

Nominal Traits

Nominal traits are described using simple statements of fact such as “Four, all identical” for the trait “Input Channels, Number of,” rather than in terms of limits that are performance requirements.

Table 1-2: Nominal Traits — Signal Acquisition System

Name	Description	
Bandwidth Selections	20 MHz, 100 MHz, and FULL (TDS 410 and TDS 420: 150 MHz, TDS 460: 350 MHz)	
Digitizers, Number of	TDS 410: Two, both identical TDS 420 and TDS 460: Four, all identical	
Digitized Bits, Number of	8 bits ¹	
Input Channels, Number of	TDS 410: Two, both identical, called CH 1 and CH 2 TDS 420 and TDS 460: Four, all identical, called CH 1 through CH 4	
Input Coupling	DC, AC, or GND	
Input Resistance Selections	1 MΩ or 50Ω	
Ranges, Offset, All Channels	Volts/Div Setting	Offset Range
	1 mV/div to 99.5 mV/div	±1 V
	100 mV/div to 995 mV/div	±10 V
	1 V/div to 10 V/div	±100 V
Range, Position	±5 divisions	
Range, Sensitivity ²	1 mV/div to 10 V/div	

¹Displayed vertically with 25 digitization levels (DLs) per division and 10.24 divisions dynamic range with zoom off. A DL is the smallest voltage level change resolved by the 8-bit A-D Converter, with the input scaled to the volts/division setting of the channel used. Expressed as a voltage, a DL is equal to 1/25 of a division times the volts/division setting.

²The sensitivity ranges from 1 mV/div to 10 V/div in a 1–2–5 sequence of coarse settings. Between consecutive coarse settings, the sensitivity can be finely adjusted with a resolution of 1% of the more sensitive setting. For example, between 50 mV/div and 100 mV/div, the volts/division can be set with 0.5 mV resolution.

Table 1-2: Nominal Traits — Signal Acquisition System (Cont.)

Name	Description	
Rise Time ³ (TDS 410 and TDS 420)	Volts/Div Setting	Rise Time
	5 mV/div–10 V/div	2.3 ns
	2 mV/div–4.98 mV/div	3.2 ns
	1 mV/div–1.99 mV/div	3.9 ns
Rise Time ³ (TDS 460)	Volts/Div Setting	Rise Time
	5 mV/div–10 V/div	1.0 ns
	2 mV/div–4.98 mV/div	1.4 ns
	1 mV/div–1.99 mV/div	3.5 ns

³Rise time is defined by the following formula:

$$\text{Rise Time (ns)} = \frac{350}{\text{BW (MHz)}}$$

Table 1-3: Nominal Traits — Time Base System

Name	Description
Range, Sample-Rate ^{1,3}	2.5 Samples/s to 100 MSamples/s
Range, Equivalent Time or Interpolated Waveform Rate ^{2,3}	200 MSamples/s to 50 GSamples/s
Range, Seconds/Division	1 ns/div to 20 s/div
Range, Time Base Delay Time	0 to 20 seconds (settings of 20 μ s and slower are displayed in roll mode)
Reference Frequency, Time Base	100 MHz
Record Length Selection	500 points, 1,000 points, 2,500 points, 5,000, and 15,000 points. Record lengths of 30,000 and 60,000 points are available with Option 1M. ⁴

¹The range of real-time rates, expressed in samples/second, at which a digitizer samples signals at its inputs and stores the samples in memory to produce a record of time-sequential samples

²The range of waveform rates for equivalent time or interpolated waveform records.

³The Waveform Rate (WR) is the equivalent sample rate of a waveform record. For a waveform record acquired by real-time sampling of a single acquisition, the waveform rate is the same as the real-time sample rate; for a waveform created by interpolation of real-time samples from a single acquisition or by equivalent-time sampling of multiple acquisitions, the waveform rate is faster than the real time sample rate. For all three cases, the waveform rate is 1/(Waveform Interval) for the waveform record, where the waveform interval (WI) is the time between the samples in the waveform record.

⁴The maximum record length of 60,000 points available with Option 1M is selectable with all acquisition modes except Hi Res and Average. In Hi Res and Average, the maximum record length is 15,000 points.

