

Tektronix Sampling Heads

SD14 * SD20 * SD22/24/26 * SD32 * SD42/44 * ORR24

The following Tektronix sampling heads enable the high performance features of the CSA803C and 11801C Sampling Oscilloscopes.

Features

SD14

- 100 kilohm, 0.5 pF Typical
- 7 V_{p-p} Dynamic Range
- 3 GHz Bandwidth

SD20

- Loopthrough Sampling Head
- Nonterminated

SD22

- 12.5 GHz Bandwidth
- Low-noise
- Dual-channel

SD24

- TDR/Sampling Head
- Dual-channel, Differential TDR
- 20 GHz Bandwidth
- 35 ps Reflected Rise Time

SD26

- 20 GHz Bandwidth

SD32

- 50 GHz Bandwidth
- Single-channel

- 2.4 mm Connector

SD42/44*1, ORR24*1

- Optical-to-electrical Converter
- DC to 15 GHz
- Optical Reference Receiver
- DC to 2.0 GHz

*1 For more information on this product, see the Telecommunications products section of this catalog.

Applications

- ECL, CMOS and ACL GaAs Device Characterization (SD14)
- General-purpose TDR (SD20)
- Digital Data Communications (SD22)
- Line Impedance and Crosstalk Characterization (SD24)
- Dual Channel Device Characterization (SD26)
- High Bandwidth Communication & Microwave (SD32)
- SONET/SDH Compliance Testing (ORR24)

SD14 High Impedance Probe Sampler

The SD14 is a dual-channel, 3 GHz probe sampler designed for high-impedance signal acquisition where a 50 Ohm acquisition system is not the optimal solution. The SD14 is ideal for high-speed device characterization such as ECL, CMOS, ACL and GaAs testing. The 100 kilohm input impedance and 0.5 pF capacitance results in very low loading of the device under test. The 7 V dynamic range and ± 3.5 V offset range, makes the SD14 suitable for testing all digital logic families as well as most analog circuits.

The SD14 consists of two samplers, each attached at the end of a 1.0 meter cable for easy circuit probing. The modular architecture of the CSA803C/11801C enables the use of extended samplers, bringing a new level of performance to sampling scopes. In conjunction with the 11801C and SM11 multi-channel unit, it

is possible to configure up to 136 channels of high-impedance, high-bandwidth acquisition with measurement accuracy approaching 140 ps.

SD14 Option 01 adds a longer probe tip, two probe-to-ECB (etched circuit board) adapters, and two probe-to-SMB adapters. These ease probing of plated holes (as found in Outboards for IC testers) and semi-permanent connections.

SD20 Loopthrough Sampling Head

The SD20 is a single-channel, 20 GHz loopthrough sampling head designed for low-loss testing in applications such as microwave systems research and development, digital device characterization and high-speed digital communications circuit design. It provides an acquisition rise time of 17.5 ps with typically 750 μV_{RMS} of noise (350 μV with smoothing) to ensure clean, undistorted signals.

The SD20 is nonterminated and keeps losses to a minimum by routing the signal of interest directly through the sampling head without the need of a power divider. The SD20 can also be used for customized TDR measurements of transmission lines and controlled impedance devices. An external signal generator may be used, instead of the SD24 step generator, to tailor the TDR stimulus to fit a particular situation. For instance, slower slew rates or higher amplitude may be utilized, or you may perform half-sine or impulse testing. In digital communications, the SD20 is useful for viewing and triggering on the clock signal without the use of a power divider.

SD22 Low-noise Sampling Head

The SD22 is a dual-channel, 12.5 GHz sampling head specifically designed for low-noise measurement in digital communications and device characterization applications. It provides an acquisition rise time of 28 ps, and typically 450 μV_{RMS} of displayed noise. With smoothing, noise levels are 180 μV_{RMS} .

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. The SD22 is the ideal instrument for these low-noise applications.

SD24 TDR/Sampling Head

The SD24 is a dual-channel TDR/Sampling Head. This sampling head has a rise time of 17.5 ps or less, with a typical 20 GHz equivalent bandwidth.

