

TEK

INSTRUCTION
MANUAL

PART NO. 070-4210-00
PRODUCT GROUP 60


P6131

10X PASSIVE PROBE

Tektronix[®]
COMMITTED TO EXCELLENCE

Copyright © 1982 Tektronix, Inc. All rights reserved.
Contents of this publication may not be reproduced in any
form without the written permission of Tektronix, Inc.

Products of Tektronix, Inc. and its subsidiaries are covered
by U.S. and foreign patents and/or pending patents.

TEKTRONIX, TEK, SCOPE-MOBILE, and  are
registered trademarks of Tektronix, Inc. TELEQUIPMENT
is a registered trademark of Tektronix U.K. Limited.

Printed in U.S.A. Specification and price change privileges
are reserved.

TEK**INSTRUCTION
MANUAL****PART NO. 070-4210-00
PRODUCT GROUP 60**

P6131

10X PASSIVE PROBE

Please check for change information at the rear of this manual.

FIRST PRINTING JUNE 1982

Tektronix®
COMMITTED TO EXCELLENCE

TABLE OF CONTENTS

	Page		Page
LIST OF ILLUSTRATIONS	ii	SECTION 4 ADJUSTMENT PROCEDURE	
LIST OF TABLES	ii	PURPOSE	4-1
SAFETY SUMMARY	iii	TEST EQUIPMENT REQUIRED . . .	4-1
SECTION 1 SPECIFICATION		PREPARATION	4-1
DESCRIPTION	1-1	PROCEDURE STEPS	4-1
ACCESSORIES	1-1	Adjust Low-Frequency	
PERFORMANCE CONDITIONS . . .	1-2	Compensation	4-1
SECTION 2 OPERATING CONSIDERATIONS		Check/Adjust High-Frequency	
PROBE HANDLING	2-1	Compensation	4-3
PROBE GROUNDING	2-1	SECTION 5 MAINTENANCE	
PROBE COMPENSATION	2-1	CLEANING	5-1
READOUT CONNECTOR	2-1	PROBE MODULE	
PROBE ACCESSORIES	2-2	REPLACEMENT	5-1
SECTION 3 PERFORMANCE CHECK PROCEDURE		SECTION 6 REPLACEABLE PARTS	
PURPOSE	3-1		
TEST EQUIPMENT REQUIRED . . .	3-1		
LIMITS AND TOLERANCES	3-1		
PREPARATION	3-1		
PROCEDURE STEPS	3-4		
Bandwidth Check	3-4		
Attenuation Accuracy Check	3-6		

LIST OF ILLUSTRATIONS

Figure	Page	Figure	Page
	The P6131 10X Passive Probe	iv	
1-1	Typical X_p and R_p versus frequency	1-5	4-3 High-frequency adjustment locations. 4-5
1-2	Typical voltage derating with frequency.	1-6	4-4 High-frequency adjustments, relative to affected areas of the waveform. 4-5
2-1	Installation of probe accessories	2-3	5-1 Schematic diagram for the 1.3-meter P6131 . . 5-3
3-1	Test setup for checking bandwidth	3-5	5-2 Schematic diagram for the 3.0-meter P6131 . . 5-4
4-1	Low-frequency adjustment location	4-2	
4-2	Low-frequency compensation	4-2	

LIST OF TABLES

Table	Page	Table	Page
1-1	Electrical Characteristics.	1-2	1-3 Physical Characteristics. 1-7
1-2	Environmental Characteristics	1-7	3-1 Test Equipment Required 3-2

SAFETY SUMMARY

The general safety information in this summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply and do not appear in this summary.

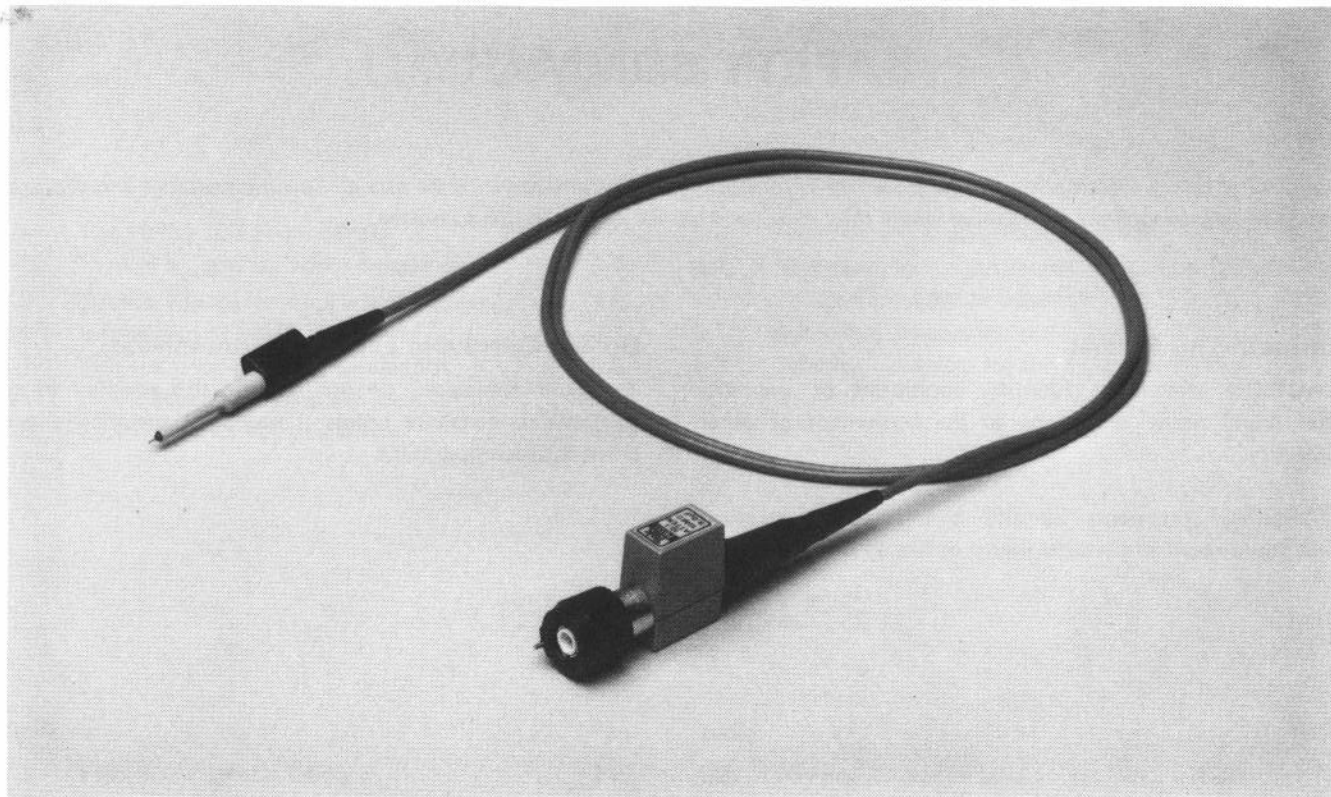
Terms in This Manual

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.



The P6131 Probe.

4210-01

SPECIFICATION

DESCRIPTION

The TEKTRONIX P6131 is a subminiature, 10X passive probe designed specifically for use with the TEKTRONIX 2445 and 2465 Oscilloscopes. It is fully compatible with the Tektronix family of subminiature probe accessories.

A coding pin on the BNC output connector activates the volts/division readout-encoding circuit of the oscilloscope to include the 10X attenuation of the probe. The compensation box houses a network that provides optimum transient response when the probe is used with the 2445 and 2465 oscilloscopes. Low-frequency compensation is accomplished by adjusting a variable capacitor through a hole provided in the compensation box housing.

The P6131 is available in two lengths, 1.3 meters and 3 meters.

ACCESSORIES

The P6131 is shipped with the following standard accessories:

- 1 Instruction manual
- 1 Carrying pouch
- 1 Hook tip
- 2 Circuit-board-to-probe-tip connectors
- 1 Ground lead with microhook
- 1 Ground lead with alligator clip
- 1 Low-inductance ground lead
- 1 Probe holder
- 4 Sets of cable markers (2 each: white, gray, red, green)

Use of these accessories is described in the "Operating Considerations" section of this manual. Part numbers are listed in the "Replaceable Parts List" (Section 6).

