Agilent Technologies
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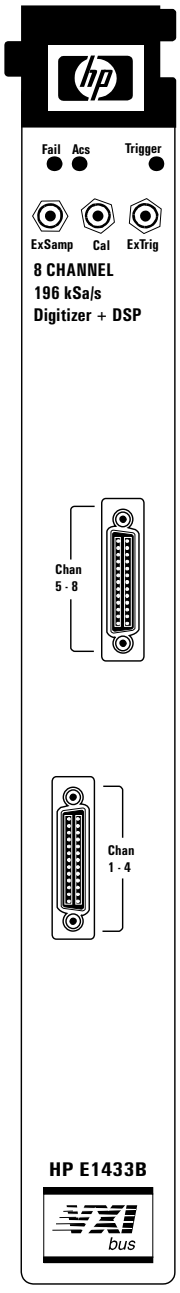
# HP E1433B

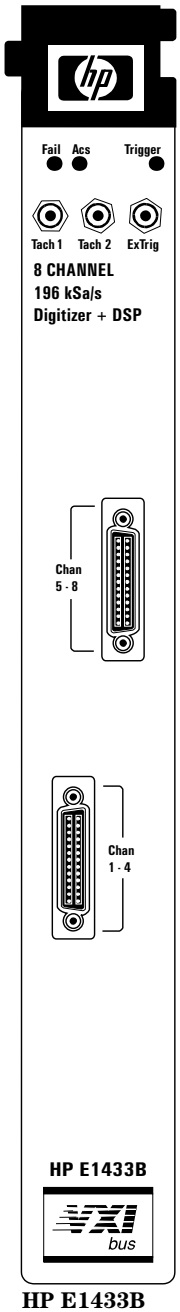
## Technical Specifications

### 8-Channel 196 kSa/sec Digitizer plus DSP

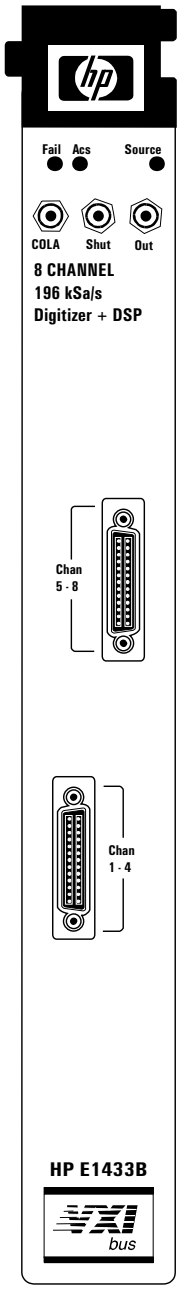
Rev. November 1999




**HP E1433B**




**HP E1433B with Tachometer Option AYF**




**HP E1433B with Arbitary Source Option 1D4**

The HP E1433B 8-Channel 196 kSa/s Digitizer plus DSP is a C-size VXI module. “196 kSa/s” refers to the maximum sample rate of 196,608 samples per second per channel.

The HP E1433B may contain either one or two four-channel input assemblies so that the module may have a total of up to eight inputs.

This module integrates transducer signal conditioning, anti-alias protection, digitization and high speed measurement computation in a single-slot VXI card. Onboard digital signal processing and 32 Mbytes of RAM maximizes total system performance and flexibility.

