

DC 504A DP 501

Our lowest cost modular counter operating is extended to 1.3 GHz (as are all Tektronix counters) with the use of DP 501 prescaler.

DC 504A

- DC to 100 MHz
- Period and Period Averaging
- Width and Width Averaging
- Autoranging
- 100X Resolution Multiplier
- Single Wide Size

DP 501

- Extends Counter Frequency Measurement Capability to 1.3 GHz
- Compatible with Most TM 500 and TM 5000 Counters
- AGC
- Low-Level Indicator
- GPIB Programmability with DC 5009 and DC 5010
- Single Wide Size

Counter/Timer Digital Prescaler



DC 504A

DC 504A

The easy-to-use DC 504A Counter/Timer measures frequency from DC to 100 MHz, with an internal prescaler being used for frequencies above 10 MHz. Both direct and prescaled counting are done through the same input connector; no need to change connectors when changing frequency range. Autoranging permits virtual hands-off operation for most measurements. The 100X resolution multiplier automatically provides 0.01 Hz resolution in one second or 0.001 Hz resolution in ten seconds on signals from 10 Hz to 25 kHz.

The DC 504A features period and width averaging of up to 1000 events. Selectable DC coupling of the input eliminates the potential errors associated with making width measurements on signals of varying duty cycle with counters that are only AC coupled. Input trigger sensitivity is 30 mV RMS across the entire 100 MHz frequency range. The trigger-level range of ± 2 V and the selectable 5X attenuator provide a triggering range of up to ± 10 volts.

The totalize mode permits totalizing up to 999,999 events – and beyond, with overflow – with a Display Update-Run/Hold control to hold the display while the internal counter continues to advance.

Characteristics

Display – Six-digit LED readout with automatic decimal-point positioning and leading-zero suppression. LED annunciators indicate gate open, resolution multiplier lock, and display overflow.

INPUT

Frequency Range – Front Panel: DC coupled to 100 MHz. AC coupled is 10 Hz to 100 MHz. Rear Interface: DC coupled is 0 to 50 MHz. AC coupled is 10 Hz to 50 MHz.

Sensitivity – 1X Attenuation: 30 mV RMS sine wave to 100 MHz; 85 mVp-p (at a minimum pulse width at 5 ns). 5X attenuation accuracy is within 2% at DC.

Attenuation – Selectable 1X, 5X.

Impedance – Front Panel, 1X, 5X: 1 M Ω , paralleled by ≈ 25 pF. Rear Interface, 1X, 5X: 50 Ω $\pm 10\%$ at DC.

Dynamic Range – 1X: 2.0 Vp-p signal within a ± 2 VDC window. 5X: 10 V peak, ± 10 VDC.

Trigger Level Range – ± 2.0 V x attenuation minimum.

Maximum Input Voltage – Front Panel: 1X is 200 V peak; 400 Vp-p from DC to 50 kHz, derate to 15 Vp-p from 1.33 to 100 MHz. 5X is 200 V peak; 400 Vp-p from DC to 5 MHz, derate to 20 Vp-p at 100 MHz. Rear Interface: ≤ 4 V peak.

FREQUENCY TO 100 MHz

Gate Time (Resolution) – 10 ms to 10 s (1 kHz to 1 Hz), selectable in decade steps; or autoranging (10 ms to 1 s only).

Accuracy – ± 1 Count \pm Time Base Error x Freq.

Prescale Factor – $\times 10$.

PERIOD AVERAGE

Range – DC Coupled: 0 Hz to 2.5 MHz. AC Coupled: 10 Hz to 2.5 MHz.

Resolution – 100 to 0.1 ns, in decade steps; or autoranging (100 to 1 ns only).

Events Averaged (N) – 10^1 to 10^3 , in decade steps; or autoranging (10^0 to 10^3 only).

Accuracy –

$$\frac{\pm 100 \text{ ns}}{N} \pm \text{Time Base Error} \times \text{Period}$$

$$\pm 1.4 \times \left(\frac{\text{Trigger Jitter Error}}{N} \right)$$

To order, contact your local sales office (listed on the inside back cover) or call the National Marketing Center at 1-800-426-2200, Ext. 99.

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DC 504A
DP 501

DIGITAL COUNTERS

WIDTH AVERAGE

Range – DC Coupled: 200 ns to <10 sec. AC Coupled: 200 ns to 100 ms.

