TEK INSTRUCTION MANUAL

Part No. 061-2816-00
Product Group 18

067-1147-99

4105 POWER SUPPLY CALIBRATION FIXTURE

(for use with 067-0883-99 Universal Load Unit)

Please Check for CHANGE INFORMATION at the Rear of this Manual

First Printing APR 1983

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WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the users at their own expense will be required to take whatever measures may be required to correct the interference.

MANUAL REVISION STATUS

PRODUCT: 067-1147-99 Power Supply Calibration Fixture

This manual supports the following versions of this product: 067-1147-99

REV DATE	DESCRIPTION
APR 1983	Original Issue

CONTENTS

Section 1

INTRODUCTION

ABOUT THIS MANUAL

This manual describes the 067-1147-99 4105 Power Supply Plug-In Module. It is used to service the power supply circuit board in the 4105 Computer Display Terminal and other terminals using the same power supply. This manual includes:

- Specifications
- Interconnect and schematic diagrams
- Parts lists
- Performance check procedure for the power supply

The following documents contain related information:

- 4105 Service Manual. For general service information concerning the power supply.
- Universal Load Unit Instruction Manual. For general operating instructions, theory of operation, calibration procedure, and plug-in module programming instructions.

NOTE

When the 067-0883-99 Universal Load Unit is available, use the performance check procedure in the Universal Load Unit Instruction Manual instead of the procedure in the terminal's service manual.

DESCRIPTION OF THE MODULE

The 4105 Power Supply Plug-In Module includes three assemblies:

- A plug-in module for the 067-0883-99 TEKTRONIX Universal Load Unit (ULU)
- An auxiliary adapter box
- A cable harness (connects the ULU to the terminal's power supply)

The plug-in consists of a metal framework enclosing a circuit board. An edge connector at the rear of the board connects with the ULU. The circuit board includes a series of resistors that program the load levels for each of the five ULU channels used by the module. The resistance values were calculated with the equations given in an appendix to the Universal Load Unit Instruction Manual.

A chart attached to the front of the plug-in lists the voltage and current range for each of the five ULU channels. Table 1-1 shows which channels connect to the voltage supplies.

Table 1-1

ULU CHANNEL VOLTAGES

Channel	Voltage (Vdc)
1	+5
5	+12
6	+95
11	-12
13	+21

The auxiliary adapter box provides control voltages back to the power supply.

Section 2

SPECIFICATIONS

This section provides specifications for the Plug-In Module operating within the Universal Load Unit.

DEFINITIONS

The following definitions explain the column heads of this section's tables.

Characteristic: A property of the equipment.

Performance Requirement: Statements which define characteristics that are essential to the intended application of the product and are verifiable by following a customer-available procedure, usually the manual's Performance Check Procedure.

> **Performance Check Procedure:** A procedure in the product's service or instruction manual that contains a series of steps that are used to verify performance requirements.
>
> **Check:** A step in a performance check procedure that compares actual performance to a performance requirement.

Supplemental Information: Statements that describe typical performance for characteristics of secondary importance that are not usually verified by the manual's Performance Check, or statements that further explain related performance requirements.

These definitions explain column entries for each channel:

High Load: Expected value with ULU LOAD SELECT switch at HI.

Low Load: Expected value with ULU LOAD SELECT switch at LOW.

Out-Of-Regulation Tolerance: Deviation beyond this tolerance turns on the out-of-regulation LED on the ULU. The percentage is substantially greater than the regulation specified for the power supply.

PERFORMANCE CONDITIONS

The performance requirements are valid only within the following environmental limits:

- The plug-in module is properly seated in a properly functioning 067-0883-99 TEKTRONIX Universal Load Unit (ULU).
- The ULU is operating within its specified environmental limits.

PHYSICAL

Table 2-1 gives the physical characteristics of the plug-in module.

Table 2-1

PHYSICAL SPECIFICATIONS

Characteristic	Supplemental Information
Module Size	2.48 in wide, 4.54 in high, and 13.5 in long
Weight	1.25 lb (570 gm)
Cable Length	Approximately 4 ft (1.02 m)

ELECTRICAL

Table 2-2 gives the electrical specifications for each ULU channel used with the 4105 Power Supply Plug-In Module.

Table 2-2

ELECTRICAL SPECIFICATIONS

Characteristic	Performance Requirement	Supplemental Information
Channel 1		
Voltage	+5 V	
Low Load	6 A	Nominal Load
High Load	9 A	
Out-Of-Regulation Tolerance		+/- 5%
Channel 5		
Voltage	+12 V	
Low Load	350 mA	Nominal Load
High Load	700 mA	
Out-Of-Regulation Tolerance		+/- 20%
Channel 6		
Voltage	+95 V	
Low Load	300 mA	Nominal Load
High Load	400 mA	
Out-Of-Regulation Tolerance		+/- 3%
Channel 11		
Voltage	-12 V	
Low Load	120 mA	Nominal Load
High Load	700 mA	
Out-Of-Regulation Tolerance		+/- 20%
Channel 13		
Voltage	+21 V	
Load	20 mA	Nominal Load
Out-Of-Regulation Tolerance		+/- 5%

ENVIRONMENTAL

Refer to the specifications for the 067-0883-99 Universal Load Unit.

CABLE

Table 2-3 describes the cable that connects the ULU to the power supply under test.

Table 2-3

INTERCONNECT CABLE PIN-OUT

TERMINAL P. S.	ULU	Auxiliary Box
J6-1 (House-keeping V+)	N/C	J3-1 (AUX V+)
J6-2 (PWM Control)	N/C	J3-2 (PWM CONTROL)
J6-3 (PRI GND)	N/C	J3-3 (PRI GND)
J4-1 (+21 V Control)	N/C	J5-4 (+21 vc)
J4-2 (+21 V)	P3-13 (CELL #13)	
J4-3 (+12 V)	P2-15 (CELL #5)	
J4-4 (-12 V)	P1-15 (CELL #11)	
J4-5 (+5 V)	P2 (1 to 5)(CELL #1)	
J4-6 (+5 V)	P2 (1 to 5)(CELL #1)	
J4-7 (+5 V)	P2 (1 to 5)(CELL #1)	
J4-8 (GND)	P2 (17 to 32) (GND)	
J4-9 (GND)	P2 (17 to 32) (GND)	
J4-10 (GND)	P1-31 (CELL #5 (GND) P3-31 (GND) - P1-(31 to 32) (GND)	
J5-1 (OVP TEST IN)	N/C	J5-1 (OVP DIVIDE)
J5-2 (SEC GND)	N/C	J5-2 (SEC GND) J5-3 (N/C)

MONITOR	ULU	Auxiliary Box
DC OUT-1 (+95 V)	P2-16 (Cell #6)	
DC OUT-2 (GND)	P2-17 to 32 (GND)	

Section 3

POWER SUPPLY PERFORMANCE CHECK

SAFETY SUMMARY

WARNING

Circuits of the power supply board are connected to the AC lines. To reduce the possibility of equipment damage or personal injury, use an isolation transformer during service of this board.

DO NOT SERVICE ALONE

Do not perform service or adjustment of the power supply unless another person is present who can give first aid and resuscitation.

WEAR SAFETY GLASSES

Some internal fault conditions can cause the switching transistor or primary components to explode. To avoid injury to your eyes, wear safety glasses while servicing the power supply.

USE CARE WHEN SERVICING WITH POWER ON

Dangerous voltages exist at several points in the power supply. To avoid personal injury, do not touch exposed connections or components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

After the power has been disconnected, the neon flasher on the power supply board indicates that dangerous voltages still are present in the filter capacitors.

POWER SOURCE

The power supply is intended to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection through the grounding conductor in the power cord is essential for safe operation.

GENERAL

The procedures in this section compare the performance of a power supply board with the electrical requirements for the terminal.

These procedures are for use on supplies which appear to be operating properly. For troubleshooting assistance or to bring up power supplies which have been repaired, refer to the terminal's service manual. If the performance on any test does not meet the requirement and cannot be adjusted, repair the power supply and repeat the entire performance check.

EQUIPMENT REQUIRED

- 067-0883-99 TEKTRONIX Universal Load Unit
- 067-1147-99 4105 Power Supply Plug-In Module (with auxiliary adapter box)
- TEKTRONIX 465 oscilloscope or equivalent
- TEKTRONIX DM501A digital multimeter or equivalent
- Variable autotransformer
- Isolation transformer

The performance check procedure assumes that the power supply board is installed in a 4105 housing with the 12-volt fan mounted and connected to the power supply.

PREPARATION

This procedure tells how to connect the equipment shown in the performance check set-up diagram, Figure 3-1.

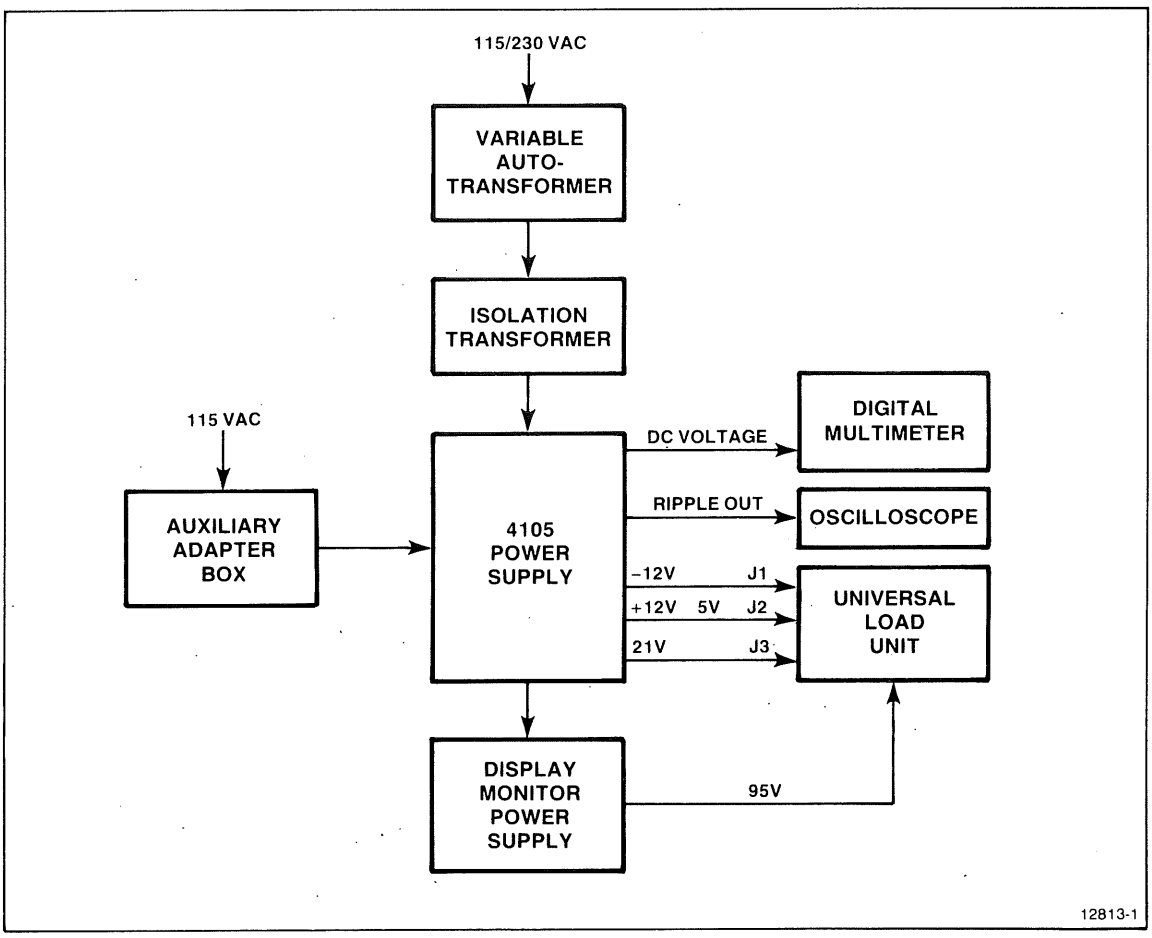

Figure 3-1. Performance Check Set Up.