PERFORMANCE CONDITIONS

The electrical characteristics listed in Table 1-1 apply when a calibrated probe is used with a calibrated oscilloscope system operating within the environmental conditions stated in Table 1-2.

Items listed in the "Performance Requirements" column are verifiable qualitative or quantitative limits, while items

listed in the "Supplemental Information" column are either explanatory notes, calibration setup descriptions, performance characteristics for which no absolute limits are specified, or characteristics that are impractical to check.

The probe's physical characteristics are listed in Table 1-3.

Table 1-1
Electrical Characteristics

Characteristic	Performance Requirement	Supplemental Information
Attenuation	10X $\pm 1\%$ at dc.	Probe must be connected to a vertical input of either a TEKTRONIX 2445 or 2465 Oscilloscope. Probe series resistor is $9\text{ M}\Omega \pm 0.5\%$.
Input Resistance	$10\text{ M}\Omega \pm 1\%$ at dc. ^a	Probe installed on a 2445 or a 2465 vertical input.

^aPerformance Requirement not checked in manual.

Table 1-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
Input Capacitance (1 kHz to 100 kHz)		Probe must be connected to instrument and low-frequency compensated. See Figure 1-1 for a graph of input resistance (R_p) and parallel reactance (X_p) versus frequency.
1.3 Meter Probe	Approximately 10.8 pF. ^a	
3.0 Meter Probe	Approximately 14.5 pF. ^a	
Compensation Range	14 pF to 18 pF. ^a	
System Bandwidth (–3 dB)		Probe must be low-frequency and high-frequency compensated.
1.3 Meter Probe	At least 300 MHz on the 2465. At least 150 MHz on the 2445.	
3.0 Meter Probe	At least 150 MHz on the 2465. At least 130 MHz on the 2445.	
Aberrations	+6%, –6%, or 6% p-p for first 30 ns. Thereafter, +1%, –1%, or 1% p-p. Probe aberrations are in addition to oscilloscope aberrations.	Probe must be low-frequency and high-frequency compensated.

^aPerformance Requirement not checked in manual.

Table 1-1 (cont)

Characteristic	Performance Requirement	Supplemental Information
Signal Delay		Measured from probe tip to probe output connector.
1.3 Meter Probe	5.5 ns \pm 100 ps. ^a	
3.0 Meter Probe	12.3 ns \pm 200 ps. ^a	
Maximum Nondestructive Input Voltage	500 V (dc + peak ac) to 1.3 MHz. Derate to 50 V at 300 MHz. ^a	See Figure 1-2 for derating curve.
Maximum Withstand Voltage	2414 V with no shock or fire hazard. ^a	One time for one minute. UL1244 (July 21, 1980) para 9.11.1.
Maximum Electrostatic Discharge Withstand Voltage	500 pF in series with 1 k Ω , charged to 20 kV. ^a	

^aPerformance Requirement not checked in manual.

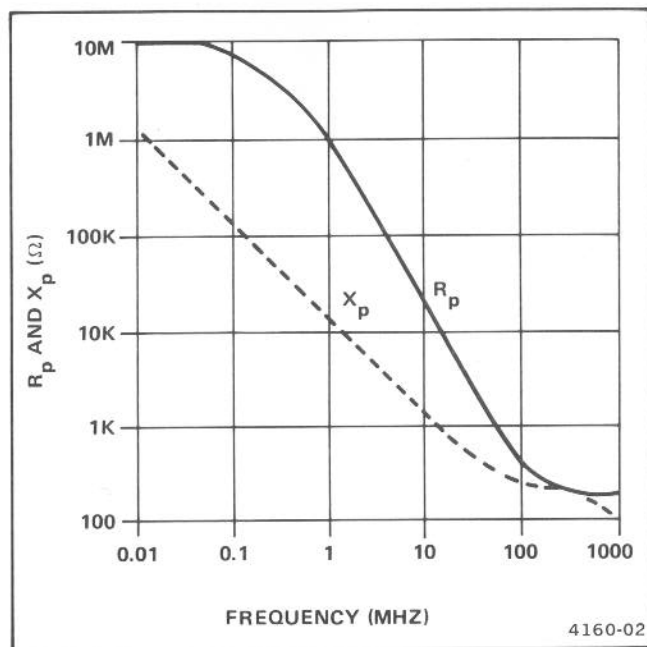


Figure 1-1. Typical X_p and R_p versus frequency.

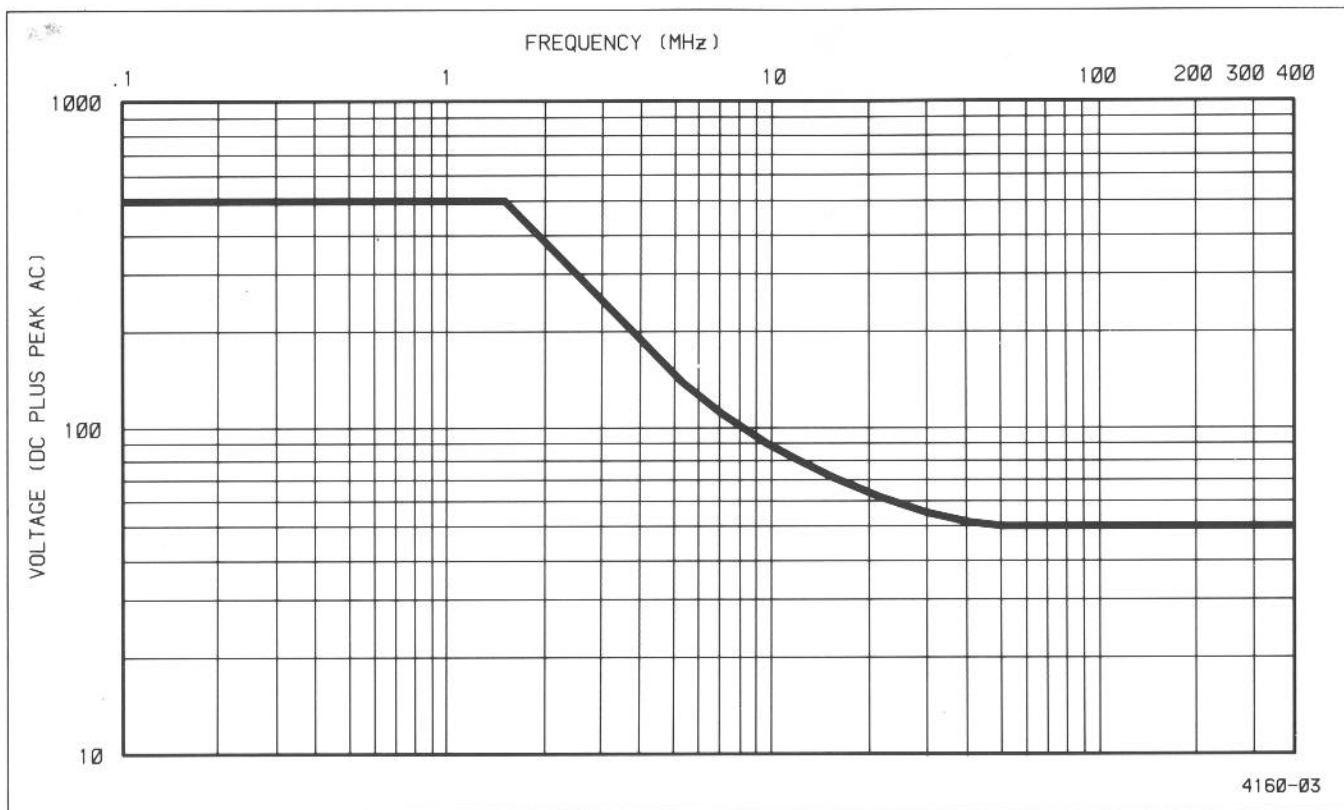


Figure 1-2. Typical voltage derating with frequency.

