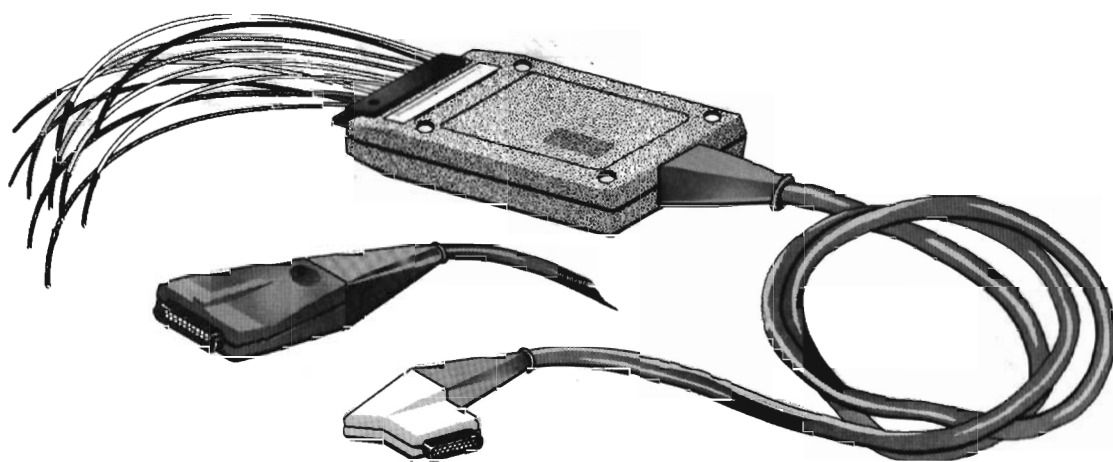


010 6451 03

P6451 Instructions

P6451 DATA ACQUISITION PROBE




2515-1

DESCRIPTION

The P6451 Data Acquisition Probe is a nine-channel active probe for use with digital-circuit analysis instruments. The P6451 active circuitry consists of two hybrid integrated circuits that contain nine FET amplifiers with differential ECL outputs. All input channels of the hybrid circuits are protected from damage by static discharges. The high input resistance and low input capacitance of the probe allows the circuit under test to perform close to normal operating conditions, with minimal loading.


Probe input threshold levels are established by a voltage source supplied by the test instrument. The P6451 outputs are compatible with test instruments having differential ECL receivers (i.e., type 10115 or 10216) with 100 ohm differential-input termination. DC power for operating the probe circuitry is derived from the associated instrument via the probe connector. The broad input range of the P6451 permits its use with a wide variety of input signal levels.

A Tektronix Lead Set (see Standard Accessories) is provided with the probe and standard accessories package. The ten input leads (nine signals plus one common ground connector) are each 25 centimeters in length and are molded into a common plug-connector that plugs into the probe body. Ten microcircuit-test probe tips are supplied with the input lead set to provide a convenient means of attaching the inputs to the circuitry under test. The individual signal leads are each color-coded to permit easy identification when making connections.



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MENT is a registered trademark of Tektronix U.K.
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SPECIFICATION

Electrical

Characteristics	Information
Input Resistance	1 M Ω , \pm 50 k Ω .
Input Capacitance	5 pF, \pm 1 pF. (without input leads)
Maximum Input Threshold Control Voltage	–16.25 V to +3.25 V with Hybrid powered from –5 V. –10 V to +10 V with Hybrid powered from +5 V.
Maximum Dynamic Input Voltage	–40 V to a maximum of 10 V above input threshold level. –40 V to a maximum of 30 V above input threshold level for RS 232 signals only.
Maximum Nondestructive Voltage to Input	40 V (dc + peak ac).
Delay Time	17 ns \pm 2 ns with \pm 1 V input signal and threshold at 0 V.
Power Requirements	
Voltage	4.7 V to 5.3 V.
Current	260 mA or less at 5 V.

Environmental

Characteristics	Information
Temperature	
Storage	–55° C to +75° C.
Operating	0° C to +50° C.
Altitude	
Storage	To 50,000 feet.
Operating	To 15,000 feet.

Physical

Characteristics	Information
Weight (Probe Only)	204 grams (7.1 ounces).
Length	
Probe Head and Cable	2 meters (6.5 feet).
Input Lead Set (10-wide)	25 centimeters (9.8 inches).

OPERATING CONSIDERATIONS

Use of the P6451 as part of a logic-analysis system is covered in the associated logic analyzer instruction manual. The instructions in this section relate mainly to the various means of connecting the P6451 into the circuitry under test.

Probe Cable Connector

The miniature 25-pin connector at the end of the probe cable (two configurations are available—see Tektronix Products catalog) should be carefully inserted into one of the associated test instrument connectors.



Make sure that the probe cable connector is correctly aligned with the test instrument connector. Damage to the terminals can result from forcing one connector into another.

Probe Cable Identification Marker

When two P6451 Probes are used with the test instrument to provide a total of sixteen data channels, plus two channel inputs for functions such as clock or enable, one test-instrument probe input is wired to cover channels 0 through 7, plus clock (C), while the other input covers channels 8 through 15 plus a qualifier channel (Q).

To permit easy identification of the channels handled by each probe, two self-adhesive identification markers are supplied as part of the Standard Accessories. One marker is labeled 0-7, and the other is labeled 8-15.

To apply these markers, peel off the marker that is factory installed on the probe body (labeled 0-7 and 8-15—see Figure 1). Then, peel the backing from the relevant accessory marker and press into place on the probe body. Repeat the process with the second probe, using the other marker.

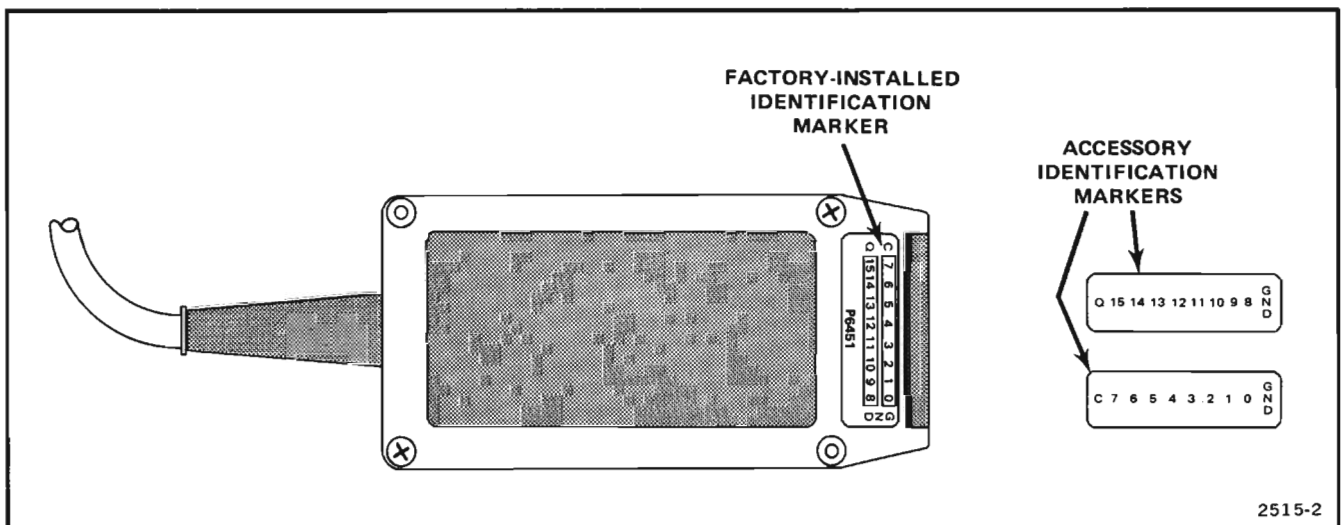


Figure 1. Probe identification markers.

