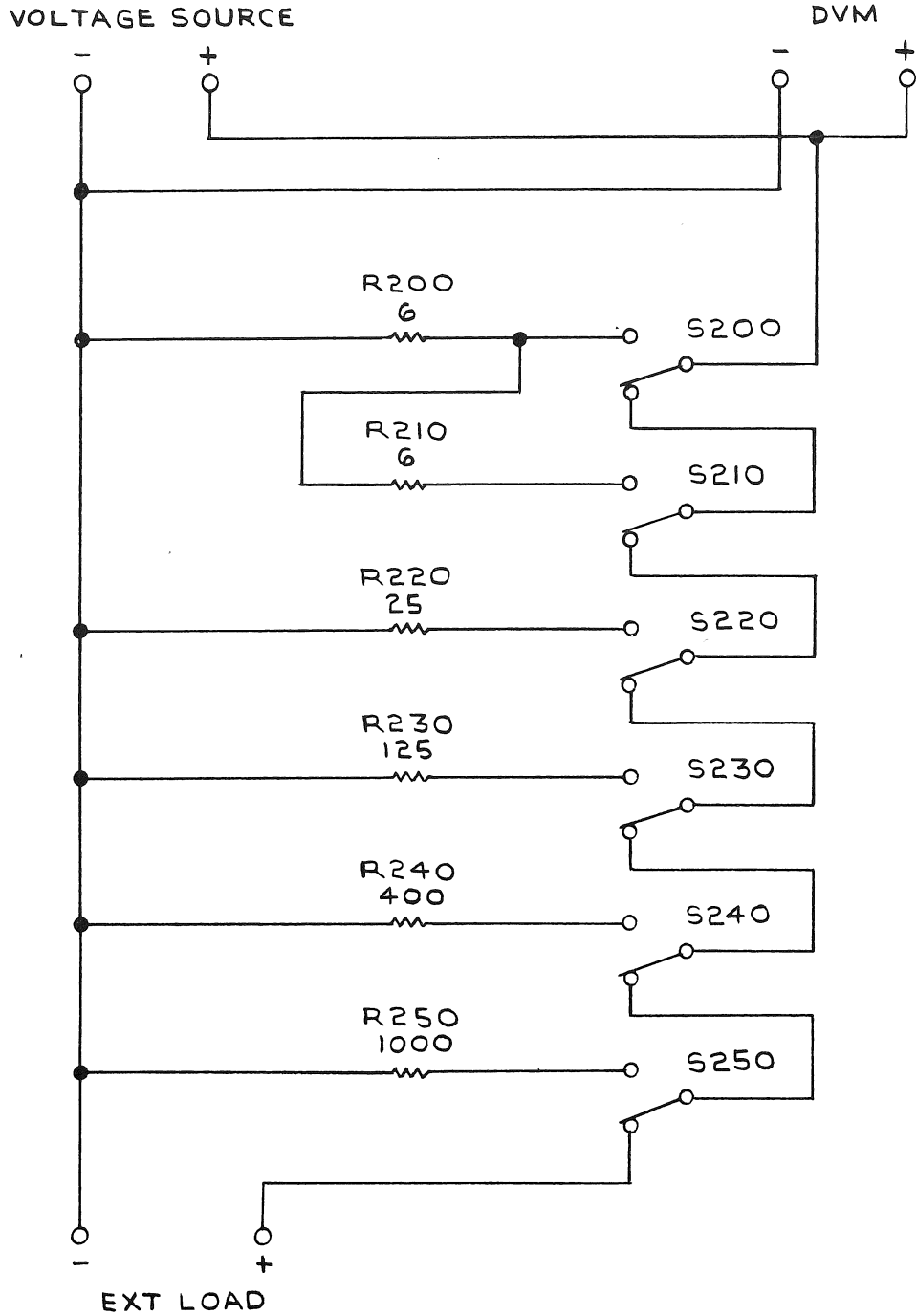


Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	Name & Description					Mfr Code	Mfr Part Number
					1	2	3	4	5		
1-1	390-0336-00			1						80009	390-0336-00
-2	348-0013-00			4						70485	1561
-3	386-2436-01			1						80009	386-2436-01
-4	211-0504-00			4						83385	OBD
-5	260-0209-00			6						04009	810218JF
-6	210-0473-00			1						80009	210-0473-00
-7	210-0902-00			1						12327	OBD
-8	210-0021-00			1						78189	1222-01-00-0541C
-9	210-0408-00			1						73743	3040-402
-10	129-0064-00			6						58474	BINP BB10167G13T
-11	358-0181-00			1						58474	BB10166G13BX
	129-0064-01			6						58474	BB10167G2BX
	358-0181-01			1						58474	BB1066G2

