

BATTERY CHARGING CIRCUIT UPDATE

For TEKTRONIX 1503B METALLIC TDR CABLE TESTERS

SERIAL NUMBERS R010100 - R010790

This Modification Kit contains parts and new firmware to improve the operation of the power supply under chart recorder load when operated by the battery pack. Without the mod, instruments will not meet the 5 hour/20 chart recording specification and the chart recorder may print black lines in place of the displayed pulse when the battery is low.

Note: The Serial Number Range is approximate. There are products below the serial number break that may have had the Update installed. Products containing the mod will have R02XXXX serial numbers or will have "UPD R02" sticker on the rear panel. Service Update kits 045-0140-01 and 045-0141-01 are not superceded by this kit (except for the firmware).

## KIT PARTS LIST

CKT. NO.	QUANTITY	PART NUMBER	DESCRIPTION
C2013	1 EA	283-0198-00	CAP, FXD CERAMIC, .22UF, 50V
R1020	1 EA	321-0189-00	RES, FILM:909 OHM, 1%, 0.125W
R1021	1 EA	321-0293-00	RES, FILM:11K OHM, 1%, 0.125W
R1022	1 EA	321-0191-00	RES, FILM:953 OHM, 1%, 0.125W
*CR1034	1 EA	152-0779-00	DI/RECT, SI, 200V, 0.75A
U2020	1 EA	160-4413-05	MICROCKT, DGTL:CMOS, 256K BIT
-----	1 EA	-----	LABEL, IDENT

\* CR1034 may not need to be replaced on some instruments.

INSTRUCTIONS:

WARNING

Dangerous shock hazards may be exposed when the instrument covers are removed. Before proceeding, ensure the power switch is in the off position. Then, disconnect the instrument from the power source.

- ( ) 1. Remove the front cover from the instrument.
- ( ) 2. Remove the battery pack from the rear of the instrument.
- ( ) 3. Loosen the four (4) screws on the back of the case and set the instrument face up on a flat surface. Swing the handle out of the way of the front panel. Release the chassis seal by pushing downward with both handle pivots on each side of the case.
- ( ) 4. Grasp the case with one hand, and lift the chassis out with the other hand. Lift by grasping the outside perimeter of the front panel.

CAUTION

Do not use the front panel controls to lift the instrument from the cabinet.

- ( ) 5. Remove the screw in the center of the bottom EMI shield.
- ( ) 6. Remove the EMI shields from the top and bottom of the chassis by gently running a screwdriver between the shield and the groove in the chassis rail.
- ( ) 7. Remove the Power Supply Module as follows:
  - ( ) a. Unplug the 2-conductor and the 4-conductor multi-pin connectors and the multi-conductor cable connector from the Power Supply circuit board.
  - ( ) b. Remove the screw located below the power switch on the side panel.

- ( ) c. Remove the screw located below the battery connector posts that secures the Power Supply Module to the Main circuit board mounting plate.
- ( ) d. Remove the two screws holding the Power Supply Module to the main chassis. One screw is located above the fuseholder and the other is located to the left of the power cord receptacle.
- ( ) e. Remove the Power Supply Module from the instrument. As the module is being removed, guide the power switch away from the mechanical linkage assembly and the black shielded cable in the center of the instrument.
- ( ) 8. Remove the Power Supply circuit board as follows:
  - ( ) a. Remove the four screws holding the Power Supply circuit board to the module.
  - ( ) b. Loosen the screw located behind J1010 on the Power-Supply Module Chassis.
  - ( ) c. Remove the Power Supply circuit board by carefully lifting up. Be sure the large capacitor (C1010) on the bottom of the board clears the nut block on the module chassis. (It may also help to loosen the screw holding the nut block on the side of the Module chassis.
- ( ) 9. Replace the following components on the Power Supply circuit board with the appropriate parts provided in the kit as follows:
  - ( ) a. Replace R1020 (237 Ohm) with the 909 Ohm resistor.
  - ( ) b. Replace R1021 (11.8 K Ohm) with the 11 K Ohm resistor.
  - ( ) c. Replace R1022 (1.1 K Ohm) with the 953 Ohm resistor.
  - ( ) d. Check the manufacturer's part number of CR1034; it should be "RW02M". If CR1034 is not marked with "RW02M" on the part, then replace it with the pn 152-0779-00 diode provided in the kit. If you do not use this part, return it along with the returned EPROM.
- ( ) 10. Install the 283-0198-00 capacitor between R2014 and R2015 as shown in Fig. 1. Caution: Use care when prepping the capacitor for installation; if the capacitor leads are bent too close to the body, the component may short or open internally.

- ( ) 11. Reassemble the Power Supply Module. Install the Power Supply Module in the instrument using the reverse of the disassembly procedure.
- ( ) 12. On the Main circuit board, replace U2020 with the microcircuit (pn 160-4413-05) provided in the kit. Refer to Fig. 2.
- ( ) 13. Verify Power Supply performance using the attached updated pages of the Service Manual DC Power Check.
- ( ) 14. Install and secure the EMI shields (top and bottom).
- ( ) 15. Install the instrument in the cabinet.
- ( ) 16. Turn the instrument power on and verify that the Firmware level at initialization is Version 4.74.
- ( ) 17. Verify instrument performance using the Performance Verification Procedure in Section 3 of the Service Manual.

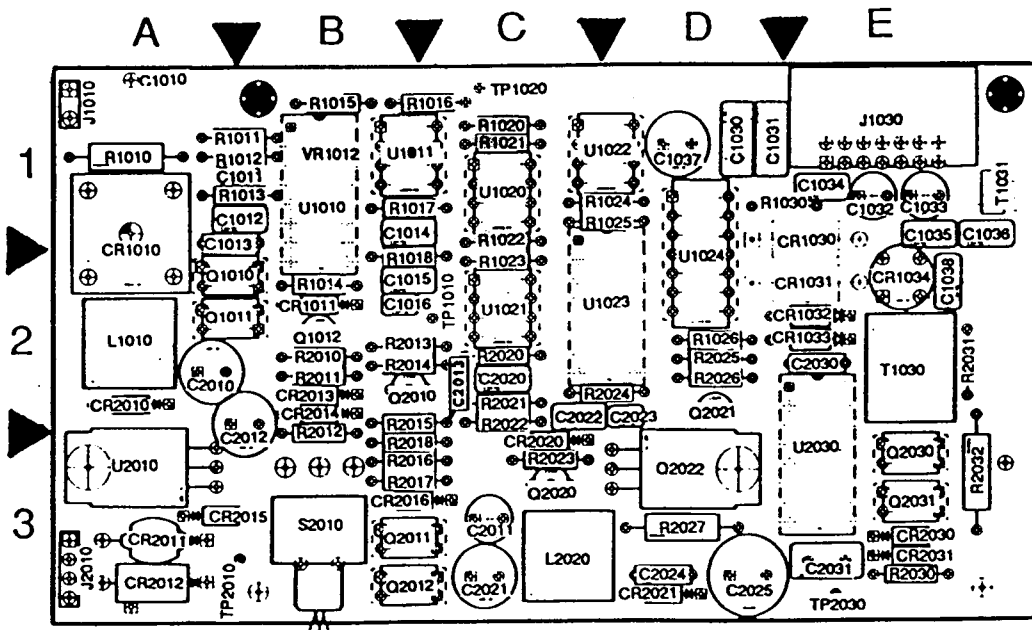


Fig. 9-2. Assembly A3A1 Power Supply board.