WARNING

Hazardous voltages exist inside the instrument panels when the power cord is connected. Ensure that the power cord is disconnected before removing an instrument cover.

WARNING

When flashing, the neon flasher indicates the presence of hazardous voltages in the filter capacitors and connected circuits. It takes approximately one minute for the charge to bleed off and the neon flasher to stop flashing.

1. Unplug the line cord from 4105 and remove the top cover.
2. Connect autotransformer to the isolation transformer.
3. Connect autotransformer to power source, but do not apply power.
4. Connect 4105 power cord to isolation transformer.
5. Install 067-1147-99 module into ULU and install supplied cable harness to P1, P2, and P3 on rear of ULU. Note these connectors are keyed to prevent improper connection.
6. Figure 3-2 shows how the cable harness is connected.

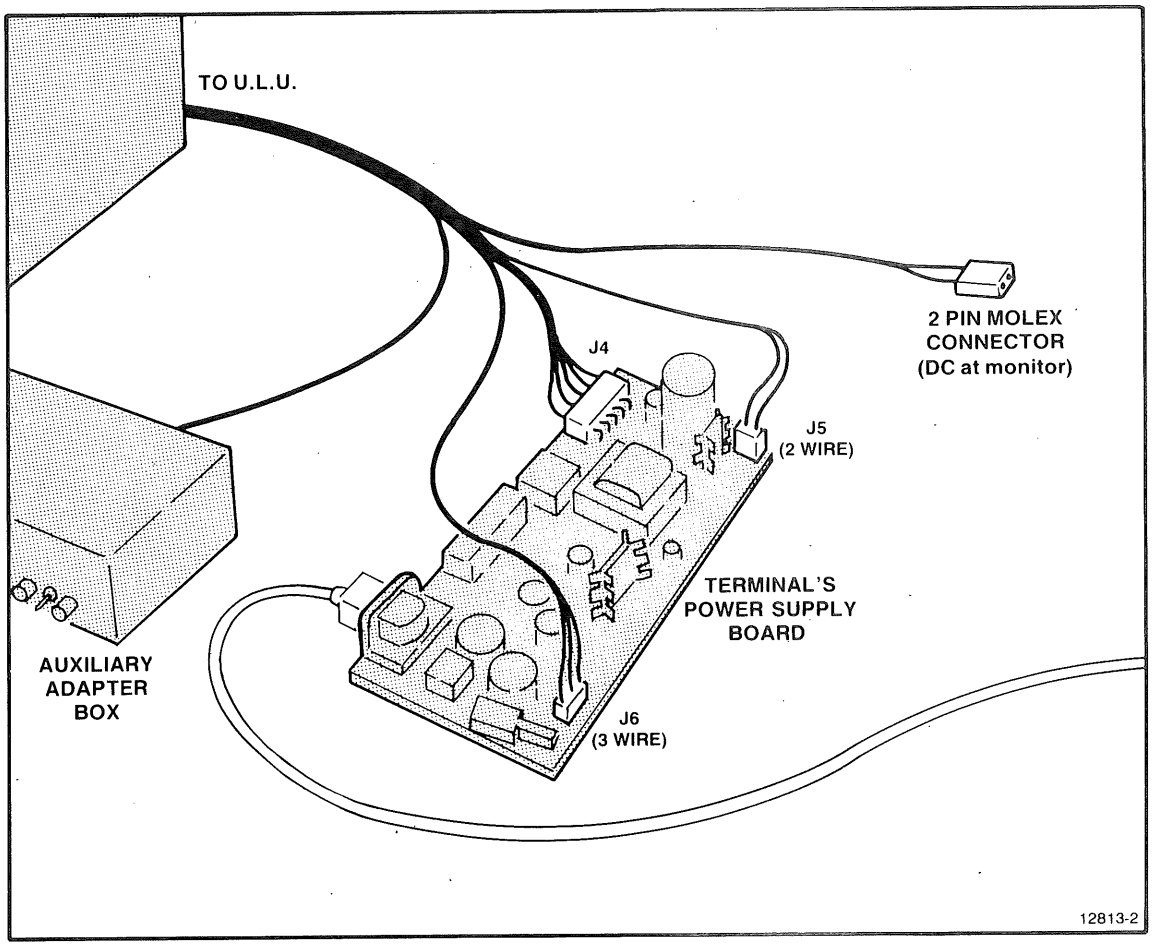

Figure 3-2. Connecting the Terminal to the Universal Load Unit and Auxiliary Box.

CAUTION

To avoid equipment damage, carefully follow the following cable harness connecting instructions.

a. Connect ten-pin connector to J4 on power supply board. Pin 1 is marked on the connector with a black line.

b. Connect the three-pin harmonica connector from the auxiliary box to J6 on the power supply.

c. Connect the two-pin harmonica connector from the chassis-mounted fan to J3 on the power supply.

d. (Optional, necessary only if you intend to check the monitor.) Plug two-pin molex connector from the load unit cable harness to the top of the monitor connection labeled DC OUT.

NOTE

The two-pin harmonica connector that goes to J5 on the power supply does not get connected at this time.

7. Set ULU controls as follows:

Control	Setting
MAX/MIN switches 1 through 12	MIN
LOAD SELECT switches	IND and SWITCH
VOLTAGE/CURRENT switch	VOLTAGE
CURRENT ADJUST switch	midrange (centered) and pushed in
OVER VOLTAGE TEST switch	OFF

8. Turn on oscilloscope and set up as follows:

a. Connect channel 1 input to the base of Q331 on the power supply. (Use R322 for ground connection.)

b. Connect channel 2 input to the cathode of CR337. (This will be used later.)

c. Set controls as follows:

Control	Setting
A and B TIME/DIV	10 us
VERT MODE	CH 1
CH 1 VOLTS/DIV	1 V
CH 2 VOLTS/DIV	200 V
CH 1 coupling	AC
A TRIGGER SOURCE	CH 1
A TRIGGER COUPLING	AC
A TRIGGER MODE	AUTO
A TRIGGER SLOPE	+
20 MHZ BW	on

9. Set voltage select switches at 115V and verify that line voltage fuse is 4 A 250 V (slow); for 230 V operation use same fuse, 4 A 250 V (slow).

10. Set up isolation transformer for 115 V operation.

11. Apply power to ULU.

12. Set auto transformer to 0 V and turn power supply switch (S305) to the on (pushed in) position.

13. Set the digital multimeter (DMM) to the 1 K range and connect it as follows:

    a. Positive lead to the cathode of VR122.
    b. Negative lead to C302, the side toward the switch.

14. Set the +21 switch to the disabled (middle) position. Set the OVP and PWM controls on the auxiliary box full counter-clockwise. Turn the auxiliary box's power switch to the off position.

PERFORMANCE CHECK PROCEDURE

1. To check voltage doubler circuit and verify that switcher remains off:

   a. Turn autotransformer up to about 87 V while watching scope to ensure that no base drive is obtained. The Pulse Width Modulator (PWM) control must be in the full counter-clockwise position. The DMM should read between 208 V and 250 V.

   b. Continue to turn the autotransformer up to 128 V. The DMM should read between 330 V and 370 V.

   c. Check that the neon light is on. Then, turn the autotransformer off.

2. To check the Pulse Width Modulator circuit:

   a. Set the autotransformer to 0 V.

   b. Connect the positive lead of the DMM to pin 6 of J4 and the negative lead to pin 10 of J4 on the power supply.

   c. Turn on the auxiliary box's power switch.

   d. Turn the auxiliary box's PWM control clockwise and observe the base drive pulse width on channel 1.

      NOTE

      Positive part of pulse rides at about .6 V and goes down to a -1.5 V level.

   e. Adjust the PWM control to set the positive pulse width to about a 30% duty cycle or about 5 us (see Figure 3-3).

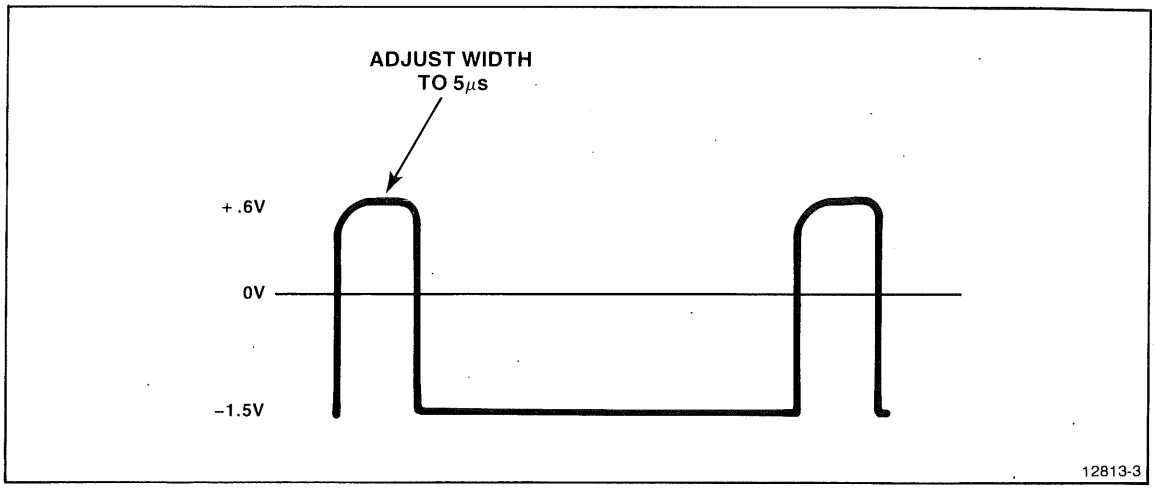

Figure 3-3. Base Drive Waveform.

3. To bring up switcher with PWM control:

   a. Set scope for ALT on Vertical Mode.

   b. Slowly turn the autotransformer up to 120 V while monitoring the switcher waveform on channel 2. (Refer to Figure 3-4 for proper switcher waveform as the autotransformer is turned up.)

   c. Turn the PWM control clockwise while watching the collector waveform and make sure that the regenerative drive and pulse width modulator circuits take over control of the pulse width.

   d. Turn off the auxiliary box power switch once the pulse width modulator is controlling the supply.

   e. Remove the three-pin connector from J6 on the power supply.