## Frequency

| Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) |
|---|---|---|---|---|---|
| 88,320.00[1] | 196,608.00 | 10,000.00 | 25,600.00 | 762.94 | 1,953.13 |
| 76,800.00 | 196,608.00 | 9,765.63 | 25,000.00 | 750.00 | 1,920.00 |
| 86,250.00[1] | 192,000.00 | 9,600.00 | 24,576.00 | 651.04 | 1,666.67 |
| 75,000.00 | 192,000.00 | 9,375.00 | 24,000.00 | 640.00 | 1,638.40 |
| 73,600.00[1] | 163,840.00 | 8,000.00 | 20,480.00 | 625.00 | 1,600.00 |
| 64,000.00 | 163,840.00 | 7,812.50 | 20,000.00 | 610.35 | 1,562.50 |
| 70,190.43[1] | 156,250.00 | 7,680.00 | 19,660.80 | 600.00 | 1,536.00 |
| 61,035.16 | 156,250.00 | 7,629.39 | 19,531.25 | 585.94 | 1,500.00 |
| 69,000.00[1] | 153,600.00 | 7,500.00 | 19,200.00 | 500.00 | 1,280.00 |
| 60,000.00[1] | 153,600.00 | 6,510.42 | 16,666.67 | 488.28 | 1,250.00 |
| 59,895.83[1] | 133,333.33 | 6,400.00 | 16,384.00 | 480.00 | 1,228.80 |
| 52,083.33 | 133,333.33 | 6,250.00 | 16,000.00 | 476.84 | 1,220.70 |
| 57,500.00[1] | 128,000.00 | 6,103.52 | 15,625.00 | 468.75 | 1,200.00 |
| 50,000.00 | 128,000.00 | 6,000.00 | 15,360.00 | 406.90 | 1,041.67 |
| 56,152.34[1] | 125,000.00 | 5,208.33 | 13,333.33 | 400.00 | 1,024.00 |
| 48,828.13 | 125,000.00 | 5,120.00 | 13,107.20 | 390.63 | 1,000.00 |
| 55,200.00[1] | 122,880.00 | 5,000.00 | 12,800.00 | 381.47 | 976.56 |
| 48,000.00 | 122,880.00 | 4,882.81 | 12,500.00 | 375.00 | 960.00 |
| 46,000.00[1] | 102,400.00 | 4,800.00 | 12,288.00 | 325.52 | 833.33 |
| 40,000.00 | 102,400.00 | 4,687.50 | 12,000.00 | 320.00 | 819.20 |
| 44,921.88[1] | 100,000.00 | 4,000.00 | 10,240.00 | 312.50 | 800.00 |
| 39,062.50 | 100,000.00 | 3,906.25 | 10,000.00 | 305.18 | 781.25 |
| 44,160.00[1] | 98,304.00 | 3,840.00 | 9,830.40 | 300.00 | 768.00 |
| 38,400.00 | 98,304.00 | 3,814.70 | 9,765.63 | 292.97 | 750.00 |
| 43,125.00[1] | 96,000.00 | 3,750.00 | 9,600.00 | 250.00 | 640.00 |
| 37,500.00 | 96,000.00 | 3,255.21 | 8,333.33 | 244.14 | 625.00 |
| 36,800.00[1] | 81,920.00 | 3,200.00 | 8,192.00 | 240.00 | 614.40 |
| 32,000.00 | 81,920.00 | 3,125.00 | 8,000.00 | 238.42 | 610.35 |