FIG. 1

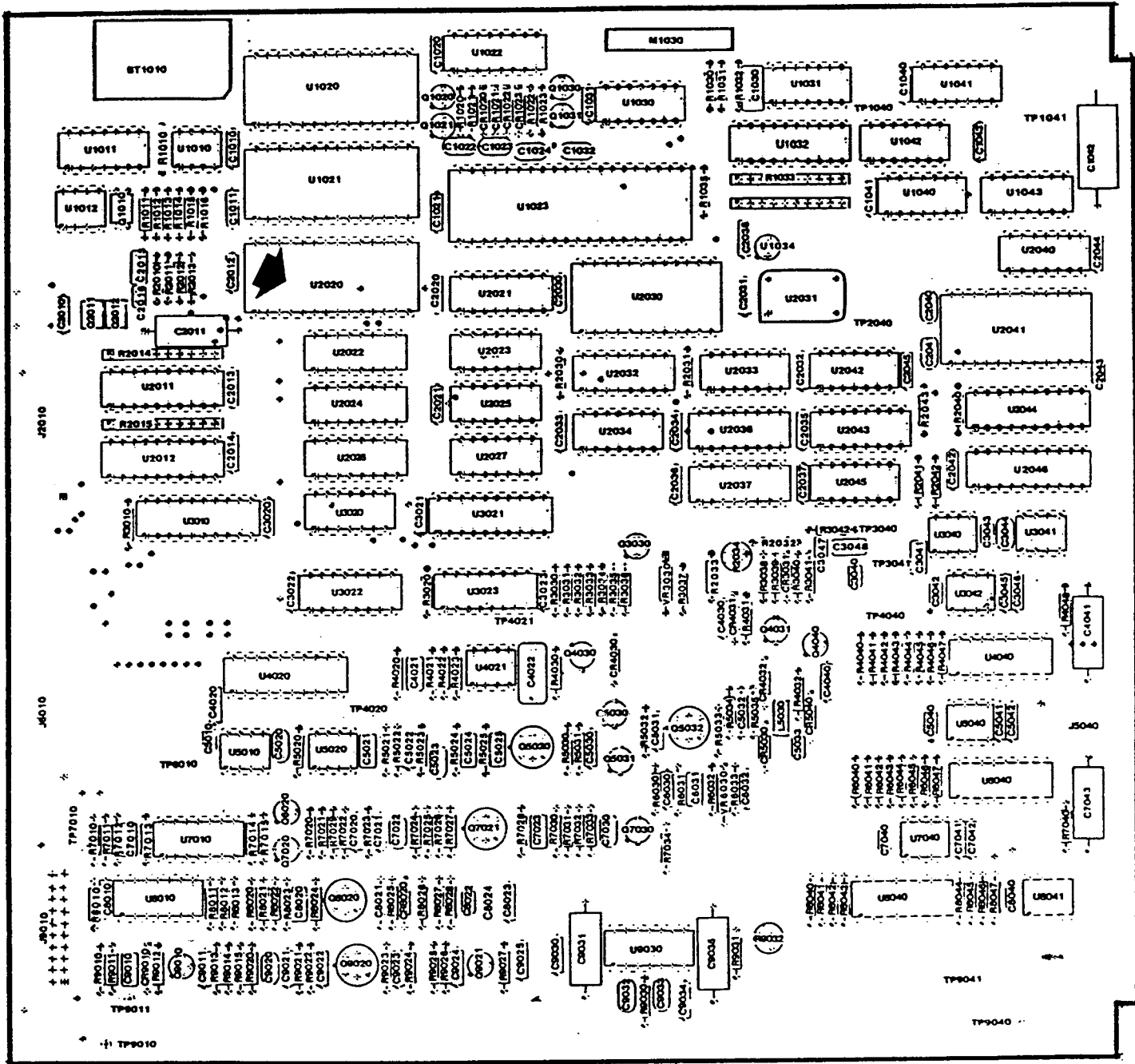


Figure 3. Main circuit board showing location of U2020.

FIG. 2

- ( ) 18. For future reference, incorporate the attached Manual Change Information into the Service Manual.
- ( ) 19. Complete the attached Installation Report and forward the report to Tektronix, Inc. Redmond, OR. M/S R1-000. Do not include the Installation Report with the materials being returned to the Repair Center.

IMPORTANT

The successful completion of this Update Program relies entirely on the prompt return of the replaced microcircuits and any unneeded 152-0779-00's. Please return the material promptly.

Ensure all return material is properly packaged. If possible, use the same shipping material in which it was received.

SHIP RETURN MATERIAL TO:

Tektronix, Inc.  
P.O. Box 500  
Beaverton, OR 97077  
DS: 78-625  
ATTN: Bill Parsons

## POWER SUPPLY CHECKS AND ADJUSTS

### Power Up Procedure

1. Set front panel controls:
 

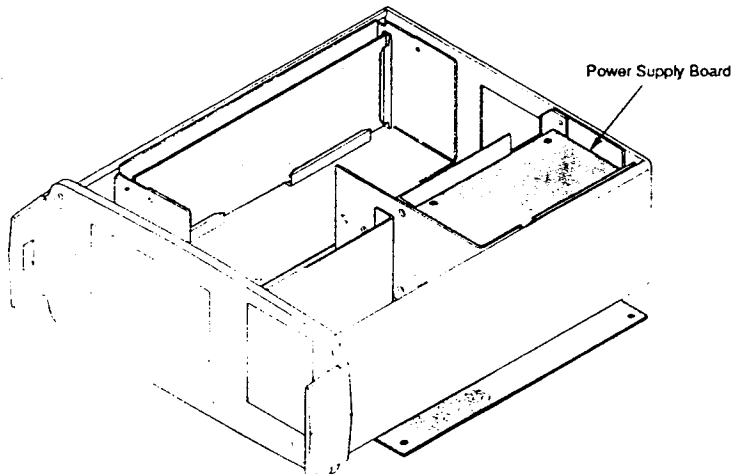
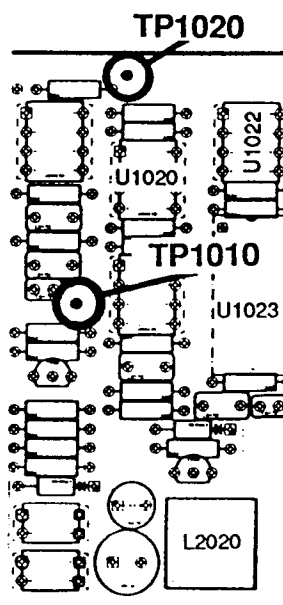
NOISE FILTER	1 avg (3rd stop CW)
DIST/DIV	1 ft/DIV (4th stop CW)
$V_p$	.99
  
