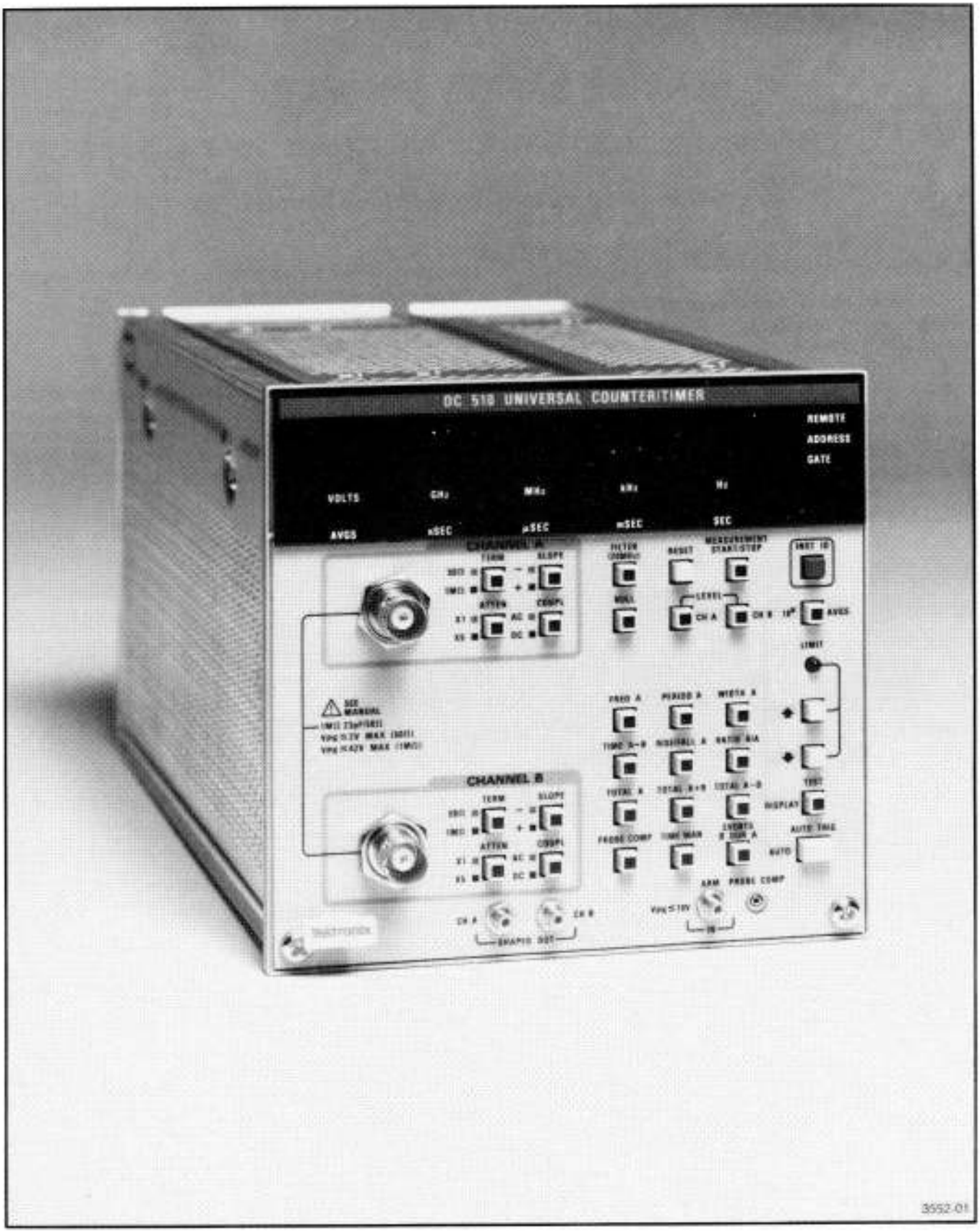

DC 510 Universal Counter/Timer.

