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Digital Sampling Oscilloscope

11801B

This product is no longer carried in our catalog.

Features

- DC to 50 GHz Bandwidth
- 7 ps Rise Time
- 8 Channels, Expandable to 136 (with SM-11)
- 10 fs Sampling Interval (0.01 ps)
- Modular Architecture
- 200 kS/s Sample Rate
- Dual Time Base
- Non-volatile Waveform and Setting Storage
- FFT
- Predefined Telecom Masks (Opt. 1T)
- TDR
- Automatic Measurements:
  - Jitter/Noise, Statistical
  - Histograms, Mask Testing
  - Pulse with Statistics
- Programmable for ATE Applications
- Color Display

Benefits

- Comprehensive Waveform Processing

Applications

- Semiconductor Testing
- TDR Characterization of Circuit Boards, IC Packages and Cables
Tektronix Measurement products are manufactured in ISO registered facilities.


For additional information or to order, contact your local Tektronix representative.

Sampling Heads

SD-14: 2.5 GHz high impedance (100 kilohm/0.475 pF) dual-channel probe sampler
SD-20: 20 GHz single-channel loop-through head
SD-22: 12.5 GHz dual-channel low noise head
SD-24: 20 GHz dual-channel TDR/sampling head
SD-26: 20 GHz dual-channel sampling head
SD-30: 40 GHz single-channel sampling head
SD-32: 50 GHz single-channel sampling head
SD-42: 6.4 GHz O/E converter (55 ps optical pulse response FWHM)
SD-46: 20 GHz O/E converter (22 ps optical pulse response FWHM)
SD-51: 20 GHz trigger head

Characteristics

Vertical System*

* Vertical system specifications of 11801B with SD-14 non-applicable. See 11800 Series Sampling Head specifications.

Rise Time/Bandwidth: Determined by the sampling head used.
Vertical Resolution: 8-Bits full screen (78 µV/LSB at 2 mV/div deflection factor).
Amplifier Gain Accuracy: ±1% of all settings.
Deflection Factors: 2 to 255 mV/div in 1 mV/div increments.
Offset Range: ±2 V.

Horizontal System
Main and Window Time Base: 1 ps/div to 5 ms/div, settable to 1-2-5 sequence or in 1 ps increments.

Record Length: 512, 1024, 2048, 4096, and 5120 samples.

Windows: Any number of window records may be placed on any number of main records, up to a maximum of eight displayed traces. All window records have the same duration, but may be independently positioned on any main record. Windows may be set to automatically track a moving edge on the main record.

Maximum Sample Rate: 200 kS/s.

Trigger System*

* 11801B external trigger requires 23 ns pre-trigger or DL 11 Delay Lines to view trigger point (45.5 ns with Option 1M).

Trigger Bandwidth: 3 GHz.

Trigger Sensitivity:
DC, 1X <=3 GHz: 100 mV;
AC, 1X 300 kHz to 3 GHz: 100 mV;
DC, 10X <=3 GHz: 1 V;
AC, 10X 300 kHz to 3 GHz: 1 V.

Delay Jitter: 1.3 ps +4 ppm of a position typical. 2.0 ps +5 ppm of position maximum (RMS).

Internal Clock: 100 kHz (drives TDR, Internal Clock Output, and Calibrator).

Trigger Level Range: ±1.0 V (±10 V with 10X trigger attenuator activated).

Trigger Input Range: ±1.5 V (+15 V, 5 V RMS maximum with 10X).

Trigger Holdoff: 5 µs to 2.5 second.

Measurement System

Waveform Processing Functions: Add, subtract, multiply, divide, absolute, average, differentiate, envelope, exponent, integrate, natural log, log, signum, square root, smoothing, and filter.

Measurement Set: Max, Min, Mid, P-P, Mean, RMS, Amplitude, Extinction Ratio, Overshoot, Undershoot, Noise*, Rise, Fall, Spectral Magnitude, Spectral Frequency, THD, SNR, Frequency, Period, Prop Delay, Cross, Width, Phase, Duty Cycle, Jitter*, Area +, Area -, and Energy. Measurements are constantly updated; mean and standard deviation available on all measurements.

* Available only in statistical measurement mode.

Measurement Parameters: (Proximal, mesial, distal, and start/stop levels): May be set to absolute levels.