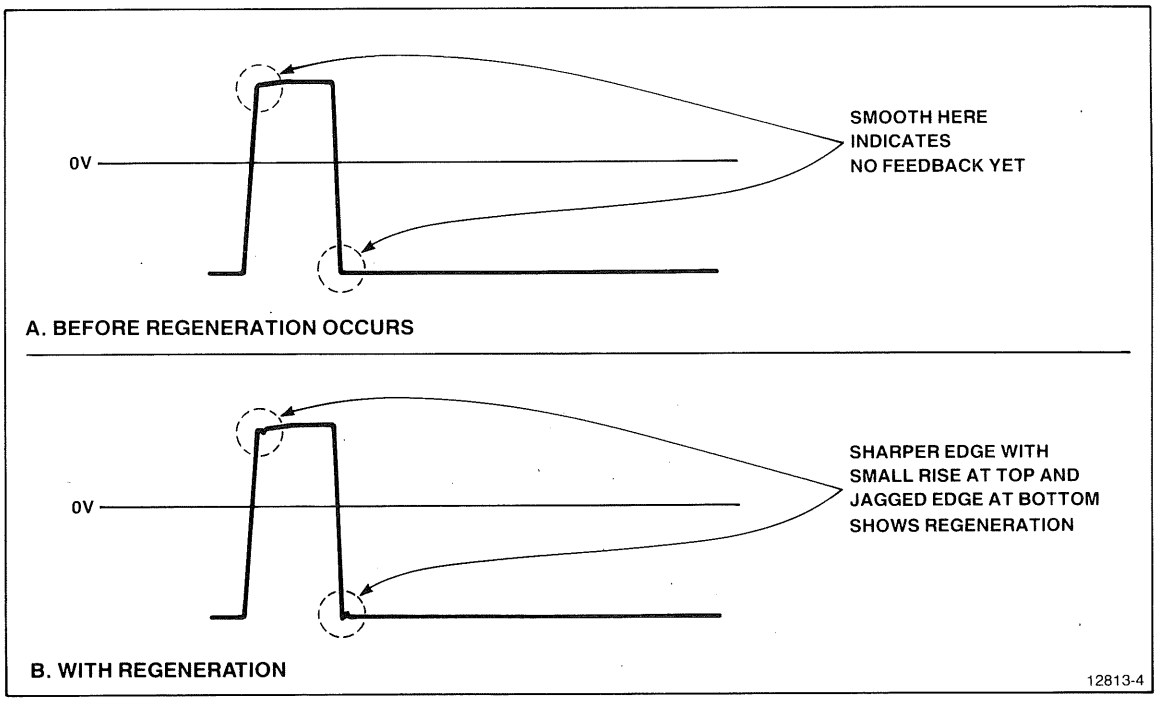

Figure 3-4. Base Waveforms Showing Regenerative Circuit Working.

4. To check the +5 V output voltage in the high and low current condition and check for ripple:

   a. Connect the scope's channel 1 probe to J4, pin 6 of power supply. Use Pin 10 for ground. Set the VOLTS/DIV to 20 mV and the TIME/DIV to 10 us.

   b. Select channel 1 using CHANNEL SELECT switch on ULU.

NOTE

The voltage reading on the ULU might differ slightly from the reading on the DMM because of the voltage drop in the cable. If the ULU reading is out of specification use the DMM to determine if the power supply is actually out of specification.

With the channel 1 LOAD SELECT switch on the ULU set to the MIN position, the voltage should be 4.75 to 5.25 V.

   c. Set channel 1 LOAD SELECT switch on the ULU to the MAX position. Voltage should be 4.75 to 5.25 V. Ripple voltage on the scope should not exceed 100 mV peak-to-peak (p-p).

   d. Set the CURRENT/VOLTAGE switch to the CURRENT position. The current should be approximately 9.0 A.

   e. Reset the channel 1 LOAD SELECT switch to the MIN position. The current should be approximately 6.0 A.

5. To check the +12 V output voltages in the high and low current condition and check for ripple:

   a. Move the channel 1 probe to pin 3 of J4 on power supply.

   b. Set CHANNEL SELECT switch to channel 5. Set the VOLTAGE/CURRENT switch to VOLTAGE. Channel 5 LOAD SELECT should be set to the MIN position. The voltage should be 11.0 V to 13.0 V.

   c. Set the channel 5 LOAD SELECT switch to the MAX position. The voltage should be 9.60 V to 14.4 V. The ripple voltage on the scope should not exceed 500 mV p-p.

   d. Set the CURRENT/VOLTAGE switch to the CURRENT position. The current should be approximately 700 mA.

   e. Reset the channel 5 LOAD SELECT switch to the MIN position. The current should be approximately 350 mA.

6. To check the -12 V output voltage in the high and low current condition and check for ripple:

   a. Move channel 1's probe to pin 4 on J4 on the power supply.

   b. Set CHANNEL SELECT switch to channel 11. Set the VOLTAGE/CURRENT switch to VOLTAGE. The channel 11 LOAD SELECT switch should be set to the MIN position. The voltage, with the fan connected, should be -11.0 V to -13.0 V. The ripple voltage should not exceed 500 mV p-p.

   c. Set the channel 11 LOAD SELECT switch to the MAX position. The voltage, with the fan connected, should be -9.6 V to -14.4 V. The ripple voltage should not exceed 500 mV p-p.

   d. Set the CURRENT/VOLTAGE switch to the CURRENT position. The current reading should be approximately 700 mA.

   e. Reset the channel 11 LOAD SELECT switch to the MIN position. The current reading should be approximately 200 mA.

7. To check the +21 V output voltage in the high and low current condition:

   a. Move channel 1's probe to pin 2 of J4 on the power supply.

   b. Turn the +21 switch on the auxiliary box to the enabled (upper) position.

   c. Set the Channel SELECT switch to channel 13. Set VOLTAGE/CURRENT switch to the VOLTAGE position. Voltage should be 20.5 to 21.5 V. Switch the +21 switch to the disabled (middle) position and verify that the 21 V output is <1.5 V.

   d. Select the HI position on the HI/LOW/IND LOAD SELECT switch. The DMM should still be connected to pin 6 of J4 on the power supply. The voltage should show that the 5 V supply is between 4.75 and 5.25 V.

8. To check the monitor's power supply if desired (otherwise go on to Step 9):

   a. Select channel 6 with the CHANNEL SELECT switch. Set the VOLTAGE/CURRENT switch to VOLTAGE and verify that the channel 6 LOAD SWITCH is set to MIN.

   b. Voltage on the ULU should be 94 to 96 V.

   c. Set the channel 6 LOAD SELECT switch to MAX. Voltage should be in the range 94 to 96 V.

   d. Using terminal's power supply switch S305, turn the power supply off.

9. Turn off the power supply if not already off. To check the Kick Start circuit in the logic power supply, wait at least 5 seconds after turning the power supply off and then turn the power supply back on again. If the power supply does not come up, check the Kick Start circuit.

10. To check that the power supply regulates with line voltage variation, monitor the 5 V supply and vary the line voltage from 87 to 128 V. The 5 V supply should stay between 4.75 and 5.25 V.

11. To check the 5 V Current Limit circuit, verify that the CURRENT ADJUST on the ULU is centered. Select channel 1 with the CHANNEL SELECT switch. Select the CURRENT position of the CURRENT/VOLTAGE switch.

    a. Pull out the CURRENT ADJUST switch and slowly increase the current load on the 5 V supply. The circuit should limit between 11 and 13.4 A.

    b. Turn off the power supply and push the CURRENT ADJUST switch in. Recenter the CURRENT ADJUST control.

12. To check the 12 V and -12 V Current Limit circuits, repeat Step 11, but select the desired supply with the CHANNEL SELECT switch. These supplies should limit between 1.0 A and 1.7 A.

13. To check the Over Voltage Protect circuit:

    a. Connect the two-pin harmonica connector coming from the auxiliary box to J5 on the power supply board.

    b. Monitor the 5 V supply with the DMM connected to pin 6 of J4. With the power supply turned on, turn the Over Voltage (OVP) control clockwise and find the voltage at which the crowbar occurs. This value should be between 5.8 and 6.2 V.

14. Turn off power. The performance check is complete.

Section 4
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

FIGURE AND INDEX NUMBERS

Items in this section are referenced by figure and index numbers to the illustrations.

INDENTATION SYSTEM

This mechanical parts list is indented to indicate item relationships. Following is an example of the indentation system used in the description column.

1 2 3 4 5 *Name & Description*

Assembly and/or Component
Attaching parts for Assembly and/or Component
- - - * - - -
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
- - - * - - -
Parts of Detail Part
Attaching parts for Parts of Detail Part
- - - * - - -

Attaching Parts always appear in the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. The separation symbol - - - * - - - indicates the end of attaching parts.

Attaching parts must be purchased separately, unless otherwise specified.

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

"	INCH
#	NUMBER SIZE
ACTR	ACTUATOR
ADPTR	ADAPTER
ALIGN	ALIGNMENT
AL	ALUMINUM
ASSEM	ASSEMBLED
ASSY	ASSEMBLY
ATTEN	ATTENUATOR
AWG	AMERICAN WIRE GAGE
BD	BOARD
BRKT	BRACKET
BRS	BRASS
BRZ	BRONZE
BSHG	BUSHING
CAB	CABINET
CAP	CAPACITOR
CER	CERAMIC
CHAS	CHASSIS
CKT	CIRCUIT
COMP	COMPOSITION
CONN	CONNECTOR
COV	COVER
CPLG	COUPLING
CRT	CATHODE RAY TUBE
DEG	DEGREE
DWR	DRAWER
ELCTRN	ELECTRON
ELEC	ELECTRICAL
ELCTLT	ELECTROLYTIC
ELEM	ELEMENT
EPL	ELECTRICAL PARTS LIST
EQPT	EQUIPMENT
EXT	EXTERNAL
FIL	FILLISTER HEAD
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FR	FRAME or FRONT
FSTNR	FASTENER
FT	FOOT
FXD	FIXED
GSKT	GASKET
HDL	HANDLE
HEX	HEXAGON
HEX HD	HEXAGONAL HEAD
HEX SOC	HEXAGONAL SOCKET
HLCPS	HELICAL COMPRESSION
HLEXT	HELICAL EXTENSION
HV	HIGH VOLTAGE
IC	INTEGRATED CIRCUIT
ID	INSIDE DIAMETER
IDENT	IDENTIFICATION
IMPLR	IMPELLER
IN	INCH
INCAND	INCANDESCENT
INSUL	INSULATOR
INTL	INTERNAL
LPHLDR	LAMPHOLDER
MACH	MACHINE
MECH	MECHANICAL
MTG	MOUNTING
NIP	NIPPLE
NON WIRE	NOT WIRE WOUND
OBD	ORDER BY DESCRIPTION
OD	OUTSIDE DIAMETER
OVH	OVAL HEAD
PH BRZ	PHOSPHOR BRONZE
PL	PLAIN or PLATE
PLSTC	PLASTIC
PN	PART NUMBER
PNH	PAN HEAD
PWR	POWER
RCPT	RECEPTACLE
RES	RESISTOR
RGD	RIGID
RLF	RELIEF
RTNR	RETAINER
SCH	SOCKET HEAD
SCOPE	OSCILLOSCOPE
SCR	SCREW
SE	SINGLE END
SECT	SECTION
SEMICOND	SEMICONDUCTOR
SHLD	SHIELD
SHLDR	SHOULDERED
SKT	SOCKET
SL	SLIDE
SLFLKG	SELF-LOCKING
SLVG	SLEEVING
SPR	SPRING
SQ	SQUARE
SST	STAINLESS STEEL
STL	STEEL
SW	SWITCH
T	TUBE
TERM	TERMINAL
THD	THREAD
THK	THICK
TNSN	TENSION
TPG	TAPPING
TRH	TRUSS HEAD
V	VOLTAGE
VAR	VARIABLE
W/	WITH
WSHR	WASHER
XFMR	TRANSFORMER
XSTR	TRANSISTOR

