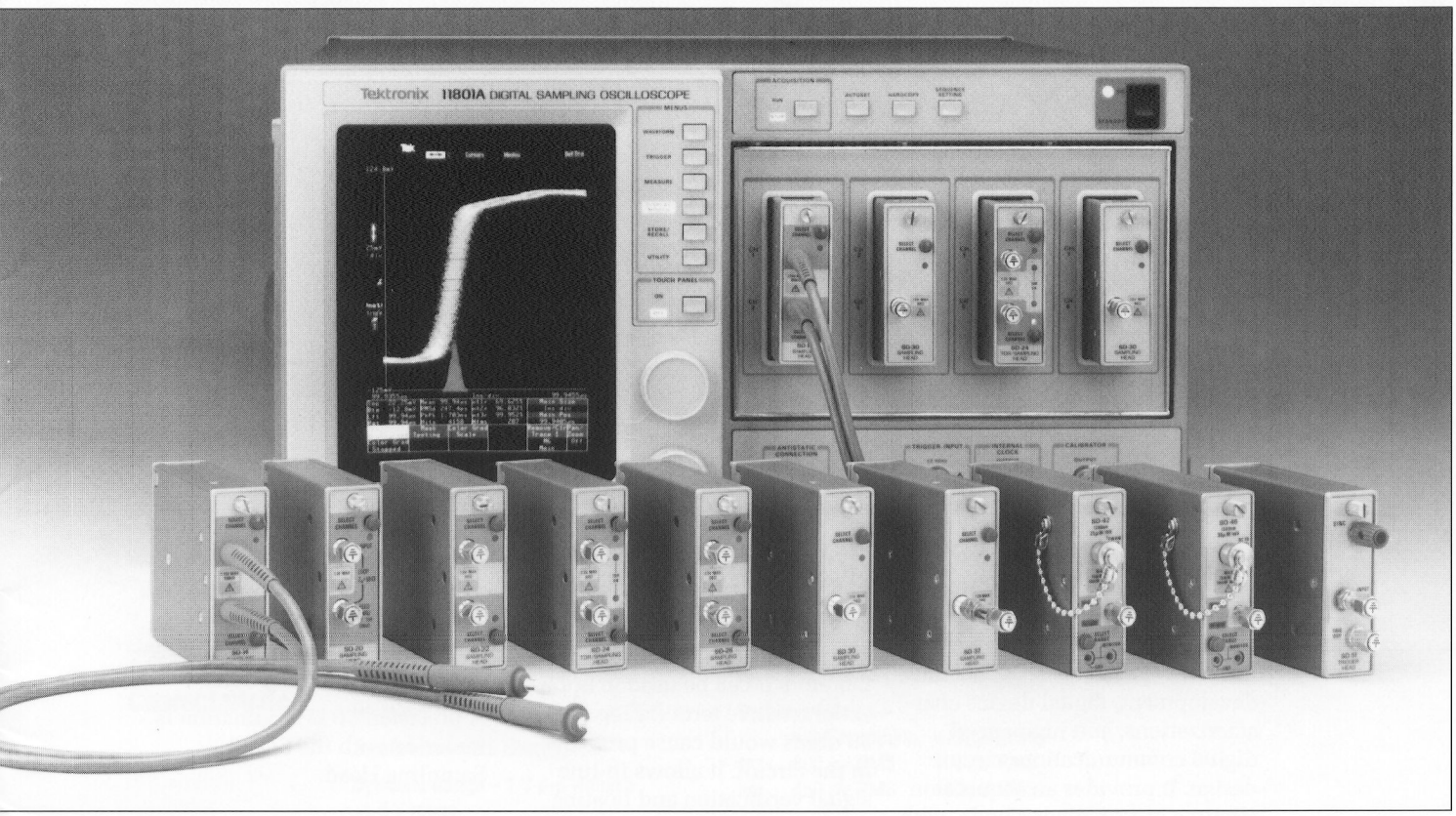
Tektronix
Test and Measurement

11800 Series Sampling Heads



Ten High Performance Sampling Heads Provide High Bandwidth Sampling For A Multitude of Applications.

SD Acquisition Heads

3 GHz SD-14 High impedance sampling probe head.

12.5 GHz SD-22 Dual Channel Sampling Head suggested for low noise digital communications and digital design applications.