In addition to the identification markers, four pairs of color bands are included in the Standard Accessories. (Only two pair of these markers are provided with the right-angle output connector package—see Standard Accessories.) These bands are color-coded (by pairs): orange, red, silver gray and yellow. The plastic bands are split so they can be slid over the probe cable: one just behind the flexible boot at the probe-head and one just behind the boot at the output connector. The color bands serve to aid in identifying individual probes in multi-probe applications where two or more probes may be connected into circuitry that is several feet remote from the test instrument.

Probe Input Leads

The 10 probe input leads, individually color-coded for easy identification of channels, are molded into a common-connector at the output end. See Figure 2. To connect this assembly to the probe head, carefully push the 10-terminal plug into the socket on the probe head. Be sure the correct sides of the probe head and plug assembly are facing upward as illustrated. To remove the input-lead set, hold the probe head and pull the assembly plug straight out away from the probe head.

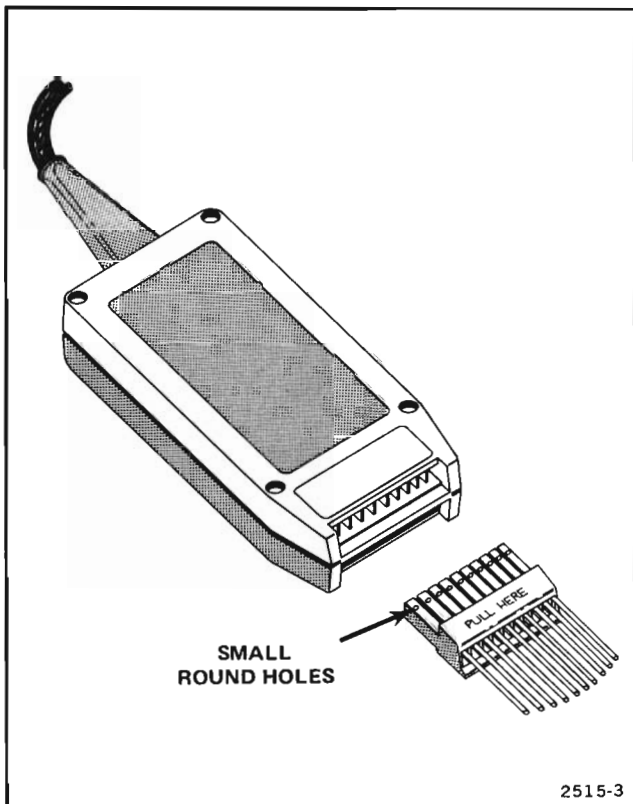


Figure 2. Installation of 10-wide input lead set.

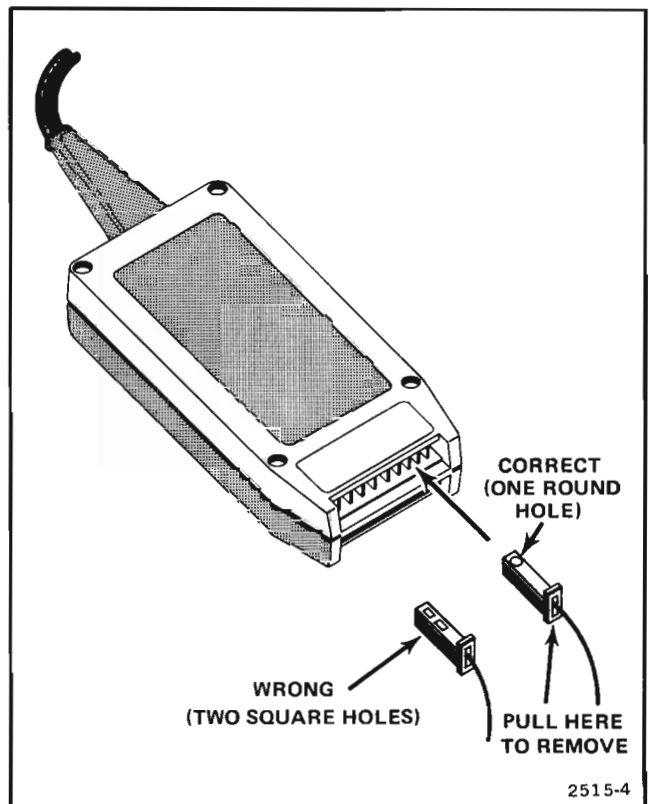


Figure 3. Installation of individual input lead connector.

To minimize the pickup of electromagnetic interference, input leads should be kept as short as possible. However, to avoid adding errors to critical timing measurements, input leads should all be the same length.

Input Lead Color Coding

The probe input leads are color-coded as follows:

Channel	Color	Channel	Color
Ground	White	4 or 12	Yellow
0 or 8	Black	5 or 13	Green
1 or 9	Brown	6 or 14	Blue
2 or 10	Red	7 or 15	Purple
3 or 11	Orange	C or Q	Gray

Optional Input Lead Set

For applications requiring longer or shorter input test leads, sets of 10 individual test leads are available (see Optional Accessories listing). These leads are equipped with individual connectors, and should be inserted into the probe head as shown in Figure 3. A 10-lead set with a 10-pin harmonica connector at the input end is also available.

Connecting Probe Input Leads to Circuitry

A set of 10 plug-on microcircuit-test probe tips is supplied as a standard accessory to the P6451. The probe tips can be attached to the test leads by pushing the lead end onto the recessed round pin near the butt end of the probe tip (see Figure 4). Make sure that the round pin on the probe tip and the connector on the end of the test lead are properly aligned to prevent damage.

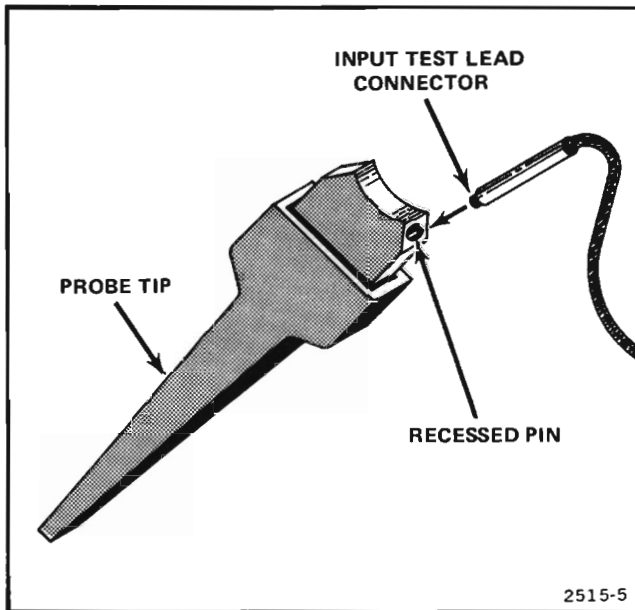


Figure 4. Connection of input lead to probe tip.

