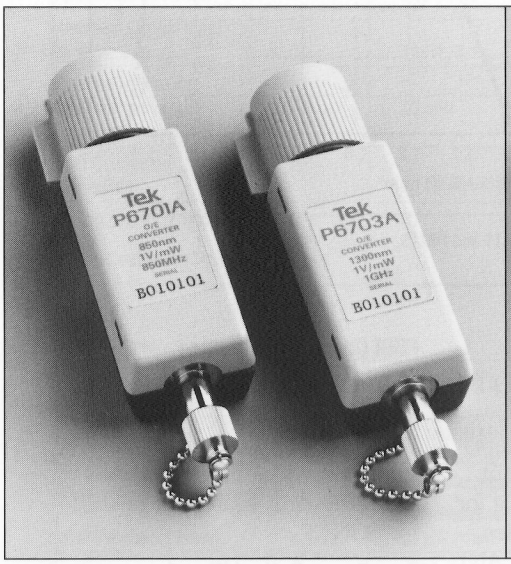
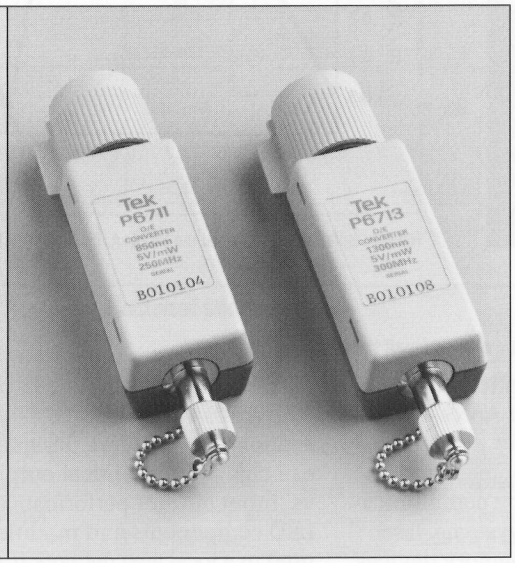
Tektronix

P6701A/P6703A P6711/P6713 Optical to Electrical Converters



P6701A and P6703A Optical to Electrical Converters.



P6711 and P6713 Optical to Electrical Converters.

The P6701A, P6703A, P6711 and P6713 are optical to electrical converters for use with Tektronix oscilloscopes equipped with the TEKPROBE interface or for use with any other oscilloscope when used in conjunction with a Tektronix power supply/TEKPROBE interface adapter.

The Vital Link in Optical Analysis Systems

Fiber-optic and laser technologies are transforming the telecommunications and electronics industries at an accelerating rate. As a result, the need for accurate and reliable optical waveform measurement and analysis solutions — solutions that are versatile and easy to use — has never been greater.

Now, Tektronix Optical to Electrical Converters and Accessories provide the vital link to analog or digital scopes for the acquisition and analysis of optical signals.

The P6701A and P6703A O-E converters receive high bandwidth optical signals via fiber optic cable and convert them to electronic signals for analysis on any Tektronix scope equipped with the TEKPROBE interface, or any other scope linked to the new Tektronix 1103 TEKPROBE Interface Power Supply. The P6711 and P6713 O-E converters receive low level optical signals and provide increased measurement sensitivity.

Tek's O-E converters are designed to work closely with Tek's 11000 series scopes. This combination makes optical waveform characterization as simple and straightforward a process as characterizing current or voltage waveforms.

FEATURES

P6701A/P6703A

500 nm to 1700 nm calibrated spectral response

High bandwidth for analog waveform analysis

Allows multichannel averages and pulse power measurements when used with oscilloscopes

P6711/P6713

500 nm to 1700 nm calibrated spectral response

High gain for analysis of low signal levels

Allows multichannel averages and pulse power measurements when used with oscilloscopes

APPLICATIONS

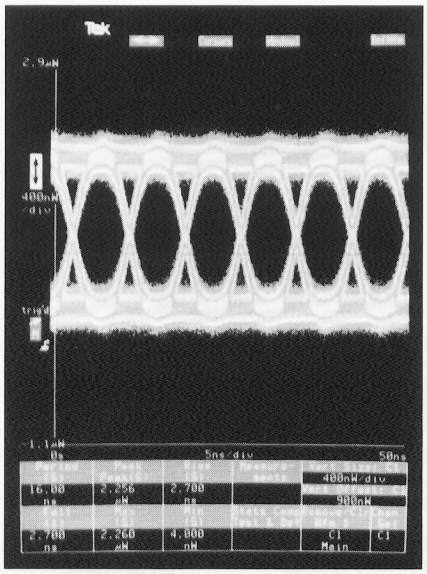
Characterization of opto-electronic devices (e.g., diode lasers, LEDs, opto-electronic modulators, optical waveguides, etc.)