SPECIFICATION

Instrument Description

The TEKTRONIX DC 510 is a universal counter/timer plug-in. It features reciprocal Frequency, Period, Ratio, and Events B During A measurements to 350 MHz. For timing measurements, the Time Interval, Width, Risetime and Falltime functions feature 3.125 nsec single-shot resolution. For these measurements, averaging and identical A and B channels provide increased accuracy. Also included is a time manual mode, as well as three 350 MHz Totalize modes (A, A+B, and A−B). The DC 510 also has an auto-trigger feature, a probe-compensation feature, an auto averages function, and an extensive set of automatic power-up self tests.

The DC 510 has a DVM mode that reads out the channel A and channel B trigger level voltages. Shaped outputs and an arming input are available at the front panel. Also available at the front panel is a signal for use with the probe compensation function.

The DC 510 can be equipped with an optional, oven-controlled, 10 MHz crystal oscillator to obtain an even more stable and precise internal time base.

A GPIB conversion kit (Field Modification Kit 040-1023-00) for the DC 510 is available from Tektronix, Inc.

Instrument Options

Option 01 replaces the internal 10 MHz time base (clock) circuit with a self-contained proportional temperature controlled oven oscillator for increased accuracy and stability.

Standard Accessories

1 Instruction Manual

1 Cable Assembly, bnc-to-slide on connector

1 Reference Guide

NOTE

Refer to the tabbed Accessories page at the rear of this manual for more information.

Performance Conditions

The limits stated in the Performance Requirements columns of the following tables are valid only if the DC 510 has been calibrated at an ambient temperature between +20°C and +30°C and is operating at an ambient temperature between 0°C and +50°C, unless otherwise stated.

Information given in the Supplemental Information and Description columns of the following tables is provided for user information only and should not be interpreted as Performance Check requirements.

The DC 510 must be operated or stored in an environment whose limits are described under Environmental Characteristics.

Allow at least 30 minutes warm-up time for operation to specified accuracy, 60 minuites after storage in a high-humidity environment.

Safety Certification

This instrument is listed with Underwriters Laboratories, Inc. under UL Standard 1244 (Electrical and Electronic Measuring and Testing Equipment).

Table 1-1
ELECTRICAL CHARACTERISTICS

Characteristics		Performance Requirements		Supplemental Information
CHANNEL A and CHANNEL B INPUTS (also see Rise/Fall MEASUREMENT MODE INPUT SPECIFICATION)				
Input Frequency Range				
Coupling		50 Ω	1 MΩ	
DC		>0 to ⩾350 MHz	>0 to ⩾300 MHz	
AC		100 kHz to ⩾350 MHz	16 Hz to ⩾300 MHz	
Input Sensitivity				1 MΩ performance is from a 25 Ω source impedance.
Sinewave		50 Ω (Term low)	1 MΩ (Term high)	
Coupling	Attenuation			Typical sensitivity is 50 mV p-p ±20 mV.
DC	X1	⩽25 mV rms	⩽25 mV rms to 200 MHz ⩽42 mV rms from 200 MHz to 300 MHz	
		⩽70 mV p-p pulse	⩽70 mV p-p pulse (<200 MHz)	
	X5	⩽125 mV rms	⩽125 mV rms to 200 MHz ⩽210 mV rms from 200 MHz to 300 MHz	
		⩽350 mV p-p pulse	⩽350 mV p-p pulse	
AC	X1	⩽25 mV rms	⩽25 mV rms to 200 MHz 42 mV rms to 300 MHz	
		+3 dB at ⩽100 kHz	+3 dB at ⩽16 Hz	
		⩽70 mV p-p pulse	⩽70 mV p-p pulse (<200 MHz)	
	X5	⩽125 mV rms	⩽125 mV rms to 200 MHz 210 mV rms to 300 MHz	
		+3 dB at ⩽100 kHz	+3 dB at ⩽16 Hz	
		⩽350 mV p-p pulse	⩽350 mV p-p pulse (⩽200 MHz)	
Dynamic Range				
Attenuation				
X1				70 mV p-p to 4 V p-p
X5				350 mV p-p to 20 V p-p
Trigger Level Range				
Attenuator				
X1		⩾+2 V to ⩽−2 V		In approximately 4 mV steps.
X5		⩾+10 V to ⩽−10 V		In approximately 20 mV steps.
Trigger Level Accuracy		±1% of full scale trigger level range, plus ±2% of reading for a dc input voltage.		Trigger level is calibrated in + slope and is firmware compensated in − slope.

