

## Section IV

## SPECIFICATIONS

### FUNCTIONS

Frequency.	Period Average.
1.3 GHz Frequency	Totalize.
Prescaler. (1.3 GHz only)	Check (Self Test).
100 MHz Frequency	
Period.	

### FEATURES

8 Digits, 0.56".	2-Position Attenuator.
Low Pass Filter.	Remote Stop-Start.
Display Hold.	

### FREQUENCY CHARACTERISTICS

<b>Rege:</b>	5 Hz to 10 MHz sinewave, kHz mode.
<b>Channel A:</b>	5 Hz to 100 MHz sinewave, MHz mode.
<b>Channel B: (1.3 GHz only) (PRESCALE)</b>	80 MHz to 1.3 GHz (1300 MHz) sinewave.

**Accuracy:**  $\pm$  Time base accuracy,  $\pm$  1 count.

**Resolution:** 0.1 Hz to 100 Hz, kHz mode.

**Channel A:** 1 Hz to 1000 Hz, MHz mode.

**Channel B:  
(PRESCALE)  
(1.3 GHz only)**

10 Hz to 10 kHz.

**Display:** Input signal frequency with decimal point positioned by GATE switch.

Units of measurement (kHz, MHz) indicated on front panel by LED indicators and selected by front panel switches.

Number of Digits Displayed See Tables 1 and 2.

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	Number Of Significant Digits Displayed							
Gate Time	10 SEC		1 SEC		0.1 SEC		0.01SEC	
Resolution	.1 Hz	1 Hz	1 Hz	10 Hz	10 Hz	100 Hz	100 Hz	1000 Hz
Function Typical Frequency	kHz	MHz	kHz	MHz	kHz	MHz	kHz	MHz
100 MHz	—	8*	—	8	—	7	—	6
10 MHz	8*	8	8	7	7	6	6	5
1 MHz	8	7	7	6	6	5	5	4
100 kHz	7	6	6	5	5	4	4	3
10 kHz	6	5	5	4	4	3	3	2
1 kHz	5	4	4	3	3	2	2	1
100 Hz	4	3	3	2	2	1	1	—
10 Hz	3	2	2	1	1	—	—	—
5 Hz	2	1	1	—	—	—	—	—

\*= Overflow

**Table 1. Number of Significant Digits Displayed for Typical Frequencies  
for Channel A Input and kHz or MHz Frequency Modes.**

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	Number Of Significant Digits Displayed			
Gate Time	25.6/32 SEC	2.56/3.2 SEC	0.256/0.32 SEC	0.0256/0.032 SEC
Resolution Typical Frequency	10 Hz	100 Hz	1 kHz	10 kHz
80 MHz	7	6	5	4
150 MHz	8	7	6	5
520 MHz	8	7	6	5
1.3 GHz	8*	8	7	6

\* = Overflow

Table 2. Number of Significant Digits Displayed for Typical Frequencies for Channel B (PRESCALE) (1.3 GHz only)

## PERIOD CHARACTERISTICS

**Range:** 0.285  $\mu$ s to 200,000  $\mu$ s.

**Frequency Range:** 5 Hz to 3.5 MHz sine wave.

**Accuracy:**  $\pm 1$  count  $\pm$  time base error  $\pm$  trigger error\*

**Resolution:** 100 ps to 100 ns, switch selectable in four decade steps.

**Display:**  $\mu$ s with decimal point.

**Minimum Pulse**

**Width:** 250 ns.

**Number of Digits**

**Displayed:** See Table 3.

\*Note: Trigger error is typically  $\pm 0.3\%$  of reading divided by the number of cycles averaged, for input signals having better than 40 dB S/N ratio and greater than 100 mV amplitude.