| 35,095.21[1] | 78,125.00 | 3,051.76 | 7,812.50 | 234.38 | 600.00 |
| 30,517.58 | 78,125.00 | 3,000.00 | 7,680.00 | 203.45 | 520.83 |
| 34,500.00[1] | 76,800.00 | 2,604.17 | 6,666.67 | 200.00 | 512.00 |
| 30,000.00 | 76,800.00 | 2,560.00 | 6,553.60 | 195.31 | 500.00 |
| 29,947.92[1] | 66,666.67 | 2,500.00 | 6,400.00 | 190.73 | 488.28 |
| 26,041.67 | 66,666.67 | 2,441.41 | 6,250.00 | 187.50 | 480.00 |
| 29,440.00 | 65,536.00 | 2,400.00 | 6,144.00 | 162.76 | 416.67 |
| 25,600.00 | 65,536.00 | 2,343.75 | 6,000.00 | 160.00 | 409.60 |
| 28,750.00[1] | 64,000.00 | 2,000.00 | 5,120.00 | 156.25 | 400.00 |
| 25,000.00 | 64,000.00 | 1,953.13 | 5,000.00 | 152.59 | 390.63 |
| 28,076.17[1] | 62,500.00 | 1,920.00 | 4,915.20 | 150.00 | 384.00 |
| 24,414.06 | 62,500.00 | 1,907.35 | 4,882.81 | 146.48 | 375.00 |
| 27,600.00[1] | 61,440.00 | 1,875.00 | 4,800.00 | 125.00 | 320.00 |
| 24,000.00 | 61,440.00 | 1,627.60 | 4,166.67 | 122.07 | 312.50 |
| 23,000.00[1] | 51,200.00 | 1,600.00 | 4,096.00 | 120.00 | 307.20 |
| 20,000.00 | 51,200.00 | 1,562.50 | 4,000.00 | 119.21 | 305.18 |
| 22,460.94[1] | 50,000.00 | 1,525.88 | 3,906.25 | 117.19 | 300.00 |
| 19,531.25 | 50,000.00 | 1,500.00 | 3,840.00 | 101.73 | 260.42 |
| 22,080.00[1] | 49,152.00 | 1,302.08 | 3,333.33 | 100.00 | 256.00 |
| 19,200.00 | 49,152.00 | 1,280.00 | 3,276.80 | 97.66 | 250.00 |
| 21,562.50[1] | 48,000.00 | 1,250.00 | 3,200.00 | 95.37 | 244.14 |
| 18,750.00 | 48,000.00 | 1,220.70 | 3,125.00 | 93.75 | 240.00 |
| 16,000.00 | 40,960.00 | 1,200.00 | 3,072.00 | 81.38 | 208.33 |
| 15,360.00 | 39,321.60 | 1,171.88 | 3,000.00 | 80.00 | 204.80 |
| 15,258.79 | 39,062.50 | 1,000.00 | 2,560.00 | 78.13 | 200.00 |
| 15,000.00 | 38,400.00 | 976.56 | 2,500.00 | 76.29 | 195.31 |
| 13,020.83 | 33,333.33 | 960.00 | 2,457.60 | 75.00 | 192.00 |
| 12,800.00 | 32,768.00 | 953.67 | 2,441.41 | 73.24 | 187.50 |
| 12,500.00 | 32,000.00 | 937.50 | 2,400.00 | 62.50 | 160.00 |
| 12,207.03 | 31,250.00 | 813.80 | 2,083.33 | 61.04 | 156.25 |
| 12,000.00 | 30,720.00 | 800.00 | 2,048.00 | 60.00 | 153.60 |
| 10,416.67 | 26,666.67 | 781.25 | 2,000.00 | 59.60 | 152.59 |

