S-42 OPTICAL SAMPLING HEAD

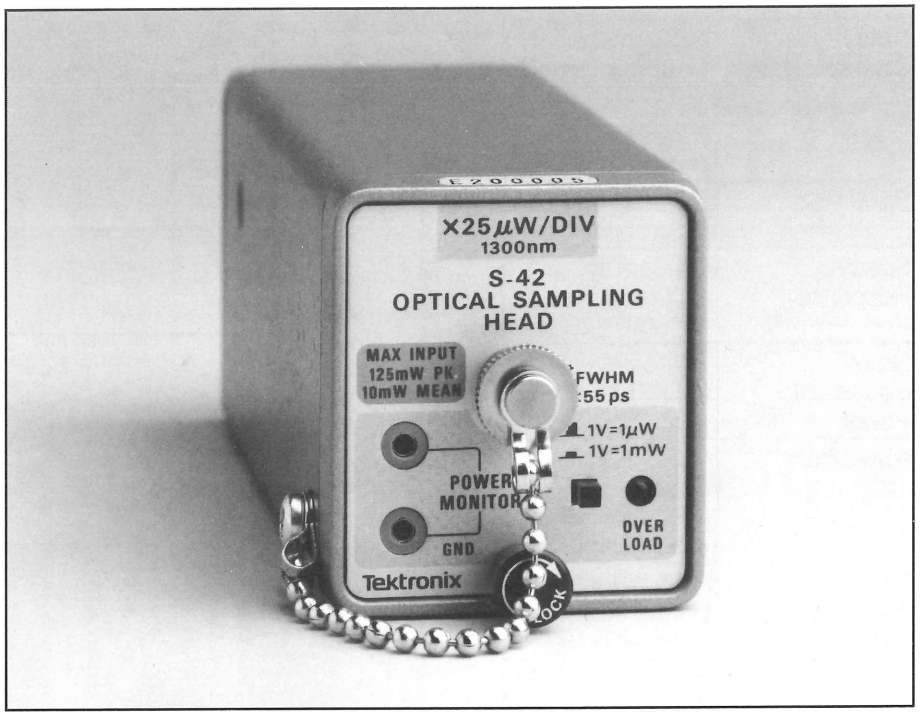
The **S-42** is an optical to electrical sampling head for use with Tektronix 7000 Series Oscilloscopes equipped with 7S11 or 7S12 sampling plug-ins.

FEATURES

- **55 ps Optical Pulse Response (max. FWHM)**
- **DC – 6.4 GHz Equivalent Bandwidth (0.35/55ps)**
- **1000nm – 1700nm Spectral Response**
- **Mean Optical Power Monitor Function**
- **Calibrated at 1300nm**

APPLICATIONS

- **Characterization of electro-optic devices (e.g., diode lasers, LEDs, electro-optic modulators, transmitters and receivers**
- **Characterization of optical waveguides and fibers (e.g., optical fiber dispersion measurements)**
- **Development of electro-optic systems (e.g., fiber optic control networks, fiber optic sensors, LANs)**
- **Manufacturing of electro-optic components (e.g., quality control, device calibration, process troubleshooting)**



S-42 Optical Sampling Head

Description

The type **S-42** is an optical to electrical sampling head for use with Tektronix 7000 Series Oscilloscopes equipped with the 7S11 or 7S12 sampling plug-ins. Thus users with very high frequency repetitive optical signals now have a measurement solution specifically designed for their application.

The S-42 Optical Sampling Head can be used to analyze optical signals in the 1000nm to 1700nm wavelength range. The pulse response of the measurement system is less than 55 ps (Full Width Half Maximum) which is equivalent to a calculated bandwidth of DC to 6.4 GHz.

The S-42 can be installed directly into a sampling plug-in or used remotely on an optional 3 foot or 6 foot extender cable.

Mean Optical Power Meter

The S-42 Optical Sampling Head is also equipped with an optical power meter for average power monitoring via a pair of voltage outputs on the front panel. The voltage outputs of the S-42 can be connected to any voltmeter with the supplied cables which have banana type connectors. A selector button on the front panel of the S-42 switches the sensitivity of the power meter to one of two ranges for optical signals at μW or mW power levels. Powers from 5 nW to 5 mW can thus be measured. An overload indicator is also mounted on the front of the S-42 to indicate when the optical signal is too large for the selected range. This prevents signal degradation due to unintentional overloading of the electronics in the S-42.

Optical Waveform Analysis

Characterization of optoelectronic devices such as laser diodes, light emitting diodes, optical waveguides, optical detectors and electro-optic modulators is becoming more important as applications for fiber optics in telecommunications and data communications expand. The S-42 optical sampling head allows researchers to display and measure optical waveforms from DC to 6.4 GHz in the 1000nm to 1700nm wavelength range. Measurements such as risetime, aberration, optical power vs. drive current and voltage, modulation bandwidth, and sensitivity can now be made at high bandwidth accurately and easily.