Table 1-1 (cont)

Characteristics		Performance Requirements	Supplemental Information
CHANNEL A and CHANNEL B INPUTS (also see Rise/Fall MEASUREMENT MODE INPUT SPECIFICATION) (cont)			
Auto Trigger Range (A or B)		10 Hz to ≥350 MHz Minimum signal required for Auto Trigger is 100 mV p-p.In Ratio mode, with Channel B frequency ≥200 MHz, the Auto Trigger will provide a CHA B level within ±24 mV of the 50% point.	Trigger point is set (once) to a nominal 50% of the p-p input signal. For signals dc to 10 Hz (inclusive), level will still be set between 0% and 100%, but not necessarily near 50%. A ten-bit DAC is used, giving nominal 4 mV steps (X attenuation factor).
Operating Range Attenuation X1		+2 V to −2 V (dc + peak ac)	
X5		+10 V to −10 V (dc + peak ac)	
AC Coupling		50 Ω input dc ≤ ±2 V (dc plus peak ac) times attenuator 1 MΩ input ≤42 V dc + peak ac	
Maximum Allowable Input (Damage Level)			In 50 Ω input mode, 50 Ω overvoltage protection trips in 1 M input impedance for signals greater than approximately ±2 V times attenuator dc + peak ac to 200 kHz.
Attenuation	Impedance		
X1	50 Ω	V_{pk} ≤2 V	dc to 350 MHz
	1 MΩ		±42 V dc + peak ac, dc to 200 kHz ±2 V dc + peak ac, 2 MHz to 300 MHz
X5	50 Ω	V_{pk} ≤10 V	±10 V dc + peak ac, dc to 350 MHz
	1 MΩ		±42 V dc + peak ac, dc to 1 MHz ±10 V dc + peak ac, 1 MHz to 300 MHz
Input Impedance	50 Ω	50 Ω approximately ±3% dc	VSWR approximately 1.5:1, dc to 350 MHz
	50 Ω ac		Bleeder resistor results in ≈390 kΩ dc input resistance.
	1 MΩ	1 MΩ approximately ±1% 23 pF approximately ±10% (2.2 pF)	For inputs greater than ±5 Vdc + peak ac, input impedance becomes approximately 300 kΩ 1000 pF, X1. Input C from X1 to X5 are equal by approximately ±1%.

Table 1-1 (cont)

Characteristics	Performance Requirements		Supplemental Information
CHANNEL A and CHANNEL B INPUTS (also see Rise/Fall MEASUREMENT MODE INPUT SPECIFICATION) (cont)			
Bandwidth Limit			Above 20 MHz minimum signal increases 40 dB/decade to ≈1 V p-p. Above approximately 80 MHz no amount of input signal can cause triggering.
Channel Isolation, Crosstalk			A ≤4 volt p-p signal into CH A will not cause triggering in CH B and vice versa.
RISE/FALL MEASUREMENT MODE INPUT SPECIFICATION			
Range	50 Ω	1 MΩ	In this mode, the input amplifiers are commoned to the CH A bnc. CH B bnc is an open circuit.
Coupling			
DC	4.0 nsec to 2.5×10^4 sec	5 nsec to 2.5×10^4 sec	
AC	4.0 nsec to 18 μsec	5 nsec to 22 msec	AC measurements near the slower limit are not recommended, because they become duty cycle dependent.
Frequency	50 Ω	1 MΩ	Upper frequency limit is essentially a limit on the repetition rate at which rise/fall edges may occur.
DC	>0 to >80 MHz	>0 to >80 MHz	
AC	100 kHz to >80 MHz	16 Hz to >80 MHz	
Input Sensitivity	50 Ω	1 MΩ	1 MΩ response is from 25 Ω source impedance.
Coupling / Attenuation			
DC, X1	50 mV rms 140 mV p-p pulse	25 mV rms 70 mV p-p pulse	Both channel modes set the same.
DC, X5	250 mV rms 700 mV p-p pulse	125 mV rms 350 mV p-p pulse	50 Ω input impedance is maintained via an internal power-splitter causing X2 attenuation.
AC, X1	50 mV rms +3 dB at 20 kHz 140 mV p-p pulse	25 mV rms +3 dB at 16 Hz 70 mV p-p pulse	These specifications apply when both channels have the same setup.
AC, X5	250 mV rms +3 dB at 20 kHz 700 mV p-p pulse	125 mV rms +3 dB at 16 Hz 350 mV p-p pulse	