[1] These sample rates also have available bandwidths that are 1.15 times the bandwidth of this table

**Frequency** (continued)

| Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) |
|---|---|---|---|---|---|
| 58.59 | 150.00 | 5.09 | 13.02 | 0.49 | 1.25 |
| 50.86 | 130.21 | 5.00 | 12.80 | 0.48 | 1.22 |
| 50.00 | 128.00 | 4.88 | 12.50 | 0.47 | 1.20 |
| 48.83 | 125.00 | 4.77 | 12.21 | 0.47 | 1.19 |
| 47.68 | 122.07 | 4.69 | 12.00 | 0.46 | 1.17 |
| 46.88 | 120.00 | 4.58 | 11.72 | 0.40 | 1.02 |
| 40.69 | 104.17 | 3.91 | 10.00 | 0.39 | 1.00 |
| 40.00 | 102.40 | 3.81 | 9.77 | 0.38 | 0.98 |
| 39.06 | 100.00 | 3.75 | 9.60 | 0.37 | 0.95 |
| 38.15 | 97.66 | 3.73 | 9.54 | 0.37 | 0.94 |
| 37.50 | 96.00 | 3.66 | 9.38 | 0.32 | 0.81 |
| 36.62 | 93.75 | 3.18 | 8.14 | 0.31 | 0.80 |
| 31.25 | 80.00 | 3.13 | 8.00 | 0.31 | 0.78 |
| 30.52 | 78.13 | 3.05 | 7.81 | 0.30 | 0.76 |
| 30.00 | 76.80 | 2.98 | 7.63 | 0.29 | 0.75 |
| 29.80 | 76.29 | 2.93 | 7.50 | 0.29 | 0.73 |
| 29.30 | 75.00 | 2.54 | 6.51 | 0.24 | 0.63 |
| 25.43 | 65.10 | 2.50 | 6.40 | 0.24 | 0.61 |
| 25.00 | 64.00 | 2.44 | 6.25 | 0.23 | 0.60 |
| 24.41 | 62.50 | 2.38 | 6.10 | 0.23 | 0.59 |
| 23.84 | 61.04 | 2.34 | 6.00 | 0.20 | 0.50 |
| 23.44 | 60.00 | 2.29 | 5.86 | 0.19 | 0.48 |
| 20.35 | 52.08 | 1.95 | 5.00 | 0.18 | 0.47 |
| 20.00 | 51.20 | 1.91 | 4.88 | 0.16 | 0.41 |
| 19.53 | 50.00 | 1.88 | 4.80 | 0.16 | 0.40 |
| 19.07 | 48.83 | 1.86 | 4.77 | 0.15 | 0.39 |
| 18.75 | 48.00 | 1.83 | 4.69 | 0.15 | 0.38 |
| 18.31 | 46.88 | 1.59 | 4.07 | 0.15 | 0.38 |
| 15.63 | 40.00 | 1.56 | 4.00 | 0.12 | 0.31 |
| 15.26 | 39.06 | 1.53 | 3.91 | 0.12 | 0.30 |
| 15.00 | 38.40 | 1.49 | 3.81 | 0.11 | 0.29 |
| 14.90 | 38.15 | 1.46 | 3.75 | 0.10 | 0.25 |
| 14.65 | 37.50 | 1.27 | 3.26 | 0.09 | 0.24 |
| 12.72 | 32.55 | 1.25 | 3.20 | 0.09 | 0.23 |
| 12.50 | 32.00 | 1.22 | 3.13 | 0.08 | 0.20 |
| 12.21 | 31.25 | 1.19 | 3.05 | 0.07 | 0.19 |
| 11.92 | 30.52 | 1.17 | 3.00 | 0.06 | 0.16 |
| 11.72 | 30.00 | 1.14 | 2.93 | 0.06 | 0.15 |
| 10.17 | 26.04 | 0.98 | 2.50 | | |
| 10.00 | 25.60 | 0.95 | 2.44 | | |
| 9.77 | 25.00 | 0.94 | 2.40 | | |
| 9.54 | 24.41 | 0.93 | 2.38′ | | |
| 9.38 | 24.00 | 0.92 | 2.34 | | |
| 9.16 | 23.44 | 0.79 | 2.03 | | |
| 7.81 | 20.00 | 0.78 | 2.00 | | |
| 7.63 | 19.53 | 0.76 | 1.95 | | |
| 7.50 | 19.20 | 0.75 | 1.91 | | |
| 7.45 | 19.07 | 0.73 | 1.88 | | |
| 7.32 | 18.75 | 0.64 | 1.63 | | |
| 6.36 | 16.28 | 0.63 | 1.60 | | |
| 6.25 | 16.00 | 0.61 | 1.56 | | |
| 6.10 | 15.63 | 0.60 | 1.53 | | |
| 5.96 | 15.26 | 0.59 | 1.50 | | |
| 5.86 | 15.00 | 0.57 | 1.46 | | |

**Frequency Accuracy** ± 0.012% (120 ppm)

## Input

| | |
|---|---|
| **Full Scale Input Ranges** (in volts peak) | 5 mV to 10 V (1, 2, 5 steps) |
| **Maximum Input Level** | 42 Vp |
| **Input Impedance** | |
| (dc coupled or ac coupled above 10 Hz) | |
| Differential | 2 MΩ nominal |
| Either side-to-chassis | 1 MΩ nominal |
| **Programmable AC Coupling 3 dB Corner Frequency** | 1 to 100 Hz |
| (two-pole, 12 dB/octave) | |
| **Common Mode Rejection Ratio** | |
| ac or dc coupled, 10 Hz to 1 kHz | > 70 dB |
| Maximum signal, low side to chassis | ± 10 Vpk |
| Maximum signal, high side to chassis ($V_T = 0$) | ± 11.5 Vp |
| Maximum signal, high side to chassis | VT ± 10 Vpk (must be ≤ 20 V)<br>($V_T$ = transducer offset cancellation voltage setting) |
| **Amplitude Over-Range Detection** | |
| Common mode overload | ± 11.5 Vp (typical) |
| Differential mode overload (dc coupled) | 105% of full scale |
| Differential mode overload (ac coupled) | |
| for cutoff frequency ≤ 6 Hz | 100% of full scale |
| for cutoff frequency > 6 Hz | 50% of full scale, worst case |
| **Residual DC** | 1% of full scale + 2 mV |