Table 1-2
Environmental Characteristics

Characteristic	Information
Temperature Range (Operating)	−15°C to +75°C (+5°F to +167°F).
Temperature Range (Nonoperating)	−62°C to +85°C (−80°F to +185°F).
Humidity	Five cycles (120 hr) 95% to 97% relative humidity at 30°C to 60°C. Reference to MIL-E-16400F, paragraph 4.5.9 through 4.5.9.5.1, class 4.
Altitude (Operating)	To 4,600 m (15,000 ft).
Transportation	Qualifies under National Safe Transit Test Procedure 1A, 48-inch drop.

Table 1-3
Physical Characteristics

Characteristic	Information
Net Weight (Includes Accessories)	
1.3 Meter Probe	108 g (3.8 oz).
3.0 Meter Probe	159 g (5.6 oz).
Probe Assembly Length	
1.3 Meter Probe	1.3 m (4.2 ft).
3.0 Meter Probe	3.0 m (9.8 ft)

OPERATING CONSIDERATIONS

PROBE HANDLING

The P6131's subminiature body has been designed for ease of use when probing small circuitry. Both the probe itself and its accessories should be handled carefully at all times. To prevent damage, avoid dropping the probe body, since damage to its tip may result. Exercise care to prevent crushing the cable or placing excessive strain on it by pulling.

PROBE GROUNDING

A passive probe is a capacitive divider for high-frequency signal components. Inductance introduced by either a long signal lead or ground lead will form a series-resonant circuit that will ring if driven by a signal containing significant frequency components at or above circuit resonance. These oscillations (ringing) can appear on the oscilloscope display and distort the true waveform. The ground lead and signal-input connections should be kept as short as possible to maintain the best waveform fidelity.

PROBE COMPENSATION

Due to variations in oscilloscope input characteristics, probe low-frequency compensation should be checked and adjusted, if necessary, after moving the probe from one oscilloscope to another or from one channel to another of a multichannel oscilloscope. See "Low-Frequency Compensation" instructions in the "Adjustment Procedure" (Section 4).

READOUT CONNECTOR

The BNC connector at the end of the probe cable is equipped with a spring-loaded contact finger that actuates the 10X readout resistor built into the connector shell. This resistor automatically advances the Volts/Division reading by 10X, in oscilloscopes equipped with this feature, so that the correct deflection factor at the probe tip is indicated.

PROBE ACCESSORIES

Both standard and optional accessories for the P6131 are listed in the "Replaceable Parts List" (Section 6). Standard accessories are supplied to aid in connecting the probe to circuitry under test and to protect the probe against damage. These accessories are described in the following paragraphs and are illustrated in Figure 2-1.

Probe Holder

Each probe holder provides a convenient means of storing two probes in a readily accessible location. The holder has adhesive on the rear side to enable attaching it to an oscilloscope. To install the holder, peel off the protective covering from the adhesive and attach the holder to the cabinet side, preferably near the vertical inputs. When a probe is not in use, insert its tapered portion (behind the probe head) into the holder.

Ground Leads

The P6131 Probe is supplied with three ground leads: a 150-mm (5.9-in) lead with a microhook, a 250-mm (9.8-in) lead with an alligator clip, and a 40-mm (1.6-in) low-inductance lead. To minimize ringing, always use the shortest possible ground lead. Each lead is equipped with a square-pin connector which plugs into the socket in the probe's grounding collar.

Before using the low-inductance lead, remove the light-gray probe-body shell and flip the grounding collar so that the socket faces toward the probe tip. Then replace the probe-body shell and install the ground lead (see Figure 2-1).

Cable Markers

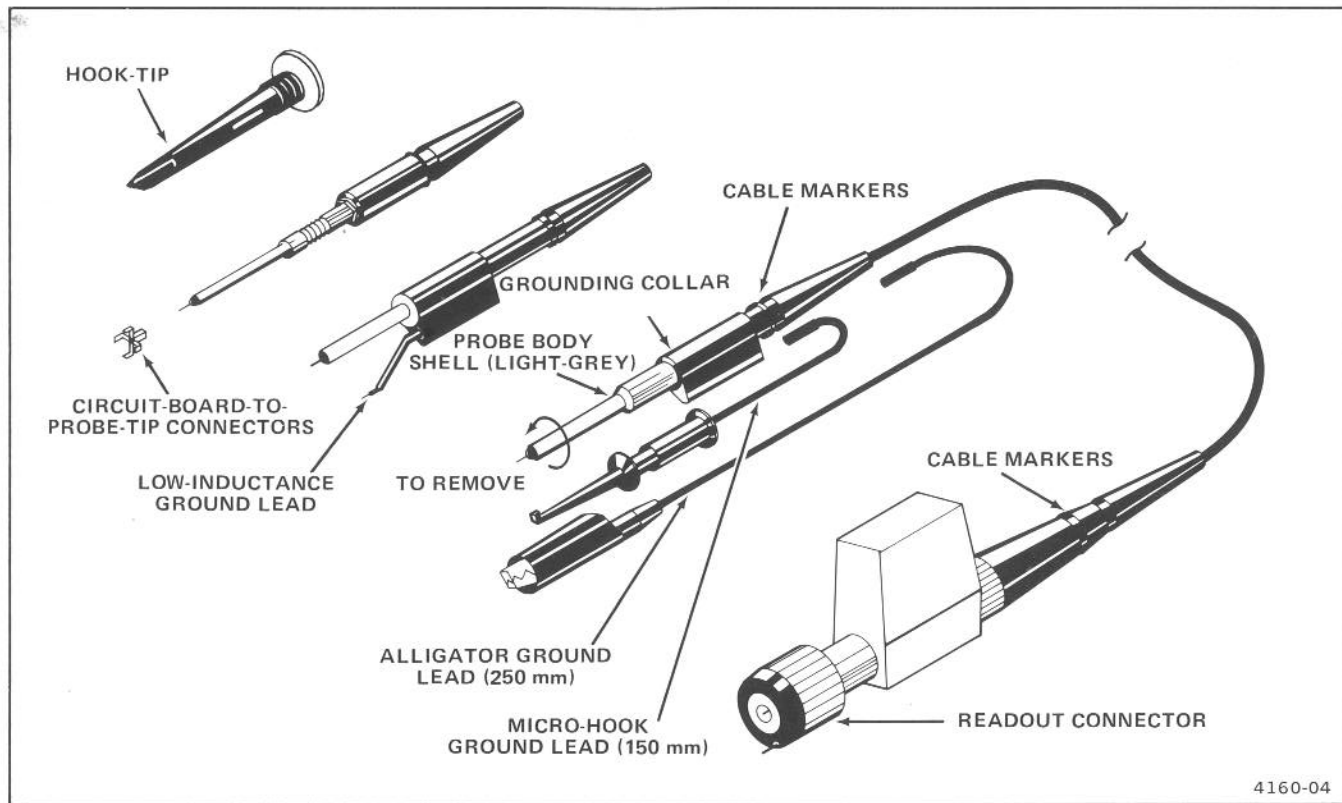
Cable markers are provided in four different colors to help identify specific probes when using multichannel oscilloscopes.

Circuit-Board-to-Probe-Tip Connectors

Two circuit-board-to-probe-tip connectors are provided for making permanent probe test points on circuit boards. These connectors provide extremely short signal and ground paths to minimize ringing. Before inserting the probe tip into a connector, remove both the light-gray probe-body shell and the grounding collar from the tip.

Hook Tip

The hook tip provides the means for making a hands-free connection to a test point or component lead. To install the hook tip, just slide the hook tip onto the probe.



4160-04

Figure 2-1. Installation of probe accessories.

PERFORMANCE CHECK PROCEDURE

PURPOSE

The "Performance Check Procedure" is used to verify the probe's Performance Requirements as listed in the "Specification" (Section 1) and to determine the need for readjustment. This procedure may also be used both as an acceptance check and as a test of the probe after repair.