Table 1-1 (cont)

Characteristics		Performance Requirements		Supplemental Information
RISE/FALL MEASUREMENT MODE INPUT SPECIFICATION (cont)				
Dynamic Range				
		50 Ω	1 MΩ	
Attenuation	X1	140 mV p-p to 8 V p-p	70 mV p-p to 4 V p-p	Maxima are centered at zero volts. Minimum measurable rise/fall signal amplitude is ten times greater than minimum dynamic range.
	X5	700 mV p-p to 10 V p-p	350 mV p-p to 20 V p-p	
Trigger Level Range				50 Ω, ×5, only ±5 V of the trigger level range is usable because only ±5 V is allowed as an input.
		50 Ω	1 MΩ	
Attenuation	X1	+4 V to −4 V ≈8 mV steps	+2 V to −2 V ≈4 mV steps	When using 50 Ω input mode, the displayed trigger level is 1/2 true trigger level due to 50 Ω power splitter divider action.
	X5	(+5 V to −5 V) +20 V to −20 V ≈40 mV steps	+10 V to −10 V ≈20 mV steps	
Operating Range				For 10% and 90% trigger point. For inputs less than minimum, 10% and 90% points are not achievable due to sensitivity. Mimimum signal is 10 times minimum dynamic range.
Attenuation		50 Ω	1 MΩ	
	X1	1.4 V p-p minimum, +4 V to −4 V dc + peak ac max	700 mV p-p minimum, +2 V to −2 V dc + peak ac max	
	X5	7.0 V p-p minimum, +5 V to −5 V dc + peak ac max	3.5 V p-p minimum, +10 V to −10 V dc + peak ac max	
Maximum Allowable Input (Damage Level)				
Attenuation	Impedance			
X1	50 Ω			±4 V dc + peak ac, dc to 80 MHz
	1 MΩ			See CHANNEL A and CHANNEL B inputs
X5	50 Ω			±5 V dc + peak ac, dc to 80 MHz[a]
	1 mΩ			See CHANNEL A and CHANNEL B inputs
Input Impedance Channel A				Channel B is an open circuit.
	1 MΩ	500 kΩ, ±2% 47 pF, ±10%		X5 probe becomes X9 X10 probe becomes X19
	50 Ω	50 Ω, ±3%		

Table 1-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
	GENERAL	
Probe Compensation Output Jack		5 V p-p nominal. 110 Hz nominal. 1 ms width nominal.
Arming Input Required Signal Input	low ≤0.4 volts high ≥2.4 volts (TTL)	Maximum voltage V_{pk} <10 volts.
Pulse Response	Pulse width ≥100 ns	
Shaped Output		≥100 mV typically to 350 MHz into 50 Ω load. Delay from front-panel input to shaped output. CH A 7.2 nsec typically CH B 7.0 nsec typically CH B commoned from CH A 7.6 nsec typically.
External Clock Input	≥500 mV rms into 1 kΩ (ac coupled) 1, 5, or 10 MHz	
10 MHz Clock Output	low ≤0.4 V high ≥2.4 V (TTL) (pins 15B and 15A (gnd))	Drives 1 TTL load.
Phase Modulated Clock (time interval functions)		≥3 ns p-p jitter induced onto 1 MHz reference. (Test point on rear of Auxiliary board.)
	STANDARD INTERNAL TIME BASE	
Frequency at calibration	10 MHz $\pm 1 \times 10^{-7}$	10 MHz
Error Terms Temperature Stability (0°C to +50°C)	$\pm 5 \times 10^{-6}$	
Aging	$\leq 1 \times 10^{-6}$/year	
Adjustment Resolution	$\pm 5 \times 10^{-8}$	