## Amplitude

| | |
|---|---|
| **Amplitude Accuracy at 1 kHz** | ± 0.5% of reading, ± 0.01% of full scale |
| **Flatness (relative to 1 kHz, at full scale)** | |
| < 29 kHz | ± 1% (± 0.09 dB) |
| < 88 kHz | ± 2% (± 0.17 dB) for > 100 mV range |
| < 88 kHz | ± 5% (± 0.42 dB) 5 mV to 100 mV range |
| **Amplitude Resolution** | 16 bits, less 5.5 dB over-range (typical) |

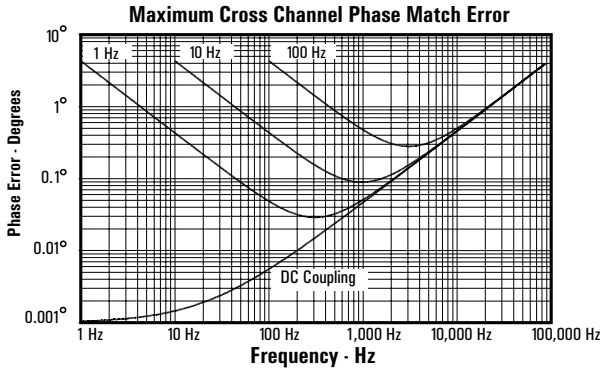
## Cross-Channel Matching (any HP E1433B module in the same mainframe)

**Cross-Channel Amplitude Match**

| | |
|---|---|
| up to 29 kHz | ± 0.1 dB |
| (freq > 2x AC HPF corner freq when AC coupled) | |
| 29 kHz to 88 kHz | ± 0.2 dB |

**Cross-Channel Phase Match**

(full-scale signal, input ranges equal)




## Dynamic Range

| | |
|---|---|
| **Resolution** | 16 bits |
| **Spurious-Free Dynamic Range*** | |
| (includes spurs, harmonic distortion, intermodulation distortion, alias products and sidebands > 300 Hz) | |
| (source impedance = 50 Ω) | |
| 51.2 kSa/s $F_s$, ≤ 1 Vpk | < – 90 dBfs (typical) |
| 48 kSa/s to 65.536 Sa/s $F_s$ | < – 80 dBfs |
| above 65.536 Sa/s $F_s$ | < – 74 dBfs |
| **Residual Response with No Input** | < – 76 dBfs |
| **Crosstalk** | < – 80 dBfs (typical) |
| (receiving channel source impedance = 50 Ω, low side grounded, full scale, < 10 kHz signal on other channels, input ranges within 20 dB) | |
| **Noise** (input terminated with 50 Ω, 5 mV range) | |
| Noise density above 100 Hz | < 70 nVrms/$\sqrt{Hz}$ |
| Total rms noise, 10 Hz to 10 kHz | < 7 μVrms |

## Triggering

| | |
|---|---|
| **Trigger Detection** | Digital |
| **Trigger Modes** | Input, external, source, TTL TRG, software, RPM (requires option AYF) |
| **Maximum Trigger Delay** | |
| (8 channels active) | |
| Pre-trigger delay | 2 MSa (32 MB RAM) |
| Post-trigger delay | 16 MSa |

* 5 mV range degrades 6 dB.