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
01295	TEXAS INSTRUMENTS, INC., SEMICONDUCTOR GROUP	P O BOX 5012, 13500 N CENTRAL EXPRESSWAY	DALLAS, TX 75222
04713	MOTOROLA, INC., SEMICONDUCTOR PROD. DIV.	5005 E MCDOWELL RD,PO BOX 20923	PHOENIX, AZ 85036
07263	FAIRCHILD SEMICONDUCTOR, A DIV. OF FAIRCHILD CAMERA AND INSTRUMENT CORP.	464 ELLIS STREET	MOUNTAIN VIEW, CA 94042
09353	C AND K COMPONENTS, INC.	103 MORSE STREET	WATERTOWN, MA 02172
11237	CTS KEENE, INC.	3230 RIVERSIDE AVE.	PASO ROBLES, CA 93446
16428	BELDEN CORP.	P. O. BOX 1331	RICHMOND, IN 47374
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
24546	CORNING GLASS WORKS, ELECTRONIC COMPONENTS DIVISION	550 HIGH STREET	BRADFORD, PA 16701
27014	NATIONAL SEMICONDUCTOR CORP.	2900 SEMICONDUCTOR DR.	SANTA CLARA, CA 95051
31918	IEE/SCHADOW INC.	8081 WALLACE ROAD	EDEN PRAIRIE, MN 55343
54473	MATSUSHITA ELECTRIC, CORP. OF AMERICA	1 PANASONIC WAY	SECAUCUS, NJ 07094
55680	NICHICON/AMERICA/CORP.	6435 N PROESEL AVENUE	CHICAGO, IL 60645
57668	R-OHM CORP.	16931 MILLIKEN AVE.	IRVINE, CA 92713
71400	BUSSMAN MFG., DIVISION OF MCGRAW-EDISON CO.	2536 W. UNIVERSITY ST.	ST. LOUIS, MO 63107
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
91637	DALE ELECTRONICS, INC.	P. O. BOX 609	COLUMBUS, NE 68601

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	067-1147-99			FIXTURE,CAL:	80009	067-1147-99
A1A1	670-6047-XX			CKT BOARD ASSY:		
	----- -----			(NOT REPLACEABLE, SEE A1)		
A2	670-8140-00			CKT BOARD ASSY:AUXILIARY BOX	80009	670-8140-00
A1	067-1147-99			FIXTURE,CAL:	80009	067-1147-99
A1J1001	161-0033-07			CABLE ASSY,POWER:3,18 AWG,125V,92.0 L	16428	KH8389
A1R1001	311-0580-00			RES.,VAR,NONWIR:50K OHM,20%,0.50W	11237	300SF-41695
A1R1002	311-0546-00			RES.,VAR,NONWIR:10K OHM,20%,0.75W	80009	311-0546-00
A1S1001	260-0614-00			SWITCH,TOGGLE:DPDT,ON-OFF,MOMENTARY	09353	7107SHZQ1
A1T0011	120-1001-00			XFMR,PWR,STPDN:18V,1.5A STANCOR		
A1A1	670-6047-XX			CKT BOARD ASSY:		
	----- -----			(NOT REPLACEABLE, SEE A1)		
A1A1CELL#1COMP	321-0816-00			RES.,FXD,FILM:5K OHM,1%,0.125W	24546	NA55D5001F
A1A1CELL#1RFH	321-0724-00			RES.,FXD,FILM:13.6K OHM,1%,0.125W	91637	CMF110216G13601F
A1A1CELL#1RFL	321-0319-00			RES.,FXD,FILM:20.5K OHM,1%,0.125W	91637	MFF1816G20501F
A1A1CELL#2DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#3DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#4DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#5COMP	321-0297-00			RES.,FXD,FILM:12.1K OHM,1%,0.125W	91637	MFF1816G12101F
A1A1CELL#5DES	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1CELL#5RFH	321-0340-00			RES.,FXD,FILM:34K OHM,1%,0.125W	91637	MFF1816G34001F
A1A1CELL#5RFL	321-0369-00			RES.,FXD,FILM:68.1K OHM,1%,0.125W	91637	MFF1816G68101F
A1A1CELL#6COMP	321-0383-00			RES.,FXD,FILM:95.3K OHM,1%,0.125W	91637	MFF1816G95301F
A1A1CELL#6RFH	321-0450-00			RES.,FXD,FILM:475K OHM,1%,0.125W	91637	MFF1816G47502F
A1A1CELL#6RFL	321-0463-00			RES.,FXD,FILM:649K OHM,1%,0.125W	91637	MFF1816G64902F
A1A1CELL#7DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#8DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#9DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#10DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#11COMP	321-0297-00			RES.,FXD,FILM:12.1K OHM,1%,0.125W	91637	MFF1816G12101F
A1A1CELL#11DES	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1CELL#11RFL	321-0414-00			RES.,FXD,FILM:200K OHM,1%,0.125W	91637	MFF1816G20002F
A1A1CELL#12DES	131-0566-00			BUS CONDUCTOR:DUMMY RES,2.375,22 AWG	57668	JWW-0200E0
A1A1CELL#13LOAD	305-0102-00			RES.,FXD,CMPSN:1K OHM,5%,2W	01121	HB1025
A1A1CELL#13REG	321-0320-00			RES.,FXD,FILM:21K OHM,1%,0.125W	91637	MFF1816G21001F
A1A1CR5001	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5002	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5005	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5006	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5010	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5011	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5015	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5016	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5020	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5021	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5025	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5026	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5030	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5031	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5035	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5036	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5040	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R

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A1A1CR5041	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5045	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5046	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5050	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5051	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5055	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1CR5056	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A1A1Q5011	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5012	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5013	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5014	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5015	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5016	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5017	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5018	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5021	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5022	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5023	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5024	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5025	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5026	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5027	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5028	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5031	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5032	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5033	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5034	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5035	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5036	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5037	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5038	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5041	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5042	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5043	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5044	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5045	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5046	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5047	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5048	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5051	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5052	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5053	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5054	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5055	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5056	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5057	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5058	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5061	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5062	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5063	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5064	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5065	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5066	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5067	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5068	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5071	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5072	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K

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A1A1Q5073	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5074	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5075	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5076	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5077	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5078	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5081	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5082	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5083	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5084	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5085	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5086	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5087	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5088	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5091	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5092	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5093	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5094	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5095	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5096	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5097	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5098	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5101	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5102	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5103	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5104	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5105	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5106	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5107	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5108	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5111	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5112	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5113	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5114	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5115	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5116	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5117	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5118	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5121	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5122	151-0188-00			TRANSISTOR:SILICON,PNP	04713	SPS6868K
A1A1Q5123	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5124	151-0190-00			TRANSISTOR:SILICON,NPN	07263	S032677
A1A1Q5125	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5126	151-0444-00			TRANSISTOR:SILICON,NPN	04713	SPS797
A1A1Q5127	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1Q5128	151-0443-00			TRANSISTOR:SILICON,PNP	04713	SPS7950
A1A1R5001	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5002	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5003	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5004	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5005	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1A1R5007	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5008	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1R5009	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	91637	MFF1816G80600F
A1A1R5010	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5012	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5014	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025

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A1A1R5015	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5016	315-0562-00			RES.,FXD,CMPSN:5.6K OHM,5%,0.25W	01121	CB5625
A1A1R5017	315-0511-00			RES.,FXD,CMPSN:510 OHM,5%,0.25W	01121	CB5115
A1A1R5018	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5019	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5020	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5022	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5023	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1A1R5024	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5025	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1R5027	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	91637	MFF1816G80600F
A1A1R5028	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5030	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5031	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5032	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5035	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5036	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5037	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5039	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5040	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1A1R5041	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5042	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1R5044	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	91637	MFF1816G80600F
A1A1R5045	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5047	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5048	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5049	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5051	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5052	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5053	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5054	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5055	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1A1R5056	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5057	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1R5059	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	91637	MFF1816G80600F
A1A1R5060	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5062	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5063	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5064	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5066	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5067	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5068	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5069	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5070	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1A1R5071	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5072	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1R5074	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	91637	MFF1816G80600F
A1A1R5075	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5077	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5078	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5079	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5081	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5082	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5083	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5084	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5085	315-0822-00			RES.,FXD,CMPSN:8.2K OHM,5%,0.25W	01121	CB8225
A1A1R5086	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1A1R5087	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	91637	MFF1816G20000F
A1A1R5089	321-0280-00			RES.,FXD,FILM:8.06K OHM,1%,0.125W	91637	MFF1816G80600F
A1A1R5090	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5092	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5093	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5094	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5096	308-0643-00			RES.,FXD,WW:0.1 OHM,3%,3W	91637	RS2B-ER1000H
A1A1R5100	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5101	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5102	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5104	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5105	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5106	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5107	315-0912-00			RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A1A1R5108	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5109	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5111	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5112	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5114	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5116	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5117	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5118	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5120	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5121	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5122	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5123	315-0912-00			RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A1A1R5124	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5125	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5127	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5128	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5130	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5132	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5133	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5134	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5136	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5137	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5138	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5139	315-0912-00			RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A1A1R5140	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5141	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5143	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5144	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5146	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5148	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5149	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5150	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5152	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5153	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5154	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5155	315-0912-00			RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A1A1R5156	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5157	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5159	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5160	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5162	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5164	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5165	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1A1R5166	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5168	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5169	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5170	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5171	315-0912-00			RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A1A1R5172	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5173	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5175	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5176	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5178	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635
A1A1R5180	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5181	315-0103-00			RES.,FXD,CMPSN:10K OHM,5%,0.25W	01121	CB1035
A1A1R5182	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5184	315-0202-00			RES.,FXD,CMPSN:2K OHM,5%,0.25W	01121	CB2025
A1A1R5185	315-0302-00			RES.,FXD,CMPSN:3K OHM,5%,0.25W	01121	CB3025
A1A1R5186	321-0200-00			RES.,FXD,FILM:1.18K OHM,1%,0.125W	91637	MFF1816G11800F
A1A1R5187	315-0912-00			RES.,FXD,CMPSN:9.1K OHM,5%,0.25W	01121	CB9125
A1A1R5188	321-0220-00			RES.,FXD,FILM:1.91K OHM,1%,0.125W	91637	MFF1816G19100F
A1A1R5189	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5191	321-0289-00			RES.,FXD,FILM:10K OHM,1%,0.125W	91637	MFF1816G10001F
A1A1R5192	315-0102-00			RES.,FXD,CMPSN:1K OHM,5%,0.25W	01121	CB1025
A1A1R5194	315-0563-00			RES.,FXD,CMPSN:56K OHM,5%,0.25W	01121	CB5635

Component No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A2	670-8140-00			CKT BOARD ASSY:AUXILIARY BOX	80009	670-8140-00
A2C30	290-0778-00			CAP.,FXD,ELCTLT:1UF,+50-10%,50V	54473	ECE-A50N1
A2C32	290-0950-00			CAP.,FXD,ELCTLT:100UF,+50-10%,50V	55680	50ULB100VA-T
A2CR14	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	01295	1N4152R
A2CR120	152-0585-00			SEMICOND DEVICE:SILICON,BRIDGE,200V,1A	80009	152-0585-00
A2F210	159-0022-00			FUSE,CARTRIDGE:3AG,1A,250V,FAST-BLOW	71400	AGC 1
A2J3	131-1343-00			TERM. SET,PIN:36-0.525 L X 0.025 SQ	22526	65501-136
A2J5	131-1343-00			TERM. SET,PIN:36-0.525 L X 0.025 SQ	22526	65501-136
A2R10	321-0223-00			RES.,FXD,FILM:2.05K OHM,1%,0.125W	91637	MFF1816G20500F
A2R12	315-0203-00			RES.,FXD,CMPSN:20K OHM,5%,0.25W	01121	CB2035
A2R20	315-0241-00			RES.,FXD,CMPSN:240 OHM,5%,0.25W	01121	CB2415
A2R22	315-0432-00			RES.,FXD,CMPSN:4.3K OHM,5%,0.25W	01121	CB4325
A2S310	260-2047-01			SWITCH,PUSH:DPST,4A,250V W/CKT PINS & LUG	31918	601805
A2VR40	156-1161-00			MICROCIRCUIT,LI:VOLTAGE REGULATOR	27014	LM317T