Table 1-4: Nominal Traits — Triggering System

Name	Description	
Range, Events Delay	1 to 9,999,999	
Ranges, Trigger Level or Threshold	Source	Range
	Any Channel	±12 divisions from center of screen
	Line	±400 Volts

Table 1-5: Nominal Traits — Display System

Name	Description
Video Display Resolution	640 pixels horizontally by 480 pixels vertically in a display area of 5.04 inches horizontally by 3.78 inches vertically
Waveform Display Graticule	A single graticule 401 × 501 pixels (8 × 10 divisions, with divisions that are 1 cm by 1 cm)
Waveform Display Grey Scale	16 levels in infinite-persistence and variable-persistence display styles

Table 1-6: Nominal Traits — Data Storage

Name	Description
Capacity, Nonvolatile Waveform Memory	Standard Instrument: Total capacity is 60,000 points. Option 1M Equipped Instrument: Total capacity is 60,000 points (one to four waveforms acquired with any combination of record lengths that add up to 60,000 points). For available record lengths, see "Record Length Selection" on page 1-8 of this section.
Capacity, Nonvolatile Setup Memory	Ten setups.
Batteries ¹ Required	Two lithium poly-carbon monofluoride. Both are type BR2/3A, UL listed. Both are rated at 3.0 volt, 1.2 amp-hour.

¹Batteries are not accessible from the outside of the instrument; therefore, they can only be replaced by a service technician.

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Table 1-7: Nominal Traits — GPIB Interface, Video Output, and Power Fuse

Name	Description
Interface, GPIB	GPIB interface complies with IEEE Std 488.1-1987 and IEEE Std 488.2-1987.
Output, Video	Provides a video signal, non-interlaced, with levels that comply with ANSI RS343A. For oscilloscopes SN B030099 and below, output is through a rear-panel DB-9 connector. For oscilloscopes SN B030100 and above, output is through a rear-panel DB-15 connector.
Fuse Rating	Either of two fuses ¹ may be used: a .25" × 1.25" (UL 198.6, 3AG): 5 A FAST, 250 V, or a 5 mm × 20 mm, (IEC 127): 4 A (T), 250 V.

¹Each fuse type requires its own fuse cap.

Table 1-8: Nominal Traits — Mechanical

Name	Description
Cooling Method	Forced-air circulation with no air filter.
Construction Material	Chassis parts constructed of aluminum alloy; front panel constructed of plastic laminate; circuit boards constructed of glass-laminate. Plastic parts are polycarbonate.
Finish Type	Tektronix Blue textured finish on aluminum cabinet.
Weight	Standard digitizing oscilloscope 8.6 kg (19.0 lbs), oscilloscope only. 10.2 kg (22.5 lbs), with front cover, accessories, and accessories pouch installed. 14.5 kg (32.0 lbs), when packaged for domestic shipment. Rackmount digitizing oscilloscope 8.2 kg (18.0 lbs) plus the weight of rackmount parts, for the rackmounted digitizing oscilloscope (Option 1R). 16.3 kg (36.0 lbs), when the rackmounted digitizing oscilloscope is packaged for domestic shipment. Rackmount conversion kit 4.5 kg (10.0 lbs), parts only; 7.9 kg (17.5 lbs), parts plus package for domestic shipping.

Table 1-8: Nominal Traits — Mechanical (Cont.)

Name	Description
Overall Dimensions	<p>Standard digitizing oscilloscope</p> <p>Height 191 mm (7.5 in), when feet and accessories pouch are installed. 165 mm (6.5 in), without the accessories pouch installed.</p> <p>Width 362 mm (14.25 in), with handle.</p> <p>Depth 471 mm (18.55 in), oscilloscope only; 490 mm (19.28 in), with optional front cover installed; 564 mm (22.2 in), with handle fully extended.</p> <p>Rackmount digitizing oscilloscope</p> <p>Height 178 mm (7.0 in).</p> <p>Width 483 mm (19.0 in).</p> <p>Depth 472 mm (18.6 in), without front-panel handles; 517 mm (20.35 in), with front-panel handles installed.</p>