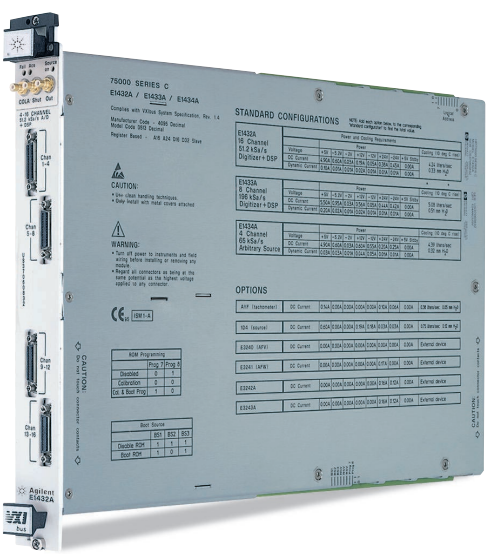
Agilent E1432A

16-Channel 51.2 kSa/sec Digitizer Plus DSP

Data Sheet

- **On-board DSP improves total system performance**
- **Built-in signal conditioning simplifies tests and reduces cost**
- **Sample rates from 51.2 kHz to 25.6 Hz (per channel) simultaneous**
- **Alias protected bandwidths from 23 kHz to 10 Hz**
- **Optional 16/20-bit arbitrary source**
- **Optional dual tachometer**



Agilent E1432A

Description

The Agilent E1432A 16-Channel Digitizer is a **C-size, 1-slot, register-based VXI module.** It includes DSP, transducer signal conditioning, alias protection, digitization, and high-speed measurement computation. You can even add an optional arbitrary source or dual-input tachometer. Putting so much capability in a single module decreases system costs while increasing system performance.

This digitizer module excels at parallel processing of data, a key to high system performance. On-board DSP computes measurement results in the input module, preventing the host computer from being a performance bottleneck. Adding more E1432As to a system adds more DSP capability, maintaining system performance for even extremely large systems.

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

Get Data in Four Domains

The E1432A turns data into information by providing the data in whichever domain gives the most insight. Digitized data can be a simple time record, or the E1432A can use onboard DSP to compute FFTs and power spectrums to provide the data in the frequency domain. For rotating machinery analysis the E1432A can measure amplitude as a function of shaft angle, or as multiples of the shaft RPM using order ratio spectrums. Since these measurements are built into the module, no user programming is required.

Key E1432A Features

Here are some of the E1432A's other significant features:

- Grounded or differential inputs
- Digital anti-alias filters
- Simultaneous sample and hold
- Zoom (non-zero start frequency)
- 16 delta-sigma ADCs

Signal Conditioning is Built In

Four different breakout boxes provide remote connections to voltage, IEPE accelerometers, microphones, and piezoelectric transducers. By putting transducer signal conditioning in the interchangeable breakout boxes, the E1432A can support mixed transducer types. To change test transducers, just change the breakout boxes.

Exceptionally Fast Data Capture

The expandable RAM FIFO in the E1432A continuously buffers up filtered time data from the input channels. Expanding the RAM to 32 MB provides 1 Msample of data storage per channel. If 1 Msample per channel is not enough, you can throughput the data to an Agilent N2216A VXI/SCSI Interface Module. The N2216A can transfer data at a 15 per-second rate to an external SCSI device or to the optional internal hard drives (one 50 GB drive or two 50 GB drives). Data may be monitored during throughput. The host can "eavesdrop" on the data as it is passed to the N2216A, displaying either raw time data or FFT results.

Optional Output for Stimulus

A 16/20-bit arbitrary source can be added to provide sine, burst sine, swept sine, random and burst random stimulus for testing structures or devices. Since it does not take up extra slots, it saves money and space. It has a constant output level amplifier (COLA) for signal monitoring, a summing junction for adding the outputs of multiple sources, and a programmable rampdown rate.

Optional Dual Tachometer Input

For testing rotating machinery the E1432A has an optional dual tachometer input. Use it to tag acquired data with the actual RPMs when the data was taken. Or use it to trigger data acquisitions at specified RPM intervals between specified start and stop RPMs.

Backplane Connector Shielding

To ensure compliance with RFI levels specified in standards EN55001 and CISPR11, this product requires the backplane connector shields installed in an Agilent VXI C-size mainframe.

