High-Performance VXI Universal Counter Agilent E1420B

Data Sheet

- **1-Slot, C-size, message based**
- **200 MHz frequency range, optional 2.5 GHz channel**
- **9-digit resolution in 1 second gate time**
- **2 ns time interval resolution (200 ps with averaging)**
- **Shared memory option configuration**
- **Phase measurement and measurement timeout**

Agilent E1420B

Description

The Agilent Technologies E1420B High-Performance Universal Counter is a **C-size, 1-slot, message-based VXI module.** It provides the full set of traditional universal counter measurements (frequency, period, time interval, totalize, and ratio), plus the automatic measurements of rise/fall time, pulse width, phase, and ac/dc voltages. Additionally, this module provides x10 attenuation, allowing measurements of higher-powered signals.

The E1420B is ideal for today's ATE applications requiring high speed in all phases of a measurement – setup, measure, and output. It can make up to 60 measurements per second of the same function. It can also sequence through a series of different functions at up to 40 measurements per second. For even faster measurements, the optional shared memory capability yields up to 160 measurements per second. This shared RAM option allows the E1420B to send measurement data to a VXI device with shared RAM. Data may be accessed by the controller, thus eliminating data formatting time and providing higher measurement throughput.

The E1420B features the industry standard SCPI interface language. SCPI will let you develop code that can easily be leveraged, increase the life of test software, and decrease the time spent learning new instrument languages.

Refer to the Agilent Technologies Website for instrument driver availability and downloading instructions, as well as for recent product updates, if applicable.

Outstanding Resolution and Range

The E1420B offers a 200 MHz frequency range (2.5 GHz with option 030) and 2 ns time interval resolution (200 ps with averaging). Rise and fall times can be measured automatically down to 15 ns.

Improve the System Clock Without Sacrificing Mainframe Space

An optional highly stable TCXO time-base is available for the E1420B. By externally driving the VXI system clock (CLK10) with this TCXO, you can substantially reduce system clock errors without losing valuable mainframe slots. This option improves measurement repeatability and accuracy.

Measurement Timing Control

For synchronizing your measurement to an external event, such as an RF burst, VXIbus and external triggering are available.

Programmable measurement time-outs help you optimize system performance even if the input signal is absent.

Single Measurement Auto-Trigger Speeds Measurements

Repetitive auto-trigger measurements are faster than ever with the E1420B's single measurement auto-trigger. This feature analyzes the input signal only once, setting the trigger levels, and speeding through the rest of the measurements.

Adjustable Sensitivity

Measuring low-level signals isn't a problem: the Agilent E1420B features 35 mV rms sensitivity to 200 MHz. When noise is a problem, this sensitivity can be decreased to 100 mV rms by using hysteresis control.

Optional 2.5 GHz Channel (Input 3)

Increase your frequency range to 2.5 GHz for communications and navigation applications.

Save on Software Costs with SCPI

The E1420B features the industry standard SCPI interface language. SCPI will let you develop code that can easily be leveraged, increase the life of test software, and decrease the time spent learning new instrument languages. SCPI also simplifies the use of the counter; for example, you can set a trigger level using a percentage of signal amplitude.

Option 100

Option 100 is a mandatory no-cost option that must be ordered with the E1420B. Option 100 reduces the maximum TI Delay range from 99.999 seconds to 1 second.

Product Specifications

Functions	
Period:	Yes
Time interval:	Yes
Totalize:	Yes
Gated totalize:	Yes
Ratio:	Yes
Pulse width:	Yes
Rise/fall time:	Yes
Phase:	Yes
Vdc:	Yes
Vac:	Yes
Up/down counter:	No

Measurements	
Frequency:	200 MHz (standard) 2.5 GHz (with option)
Frequency 1, 2, 3:	
Range:	0.001 Hz to 200 MHz, input 1; 0.001 Hz to 100 MHz, input 2; 90 MHz to 2.5 GHz, input 3 (Optional)
Resolution:	9 digits/s of measurement time + trigger error + system jitter *(Frequency resolution is directly proportional to gate time. For example, resolution is 9 digits for a 1-second gate time and 8 digits for a 0.1-second gate time.)*
Period 1, 2, 3:	
Range:	5 ns to 1,000 s, input 1; 10 ns to 1000 s, input 2; 400 ps to 10 ns, input 3 (Optional)
Resolution:	Same as Frequency
Time interval (TI) 1 to 2:	
Range:	1 ns to 1,000 s *(single-shot);* 1 ns to 10 s *(averaging) (100-gate average)*
Resolution:	2 ns + trigger error, single-shot; 200 ps + trigger error, averaging
Rise/fall time 1:*	
Range:	15 ns to 400 µsec *(automatic)*; to 800 sec *(manual)*
Resolution:	Same as TI
Pulse width 1, 2:*	
Range:	5 ns to 1 ms
Resolution:	Same as TI
Phase 1 relative 2:*	
Range:	0.1° to 360°
Resolution:	TI resolution x frequency x 360°
Ratio 1/2, 2/1, 3/1:	
Range (1/2, 2/1):	0.001 Hz to 100 MHz
Range (3/1):	90 MHz to 2.5 GHz (Optional)
Totalize 1, 1 by 2, 2 by 1:	
Range:	0 to (1 x 1.0E12 - 1) events
Min/max, ac voltage 1, 2:*	
Range:	200 mVp-p to 5 Vp-p *(x Atten.)*
Resolution:	30 mV *(x Atten.)*
Min/max, dc voltage 1:	
Range:	30 mV to ±10 V *(x Atten.)*
Resolution:	30 mV *(x Atten.)*