20 GHz SD-20 50Ω Loop-through Single Channel Sampling Head for non-terminated applications and general purpose TDR.

20 GHz SD-26 Dual Channel Sampling Head for dual channel sampling in high bandwidth applications.

20 GHz SD-24 Dual Channel TDR/Sampling Head for TDR and true differential TDR measurements.

40 GHz SD-30 Single Channel Sampling Head for 2.9 mm coax connector input sampling requirements.

50 GHz SD-32 Single Channel Sampling Head for 2.4 mm coax connector input sampling requirements.

SD Optical Heads

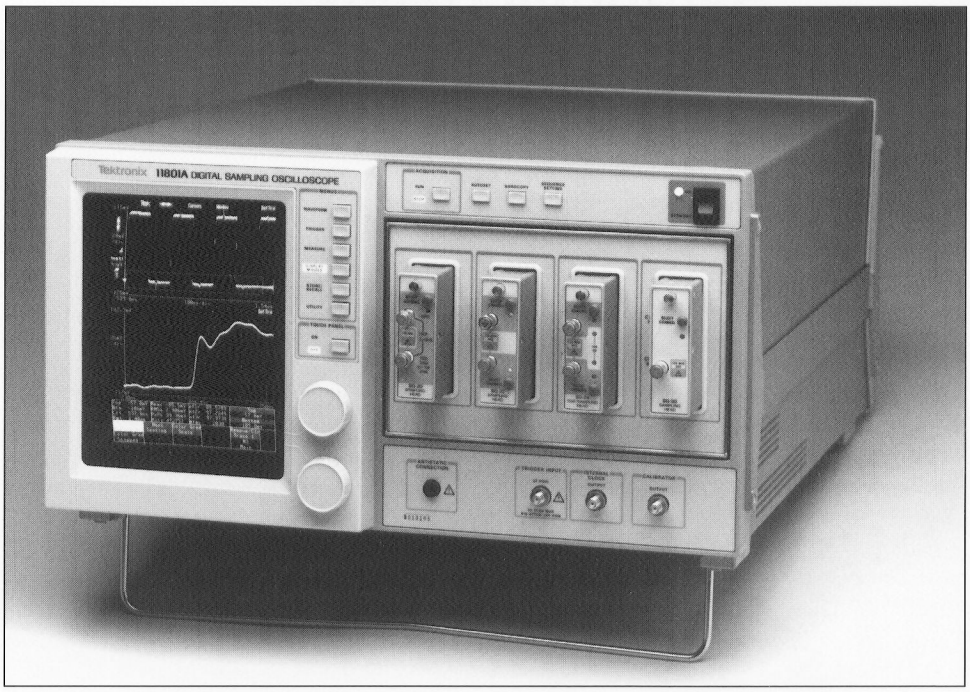
6.4 GHz SD-42 Optical to Electrical Converter Head for development, characterization and manufacturing of electro-optic devices, components and systems.

20 GHz SD-46 Optical to Electrical Converter Head for use in analyzing optical signals in 1,200 to 1,700 nm wavelength range.

SD Trigger Countdown Head

20 GHz SD-51 Trigger Head for triggering on signals up to 20-GHz.

SD-20 Loop Through Sampling Head



11801A Digital Sampling Oscilloscope.

The SD-20 is a single channel loop through 20 GHz sampling head designed for low-loss testing in applications such as microwave systems research and development, digital device characterizations, and high-speed digital communications circuit design. It provides an acquisition risetime of 17.5 picoseconds, with a typical noise floor of 750 µV RMS (350 µV with smoothing) to ensure clean undistorted signals.

The SD-20 is non-terminated, therefore it can be used in applications where terminating into 50 ohms would cause problems in the circuit. It allows in-line signal verification and floating source/termination signal characterization. The SD-20 can be inserted in a 50 Ω system without acting as a termination point. This avoids mismatch caused by double termination and avoids the attenuation associated with power splitters.

The SD-20 can also be used for customized TDR measurements of transmission lines and controlled impedance devices. An external signal generator may be used to tailor the TDR step to fit a particular situation. This gives the user greater flexibility in TDR measurements of cables, circuit boards, connectors, strip lines, and other controlled impedance devices. Slower slew rates may be utilized, for instance, or the user may perform half-sine or impulse testing. A slower rep rate TDR step may be used for testing long lines. Several configurations are possible – the 11800 mainframe may be used to trigger the external generator, for example, or the external generator may supply a pretrigger to the scope, allowing the user to choose rep rate.

A precision 50 Ω termination is included with the SD-20 Sampling Head.

SD-20 Characteristics

Acquisition System – single channel loop through

Risetime – 17.5 ps or less, 10% to 90% Using External TDR Stimulus: Reflected risetime excluding external stimulus is 33 ps or less

Bandwidth – 20 GHz (typical)

Dynamic Range – 1 V p-p within a ±1.6 V range

Dot Transient Response – Accuracy after calibration at operating temperature is ±5% for signals up to 0.5 V p-p. Adjustable to unity for signals up to 1.0 V p-p.

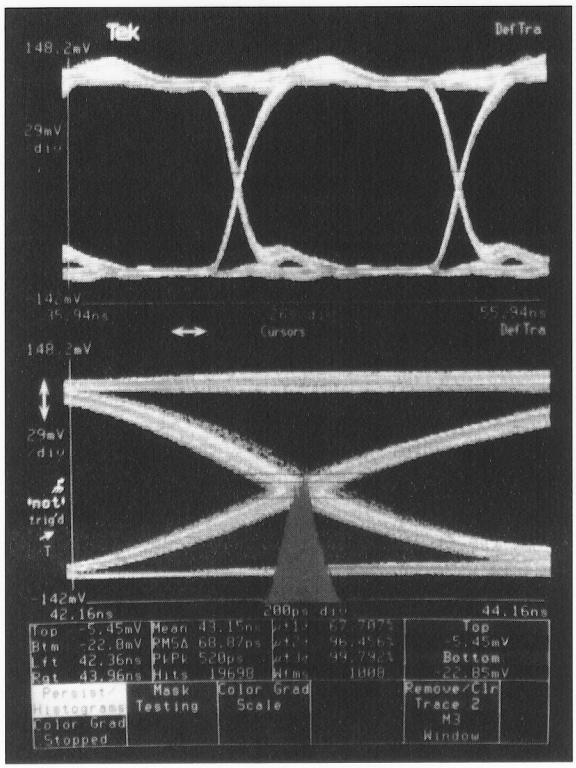
Displayed Noise –

	w/o Smoothing	w/Smoothing
max	1.2 mV RMS	550 µV RMS
typ	750 µV RMS	350 µV RMS

Aberrations (typical) –
10 ns to 20 ps before step: ±3% or less
<300 ps after step: +10%, –5% or less
300 ps to 5 ns after step: ±3% or less
5 ns to 100 ns after step: ±1% or less
Elsewhere: ±0.5% or less

Max Input Voltage – ±3 volts

SD-22 Low Noise Sampling Head



An eye pattern displayed on an 11801A using an SD-22 low-noise sampling head.

The SD-22 is a dual channel, 12.5-GHz sampling head specifically designed for low noise test and measurement in telecommunications, digital design and debug, and high throughput ATE applications. It provides an acquisition risetime of 28-picoseconds, and a typical noise level of 450 µV RMS (180 µV with smoothing).

Whenever the input signal amplitude is on the order of tens of millivolts, as is characteristic of digital communications devices, the noise introduced by the test system becomes critical. In order to precisely capture and display the switching characteristics of high-speed communications circuits, to make accurate statistical measurements of signal noise and signal timing jitter, or to obtain stable timing measurements of fast digital ICs, the noise floor of the test equipment must be kept to a minimum.