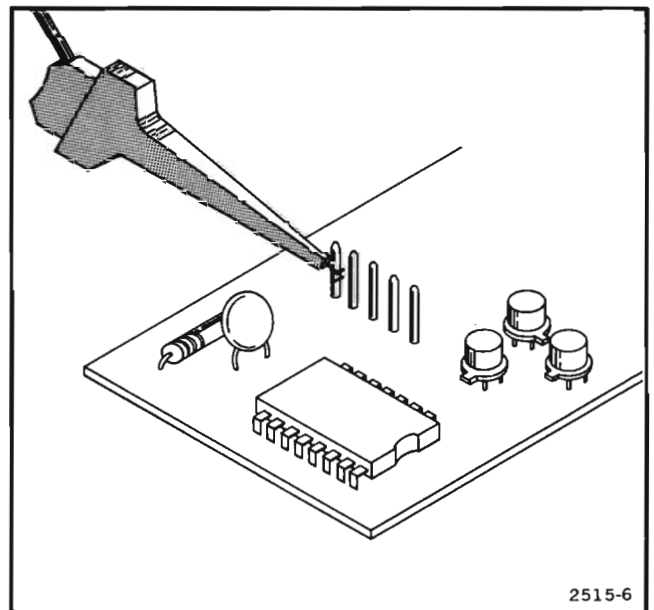
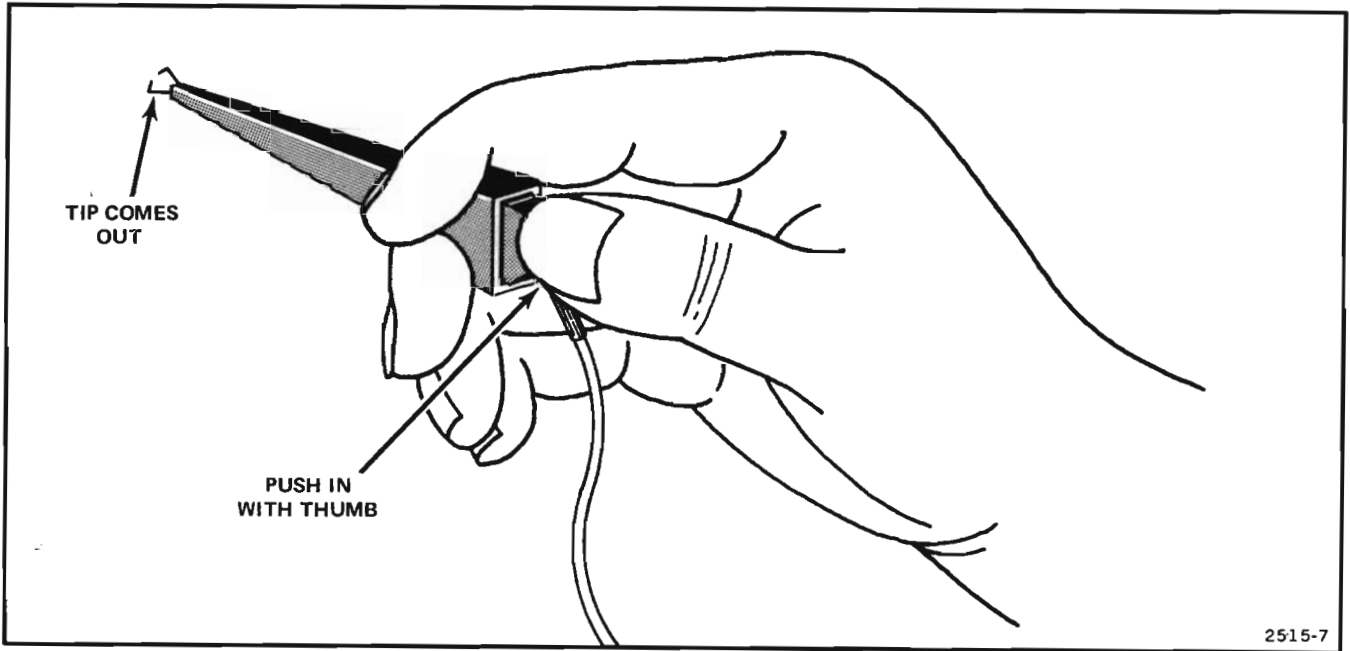


Figure 5. Attaching the retractable hook tip.

CAUTION

To avoid damage to the probe, do not connect the ground lead to a voltage source above or below ground reference.

Each probe tip has a retractable hook that grasps a lead, wire, or connector firmly. To use the retractable probe tip, push in the base of the probe tip until the hook appears. See Figure 6. Slip the hook over a lead or connector and release the tip base. The hook will retract and grip the connection firmly (see Figure 5).



2515-7

Figure 6. Operation of retractable hook tip.

P6451 Data Acquisition Probe

Where several probe tips are to be connected close together in a compact area, the probe tips can be attached vertically onto 0.020 to 0.034-inch round pin connectors or 0.025-inch square pins. Open the hook by pressing in the base of the probe tip and then slide the tip end down onto the round or square pin (see Figure 7).

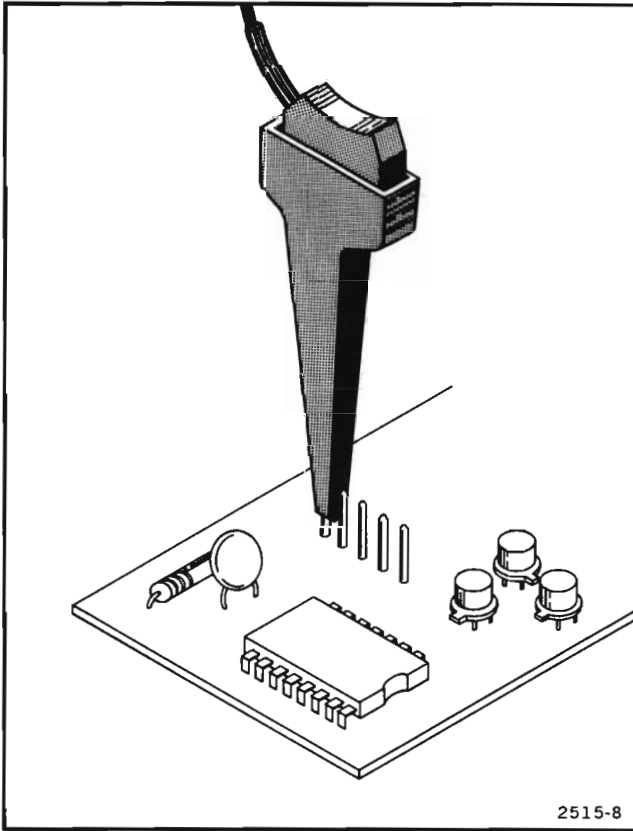


Figure 7. Attaching the hook tip vertically onto a pin connector.