TEST EQUIPMENT REQUIRED

The test equipment listed in Table 3-1 is a complete list of equipment required to accomplish both the "Performance Check Procedure" in this section and the "Adjustment Procedure" in Section 4. Test equipment specifications described in Table 3-1 are the minimum necessary to provide accurate results; therefore, equipment used must meet or exceed the listed specifications. Detailed operating

instructions for test equipment are not contained in this procedure. Should additional operating information be needed, refer to the appropriate test-equipment instruction manual.

LIMITS AND TOLERANCES

The limits and tolerances given in this procedure are for the P6131 under test only. Test-equipment error is not included except as noted.

PREPARATION

Before proceeding with each check step, allow sufficient warm-up time for test equipment to stabilize (typically 20 minutes). Each of the following checks can be independently performed.

Table 3-1
Test Equipment Required

Item Number and Description	Minimum Specification	Purpose	Example of Suitable Test Equipment
1. Oscilloscope	The P6131 is designed specifically for use with the TEKTRONIX 2445 and 2465 Oscilloscopes.	Signal display.	a. TEKTRONIX 2465 Oscilloscope. b. TEKTRONIX 2445 Oscilloscope. ^a
2. Calibration Generator	Pulse rise time: 1 ns or less. Amplitude: 0.5 V or greater into 50 Ω . Repetition rate: 100 kHz. Accuracy: $\pm 0.25\%$. Direct error readout.	Attenuation check. High-frequency compensation adjustments.	TEKTRONIX PG 506 Calibration Generator. ^b
3. Leveled Sine-Wave Generator	a. Amplitude: adjustable from 0.5 V to at least 1 V p-p into 50 Ω . Frequency: variable from 245 MHz to at least 300 MHz, plus fixed 50-kHz reference.	Bandwidth check.	a. TEKTRONIX SG 504 Leveled Sine-Wave Generator. ^b

^aA TEKTRONIX 2465 Oscilloscope and a leveled sine-wave generator capable of producing a 300-MHz output signal are required to confirm the full bandwidth specification of the P6131. If the P6131 is to be used only on a TEKTRONIX 2445, the bandwidth specification is lower (see Table 1-1).

^bRequires a TM 500-Series power-module mainframe.

Table 3-1 (cont)

Item Number and Description	Minimum Specification	Purpose	Example of Suitable Test Equipment
3. Leveled Sine-Wave Generator (cont)	b. Amplitude: adjustable from 0 V to at least 1 V p-p into 50 Ω . Frequency: variable from 1 MHz to at least 150 MHz, plus fixed 50-kHz reference. ^a		b. TEKTRONIX SG 503 Leveled Sine-Wave Generator. ^{a,b}
4. Precision Coaxial Cable	Impedance: 50 Ω . Length: 36 in. Connectors: BNC.	Signal interconnection.	Tektronix Part Number 012-0482-00.
5. 10X Attenuator	Impedance: 50 Ω . Connectors: BNC.	High-frequency compensation.	Tektronix Part Number 011-0059-02.
6. Adapter	Connectors: subminiature-probe-tip-to-BNC male.	Attenuation check.	Tektronix Part Number 013-0195-00.
7. Termination	Impedance: 50 Ω . Connectors: BNC.	Signal termination.	Tektronix Part Number 011-0049-01.

^aA TEKTRONIX 2465 Oscilloscope and a leveled sine-wave generator capable of producing a 300-MHz output signal are required to confirm the full bandwidth specification of the P6131. If the P6131 is to be used only on a TEKTRONIX 2445, the bandwidth specification is lower (see Table 1-1).

^bRequires a TM 500-Series power-module mainframe.

Table 3-1 (cont)

Item Number and Description	Minimum Specification	Purpose	Example of Suitable Test Equipment
8. Termination Adapter	Impedance: 50 Ω . Connectors: subminiature-probe-tip-to-GR.	Signal pick-off.	Tektronix Part Number 017-0520-00.
9. Adapter	Connectors: GR-to-BNC female.	Signal interconnection.	Tektronix Part Number 017-0063-00.
10. Low-Reactance Alignment Tool	Length: 2-in shaft. Bit size: .050 in.	Low- and high-frequency compensation adjustments.	Tektronix Part Number 003-0675-00.
11. Open-End Wrench	Jaw size: 7/16 in. Maximum thickness: 0.160 in.	Removal of compensation box cover.	Tektronix Part Number 003-0263-00.

PROCEDURE STEPS

1. Bandwidth Check

Equipment Required (see Table 3-1):

Oscilloscope (Item 1)
 Leveled Sine-Wave Generator (Item 3)
 Precision Coaxial Cable (Item 4)
 Termination Adapter (Item 8)
 Adapter (Item 9)

a. Connect the test setup as shown in Figure 3-1.

b. Set test oscilloscope controls:

Volts/Division	0.1 V (Includes probe 10X attenuation)
Time/Division	1 ms
Input Coupling	DC
Bandwidth	Full Bandwidth

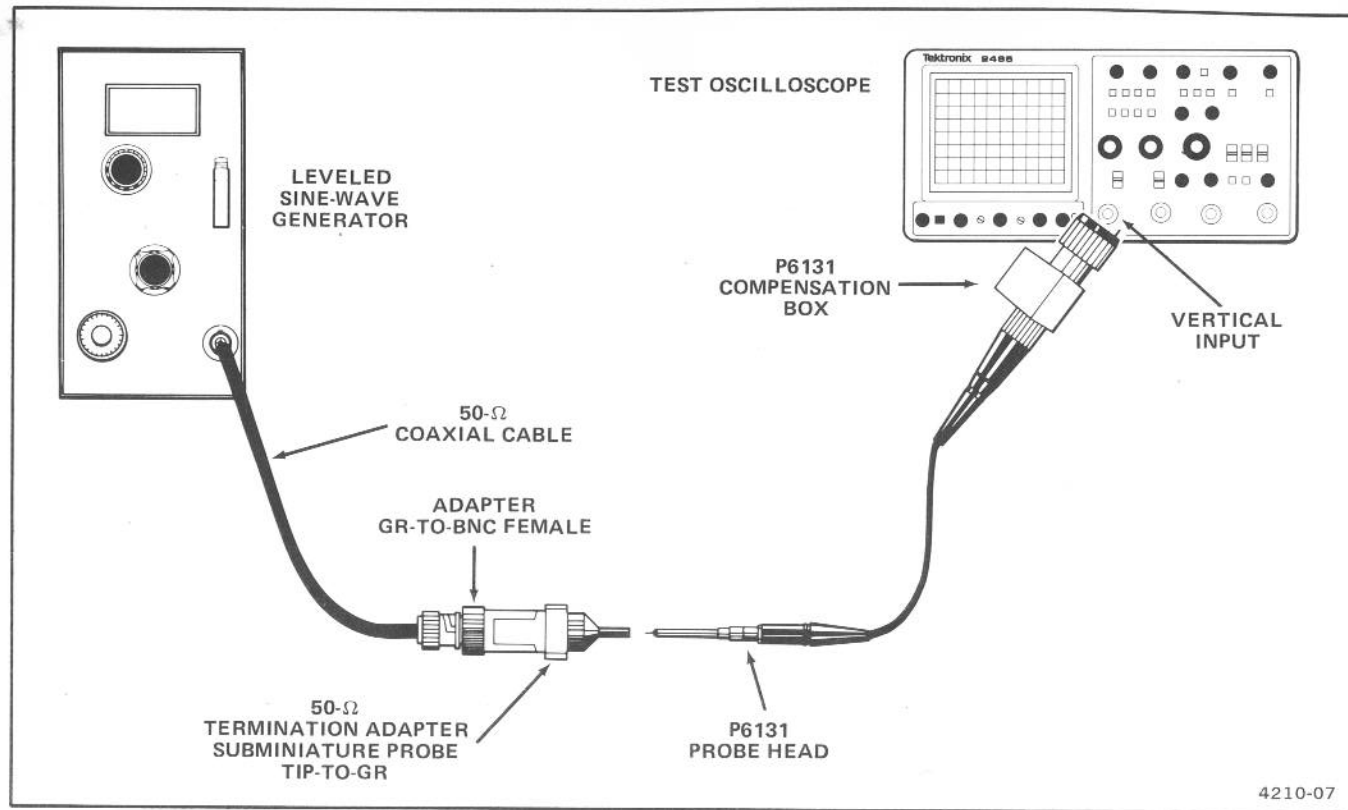


Figure 3-1. Test setup for checking bandwidth.

c. Set the leveled sine-wave generator frequency to 50 kHz.

d. Adjust the generator output amplitude to produce a 6-division display on the test oscilloscope. Center the display on the screen.

e. Set the generator frequency-range switch to the high-frequency position (245-550 MHz for the SG 504, 100-250 MHz for the SG 503) and slowly increase the setting of the variable frequency control until the display amplitude decreases to 4.2 divisions (-3 dB).

f. **CHECK**—Sine-wave generator readout must be greater than or equal to the following values:

	2445 Oscilloscope	2465 Oscilloscope
1.3-m probe	150 MHz	300 MHz
3.0-m probe	130 MHz	150 MHz

If the reading is less than the required value, perform the low-frequency and high-frequency compensation adjustments in the "Adjustment Procedure" (Section 4).

g. Disconnect the test setup.