## Option 1D4 Arbitary Source Specifications

### General

| | |
|---|---|
| **Output Modes** | Sine and pseudo random with burst; arbitrary waveform with continuous output |
| **Frequency Bands** | |
| **Sine, Noise Modes** | |
| Reconstruction filter bandwidth | 0 to 25.6 kHz |
| DSP data rate (Fs) | 48.00 kHz to 65.536 kHz |
| Data word size | 16 bits |
| **Arb Modes** | |
| Reconstruction filter bandwidth | 0 to 6.4 kHz |
| Data word size | 20 bits |
| **Frequency Accuracy** | ± 0.012% (120 ppm) |

### Signal Output

| | |
|---|---|
| **Number of Output Channels** | 1 |
| **Maximum Amplitude** | 10 Vp nominal |
| **Output Impedance** | < 0.5 Ω (typical) |
| **Maximum Output Current** | 100 mA (typical) |
| **Maximum Capacitive Load** | 0.01 μF (typical) |
| **Amplitude Control** | |
| (signal amplitude = range × scale factor) | |
| Maximum amplitude | 10 Vp nominal |
| Amplitude ranges | 79 mVp to 10 Vp in 0.375 dB steps |
| Amplitude scale factor | 0.0 to 1.0, with 20-bit resolution |
| **Residual Output Noise Voltage** (Freq > 500 Hz) | < 500 nV/$\sqrt{\text{Hz}}$ |
| **Residual DC Offset** | |
| Offset after autozero | ± 2 mV |
| Offset after shutdown | ± 20 mV |
| Zeroing resolution | 100 μV |
| **Output Overload Trip** | > 17 V |
| **Amplitude Ramp-down Time** (Programmable) | 0 to 30 seconds |
| **Shutdown** | |
| Shutdown input | TTL levels |
| Shutdown time | < 5 s |
| Shutdown time, ac fail | < 4 ms |

## Sine Output Mode

| | |
|---|---|
| **Sine Frequency** (65536 Hz Fs) | |
| Frequency range | 0 to 25.6 kHz |
| Frequency resolution | 244 μHz |
| **Amplitude Accuracy** | |
| (1 kHz sine wave, into ≥ 200 Ω) | |
| 10 Vp to 0.158 Vp ranges | ± 0.20 dB (2.3 %) |
| 0.152 Vp to 79 mVp ranges | ± 0.40 dB (4.7 %) |
| **Flatness** (relative to 1 kHz) | ± 0.5 dB |
| **Harmonic and Aliased-harmonic Distortion** | |
| (≥ 1 kΩ load) | |
| 1 Vp range, 1.0 scale factor, 0 to 6.4 kHz | < – 80 dBc |
| 2 to 10 Vp range, 0.05 to 1.0 scale factor, 0 to 25.6 kHz | < – 70 dBc |
| **Spurious Responses** | <– 60 dBVp |

## Constant-Level Output

| | |
|---|---|
| **Output Level at 1 kHz** | |
| (after 1 second settling, amplitude scale factor > 0.001) | 1 Vp (nominal) |
| **Output Impedance** | 1.2 kΩ (typical) |
| **Flatness** | |
| 25 Hz to 5 kHz, amplitude scale factor 0.001 to 1.0 | 1.13 Vp to 0.50 Vp (+10, -6.0 dB) (typical) |
| 5 Hz to 20 kHz, amplitude scale factor 0.01 to 1.0 | 1.13 Vp to 0.44 Vp (+10, -7.0 dB) (typical) |
| 5 Hz to 20 kHz, amplitude scale factor 0.1 to 1.0 | 1.13 Vp to 0.88 Vp (± 1.0 dB) (typical) |
| **Sine Wave Distortion** (at 1 kHz, amplitude scale factor 0.1 to 1.0) | – 40 dBc (typical) |
| **Residual DC Offset** | < 5 mV (typical) |

## Summer Input

| | |
|---|---|
| **Maximum Input Level** | 10 Vp |
| **Gain, Summer Input to Signal Output** | 0 ± 0.5 dB at 1 kHz |
| **Input Impedance** | > 10 kΩ (typical) |
| **Flatness, dc to 25.6 kHz** | ± 0.5 dB (typical) |
| **Sine Wave Distortion** | – 80 dBc (typical) |
| **Residual DC Offset** | 1 mV (typical) |

## Option AYF Tachometer Input Specifications

Option AYF, Tachometer Input, provides two tachometer inputs. When this option is installed, two of the three SMB connectors on the VXI module are used for tachometer inputs. When this option is not installed, these connectors are normally used for "External Sample" and "Trigger."