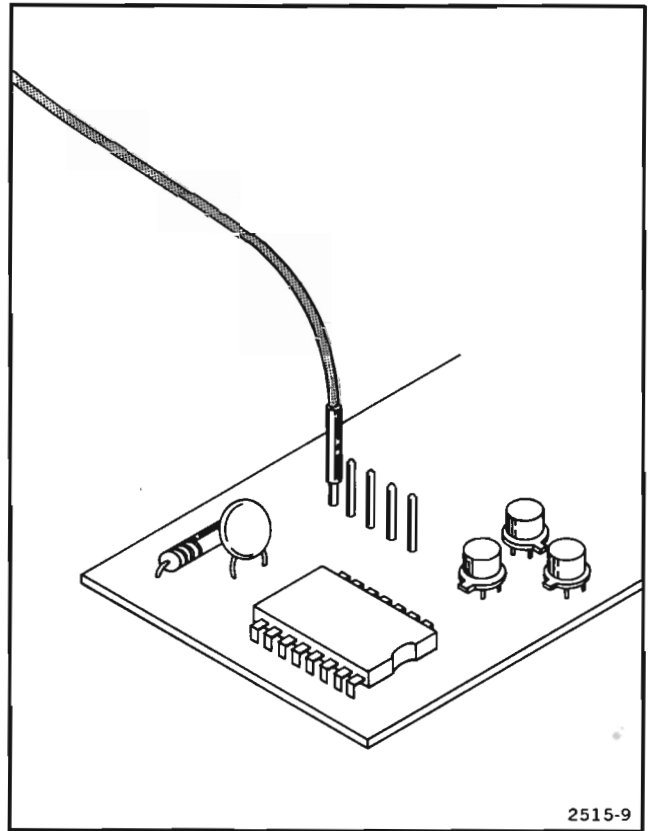


Figure 8. Attaching an input test lead connector onto a pin connector.

Where space is even more restricted for making connections, pull the test lead out of the retractable hook tip and slide the connector end of the test lead down onto the round or square pin (the lead connector also fits onto 0.025-inch square pins and round pins from 0.020 to 0.034 inch). See Fig. 8.

MAINTENANCE

The following service instructions are intended for use by qualified service personnel only. Do not perform maintenance on this instrument unless you are qualified.

The P6451 Probe is designed to withstand normal operation and handling. However, if the probe fails or is damaged, replacement parts are available. See the Replacement Parts List for descriptions and part numbers.

Cleaning

Dirt that accumulates on the probe head can be removed with a soft cloth dampened in a mild detergent and water solution. Abrasive cleaners should not be used.



CAUTION

Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. In particular, avoid chemicals which contain benzene, toluene, xylene, acetone or similar solvents.

Recommended cleaning agents are isopropyl alcohol (Isopropanol) or ethyl alcohol (Fotocol or Ethanol).

Contaminated contact areas of the connectors, hybrids, and circuit board can be cleaned with a cotton-tipped applicator dipped in a recommended cleaning agent (above).

Probe Head Component Access



CAUTION

Do not remove hybrid frames.

1. Remove the four corner screws and nuts which hold the probe halves together.
2. While pulling the probe body halves apart, note which half covers which side of the circuit board.

See Figure 9 for component locations on the circuit board; and see Figure 10 for probe head cable connections.

3. Replace any defective components.
4. When reinstalling the circuit board in probe body, be sure that the body half with channel identification label covers the circuit-board side with the channel input pins.
5. Replace the four screws that hold the probe body halves together.

Troubleshooting

Equipment Required

- | | |
|-----------------------|-----------------|
| 1. Test Oscilloscope | 3. Power Supply |
| 2. Function Generator | |

The following information is provided to aid in troubleshooting the P6451. Troubleshooting information contained in the associated test-instrument instruction manual should be used with the following information in locating malfunctions.

1. Isolate Trouble to a Circuit. To determine if the trouble is in the probe or the test instrument, use the troubleshooting information in the instruction manual for the test instrument. If the probe is found to be defective, proceed with step 2.

2. Visual Check. Remove the two halves of the probe body (refer to the Probe Head Component Access procedure, above). Check the probe for visible indications of a defect. Look for broken wires, damaged circuit board, damaged components, etc. Repair or replace any such defects. If there are no visible indications of a defect, proceed with step 3.

3. Check Supply Voltage. The supply voltage to the P6451 can have various values depending upon the voltage level used in the test instrument. Refer to the probe schematic and the test instrument instruction manual for the supply voltage assigned to the probe.

If all the channels are affected by the trouble, check supply voltages, VCC, VDD, and VEE. If one or more of the channels are operating correctly, proceed with step 4.

NOTE

Supply voltages are measured with respect to the test instrument chassis ground.

+VCC = Chassis Ground	-VEE = Chassis Ground
Typical Voltage	Typical Voltage
+VCC = 0 V	+VCC = +5 V
+VDD = -0.5 V	+VDD = +4.5 V
-VEE = -5 V	-VEE = 0 V

a. If VCC does not have its assigned voltage, check the VCC cable wire (RED) for continuity. If wire shows no continuity, proceed to step 5.

b. If VEE does not have its assigned voltage, check the VEE cable wire (VIOLET) for continuity. If wire shows no continuity, proceed to step 5.

- c. If the voltage at VDD is the same as VEE, check diode CR4 for an open. If diode is open, replace it.
- d. If the voltage at VDD is the same as VCC, check diode CR4 for a short. If diode is shorted, replace it.

4. Check Hybrid Operation. If the supply voltages are correct, check for a defective channel on one of the hybrids.

- a. Set the input threshold level of the test instrument to zero volts.
- b. Connect a signal lead from a channel input on the probe to a 1 kHz square wave of +1 volt to -1 volt (use a function generator).
- c. With a test oscilloscope, check the + (plus) output (noninverting) and - (minus) output (inverting) at the cable connector and at the circuit board for the correct output waveform (see Figure 11 for typical waveforms).

See Figure 10 for cable connections at the circuit board; and Figure 12 for output connector assignments.

- d. If an output signal is present on the circuit board, but not at the cable connector, check the cable wire for continuity.
- e. If there is no signal at any of the circuit board connections, suspect the hybrid. If the hybrid is found to be defective, proceed to step 5.

5. Replacement of Parts. If one of the hybrid integrated circuits is defective, or if the circuit board is damaged, a wired circuit board with components is available. See the Replaceable Parts List for Tektronix part numbers of available components. Electrical replaceable components are called out by component number on Figure 9. The Replaceable Electrical Parts list contains reference to circuit numbers, and components are also called out by index numbers in the Replaceable Mechanical Parts list.

6. Obtaining Replaceable Parts. All electrical and mechanical part replacements for the P6451 Probe can be obtained through your local Tektronix Field Office or representative.