2. Attenuation Accuracy Check

Equipment Required (see Table 3-1):

Oscilloscope (Item 1)
Calibration Generator (Item 2)
Precision Coaxial Cable (Item 4)
Adapter (Item 6)

a. Connect the calibration generator standard-amplitude output to the test oscilloscope vertical input via a precision cable.

b. Set calibration generator controls:

Standard Amplitude	
Output	50 mV
Frequency	1 kHz

c. Set test oscilloscope controls:

Volts/Division	10 mV
Time/Division	1 ms
Input Coupling	DC
Triggering Controls	Obtain stable display

d. Adjust the generator variable amplitude control to produce an exact 5-division display.

e. Note the oscilloscope deflection error directly from the calibration generator display for calculation in part j. (Example: +1%).

f. Remove the precision cable from the test setup; connect the P6131 Probe output to the same vertical input on the test oscilloscope.

g. Connect the probe tip, via the probe-tip-to-BNC adapter, to the standard-amplitude output of the calibration generator. (The light-gray probe-body shell must be removed before inserting the probe tip into the probe-tip-to-BNC adapter.)

h. Set the calibration generator amplitude control to 0.5 V.

i. Adjust the generator variable amplitude control to produce an exact 5-division display.

j. CHECK—The deflection error indicated by the calibration generator must be within 0.75% (probe attenuation accuracy of $\pm 1\%$ minus generator uncertainty of $\pm 0.25\%$) of the error noted in part e. (Example: The error noted in part e is +1%; then the generator display must now indicate between 0.25% and 1.75%.)

k. Disconnect the test setup.

NOTE

If an ohmmeter is available with a 10 M Ω or greater range, with an accuracy of $\pm 0.05\%$ or greater, it may be used in an alternate method of confirming probe attenuation accuracy.

An attenuation accuracy of $\pm 1.0\%$ is insured if the oscilloscope input resistance is indicated to be 1 M $\Omega \pm 0.55\%$ ($\pm 0.5\%$ tolerance plus $\pm 0.05\%$ reading uncertainty) and the probe's probe-tip-to-output series resistance is indicated to be 9 M $\Omega \pm 0.35\%$ ($\pm 1.0\%$ attenuation accuracy minus $\pm 0.6\%$ input resistance uncertainty minus $\pm 0.05\%$ reading uncertainty).

ADJUSTMENT PROCEDURE

PURPOSE

This section contains the information necessary to perform low-frequency and high-frequency compensation adjustments for the P6131 Probe. The adjustment procedures are not intended to be troubleshooting guides; however, any deficiency found during performance of each adjustment step should be corrected before continuing. Tektronix Field Service Centers and the Factory Service Center provide instrument repair and adjustment service. Refer to Section 5 for further repair information.

TEST EQUIPMENT REQUIRED

All test equipment items listed in Table 3-1, except items 3 and 6, are needed to perform the complete Adjustment Procedure.

PREPARATION

Before proceeding with each adjustment step, allow sufficient warm-up time for test equipment to stabilize (typically 20 minutes). Low-frequency compensation should always be done prior to high-frequency compensation.

PROCEDURE STEPS

1. Adjust Low-Frequency Compensation

Equipment Required (see Table 3-1):

Oscilloscope (Item 1)
Alignment Tool (Item 10)

a. Connect the probe output to the test oscilloscope vertical input.

b. Set test oscilloscope controls:

Volts/Division	0.1 V (Includes probe 10X attenuation.)
Time/Division	1 ms
Input Coupling	DC
Bandwidth	Full Bandwidth

c. Connect the probe input via the hook tip to the oscilloscope calibrator output.

d. Set oscilloscope triggering controls for a stable display. The display should be approximately 5 cycles of square wave, with an amplitude of 4 divisions. Center the display on the screen.

e. ADJUST—Low-frequency compensation (C2010) using a low-reactance alignment tool for the squarest wave-

form front-corner. Figure 4-1 shows the location of C2010. Use Figure 4-2 to determine the correct setting.

f. Disconnect the test setup.

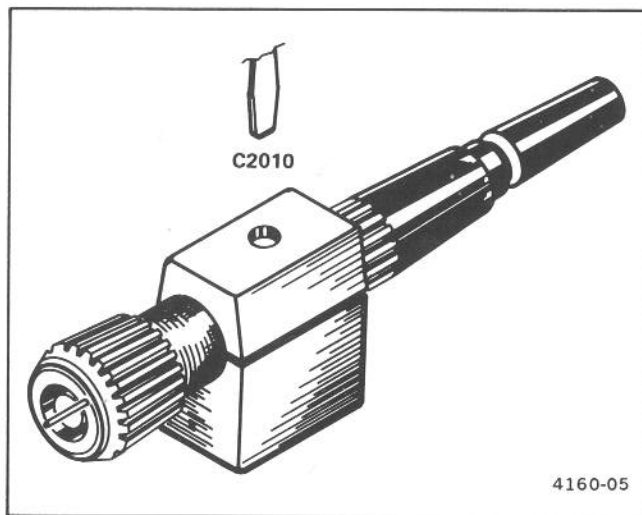


Figure 4-1. Low-frequency adjustment location.

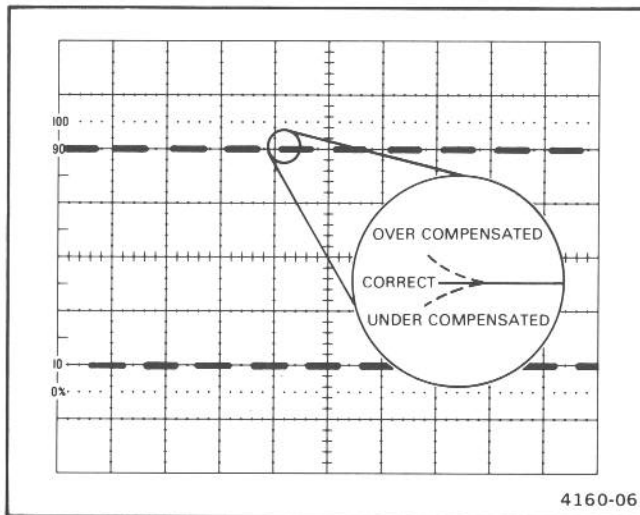


Figure 4-2. Low-frequency compensation.

