Keysight E1420B
High-Performance VXI Universal Counter

Data Sheet

- 1-Siot, 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

KEYSIGHT
TECHNOLOGIES

Description

The Keysight Technologies, Inc. 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 xlO 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 El420B 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 El420B 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 Keysight 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, VXI bus 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 Keysight 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.

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)

Measurements (continued)

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 A tten.)
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 MQ); ± 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 MQ (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 TIL 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:	1 ms to 99 s in 1 ms step
Measurement timeout:	0.1 s to 1.500 s
Gate output:	VXI TTLTRIP Lines
Measurement throughput rate (measured using Radi-sys 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)

Time Base

Standard:	VX I 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 Keysight Technologies Website (www.keysight.com/find/ inst_drivers) for driver availability and downloading

Command module firmware:	n/a
Command module firmware rev:	n/a
1-SCPI Win 3.1:	n/a
1-SCPI Series 700:	n/a
C-SCPI LynxOS:	n/a
C-SCPI Series 700:	n/a
Panel Drivers:	Yes
VXI*plug&play* Win Frame-work :	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 OB3

myKeysight

myKeysight

www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

Keysight Assurance Plans
www.keysight.com/find/AssurancePlans
Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.

Keysight T&M Software and Connectivity

www.keysight.com/find/connectivity
Keysight's Test and Measurement software and connectivity products, solutions and developer network allows you to take time out of connecting your instruments to your computer with tools based on PC standards, so you can focus on your tasks, not on your connections. For more information visit:

www.keysight.com/find/vxi

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:
www.keysight.com/find/contactus
(BP-09-23-14)

KEYSIGHT
TECHNOLOGIES