When ordering replacement parts from Tektronix, Inc., include the following information:

- a. Instrument type.
- b. Instrument date code.
- c. A description of the part (if electrical, include circuit number; for example, CR4).
- d. Tektronix part number.

Service Available

Tektronix, Inc. provides complete instrument repair and calibration at Field Service Centers and at the Factory Service Center. Contact your nearest Tektronix Field Office or representative for more information or assistance on troubleshooting.

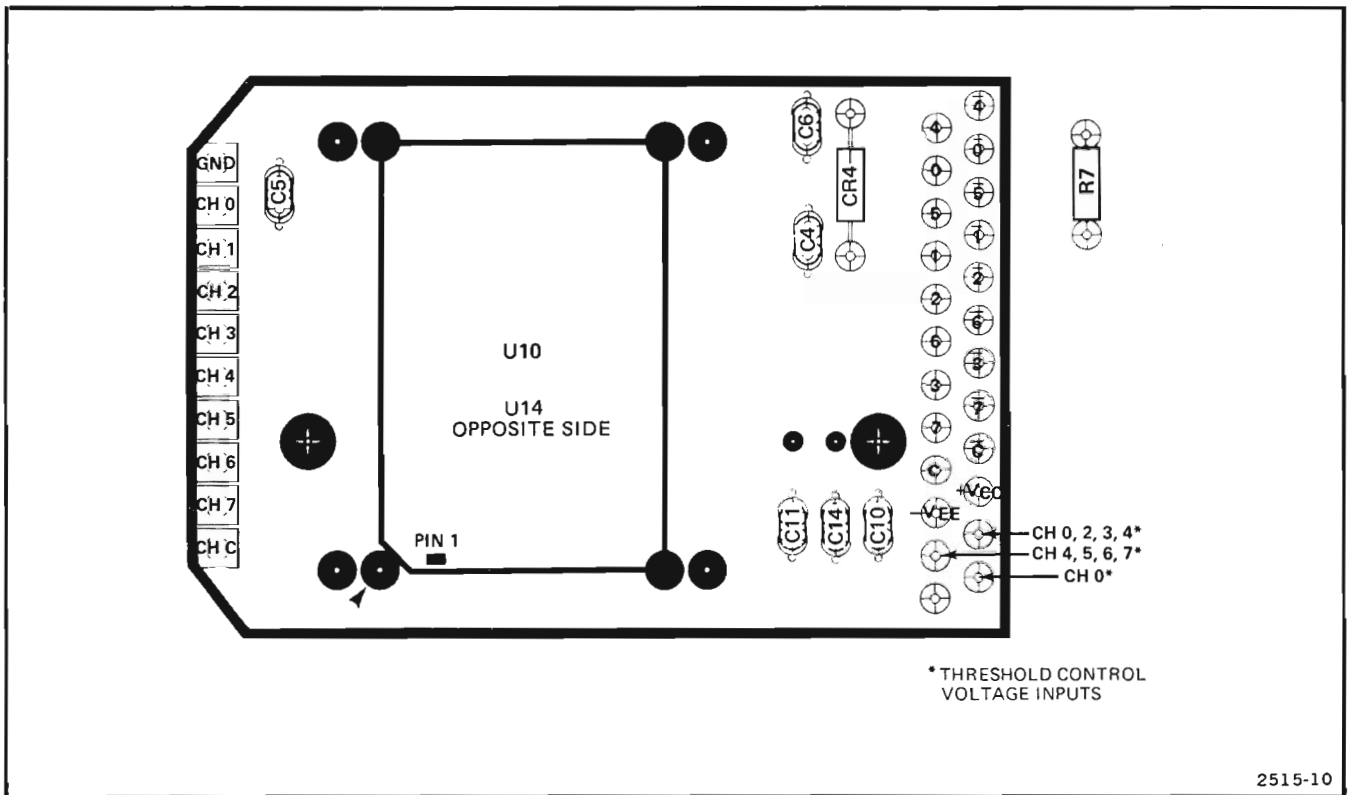


Figure 9. Component locations on the circuit board.

