at the Rear of This Manual
CHANGE INFORMATION
Please Check For

O/E CONVERTER
1 CHZ, 1300 nm

P6703
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## THEORY OF OPERATION

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The P6703 Probe

Normalized Spectral Response

Offset Effect on Linear Operation Region

Transimpedance Amplifier

Conversion Gain and Offset Gain Check Setup

Rise Time and Aberration Check Setup

Typical Aberration Averaging Display

Bandwidth Check Setup

Adjustment Locations

Top Cover Removal

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Exploled View
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<th>Page</th>
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<td>4-2</td>
</tr>
</tbody>
</table>
The P6703 is shipped with the following standard accessories:

**ACCESSORIES**

- Carrying Case
- Instruction Manual
- [Image 14x12 to 382x600]

**DESCRIPTION**

Compatible with this connector is the following standard accessories:

- Most manufactures SMA-style connectors are compatible with this connector. (Rc style available in Option 01, ST style available in Option 02.)
- Most manufacturers offer analog output in place of digital output.

**SPECIFICATIONS**

This manual (see Figure 1-1).
PERFORMANCE CONDITIONS

The electrical and optical characteristics listed in Tables 1-1 and 1-2 apply when the converter is calibrated between 20°C and 30°C and is used with a calibrated instrument system operating within the environmental conditions stated in Table 1-3.

Items listed in the "Performance Requirement" column are verifiable qualitative or quantitative limits. Items listed in the "Supplemental Information" column are not verified in the "PERFORMANCE CHECK PROCEDURE" (Section 4); they are either explanatory notes, calibration setup descriptions, performance characteristics for which no absolute limits are specified, or characteristics that are impractical to check.

The converter's physical characteristics are listed in Table 1-4.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Performance Requirement</th>
<th>Supplemental Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal Input</td>
<td>Absolute Maximum Nondestructive</td>
<td>0.9 to 2 MW at 1 MW offset, 0 to 1 MW at 0 MW offset</td>
</tr>
<tr>
<td></td>
<td>Linear Output</td>
<td>See Figure 3-1.</td>
</tr>
<tr>
<td></td>
<td>Maximum Optimal Input</td>
<td>0.9 to 2 MW at 1 MW offset, 0 to 1 MW at 0 MW offset</td>
</tr>
<tr>
<td></td>
<td>Input Dynamic Range</td>
<td>0 to 1 MW</td>
</tr>
<tr>
<td></td>
<td>Offset Compensation</td>
<td>0.9 to 2 MW at 1 MW offset, 0 to 1 MW at 0 MW offset</td>
</tr>
<tr>
<td></td>
<td>Core diameters. NA ≤ 0.25</td>
<td>Accepts fiber up to 100 µm</td>
</tr>
<tr>
<td></td>
<td>Wavelength Range</td>
<td>1,000 to 1,700 nm, ≤ 100 nm</td>
</tr>
<tr>
<td></td>
<td>Input Connector Uncertainty</td>
<td>&gt; 0.15 dB, ≤ 0.6 dB</td>
</tr>
<tr>
<td></td>
<td>Optical Input</td>
<td>10 mW, 9 mW (no offset), 5 mW (offset at 1 mW)</td>
</tr>
</tbody>
</table>

Table 1-1: Optimal Characteristics
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Performance Requirement</th>
<th>Supplemental Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversion Gain</td>
<td>1 V/mW ±12% at dc, 1300 nm.</td>
<td>Calibrations made at 1300 nm.</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>1 GHz (-3 dB optical, -6 dB electrical)</td>
<td></td>
</tr>
<tr>
<td>Noise Equivalent Power</td>
<td>&lt; 1 µW (rms).</td>
<td></td>
</tr>
<tr>
<td>Risetime</td>
<td>≤ 500 picoseconds.</td>
<td></td>
</tr>
<tr>
<td>Aberrations</td>
<td>≤ ± 10%, 15% p-p total.</td>
<td></td>
</tr>
<tr>
<td>Output Zero</td>
<td>≤ ±15 mV 15-55°C, ≤ -30 + 15 mV 0-55°C.</td>
<td></td>
</tr>
<tr>
<td>Offset</td>
<td>0 to 1.000 mW.</td>
<td></td>
</tr>
</tbody>
</table>