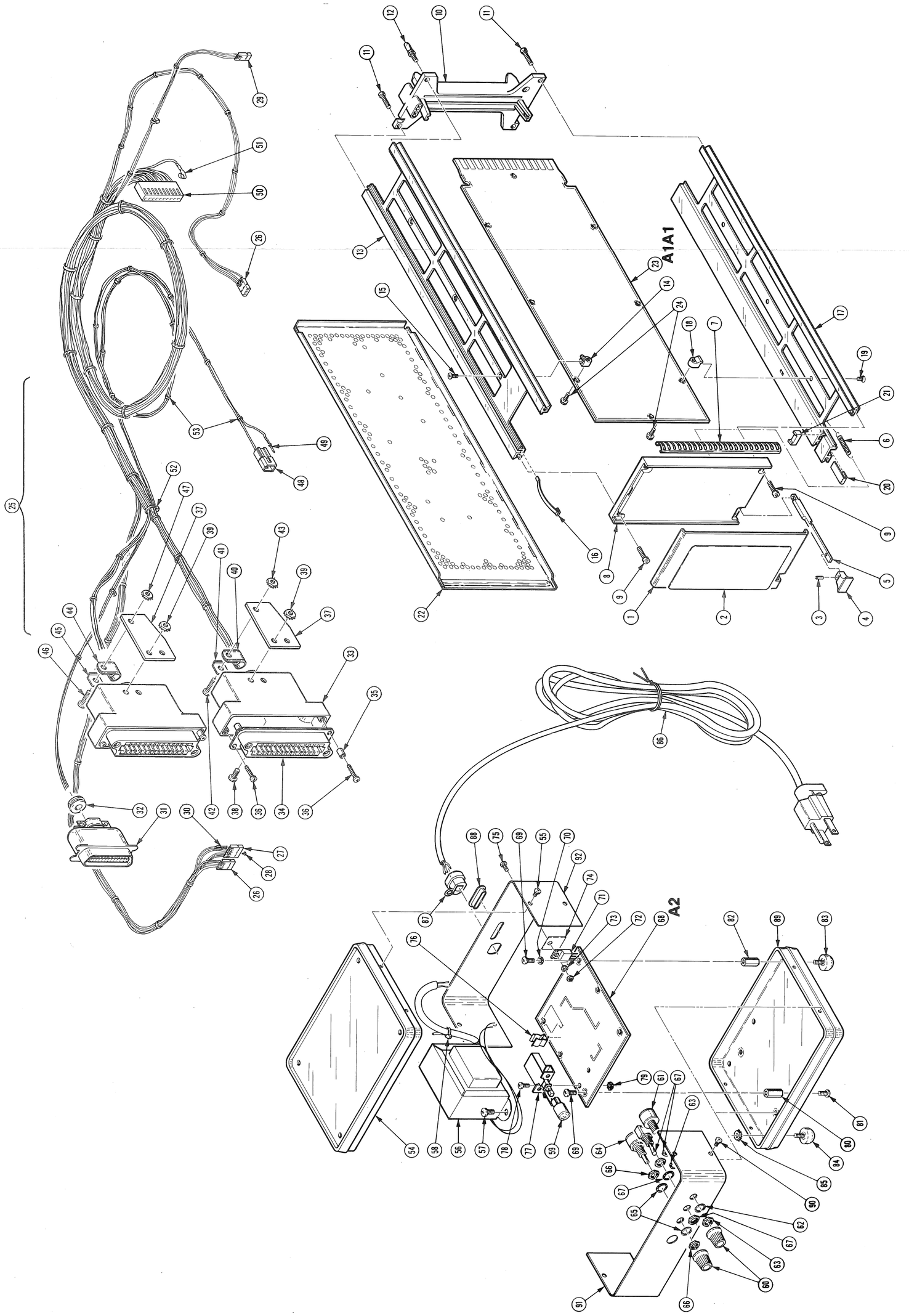
CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
000BB	BERQUIST COMPANY	4350 WEST 78TH	MINNEAPOLIS, MN 55435
000BK	STAUFFER SUPPLY	105 SE TAYLOR	PORTLAND, OR 97214
000EO	ZEPHER ELECTRONIC SALES CORP.	647 INDUSTRY DRIVE	SEATTLE, WA 98188
000FW	WESTERN SINTERING CO INC.	2620 STEVENS DRIVE	RICHLAND, WA 99352
02660	BUNKER RAMO CORP., CONNECTOR DIVISION	2801 S 25TH AVENUE	BROADVIEW, IL 60153
06383	PANDUIT CORPORATION	17301 RIDGELAND	TINLEY PARK, IL 60477
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
22599	ESNA, DIV. OF AMERACE CORPORATION	16150 STAGG STREET	VAN NUYS, CA 91409
27264	MOLEX PRODUCTS CO.	5224 KATRINE AVE.	DOWNERS GROVE, IL 60515
28520	HEYMAN MFG. CO.	147 N. MICHIGAN AVE.	KENILWORTH, NJ 07033
52905	SIMPLEX MFG. COMPANY	5224 NE 42ND AVENUE	PORTLAND, OREGON 97218
70485	ATLANTIC INDIA RUBBER WORKS, INC.	571 W. POLK ST.	CHICAGO, IL 60607
71590	CENTRALAB ELECTRONICS, DIV. OF GLOBE-UNION, INC.	P O BOX 858	FORT DODGE, IA 50501
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
75915	LITTELFUSE, INC.	800 E. NORTHWEST HWY	DES PLAINES, IL 60016
77250	PHEOLL MANUFACTURING CO., DIVISION OF ALLIED PRODUCTS CORP.	5700 W. ROOSEVELT RD.	CHICAGO, IL 60650
78189	ILLINOIS TOOL WORKS, INC. SHAKEPROOF DIVISION	ST. CHARLES ROAD	ELGIN, IL 60120
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153
87308	N. L. INDUSTRIES, INC., SOUTHERN SCREW DIV.	P. O. BOX 1360	STATESVILLE, NC 28677
92101	SCHULZE MFG	50 IMGOLD RD.	BURLINGAME, CA 94010
93907	TEXTRON INC. CAMCAR DIV	600 18TH AVE	ROCKFORD, IL 61101
95987	WECKESSER CO., INC.	4444 WEST IRVING PARK RD.	CHICAGO, IL 60641

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-1	333-1367-00			1		PANEL,FRONT:	80009	333-1367-00
-2	334-3663-01			1		MARKER,IDENT:MARKED CHANNEL VOLTAGE		
-3	214-1095-00			1		PIN,SPG,SPLIT:0.094 OD X 0.187 INCH LONG	22599	52-022-094-0187
-4	366-1058-00			1		KNOB:LATCH	80009	366-1058-00
-5	105-0076-02			1		REL BAR,LATCH:PLUG-IN UNIT	80009	105-0076-02
-6	214-1280-00			1		SPRING,HLCPS:0.14 OD X 1.126"L,0.16"DIA W	80009	214-1280-00
-7	348-0235-00			1		SHLD GSKT,ELEC:4.734 INCH LONG	92101	OBD
-8	386-1447-47			1		SUBPANEL,FRONT:	80009	386-1447-47
						(ATTACHING PARTS)		
-9	213-0192-00			4		SCR,TPG,THD FOR:6-32 X 0.50 INCH,PNH STL	87308	OBD
						- - - * - - -		
-10	386-1402-04			1		PANEL,REAR:	80009	386-1402-04
						(ATTACHING PARTS)		
-11	213-0192-00			3		SCR,TPG,THD FOR:6-32 X 0.50 INCH,PNH STL	87308	OBD
-12	386-3657-01			1		SUPPORT,PLUG IN:	93907	OBD
						- - - * - - -		
-13	426-0505-07			1		FR SECT,PLUG-IN:TOP	80009	426-0505-07
						(ATTACHING PARTS)		
-14	220-0547-01			3		NUT,BLOCK:0.38 X 0.26 X0.282 (2)4-40 THD	000FW	OBD
-15	211-0105-00			3		SCREW,MACHINE:4-40 X 0.188,100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-16	214-1061-00			1		SPRING,GROUND:FLAT	80009	214-1061-00
-17	426-0499-07			1		FR SECT,PLUG-IN:BOTTOM	80009	426-0499-07
						(ATTACHING PARTS)		
-18	220-0547-01			3		NUT,BLOCK:0.38 X 0.26 X0.282 (2)4-40 THD	000FW	OBD
-19	211-0105-00			3		SCREW,MACHINE:4-40 X 0.188,100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-20	214-1054-00			1		SPRING,FLAT:0.825 X 0.322,SST	80009	214-1054-00
-21	105-0075-00			1		BOLT,LATCH:7A & 7B SER PL-IN	80009	105-0075-00
-22	337-1064-04			2		SHIELD,ELEC:SIDE PLUG-IN UNITS	80009	337-1064-00
-23	----- -----			1		CKT BOARD ASSY:PROGRAMMED(SEE A1A1 REPL)		
						(ATTACHING PARTS)		
-24	211-0116-00			6		SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS	83385	OBD
						- - - * - - -		
-25	179-2924-00			1		WIRE HARNESS:		
-26	352-0161-00			2		. HLDR,TERM CONN:3 WIRE,BLACK	80009	352-0161-00
-27	352-0162-00			1		. HLDR,TERM CONN:4 WIRE BLACK	80009	352-0162-00
-28	134-0153-00			1		. KEY,CONN PLZN:MINI LATCH HOUSING,PLASTIC	80009	134-0153-00
-29	352-0169-00			1		. HLDR,TERM CONN:2 WIRE BLACK	80009	352-0169-00
-30	131-0707-00			5		. CONNECTOR,TERM:22-26 AWG,BRS& CU BE GOLD	22526	47439
	131-2728-00			6		. CONN,TERM:18-24 AWG,GOLD PLATED BRASS	27264	08-58-0187
-31	131-0293-00			1		. CONNECTOR,PLUG,:36 PIN CABLE PLUG,MALE	02660	57-30360
-32	348-0004-00			1		. GROMMET,RUBBER:0.281 ID X 0.563 INCH OD	70485	763
-33	200-0551-01			2		. COVER,PL-IN EXT:3.895 X 2.125 X 0.987,GRAY	80009	200-0551-01
-34	131-0097-00			2		. CONNECTOR,RCPT,:32 CONTACT,FEMALE	02660	26-190-32
						(ATTACHING PARTS)		
-35	166-0025-00			1		. SPACER,SLEEVE:0.25 L X 0.125 ID,AL	71590	P07608-51
-36	213-0264-00			2		. SCREW,TPG,TF:4-24 X 0.625,TYPE BT,PNH,STL	83385	OBD
						- - - * - - -		
-37	386-4827-00			2		. PLATE,STRAIN RLF:	80009	386-4827-00
						(ATTACHING PARTS)		
-38	212-0004-00			2		. SCREW,MACHINE:8-32 X 0.312 INCH,PNH STL	83385	OBD
-39	210-0458-00			2		. NUT,PL,ASSEM WA:8-32 X 0.344 INCH,STL	83385	OBD
						- - - * - - -		
-40	343-0003-00			1		. CLAMP,LOOP:0.25 ID,PLASTIC	95987	1-4-6B
						(ATTACHING PARTS)		
-41	210-0863-00			1		. WSHR,LOOP CLAMP:0.187 ID U/W 0.5 W CLP,STL	95987	C191
-42	210-0008-00			1		. WASHER,LOCK:INTL,0.172 ID X 0.331"OD,STL	78189	1208-00-00-0541C
-43	210-0458-00			1		. NUT,PL,ASSEM WA:8-32 X 0.344 INCH,STL	83385	OBD
						- - - * - - -		
-44	343-0001-00			1		. CLAMP,LOOP:0.15 INCH DIA,PLASTIC	95987	1-8-6B
						(ATTACHING PARTS)		
-45	210-0863-00			1		. WSHR,LOOP CLAMP:0.187 ID U/W 0.5 W CLP,STL	95987	C191
-46	210-0008-00			1		. WASHER,LOCK:INTL,0.172 ID X 0.331"OD,STL	78189	1208-00-00-0541C
-47	210-0458-00			1		. NUT,PL,ASSEM WA:8-32 X 0.344 INCH,STL	83385	OBD
						- - - * - - -		