For ATE applications requiring low noise and high throughput the SD-22 Sampling Head matched with the display and analysis features of the programmable 11800-Digital Sampling Oscilloscope Series is the ideal solution.

SD-22 Characteristics

Acquisition System – dual channel

Risetime – 28 ps or less, 10% to 90%

Bandwidth – 12.5 GHz (typical)

Dynamic Range – 1 V p-p within a ±1.6 V range

Dot Transient Response –
Accuracy after calibration at operating temperature is ±5% for signals up to 0.5 V p-p. Adjustable to unity for signals up to 1.0 V p-p.

Input Impedance – 50 ±0.5 ohms

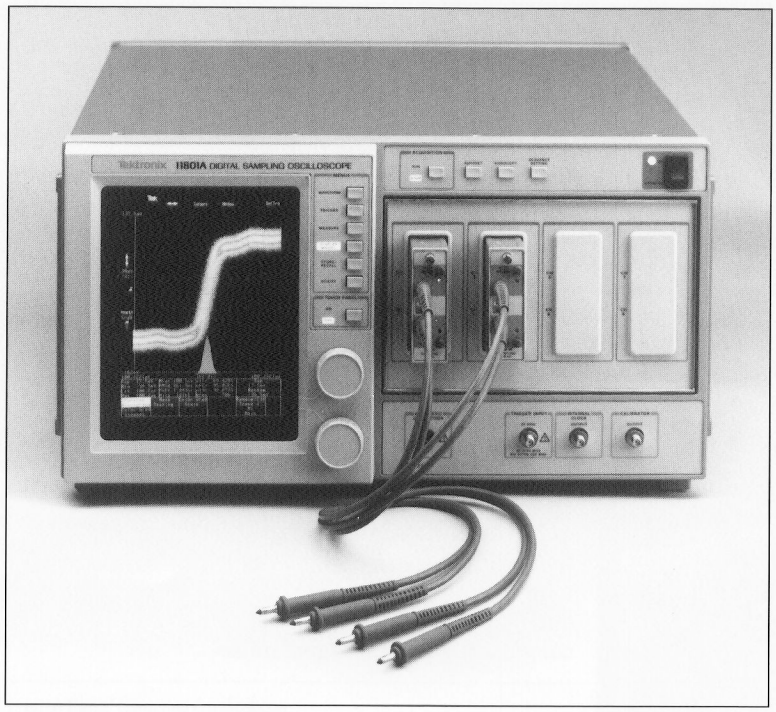
Displayed Noise –

	w/o Smoothing	w/Smoothing
max	800 µV RMS	400 µV RMS
typ	450 µV RMS	180 µV RMS

Aberrations (typical) –
10 ns to 20 ps before step: ±3% or less
<300 ps after step: +10%, –5% or less
300 ps to 5 ns after step: ±3% or less
5 ns to 100 ns after step: ±1% or less
Elsewhere: ±0.5% or less

Max Input Voltage – ±3 volts

SD-14 High Impedance Probe Sampling Head



11801A with two SD-14 probe samplers.

The SD-14 is a 2 channel, high-impedance probe sampler designed for the characterization and test of high-speed digital and analog ICs and systems. The SD-14 offers capability never before available - 3 GHz (typical) bandwidth with input impedance of 100 kΩ impedance and less than 0.4 pF input capacitance. Like most of the SD-Series Sampling Heads, the SD-14 bandwidth is specified in the time domain at 140 ps risetime. This results in a calculated 2.5 GHz bandwidth (typically 3 GHz if measured with a swept frequency source).

Configured as a two channel probe sampling head, the SD-14 is compatible with any 11800 Series or CSA 803 mainframe.

Applications

An 11801A or CSA 803 configured with an SD-14 is capable of characterizing the fastest logic families while minimizing the disturbance to the circuit under test. The low 0.4 pF capacitance makes the SD-14 an optimum solution for probing CMOS circuits. This low capacitance limits AC current flow and reduces the sensitivity to the ground loop, thereby easing grounding requirements. The 7 volt p-p dynamic range makes the SD-14 appropriate for characterizing most digital and analog circuits.

A complete AC characterization system can be configured by using the HFS 9000 Series precision stimulus system. For additional data/time generator information, refer to the current Tektronix Catalog.

Probe Tip Adapter (013-0271-00)

The Probe Tip Adapter is a high-performance 50 Ω 'T' type pickoff for use with the high input impedance Tektronix SD-14 Sampling Head and other probes compatible with the 4 mm probe tip system. The in-line portion of the 'T' is fitted with SMA-compatible 2.92 mm connectors, one end male and one end female. The pickoff point is a receptacle for the probe tip. An SMA male 50 Ω termination (015-1022-00) is included.

When used with an SD-14 sampling probe, the Probe Tip Adapter allows signal pickoff from a 50 Ω system with a minimum of disturbance of the system characteristics. This provides a convenient means of obtaining a signal for the SD-14 from a closed coaxial 50 Ω system.

Timing Accuracy and Repeatability

Another advantage to this acquisition technology is extremely high timing accuracy and repeatability. By using the technique of sequential equivalent time sampling, the 11801A/CSA 803 can achieve 1 ps measurement repeatability and 10 ps measurement accuracy.

Multichannel Capabilities

In conjunction with the 11801A and SM-11 multi-channel expansion units, it is possible to configure up to 136 channels of high-accuracy, high-bandwidth acquisition. A hardware measurement system allows for parallel timing measurements on half of the channels, simultaneously.