*Frequency range 1 kHz to 20 MHz.

Input Characteristics for Channels 1, 2

Sinewave sensitivity:	35 mV rms
Pulse sensitivity:	100 mVp-p *(with minimum pulse width of 5 ns)*
Dynamic range:	200 mVp-p to 5 Vp-p *(x Atten.)*
Attenuator:	x1 *(default)* or x10
Signal operating range:	± 10 V *(x Atten.) (1 MΩ)*; ± 5 V *(50 Ohm)*
Trigger level range:	± 10.2 V with step size of 2.5 mV *(Specified by V or % of signal)*
Trigger level accuracy:	± 30 mV *(x Atten.)* ± 1% of trigger level
Coupling:	ac/dc
Impedance:	50 Ω/1 MΩ (default programmable)
Slopes:	Positive or Negative
Input:	Separate or Common *(1 routed to 2)*

General Characteristics

Gate time:	1 ms to 99.99s in 1 ms steps
External arm:	via front-panel BNC or VXI TTL TRIG lines
Auto trigger:	
Range:	1 kHz to 20 MHz (Single or Repetitive Range)
Minimum amplitude:	200 mVp-p *(x Attn.)*
TI delay (inserts delay after start event before allowing stop event to occur):	
Range (Option 100*):	1 ms to 1 s in 1 ms step
Measurement timeout:	0.1 s to 1,500 s
Gate output:	VXI TTLTRIP Lines
Measurement throughput rate (measured using Radisys EPC-2):	
Free-run:	Up to 60 Measurements/s
Switching:	Up to 40 Measurements/s
Shared memory (option 040):	Up to 160 Measurements/s
Memory states:	10 setups can be stored and recalled (Volatile)

***Note:** Option 100 is a mandatory no-cost option that must be ordered with the E1420B. Option 100 reduces the maximum TI Delay range from 99.999 seconds to 1 second.

Time Base

Standard:	VXI CLK10
Option 010 TCXO time base:	
Frequency:	10 MHz
Aging:	<0.1 ppm/month
Temperature:	± 1 ppm, 0 to 40° C

UHF Channel (Input 3) (Option 030)

Frequency range:	90 MHz to 2.5 GHz
Sensitivity (sinewave):	
90 MHz-1 GHz:	–25 dBm
1 GHz-1.8 GHz:	–20 dBm
1.8 GHz-2.5 GHz:	–12 dBm

Shared Memory (Option 040)

Shared memory throughput rate:	Up to 160 Measurements/s

General Specifications

VXI Characteristics

VXI device type:	Message based
Size:	C
Slots:	1
Connectors:	P1/2
Shared memory:	Yes
VXI buses:	TTL Trigger Bus

Instrument Drivers - See the Agilent Technologies Website (http://www.agilent.com/find/inst_drivers) for driver availability and downloading.

Command module firmware:	n/a
Command module firmware rev:	n/a
I-SCPI Win 3.1:	n/a
I-SCPI Series 700:	n/a
C-SCPI LynxOS:	n/a
C-SCPI Series 700:	n/a
Panel Drivers:	Yes
VXI*plug&play* Win Framework:	Yes
VXI*plug&play* Win 95/NT Framework:	Yes
VXI*plug&play* HP-UX Framework:	No

Module Current

	I_{PM}	I_{DM}
+5 V:	2	0.15
+12 V:	0.25	0.01
–12 V:	0.15	0.02
+24 V:	0	0
–24 V:	0	0
–5.2 V	0.8	0.03
–2 V:	0	0

Cooling/Slot

Watts/slot:	15.50
ΔP mm H_2O:	0.15
Air Flow liter/s:	1.00

Ordering Information

Description	Product No.
High-Performance VXI Universal Counter	E1420B*
TCXO Time Base	E1420B 010
UHF Input Channel	E1420B 030
High Throughput/Shared RAM	E1420B 040
Reduced TI Delay Spec	E1420B 100
Service Manual	E1420B 0B3

***Note: You must order Option 100.**

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