2. Make sure the POWER switch is in the OFF position.
  
3. Connect the 115 VAC output of the Variac into the AC socket in the rear of the 1502B.

### Power Supply Voltage Checks

1. Turn on the POWER switch. Observe that the power drawn does not go over 4 watts on the Variac.

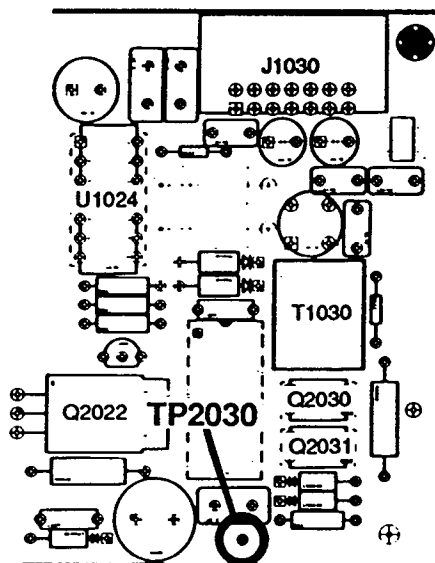
*The following test points are located on the power supply board.*

2. Connect the positive (+) voltmeter probe to TP1020 (16.6V). (This test point may be marked "15.8V" on some power supplies.) Connect the negative (-) probe to TP1010 (ground). Verify that the supply voltage is 16.6 VDC and there is minimal current drawn (< 2 watts) from the Variac.





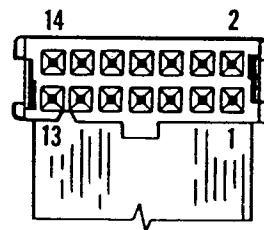
- The negative (+) voltmeter probe should remain connected to ground. Connect the voltmeter positive (+) probe to TP2030 and verify the voltage listed in the table below.



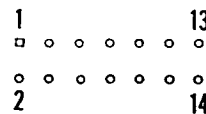
- Make a mental note of the location where the ribbon cable from the power supply is plugged into the main board. Turn the instrument over.

*NOTE: When the instrument is turned over, you are looking at the TOP (component) side of the main board.*

The J5040 pins go through the circuit board and appear on the top (component) side of the main board. J5040 and P5040 is the input from the power supply. The other end of the cable is J1030 and P1030 on the power supply board. Measure the voltages on the pins listed in the table below and verify the supply voltages.



Connector plug P5040 on bottom of Main Board.



Connector pin J5040 on top of Main Board.

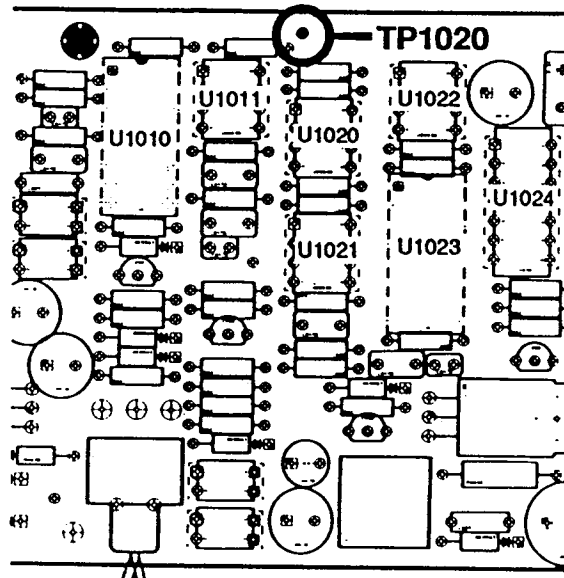
Supply	Range	Test Point	Location
16.2 VDC	15.9 to 16.4 VDC	TP2030	Power Supply board
+5.0 VDC	4.85 to 5.25 VDC	Pin 1, J5040	Main board
-5.0 VDC	-4.85 to -5.25 VDC	Pin 3, J5040	Main board
+15.0 VDC	14.7 to 15.3 VDC	Pin 4, J5040	Main board
-15.0 VDC	-14.7 to -15.3 VDC	Pin 6, J5040	Main board

1503B Service - Calibration

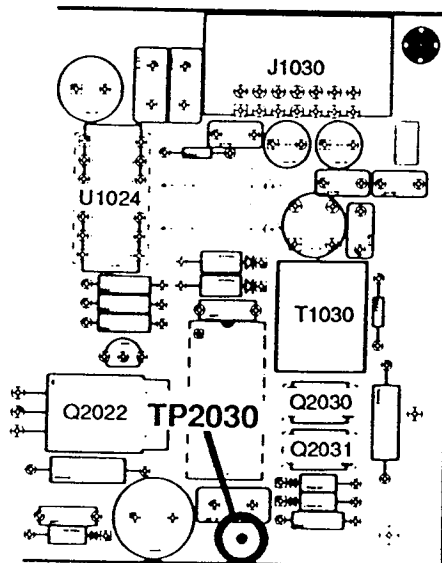
**Range Check**

*The following test points are located on the power supply board.*

1. Turn the instrument over. Connect the positive (+) probe to the 16.6 VDC supply (TP1020) on the power supply board.
2. Change the AC output voltage on the Variac to 132 VAC. Verify that the 16.6 VDC supply remains regulated (16.4 to 16.8 VDC).
3. Reduce the Variac output voltage to 90 VAC. Verify that the 16.6 VDC supply is still regulated (16.4 to 16.8 VDC).



4. Move the positive (+) probe to the 16.2 VDC supply (TP2030). Reduce the Variac output voltage until the 16.2 VDC (and the instrument) shut down. This voltage must be lower than 90 VAC.
5. Raise the Variac output voltage to 120 VAC. The instrument should remain shut down.
6. Turn 1502B POWER off.

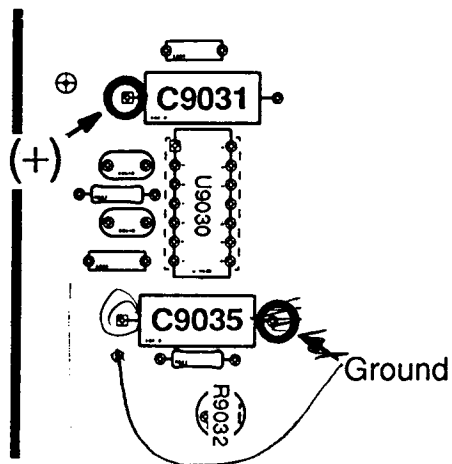


## Main board $\pm 12$ V

### 1. +12 V

The following test points are located on the main board.