Each channel of the SD24 is also capable of generating a fast rising step for use in Time Domain Reflectometry (TDR). In TDR mode, the acquisition portion of the sampling head monitors the incident step and any reflected energy. The reflected rise time of the TDR step is 35 ps or less. The polarity of each channel's TDR step can be selected independently of the other channel. This allows for differential or common-mode testing of two coupled lines, in addition to the independent testing of isolated lines. The SD24 can be used to characterize crosstalk by using the TDR step to drive one line while monitoring a second with the other channel.

The "filter" function on the CSA803C/11801C can be used with TDR or crosstalk measurements to characterize a system at a slower rise time.

SD26 Sampling Head

The SD26 is a dual-channel, 20 GHz equivalent bandwidth sampling head. This sampling head has the same acquisition capability as the SD24 TDR/Sampling Head but does not include the TDR step generators.

SD32 Sampling Head

The SD32 is a single-channel, 50 GHz bandwidth sampling head. The SD32 performance is available for any new or existing CSA803A/11801B mainframe. The SD32 has measured bandwidth of greater than 50 GHz and calculated rise time less than 7.0 ps. The front-panel connector is female 2.4 mm, and an

adapter is provided (011-0157-00; 2.4 mm male to 2.92 mm female) in order to maintain compatibility with SMA connector systems.

SD42 Optical-to-electrical Converter*¹

The SD42 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 electrical output on the front panel is coupled to the adjacent sampling head via the semi-rigid coaxial link provided.

The SD42 is also equipped with an optical power meter for average power monitoring through a pair of voltage outputs on the front panel. Power from 5 nW to 5 mW can be measured.

SD44 Optical-to-electrical Converter*¹

The SD44 is an optical-to-electrical (O/E) converter for use with the Tektronix CSA803 and 11800 Series sampling oscilloscopes equipped with an SD2x or SD3x Electrical Sampling Head. The SD44 Optical-to-electrical Converter can be plugged directly into a 11800 sampling slot, CSA803 power slot, or attached via a sampling head extender cable for remote use. The head extenders come in either 1 meter (012-1220-00) or 2 meter (012-1221-00) options.

Optical signal input on the SD44 is a standard FC/PC fiber optic connector. Other connector types can be accommodated by using hybrid fiber optic jumper cables (SA/SD42) or an assortment of hybrid mating adapters (SD44).

ORR-24 Optical Reference Receiver*¹

The Synchronous Data Hierarchy (SDH) and the Synchronous Optical NETWORK (SONET) standards are the cornerstones of today's high-speed digital telecommunications systems. The Tektronix ORR24 optical reference receiver

provides an important interface for compliance testing of SDH/SONET optical transmission products or components.

The amplified design of the ORR24 converts the incoming optical light into a high gain, low noise electrical signal. This allows easy testing of optical designs as well as repeatable measurements. The ORR24 is DC coupled which is required for accurate extinction ratio measurements.

*¹ For more information on this product, see the Telecommunications products section of this catalog. Selection Guide

	Channels	Bandwidth	Rise Time	Impedance	Noise	Applications (Typical)
SD14	2	3 GHz (typical)	140 ps	100 kilohm/0.5 pF 0.55 pF Opt. 01	2 mV	ECL, CMOS, ACL GaAs Dev. Characterization
SD20	1	20 GHz	17.5 ps	50 Ohm unterm.	750 μ V	Special TDR, Communications
SD22	2	12.5 GHz	28 ps	50 Ohm	450 μ V	Communications
SD24	2	20 GHz	17.5 ps	50 Ohm	750 μ V	TDR/TDT Crosstalk
SD26	2	20 GHz	17.5 ps	50 Ohm	750 μ V	Device Characterization
SD32	1	50 GHz	7.0 ps	50 Ohm	1.8 mV	High Bandwidth Communications & Microwave
SD42	1	6.4 GHz				Optical-to-electrical
SD44	1	15 GHz				Optical-to-electrical
ORR24	1	2.0 GHz	205 ps	50 Ohm		Optical Reference Receivers (SONET/SDH)