SD-14 Characteristics

Number of Channels – 2

Bandwidth – 2.5 GHz, 3.0 GHz (typical)

Sampling Repetition Rate –

maximum	200 kHz
minimum	100 Hz
rise time	(10%-90%)

Aberration –
0 to 1.5 ns before step: +12% to –25% (typical)
1.5 ns to 4 ns: +1% to –3% (typical)
4 ns to 30 ns: ±2% (typical)
≥30 ns: ±1% (typical)

Maximum Safe Input – ±15 V (DC and Peak AC)

Signal Voltage – .7 V p-p AC, limited to 1.33 V

Dynamic Range – 7 V p-p at 36 Hz or slew rates <12.5 mV/ps

Operating Range – –7 V to +7 V

Offset Accuracy – ±(20 mV + 1%)

Input Impedance – 100 kΩ (typical), 0.4 pF (typical)

Time Matching – Able to match channel 1 to channel 2 within 10 ps; adjustment range 350 ps, 400 ps (typical)

Power – 650 MW per probe; 1300 MW total

Probe Cable Length – 1 meter. Heads may also be put on 1 or 2 meter extender cables

SD-24 / SD-26 Dual Channel TDR/High Bandwidth Sampling Heads

The SD-24 is a dual-channel TDR/ Sampling Head. The SD-26 is a dual-channel Sampling Head. These sampling heads have a rise time of 17.5 ps or less, with a typical 20 GHz equivalent time bandwidth. The input impedance of the SD-24 and SD-26 is 50 ohms, and the maximum safe input voltage is ±3 V. The SD-24 and SD-26 – like all of the 11800 series sampling heads – can be inserted directly into the 11801A or CSA 803 mainframes, or the SM-11 Multi-Channel Unit; with or without Sampling Head Extender Cables. Extender Cables let you place the sampling heads closer to the device under test minimizing cable losses.

Each channel of the SD-24 is also capable of generating a TDR step. The TDR step generator is a fast-rising step that is activated when the SD-24 is in TDR mode. Each TDR step is applied to the input signal path for that channel. The acquisition portion of the sampling head is still functional for monitoring the incident step and this step's reflected components. The polarity of each channel's TDR step can be selected independently of the other channel. This allows for differential or common-mode TDR testing of coupled lines, besides independent testing of isolated lines.

SD-24 / SD-26 Characteristics

Acquisition System – dual channel

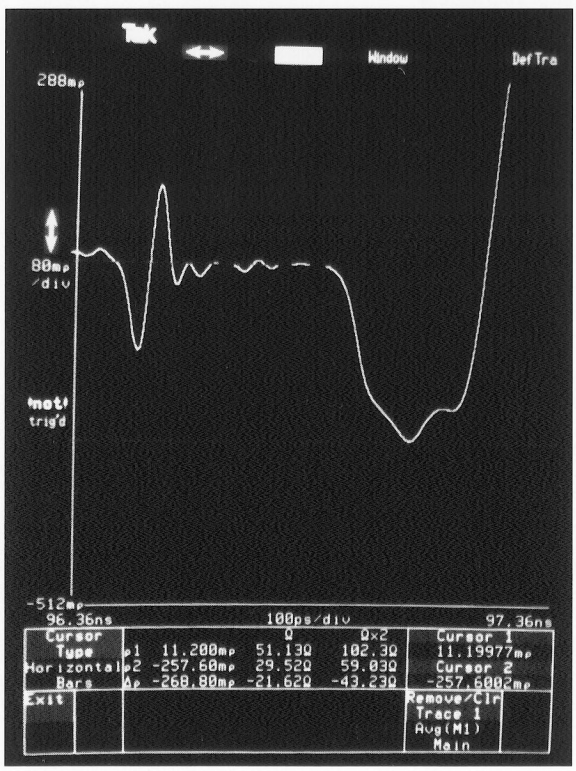
Risetime – 17.5 ps or less, 10% to 90%

Bandwidth – 20 GHz (typical)

Dynamic Range – 1 V p-p within a ±1.6 V range

Input Impedance – 50 ±0.5 ohms

Dot Transient Response – Accuracy after calibration at operating temperature is ±5% for signals up to 0.5 V p-p. Adjustable to unity for signals up to 1.0 V p-p.



TDR Measuring the Impedance of an IC pin.

Displayed Noise –

	w/o Smoothing	w/Smoothing
max	1.2 mV RMS	550 µV RMS
typ	750 µV RMS	350 µV RMS

Max Input Voltage – ±3 volts

Aberrations (typical) –
10 ns to 20 ps before step: ±3% or less
<300 ps after step: +10%, –5% or less
300 ps to 5 ns after step: ±3% or less
5 ns to 100 ns after step: ±1% or less
Elsewhere: ±0.5% or less

Isolation Between Channels – ≤1% p-p voltage transmission from the channel driven by the 067-1338-0X Calibration Step Generator, to the quiescent channel.

Time Coincidence Between Channels – 10 ps accuracy; <0.2 ps/C stability

TDR System (SD-24 only)

Acquisition System – dual channel

Displayed Risetime –
Incident: 28 ps typical, 10% to 90%, at ±250 mV output.

Reflected: 35 ps or less, 10% to 90%, at ±250 mV.

Repetition Rate – 100 kHz

TDR Step Amplitude – Adjustable to ±250 mV (polarity of either step may be inverted).

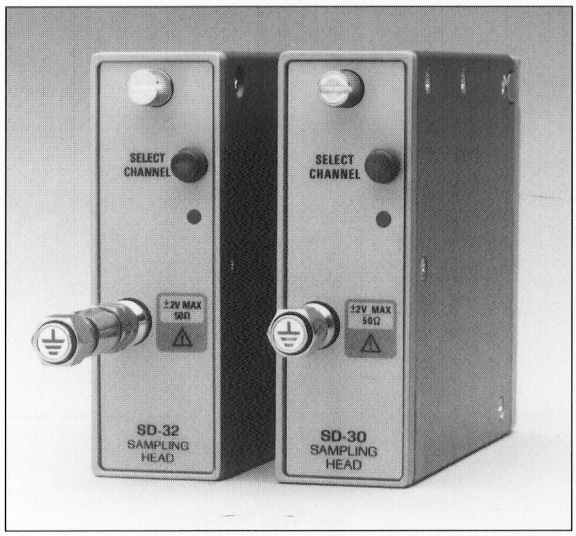
Channel 2 Step Delay Adjustment – ±50 ps typical relative to channel 1

Time Coincidence Between TDR Steps – Adjustable to less than 1 ps.