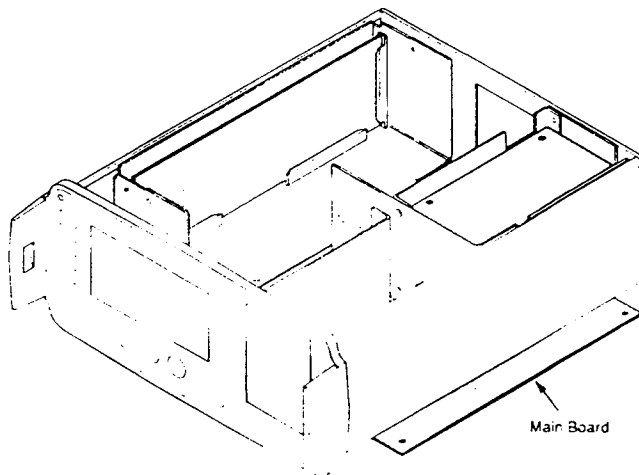
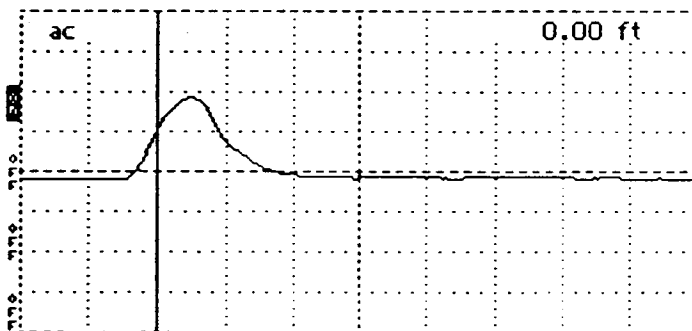
- A. Turn the instrument over to access the main board. Attach the positive + probe from the voltmeter to the + side (the side facing the edge of the board) of C9031. Attach the negative (-) probe to the other side of C9031.
- B. Turn on the instrument **POWER** and check for less than 4 watts drawn from the Variac.
- C. Adjust R9032 for 12.0 VDC.



### 2. -12V

The following test points are located on the main board.

- A. Move the positive + probe to the - side of C9035 (the side farthest from the edge of the board). Verify voltage is  $-11.8$  to  $-12.2$  VDC.
- B. Verify that the LCD has the following display. You may have to adjust R1014 (Contrast Adjust) on the front panel board to get a clear display (see *LCD Check and Adjust* in this section).



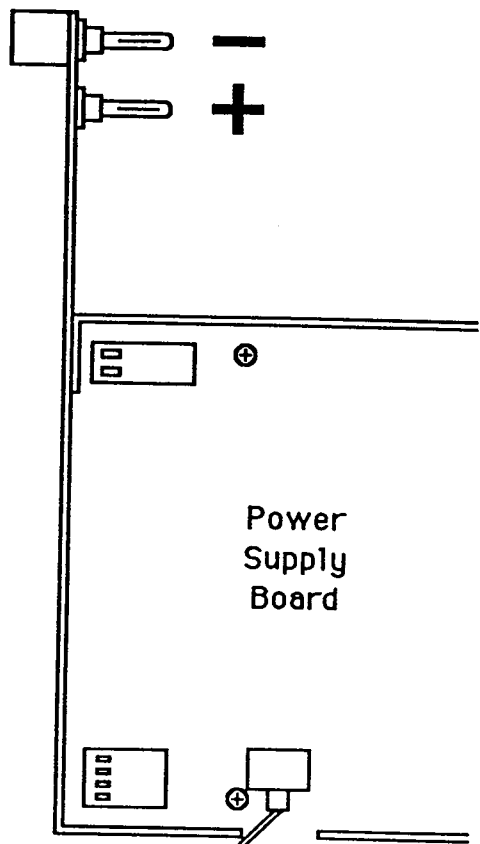
## DC Power Check

1. Turn POWER off. Remove the AC plug from the rear of the instrument.

2. Connect an external 12 VDC power supply into the battery pack port jacks. Make sure you observe proper polarity. The positive side of the battery pack port is next to the power supply. Negative is next to the Driver/Sampler board cover.

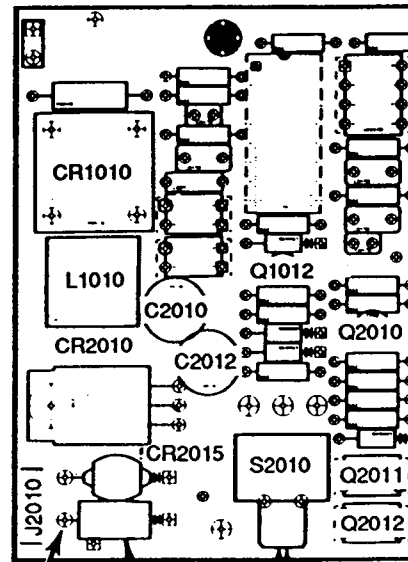
3. Adjust the external 12 VDC supply for +11.5 V output at the terminals of the battery input.

4. Connect a DC ammeter in series with the positive (+) side of the 12 VDC supply. The current measurement must not exceed 350 mA.



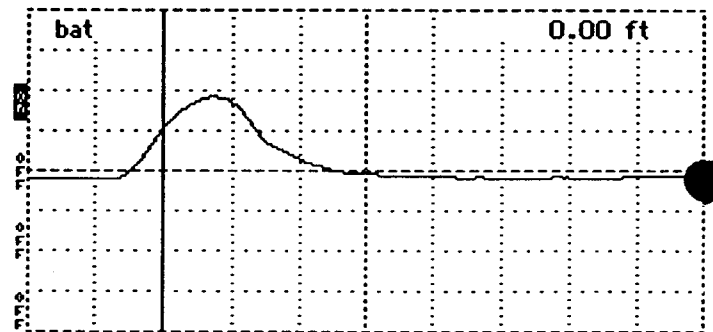
The following test points are located on the power supply board.

5. Connect the positive (+) lead of the voltmeter to the front side of CR2012. (This is the large diode next to J2010 near the front of the power supply board. Positive probe should be on the *non-banded* end of the diode.) Connect the negative (-) lead to ground.