* Performance Requirement not checked in manual.*
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Power Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Load Requirements</td>
<td>50 Ω ± 1%</td>
</tr>
<tr>
<td>Supplemental Information</td>
<td></td>
</tr>
<tr>
<td>Electrical Characteristics</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1-2 (cont)**
### TABLE 1-3
Environmental Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Range (Operating)</td>
<td>0° C to +55° C (+32 F to +131° F).</td>
</tr>
<tr>
<td>Temperature Range (Nonoperating)</td>
<td>-62° to +75 ° C (-80° F to +167 ° F).</td>
</tr>
<tr>
<td>Humidity</td>
<td>Five cycles (120 hr.) 95% to 97% relative humidity at 30° C to 60°C.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Qualifies under National Safe Transit Association's Pre-shipment Test, 1A-B-1.</td>
</tr>
<tr>
<td>Electrostatic Immunity</td>
<td>Will withstand discharge of a 500 pF capacitor charged to 20 kV, through a 1k Ω resistor (to TEKPROBE™ interface pins).</td>
</tr>
</tbody>
</table>

### TABLE 1-4
Physical Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Weight (includes accessories)</td>
<td>70 g (2.5 oz).</td>
</tr>
</tbody>
</table>
Figure 1-1: Normalized Spectral Response.
CONVERTER HANDLING

OPERATING INSTRUCTIONS

NOTE

This section of the manual is intended to familiarize the operator with the use of the P6703 Optical Converter.

Upon receipt, save the shipping and packaging materials for reuse should reassembly become necessary. Keep the receipt in a safe place.

Avoid exposure of the connector to moisture, high humidity, shock, high temperatures, or direct sunlight.

The P6703 and its accessories should be handled carefully.

Avoid dropping the converter assembly since damage and misalignment of the photoelectric optical assembly at all times. Avoid dropping the converter assembly when a fiber optic connector is not attached. Avoid crushing, excessively bending or crimping the fiber optic cables.

Information on:

MAINTENANCE (Section 8) for further

safety. Refer to "MAINTENANCE" (Section 8) for further maintenance.

Section 8: Maintenance.
Converter Cleaning

The converter needs very little cleaning. The optical input in particular can be damaged by excessive or improper cleaning. Reduce the need for cleaning by installing the protective cap over the input when it is not being used. Refer to "MAINTENANCE" for cleaning procedures.

OPERATING CONSIDERATIONS

Optical Input Connector

Allows connection to a fiber optic cable with an SMA, FC or ST connector (depending on the converter option). Cleaning and replacement instructions are included in "MAINTENANCE" (Section 6).

CONNECTIONS

BNC Locking Ring

The BNC Locking Ring locks the converter onto the host instrument and houses the TEKPROBE™ interface connections (described below).

TEKPROBE™ Interface (Level 2)

Provides connections for power, signal, and data transfer, and allows the oscilloscope system to automatically set the scale factor (in mW) and input termination. An oscilloscope-controlled calibrated offset is also transmitted through this connection.

Optical Input

Optical fibers with a core diameter of up to 100 microns with a Numerical Aperture (NA) of 0.29 can be connected to the optical input through an SMA connector (or through an optional FC or ST connector). Most manufacturer's SMA-style optical connectors will connect to the converter. It is recommended that the straight-ferrule SMA connector that does not require use of a plastic alignment sleeve be used (Amphenol® 905 or equivalent). If a stepped-style connector (Amphenol® 906 or equivalent) is used, adapter cables are available as optional accessories.
For additional information on converter signal development, refer to "THEORY OF OPERATION" in this manual (Section 2). Figure 1-1 illustrates the response curve shown on the converter’s display. The converter’s output is a linear function of the input signal, with the output increasing as the input signal increases. The converter has a linear range from 0.1 to 10 VA and a corresponding output voltage ranging from 0.1 to 100 mV (500 mV). The converter’s output power is limited to 0.2 W. The converter is shipped with an adapter cable that is used to connect to the power source. The converter's output signal is then connected to the oscilloscope.