Option 918 is available with the purchase of a new mainframe; accessories, Agilent P/Ns E1400-80920, E1421-80920, and E8400-80918 (one kit per mainframe) are available for retrofitting existing Agilent mainframes E1401A/B, E1421B, and E84XXA, respectively.

For More Information

E1432A, E1433B, E1434A VXI Digitizers/Source Product Overview, pub. no.: 5968-7086E;
E1432A Technical Specifications, pub. no.: 5968-8729E.

Product Specifications

General

Number of channels:	16
Bandwidth:	23 kHz
Alias protection:	Anti-Aliasing Filter built-in
Timebase resolution:	20 μs
Low-frequency CMRR:	50 dB
Variable bandwidth:	Yes
2 dB Input range headroom:	Yes
Pre-arm capture:	Yes
Dual-ported memory:	Yes
Dual-rate sampling:	No
Segmented memory:	No

Frequency

Sample rates:	51.2 Sa/s to 25.6 Sa/s (internal clock)
Alias protected frequency spans:	23 kHz to 10 Hz
Zoom frequency span:	2 kHz, 500 Hz, 125 Hz, 31.25 Hz
Zoom center frequency:	≤4 kHz

Input

Full scale input ranges:	100 mVpk to 20 Vpk (1, 2, 5 steps)
Input impedance:	
Differential:	1 MΩ, 35 pF
Grounded:	500 kΩ, 35 pF
AC coupling 3 dB frequency:	1 Hz
Common mode rejection ratio:	
Frequency:	1 kHz
DC coupled:	>50 dB
AC coupled:	>45 dB
Residual DC after auto-zero:	≤10 mV

Amplitude

Basic accuracy:	0.7%
Amplitude accuracy at 1 kHz:	± 0.7% (± 0.06 dB)
Flatness relative to 1 kHz:	± 1% (± 0.086 dB)

Cross Channel Matching

(in the same mainframe)	
Cross channel magnitude:	± 1.2% (± 0.1 dB)
Cross channel phase:	
23 kHz:	± 2.5 degrees
1 kHz:	± 0.125 degrees
Cross-mainframe time delay:	70 nsec delay typ. + 6 nsec/m of cable

Dynamic Range

Resolution:	16 bits
Spurious-free dynamic range:	80 dBfs, 90 dBfs typical
Total harmonic/intermod distortion:	–80 dBfs
FFT noise floor:	<–90 dBfs
Channel to channel crosstalk:	–80 dBfs
Input noise level (above 100 Hz):	300 $nV_{rms}\sqrt{Hz}$ (Split equally over active channels)
Input channel RAM buffer size:	4 MB (2 Msample) standard 32 MB (16 Msample) optional
Memory:	4-32 MB

Triggering Types

Input, external, source, TTL TRG, RPM (requires AYF option).

Trigger: Next sample

E1432A/33B/34A sample rates and triggering can be synchronized across multiple modules and mainframes.

Maximum trigger delay:

Note: 16 channels active

	4 MB RAM	32 MB RAM
Pre-trigger:	131 kSa	1 MSa
Post trigger:	16 MSa	16 MSa

DSP Measurement Results

Build-in DSP:	Yes
Time domain:	Time
Frequency domain:	Windowed FFT, power spectrum
Revolution domain:	Sample at tach times
Order domain:	RPM triggered order ratio spectrums
Window types:	Uniform, Hann, Flattop
Averaging types:	RMS, linear, exponential, peak hold
Lines of resolution:	
Frequency domain:	50 to 3,200
Order domain:	50 to 1,600

Signal Conditioning

8-channel voltage breakout box:	8 BNC connectors
8-channel voltage/IEPE breakout box:	8 BNC connectors with switchable voltage/IEPE
IEPE current:	4 mA
Open circuit voltage:	24 V
4-channel Mic/voltage/IEPE breakout box:	4 channels with LEMO connectors 0/200 V polarization voltage 28 V preamp power 4 BNCs with switchable IEPE/voltage
4-channel charge/voltage/IEPE breakout box:	4 channels with microdot connectors 4 BNCs with switchable IEPE/voltage