Source Resistance – 50 ±0.5 ohms

Aberrations (at ±250 mV amplitude) –
10 ns to 20 ps before step: ±3% or less
<300 ps after step: +10%, –5% or less (typical)
300 ps to 5 ns after step: ±3% or less
Elsewhere: ±1% or less

SD-30 40 GHz High Bandwidth Sampling Head



SD-32 and SD-30 High Bandwidth Sampling Heads.

The SD-30 takes Tektronix into the realm of the highest bandwidth with a 2.9 mm (K) connector. The 40 GHz head makes it possible to enhance the performance of your 11801A Digital Sampling Oscilloscopes or the CSA 803 Communication Signal Analyzer. This extra bandwidth is needed when working with GaAs, bipolar devices, and microwave devices.

It has a calculated acquisition risetime of 8.8 ps or less with a typical noise floor of 1.8 mV RMS (700 µV with smoothing). A one volt peak-to-peak dynamic range within a ±1.6 V window allows sampling signals containing a dc component. Maximum safe voltage is ±2 volts.

SD-30 Characteristics

Acquisition System – single channel

Risetime – 8.8 ps or less (Calculated from .35/bandwidth)

Bandwidth – 40 GHz or greater

Dynamic Range – 1 V p-p within a ±1.6 V range

Dot Transient Response – Accuracy after calibration at operating temperature is ±5% for signals up-to 0.5 V p-p.

Displayed Noise (Maximum) –

w/o Smoothing	w/Smoothing
2.3 mV RMS	1 mV RMS

Displayed Noise (Typical) –

w/o Smoothing	w/Smoothing
1.8 mV RMS	700 µV RMS

Aberrations (Typical) –
10 ns to 20 ps before step: ±3 % or less
<300 ps after step: +12%, –5% or less
300 ps to 3 ns after step: ±5.5%, –3% or less
3 ns to 100 ns after step: ±1% or less
Elsewhere: ±0.5% or less

Max Input Voltage – ±2 volts

SD-32 50 GHz High Bandwidth Sampling Head

The SD-32 is a single-channel, 50 GHz sampling head designed for highest bandwidth applications such as high-speed, digital data communications, RF and microwave. It provides a calculated acquisition risetime of 7 ps or less with a typical noise floor of 1.8 mV RMS (700 µV with smoothing). The input impedance of the SD-32 is 50 ohms. A 1 Volt peak-to-peak dynamic range within a ±1.6 V window allows sampling signals containing a dc component. The maximum safe input voltage is ±2 Volts.

The SD-32 utilizes a 2.4 mm connector to provide 50 GHz bandwidth. The frequency response is fully characterized to 50 GHz (the frequency response plot is included with each head).

The SD-32, like all of the SD-Series sampling heads, can be used with any CSA 803 or 11801A mainframe or the SM-11 Multi-Channel Unit. Simply plug in the SD-32 to upgrade an existing system to the higher performance. Sampling head extender cables allow the SD series sampling heads to be located close to the device under test and connected to a mainframe.

When used with the SD-32, the 067-1338-00 Fast-risetime Step Generator is ideal for time domain characterization of SD-Series sampling heads and for high resolution TDR. Used with the SD-46 Optical to Electrical Converter, the SD-32 provides direct optical sampling to an optical bandwidth of 20 GHz. The spectral response of the SD-46 is from 1200 nm to 1700 nm. Typical applications of the SD-32/SD-46 combination is characterization of opto-electronic devices, optical waveguides and fibers, and development of opto-electronic devices, optical waveguides and fibers, and opto-electrical systems such as fiber optic control systems, sensors and networks.

SD-32 Characteristics

Acquisition System – single channel

Risetime – 7 ps or less (Calculated from .35/Bandwidth)

Bandwidth – 50 GHz or greater

Dynamic Range – 1 V p-p within a ±1.6 V range

Dot Transient Response – Accuracy after calibration at operating temperature is ±5% for signals up to 0.5 V p-p. Adjustable to unity for signals up to 1 V p-p.

Displayed Noise –

	w/o Smoothing	w/Smoothing
max	2.3 mV RMS	1 mV RMS
typ	1.8 mv RMS	700 µV RMS

Aberrations (typical) –
10 ns to 20 ps before step: ±3% or less
<300 ps after step: +12%, –5% or less
300 ps to 3 ns after step: +5.5%, –3% or less
3 ns to 100 ns after step: ±1% or less
Elsewhere: ±0.5% or less

Maximum Input Voltage – ±2 volts

Environmental

Temperature – Operating: 0°C to 50°C
Non-Operating: –40°C to +75°C

Altitude –
to 4.5 km (15,000 ft) operating
to 15 km (50,000 ft) non-operating

Humidity – to 95% RH at up to 50°C
Meets MIL-T-2300C, Type III, Class 5

Electromagnetic Compatibility – Meets the requirements of:
MIL-STD-461B;
CE-03 pt 4 Curve 1, CS-01 pt 7, CS-02 pt 4, CS-06 pt 5,
RE-02 pt 7, RS-01 pt 4, RS-02 pt 5, RS-03 pt 7 (limited to 1 GHz)
VDE 0871/6.78 Class B

Physical Characteristics

Weight – 205 grams (11 oz)

Height – 71 mm (2.9 in)

Width – 23 mm (0.95 in)

Depth – 91 mm (3.8 in)

SD-42 Optical to Electrical Converter Head

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

The SD-42 fits into the front panel of an 11800 Series Digital Sampling Oscilloscope or CSA 803 directly adjacent to an SD-22, SD-24, SD-26, SD-30, or SD-32 Sampling Head. The electrical output on the front panel SD-42 converter head is coupled to the adjacent Sampling Head via the semi-rigid coaxial link provided. Users with very high frequency repetitive optical signals now have a software controllable measurement solution specifically designed for their applications.