NOTE

The stopped connection will not connect with the oscilloscope.
The P6703 can be divided into the following functional blocks:

1. Optical Input
2. Offset Amplifier
3. High Frequency Amplifier
4. Flexible Circuit Board and Interconnections

How the P6703 converter develops the output signal:

This section is intended to provide a general description of the theory of operation.

Introduction
The current level that is provided is determined by the oscilloscope through the TEKPROBE™ interface, as well as by the settings of R2010 and R2024. These potentiometers are set during the adjustment procedure so the converter output is properly zeroed, and a 1 V offset signal programmed by the oscilloscope system corresponds to 1 mW of input signal and reads as mW on the oscilloscope system display.

The linear operating region of the amplifier shifts when an offset current is applied (see Figure 3-1). Amplification is undistorted only when a signal is maintained within this dynamic window (large signals that are not entirely within the dynamic window should be attenuated).

3. High-Frequency Amplifier

Input to the high-frequency amplifier is equal to the sum of the current generated in the photodiode and the offset current. The amplifier consists of two transimpedance amplifier stages cascaded in series.

A transimpedance amplifier converts an input current to an output voltage according to the relationship shown in Figure 3-2.
For lowest noise a large feedback resistor is desired, but
The following checks can be independently performed.

PROCEDURE

Included except as noted. Test equipment error is not

LIMITS AND TOLERANCES

Test equipment requirements are specified in Table 4-1 of the PERFORMANCE CHECK PROCEDURE. This section and the "SPECIFICATION" (Section 1) and to determine the need for

Performance Check Procedure is used to

Purpose
Table 4-1
Test Equipment Required

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Purpose</th>
<th>Recommended Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Oscilloscope System</td>
<td>All checks.</td>
<td>Tektronix 11402 with 11A72 vertical amplifier.</td>
</tr>
<tr>
<td>4. Optical Power Meter</td>
<td>Conversion Gain.</td>
<td>HP Model 8152A with HP81521B Head and appropriate connections or equivalent.</td>
</tr>
<tr>
<td>5. Electrical Pulse Generator</td>
<td>Risetime &amp; Aberrations.</td>
<td>Tektronix PG506 or equivalent.a</td>
</tr>
<tr>
<td>6. Signal Generator</td>
<td>Bandwidth.</td>
<td>Tektronix SG504 or equivalent.a</td>
</tr>
</tbody>
</table>

a Requires TM500 or TM5000 - Series power module mainframe.
<table>
<thead>
<tr>
<th>Equivalent Tektronix Part Number</th>
<th>Equivalent TEKtronix DSO501 or Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>015-1014-00 or Equivalent</td>
<td>Bandwidth</td>
</tr>
<tr>
<td>003-1364-01 or Equivalent</td>
<td>Bandwidth</td>
</tr>
<tr>
<td>012-0482-00 or Equivalent</td>
<td>All adjustments</td>
</tr>
<tr>
<td>067-0681-01</td>
<td>11. Digital Prescaler</td>
</tr>
<tr>
<td></td>
<td>12. SD-9 Power Divider</td>
</tr>
<tr>
<td>9. 50-1 Precision BNC cable</td>
<td>All settings</td>
</tr>
<tr>
<td>8.1D Pulse Test Fixture</td>
<td>All settings</td>
</tr>
<tr>
<td>10. Low Capacitance Alignment</td>
<td>All adjustments</td>
</tr>
<tr>
<td></td>
<td>7. Optical Reference Receiver</td>
</tr>
<tr>
<td></td>
<td>6. 50-2 Precision BNC cable</td>
</tr>
<tr>
<td></td>
<td>All settings</td>
</tr>
</tbody>
</table>

**Recommended Example**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Purpose</th>
</tr>
</thead>
</table>

**Test Equipment Required**

*Table 4-1 (Con)*
PROCEDURE STEPS

1. Noise Check

   Equipment Required (see Table 4-1):
   Oscilloscope System (Item 1)

   a. Connect the P6703 to the vertical input of the oscilloscope system.

   b. Place the protective cap over the P6703 optical input.

   c. Set the oscilloscope as follows:

      MODE
      MAIN SIZE (TIME/DIV) 10 ns/div
      VERTICAL SIZE (WATTS/DIV) 10 μW/div
      VERT OFFSET 0

      (Display trace should now be at center screen.)