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		Number Of Significant Digits Displayed			
	Gate (CHA)	0.01s	0.1s	1.0s	10s
	Resolution	0.1 $\mu$ s	0.01 $\mu$ s	0.001 $\mu$ s	0.0001 $\mu$ s
Typical Period	Corresponding Frequency	(1 Period Average)	(10 Period Average)	(100 Period Average)	(1000 Period Average)
0.285 $\mu$ s	3.5 MHz	1	2	3	4
1.0 $\mu$ s	1 MHz	2	3	4	5
10 $\mu$ s	100 kHz	3	4	5	6
100 $\mu$ s	10 kHz	4	5	6	7
1000 $\mu$ s	1 kHz	5	6	7	8
10,000 $\mu$ s	100 Hz	6	7	8	8*
100,000 $\mu$ s	10 Hz	7	8	8*	8*
200,000 $\mu$ s	5 MHz	7	8	8*	8*

\* = Overflow

Table 3. Number of Significant Digits Displayed for Typical Periods.

## TOTALIZE CHARACTERISTICS

**Range:** 5 Hz to 10 MHz sine wave.

**Capacity:** 0 to 99,999,999 plus overflow LED.

**Control:**

Manual reset and hold from the front panel. Normally enabled, except when signal at back panel START/STOP jack is low.

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### CHANNEL A INPUT CHARACTERISTICS (5 Hz to 100 MHz input)

Impedance:	1 M $\Omega$ resistance, shunted by 40 pF capacitance.
Connector:	BNC on front panel.
Coupling:	AC.
Sinewave	20 mV rms, 5 Hz to 30 MHz.
Sensitivity:	50 mV rms, 30 MHz to 100 MHz.
Maximum Input:	See Fig. 3.
Attenuator:	x1/x10, switch selectable.
Filter:	Low pass filter, — 3 dB point of 100 kHz, switch selectable.

### PRESCALE INPUT CHARACTERISTICS (80 MHz to 1.3 GHz input) (1.3 GHz only)

Impedance:	50 ohms.
Connector:	BNC on front panel.
Coupling:	AC.

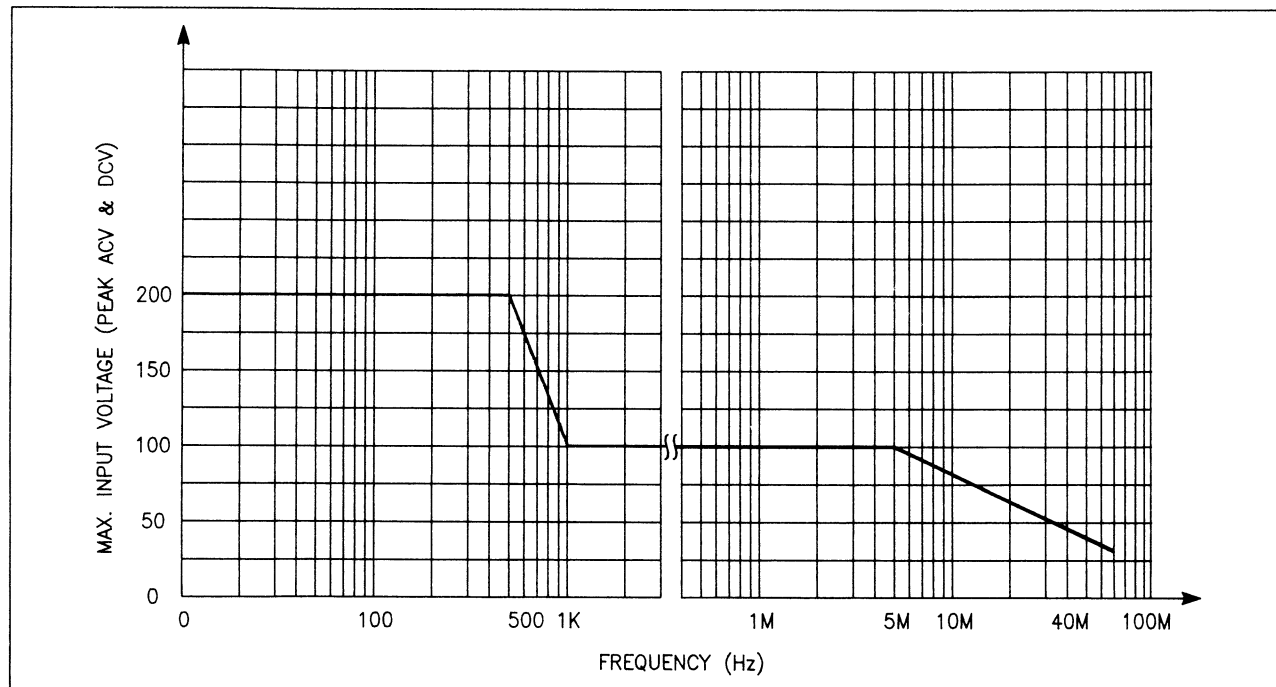
Sinewave	10 mV rms, 80 MHz to 600 MHz.
Sensitivity:	25 mV rms, 600 MHz to 1.0 GHz. 50 mV rms, 1.0 GHz to 1.3 GHz.
Maximum Input:	1 V rms.