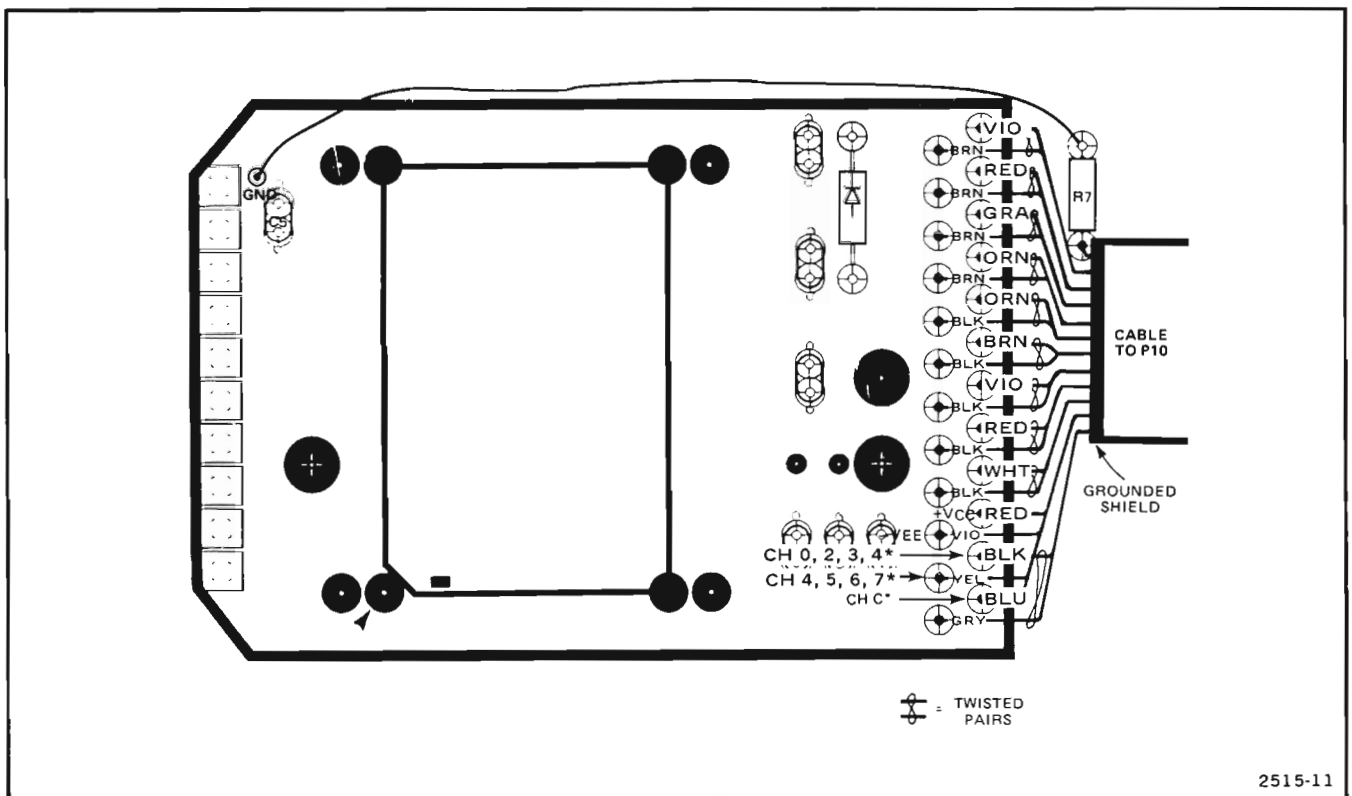
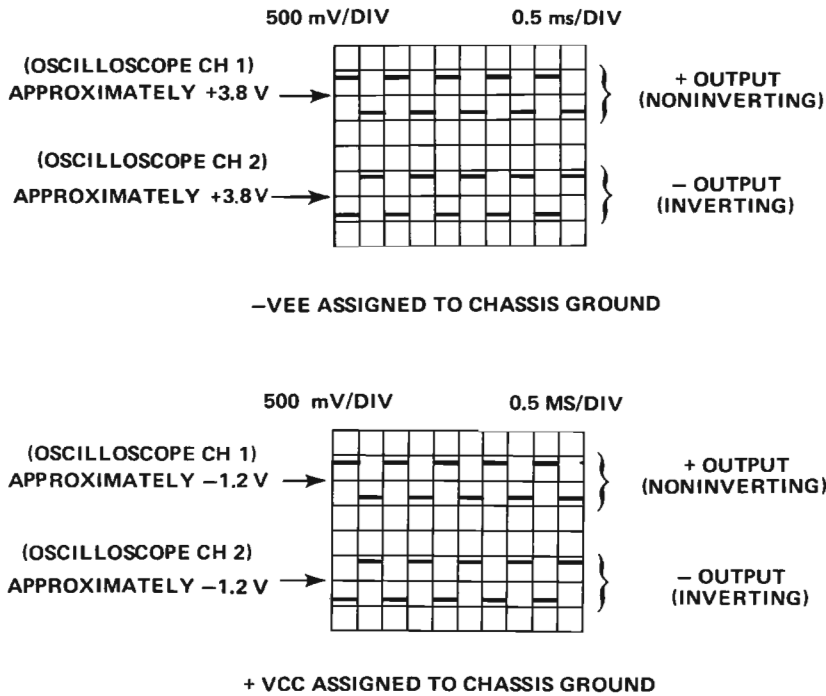
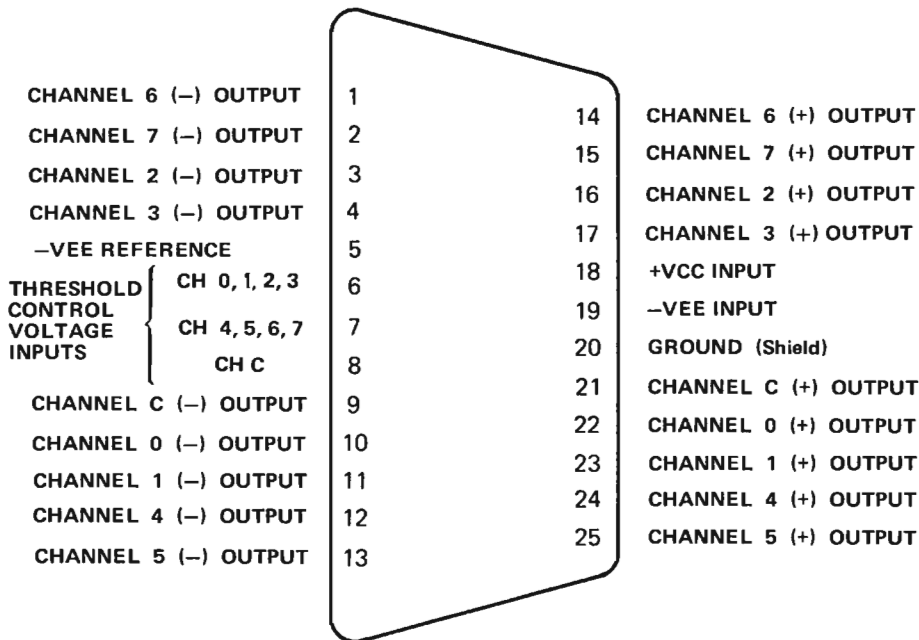


Figure 10. Probe head cable connections.