   d. Using the Define Waveform Menu, define a trace equal to the waveform minus the average value of the waveform. (e.g. if the converter is plugged into Channel One of the left plug-in, define the trace as L1 - Avg (L1).

   e. Set the oscilloscope mode to MEASURE.

   f. Select RMS and MEAN.

   g. CHECK - that the MEAN value is < 0.1 μW.

   h. Verify that the RMS value is < 1 μW.
Equipment Required (see Table 4-1):

- Oscilloscope System (Item 1)
- Oscilloscope System without an optical input

NOTE

3. Conversion Gain

2. Output Zero

1. Output Zero (without an optical input)

Please refer to Figure 4-1 for this check.

Operating region in all checks:

- The waveform should make certain that the display is within the linear range of the vertical output, and is clearly visible by the user.
- To ensure an accurate display, the user should make certain that the display is within the linear range of the vertical output, and is clearly visible by the user.

The converter output is equal to the displayed output.

Equipment Required (see Table 4-1):

- Oscilloscope System (Item 1)
- Oscilloscope System without an optical input

c. Place the protective cap over the P6703 optical input.

Display the output waveform of the P6703.

b. Set the oscilloscope system for 10 MW/div. (The oscilloscope trace should be at center screen.)

a. Set oscilloscope mode to MEASURE, and OFFSET to 0.

e. VERIFY: that P6703 output zero is within 10 ± 1%V range.

d. Measure output zero.
a. Connect the optical attenuator between the optical signal source and the optical power meter.

b. Adjust the optical attenuator to provide 0.5 mW at the meter.

c. Connect the P6703 converter to the oscilloscope system input. Set the oscilloscope system to display 100 µW/div.

d. Measure and note the P6703 output MEAN with no input signal applied.

e. Connect the optical attenuator output to the input of the converter.

f. VERIFY - that the change in the converter output is 0.5 mW (5 div. ± 12%).

4. Offset Gain

Equipment Required (see Table 4-1):
Oscilloscope System (Item 1)
Optical Source (Item 2)
Optical Attenuator (Item 3)
Optical Power Meter (Item 4)
the Oscilloscope system vertical input.

p. Connect the Pulse Generator HIGH AMPL output and the Pulse Output (through a 50Ω cable) to the
50Ω Cable (item 9).

q. Connect the Pulse cable to the Oscilloscope system vertical input.

r. Press the p.6703 output to the p.6703 input.

s. Adjust the optical attenuator to provide 0.5 mW at the
defset to 0 (with no optical input to the
c. Adjust the optical attenuator to the display 100 mW/div.

b. Adjust the optical power meter.

c. Connect the optical attenuator to provide 0.5 mW at the
and the optical power meter.

a. Connect the optical attenuator to the optical source
b. Measure and note the P6703 output MEAN value.

c. Adjust the optical attenuator for +0.5 mW.

d. Connect the optical attenuator output to the P6703 input.

e. Adjust the optical attenuator for +0.5 mW.

f. Measure and note the P6703 output MEAN value.

g. Adjust the optical attenuator for +0.5 mW.

h. CHECK - that the MEAN value has not changed more

i. Connect the Pulse Generator HIGH AMPL output and the Pulse Output (through a 50Ω cable) to the
50Ω Cable (item 9).

j. Connect the Pulse cable to the oscilloscope system vertical input.

k. Press the p.6703 output to the p.6703 input.

l. Adjust the optical attenuator to provide 0.5 mW at the
defset to 0 (with no optical input to the
c. Adjust the optical attenuator to the display 100 mW/div.

b. Adjust the optical power meter.

c. Connect the optical attenuator to the optical source
b. Measure and note the P6703 output MEAN value.

c. Adjust the optical attenuator for +0.5 mW.

d. Connect the optical attenuator for +0.5 mW.

f. Measure and note the P6703 output MEAN value.

g. Adjust the optical attenuator for +0.5 mW.

h. CHECK - that the MEAN value has not changed more

i. Connect the Pulse Generator HIGH AMPL output and the Pulse Output (through a 50Ω cable) to the
50Ω Cable (item 9).

j. Connect the Pulse cable to the oscilloscope system vertical input.

k. Press the p.6703 output to the p.6703 input.