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-48	204-0970-00			1		. CONN BODY,PLUG:1X2,W/LOCKING EARS	27264	03-06-2023
-49	131-3079-00			2		. CONTACT,ELEC:PHOSPHOR BRONZE,TIN PLATED	27264	02-06-2202
-50	352-0649-00			1		. HLDR,TERM CONN:1 X 10,W/O RAMP,TRIFUCON	27264	26-03-3101
-51	131-2728-00			10		. CONN,TERM:18-24 AWG,GOLD PLATED BRASS	27264	08-58-0187
-52	343-0128-00			1		. STRAP,TIEDOWN,E:0.136 OD CABLE,STRAIGHT	80009	343-0128-00
-53	343-0549-00			61		. STRAP,TIEDOWN:0.091 W X 3.62 INCH LONG	06383	PLT1M
-54	200-0277-13			1		PANEL,CABINET:	80009	200-0277-13
						(ATTACHING PARTS)		
-55	211-0007-00			4		SCREW,MACHINE:4-40 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
-56	----- -----			1		TRANSFORMER:(SEE A1T1001 REPL)		
						(ATTACHING PARTS)		
-57	212-0001-00			2		SCREW,MACHINE:8-32 X 0.250 INCH,PNH STL	77250	OBD
						- - - * - - -		
-58	346-0120-00			2		STRAP,TIEDOWN:5.5 L MIN,PLASTIC	06383	SST 1.5M
-59	366-1767-00			1		PUSH BUTTON:BLACK,YELLOW INDICATOR	000E0	FA201
-60	366-1125-00			2		KNOB:GY,0.127 ID X0.531 H	80009	366-1125-00
-61	----- -----			1		RESISTOR,VAR:(SEE A1R1002 REPL)		
						(ATTACHING PARTS)		
-62	210-0046-00			2		WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
-63	210-0583-00			2		NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
						- - - * - - -		
-64	----- -----			1		RESISTOR,VAR:(SEE A1R1001 REPL)		
						(ATTACHING PARTS)		
-65	210-0046-00			2		WASHER,LOCK:0.261 ID,INTL,0.018 THK,BRS	78189	1214-05-00-0541C
-66	210-0583-00			2		NUT,PLAIN,HEX:0.25-32 X 0.312 INCH,BRS	73743	2X20317-402
						- - - * - - -		
-67	----- -----			1		SWITCH,TOGGLE:(SEE A1S1001 REPL)		
-68	----- -----			1		CKT BOARD ASSY:AUXILIARY BOX(SEE A2 REPL)		
						(ATTACHING PARTS)		
-69	211-0504-00			4		SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL	83385	OBD
-70	210-1133-00			1		WASHER,FLAT:0.142 ID X 0.058 THK,FBR	80009	210-1133-00
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-71	----- -----			1		. MICROCIRCUIT:(SEE A2VR40 REPL)		
						(ATTACHING PARTS)		
-72	210-0551-00			1		. NUT,PLAIN,HEX.:4-40 X 0.25 INCH,STL	000BK	OBD
-73	210-1171-00			1		. WSHR,SHOULDERED:0.116 ID X 0.138 INCH OD	52905	A7148516P2
-74	342-0354-00			1		. INSULATOR,PLATE:TRANSISTOR,SILICON RUBBER	000BB	7403-10-52
-75	211-0008-00			1		. SCREW,MACHINE:4-40 X 0.250,PNH,STL,CD PL	83385	OBD
						- - - * - - -		
	----- -----			-		CKT BOARD ASSY INCLUDES:		
-76	344-0286-00			2		. CLIP,ELECTRICAL:FOR 3AG FUSE,BRS	75915	102074
-77	----- -----			1		. SWITCH:(SEE A2S310 REPL)		
						(ATTACHING PARTS)		
-78	211-0008-00			2		. SCREW,MACHINE:4-40 X 0.250,PNH,STL,CD PL	83385	OBD
-79	210-0586-00			2		. NUT,PL,ASSEM WA:4-40 X 0.25,STL	83385	OBD
						- - - * - - -		
-80	384-0519-00			2		SPACER,POST:0.562 L,W/6-32 THD THRU	80009	384-0519-00
						(ATTACHING PARTS)		
-81	211-0504-00			2		SCREW,MACHINE:6-32 X 0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		
-82	384-0519-00			2		SPACER,POST:0.562 L,W/6-32 THD THRU	80009	384-0519-00
						(ATTACHING PARTS)		
-83	348-0048-00			2		FOOT,CAMERA:BLACK VINYL,W/6-32 STUD	80009	348-0048-00
						- - - * - - -		
-84	348-0048-00			2		FOOT,CAMERA:BLACK VINYL,W/6-32 STUD	80009	348-0048-00
						(ATTACHING PARTS)		
-85	210-0457-00			2		NUT,PL,ASSEM WA:6-32 X 0.312,STL CD PL	83385	OBD
						- - - * - - -		
-86	----- -----			1		POWER CORD:(SEE A1J1001 REPL)		
-87	358-0161-00			1		BSHG,STRAIN RLF:FOR 0.50 INCH HOLE,PLASTIC	28520	1147 SR-5P-4
-88	348-0417-00			1		GROMMET,PLASTIC:0.75 INCH DIA	80009	348-0417-00
-89	200-0277-18			1		PANEL,CABINET:		
						(ATTACHING PARTS)		
-90	211-0007-00			4		SCREW,MACHINE:4-40 X 0.188 INCH,PNH STL	83385	OBD
						- - - * - - -		
-91	380-0360-03			1		HOUSING,HALF,WRAPER:FRONT,5.596 X 2.077 X 1.75		
-92	380-0360-02			1		HOUSING,HALF,WRAPER:REAR,5.595 X 2.077 X 1.75		

FIG. 1 EXPLODED VIEW



067-11147-99

Section 5

DIAGRAMS

Symbols and Reference Designators

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).

Resistors = Ohms (Ω).

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

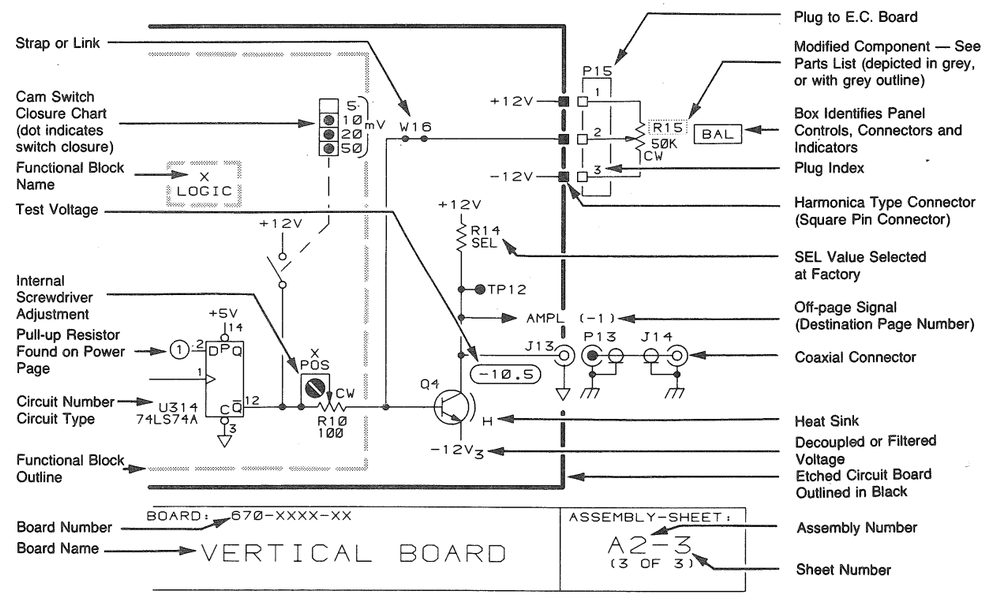
Abbreviations are based on ANSI Y1.1-1972. Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc., are:

Y14.15, 1966	Drafting Practices.
Y14.2, 1973	Line Conventions and Lettering.
Y10.5, 1968	Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

The following prefix letters are used as reference designators to identify components or assemblies on the diagrams.

A	Assembly, separable or repairable (circuit board, etc.)
AT	Attenuator, fixed or variable
B	Motor
BT	Battery
C	Capacitor, fixed or variable
CB	Circuit breaker
CR	Diode, signal or rectifier
DL	Delay line
DS	Indicating device (lamp)
E	Spark Gap, Ferrite bead
F	Fuse
FL	Filter
H	Heat dissipating device (heat sink, heat radiator, etc.)
HR	Heater
HY	Hybrid circuit
J	Connector, stationary portion
K	Relay
L	Inductor, fixed or variable
M	Meter
P	Connector, movable portion
Q	Transistor or silicon-controlled rectifier
R	Resistor, fixed or variable
RT	Thermistor
S	Switch or contactor
T	Transformer
TC	Thermocouple
TP	Test point
U	Assembly, inseparable or non-repairable (integrated circuit, etc.)
V	Electron tube
VR	Voltage regulator (zener diode, etc.)
W	Wirestrap or cable
Y	Crystal
Z	Phase shifter

The following special symbols may appear on the diagrams:



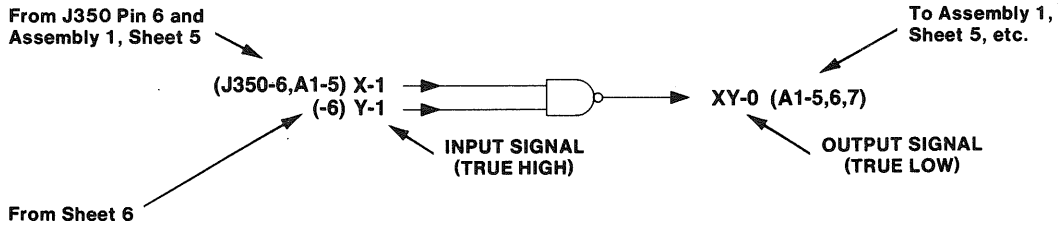
1. True High and True Low Signals

Signal names on the schematics are followed by -1 or a -0. A TRUE HIGH signal is indicated by -1, and a TRUE LOW signal is indicated by -0.

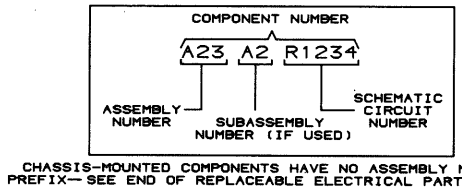
SIGNAL -1 = TRUE HIGH
SIGNAL -0 = TRUE LOW

2. Cross-References

Schematic cross-references (from/to information) are included on the schematics. The "from" reference only indicates the signal "source," and the "to" reference lists all loads where the signal is used. All from/to information will be enclosed in parentheses.