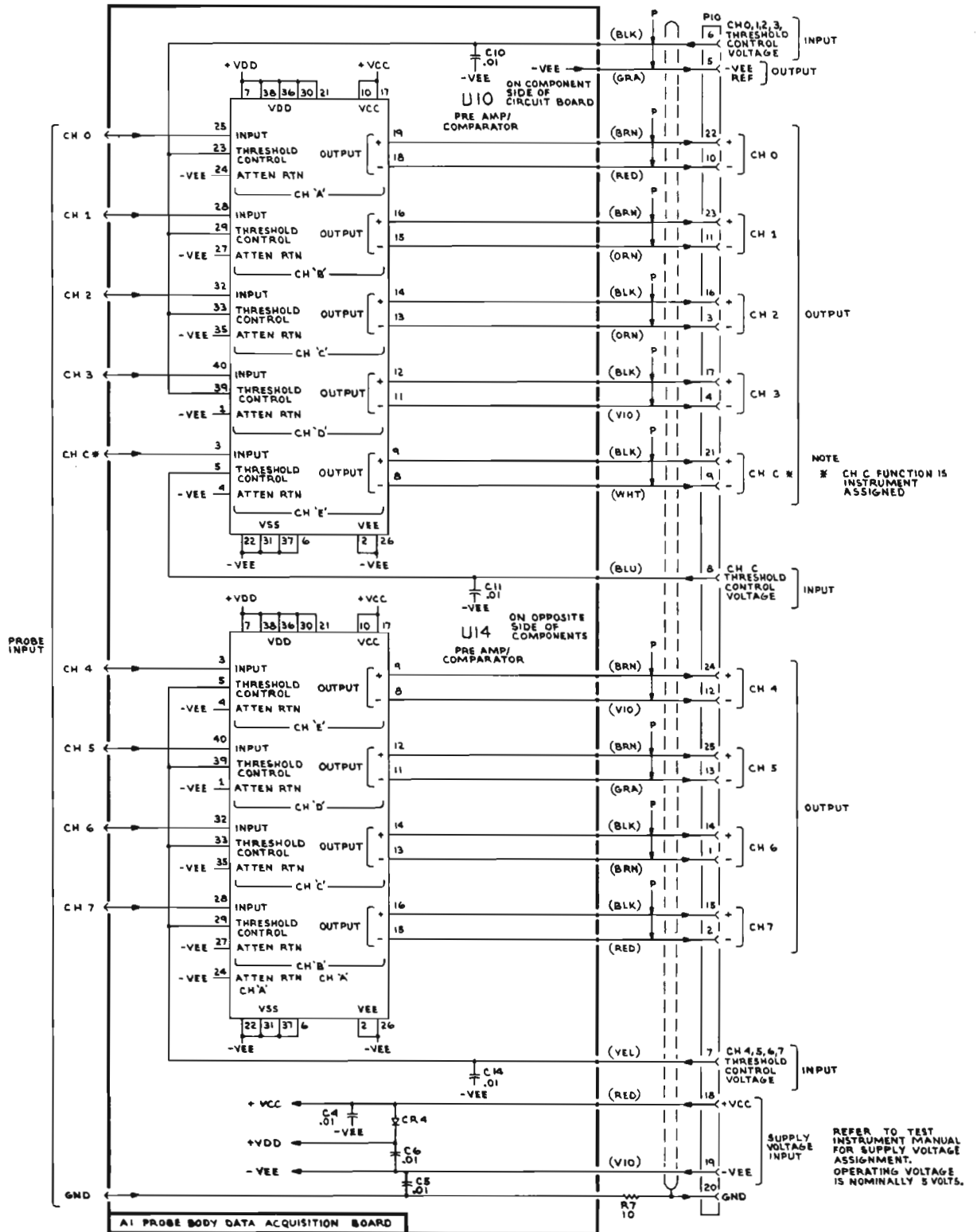
2515-12A

Figure 11. Typical channel output waveforms vs. supply voltage assigned.



2515-13

Figure 12. Probe output connector pin assignment (P10, end view).



2515-14

Figure 13. P6451 Schematic Diagram.

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

P6451 Data Acquisition Probe

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

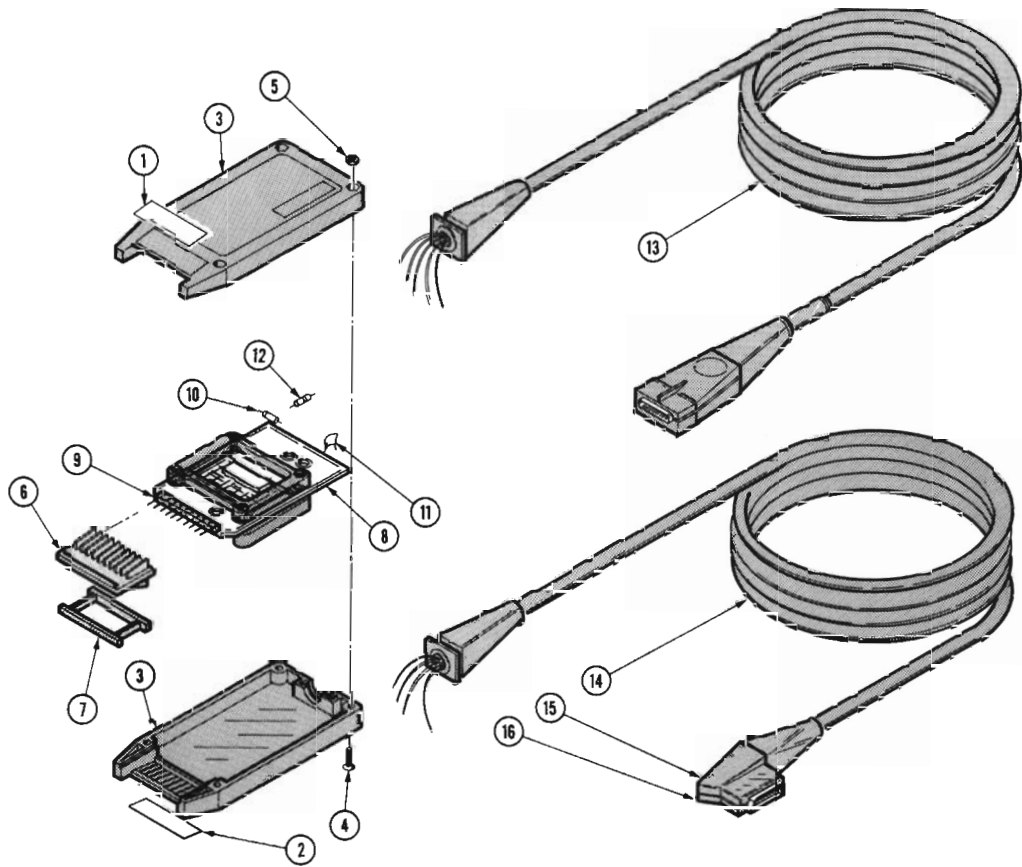
Mfr. Code	Manufacturer	Address	City, State, Zip
01121	ALLEN-BRADLEY COMPANY	1201 2ND STREET SOUTH	MILWAUKEE, WI 53204
05006	TWENTIETH CENTURY PLASTICS, INC.	415 E WASHINGTON BLVD.	LOS ANGELES, CA 90015
14433	ITT SEMICONDUCTORS	3301 ELECTRONICS WAY P O BOX 3049	WEST PALM BEACH, FL 33402
22526	BERG ELECTRONICS, INC.	YOUK EXPRESSWAY	NEW CUMBERLAND, PA 17070
72982	ERIE TECHNOLOGICAL PRODUCTS, INC.	644 W. 12TH ST.	ERIE, PA 16512
73743	FISCHER SPECIAL MFG. CO.	446 MORGAN ST.	CINCINNATI, OH 45206
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077
83385	CENTRAL SCREW CO.	2530 CRESCENT DR.	BROADVIEW, IL 60153

Replaceable Electrical Parts

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
	670-5025-00			CKT BOARD ASSY:DATA ACQUISITION	80009	670-5025-00
C4	283-0220-00			CAP., FXD, CER DI:0.01UF, 20%, 50V	72982	8121N075X7R0103M
C5	283-0220-00			CAP., FXD, CER DI:0.01UF, 20%, 50V	72982	8121N075X7R0103M
C6	283-0220-00			CAP., FXD, CER DI:0.01UF, 20%, 50V	72982	8121N075X7R0103M
C10	283-0220-00			CAP., FXD, CER DI:0.01UF, 20%, 50V	72982	8121N075X7R0103M
C11	283-0220-00			CAP., FXD, CER DI:0.01UF, 20%, 50V	72982	8121N075X7R0103M
C14	283-0220-00			CAP., FXD, CER DI:0.01UF, 20%, 50V	72982	8121N075X7R0103M
CR4	152-0075-00			SEMICON D DEVICE:GE, 25V, 40MA	80009	152-0075-00
R7	315-0100-00			RES., FXD, CMPSN: 10 OHM, 5%, 0.25W	01121	CB1005
U10	-----	-----	1			
U14	-----	-----	1			

¹ Replaceable under the 670-5025-00 only.