Table 1-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
OPTIONAL INTERNAL TIME BASE		
Frequency at calibration	10 MHz $\pm 2 \times 10^{-8}$	With proportional oven
Error terms:		
Temperature Stability (0°C to +50°C)	$\pm 2 \times 10^{-7}$ after warmup	
Warm-up Time	Within $\pm 2 \times 10^{-7}$ of final frequency in less than 10 minutes when cold started at 25°C ambient.	
Aging		
At time of shipping	1×10^{-8}/day maximum.	
After 30 days of continuous operation	4×10^{-8}/week maximum	
After 60 days of continuous operation.	$<1 \times 10^{-6}$/year maximum	
Short Term Stability		$\leqslant 1 \times 10^{-9}$ rms based on 60 consecutive 1 second measurements.
Adjustment Resolution	$\pm 2 \times 10^{-8}$	
Adjustment Range		Sufficient for 8 years of aging.
FUNCTIONS		
Frequency A		
Range	$\leqslant 36$ μHz to $\geqslant 350$ MHz	
Resolution		$\pm$LSD $\pm 1.4 \times \frac{\text{Trigger Jitter Error}}{N}$ X (Freq. A)^2
Accuracy		Resolution $\pm$(Timebase Error $\times$ Freq. A)
Period A		
Range	3.125 ns to 7.6 hours	
Repetition Rate	$\geqslant 350$ MHz	
Clock Period Counted		3.125 ns
Resolution		$\pm$LSD[b] $\pm \frac{1.4 \times \text{B Trig Jitter Error}}{N}$
Accuracy		Resolution $\pm$(Timebase Error) $\times$ Period A

Table 1-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
	FUNCTIONS (cont)	
Ratio B/A		Averaged by A
Range	10^{-8} to 10^{9} with correct decimal point displayed. (10^{-11} to 10^{12} without decimal point.)	
Frequency Range (A & B)	≤36 μHz to ≥350 MHz	
Resolution		$\pm LSD \pm \frac{1.4 \times B\ Trig\ Jitter\ Error \times Freq.\ B}{N}$
Accuracy		Same as Resolution
Time A → B		
Range	2.0 nsec[c] to 7.6 hours	
Resolution		$\pm LSD + \frac{1}{\sqrt{N}}$ (±A Trigger Jitter Error ±B Trigger Jitter Error)
Accuracy		Resolution ±(Timebase Error × Time Interval) ±Channel Delay Mismatch[d] + B Trigger slew error-A Trigger slew error
Clock Period counted		3.125 nsec
Minimum Time A → B	0.0 ± 2.0 nsec[c]	
Minimum Time B → A	≤12.5 nsec	(≥70 MHz Rep. Rate)
Channel Delay Mismatch		
Internal	≤2 nsec nominal, without null	
Front Panel (Shaped Out)		≤500 ps
Events B Dur A		Averaged by A
Range	10^{-8} to 10^{9}	
Maximum B Frequency	≥350 MHz	
Maximum A Frequency	≥80 MHz	
Minimum A Pulse Width	≤4.0 nsec	
Minimum A Pulse Width	≤8.5 nsec	
Resolution		$+LSD + \frac{Freq\ B}{\sqrt{N}}$ (±A Start Trigger Jitter error ± A Stop Trigger Jitter Error)
Accuracy		Resolution + Freq B (Stop Slew Rate Error −Start Slew Rate Error) + Freq B × (5 ±2 nsec)

@

Table 1-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
	FUNCTIONS (cont)	
Width A		
Range	≤4 nsec to 7.6 hours	
Repetition Rate	≥80 MHz	
Resolution		$\pm$LSD + $\frac{1}{\sqrt{N}}$ ($\pm$Start edge Trigger Jitter Error $\pm$ Stop Edge Trigger Jitter Error)
Accuracy		Resolution $\pm$Timebase Error × Width A + (Stop Slew Rate − Start Slew Rate Error) $\pm$2 nsec
Clock period counted		3.125 nsec
Minimum Time Stop Edge to Start Edge	≤8.5 nsec	
Totalize A		
Range	0 to 10^9 counts	(to 8.7×10^{12} with no decimal point.)
Repetition Rate	0 to ≥350 MHz	See CHANNEL A and CHANNEL B INPUTS for pulse specifications.
Totalize[e] A+B		
Range	0 to 10^9 (A + B ≤10^9)	(to 8.7×10^{12} with no decimal point.)
Repetition Rate (A or B)	0 to ≥350 MHz	See CHANNEL A and CHANNEL B INPUTS for pulse specifications.
Totalize[e] A−B		
Range	-10^8 to 10^9	(-8.7×10^{12} to 8.7×10^{12} with no decimal point or minus indication.) Note: either A ≥10^{12} or B ≥^{12} will lead to overflow, independent of the value of (A−B). See CHANNEL A and CHANNEL B INPUTS for pulse specifications.
Rise/Fall A		
Range	4.0 ns → 7.6 hrs. (dc coupling) 50 Ω 5.0 ns → 7.6 hrs. (dc coupling) "1 MΩ".	Risetime of "1 MΩ" is ≈4.5 ns
Repetition Rate	Minimum time between rising (falling) edges is 12.5 ns (80 MHz)	
Trigger Points	Trigger levels are automatically set to the 90% and 10% points of the incoming signal, to a resolution that depends on the incoming signal amplitude.	In this mode Channels A and B are commoned. This changes the input characteristics. See RISE/FALL MEASUREMENT MODE INPUT SPECIFICATION.