### TOTALIZE START/STOP INPUT

Logic Levels:	Standard TTL levels; low level inhibits totalizing, high level enables it.
Loading:	One standard TTL gate.
Maximum Input:	5V DC peak.

### TIME BASE CHARACTERISTICS (STANDARD):

Type:	crystal-controlled oscillator
Frequency:	10 MHz.
Stability:	less than $\pm 10$ ppm (0 °C to 40 °C ) less than $\pm 1$ ppm (line voltage $\pm 10\%$ )
Maximum Aging Rate:	$\pm 1$ ppm/yr.



**Figure 3 Maximum Input Protection Derating Curve.**

**(Channel A Input)**

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**TIME BASE CHARACTERISTICS**

Type:	TCXO (temperature compensated crystal oscillator).
Frequency:	10 MHz.
Line Voltage Stability:	$\leq 0.1$ ppm with $\pm 10\%$ with line voltage variation.
Temperature Stability:	$\leq 0.0001\%$ ( $\pm 1$ ppm from 0 °C to 40 °C ambient).
Maximum Aging Rate:	$\pm 1$ ppm/year.

**DISPLAY CHARACTERISTICS**

Visual Display:	Eight 0.56" seven-segment digits with kHz, MHz, $\mu$ s, GATE, and OVERFLOW LED indicators.
OVERFLOW Indication:	LED indicator lights when count exceeds 99,999,999 during any selected gate time.
Display Update Time:	1. KHz and MHz FREQUENCY Mode: User

selected gate time plus fixed 200 ms interval.

2. Pre-scale Mode: User selected gate time plus fixed 640 ms interval.
3. PERiod Mode: User selected cycles averaging plus fixed 200 ms interval.
4. TOTALize Mode: Continuous.

**Resolution:**

Selectable in four steps as follows:

GATE		kHz		MHz	
Time:	Period	Frequency	Frequency	Prescale	
0.01s	0.1 $\mu$ s	100Hz	1000Hz	10kHz	
0.1s	0.01 $\mu$ s	10Hz	100Hz	1kHz	
1.0s	0.001 $\mu$ s	1Hz	10Hz	100Hz	
10s	0.0001 $\mu$ s	0.1Hz	1Hz	10Hz	

**RESET and HOLD Switches**

RESET:	Resets the display to zero.
HOLD:	In FREQUENCY and PERi-

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od modes, measurement in progress is stopped, and the last complete measurement is displayed. When HOLD is released, a new measurement begins. In TOTALize mode, counter is stopped but not reset, and the last count is displayed. When HOLD is released, count continues from where the counter stopped.

### GENERAL

<b>Power Requirements:</b>	100/120/220/240 VAC ( $\pm 10\%$ ), 50/60 Hz; 12 W.
<b>Dimensions (HxWxD):</b>	71 x 261 x 211 mm (2.8 x 10.3 x 8.3")
<b>Weight:</b>	1.8 kg (3.96 lbs).
<b>Temperature and Humidity:</b>	
<b>Operation:</b>	0 °C to + 40 °C $\leq$ 80% R.H.
<b>Storage:</b>	- 20 °C to + 60 °C $\leq$ 70% R.H.

### Standard Accessories:

Operator's manual, power cord.

### Optional Accessories:

EB-10: 3 feet, 50  $\Omega$  BNC to BNC coaxial cables  
EB-11: 3 feet, 50  $\Omega$  BNC to alligator clip coaxial cables  
EB-32: Carrying case