Resolution – 100 ns/√N

Events Averaged (N) – 100 to 103, selectable in decade steps; or autoranging (100 to 102 only).

Accuracy –

$$\frac{100 \text{ ns}}{\sqrt{N}} \pm \text{Time Base Error} \times \text{Width}$$

$$\pm \frac{\text{Start Trigger Jitter Error}}{\sqrt{N}}$$

$$+ \frac{\text{Stop Trigger Jitter Error}}{\sqrt{N}}$$

+ (Stop Slew Rate Error – Start Slew Rate Error) ±10 ns

TOTALIZE

Frequency Range – DC Coupled: >0 Hz to 10 MHz. AC Coupled: 10 Hz to 10 MHz. Overflows above 999,999. Display update Run/Hold will hold display while counter continues to advance. Releasing Run/Hold will update display to new value.

TIME BASE

Frequency (At Calibration) – 10 MHz ±1 × 10⁻⁷

Temperature Stability – ±5×10⁻⁸ (±5 ppm), 0 to +50°C.

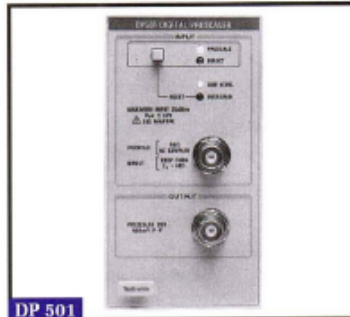
Adjustment Resolution – ±5×10⁻⁶

Aging Rate – ≤1×10⁻⁶/year (≤1 ppm/year).

External Time Base Input – 10 MHz.

RESOLUTION AND ACCURACY DEFINITIONS

Same as DC 503A except DC 504A has 100 MHz bandwidth and input hysteresis =30 mVp-p typical.



DP 501

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The DP 501 Digital Prescaler adds 1.3 GHz frequency-counting capability to most counters, though it was designed specifically for use with the DC 503A, DC 509/DC 5009, and the DC 5010/DC 510 Universal Counter/Timers.

The DP 501 is placed in the signal line between the source and the counter's signal input and can be operated in either the Direct or the Prescale mode. The +16 prescaling function can be activated manually, with a front panel pushbutton, or via the GPIB when used with the DC 5009 or DC 5010.

Input sensitivity in the Prescale mode is 20 mV RMS to 1 GHz and 30-mV RMS to 1.3 GHz. A Low-Level indicator alerts the user if the input signal amplitude is too low for error-free counting. An automatic gain-control circuit provides optimum immunity to signal noise in the Prescale mode.

Characteristics

PRESCALE MODE INPUT

Frequency Range – ≤100 MHz to ≥1.3 GHz.

Sensitivity – 100 MHz to 1 GHz is ≤20 mV RMS (-21 dBm). 1 to 1.3 GHz is ≤30 mV RMS (-17 dBm).

Impedance – 50 Ω, AC coupled; vswr ≤2.2:1.

Output – Amplitude into 50 Ω is ≤200 mVp-p. Underterminated is 2X terminated value.

DIRECT MODE INPUT

(Connected directly to output.)

Frequency Range – 0 to >350 MHz.

Impedance – Loop through characteristic impedance is 50 Ω; nonterminated capacitance ≈20 pF (no connection to output).

Output – Connected directly to input. <1 dB insertion loss up to 350 MHz. Powers up in direct mode.

GENERAL

Overload Protection – Prescale: Input disconnects when input signal exceeds +20 dBm ±5 dBm.

Damage Level – Prescale: Input may be damaged if signal level exceeds +25 dBm. Direct: 42 V peak maximum. Maximum current is 250 mA.

Input Attenuation – Automatic: Up to 40 dB range.

Low Level Indicator – Lights when input signal is below that required for error-free counting.

ORDERING INFORMATION

DC 504A	
Counter/Timer	\$845
Includes: Instruction Manual (070-4291-00).	
DP 501	
Digital Prescaler	\$995
Includes: Instruction Manual (070-4332-00).	

ACCESSORIES

See Accessory Section for compatible products.

WARRANTY-PLUS SERVICE OPTIONS

Opt. M7 – Calibration Service	
DC 504A	+\$55
DP 501	+\$65
Opt. M9 – Repair Protection	
DC 504A	+\$100
DP 501	+\$80

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