2. Check/Adjust High-Frequency Compensation

Equipment Required (see Table 3-1):

Oscilloscope (Item 1)
Calibration Generator (Item 2)
Precision Coaxial Cable (Item 4)
10X Attenuator (Item 5)
Termination (Item 7)
Termination Adapter (Item 8)
Adapter (Item 9)
Alignment Tool (Item 10)
Open-End Wrench (Item 11)

a. Connect the positive-going, fast-rise output of the calibration generator via a 50- Ω cable, a 10X attenuator, and a through-line termination to the test oscilloscope vertical input connector.

b. Set test oscilloscope controls:

Volts/Division	10 mV
Time/Division	0.02 μ s
Input Coupling	DC
Bandwidth	Full Bandwidth

c. Set the calibration generator to produce a fast-rise output with a period (repetition rate) of 10 μ s (100 kHz) and adjust the amplitude control to produce a 5-division display on the test oscilloscope.

d. Set oscilloscope triggering controls for a stable display and center the display on the screen.

e. Note the pulse shape and system aberrations for comparison in part j.

f. Disconnect the signal from the oscilloscope input connector.

g. Remove the probe compensation box cover. First, unscrew the compensation box retainer about two complete turns. Use the open-end wrench to loosen the BNC connector. Unscrew the BNC connector about three complete turns. Remove the cover. Assure that the cable connection is pressed in firmly and retighten the retainer and the BNC connector.

h. Connect the probe output connector to the test oscilloscope vertical input connector.

i. Connect the probe tip via a probe-tip-to-GR termination adapter, a GR-to-BNC female adapter, and a 50- Ω coaxial cable to the positive-going fast-rise output of the calibration generator. (The light-gray probe-body shell must be removed before inserting the probe tip into the probe-tip-to-GR termination adapter.)

j. CHECK—High-frequency aberrations do not exceed +6% (5.30 divisions), -6% (4.70 divisions), or 6% (0.3 division) p-p (in addition to system aberrations noted in part e).

If probe aberrations are within tolerance, proceed to part m. If they are not, proceed with part k.

k. ADJUST—R2021 for best overall flat response. See Figure 4-3 for the location of all adjustments and refer to Figure 4-4 for identification of the waveform area affected by each adjustment.

l. ADJUST—R2020, R2010, and C1010 for best corner response (without ringing).

NOTE

The high-frequency compensation adjustments affect probe bandwidth. After making these adjustments, check probe bandwidth using the procedure given in Section 3. A small overshoot on the leading edge of the pulse may be necessary to enable meeting the bandwidth specification. However, overshoot should not exceed the typical aberrations described in part j.

m. Reinstall the compensation box cover by reversing the procedure in part g.

n. Disconnect the test setup.

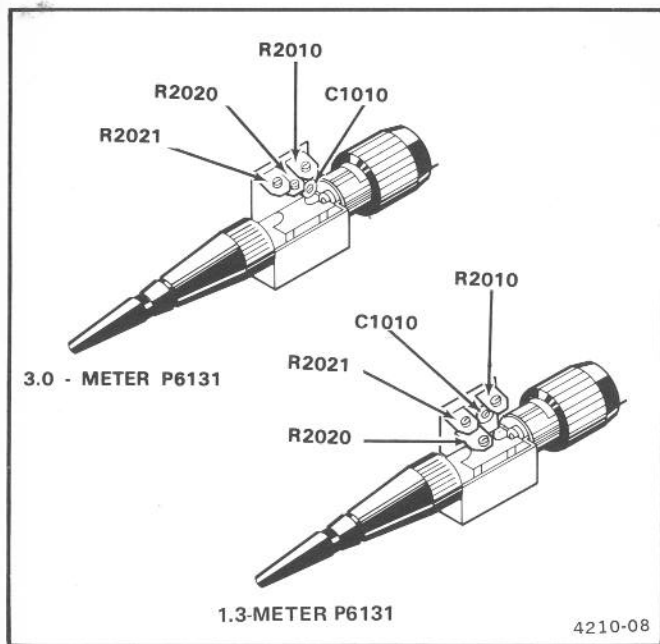


Figure 4-3. High-frequency adjustment locations.

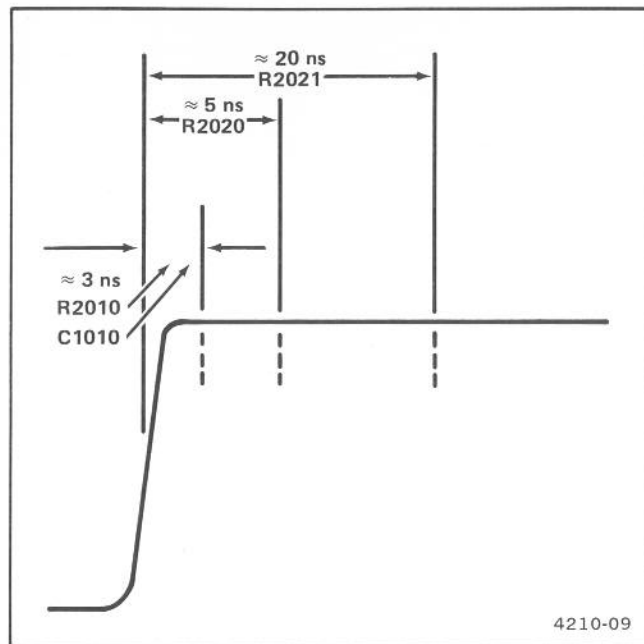


Figure 4-4. High-frequency adjustments, relative to affected areas of the waveform.

MAINTENANCE

CLEANING

Occasional cleaning of the exterior surfaces of the probe assembly may be required.

WARNING

To avoid electrical shock, do not clean the probe while it is connected to a signal or voltage source.

CAUTION

Do not use chemical cleaning agents which might damage the materials used in this probe. In particular, avoid chemicals which contain benzene, toluene, xylene, acetone, or similar solvents.

Dirt that accumulates on the outside of the probe can be removed with a soft cloth dampened with a nonresidue-type cleaner, preferably isopropyl alcohol or a solution of

5% Kelite detergent with 95% water. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

PROBE MODULE REPLACEMENT

If the probe is damaged or experiences a failure during use, replacement parts can be obtained through your local Tektronix Service Center or representative. The "Replaceable Parts List" (Section 6) provides Tektronix part numbers and item descriptions.

To simplify repair, modular construction was incorporated in the design of the P6131. The probe tip, compensation box, and cable are removable and replaceable as complete units. Individual components within the compensation box and probe tip are not considered replaceable parts.

The schematic diagrams for the P6131 are shown in Figure 5-1 (1.3-meter probe) and in Figure 5-2 (3.0-meter probe). When troubleshooting, use these diagrams to help isolate the faulty module.

The following paragraphs describe how to remove each of the three replaceable modules. To install a replacement module, simply reverse the disassembly procedure. Figure 6-1 in the "Replaceable Parts List" may be useful when removing or replacing modules.

WARNING

To avoid electrical shock, do not disassemble the probe while it is connected to a signal or voltage source.

Compensation Box and Cable

To remove the compensation box, first unscrew the retainer cover from the box. Then pull out the cable until it separates from the compensation box.

Probe Tip and Cable

To remove the probe tip, first unscrew the light-gray probe-body shell and slide off the grounding collar. Then unscrew the probe tip from the cable assembly. The probe tips for the two different-length P6131s have a small plastic end-piece at the tip that is color-coded clear to aid in distinguishing the P6131 tips from other subminiature probe tips. The probe tips also have a colored end-piece at the cable end of the tip to distinguish the tips for the different-length versions of the P6131. The end-piece is blue for the 1.3-meter probe and red for the 3.0-meter probe.

