Appendix A: Specifications

This appendix contains complete specifications for the TDS 340, TDS 360, and TDS 380. The specifications are divided into three subsections, one for each of three classes of traits: *Warranted Characteristics, Typical Characteristics,* and *Nominal Traits.*

Warranted Characteristics

Warranted characteristics are described in terms of quantifiable performance limits that are warranted. This subsection lists only warranted characteristics.

NOTE. *In these tables, those warranted characteristics that are checked in the* Performance Tests, *starting on page B–5, appear in* ***boldface type*** *under the column* **Name**.

Performance Conditions

The electrical characteristics found in these tables of warranted characteristics apply when the oscilloscope has been adjusted at an ambient temperature between +20° C and +30° C, has had a warm-up period of at least 20 minutes, and is operating at an ambient temperature between –10° C and +55° C (unless otherwise noted).

Table A–1: Warranted characteristics — signal acquisition system

Name	Description	
Accuracy, DC Voltage Measurement, Average Acquisition Mode	**Measurement type**	**DC accuracy**
	Average of ≥16 waveforms	±(2.0% × |(reading – Net Offset[1])| + Offset Accuracy + 0.1 div)
	Delta volts between any two averages of ≥16 waveforms acquired under the same setup and ambient conditions	±(2.0% × |reading| + 0.15 div + 0.3 mV)
Accuracy, DC Gain, Sample or Average Acquisition Modes	±2%	
Pulse Response, Peak Detect and Envelope Mode	**Sec/Div setting**	**Minimum pulse width**
	5 s/div – 25 µs/div	10 ns
	TDS 340: 10 µs/div – 5 ns/div TDS 360: 10 µs/div – 2.5 ns/div TDS 380: 10 µs/div – 1 ns/div	The greater of 10 ns or .02 × sec/div setting

Table A–1: Warranted characteristics — signal acquisition system (Cont.)

Name	Description	
Accuracy, Offset	**Volts/Div setting**	**Offset accuracy**
	2 mV/div – 99.5 mV/div	±(0.4% × |Net Offset[1]| + 3 mV + 0.1 div × V/div setting)
	100 mV/div – 995 mV/div	±(0.4% × |Net Offset[1]| + 30 mV + 0.1 div × V/div setting)
	1 V/div – 10 V/div	±(0.4% × |Net Offset[1]| + 300 mV + 0.1 div × V/div setting)
Analog Bandwidth, DC Coupled	TDS 340: DC – ≥100 MHz TDS 360: DC – ≥200 MHz; DC – ≥180 MHz for 2 mV/div TDS 380: DC – ≥400 MHz; DC – ≥250 MHz for 2 mV/div	
Cross Talk (Channel Isolation)	≥100:1 at 50 MHz with equal Volts/Div settings on each channel	
Input Impedance, DC-Coupled	TDS 340: 1 MΩ ±1% in parallel with 20 pF ±2.0 pF TDS 360: 1 MΩ ±1% in parallel with 20 pF ±2.0 pF TDS 380: 1 MΩ ±1% in parallel with 12 pF ±2.0 pF	
Input Voltage, Maximum	±300 V (DC or AC) CAT II; derate at 20 dB/decade above 100 kHz to 13 V peak AC at 3 MHz and above	
Lower Frequency Limit, AC Coupled[2]	≤10 Hz	

1 **Net Offset = Offset – (Position × Volts/Div). Net offset is the voltage level at the center of the A-D converter dynamic range. Offset Accuracy is the accuracy of this voltage level.**

2 **The AC Coupled Lower Frequency Limits are reduced by a factor of 10 when 10X, passive probes are used.**

Table A–2: Warranted characteristics — time base system

Name	Description
Accuracy, Long Term Sample Rate and Delay Time	±100 ppm over any ≥1 ms interval
Accuracy, Delta Time Measurements[1, 2]	For single-shot acquisitions using sample acquisition mode and a bandwidth limit setting of FULL: ±(1 WI + 100 ppm × |Reading| + 0.6 ns) For repetitive acquisitions using average acquisition mode with ≥16 averages and a bandwidth limit setting of FULL: ±(1 WI + 100 ppm × |Reading| + 0.4 ns)