l. Adjust the optical attenuator to provide 0.5 mW at the
defset to 0 (with no optical input to the
c. Adjust the optical attenuator to the display 100 mW/div.

b. Adjust the optical power meter.

c. Connect the optical attenuator to the optical source
b. Measure and note the P6703 output MEAN value.
b. Adjust the pulse generator, TD Pulser, and oscilloscope system to obtain a triggered pulse.

c. Move the TD Pulser (without disconnecting the generator or altering the TD TRIGGERED LEVEL) to the input of the light source generator.

d. Connect the output of the light source to the input of the optical reference receiver. Connect the output of the optical receiver to the oscilloscope system vertical input (refer to Figure 4-2).

e. Connect the Trigger Out of the PG506 to the input trigger channel of the oscilloscope system.

f. Adjust the oscilloscope system for a triggered display.

g. NOTE - the system RISE \( T_{(r\ system)} \) and aberrations.

h. Remove the optical reference receiver and connections from the light source and the oscilloscope system. Connect the optical attenuator and P6703 in its place.

i. Adjust the optical attenuator, so that the optical input signal lies between .3 and .7 mW.

j. NOTE - the system RISE \( T_{R} \) (converter & system).

k. Calculate the risetime of the converter using the following formula:

\[
T_R(\text{converter}) = \sqrt{(T_R \text{ converter} + \text{ System})^2 - (T_R \text{ System})^2}
\]

l. CHECK - that the resulting risetime is 500 ps or less.

m. Adjust the oscilloscope system Main Size so that the 100% level of the oscilloscope measurement system is referenced to the flat portion of the pulse (see Figure 4-3).

n. Use the WAVEFORM, Acquire Description and Cursors (on the highest and lowest aberration points) to obtain an average of the front corner aberrations (refer to Figure 4-3).

o. CHECK - that the aberration average minus the system aberrations do not exceed ±10%, 15% p-p.)
Figure 4-2. Riselime and Aberration Check Setup.
Figure 4-3. Typical Aberration Averaging Display.
b. Connect one output of the divider to the Digital Preselector.

c. Connect the output of the Digital Prescaler to the Trigger Input.

d. Connect the other output of the divider to the Oscilloscope Vertical Amplifier.

e. Adjust the oscilloscope system for 4 divisions of signal.

f. Adjust the generator to 1 GHz and the display (at 100 ns/div).

g. Adjust for triggered display and average for 16 cycles (10 ms base).
Test Equipment Required

Purpose

Adjustment Procedure
PREPARATION

Before proceeding with checks, allow sufficient warm-up time for test equipment to stabilize (typically 20 minutes). Refer to Figure 5-1 for the location of adjustments used in the following checks.

PROCEDURE STEPS

1. Adjust Converter Gain

   NOTE
   
   The converter output is equal to the displayed output minus the vertical offset, and is greatly affected by its relationship to the linear operating region of the amplifier. To ensure an accurate display, the user should make certain that the display is within the linear operating region in all checks.

   Equipment Required (see Table 4-1):
   
   - Oscilloscope System (Item 1)
   - Optical Source (Item 2)
   - Optical Attenuator (Item 3)
   - Optical Power Meter (Item 4)
   - Adjustment Tool (Item 11)

   a. Connect the optical attenuator between the optical signal source and the optical power meter.

   b. Adjust the attenuator to provide an optical power reading of 0.5 mW on the meter.

   c. Set the oscilloscope system to display a trace with a MEAN of 0.

   d. Connect the P6703 converter to the oscilloscope system vertical input with the cap installed over the optical input.
Figure 5-1. Adjustment Locations

1. Connect the converter to the oscilloscope system vertical.
   Oscilloscope System (Item 1)
   Equipment Required (See Table 4-1).
2. Adjust output zero and offset gain.
3. Adjust the gain of the output attenuator reading.
4. Adjust gain (R1016) so that the converter output is 0.5 MV (the same as the optical attenuator reading).
5. Connect the optical signal to the input of the converter.
6. Adjust converter output (R2024) so that the output is 0.
7. Adjust the converter gain (R2010) to the same as the optical attenuator reading.
b. ADJUST - (with the protective dust cap in place) converter output zero (R2024) so that converter output is zero.

c. Set the vertical offset to -1 mW.

d. Select MEASURE mode on the oscilloscope system.

e. Measure the MEAN.

f. ADJUST - R2010 so that the measured mean is 0 μW.

g. Recheck converter output zero. If necessary to readjust output zero, repeat steps b through f.

h. This concludes the adjustment procedures.