Table 1-1 (cont)

Characteristics	Performance Requirements	Supplemental Information
FUNCTIONS (cont)		
Resolution		$\pm$LSD + $\frac{1}{\sqrt{N}}$ ($\pm$Start Trig Jitter Error $\pm$Stop Trigger Jitter Error)
Accuracy		Resolution $\pm$(Timebase Error $\times$ TI) $\pm$2 nsec $\pm$4 mV $\times$ slew rate A (near 10%) $\pm$4 mV $\times$ slew rate A (near 90%)
Time Manual		
Range	3.125 ns to 3.125 $\times$ 10^4 sec ($\approx$8 hours)	
Resolution		3.125 nsec clock is counted, but usable resolution is $\approx \pm$10 ms due to START/STOP buttons.
Probe Comp Accuracy		$\times$5 probe, 1.5% nominal. $\times$10 probe, 3% nominal. $\times$100 probe, 30% nominal.

Resolution and Accuracy Definitions

$$\text{Trigger Jitter Error (seconds rms)} = \frac{\sqrt{({}^{e}n^{1})^2 + ({}^{e}n^{2})^2}\ \text{Volts rms}}{\lvert\text{Input slew rate at trigger point}\rvert\ \text{(volts/sec)}}$$

where ${}^{e}n^{1}$ = 140 μV rms typical counter input noise for 1 MΩ filter on; 240 μV rms typical for 1 MΩ filter off; 340 μV rms typical for 50 Ω.

${}^{e}n^{2}$ = V rms noise voltage of users input signal at trigger point, measured with the appropriate bandwidth.

Note: Best usable resolution is $\pm$1 psec in Time Interval (TI) modes.

$$\text{Slew Rate Error (seconds)} = \frac{\text{*trigger level error (Volts)}}{\lvert\text{Input slew rate at trigger point}\rvert\ \text{(volts/sec)}}$$

*Trigger level error =

All functions except WIDTH A and EVENTS B DUR A	pos slope	trigger accuracy times attenuation factor
	neg slope	(trigger accuracy $\pm$10 mV) times attenuation factor
WIDTH A, ⎍	start edge	trigger accuracy times attenuation
	stop edge	factor (trigger accuracy + hyst) times attenuation factor
⎎	start edge	(trigger accuracy + hyst) times attenuation factor
	stop edge	trigger accuracy times attenuation factor

Table 1-1 (cont)

FUNCTIONS (cont)	
EVENTS B DUR A	Same as WIDTH A, except each number is multiplied by Freq B
Note:	Trigger Accuracy, (see CHANNEL A and CHANNEL B INPUTS) Input hysteresis is typically 50 mV p-p times attenuation, maximum 70 mV p-p times attenuation. Internal slew rate = 800 ps (50 Ω) 1.3 nsec (1 MΩ) 18 nsec (20 MHz filter)

N = Number of Averages

The minimum number of averages is selected by the AVERAGES button and the ▲ ▼ buttons in decade steps from 1 to 10^9. At Channel A repetition rates above approximately 250 Hz the actual number of averages will be:

$N \approx [\text{FREQ A (Hz)} \times 4 \text{ msec}] + \text{AVGS}$

N = AVGS setting (below 250 Hz)

This typically leads to better than expected resolution in the displayed answer for small N with only minimal impact on measurement time. Arming must be used when measuring only one event out of a pulse train (multiple events) with signals ≥250 Hz.