Mean Optical Power Meter – The SD-42 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 SD-42 can be connected to any voltmeter with the supplied cables. A selector button on the front panel of the SD-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 be measured. The selected range is illuminated on the front panel. An input overload indicator illuminates when the optical signal is too large for the selected range.

SD-42 Characteristics

(Specifications at 25C ±5C; calibrated for use with a single mode fiber input at 1300 nm ±20 nm*)

Pulse Characteristics

Wavelength Range –1000 to 1700-nm

Optical Pulse Response Speed – 55 ps max Full Width Half Maximum

Conversion Gain – 25 μW/mV

Response Bandwidth – DC to 6.4-GHz (typical)

* Can accept fibers up to 62.5 mm core diameter with response speed degradation.

Equivalent Display Noise – 10 μW RMS typical (with SD 22 only); 33 μW RMS typical (with SD 24 and SD 26; unity dot response); <15 μW RMS typical (with smoothing)

Aberrations – <15% p-p in first 400 ps following pulse input

Linear Response Range – <25-mW peak power; <5 mW mean power

Maximum Non-Destructive Input – 75 mW peak power; 10 mW mean power

Power Meter Characteristics

Dynamic Range – 5 nW to 5 mW

Linear Response Range –

Range 1	<5 μW mean, <25 mW peak
Range 2	<5 mW mean, <25 mW peak

Sensitivity –

Range 1	1 V/mW
Range 2	1 V/μW

SD-51 Trigger Head

The SD-51 Trigger Head provides stable displays of signals from 1 to 20 GHz with ≤7 ps RMS jitter. The SD-51 is a free-running tunnel diode oscillator with a front panel control to synchronize the oscillator to a subharmonic of the input signal. The output from the SD-51 is coupled to the 11800 Series trigger input connector; and the output signal is a direct countdown of the input signal.

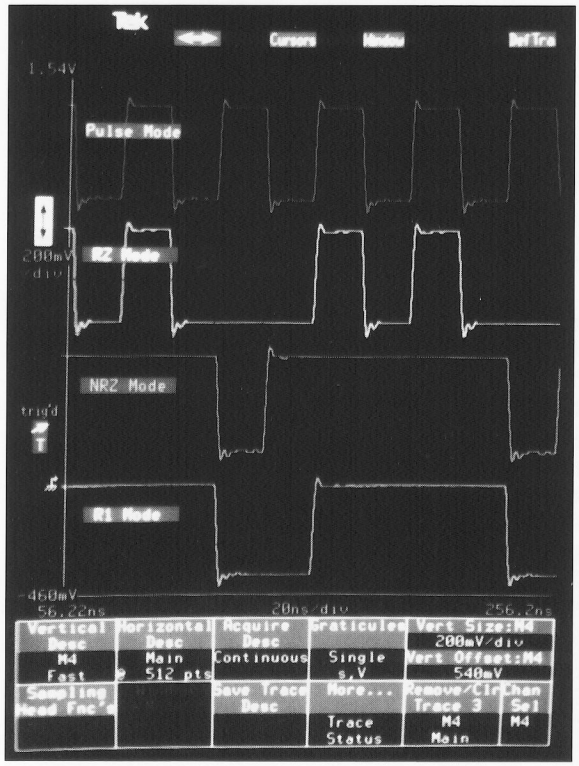
SD-51 Characteristics

Input Signal – Frequency range is 1 to 20 GHz. Stable synchronization on signals of at least 100 mV p-p, as measured separately into 50 Ω, 5 V p-p maximum safe input.

Input Characteristics – 50 Ω SMA (3 mm) connector. Open termination paralleled by 1 pF.

Trigger Output – Approximately 200 mV into 50 Ω. Jitter is 6 ps RMS or less with signals from 5 to 20 GHz; 7 ps or less with signals from 1 to 5 GHz. Kickout at signal input is 180 mV peak; kickout occurs between successive samples.

SD-46 Optical to Electrical Converter Head



Characterization of opto-electronic devices such as laser diodes, light emitting diodes, optical waveguides, optical detectors and electro-optic modulators becomes more important as applications for fiber optics in telecommunications and data communications expand. The SD-46 Optical to Electrical Converter allows users to display and measure modulated optical waveforms from DC to 20 GHz in the 1,200 to 1,650-nm wavelength range. Broad bandwidth measurements involving risetime, aberrations, optical power vs. drive current and voltage, modulation bandwidth, and sensitivity can now be made accurately and easily over a wide bandwidth.

The SD-46 combined with a Tektronix CSA 803 Communication Signal Analyzer or an 11800 Series Sampling Oscilloscope provides a convenient optical waveform analysis capability. This capability is useful in the development and characterization of opto-electronic components and modules found in fiber optic transmission networks and fiber optic sensor systems.

The SD-46, which uses a 2.9 mm (K) connector, can also be used in the manufacturing environment. It can be used in process control, quality control, calibration and troubleshooting in the manufacture of opto-electronic components and systems.

SD-46 Characteristics

(Specifications at 25°C ±5C; calibrated for use with a single mode fiber input at 1300 nm)

Pulse Characteristics:

Wavelength Range – 1200 to 1650-nm

Optical Pulse Response Speed – 18 ps max Full Width Half Maximum

Conversion Gain – 35μW/mV

Noise Equivalent Power – ≤16 mW RMS typical*; ≤46 mW RMS typical**

*When used with Tektronix SD-22 only

**When used with Tektronix SD-24 & SD-26

Noise Equivalent Power (with smoothing) – ≤7 mW RMS typical*; ≤21mW RMS typical**