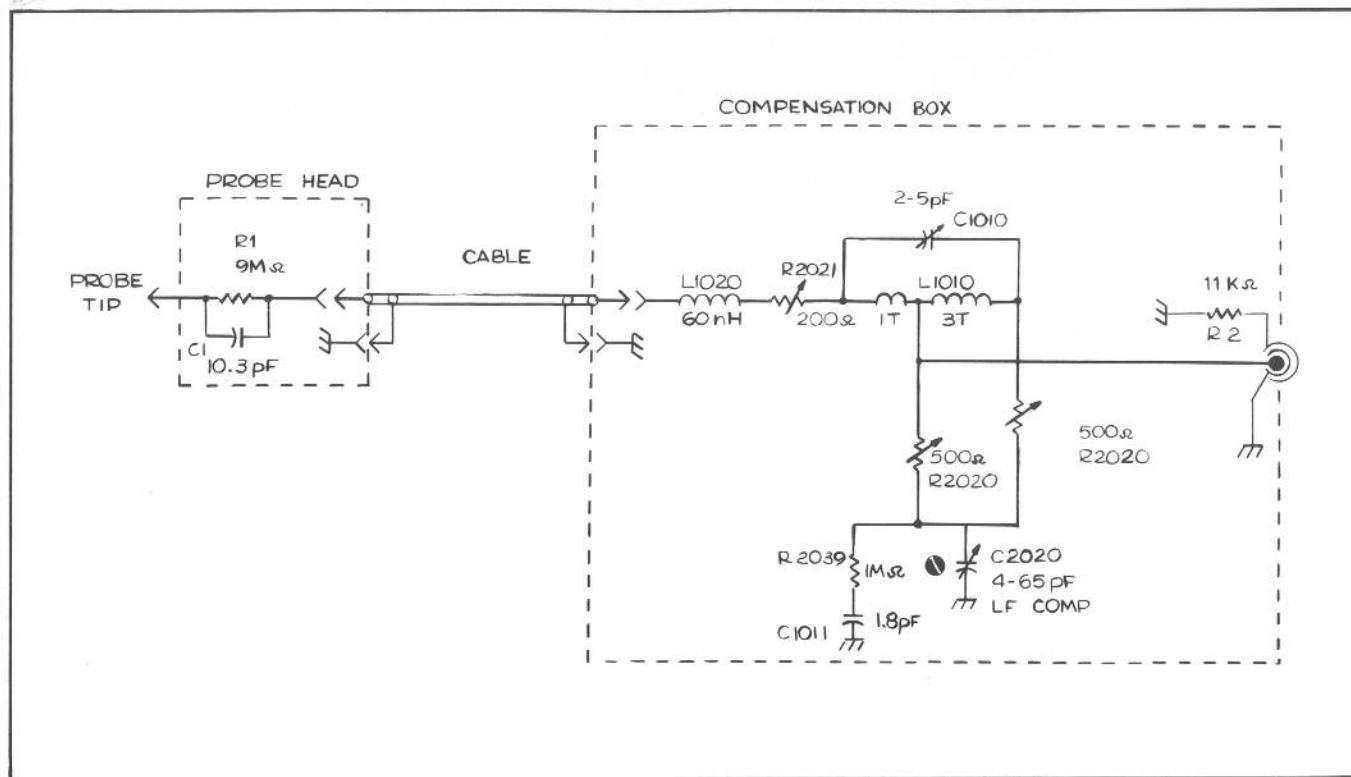


Figure 5-1. Schematic diagram for the 1.3-meter P6131.

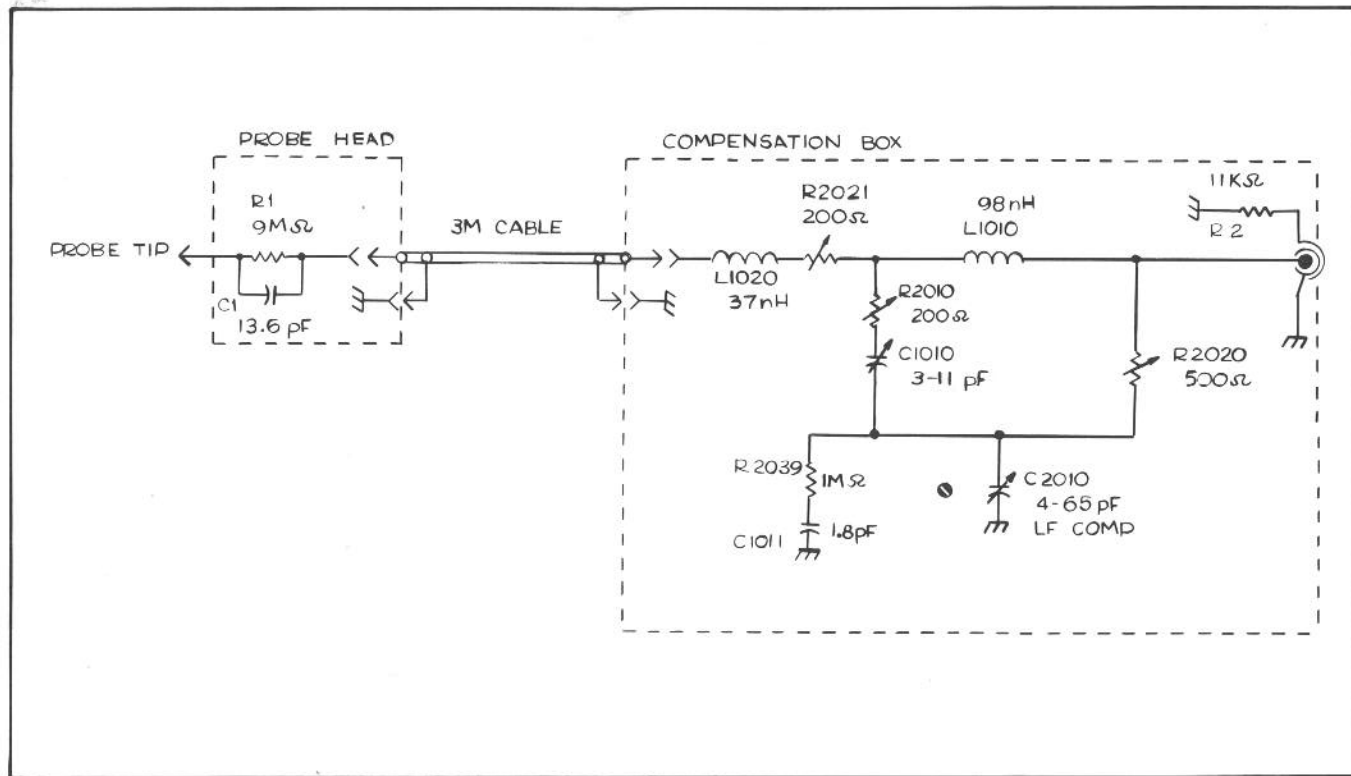


Figure 5-2. Schematic diagram for the 3.0-meter P6131.

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.

FIGURE AND INDEX NUMBERS

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

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.

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.

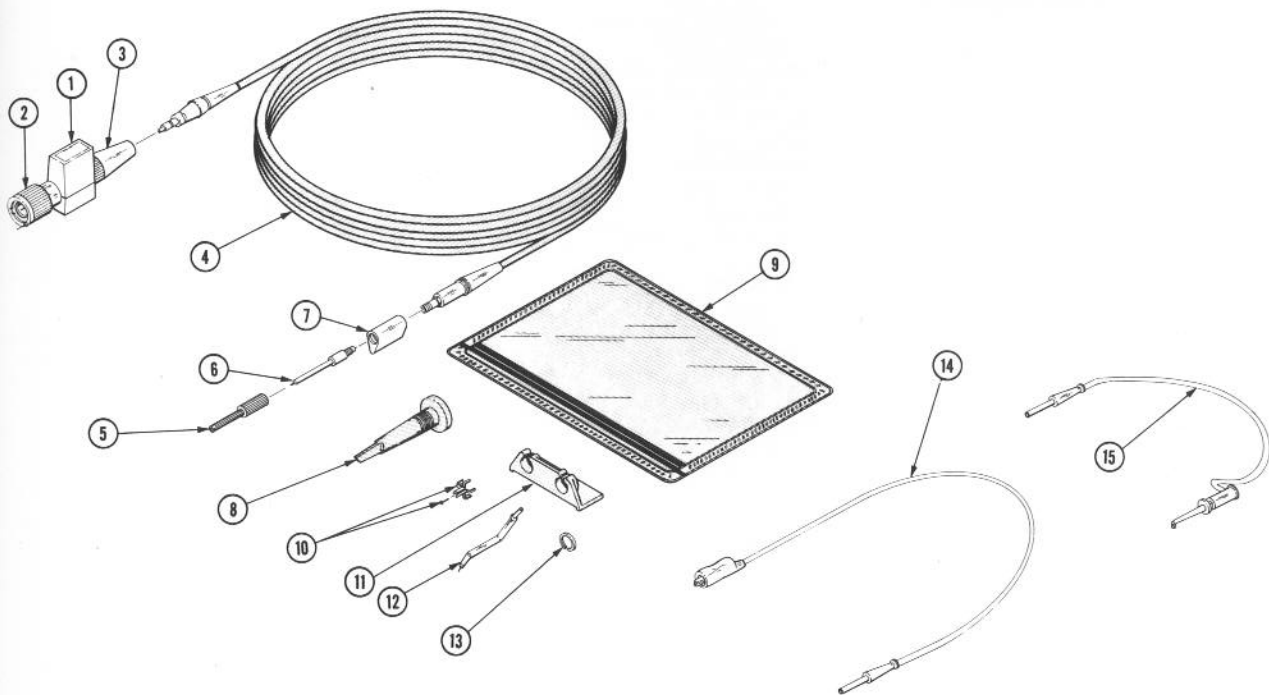
1	2	3	4	5	Name & Description
					<i>Assembly and/or Component</i>
					<i>Attaching parts for Assembly and/or Component</i>
					---*---
					<i>Detail Part of Assembly and/or Component</i>
					<i>Attaching parts for Detail Part</i>
					---*---
					<i>Parts of Detail Part</i>
					<i>Attaching parts for Parts of Detail Part</i>
					---*---

