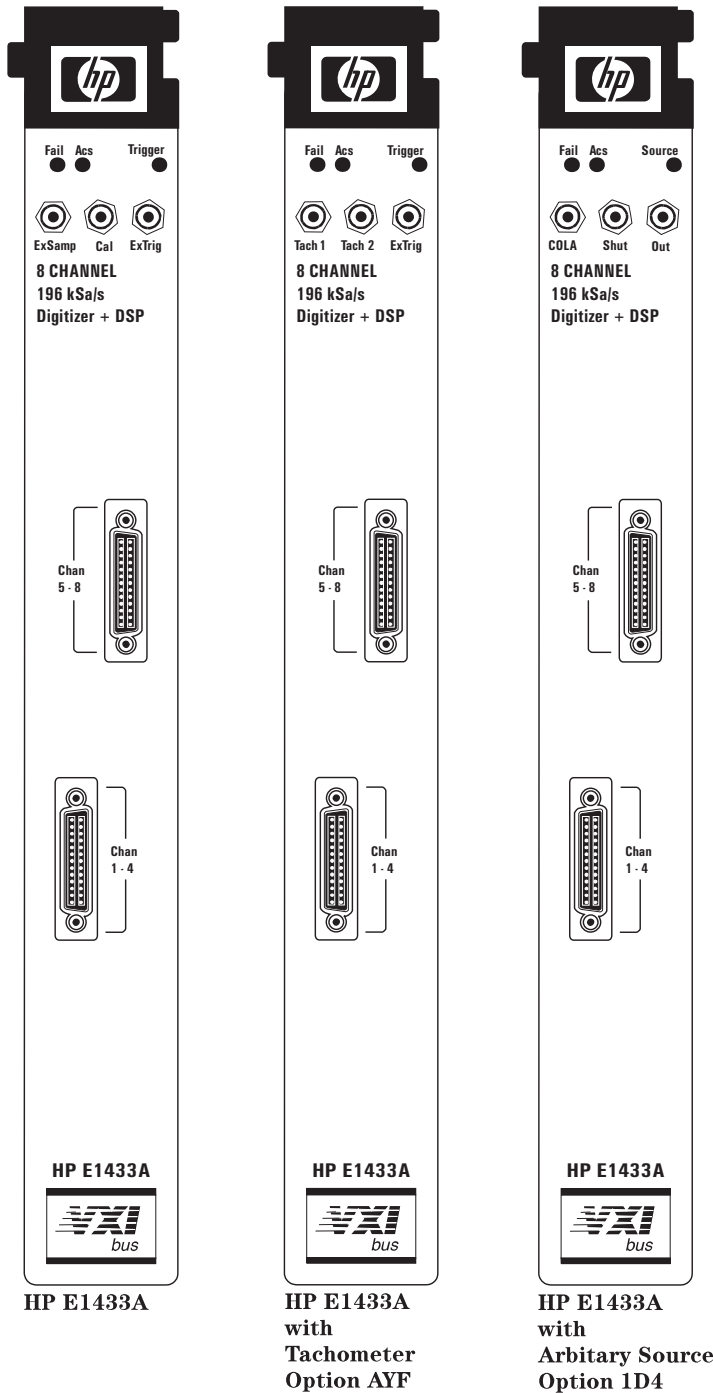


# HP E1433A

## Technical Specifications

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

Rev. April 1999



The HP E1433A 8-Channel 196 kSa/s Digitizer plus DSP is a C-size VXI module. "196 kSa/s" refers to the maximum sample rate of 196608 samples per second per channel.

The HP E1433A may contain either one or two 4-channel input assemblies so that the module may have a total of up to 8 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 up to 32 Mbytes of RAM maximizes total system performance and flexibility.