Aberrations – <10% p-p in first 400 ps following pulse input

Linear Response Range – ≤25-mW peak power; ≤5 mW mean power

Maximum Non-Destructive Input – 75 mW peak power; 10 mW mean power

Power Meter Characteristics

Dynamic Range – 5 nW to 5 mW

Linear Response Range –

Range 1	<5 μW mean, <25 mW peak
Range 2	<5 mW mean, <25 mW peak

Sensitivity –

Range 1	1 V/mW
Range 2	1 V/μW

SD-20/SD-22/ SD-24/SD-26/ SD-30/SD-32/ SD-51 Common Characteristics

Environmental

Meets MIL-T-28000C, Type III, Class 5

Operating Temperature – 0°C to 50°C

Non-operating Temperature – 40°C to +75°C

Altitude – to 4.5 km (15,000 ft) operating to 15 km (50,000 ft) non-operating

Humidity – to 95% RH at up to 50°C

Electromagnetic Compatibility

United States: MIL-STD-461B: CE-03 Pt 4 Curve 1, CS-01 Pt 7, CS-02 Pt-4, CS-06 Pt 5, RE-02 Pt 7, RS-01 Pt-4, RS-02 Pt 5, RS-03 Pt 7 (limited to 1 GHz)

Germany: Meets VDE 0871/6.78 Class B

Physical

Weight – 205 grams (11 oz)

Height – 71.05 mm (2.9 in)

Width – 23.28 mm (0.95 in)

Depth – 91.39 mm (3.8 in)

SD-42/SD-46 Common Characteristics

Environmental

Operating Temperature – 0°C to 50°C

Non-operating Temperature – 55°C to 75°C

Humidity – Five cycles, 120 hours, 90-95% RH at 30°C to 60°C

Vibration (operating) – 10-55 Hz, 0.38 mm, 75 min total

Shock (operating) – 30 g, half sine 11 mS, 18 shocks

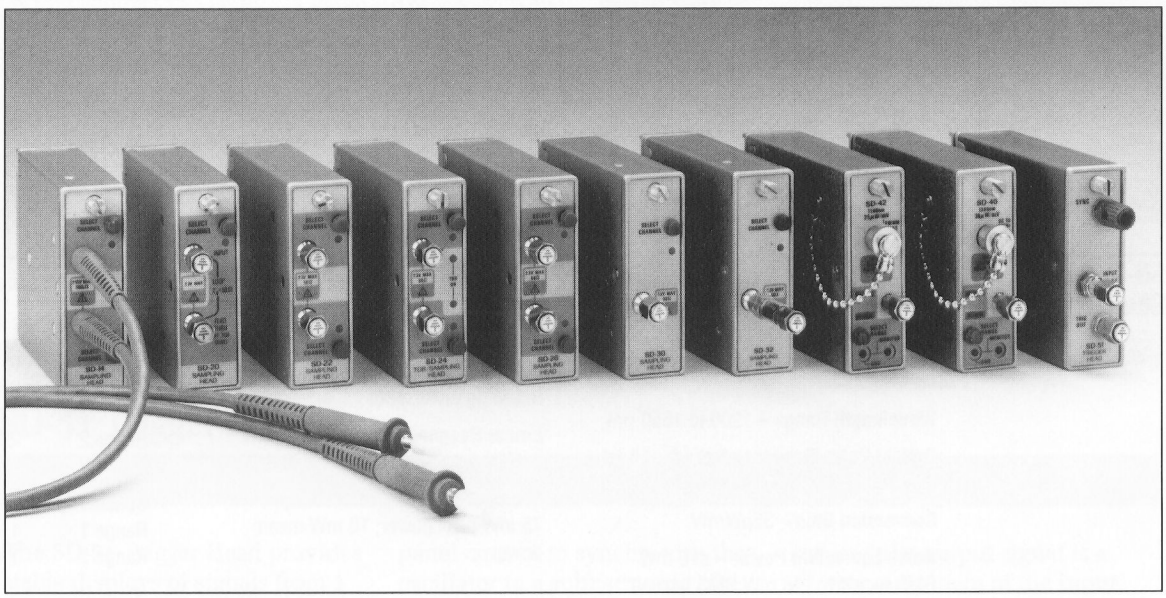
Transportation – Qualifies under National Safe Transit Association Preshipment Test Procedures, Project 1A-B1 Package drop 30-inches.

EMI – Complies under test limits specified in FCC Part 15 J and VDE-0871 Class B.

Physical

Dimensions – 4"L X 1"W X 3"H

Weight – 205 g.



SD-Series Family of sampling heads.

Sampling Head Selection Guide

The following selection guide features all sampling heads from Tektronix. Please refer to the current Tektronix catalog for details.

	Channels	Bandwidth	Risetime	Impedance	Noise (typical)	Applications
SD-14	2	3 GHz	140 ps	100 kΩ/0.4 pF	8 mV max 7 mV typ	Digital IC/System Characterization
SD-20	1	20 GHz	17.5 ps	50 Ω loop through	750 µV	Special Purpose TDR, Communications
SD-22	2	12.5 GHz	28 ps	50 Ω	450 µV	Low-noise, Communications
SD-24	2	20 GHz	17.5 ps	50 Ω	750 µV	TDR, TDT, Crosstalk, IC Characterization
SD-26	2	20 GHz	17.5 ps	50 Ω	750 µV	IC Characterization
SD-30	1	40 GHz	8.8 ps	50 Ω	1.8 mV	Communications & Microwave
SD-32	1	50 GHz	7 ps	50 Ω	1.8 mV	Communications & Microwave
SD-42	1	6.4 GHz				Optical to Electrical Converter
SD-46	1	20 GHz				Optical to Electrical Converter
SD-51	-	20 GHz				Countdown Trigger

Ordering Information

11800 Series
Sampling Heads

SD-32 50 GHZ High Bandwidth Sampling Head
Includes: Installation/User 070-8268-00; Service Reference 070-8269-00; 1 2.4 mm short-circuit termination (011-0157-00).

SD-30 40 GHz High Bandwidth Sampling Head
Includes: Installation/User (070-7904-00); Service Reference (070-7905-00); 1 SMA short-circuit termination (015-1020-00).