**NOTE**

The converter gain (R1016) and offset gain (R2010) adjustments interact. It may be necessary to readjust each alternately to obtain the best accuracy.
or representative cleaning agents. Consult your Tektronix Service Center for additional information on recommended solvents. For aromatic solvents, toluene, xylene, acetone, MEK, or similar benzene, toluene, xylene, acetone, MEK, or similar cleaning agents. In particular, avoid chemicals containing compounds used in the damage the plastics and circuit board used in the monitor. Avoid the use of chemical cleaning agents which may

**CAUTION**

**CLEANING**

**WARNING**

**PREVENTIVE MAINTENANCE**

This section contains information for performing preventive and corrective maintenance and instrument repackaging instructions.

**MAINTENANCE**

and calibration.

to perform maintenance is just before a performance check

depends on the severity of the environmental. A conventional time
improve instrument reliability. Frequency of maintenance
the maintenance can prevent instrument breakdown and may
visual inspection. When performed on a regular basis, prevent-
Preventive maintenance consists primarily of cleaning and

To prevent electric shock or shorting of components, the meter is connected to the oscilloscope system.
Optical Input Lens

**CAUTION**

*Use extreme caution when cleaning the converter optical input lens. Use of abrasive cleaners, solvents, excessive rubbing or high-pressure air will damage the lens.*

Ordinarily, the lens should not need to be cleaned. To reduce the necessity for cleaning, keep the protective cover over the optical input to the converter at all times other than when in use. Use clean, dry, low-pressure air (5 lb./sq.in maximum) to remove dust from the lens.

Exterior

Loose dust accumulated on the outside of the converter can be removed with a soft cloth or a small brush. Dirt which remains can be removed with a soft cloth dampened in a mild detergent and water solution. Do not use abrasive cleaners. Avoid causing damage to the optical input lens during the cleaning procedure.

Interior

Normally, the main circuit board will not require cleaning unless a cover has been removed for an extended period of time. The best way to clean the interior is to blow off the accumulated dust with dry, low-velocity air (about 9 lb/sq. in). Remove any dirt which remains with a soft brush or a cloth dampened with a nonresidue-type cleaner, preferably isopropyl alcohol. A cotton-tipped applicator is useful for cleaning in narrow spaces or for cleaning more delicate circuit components.

**TROUBLESHOOTING**

Individual components are not replaceable by the customer. Obtain a new assembly to replace a defective one, or send the converter to a Tektronix Repair Center for repair (see "ASSEMBLY REPLACEMENT" and "INSTRUMENT REPACKAGING" procedures in this section).
3. The Tektronix part number.

2. Description of the part (if electrical, include the circuit number).

1. Instrument type (including modification or option number).

Ordering Parts

OBTAINING REPLACEMENT PARTS

on the main circuit board.

REPLACEMENT PARTS

if there is a problem, separate the board and the main circuit board (refer to circuit diagram in parts.

Ordering Parts

When ordering, check the voltage levels at the junction of the flex circuit board and the main circuit board (refer to circuit diagram in Parts.

ORDERING PARTS

3. The Tektronix part number.

2. Description of the part (if electrical, include the circuit number).

1. Instrument type (including modification or option number).

c. Check the voltage levels at the junction of the flex circuit board and the main circuit board (refer to circuit diagram in Parts.

b. Check the photo diode assembly by removing it and checking if it can cone interface. The reverse bias leakage current should be ≥5 mA, ≥15 V, & diode response can be checked by shining a bright light (such as a flashlight) into the op-amp.

a. Ensure that all interconnections and mechanical components are functional.

The following basic procedure may be useful in locating and isolating a malfunction in the converter (refer to disassembly procedures provided later in this section to gain access to the components provided later in this section to gain access to the components).
ASSEMBLY REPLACEMENT

TEKPROBE™ Contact Pin Replacement

Carefully grasp the end of the pin to be replaced with a pair of needle nosed pliers and pull it straight out of the BNC assembly. To install a new pin, carefully hold the pin with needle nosed pliers and push the pin into the BNC assembly.