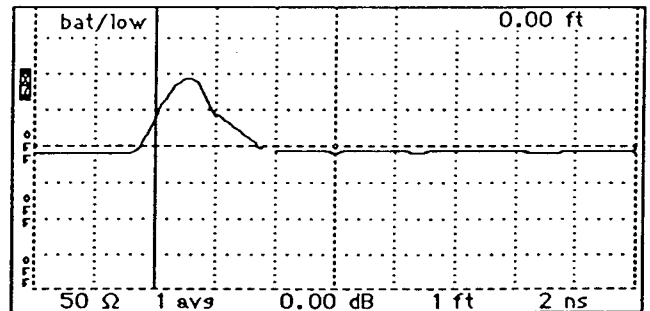


(+) CR2012

6. Turn on the 1502B POWER. The instrument should initialize and go into normal operation. The display will be normal except "AC" in the upper left corner will have changed to "bat".



7. Reduce the output voltage of the DC power supply until the words "bat/low" appear in the upper left corner of the display. Verify that the DC supply voltage is between 10.6 and 11 VDC.



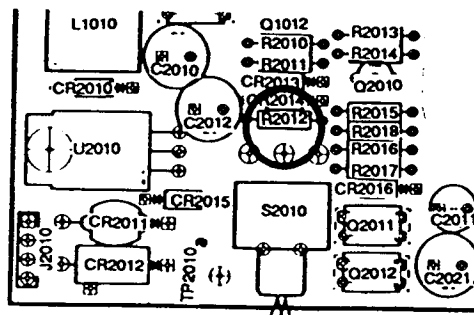
8. Remove the voltmeter probes from the 1502B. Remove the external 12 VDC power supply cable from the battery pack port.

9. Connect the AC supply cord to the rear panel.

## Charging Current Check (with optional battery pack)

The following test points and adjustments are located on the power supply board. See illustration.

1. Turn POWER off.
2. Plug in the optional battery pack in the battery pack port.
3. Connect a voltmeter across the  $4\Omega$  resistor R2012 located on the power supply board. Connect the positive (+) probe to the side nearest the front panel and the negative (-) probe to the side farthest from the front panel.
4. The voltage drop across R2012 should read approximately 0.4 to 1.2 VDC.
5. Turn POWER on. The voltage reading across R2012 should change only slightly ( $\pm 10\text{mv}$ ).



**NOTE:** The charging current will vary according to the level of charge already on the battery. With a fully charged battery, the voltage across R2012 should read approximately 0.4 VDC. With a battery below 11 volts, R2012 should read approximately 1.2 VDC.

Replaceable Electrical Parts - 1503B

A3-Power Supply

Ckt.No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr.Part Number
		Eff.	Dscont.			
A3	620-0477-00 620-0477-01	R010100	R020789 R020790	POWER SUPPLY ASSEMBLY POWER SUPPLY ASSEMBLY	80009 80009	620-0477-00 620-0477-01
A3FL1	119-1957-00			FILTER,RFI:1A,250V,SFTY CNTRLD	80009	119-1957-00
A3C102	283-0024-00			CAP.,FXD,CER DI:0.1µF,+80-20%,50V	04222	SR215C104MAA
A3F101	159-0029-01 159-0054-00			FUSE CARTRIDGE:0.3A,115V FUSE CARTRIDGE:0.15A,250V	71400 71400	MDL3/10 MDL15/100
A3R101	307-0449-00			RES.,V SENSITIVE:1900pF,130V	03508	V130LA209
A3S201	260-2372-00			SWITCH,ROTARY:VOLTAGE SELECTOR	80009	260-2372-00
A3T201	120-1607-00			XFMR:DUAL,115V/230V	80009	120-1607-00
A3A1	670-9286-00 670-9286-01 670-9286-03	R010100	R010165 R010166 R020789 R020790	CKT BD ASSY:POWER SUPPLY CKT BD ASSY:POWER SUPPLY CKT BD ASSY:POWER SUPPLY	80009 80009 80009	670-9286-00 670-9286-01 670-9286-03
A3A1C1010	290-0997-00			CAP.,FXD,ELCTLT:3000µF,+75-1%,75V	56289	S3D302G075JP6
A3A1C1011	283-0220-02			CAP.,FXD,CER DI:0.01µF,20%,50V	50434	C320C103M2R5CA
A3A1C1012	283-0359-01			CAP.,FXD,CER DI:1000pF,5%,200V	31433	C330C102J2G5CA
A3A1C1013	283-0423-00			CAP.,FXD,CER DI:0.22µF,+80-20%,50V	04222	MD015E224ZAA
A3A1C1014	283-0359-01			CAP.,FXD,CER DI:1000pF,5%,200V	31433	C330C102J2G5CA
A3A1C1015	283-0359-01			CAP.,FXD,CER DI:1000pF,5%,200V	31433	C330C102J2G5CA
A3A1C1016	283-0107-00			CAP.,FXD,CER DI:51pF,5%,200V	04222	SR206A510JAA
A3A1C1030	283-0059-02			CAP.,FXD,CER DI:1µF,20%,50V	31433	C330C105Z5U5CA
A3A1C1031	283-0059-02			CAP.,FXD,CER DI:1µF,20%,50V	31433	C330C105Z5U5CA
A3A1C1032	290-0536-00			CAP.,FXD,ELCTLT:10µF,20%,25V	31433	T368B106M025AS
A3A1C1033	290-0536-00			CAP.,FXD,ELCTLT:10µF,20%,25V	31433	T368B106M025AS
A3A1C1034	283-0177-00			CAP.,FXD,CER DI:1µF,+80-20%,25V	04222	SR302E105ZAA
A3A1C1035	283-0177-00			CAP.,FXD,CER DI:1µF,+80-20%,25V	04222	SR302E105ZAA
A3A1C1036	283-0177-00			CAP.,FXD,CER DI:1µF,+80-20%,25V	04222	SR302E105ZAA
A3A1C1037	290-0973-00			CAP.,FXD,ELCTLT:100µF,20%,25V	55680	UVX1V101MPA
A3A1C1038	283-0177-00			CAP.,FXD,CER DI:1µF,+80-20%,25V	04222	SR302E105ZAA
A3A1C2010	290-0973-00			CAP.,FXD,ELCTLT:100µF,20%,25V	55680	UVX1V101MPA
A3A1C2011	290-0517-00			CAP.,FXD,ELCTLT:6.8µF,35V TANT	05397	T368B685M035AZ
A3A1C2012	290-0973-00			CAP.,FXD,ELCTLT:100µF,20%,25V	55680	UVX1V101MPA
A3A1C2013	283-0198-00	R020790		CAP.,FXD,CER DI:0.22µF,20%,50V	04222	SR305C224MAA
A3A1C2020	283-0051-00			CAP.,FXD,CER DI:0.0033µF,5%,100V	04222	SR301A332JAA
A3A1C2021	290-0745-02			CAP.,FXD,ELCTLT:22µF,+50-10%,25V	55680	ULA1E220TEA
A3A1C2022	283-0010-00			CAP.,FXD,CER DI:0.05µF,+80-20%,50V	04222	SR305E503ZAA
A3A1C2023	283-0220-02			CAP.,FXD,CER DI:0.01µF,20%,50V	31433	C320C103M2R5CA
A3A1C2024	283-0423-00			CAP.,FXD,CER DI:0.22µF,+80-20%,50V	04222	MD015E224ZAA
A3A1C2025	290-0846-00			CAP.,FXD,ELCTLT:47µF,+75-10%,35V	54473	ECE-A35V47LU
A3A1C2030	283-0423-00			CAP.,FXD,CER DI:0.22µF,+80-20%,50V	04222	MD015E224ZAA
A3A1C2031	283-0059-02			CAP.,FXD,CER DI:1µF,20%,50V	31433	C330C105Z5U5CA
A3A1CR1010	152-0406-00			SEMICON DVC,DI:RECT,SI,3A,200V	83003	W-675
A3A1CR1011	152-0322-00			SEMICON DVC,DI:SCHOTTKY SI,15V	50434	5082-2672
A3A1CR1030	152-0582-00			SEMICON DVC,DI:RECT,20V,3A	04713	IN5820 (FAMILY)
A3A1CR1031	152-0582-00			SEMICON DVC,DI:RECT,20V,3A	04713	IN5820 (FAMILY)
A3A1CR1032	152-0581-00			SEMICON DVC,DI:RECT,SI,1A,20V	04713	1N5817
A3A1CR1033	152-0581-00			SEMICON DVC,DI:RECT,SI,1A,20V	04713	1N5817