SD-20 20 GHz Loop Through Sampling Head
Includes: Installation/User (070-7531-00); Service Reference (070-7528-00); precision 3.5 mm termination (011-0155-00); 2 SMA short-circuit terminations (015-1020-00).

SD-22 12.5 GHz Low Noise Sampling Head
Includes: Installation/User (070-7226-01); Service Reference (070-7227-01); 2 SMA short-circuit terminations (015-1020-00).

SD-24 20 GHZ Dual TDR/Sampling Head
Includes: Installation/User (070-7052-00); Service Reference (070-7053-00); SMA short-circuit terminations (015-1020-00).

SD-26 20 GHz Dual Sampling Head
Includes: Installation/User (070-7226-01); Service Reference (070-7227-01); 2 SMA short-circuit terminations (015-1020-00).

SD-14 3 GHz High-Impedance Probe Sampler
Includes: Installation/User (070-8286-00); Service Reference (070-8285-00); 4 each, 4-post ECB mount ground socket (131-5308-00); 20 each, Edge tab ground socket (131-5309-00); 10 each, wire-form ground (131-5307-00); 1 each cable marker set (016-0633-00); 2 each ESD protective tip (200-3961-00); plastic accessories case.

Probe Tip Adapter
Includes: Instruction Sheet plus SMA male 50 Ω Termination (013-0271-00).

SD-46 20 GHz Optical to Electrical Converter Head
Includes: Red, 2 mm to banana lead, 1 m (012-1286-00); black, 2mm to banana lead, 1 m (012-1287-00); 50 Ω semirigid cable link (174-1635-00); User (070-8671-00).

SD-42 6.4 GHz Optical to Electrical Converter Head
Includes: Red, 2 mm to banana lead, 1 m (012-1286-00); black, 2 mm to banana lead, 1 m (012-1287-00); 50 Ω semirigid cable link (174-1635-00); User (070-8671-00).

Optional Accessories for SD-46 and SD-42:

☐ Optical Cables: 2 m, 8/125 micron single mode (including in-line adapter)

☐ FC to Diamond 3.5 174-1385-00

☐ FC to ST 174-1386-00

☐ FC to FC 174-1397-00

☐ FC to Biconic 174-1388-00

☐ FC to Diamond 2.5 174-1497-00

SD-51 20 GHz Trigger Head
Includes: Installation/User (070-7338-00); Service Reference Manual (070-7339-00); 12-inch SMA male-to-male (174-1364-00).

067-1338-0X Calibration Step Generator

The 067-1338-0X Calibration Step Generator is intended to support calibration of our SD- series of sampling heads including the SD-24 TDR/ Sampling Head, the SD-26, SD-22, SD-20, SD-14 Sampling Heads, and future Tektronix sampling heads.

The Calibration Step Generator is capable of certifying sampling head acquisition performance to a controlled internal Tektronix standard acquisition unit.

The Calibration Step Generator unit consists of a control unit and a remote head. The control unit features a power supply port for connecting a removable power supply, a TRIGGER INPUT connector for external trigger signals, and an ON/STANDBY switch; which enables the output of the Calibration Step Generator. (The remote head attaches directly to the sampling head through a male 3.5 mm connector.) (Note: For the SD-14 Probe Sampler, use the 013-0271-00 Probe Tip Adapter.)

Calibration Step Generator Characteristics

This section lists the electrical, environmental and mechanical, and physical specifications particular to the Calibration Step Generator.

Electrical

Step Response – Refer to the Test Data Sheet packaged with your Calibration Step Generator

Step Generator Repetition Rate – 200 kHz maximum

Absolute Maximum Signal Voltage on Output – ±3 V

Absolute Maximum Signal Trigger Input Voltage – –0.5 V to +3.0 V

Step Amplitude – +250 mV ±10 mV

Insertion Delay Stability – 11 ns nominal ±1 ps/C

Source Resistance – 50 Ω nominal

Environmental and Mechanical

Ambient Temperature –
Operating: 15° to 35°C (59° to 95F°)
Non-operating: –40° to 75°C (–40° to 167°F)

Altitude –
Operating: to 4.5 km (15,000 ft)
Non-operating: to 15 km (50,000 ft)

Humidity –
(Non-operating): to 95% relative humidity at up to 50°C (122°F)

Vibration –
Operating and Non-operating: 0.015 in. total displacement from 10 Hz to 55 Hz, 75-min. total

Shock –
Remote Head (Non-operating): 1000 G's, half sine 1 ms duration, all sides, 18 shocks total
Control Unit (Non-operating): Mil-T-28800C, Sec. 4.5.5.4.1, Type III, Class 5

Packaged Product Vibration and Shock –
Vibration and Shock: ASTM D999-75, method A, para.-3.1g (NSTA Proj 1A-B-1)
Drop: ASTM D775-61, method 1, para.-5 (NSTA Proj 1A-B-2)

Electromagnetic Compatibility –
United States: Mil-Std-461B; RE-02 Pt 7, RS-01 Pt 4, RS-02 Pt 5, RS-03 Pt 7 (limited to 1 GHz)
Germany: Meets VDE 0871/ 6.78 Class B

Physical

Remote Head Dimensions –

Height	2.90 in
Width	0.95 in
Depth	3.25 in

Control Unit Dimensions –

Height	2.55 in
Width	5.65 in
Depth	5.20 in

Interconnect Cable Length – 1 m

Weight –

Net	2 lbs 10 oz.
Domestic Shipping	5 lbs 12 oz

Ordering Information

Calibration Step Generator

067-1338-00 (using Standard power)
067-1338-01 (using European power)
067-1338-02 (using United Kingdom power)
067-1338-03 (using Australian power)
067-1338-05 (using Swiss power)
067-1338-06 (using Japanese power)

For further information, contact:

Tektronix, Inc.
P.O. Box 500
Beaverton, Oregon 97077-0001
(800) 426-2200
(503) 627-7111

8/92 TG 15M 85W-8218-0

Tektronix
Test and Measurement