In the development and characterization of optoelectronic systems such as fiber optic transmission networks and fiber optic sensor networks, the S-42 with a 7000 Series

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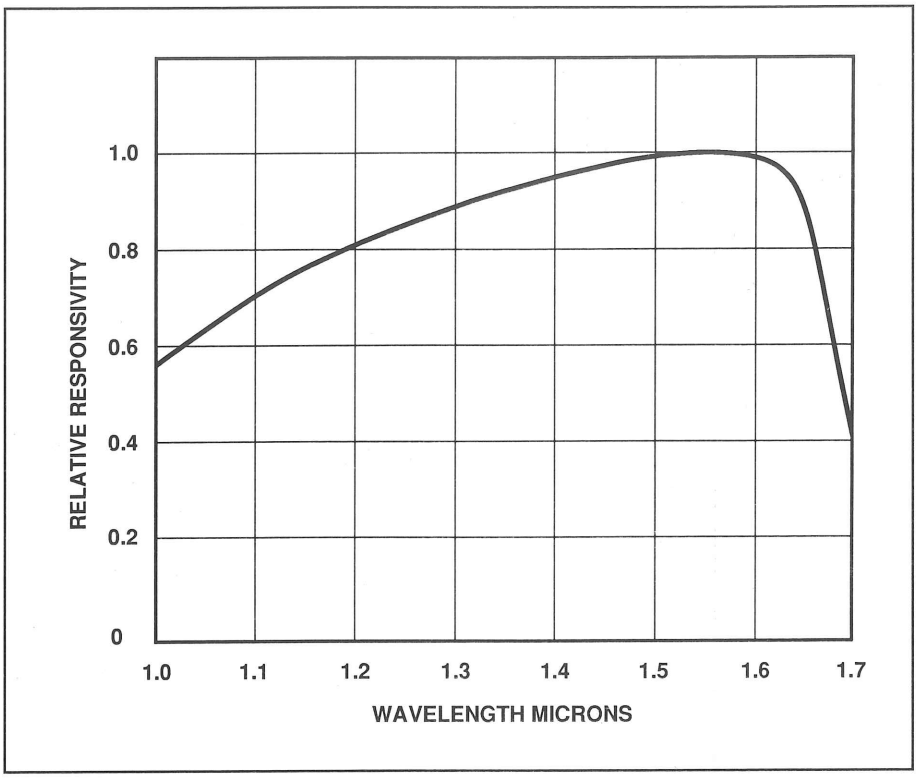
Tektronix oscilloscope offers unmatched bandwidth and optical waveform analysis capabilities.

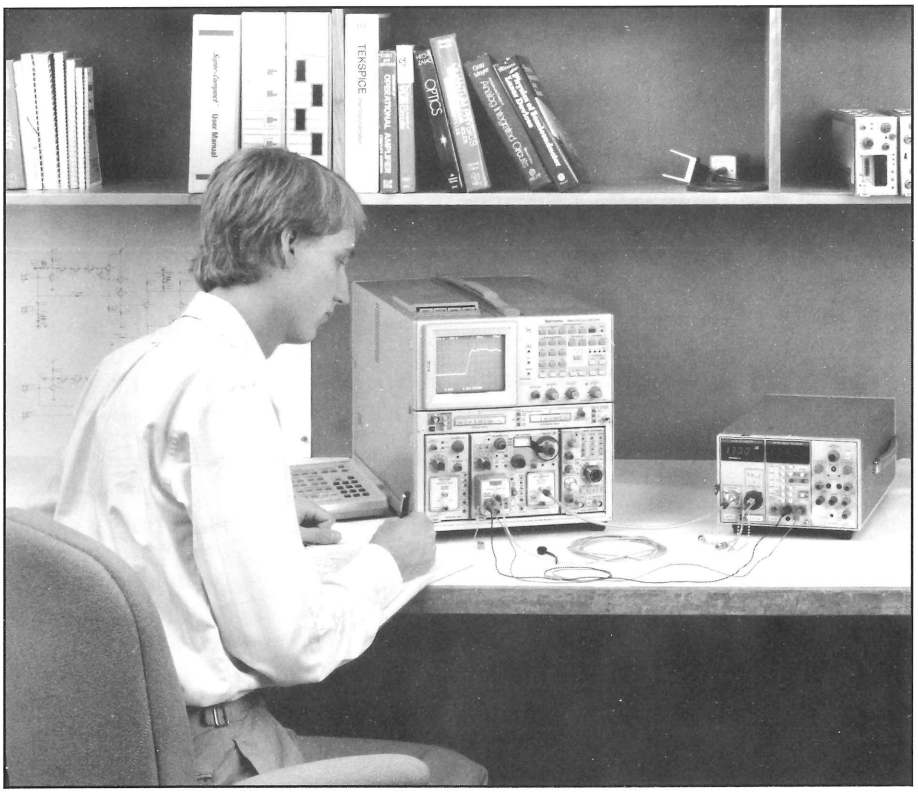
The S-42 can also be used in the manufacturing environment for process control, quality control, calibration and troubleshooting in the manufacture of optoelectronic components and systems.