## A3-Power Supply(cont)

Ckt.No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr.Part Number
		Eff.	Discont.			
A3A1CR1034	152-0779-00			SEMICON DVC,DI:RECT,SI,0.75A,200V	05828	RW02M
A3A1CR2010	152-0601-00			SEMICON DVC,DI:RECT,PLSTC,150V,25NS	04713	MUR115
A3A1CR2011	152-0655-00			SEMICON DVC,DI:RECT,SI,100V,3A,FAST R	03508	A115AX39
A3A1CR2012	152-0582-00			SEMICON DVC,DI:RECT,20V,3A	04713	1N5820(FAMILY)
A3A1CR2013	152-0322-00			SEMICON DVC,DI:SCHOTTKY SI,15V	50434	5082-2672
A3A1CR2014	152-0322-00			SEMICON DVC,DI:SCHOTTKY SI,15V	50434	5082-2672
A3A1CR2015	152-0601-00	R010100	R010165	SEMICON DVC,DI:RECT,PLSTC,150V,25NS	04713	MUR115
	152-0836-00	R010166		SEMICON DVC,DI:RECT,SI,1A,40V	04713	IN5819
A3A1CR2016	152-0141-02			SEMICON DVC,SW,SI,30V 150mA	03508	DA2527(IN4152)
A3A1CR2020	152-0322-00			SEMICON DVC,DI:SCHOTTKY SI,15V	50434	5082-2672
A3A1CR2021	152-0601-00			SEMICON DVC,DI:RECT,PLSTC,150V,25NS	04713	MUR115
A3A1CR2030	152-0333-00			SEMICON DVC,DI:SW,SI,55V,200mA	07263	FDH-6012
A3A1CR2031	152-0333-00			SEMICON DVC,DI:SW,SI,55V,200mA	07263	FDH-6012
A3A1J1010	---			(SEE 3-4 RMPL)		
A3A1J1030	---			(SEE 3-3 RMPL)		
A3A1J2010	---			(SEE 3-5 RMPL)		
A3A1L1010	108-1230-00			COIL,RF:FXD,100μH,5%	54937	109-1230-00
A3A1L2020	108-1230-00			COIL,RF:FXD,100μH,5%	54937	109-1230-00
A3A1Q1010	151-1176-00			XSTR:NPN,HEX DIP,SI	81483	IRFD9120
A3A1Q1011	151-1176-00			XSTR:NPN,HEX DIP,SI	81483	IRFD9120
A3A1Q1012	151-0736-00			XSTR:NPN,SI, TO-92	04713	SPS8317
A3A1Q2010	151-0736-00			XSTR:NPN,SI, TO-92	04713	SPS8317
A3A1Q2011	151-1176-00			XSTR:NPN,HEX DIP,SI	81483	IRFD9120
A3A1Q2012	151-1176-00			XSTR:NPN,HEX DIP,SI	81483	IRFD9120
A3A1Q2020	151-0188-00			XSTR:PNP,SI,TO-92	07263	S35924
A3A1Q2021	151-0424-00			XSTR:NPN,SI,TO-92F	04713	SPS8246
A3A1Q2022	151-1136-00			XSTR:MOS-FET,SI,TO-220AB	04713	IRF530
A3A1Q2030	151-1063-00			XSTR:MOS-FET,N-CHANNEL,SI	81483	IRF0113
A3A1Q2031	151-1063-00			XSTR:MOS-FET,N-CHANNEL,SI	81483	IRF0113
A3A1R1010	308-0839-00			RES.,WW:0.1 OHM,5%,1W	75042	8W-20-R1000J
A3A1R1011	321-0193-00			RES.,FXD,FILM:1.00K OHM,1%,0.125W	19701	5033ED1K00F
A3A1R1012	321-0222-00			RES.,FXD,FILM:2.00K OHM,1%,0.125W	19701	5033ED2K00F
A3A1R1013	321-0309-00			RES.,FXD,FILM:16.2K OHM,1%,0.125W	19701	5033ED16K20F
A3A1R1014	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	19701	5033ED3K32F
A3A1R1015	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	19701	5033ED2K49F
A3A1R1016	321-0301-00	R010100	R010165	RES.,FXD,FILM:13.3K OHM,1%,0.125W	07716	CEAD13301I
	321-0303-00	R010166		RES.,FXD,FILM:14K OHM,1%,0.125W	07716	CEAD14001F
A3A1R1017	321-0243-00			RES.,FXD,FILM:3.32K OHM,1%,0.125W	19701	5033ED3K32F
A3A1R1018	321-0318-00			RES.,FXD,FILM:20.0K OHM,1%,0.125W	19701	MF5C14.0KOHM
A3A1R1020	321-0133-00	R010100	R020789	RES.,FXD,FILM:237 OHM,1%,0.125W	91637	MF1816G237R0F
	321-0189-00	R020790		RES.,FXD,FILM:1.13K OHM,1%,0.125W	19701	5043ED1K130Fa
A3A1R1021	321-0296-00	R010100	R020789	RES.,FXD,FILM:11.8K OHM,1%,0.125W	91637	MFF1816G11801F
	321-0293-00	R020790		RES.,FXD,FILM:11.0K OHM,1%,0.125W	07716	CEAD11001F
A3A1R1022	321-0197-00	R010100	R020789	RES.,FXD,FILM:1.1K OHM,1%,0.125W	91637	MFF1816G11000F
	321-0191-00	R020790		RES.,FXD,FILM:953 OHM,1%,0.125W	19701	5034ED953R0F