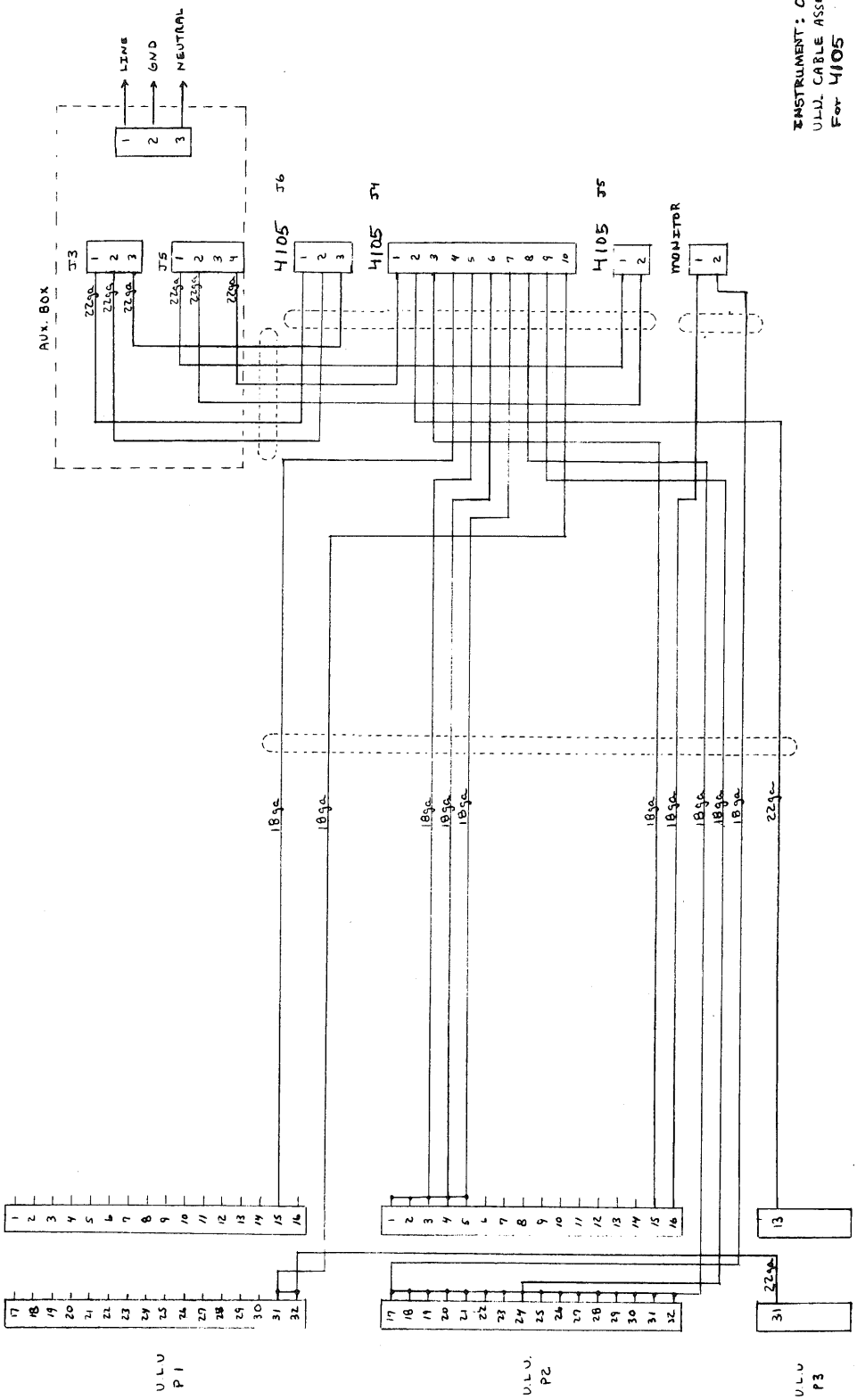


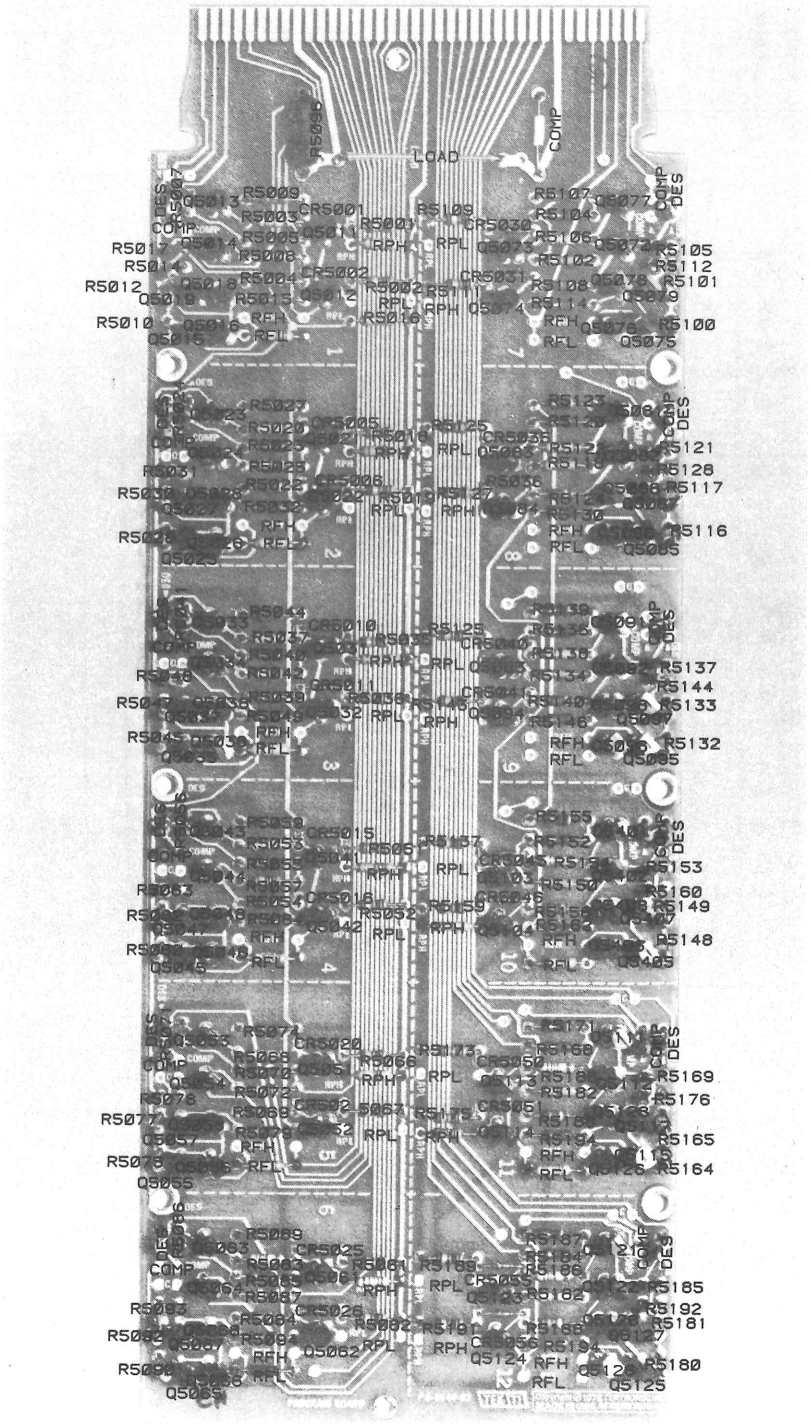
3. Component Number Example



CHASSIS-MOUNTED COMPONENTS HAVE NO ASSEMBLY NUMBER PREFIX— SEE END OF REPLACEABLE ELECTRICAL PARTS LIST.

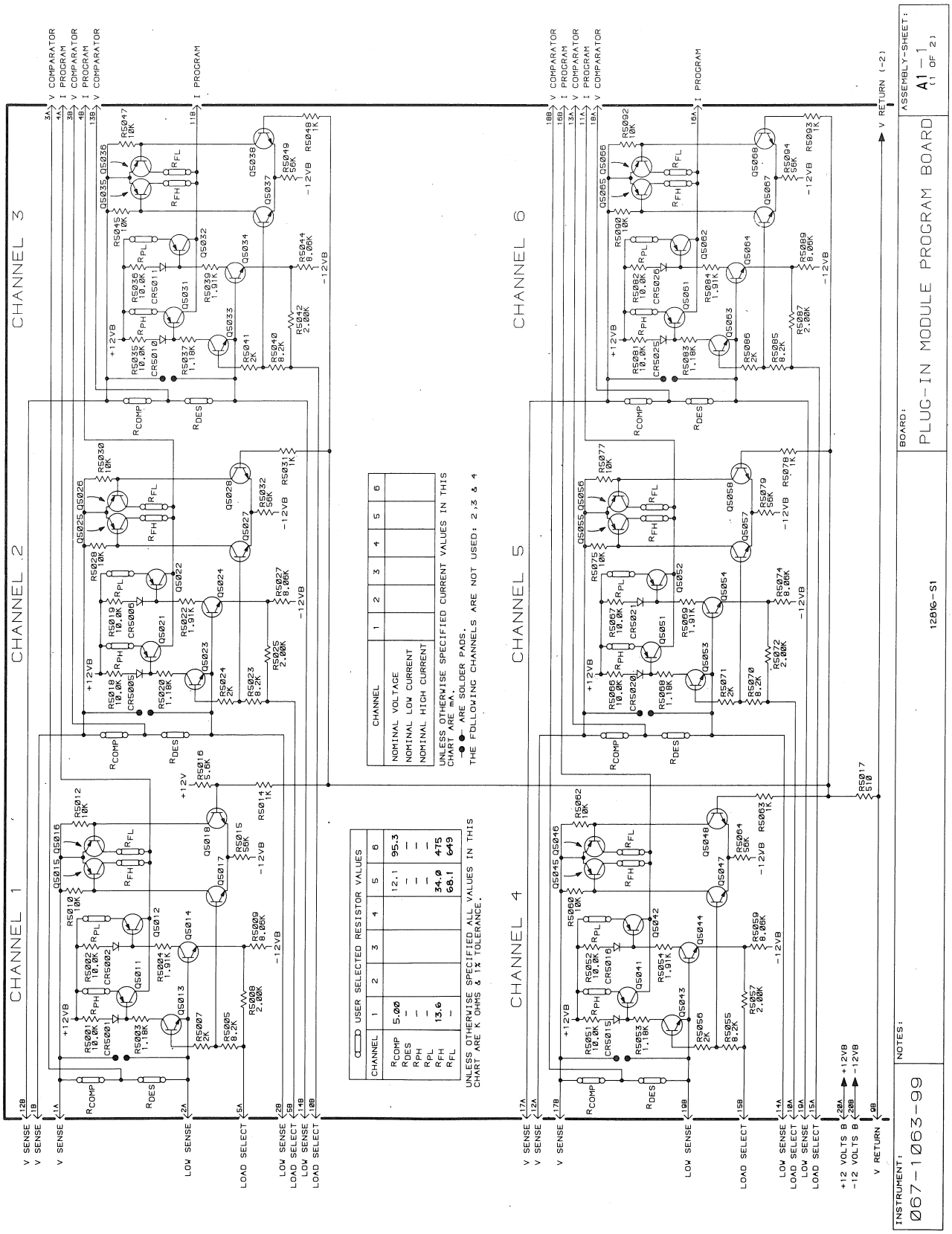
INSTRUMENT: 067-1147-99
ULU CABLE ASSEMBLY 1 of 1
For 4105