Be careful not to bend or crush the pin.

Converter Top Cover Removal

Remove the top cover (the cover with slots), with the cover removal tool. (See Figure 6-1.) The removal tool is available as an optional accessory, see "REPLACEABLE PARTS".

Figure 6-1 Top Cover Removal
Figure 6-2. Flex Circuit Board Replacement

Procedure:
1. Use only silver solder and a temperature-control.
2. Keep the soldering iron contact as short as possible.
3. Observe and note the position of all contacts.
4. Check that there are no shorts or opens before assembling the connector.

Cautions:
- Be careful not to damage the interface between the flex circuit board and the main board.
- The flex circuit board (as well as the main board) are easily damaged by excessive heat, and the connector.
- Disconnect the BNC assembly from the main circuit board.
- Carefully pry up the main circuit board, photodiode, and flex circuit board replacement.
Figure 6-3. Assembly Replacement.

Main Circuit Board/Photodiode Assembly

Flex Circuit Board Assembly

BNC Assembly

Extension Probe Contact Pin

TOP COVER

BOTTOM COVER

(See Figure 6-3 for connection to Flex Board Assembly)
The BNC and Photodiodes/Assemblies and the Converter Body.

1. Reassemble (by reversing the disassembly procedure)

2. Carefully unfasten the flex board from the main circuit board.

3. Carefully unsolder the flex board from the main circuit board.

4. Carefully pry up the main circuit board, Photodiodes, and BNC assemblies.

5. Carefully remove the top cover.

6. Main Circuit Board/Photodiodes Assemblies Replacement

7. Remove the BNC and the converter body.

8. Reassemble (by reversing the disassembly procedure)

9. Carefully solder the new flex circuit board to the main circuit board.

10. Carefully solder the flex circuit board to the new main circuit board.

11. Reassemble (by reversing the disassembly procedure)

12. Carefully unfasten the flex board from the main circuit board.

13. Carefully unsolder the flex board from the main circuit board.

14. Carefully unsolder the flex board from the BNC assemblies.

15. Carefully remove the top cover.
READJUSTMENT AFTER REPAIR

After any electrical or optical component has been repaired or replaced, complete the "PERFORMANCE CHECK PROCEDURE" (Section 4), to verify that the converter is within specification limits. If adjustment is necessary, perform the appropriate "ADJUSTMENT PROCEDURE" (Section 5).

INSTRUMENT REPACKAGING

If the converter is to be shipped to a Tektronix Service Center for service or repair, attach a tag that contains the following information:

a. Owner's name and address and the name of an individual that can be contacted.

b. Description of the service required.

To repackage the converter, use the original packaging carton in which your converter was shipped. If the original packing is unfit for use or is not available, repackage the converter as follows:

a. Obtain a corrugated cardboard carton having inside dimensions that allow for at least 2 inches of cushioning around the converter. Use a carton having a test strength of at least 175 pounds.

b. Surround the converter with protective polyethylene sheeting.

c. Cushion the converter on all sides by tightly packing dunnage or urethane foam between carton and converter, allowing 2 inches on all sides.

d. Seal the carton with shipping tape or an industrial stapler.

e. Send the instrument to the nearest Tektronix Repair Center (check your Tektronix Product Catalog for the correct address).
Replacement parts are available from your local Tektronix, Inc. Field Office or representative. Contact your local Tektronix, Inc. Field Office or representative to obtain the latest circuit improvements developed in our engineering department. It is therefore important to include the following information in your order: part number, instrument type, and serial number. If applicable, provide the modification number (i.e., 2345). The following parts are intended to indicate item relationships. This parts list is intended to indicate item relationships. Following items in the list are separated from the description by a colon (:) or because of space limitations, an item name may be in the parts list, an item name is separated from the description by a colon (:) because of space limitations.
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<td>CIRCUIT BD ASSY: TESTED</td>
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<td>13690</td>
<td>131-4125-00</td>
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**Fig. 7.3**
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**CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER**

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<td>ATTLEBORO MA 02703-1403</td>
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<td>BURLINGAME CA 94010-1927</td>
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