Development of electro-optic systems (e.g., fiber optic control networks, LANs, optical disk storage systems)

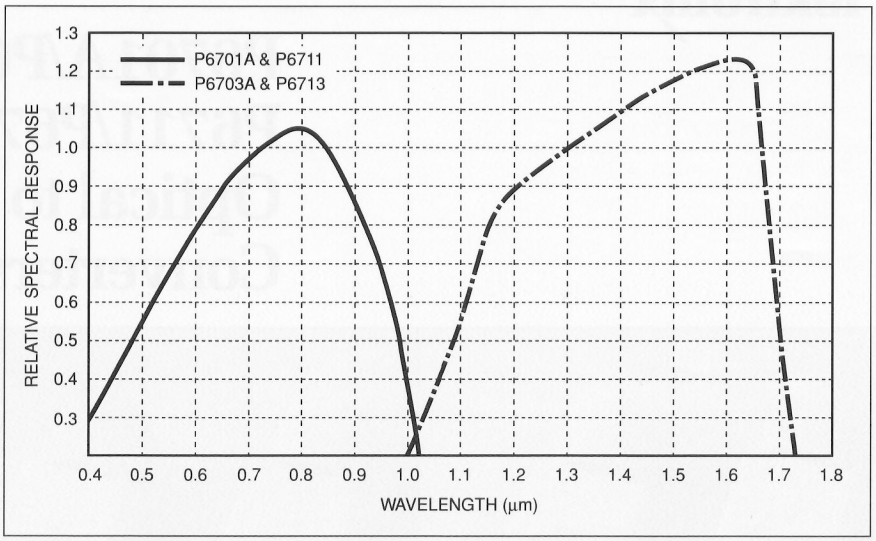
Test of fiber optic communications systems to standards such as SONET (P6701A and P6703A)

Test of fiber optic communications systems to standards such as FDDI (P6711 and P6713)

Manufacturing of opto-electronic components (e.g., quality control, device calibration, process troubleshooting)



Eye Pattern of minimum FDDI Signal (-31 dBm) with P6713 and CSA404.



Relative Spectral Response of the P6701A, P6703A, P6711 and P6713.

Typical Applications

With Tektronix Optical to Electrical Converters and Accessories, your scope becomes a powerful tool for the development and testing of fiber optic communications and control systems, laser printers, optical memory devices, and free space laser systems.

The P6701A, P6703A, P6711 and P6713 optical to electrical converters are ideal for use in opto-electronics development and testing at the device level, the component level, and the systems level.

LAN Design

Using the P6711 and P6713 O-E converters with a Tek 11000 series scope, network designers can characterize optical output vs. input current performance for LED components and modules used in a local area network (LAN). These converters are particularly useful for applications having lower optical signal levels.

SONET Compliance Testing

For applications requiring compliance with the SONET standard, the P6703A O-E converter/11000 series scope combination can provide measurements like risetime, aberration, bandwidth, dynamic range (extinction ratio), and mask go/no go testing at the touch of a button.

FDDI Compliance Testing

For applications requiring compliance with the FDDI standard, the P6713 O-E converter/11000 series scope combination can provide measurements like those possible for SONET

Free-Space Optical Waveform Characterization

The P6751 Spatial Input Head, adds the capability to characterize waveforms from free space optical sources such as lasers and LEDs.

Used in conjunction with the P6701A, the P6703A, P6711 or the P6713 optical probes, this tunable lens extends your capabilities into development and testing fields such as laser printers, satellite communications, optical disk manufacturing, wireless remote video transmission systems, and range finding systems for photographic and military uses.

Specifications

Optical Characteristics

Characteristic	Performance Requirements			
	P6701A	P6703A	P6711	P6713
Detector	Si	InGaAs	Si	InGaAs
Wavelength Range	500 to 950 nm(a)	1100 to 1700 nm(b)	500 to 950 nm(a)	1100 to 1700 nm(b)
Optical Input	Accepts fiber up to 200 µm core diameters NA ≤0.29	Accepts fiber up to 100 µm core diameters NA ≤0.29	Accepts fiber up to 200 µm core diameters NA ≤0.29	Accepts fiber up to 100 µm core diameters NA ≤0.29
Input Dynamic Range	0 to 1 mW	0 to 1 mW	0 to 200 µW	0 to 200 µW
Maximum Optical Input for linear Output	1 mW	1 mW	200 µW	200 µW
Absolute Maximum Non-destructive Optical Input	10 mW	10 mW	10 mW	10 mW
Input Connector Uncertainty	<0.15 dB	<0.15 dB	<0.15 dB	<0.15 dB