Mechanical Parts List—067-0764-00

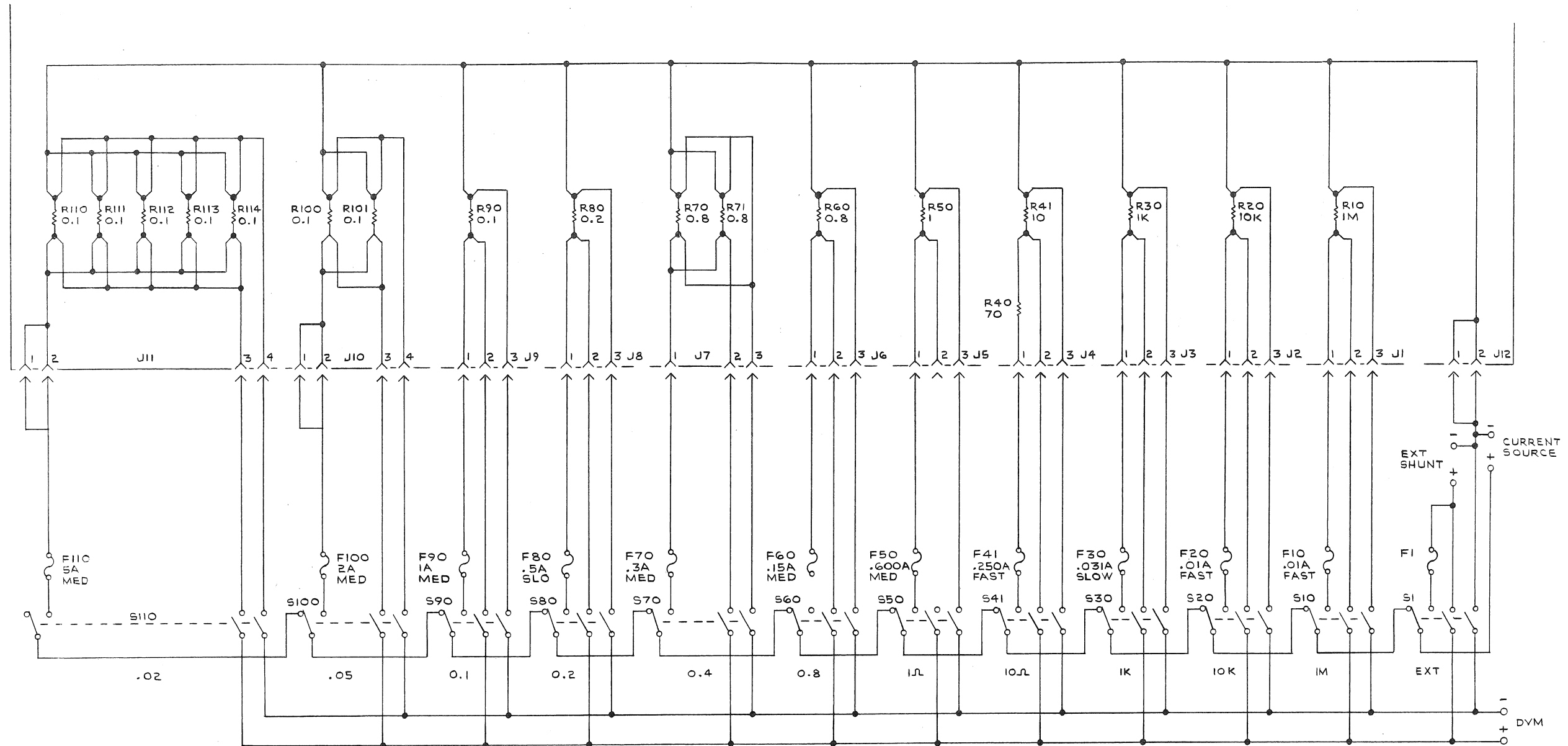
Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Model No. Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
-12	333-2102-00			1						PANEL,FRONT: (ATTACHING PARTS)	80009	333-2102-00
-13	211-0097-00			4						SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL - - - * - - -	83385	OBD
-14	260-0878-00			12						SWITCH,SLIDE:2 SECT,0.5A,125VAC-DC (ATTACHING PARTS FOR EACH)	82389	11E1021A
-15	210-0406-00			2						NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS - - - * - - -	73743	2X12161-402
-16	-----			6						RES.,WIREWOUND:(SEE R200,R210,R220,R230,R240,R250 EPL) (ATTACHING PARTS FOR EACH)		
-17	211-0552-00			1						SCREW,MACHINE:6-32 X 2 INCH,PNH STL	83385	OBD
-18	210-0808-00			2						EYELET,METALLIC:CENTERING - - - * - - -	63743	2515113-3TP-909
-19	352-0076-00			12						FUSEHOLDER:W/HARDWARE	75915	342012
-20	386-3463-00			1						SUBPANEL,KYBD: (ATTACHING PARTS)	80009	386-3463-00
	210-0408-00			3						NUT,PLAIN,HEX.:6-32 X 0.312 INCH,BRS - - - * - - -	73743	3040-402
-21	407-1032-00			2						BRACKET,ANGLE:KEYBOARD COVER,LEFT AND RIGHT (ATTACHING PARTS FOR EACH)	80009	407-1032-00
-22	211-0097-00			2						SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
-23	210-0586-00			2						NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL - - - * - - -	78189	OBD
-24	407-1034-00			1						BRACKET,ANGLE:REAR PNL MTG,LEFT (ATTACHING PARTS)	80009	407-1034-00
-25	211-0097-00			2						SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
	210-0586-00			2						NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL - - - * - - -	78189	OBD
-26	407-1035-00			1						BRACKET,ANGLE:REAR PNL MTG,RIGHT (ATTACHING PARTS)	80009	407-1035-00
-27	211-0097-00			2						SCREW,MACHINE:4-40 X 0.312 INCH,PNH STL	83385	OBD
-28	210-0586-00			2						NUT,PLAIN,EXT W:4-40 X 0.25 INCH,STL - - - * - - -	78189	OBD
