

# Counters

B+K PRECISION counters provide versatility and reliability for a broad spectrum of laboratory and service applications. In addition to frequency measurement, most B+K PRECISION counters also provide period and totalize measurement capabilities.

## COUNTER TERMS

**FREQUENCY RATIO**—Measurement of the frequency ratio of two different input signals as applied to two different input channels.

**PERIOD**—The time required for a single cycle of the input event to occur. Measured in seconds or fractions of a second and is the reciprocal of frequency. (i.e.,  $\text{Time} = 1/\text{Frequency}$ ).

**PERIOD AVERAGING**—Sampling a number of input periods and displaying the average of these sampled periods.

**PRESCALER**—A frequency divider circuit which extends the high frequency measurement capability of a counter.

**SENSITIVITY**—The lowest amplitude (strength) signal that the counter will count.

**TCXO**—Temperature Compensated Crystal Oscillator. The time base of the highest quality frequency counters is a TCXO, which provides high accuracy and stability.

**TIME BASE ACCURACY**—The accuracy of a counter is determined by the stability of its internal time base. Stability is measured in parts per million (ppm), while undergoing temperature and operating voltage variations.

**TIME INTERVAL**—Measurement of the time difference from the edge of one channel's input signal to the edge of another channel's input signal.

**TOTALIZE**—Continuous counting of the number of events that have occurred since the counter was reset.



**1803D**

## Model 1803D & 1804D

- Selectable gate times 0.1 sec and 1.0 sec
- 7 digit LED display
- High accuracy time display
- Compact bench top AC powered counter
- Wide measuring range up to:
  - 200MHz(model 1803D)
  - 1.0GHz(model 1804D)



**1875**

## Model 1875

- Handheld portable instrument for field use
- High sensitivity for VHF and UHF frequencies
- Wide measuring range up to 2.5GHz
- Data hold, Relative, and Memory (Max, Min, Average reading)

## Specifications

	models				
	1856C	1823	1803D	1804D	1875
Range	2.4GHz	175 MHz	200MHz	1.0GHz	2.5GHz
FUNCTIONS					
Frequency	√	√	√	√	√
Totalize	√	√			
Period	√	√			
Time Interval		√			
Ratio		√			
Time Base Stability	±0.1ppm	±0.1ppm	±0.1ppm	±0.1ppm	±4ppm
Best Resolution	0.1 Hz	0.1 Hz	1 Hz	1Hz	0.1 Hz
No. of Digits	8	8	7	7	8
Display Hold	√	√			
Low Pass Filter	√	√			
Sensitivity	10 mVrms	20 mVrms	25 mVrms	50mV	50mV
Remote Start-Stop	√	√			
Self Test	√	√			



**1823**

## Model 1823

- Eight-digit display provides up to 0.1 Hz resolution
- Period mode provides greater accuracy at low frequencies
- Ratio mode combines two input frequencies and displays their ratio
- Totalize mode and Time interval mode add versatility
- Large bright LED display
- Selectable attenuators and low-pass filter prevent miscounts due to input noise



**1856C**

## Model 1856C

- Wide measuring range up to 2.4GHz
- Bright eight-digit LED display
- Period mode for accurate low frequency measurement
- Totalize mode permits counting of individual events
- Accurate TCXO time base