(a) Calibrations made at 850 nm

(b) Calibrations made at 1300 nm

Electrical Characteristics

Characteristic	Performance Requirements			
Conversion Gain	1 V/mW ±8% at dc, 850 nm	1 V/mW ±8% at dc, 1300 nm	5 V/MW ±8% at dc, 850 nm	5 V/mW ±8% at dc, 1300 nm
Small Signal Bandwidth (a)	DC to 850 MHz (-3 dB optical, -6 dB electrical)	DC to 1 GHz (-3 dB optical, -6 dB electrical)	DC to 250 MHz (-3 dB optical -6 dB electrical)	DC to 300 MHz (-3 dB optical, -6 dB electrical)
Noise Equivalent Power	Referenced to input: ≤1 µW (rms)	Referenced to input: ≤1µW (rms)	Referenced to input: ≤250 nW (rms)	Referenced to input: ≤200 nW (rms)
Risetime	≤600 picoseconds	≤500 picoseconds	≤2 nanoseconds	≤1.6 nanoseconds
Aberrations	<±10%, 15% p-p total within 1st 4 ns	<±10%, 15% p-p total within 1st 4 ns	<±10%, 15% p-p total within 1st 10 ns	<±10%, 15% p-p total within 1st 10 ns
Output Zero (b)	≤±1 mV, 15-25°C	≤±1 mV, 15-25°C	≤±1 mV, 15-25°C	≤±1 mV, 15-25°C
Output Zero Drift	≤±1.5 mV, 0-50°C	≤±1.5 mV, 0-50°C	≤±1.5 mV, 0-50°C	≤±1.5 mV, 0-50°C
Output Load Requirements	50 ohms ±1%	50 ohms ±1%	50 ohms ±1%	50 ohms ±1%
Output impedance	50 ohms ±10%	50 ohm ±10%	50 ohm ±10%	50 ohm ±10%
Differential Linearity	≤±2%	≤±2%	≤±2%	≤±2%
Power Requirements	TEKPROBE INTERFACE (+15 Vdc ±4%, 35 mA max) (+5 Vdc ±4%, 60 mA max) (-5 Vdc ±4%, 60 mA max) (-15 Vdc ±4%, 20 mA max) <10 mV ripple (20 Hz to 500 kHz)	TEKPROBE INTERFACE (+15 Vdc ±4%, 35 mA max) (+5 Vdc ±4%, 60 mA max) (-5 Vdc ±4%, 60 mA max) (-15 Vdc ±4%, 20 mA max) <10 mV ripple (20 Hz to 500 kHz)	TEKPROBE INTERFACE (+15 Vdc ±4%, 35 mA max) (+5 Vdc ±4%, 60 mA max) (-5 Vdc ±4%, 60 mA max) (-15 Vdc ±4%, 20 mA max) <10 mV ripple (20 Hz to 500 kHz)	TEKPROBE INTERFACE (+15 Vdc ±4%, 35 mA max) (+5 Vdc ±4%, 60 mA max) (-5 Vdc ±4%, 60 mA max) (-15 Vdc ±4%, 20 mA max) <10 mV ripple (20 Hz to 500 kHz)

(a) For signals having ≤100 mV p-p at electrical output

(b) Zeroing operation assumed at 20°C

Environmental Characteristics

Operating temperature — 0°C to 50°C (32°F to 131°F).

Nonoperating temperature — 62°C to 75°C (80°F to 167°F).

Humidity — Five cycles (120 hours) at 95% to 97% relative humidity at 30°C to 60°C.

Transportation — Qualifies under National Safe Transit Association's Pre-shipment Test; 1A-B-1.

Electrostatic immunity — Will withstand discharge of a 500 pF capacitor charged to 20 kV, through a 1 kilohm resistor (to TEKPROBE interface pins).

Physical Characteristics

Net weight (includes accessories) — 70 g (2.5 oz).

Ordering Information

P6701A
P6703A
P6711
P6713
Optical to Electrical Converters

P6701A O/E Converter

Includes: Standard SMA905 input connector; carrying case (016-0156-03); and instruction manual (070-8237-00).

Option 01 — FC input connector.

Option 02 — ST input connector.

Option 03 — DIN (47256) input connector

P6703A O/E Converter

Includes: Standard SMA905 input connector; carrying case (016-0156-03); and instruction manual (070-8237-00).

Option 01 — FC input connector.

Option 02 — ST input connector.

Option 03 — DIN (47256) input connector

P6711 O/E Converter

Includes: Standard SMA905 input connector; carrying case (016-0156-03); and instruction manual (070-8237-00).

Option 01 — FC input connector.

Option 02 — ST input connector.

Option 03 — DIN (47256) input connector

P6713 O/E Converter

Includes: Standard SMA905 input connector; carrying case (016-0156-03); and instruction manual (070-8237-00).

Option 01 — FC input connector.

Option 02 — ST input connector.

Option 03 — DIN (47256) input connector

P6751 Spatial Input Head

Includes: Adjustment tool (003-1418-00); and instruction sheet (070-6639-00).

Optional Accessories

1103 TEKPROBE Power Supply

Optical cables — 2 m, 100/140 micron multimode.

SMA905 to SMA905	174-0879-00
SMA905 to Dia 3.5	174-0877-00
SMA905 to FC	174-0878-00
SMA905 to Biconic	174-0880-00
SMA905 to ST	174-0876-00
SMA905 to Dia 2.5	174-1303-00

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