Cursors: Paired or split dots, vertical bars, and horizontal bars.

TDR System (SD-24 only)

Combined TDR/Acquisition Reflected Rise Time: 35 ps or less.

TDR Step Amplitude: Adjustable to ±250 mV (polarity of either step may be inverted).
**Time Coincidence Between TDR Steps:** Adjustable to less than 1 ps.

**Source Resistance:** 50 ±0.5 ohm.

**Typical Aberrations:** (at ±250 mV Amplitude) 10 ns to 20 ps before step: +/-3% or less; Less than 300 ps after step: +10%, -5% or less; 300 ps to 5 ns after step: ±3% or less; Elsewhere: ±1% or less.

**CRT And Display Features**

**CRT:** 9 inch diagonal, magnetic deflection, vertical raster scan orientation. Color.

**Colors:** Eight-color default color set included; or colors are user-selectable from palette of 262,144 colors.

**Video Resolution:** 552 horizontal by 704 vertical displayed pixels.

**Power Requirements**

**Line-voltage Ranges:** 90 to 132 V_{RMS}, 180 to 250 V_{RMS}.

**Line Frequency:** 48 to 440 Hz.

**Maximum Power Consumption:** 214 W.

**Environmental And Safety**

**Temperature:**
- Operating: 0 to +50 degree C
- Nonoperating: -40 to +75 degree C.

**Humidity:**
- Operating and Nonoperating: up to 95% relative humidity, up to 50 degree C. Per MIL-T-28800E, Type III, Class 5.

**Altitude, Vibration, Shock Nonoperating, Bench Handling:** Meets MIL-T-28800E, Type III, Class 5.

**Electromagnetic Compatibility:** (with sampling heads or optional blank panels installed in all sampling head compartments) Meets the Requirements of: MIL-STD-461B; FCC Part 15, subpart J, Class A; VDE 0871/6.78 Class B.

**Safety:** Listed UL 1244, CSA Bulletin 556B September 1973.

**Time Base Accuracy - Typical Specifications**

**Range*, ** = Interval >/=1 ns:** Base: 4 ps + Interval Specification: 0.004%* Interval + Position Specification 0.0004%* Position

**Range*, ** = Interval =100 ps:** Base: 2.5 ps + Position Specification: 0.0004%* Position

**Range*, ** = Interval </=10 ps:** Base: 1 ps + Position Specification: 0.0004%* Position

* For intervals <100 ps, the above holds for time/div </=20 ps/div.

** For other intervals not listed above, linearly interpolate the cardinal points.

**Physical Characteristics**
11801B Cabinet:
Width: 448 mm (17.6 in.)
Height: 238 mm (9.4 in.)
Depth: 599 mm (23.6 in.)
Net Weight: 22.3 kg (49 lb.)
Shipping Weight: 25.9 kg (57 lb.)

SM-11 Cabinet:
Width: 448 mm (17.6 in.)
Height: 238 mm (9.4 in.)
Depth: 558 mm (22.0 in.)
Net Weight: 20.0 kg (44 lb.)
Shipping Weight: 23.6 kg (52 lb.)

11801B Rackmount:
Width: 483 mm (19.0 in.)
Height: 222 mm (8.8 in.)
Depth: 550 mm (21.6 in.)
Net Weight: 23.2 kg (51 lb.)
Shipping Weight: 26.8 kg (59 lb.)

SM-11 Rackmount:
Width: 483 mm (19.0 in.)
Height: 222 mm (8.8 in.)
Depth: 550 mm (21.6 in.)
Net Weight: 20.9 kg (46 lb.)
Shipping Weight: 24.5 kg (54 lb.)

Ordering Information

11801B Digital Sampling Oscilloscope
Includes: User Manual (070-8783-00), Programmer Manual (070-8784-00), Service Manual (070-8781-00), 12 inch SMA-SMA Cable, 2 ea. 8 1/2 inch SMA-SMA Cable, 1 Wrist Strap.

Opt. 1R: Rackmount

Opt. 1M: Multi-channel Conversion.
Modifies 11801B to permit operation with up to four SM-11 Multi-channel Units

Opt. 1T: Predefined Telecom Masks.
AutoMask offers 38 standards-defined masks in memory for instant recall.