In the AUTO mode the counter measures with a fixed measurement time of about 300 msec (or the time for one event, whichever is greater).

$N \leq \text{Freq A (Hz)} \times .3 \text{ seconds (N always} \geq 1)$

LSD:

FREQ	$\frac{(\text{Freq A})^2}{N \times 3.2 \times 10^8}$
PER	$\leq$3.125 nsec for N $\leq$10, $\leq \frac{10 \text{ nsec}}{N}$ for N >10
RATIO	$\frac{\text{Freq A}}{\text{Freq B} \times N}$
TIME A→B & RISE/FALL A	$\leq$3.125 nsec for N $\leq$10, $\frac{10 \text{ nsec}}{\sqrt{N}}$ for N $\geq$10
WIDTH A	$\leq$3.125 nsec for N $\leq$10, $\frac{10 \text{ nsec}}{\sqrt{N}}$ for N > 10
EVENTS B DUR A	$\frac{\text{Period B}}{\text{Width A} \times N} \times$ Events B dur A

Time Base Error: The sum of all the errors specified for the time base used.

[a]Over voltage protection still functions, but in rise/fall, (50 Ω and ×5) it may not always protect the 25 Ω series input resistor.

[b]With 10^9 Averages selected, LSD can be 31.25 atto sec.

[c]Can be set to 0.0 ns by use of "NULL" function.

[d]Can be removed by use of "NULL".

[e]The B channel will not count events until after the first valid A channel count.

Table 1-2
MISCELLANEOUS

Characteristics	Description	
Power Requirements	TM 500 series power module	TM5000 series power module
DC 510	14.6 W	14.0 W
DC 510 Opt 01	18.9 W	18.2 W
Recommended Calibration Interval		2000 hours or 6 months whichever occurs first
Minimum Display Time		100 msec (typical)
Auto Averages Measurement Time		300 msec (typical)

Table 1-3
ENVIRONMENTAL[a]

Characteristics	Description	
Temperature		Meets MIL-T-28800B, class 5.
Operating	0°C to +50°C	
Non-operating	−55°C to +75°C	
Humidity	95% RH, 0°C to 30°C 75% RH to 40°C 45% RH to 50°C	Exceeds MIL-T-28800B, class 5.
Altitude		Exceeds MIL-T-28800B, class 5.
Operating	4.6 km (15,000 ft)	
Non-operating	15 km (50,000 ft)	
Vibration	0.38 mm (0.015") peak to peak, 5 Hz to 55 Hz, 75 minutes.	Exceeds MIL-T-28800B, class 5 when installed in qualified power modules.[b]
Shock	30 g's (1/2 sine), 11 ms duration, 3 shocks in each direction along 3 major axes, 18 total shocks.	Meets MIL-T-28800B, class 5 when installed in qualified power modules.[b]
Bench Handling[c]	12 drops from 45°, 4" or equilibrium, whichever occurs first.	Meets MIL-T-28800B, class 5.
Transportation[c]	Qualified under National Safe Transit Association Preshipment Test Procedures 1A-B-1 and 1A-B-2.	
EMC	Within limits of MIL-461A, with exceptions[d], and F.C.C. Regulations, Part 15, Subpart J, Class A. Unused plug-in compartments must be filled with blank plug-ins.	
Electrical Discharge	20 kV maximum charge applied to instrument case.	

[a]With power module.
[b]Refer to TM 5000-Series power module specifications.
[c]Without power module.
[d]Within 4 dB of REO2 at 130 MHz and 960 MHz. Within 8 dB of RE02 at 320 MHz.

Table 1-4
PHYSICAL CHARACTERISTICS

Characteristics	Description
Finish	Anodized aluminum chassis.
Net Weight (nominal)	
DC 510	3 lb. 5 oz.
Option 01	3 lb. 9 oz.
Nominal Overall Dimensions	
Height	126.0 mm (4.96 inches)
Width	134.5 mm (5.29 inches)
Length	278.8 mm (10.98 inches)
Enclosure Type and Style per MIL-T-28800B	
Type	III
Style	E (Style F in rackmount power module)