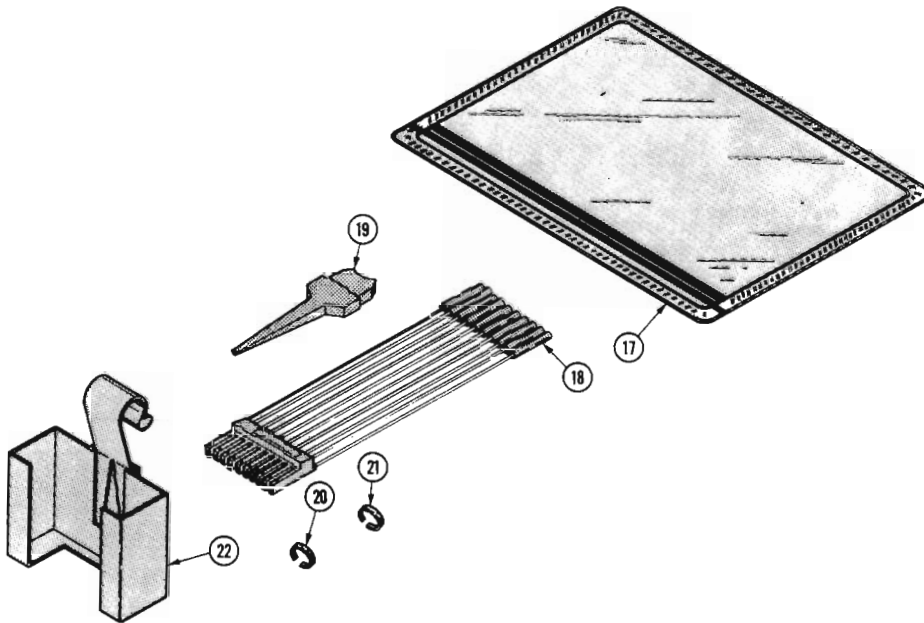
P6451 Data Acquisition Probe



REPLACEABLE PARTS LIST

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-	010-6451-03			1						PROBE, DATA ACQ: MULTI LEAD, W/ACCESS	80009	010-6451-03
	010-6451-05			1						PROBE, DATA ACQ: MULTILEAD, W/ACCESS	80009	010-6451-05
-1	334-2778-01			1						. MARKER, IDENT: MARKED GND 0 THRU 15	80009	334-2778-01
-2	334-3861-00			1						. MARKER, IDENT: MARKED P6451 DATA ACQUISITION	80009	334-3861-00
	-----			-						. (010-6451-03 ONLY)		
	334-2779-02			1						. MARKER, IDENT: MARKED TEXTRONIX P6451	80009	334-2779-02
	-----			-						. (010-6451-05 ONLY)		
-3	380-0463-00			2						. HOUSING PROBE:	80009	380-0463-00
										(ATTACHING PARTS)		
-4	211-0106-00			4						. SCREW, MACHINE: 4-40 X 0.625"100 DEG, FLH, STL	83385	OBD
-5	210-0406-00			4						. NUT, PLAIN, HEX.: 4-40 X 0.188 INCH, BRS	73743	2X12161-402
										----- * -----		
-6	361-0758-00			1						. SPACER, PROBE: GRAY ACETAL	80009	361-0758-00
-7	361-0772-00			1						. SPACER, COVER: PROBE	80009	361-0772-00
-8	670-5025-00			1						. CKT BOARD ASSY: DATA ACQUISITION	80009	670-5025-00
-9	131-1811-00			1						. . TERM SET, PIN: 10, 0.025 SQ ON 0.15 CTR	22526	65595-110
-10	152-0075-00			1						. . SEMICOND DEVICE: GE, 25V, 40MA	14433	G866
-11	283-0220-00			6						. . CAP., FXD, CER DI: 0.01UF, 20%, 50V	72982	8121N075X7R0103M
-12	315-0100-00			1						. RES., FXD, CMPSN: 10 OHM, 5%, 0.25W	01121	CB1005
-13	175-1835-02			1						. CA ASSY, SP, ELEC: PROBE	80009	175-1835-00
	-----			-						. (010-6451-03 ONLY)		
-14	175-1835-06			1						. CA ASSY, SP, ELEC: PROBE, 75.5 L	80009	175-1835-06
	-----			-						. (010-6451-05 ONLY)		
-15	380-0565-00			1						. HSG HALF, CONN: TOP, POLYCARBONATE	80009	380-0565-00
	-----			-						. (010-6451-05 ONLY)		
-16	380-0566-00			1						. HSG HALF, CONN: BOTTOM, POLYCARBONATE	80009	380-0566-00
	-----			-						. (010-6451-05 ONLY)		

P6451 Data Acquisition Probe



STANDARD ACCESSORIES

-17	016-0537-00	1	POUCH,ACCESSORY:VINYL,W/ZIPPER	05006	0BD
-18	012-0747-00	1	LEAD SET,ELEC:10 WIDE,25 CML	80009	012-0747-00
-19	206-0222-00	10	TIP PROBE:MICROCIRCUIT TEST	80009	206-0222-00
-20	334-2794-02	2	BAND,MARKER:0.371 DIA,SILVER GRAY,PLASTIC	80009	334-2794-02
	-----	-	(010-6451-03 ONLY)		
	334-2794-05	2	BAND,MARKER:0.371 DIA,ORANGE,PLASTIC	80009	334-2794-05
	-----	-	(010-6451-03 ONLY)		
	334-2794-04	2	BAND,MARKER:0.371 DIA,YELLOW,PLASTIC	80009	334-2794-04
	334-2794-06	2	BAND,MARKER:0.371 DIA,RED,PLASTIC	80009	334-2794-06
-21	334-2855-00	2	MARKER,IDENT:MARKED 0 THRU 7	80009	334-2855-00
	-----	-	(010-6451-03 ONLY)		
	334-2856-00	2	MARKER,IDENT:MARKED 0 THRU 7 P6451	80009	334-2856-00
	-----	-	(010-6451-03 ONLY)		
	334-2855-01	1	MARKER,IDENT:MARKED GND THRU 7 P6451	80009	334-2855-01
	-----	-	(010-6451-05 ONLY)		
	334-2856-01	1	MARKER,IDENT:MARKED GND 8 THRU 15 P6451	80009	334-2856-01
	-----	-	(010-6451-05 ONLY)		
-22	352-0473-01	1	HOLDER,PROBE:W/HANGER	80009	352-0473-01
	070-2515-00	1	MANUAL,TECH:INSTRUCTION	80009	070-2515-00

OPTIONAL ACCESSORIES

012-0655-01	1	LEAD SET,ELEC:INPUT/W 10 40CM L WIRES	80009	012-0655-01
012-0655-02	1	LEAD SET,ELEC:INPUT,W/10 7.874 L WIRES	80009	012-0655-02
012-0670-00	1	LEAD SET,ELEC:INPUT,W/10 15.748 L WIRES	80009	012-0670-00
012-0800-00	1	LEAD SET,ELEC:10 WIRE,9.843 L	80009	012-0800-00
015-0330-00	1	ADAPTER,TEST CLIP:16 DIP	80009	015-0330-00
015-0325-00	1	ADAPTER,PROBE:PROBE TO CONNECTOR PINS	80009	015-0325-00
195-0234-00	1	LEAD,ELECTRICAL:1,26 AWG,12.0 L	80009	195-0234-00
103-0210-00	1	ADAPTER,PROBE:PROBE TP SQ OR RND PIN	80009	103-0210-00
103-0209-00	1	ADAPTER,CONN:GRIB TO PROBE	80009	103-0209-00