SPECIFICATIONS

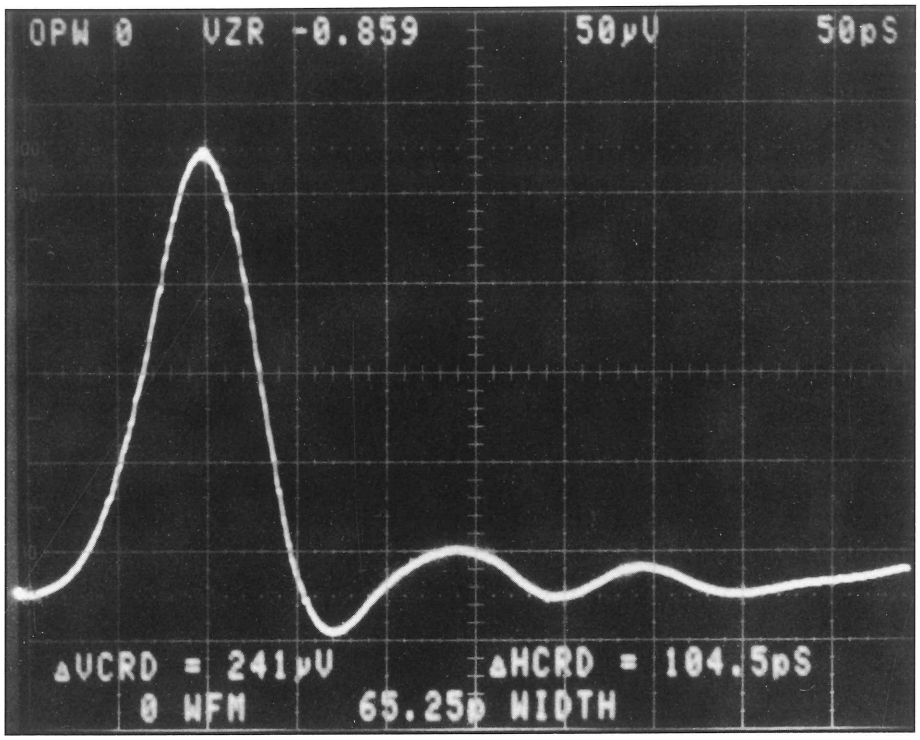
Pulse Characteristics	Performance Requirements
Pulse Response	55 ps Max. (FWHM). (See photo next page)
Bandwidth (Equivalent)	DC – 6.4 GHz (0.35/55ps)
Spectral Response	1000nm to 1700nm calibrated at 1300 ±20 nm
Noise Equivalent Power	<125μW @1300nm
Aberrations	<30% peak to peak in the first 400ps following a pulse input
Linear Response Range	<25mW peak power, <5mW average power
Sensitivity	40 mV/mW ±20% @25° ±5°C
Power Meter Characteristics	**Performance Requirements**
Bandwidth	DC to 100 Hz
Spectral Response	1000nm to 1700nm calibrated at 1300 ±20 nm
Dynamic Range	5nW to 5mW (60 dB)
Linear Response Range	≤5 μW mean, ≤25 mW peak (Range 1) ≤5 mW mean, ≤25 mW peak (Range 2)
Sensitivity	1V/mW ±20% (Range 1) 1V/μW ±20% (Range 2)
Maximum Non-Destructive Input	10 mW average 125 mW peak to peak



Relative Spectral Response of the S-42 Optical Sampling Head



S-42 Optical Sampling Head with Tektronix 7854 mainframe and 7S12 sampling plug-in characterizing the output of a 1300nm laser diode transmitter. The mean optical power of the device is monitored by a DM501A multimeter.



Pulse response of an S-42 Optical Sampling Head in a Tektronix 7854 oscilloscope with a 7S11 sampling plug-in. The optical source is a 1300nm, 50 ps (FWHM) laser diode, and thus the calculated response for the S-42 is $((65.25ps)^2-(50ps)^2)^{1/2} = 42$ ps.

Environmental Characteristics

Operating temperature:
0°C to 55°C (32°F to 131°F)

Nonoperating temperature:
−55°C to +75°C (−67°F to +167°F)

Humidity: Five cycles (120 hours) at 90% to 95% relative humidity at 30°C to 60°C.

Transportation: Qualifies under National Safe Transit Association's Preshipment Test Procedure, Project 1A-B1 Package drop 30 inches.

EMI: Complies under test limits specified in FCC Part 15, Subpart J and VDE 0871 Class B when used with a 7854 Option 03.

Physical Characteristics

Net weight: 0.4 kg (14 oz)

Dimensions: 6″ × 1.75″ × 2″.

Optional Accessories

Sampling head extender cable

3 ft.	012-0124-00
6 ft.	012-0125-00

Fiber Optic Cables 2m, 8/125 micron, single mode

FC to Diamond 2.5	174-1497-00
FC to Diamond 3.5	174-1385-00
FC to ST	174-1386-00
FC to FC	174-1387-00
FC to Biconic	174-1388-00

ORDERING INFORMATION

S-42 Optical Sampling Head

Includes: Standard FC input connector; instruction manual (070-7191-00); and 2 multimeter connection cables (012-1286-00 and 012-1287-00).

Call Now: 1-800-426-2200
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