# Counters

## Specifications

	1856C	1823	1803D	1804D	models 1875
<b>FREQUENCY</b>					
KHz MODE	5Hz to 10MHz sinewave	5Hz to 175MHz	10Hz to 25MHz sinewave	10Hz to 16MHz	10Hz to 10MHz
MHz MODE	5Hz to 100MHz sinewave	50kHz to 175MHz	10MHz to 200MHz sinewave	10MHz to 1.0 GHz	10MHz to 500Hz
	50MHz to 2.4GHz sinewave (prescale)	50MHz to 175MHz sinewave			100MHz to 2.5GHz
ACCURACY	±Time base accuracy +1 count	± 1 count ± 1 time base error	±Time base accuracy +1 count		±(4ppm + dgt)
<b>PERIOD CHARACTERISTICS</b>					
RANGE	0.285 $\mu$ s to 200,000 $\mu$ s	0.5 $\mu$ s to 200,000 $\mu$ s	Does not apply	Does not apply	10Hz to 10MHz
CONTROL	Manual reset and hold from the front panel START/STOP jack is low	Manual reset and hold from the front panel START/STOP jack is low			
<b>INPUT CHARACTERISTICS</b>					
SENSITIVITY	20 mV rms, 5Hz to 30 MHz, 50 mV rms above 100 MHz	20 mV rms, 5 Hz to 5 MHz 50 mV rms, 5 Hz to 125 MHz 100 mV rms, 125 MHz to 150 MHz 150 mV rms, 150 MHz to 175 MHz	25 mV rms, 5Hz to 30 MHz, 50 mV rms 30 MHz to 100 MHz	50mV (10Hz to 200MHz)	≤ 50mV, 5Hz - 100MHz ≤ 100mV, 100MHz - 120GHz
IMPEDANCE	1 M $\Omega$ (<40 pF)	1 M $\Omega$ (<40 pF)	Direct: 1M $\Omega$	HF=1M $\Omega$ , VHF=50 $\Omega$	1M $\Omega$
ATTENUATOR	X1/X10, switch selectable	X1/X10, switch selectable			High, Low on C channel
COUPLING	AC	AC	AC	AC	AC
FILTER	100 kHz, -3 dB switch selectable	10 kHz, -3 dB switch selectable			
<b>PRESCALE</b>					
SENSITIVITY	10 mV rms, 30 MHz, 50 MHz to 600 MHz, 25 mV rms, 600 MHz to 1.3 GHz, 50 mV 1.3 GHz to 2.4 GHz	Does not apply	Does not apply	Does not apply	Does not apply
IMPEDANCE	50 $\Omega$				
COUPLING	AC				
MAXIMUM INPUT	1 V rms				
TOTALIZE START/STOP INPUT					
<b>CHARACTERISTICS</b>					
LOGIC LEVELS	Standard TTL levels	Standard TTL levels			
LOADING	One standard TTL gate	One standard TTL gate			
<b>TIME BASE CHARACTERISTICS</b>					
STANDARD TYPE	TXCO	Crystal controlled oscillator	Crystal controlled oscillator		Crystal oscillator
FREQUENCY	10 MHz	10 MHz (INT, EXT)	10 MHz	5.24288MHz	4.194MHz
STABILITY	±0.1 ppm (±1 Hz)	±0.1 ppm (±1 Hz)	±0.1 ppm	±0.1 ppm	±4ppm + 1 dgt.
LINE VOLTAGE STABILITY	< ±0.1 ppm ±10% 10% line volt variation	Less 1 ppm with ± 10% line volt variation			
TEMPERATURE STABILITY	±10ppm (from 0°C to 40°C)	±1 ppm (from 0°C to 28°C) 0°C to 50°C ambient, ±0.5 ppm from 18°C to 28°C	< ±10 ppm from 0° to 50°C, 2 ppm 20°C to 30°C	< ±10 ppm from 0° to 50°C	0.1 ppm/°C
EXTERNAL TIME BASE INPUT		10 MHz, > 1.77V rms			
<b>DISPLAY CHARACTERISTICS</b>					
DISPLAY	0.56" seven segment LED - 8 digits	0.56" seven segment LED - 8 digits	0.43" seven segment LED - 7 digits	0.43" seven segment LED - 7 digits	0.5" (13mm) LCD, 8 digits
LED INDICATORS	For kHz, MHz, $\mu$ sSEC, Gate, and overflow indicators	For kHz, MHz, $\mu$ sSEC, Gate, and overflow indicators	N/A	N/A	N/A
<b>GENERAL</b>					
POWER REQUIREMENTS	120/220/240 VAC ± 10%, 50/60 Hz 12W	120/220/240 VAC ± 10%, Battery operation: 6AA	9VDC 300mA	7-10VDC with 800mA	4 x 1.5V AA batteries, optional AC/DC adapter
DIMENSIONS (H x W x D)	4.5 x 11.75 x 10.375" (114 x 298 x 264mm)	2.8 x 10.2 x 8.3" (71 x 261 x 211 mm)	2.1 x 9.06 x 6.18" (54 x 230 x 157mm)	2.1 x 9.06 x 6.18" (54 x 230 x 157mm)	6.8 x 3.1 x 1.4" (173 x 80 x 35 mm)
WEIGHT	3.98 lbs (1.8 kg)	3.98 lbs (1.8 kg)	24 oz (680 g)	24 oz (680 g)	12 oz (340 g)

## Accessories

**One Year Warranty**

SUPPLIED: Instruction Manual, all models; AC adapter for models 1803D &amp; 1804D

OPTIONAL:	AT-21 antenna kit,	AT-21 antenna kit,	AT-21 antenna Kit	AT-21 antenna Kit	9VDC 300mA AC/DC adapter, AT-20 antenna
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