International Power Plug Options

Opt. A2: United Kingdom 240 V, 50 Hz
Opt. A5: Switzerland 220 V, 50 Hz

Service Assurance Options

Opt. R2: Adds two years of post-warranty Repair Protection
Opt. C5: Adds five years of Calibration Services

Probes

50 ohm Divider (Z0) Probe: 9 GHz. Order P6150

Active Probes: (requires 1103 power supply)
10X, DC - 1 GHz, >/=10 Megohm Input Impedance, 1.9 pF. Order P6204
10X, DC - 4 GHz, >/=100 kilohm Input Impedance, 0.4 pF. Order P6217
1103 Power Supply

Current Probe: (requires BNC to SMA Adapter)
DC - 50 MHz, 0-20 A (DC + peak AC). Order AM 503S
DC - 15 MHz, 0-100 A (DC + peak AC). Order AM 503S Opt. 03.
25 kHz-1 GHz, Max Current of 0.5. A RMS. Order CT-1

Optical-to-Electrical Converters:
DC - 6.4 GHz, 1000-1700 nm. Order SD42
DC - 20 GHz, 1200-1650 nm. Order SD46
DC - 1 GHz, 1100-1700 nm. Order P6703A
DC - 700 MHz, 450-1050 nm. Order P6701A
DC - 300 MHz, 1000-1700 nm, High Gain. Order P6713
DC - 250 MHz, 450-1050 nm, High Gain. Order P6711

Cart

Order K465

Cables And Extenders

Sampling Head Extender Cable:
1 m. Order 012-1220-00
2 m. Order 012-1221-00

Additional Accessories

Power Strip: Four Outlet, 6 ft., Noise/Surge Suppression. Order 131-5342-01

SMA Accessory Kit:
2 ea. 2X and 5X Attenuators;
2 ea. SMA Terminations, Male Short Circuit, Female Short Circuit, Male 50 ohm, Female 50 ohm,
2 ea. 50 ohm Signal Cables (2 ns),
2 ea. 500 ps Semi-rigid Cable,
2 ea. Male-to-Male adapters,
2 ea. SMA Male-to-BNC Female,
2 ea. Female-to-Female, 1 ea. 50 ohm Power Divider,
1 ea. Combination Wrench (.312, 6 point). Order 020-1693-00

3.5 mm Accessory Kit:
1 ea. 50 ohm Reference Air Line,
1 ea. Male-to-Male Adapter,
1 ea. Female-to-Female Adapter,
1 ea. 26.5 GHz 50 ohm Terminator (Male),
1 ea. 26.5 GHz 50 ohm Terminator (Female),
1 ea. 26.5 GHz Short Circuit (Male),
1 ea. 26.5 GHz Short Circuit (Female),
2 ea. 50 ohm Attenuators (6 dB 26.5 GHz, 2.9 mm),
2 ea. 50 ohm Attenuators (20 dB 26.5 GHz, 2.9 mm),
1 ea. Power Divider (26.5 GHz, 2.9 mm),
2 ea. Flexible Signal Cables (2 ns, Male-to-Male),
2 ea. Signal Cables (500 ps, Male-to-Male, 2.9 mm Semi-rigid),
1 ea. Torque Wrench,
1 ea. Combination Wrench (0.312, 6 point),
1 ea. Combination Wrench (0.281, 6 point). Order 020-1692-00

**2X Attenuator:** SMA Male-to-Female. Order 015-1001-00

**5X Attenuator:** SMA Male-to-Female. Order 015-1002-00

**Power Divider:** Order 015-1014-00

**Blank Sampling Head:** Order 200-3395-00

**ECL Terminator:** Provides the bias and termination for ECL device outputs. At 10 GHz bandwidth and 1% precision attenuation, accurate AC and DC measurements are ensured. Attenuation: 10X ±1.0% @ DC, 20 dB ±3 dB, DC to 10 GHz Aberrations: ±3% max with 100 ps rise time. Order 015-0558-00

**DC Block (Coupling Capacitor):** Order 015-1013-00

**Slip-on Connector:** Order 015-0553-00

**Connector Savers:**
  (SMA) Order 015-0549-00
  (APC) Order 015-0552-00

**DL-11 Service Manual:** Order 070-7050-01

**SM-11 Service Manual:** Order 070-7049-01
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