## Replaceable Electrical Parts - 1503B

## A3-Power Supply(cont)

Ckt.No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr.Part Number
		Eff.	Dscont.			
A3A1R1023	321-0235-00			RES.,FXD,FILM:2.74K OHM,1%,0.125W	91637	MFF1816G27400F
A3A1R1024	321-0231-00			RES.,FXD,FILM:2.49K OHM,1%,0.125W	19701	5033ED2K49F
A3A1R1025	321-0302-00			RES.,FXD,FILM:13.7K OHM,1%,0.125W	91637	MFF1816G13701F
A3A1R1026	321-0193-00			RES.,FXD,FILM:1.00K OHM,1%,0.125W	91637	CMF55116G1000F
A3A1R1030	317-0027-00			RES.,FXD,FILM:2.7 OHM,5%,0.125W	01121	BB27G5
A3A1R2010	321-0245-00	R010100	R010165	RES.,FXD,FILM:3.48K OHM,1%,0.125W	19701	5033ED3K48F
	321-0257-00	R010166		RES.,FXD,FILM:4.64K OHM,1%,0.125W	07716	CEAD46400F
A3A1R2011	321-0300-00			RES.,FXD,FILM:13.0K OHM,1%,0.125W	91637	MFF1816G13001F
A3A1R2012	321-0001-00	R010100	R010165	RES.,FXD,FILM:10 OHM,1%,0.125W	91637	CMF55116G10R00F
	308-0739-00	R010166		RES.,FXD,WW:4 OHM,1%,3W	00213	1240S4 OHM1%
A3A1R2013	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	CMF55116G10002F
A3A1R2014	321-0357-00			RES.,FXD,FILM:51.1K OHM,1%,0.125W	91637	MFF1816G51101F
A3A1R2015	321-0289-00			RES.,FXD,FILM:10.0K OHM,1%,0.125W	91637	CMF55116G10001F
A3A1R2016	321-0097-00			RES.,FXD,FILM:100 OHM,1%,0.125W	91637	CMF55116G100R0F
A3A1R2017	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	CMF55116G10002F
A3A1R2018	321-0385-00			RES.,FXD,FILM:100K OHM,1%,0.125W	91637	CMF55116G10002F
A3A1R2020	321-0253-00			RES.,FXD,FILM:4.22K OHM,1%,0.125W	19701	5033ED4K22OF
A3A1R2021	321-0222-00			RES.,FXD,FILM:2.00K OHM,1%,0.125W	19701	5033ED2K00F
A3A1R2022	321-0193-00			RES.,FXD,FILM:1.00K OHM,1%,0.125W	91637	CMF55116G1000F
A3A1R2023	321-0261-00			RES.,FXD,FILM:5.11K OHM,1%,0.125W	91637	CMF55116G51100F
A3A1R2024	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	19701	5043ED3K010F
A3A1R2025	321-0239-00			RES.,FXD,FILM:3.01K OHM,1%,0.125W	91637	CMF55116G30100F
A3A1R2026	321-0289-00			RES.,FXD,FILM:10.0K OHM,1%,0.125W	91637	CMF55116G10001F
A3A1R2027	308-0839-00			RES.,WW:0.1 OHM,5%,1W	75042	BW-20-R1000J
A3A1R2030	321-0326-00			RES.,FXD,FILM:24.3K OHM,1%,0.125W	91637	CMF55116G24301F
A3A1R2031	317-0027-00			RES.,FXD,FILM:2.7 OHM,5%,0.125W	01121	BB27G5
A3A1R2032	308-0767-00			RES.,FXD,WW:1.1 OHM,5%,1W	75042	BW-20-1R100J
A3A1S2010	260-2370-00			SW,TOGGLE:SPDT,3A,250V	09353	E101-S-D1-AQ
A3A1T1030	120-1608-00			XFMR,POWER:16.2V,40KHz	80009	120-1608-00
A3A1T1031	120-0487-00			XFMR,TOROID:5T,BIFILAR,3T2	80009	120-0487-00

## A3-Power Supply(cont)

Ckt.No.	Tektronix Part No.	Serial/Model No.		Name & Description	Mfr Code	Mfr.Part Number
		Eff.	Dscont.			
A3A1TP1010	214-0579-00			TERM,TEST POINT:CD PL BRS	80009	214-0579-00
A3A1TP1020	214-0579-00			TERM,TEST POINT:CD PL BRS	80009	214-0579-00
A3A1TP2010	214-0579-00			TERM,TEST POINT:CD PL BRS	80009	214-0579-00
A3A1TP2020	214-0579-00			TERM,TEST POINT:CD PL BRS	80009	214-0579-00
A3A1U1010	156-0933-00			MICROCKT,LI:REGULATOR,PULSE	34333	SG9257
A3A1U1011	156-1173-00			MICROCKT,LI:VOLTAGE REFERENCE	04713	MC1403UDS
A3A1U1020	156-1225-00			MICROCKT,LI:COMPARATOR,DUAL	01295	LM393P
A3A1U1021	156-1225-00			MICROCKT,LI:COMPARATOR,DUAL	01295	LM393P
A3A1U1022	156-1173-00			MICROCKT,LI:VOLTAGE REFERENCE	04713	MC1403UDS
A3A1U1023	156-0933-00			MICROCKT,LI:REGULATOR,PULSE	34333	SG9257
A3A1U1024	156-0366-02			MICROCKT,DI:DUAL D FLIP-FLOP	02735	CD40138F
A3A1U2010	156-1161-00			MICROCKT,LI:VOLTAGE REGULATOR	12969	UC317T
A3A1U2030	156-0494-02			MICROCKT,DI:HEX INV/BUFF,SEL	02735	CD4049UBFX
A3A1VR2012	152-0217-00	R010166		SEMICOND,DVC,DI:ZEN,SI,8.2V,5%	04713	SZG20