Optional Arbitrary Source

Output:	
Full-scale ranges:	10 V to 80 mV
Output impedance:	<0.5 Ω typical
Output modes:	
Sine:	Continuous, burst, swept
Random:	Pseudo, periodic, burst, mooz
Arbitrary output:	Continuous, loop
Sine frequency range:	
Frequency range:	0 to 25.6 kHz
Frequency resolution:	244 μHz
Random Noise bandwidth:	
Frequency spans:	25.6 kHz to 0.4 Hz
Mooz spans:	2 kHz to 156 mHz
Mooz center frequency:	<4 kHz
Arbitrary output signal bandwidth:	
20 bit:	6.4 kHz
16 bit:	25.6 kHz
Arbitrary output dual buffer size:	40,960 samples/buffer

Optional Dual Tachometer Input

Maximum input voltage:	± 25 V
Maximum tach pulses/sec:	
Max pulse rate:	100 kHz
Max pulses/rev:	65,535

General Specifications

VXI Characteristics

VXI device type:	Register based
Data transfer bus:	A16, A32, D32 slave only
Size:	C
Slots:	1
Connectors:	P1/2
Shared memory:	n/a
VXI busses:	Local Bus A-row (left) Local Bus C-row (right) TTL Trigger Bus
C-size compatibility:	n/a

Instrument Drivers

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

Command module firmware:	No
Command module firmware rev:	n/a
I-SCPI Win 3.1:	No
I-SCPI Series 700:	No
C-SCPI LynxOS:	No
C-SCPI Series 700:	C-SCPI not required, C libraries included
Panel Drivers:	No
VXI*plug&play* Win Framework:	No
VXI*plug&play* Win 95/NT Framework:	Yes
VXI*plug&play* HP-UX Framework:	Yes

Module Current

E1432A

	I_{PM}	I_{DM}
+5 V:	4.9	0.1
+12 V:	0.19	0.02
–12 V:	0.05	0.01
+24 V:	0.45	0.01
–24 V:	0.45	0.01
–5.2 V:	0.6	0.01
–2 V:	0.03	0.01

E1432A Opt AYF

	I_{PM}	I_{DM}
+5 V:	0.14	0
+12 V:	0	0
–12 V:	0	0
+24 V:	0.1	0
–24 V:	0.06	0
–5.2 V:	0	0
–2 V:	0	0

E1432A Opt 1D4

	I_{PM}	I_{DM}
+5 V:	0.6	0
+12 V:	0.19	0
–12 V:	0.18	0
+24 V:	0.03	0
–24 V:	0.03	0
–5.2 V:	0	0
–2 V:	0	0

E1432A Opt AFV

	I_{PM}	I_{DM}
+5 V:	0	0
+12 V:	0	0
–12 V:	0	0
+24 V:	0	0
–24 V:	0	0
–5.2 V:	0	0
–2 V:	0	0

E1432A Opt AFW

	I_{PM}	I_{DM}
+5 V:	0	0
+12 V:	0	0
–12 V:	0	0
+24 V:	0.17	0
–24 V:	0	0
–5.2 V:	0	0
–2 V:	0	0

Cooling/Slot

Watts/slot:	58.20
ΔP mm H_2O:	0.46
Air Flow liter/s:	5.20

Ordering Information

Description	Product No.
16-Channel 51.2 kSa/s Digitizer plus DSP	E1432A
Delete Manual Set	E1432A 0B0
Add Manual Set	E1432A 0B1
Mil std 45662A Calibration w/Test Data	E1432A 1BP
Arbitrary Source	E1432A 1D4
Delete 12 Input Channels	E1432A 1DD
Delete 8 Input Channels	E1432A 1DE
Voltage Input Breakout Box	E1432A AFV
ICP/Voltage Input Breakout Box	E1432A AFW
Charge/ICP/Voltage Input Breakout Box	E3242E
Microphone/ICP/Voltage Input Breakout Box	E3243E
32 MB Total RAM	E1432A ANC
Dual Rack Mount Kit, 19″	E1432A AXM
Add Tachometer Input	E1432A AYF
Add Local Bus Interface	E1432A UGV
Commercial Cal. Certificate w/Test Data	E1432A UK6
3 yr. retn. to Agilent to 1 yr. OnSite warr.	E1432A W01
Shield, Backplane Connector	E1400-80920
VXI Backplane Connector Shield Kit for 6-Slot Mainframe (if ordered separately)	E1421-80920
Extra Terminal Block	E1463-80011

Note: OPT 1D4 and AYF cannot be ordered together.

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