Each tachometer input has a programmable trigger level. Each tach pulse causes a "Tach Edge Time" to be recorded in a 16384-word FIFO. A "Tach Edge Time" is the instantaneous value of the 32-bit "Tach Counter." A "Decimate" number can be set to ignore a number of tach pulses before recording each Tach Edge Time. A "Holdoff" time can be set to avoid false triggering due to ringing.

One of the tachometer inputs can be programmed for use as a trigger input rather than a tachometer input. In this mode, the tachometer option can trigger the system and measure the time between the trigger and the next sample clock edge.

The analog signal from either of the tachometer inputs can be routed to an input channel using the internal calibration path.

### General

| | |
|---|---|
| **Tach Counter** | 32-bit counter with roll-over detector bit |
| **Decimate Counter** | 16-bit counter |
| **Input Signal Trigger Level** (typical) | |
| Voltage Range | – 25 V to + 25 V |
| Resolution, levels < ± 5V | 40 mV |
| Resolution, levels > ± 5V | 200 mV |
| Hysteresis, levels < ± 5V | 0 to 250 mV |
| Hysteresis, levels > ± 5V | 0 to 1.25 mV |
| Slope | Programmable, positive or negative |
| **Input Signal Timing** | |
| Minimum pulse width | 5 μs |
| Maximum pulse rate | 100 kHz |
| Trigger holdoff | 1 to 65536 clock periods |
| **Input Impedance** | 20 kΩ (typical) |

## Features

| | |
|---|---|
| **VXI Standard Information** | Conforms to VXI Revision 1.4<br>C-size, single slot width<br>Register-based programming<br>"Slave" Data Transfer Bus functionality<br>A24 address capability<br>D32 data capability<br>Optional Local Bus capability<br>SUMBUS driver and receiver<br>Requires two or four TTLTRG_ lines for multi-module synchronization |
| **Signal Processing** | 33 MHz Motorola 96002 DSP<br>two banks of 128 Kword static RAM<br>32 Mbytes dynamic RAM<br>128 Kbytes Flash ROM<br>Direct Memory Access (DMA) data transfer |

## Software Drivers

| | |
|---|---|
| **Driver Type** | C libraries with source code |
| **Supported Operating Systems** | Microsoft Windows 95 and NT®, and HP-UX 10.20 |
| **Supply Media** | CD-ROM |
| **VXI Plug & Play Compliance** | C libraries support MS Windows 95 and NT, and HP-UX. |

HP-UX Release 10.20 and later and HP-UX Release 11.00 and later (in both 32 and 64 bit configurations,on all HP 9000 computers) are Open Group UNIX 95 branded products.

MS Windows and Windows NT are U.S. registered trademarks of Microsoft Corporation.

## Regulatory Compliance

| | |
|---|---|
| **Safety Standards** | Designed for compliance to:<br>UL 1244, 4th Edition<br>IEC 348, 2nd Edition, 1978<br>CSA C22.2, No. 231 |
| **Radiated Emissions**<br>(tested in a "typical" system configuration, consisting of an HP E1401B Mainframe, HP V743 Controller, and HP E1432A module with option 1D4 or AYF) | CISPR 11: 1990, Group 1, Class A<br>(requires connector shields HP E1400-80920 or HP E1421-80920)<br>Tested for compliance to the European Economic Area's EMC directive |
| **Electrostatic Discharge** | Tested for compliance to the European Economic Area's EMC directive |
| **Radiated Immunity** | Tested for compliance to the European Economic Area's EMC directive |

## Environmental

| | |
|---|---|
| **Operating Restrictions** | |
| Ambient Temperature | 0° to 50°C |
| Humidity, Non-condensing | 20% RH to 90% RH at 40°C |
| Maximum Altitude | 4600 meters (15,000 feet) |
| **Storage and Transport Restrictions** | |
| Ambient Temperature | – 20° to 65°C |
| Humidity, Non-condensing | 20% RH to 90% RH at 40°C |
| Maximum Altitude | 4600 meters (15,000 feet) |