1 **For input signals ≥5 divisions in amplitude and a slew rate of ≥2.0 divisions/ns at the delta time measurement points. Signal must be acquired at a volts/division setting ≥5 mV/division.**

2 **The WI (waveform interval) is the time between the samples in the waveform record. Also, see the footnotes for *Sample Rate Range* and *Equivalent Time or Interpolated Waveform Rates* in Table A–11 on page A–8.**

Table A–3: Warranted characteristics — triggering system

Name	Description	
Accuracy, Trigger Level, DC Coupled	**Trigger source**	**Sensitivity**
	CH1 or CH2	±(3% of |Setting – Net Offset[1]| + 0.2 div × volts/div setting + Offset Accuracy)
	External	±(6% of |Setting| + 20 mV)
	External/10	±(6% of |Setting| + 200 mV)
Sensitivity, Edge-Type Trigger, DC Coupled	**Trigger source**	**Sensitivity**
	CH1 or CH2	TDS 340: 0.35 division from DC to 20 MHz, increasing to 1 div at 100 MHz TDS 360: 0.35 division from DC to 50 MHz, increasing to 1 div at 200 MHz TDS 380: 0.35 division from DC to 50 MHz, increasing to 1 div at 400 MHz
	External	TDS 340: 50 mV from DC to 20 MHz, increasing to 150 mV at 100 MHz TDS 360: 50 mV from DC to 50 MHz, increasing to 150 mV at 200 MHz TDS 380: 50 mV from DC to 50 MHz, increasing to 500 mV at 400 MHz
	External/10	TDS 340: 500 mV from DC to 20 MHz, increasing to 1.5 V at 100 MHz TDS 360: 500 mV from DC to 50 MHz, increasing to 1.5 V at 200 MHz TDS 380: 500 mV from DC to 50 MHz, increasing to 5.0 V at 400 MHz
Input Impedance, External Trigger	1 MΩ ±2% in parallel with 20 pF ±2 pF	
Maximum Input Voltage, External Trigger	±300 V (DC or AC) CAT II; derate at 20 dB/decade above 100 kHz to 13 V peak AC at 3 MHz and above	

1 **Net Offset = Offset – (Position × Volts/Div). Net Offset is the voltage level at the center of the A-D converter dynamic range. Offset Accuracy is the accuracy of this voltage level.**

Table A–4: Power Requirements

Name	Description
Source Voltage and Frequency	90 to 132 VAC_{RMS}, continuous range, for 47 Hz through 440 Hz 132 to 250 VAC_{RMS}, continuous range, for 47 Hz through 63 Hz
Power Consumption	≤65 Watts (120 VA)

Table A–5: Warranted characteristics — environmental

Name	Description
Atmospherics (TDS 340)	Temperature: –10° C to +55° C, operating; –51° C to +71° C, non-operating Relative humidity: to 95%, at or below +40° C, or to 75% from +41° C to +55° C Altitude: To 15,000 ft (4570 m), operating; to 40,000 ft (12190 m), non-operating
Atmospherics (TDS 360 or TDS 380)	Temperature without diskette in floppy disk drive: +4° C to +50° C, operating; –22° C to +60° C, non-operating Temperature with diskette in floppy disk drive: +10° C to +50° C, operating or non-operating Relative humidity without diskette in floppy disk drive: to 80% at or below +29° C, or to 20% from +30° C to +50° C, operating; to 90% at or below +40° C, or to 5% from +41° C to +50° C, non-operating; Relative humidity with diskette in floppy disk drive: to 80% at or below +29° C, or to 20% from +30° C to +50° C, operating or non-operating Altitude: To 15,000 ft (4570 m), operating; to 40,000 ft (12190 m), non-operating
Dynamics	Random vibration without diskette in floppy disk drive: 0.31 g_{RMS}, from 5 to 500 Hz, 10 minutes each axis, operating; 2.46 g_{RMS}, from 5 to 500 Hz, 10 minutes each axis, non-operating