-29	426-0979-01			1						FR SECT,CAL FIX:UPPER FRONT (ATTACHING PARTS)	80009	426-0979-01
-30	211-0541-00			2						SCREW,MACHINE:6-32 X 0.25"100 DEG,FLH STL - - - * - - -	83385	OBD
-31	-----			1						CKT BOARD ASSY:RECAL CURRENT SHUNT(SEE EPL) (ATTACHING PARTS)		
-32	211-0116-00			4						SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS - - - * - - -	83385	OBD
	-----			-						. CKT BOARD ASSY INCLUDES:		
-33	131-0589-00			25						. CONTACT,ELEC:0.46 INCH LONG	22526	47350
-34	179-2373-00			1						WIRING HARNESS:SWITCH #1	80009	179-2373-00
-35	131-0621-00			25						. CONTACT,ELEC:0.577"L,22-26 AWG WIRE	22526	46231
-36	352-0198-02			1						. CONN BODY,PL,EL:2 WIRE RED	80009	352-0198-02
-37	352-0200-00			1						. CONN BODY,PL,EL:4 WIRE BLACK	80009	352-0200-00
	352-0200-01			1						. CONN BODY,PL,EL:4 WIRE BROWN	80009	352-0200-01
-38	352-0199-09			1						. CONN BODY,PL,EL:3 WIRE WHITE	80009	352-0199-09
	352-0199-08			1						. CONN BODY,PL,EL:3 WIRE GRAY	80009	352-0199-08
	352-0199-07			1						. CONN BODY,PL,EL:3 WIRE VIOLET	80009	352-0199-07
	352-0199-06			1						. CONN BODY,PL,EL:3 WIRE BLUE	80009	352-0199-06
	352-0199-05			1						. CONN BODY,PL,EL:3 WIRE GREEN	80009	352-0199-05
	179-2374-00			1						WIRING HARNESS:SWITCH #2	80009	179-2374-00
	131-0621-00			12						. CONTACT,ELEC:0.577"L,22-26 AWG WIRE	22526	46231
	352-0199-01			1						. CONN BODY,PL,EL:3 WIRE BROWN	80009	352-0199-01
	352-0199-02			1						. CONN BODY,PL,EL:3 WIRE RED	80009	352-0199-02
	352-0199-03			1						. CONN BODY,PL,EL:3 WIRE ORANGE	80009	352-0199-03
	352-0199-04			1						. CONN BODY,PL,EL:3 WIRE YELLOW	80009	352-0199-04
	179-2375-00			1						WIRING HARNESS:POWER SUPPLY	80009	179-2375-00
STANDARD ACCESSORIES												
	070-3219-00			1						MANUAL,TECH:INSTRUCTION	80009	070-3219-00



1140A LOAD AND
CURRENT SHUNT FIXTURE
067-0764-00

VOLTAGE SUPPLY LOAD
RESISTOR WIRING

475 EKP



1140A LOAD AND CURRENT SHUNT FIXTURE
067-0764-00

CURRENT SHUNT WIRING 475
EKP