## ASSEMBLY A3A1 POWER SUPPLY

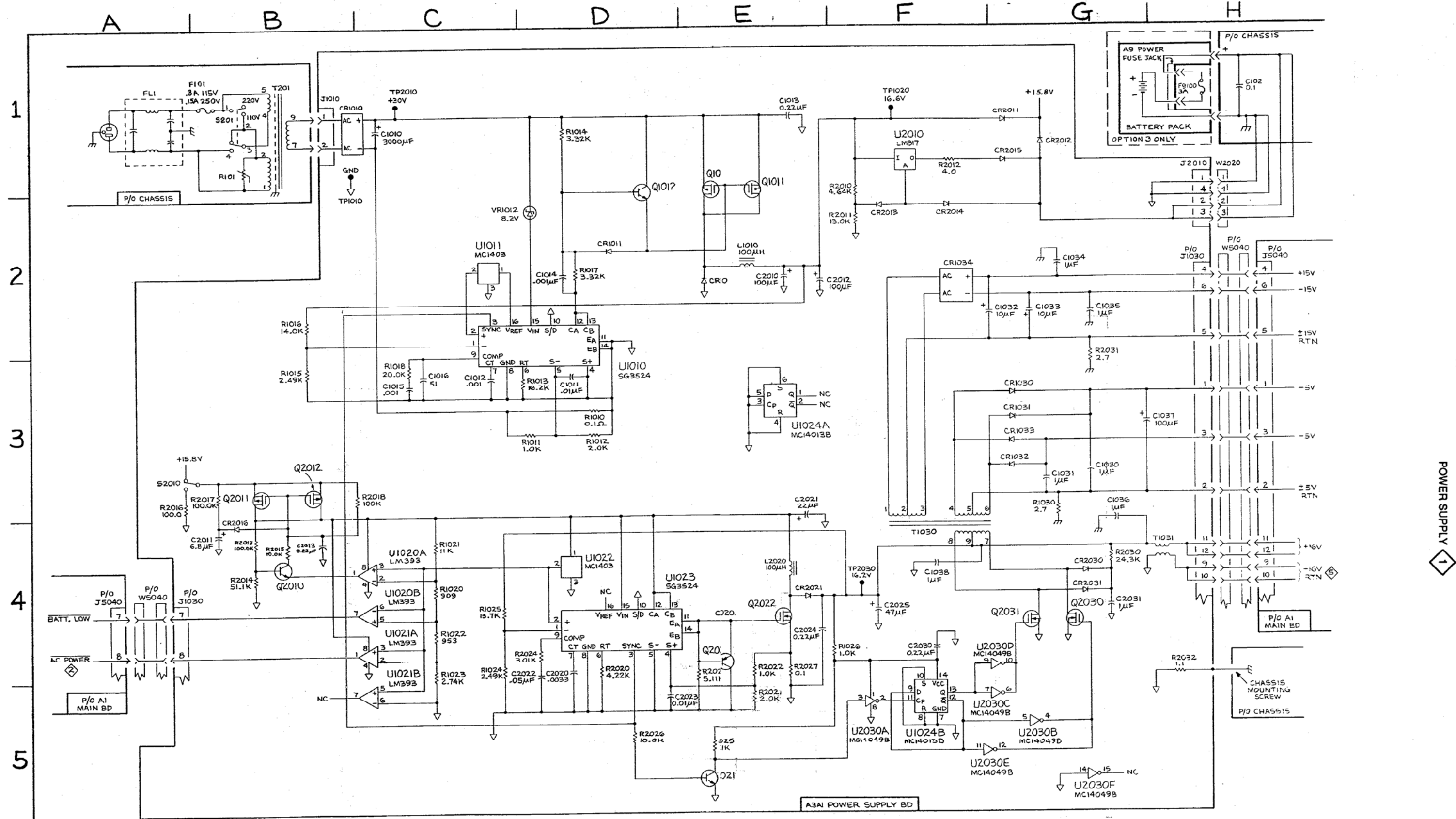
1

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C1010	C1	A1	J1010	B1	A1	R2021	E5	C2
C1011	D3	A1	J1030	A4	E1	R2022	E4	C2
C1012	C3	A1	J1030	G2	E1	R2023	E4	C3
C1013	E1	A1	J2010	G1	A3	R2024	D4	C2
C1014	D2	B1				R2025	E5	D2
C1015	C3	B2	L1010	E2	A2	R2026	D5	D2
C1016	C3	B2	L2020	E4	C3	R2027	E4	D3
C1030	G3	D1				R2030	G4	E3
C1031	G3	D1	Q1010	E1	A2	R2031	G3	E2
C1032	G2	E1	Q1011	E1	A2	R2032	G4	E3
C1033	G2	E1	Q1012	D1	B2			
C1034	G2	E1	Q2010	B4	B2	S2010	A3	B3
C1035	G2	E1	Q2011	B3	B3			
C1036	G3	E1	Q2012	B3	B3	T1030	F4	E2
C1037	G3	D1	Q2020	E4	C3	T1031	G4	E2
C1038	F4	E2	Q2021	E5	D2			
C2010	E2	A2	Q2022	E4	D3	TP1010	B2	B2
C2011	B4	C3	Q2030	G4	E3	TP1020	F1	C1
C2012	F2	A2	Q2031	G4	E3	TP2010	C1	A3
C2013	C4	C2				TP2030	F4	E3
C2020	D4	C2	R1010	D3	A1			
C2021	E3	C3	R1011	D3	A1	U1010	D3	B1
C2022	D4	C2	R1012	D3	A1	U1011	C2	B1
C2023	D5	C2	R1013	D3	A1	U1020A	C4	C1
C2024	E4	D3	R1014	D1	B2	U1020B	C4	C1
C2025	F4	D3	R1015	B3	B1	U1021A	C4	C2
C2030	F4	E2	R1016	B2	B1	U1021B	C4	C2
C2031	G4	E3	R1017	D2	B1	U1022	D4	C1
			R1018	C3	B2	U1023	D4	C2
CR1010	B1	A1	R1020	C4	C1	U1024A	E3	D2
CR1011	D2	B2	R1021	C4	C1	U1024B	F5	D2
CR1030	G3	D1	R1022	C4	C1	U2010	F1	A3
CR1031	G3	D2	R1023	C4	C2	U2030A	F5	E3
CR1032	G3	D2	R1024	C4	C1	U2030B	G5	E3
CR1033	G3	D2	R1025	C4	C1	U2030C	F5	E3
CR1034	F2	E2	R1026	F4	D2	U2030D	F4	E3
CR2010	E2	A2	R1030	G3	D1	U2030E	F5	E3
CR2011	G1	B2	R2010	F1	B2	U2030F	G5	E3
CR2012	G1	A3	R2011	F2	B2			
CR2013	F2	B2	R2012	F1	B2	VR1012	C2	B1
CR2014	F2	B2	R2013	B4	B2			
CR2015	G1	A3	R2014	B4	B2			
CR2016	B4	B3	R2015	B4	B2			
CR2020	E4	C3	R2016	A3	B3			
CR2021	E4	D3	R2017	B3	B3			
CR2030	G4	E3	R2018	C3	B3			
CR2031	G4	E3	R2020	D4	C2			

## ASSEMBLY A9 POWER FUSE JACK BOARD (Option 03 - Battery Pack)

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
F9100	G1	

See Replaceable Mechanical Parts List for circuit board part number.



1503B

REV AUG 1988

POWER SUPPLY 1