## General Characteristics

| VXI Power Requirements | DC Current |
|---|---|
| No options installed | |
| +5.0 V | 5.50 A |
| +12.0 V | 0.56 A |
| –12.0 V | 0.05 A |
| +24.0 V | 0.44 A |
| –24.0 V | 0.42 A |
| –5.2 V | 0.95 A |
| –2.0 V | 0.03 A |
| Tachometer option installed (AYF) | |
| +5.0 V | 0.14 A |
| +12.0 V | 0.00 A |
| –12.0 V | 0.00 A |
| +24.0 V | 0.10 A |
| –24.0 V | 0.06 A |
| –5.2 V | 0.00 A |
| –2.0 V | 0.00 A |
| Source option installed (1D4) | |
| +5.0 V | 0.60 A |
| +12.0 V | 0.19 A |
| –12.0 V | 0.18 A |
| +24.0 V | 0.03 A |
| –24.0 V | 0.03 A |
| –5.2 V | 0.00 A |
| –2.0 V | 0.00 A |
| Dynamic Current+12.0 V | |
| +5.0 V | 0.20 A |
| +12.0 V | 0.02 A |
| –12.0 V | 0.01 A |
| +24.0 V | 0.01 A |
| –24.0 V | 0.01 A |
| –5.2 V | 0.02 A |
| –2.0 V | 0.01 A |

| | |
|---|---|
| **VXI Cooling Requirements** | 5.08 liters/second<br>0.51 mm $H_2O$ |
| **Warm-up Time** | 15 minutes |

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**Performance Benchmarks**

Because these performance benchmarks depend on the software and hardware configuration, they are included as supplemental, non-warranted characteristics.

| **VXI Data Transfer Rate** (P1 connector) | |
|---|---|
| From HP E1433B DRAM to VXI V743 Controller | 6.5 MB/s |
| From HP E1433B DRAM to MXI to external HP Series 700 Controller | 1.5 MB/s |
| From HP E1433B DRAM to VXLink interface | 345 KB/s |
| From HP E1433B DRAM to E6233B Pentium Controller | 1.6 MB/s |
| From HP E1433B DRAM to National MXI-2 to external 200 MHz Pentium Pro | 1.2 MB/s |

| **Local Bus Data Transfer Rate** | |
|---|---|
| From HP E1433B DRAM, one block, during continuous acquisition. | 15.7 MB/s |
| From HP E1433B's DRAM to HP E1562D | 5 MB/s to 7.8 MB/s |
| From HP E1433B's DRAM to HP E1562E | 10 MB/s to 15.7 MB/s |
| Maximum number of input channels for continuous throughput at 196 kSa/s sample rate | 40 channels |

| **FIFO Memory** | |
|---|---|
| (Maximum FIFO size, 32 MB DRAM installed) | 16 MSa/number active channels (opt. ANC) |

## Specification Note

Specifications describe warranted performance over the temperature range of 0° to 50°C, after a 15-minute warm-up from ambient conditions. Supplemental characteristics identified as "typical" provide useful information by giving non-warranted performance parameters. Typical performance is applicable from 20° to 30°C.

## Abbreviations

**Fs** = sample rate of ADC.
**Fc** = cut off frequency of high pass or low pass filters.
**dBfs** = dB relative to full scale amplitude range.
**dBc** = dB relative to carrier amplitude.
**Typical** = typical, non-warranted, performance specification included to provide general product information.

## Warranty Information

This product is distributed, warranted, and supported by Agilent Technologies.

The HP E1432A comes with a 3 year warranty. During that period, the unit will either be replaced or repaired, at Agilent Technologies option, and returned to the customer without charge.

## For More Information

http://www.tm.agilent.com/tmo/pia/data_acq/PIATop/English/index.html

HP E1432A
HP E1433B
HP E1434A
Product Overview
5965-9834E


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