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.

CROSS INDEX—MFR. CODE NUMBER TO MANUFACTURER

Mfr. Code	Manufacturer	Address	City, State, Zip
24931	SPECIALITY CONNECTOR CO., INC.	2620 ENDRESS PLACE	GREENWOOD, IN 46142
80009	TEKTRONIX, INC.	P O BOX 500	BEAVERTON, OR 97077



Replaceable Parts—P6131

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-	010-6131-01		1						PROBE,VOLTAGE:10X W/ACC	80009	010-6131-01
	-----		-						(1.3 METER ONLY)		
	010-6131-00		1						. PROBE,VOLTAGE:10X	80009	010-6131-00
	-----		-						. (1.3 METER ONLY)		
	010-6131-05		1						PROBE,VOLTAGE:10X W/ACC	80009	010-6131-05
	-----		-						(3 METER ONLY)		
	010-6131-04		1						. PROBE,VOLTAGE:10X	80009	010-6131-04
	-----		-						. (3 METER ONLY)		
-1	206-0272-00		1						. . COMP BOX:	80009	206-0272-00
	-----		-						. . (1.3 METER ONLY)		
	206-0283-00		1						. . COMP BOX:	80009	206-0282-00
	-----		-						. . (3 METER ONLY)		
-2	131-1799-03		1						. . . CONN,RCPT,ELEC:BNC,FEMALE	80009	131-1799-03
-3	200-2547-03		1						. . . COVER,CABLE NIP:	80009	200-2547-03
-4	175-8011-00		1						. . CABLE ASSY,RF:	80009	175-8011-00
	-----		-						. . (1.3 METER ONLY)		
	175-6697-00		1						. . CABLE ASSY,RF:0.004 DIA,COAX	80009	175-6697-00
	-----		-						. . (3 METER ONLY)		
-5	204-0925-01		1						. . BODY SHL,PROBE:	80009	204-0925-01
-6	206-0265-00		1						. . TIP,PROBE:10X	80009	206-0265-00
	-----		-						. . (1.3 METER ONLY)		
	206-0265-01		1						. . TIP,PROBE:10X	80009	206-0265-01
	-----		-						. . (3 METER ONLY)		
-7	343-1003-01		1						. . COLLAR,GND:	80009	343-1003-01

Fig. & Index	Tektronix	Serial/Model No.	Qty						Name & Description	Mfr Code	Mfr Part Number
No.	Part No.	Eff	Dscont	1	2	3	4	5			

STANDARD ACCESSORIES

	070-4210-00			1	MANUAL, TECH, INSTR:					80009	070-4210-00
-8	013-0208-00			1	TIP, PROBE: RETRACTABLE HOOK					80009	013-0208-00
-9	016-0708-00			1	POUCH, ACCESSORY:					80009	016-0708-00
-10	131-2766-03			1	CONNECTOR, PROBE: W/SOCKET, DATA SHEET					80009	131-2766-03
-11	352-0687-00			1	HOLDER, PROBE:					80009	352-0687-00
-12	195-4240-00			1	LEAD, ELECTRICAL: 0.025 DIA					80009	195-440-00
-13	334-2794-01			2	BAND, MARKER: 0.371 DIA, WHITE, PLASTIC					80009	334-2794-01
	334-2794-03			2	BAND, MARKER: 0.371 DIA, GRAY, PLASTIC					80009	334-2794-03
	334-2794-06			2	BAND, MARKER: 0.371 DIA, RED, PLASTIC					80009	334-2794-06
	334-2794-07			2	BAND, MARKER: 0.371 DIA, GREEN, PLASTIC					80009	334-2794-07
-14	195-1870-01			1	LEAD, ELECTRICAL: 22 AWG, 8.812 L					80009	195-1870-01
-15	195-4104-01			1	LEAD, ELECTRICAL: 23 AWG, 6.3 L					80009	195-4104-01

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
------------------------	-----------------------	-------------------------	--------	-----	---	---	---	---	---	--------------------	-------------	-----------------

OPTIONAL ACCESSORIES

THE FOLLOWING COMMONLY USED OPTIONAL ACCESSORIES ARE COMPATIBLE WITH THE P6131 PROBE. FOR A COMPLETE LIST OF AVAILABLE PROBE ACCESSORIES, CONSULT A TEKTRONIX PRODUCT CATALOG OR YOUR NEAREST TEKTRONIX FIELD OFFICE OR REPRESENTATIVE.

013-0197-00	1	ADAPTER ASSY:PROBE TO TIP	80009	013-0197-00
013-0195-00	1	ADAPTER,CONN:BNC TO PROBE	24931	28P264-1
017-0520-00	1	CONN,PLUG,ELEC:50 OHM	80009	017-0520-00
131-2766-01	1	CONN,PROBE:PKG OF 100	80009	131-2766-01
136-0352-02	1	SOCKET,PIN TERM:PKG OF 100	80009	136-0352-02
013-0202-00	1	ADAPTER,PROBE:MINI	80009	013-0202-00
*015-0325-00	1	ADAPTER,PROBE:PROBE TO CONNECTOR PINS	80009	015-0325-00
*206-0222-00	1	TIP,PROBE:MICROCIRCUIT TEST	80009	206-0222-00
*013-0084-01	1	ADAPTER,CONN:BNC TO PROBE	24931	28P156-1
*017-0088-00	1	CONN,PLUG,ELEC:50 OHM	80009	017-0088-00
*013-0085-00	1	TIP,PROBE:GROUNDING	80009	013-0085-00

*THE SUBMINIATURE-TO-MINIATURE-PROBE-TIP ADAPTER IS REQUIRED TO USE THESE ACCESSORIES.

Tektronix®

COMMITTED TO EXCELLENCE

MANUAL CHANGE INFORMATION

Date: 8-26-82

Change Reference: C1/882

Product: P6131 10X PASSIVE PROBE

Manual Part No.: 070-4210-00

CHANGE TO:

Page 1-3, Aberrations, first line, +6%, -6%, or 9% p-p for first 30 ns.

Page 1-4, Signal delay, 1.3 Meter Probe, 6.3 ns ± 100 ps^a

3.0 Meter Probe, 13.25 ns ± 200 ps^a

Page 4-4, Step j, second line, ...or 9% (0.45 division) p-p....

Page 5-2, Probe Tip and Cable

To remove the probe tip, first unscrew the light-gray probe-body shell and slide off the grounding collar. Then unscrew the probe tip from the cable assembly. The family of subminiature probe tips have small color-coded dots near the connector end to aid in identification. For the 3.0 meter P6131, this dot is orange. The absence of any dot denotes the 1.3 meter P6131 tip.

Page 6-5 Standard Accessories

Line 12, Both part numbers should be 195-4240-00

Line 14, Both part numbers should be 195-1870-00

Line 15, Both part numbers should be 195-4104-00