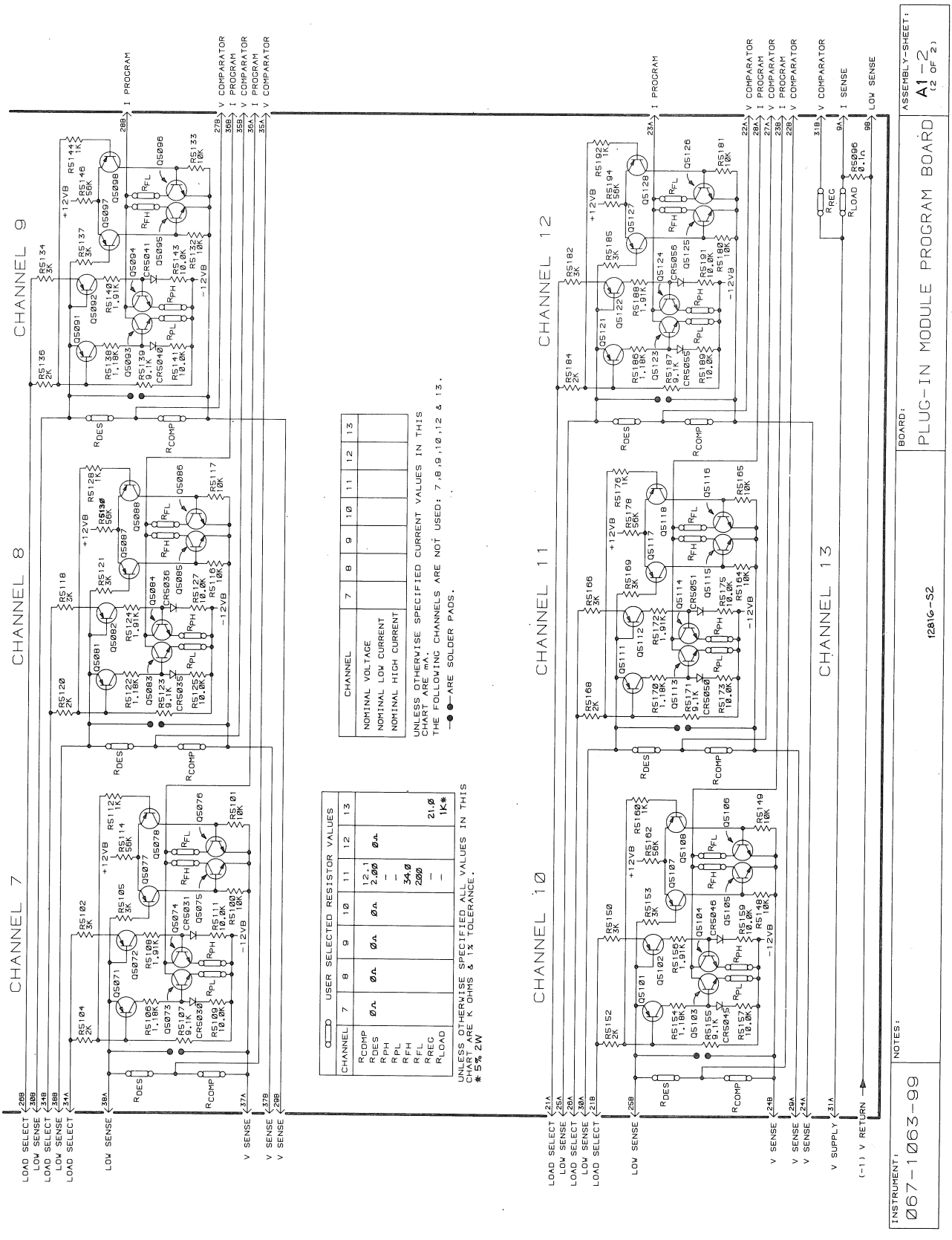


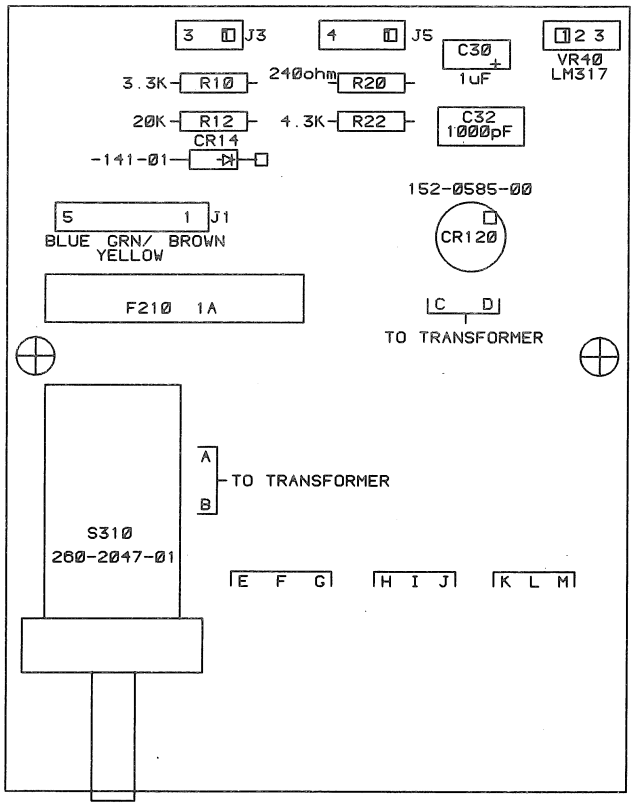


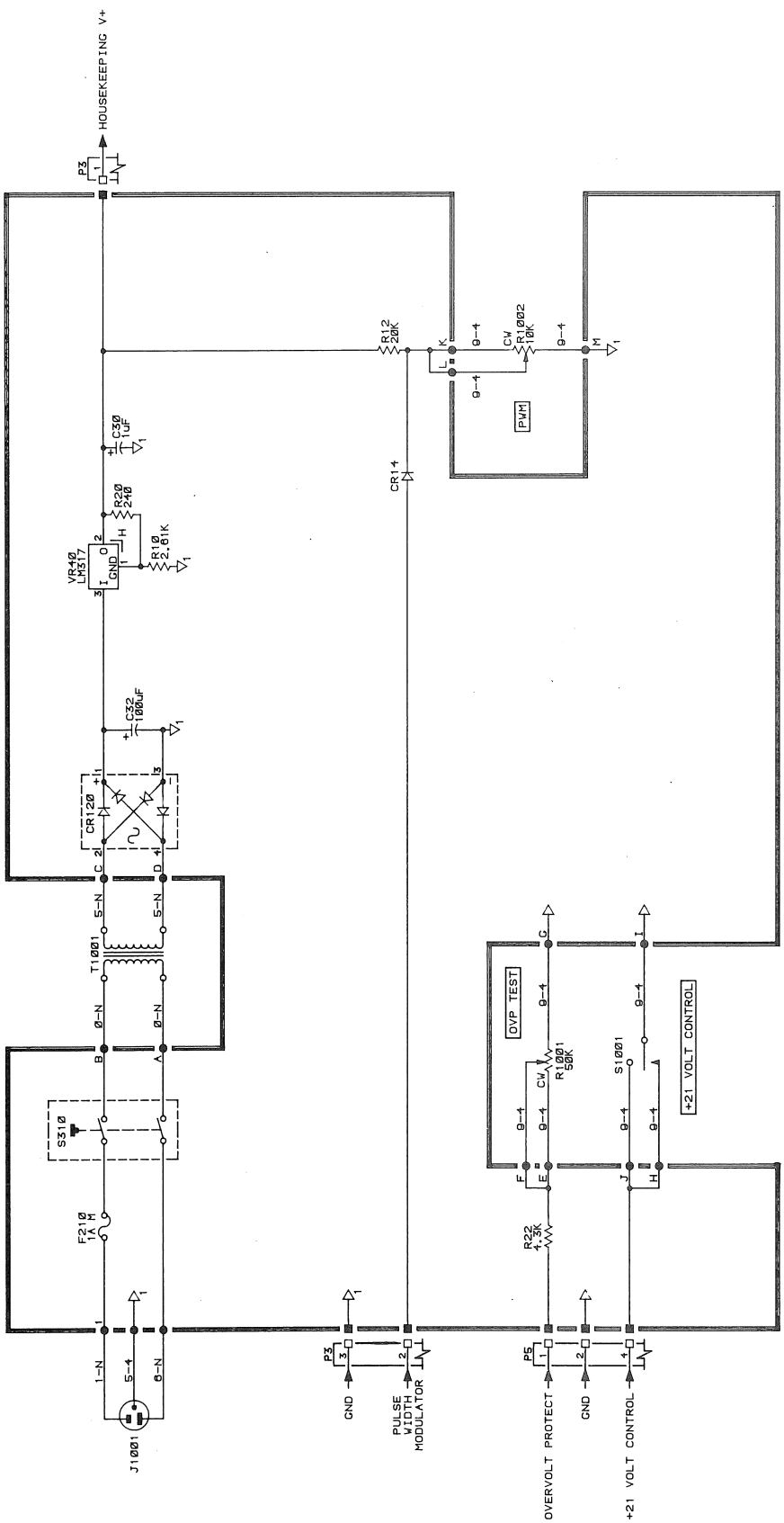
12572-13

Plug-in Module Board Component Locations.


CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
V COMPARATOR
I PROGRAM
V SENSE
LOW SENSE
LOAD SELECT
V RETURN
+12 VOLTS B
-12 VOLTS B
USER SELECTED RESISTOR VALUES
UNLESS OTHERWISE SPECIFIED ALL VALUES IN THIS CHART ARE K OHMS & 1% TOLERANCE.
UNLESS OTHERWISE SPECIFIED CURRENT VALUES IN THIS CHART ARE mA.
ARE SOLDER PADS.
THE FOLLOWING CHANNELS ARE NOT USED: 2,3 & 4
INSTRUMENT:
067-1063-99
NOTES:
1286-S1
BOARD:
PLUG-IN MODULE PROGRAM BOARD
ASSEMBLY-SHEET:
A1-1
(1 OF 2)


CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
CHANNEL 13
LOAD SELECT
LOW SENSE
V SENSE
I PROGRAM
V COMPARATOR
V SUPPLY
(-1) V RETURN
I SENSE
LOW SENSE
USER SELECTED RESISTOR VALUES
UNLESS OTHERWISE SPECIFIED ALL VALUES IN THIS CHART ARE K OHMS & 1% TOLERANCE.
* 5% 2W
UNLESS OTHERWISE SPECIFIED CURRENT VALUES IN THIS CHART ARE mA.
THE FOLLOWING CHANNELS ARE NOT USED: 7,8,9,10,12 & 13.
—●—ARE SOLDER PADS.
INSTRUMENT: 067-1063-99
NOTES:
12816-S2
BOARD: PLUG-IN MODULE PROGRAM BOARD
ASSEMBLY-SHEET: A1-2 (2 OF 2)


3
J3
4
J5
C30
1uF
1 2 3
VR40
LM317
3.3K
R10
240ohm
R20
20K
R12
CR14
-141-01
4.3K
R22
C32
1000pF
152-0585-00
CR120
5
1
J1
BLUE GRN/ BROWN
YELLOW
F210 1A
C D
TO TRANSFORMER
A
B
TO TRANSFORMER
S310
260-2047-01
E F G
H I J
K L M



INSTRUMENT:	NOTES:	BOARD: 670-8140-00	ASSEMBLY-SHEET:
067-1147-99		UNIVERSAL LOAD BOARD	A2-1 (1 OF 1)
		12816-S1	