# Specifications

## Frequency

| Sample Rate (Hz)      | Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) |
|-----------------------|----------------|------------------|----------------|------------------|----------------|
| 196608 <sup>1</sup>   | 76800          | 8000             | 3125           | 610.3515         | 238.4185       |
| 192000 <sup>1</sup>   | 75000          | 7812.5           | 3051.757       | 600              | 234.375        |
| 163840 <sup>1</sup>   | 64000          | 7680             | 3000           | 520.8333         | 203.4505       |
| 156250 <sup>1</sup>   | 61035.15       | 6666.666         | 2604.166       | 512              | 200            |
| 153600 <sup>1</sup>   | 60000          | 6553.6           | 2560           | 500              | 195.3125       |
| 133333.3 <sup>1</sup> | 52083.33       | 6400             | 2500           | 488.2812         | 190.7348       |
| 131072 <sup>1</sup>   | 51200          | 6250             | 2441.406       | 480              | 187.5          |
| 128000 <sup>1</sup>   | 50000          | 6144             | 2400           | 416.6666         | 162.7604       |
| 125000 <sup>1</sup>   | 48828.125      | 6000             | 2343.75        | 409.6            | 160            |
| 122880 <sup>1</sup>   | 48000          | 5120             | 2000           | 400              | 156.25         |
| 102400 <sup>1</sup>   | 40000          | 5000             | 1953.125       | 390.625          | 152.5878       |
| 100000 <sup>1</sup>   | 39062.5        | 4915.2           | 1920           | 384              | 150            |
| 98304 <sup>1</sup>    | 38400          | 4882.812         | 1907.348       | 375              | 146.4843       |
| 96000 <sup>1</sup>    | 37500          | 4800             | 1875           | 320              | 125            |
| 81920 <sup>1</sup>    | 32000          | 4166.666         | 1627.604       | 312.5            | 122.0703       |
| 78125 <sup>1</sup>    | 30517.57       | 4096             | 1600           | 307.2            | 120            |
| 76800 <sup>1</sup>    | 30000          | 4000             | 1562.5         | 305.1757         | 119.2092       |
| 66666.66 <sup>1</sup> | 26041.66       | 3906.25          | 1525.878       | 300              | 117.1875       |
| 65536 <sup>1</sup>    | 25600          | 3840             | 1500           | 260.4166         | 101.7252       |
| 64000 <sup>1</sup>    | 25000          | 3333.333         | 1302.083       | 256              | 100            |
| 62500 <sup>1</sup>    | 24414.06       | 3276.8           | 1280           | 250              | 97.65625       |
| 61440 <sup>1</sup>    | 24000          | 3200             | 1250           | 244.1406         | 95.36743       |
| 51200 <sup>1</sup>    | 20000          | 3125             | 1220.703       | 240              | 93.75          |
| 50000 <sup>1</sup>    | 19531.25       | 3072             | 1200           | 208.3333         | 81.38020       |
| 49152 <sup>1</sup>    | 19200          | 3000             | 1171.875       | 204.8            | 80             |
| 48000 <sup>1</sup>    | 18750          | 2560             | 1000           | 200              | 78.125         |
| 40960                 | 16000          | 2500             | 976.5625       | 195.3125         | 76.29394       |
| 39062.5               | 15258.78       | 2457.6           | 960            | 192              | 75             |
| 38400                 | 15000          | 2441.406         | 953.6743       | 187.5            | 73.24218       |
| 33333.33              | 13020.83       | 2400             | 937.5          | 160              | 62.5           |
| 32768                 | 12800          | 2083.333         | 813.8020       | 156.25           | 61.03515       |
| 32000                 | 12500          | 2048             | 800            | 153.6            | 60             |
| 31250                 | 12207.03       | 2000             | 781.25         | 152.5878         | 59.60464       |
| 30720                 | 12000          | 1953.125         | 762.9394       | 150              | 58.59375       |
| 25600                 | 10000          | 1920             | 750            | 130.2083         | 50.86263       |
| 25000                 | 9765.625       | 1666.666         | 651.0416       | 128              | 50             |
| 24576                 | 9600           | 1638.4           | 640            | 125              | 48.82812       |
| 24000                 | 9375           | 1600             | 625            | 122.07031        | 47.68371       |
| 20480                 | 8000           | 1562.5           | 610.3515       | 120              | 46.875         |
| 19660.8               | 7680           | 1536             | 600            | 104.1666         | 40.69010       |
| 19531.25              | 7629.394       | 1500             | 585.9375       | 102.4            | 40             |
| 19200                 | 7500           | 1280             | 500            | 100              | 39.0625        |
| 16666.66              | 6510.416       | 1250             | 488.28125      | 97.65625         | 38.14697       |
| 16384                 | 6400           | 1228.8           | 480            | 96               | 37.5           |
| 16000                 | 6250           | 1220.703         | 476.8371       | 93.75            | 36.62109       |
| 15625                 | 6103.515       | 1200             | 468.75         | 80               | 31.25          |
| 15360                 | 6000           | 1041.666         | 406.9010       | 78.125           | 30.51757       |
| 13333.33              | 5208.333       | 1024             | 400            | 76.8             | 30             |
| 13107.2               | 5120           | 1000             | 390.625        | 76.29394         | 29.80232       |
| 12800                 | 5000           | 976.5625         | 381.4697       | 75               | 29.29687       |
| 12500                 | 4882.812       | 960              | 375            | 65.10416         | 25.43131       |
| 12288                 | 4800           | 833.3333         | 325.5208       | 64               | 25             |
| 12000                 | 4687.5         | 819.2            | 320            | 62.5             | 24.41406       |
| 10240                 | 4000           | 800              | 312.5          | 61.0351          | 23.84185       |
| 10000                 | 3906.25        | 781.25           | 305.1757       | 60               | 23.4375        |
| 9830.4                | 3840           | 768              | 300            | 52.08333         | 20.34505       |
| 9765.625              | 3814.697       | 750              | 292.9687       | 51.2             | 20             |
| 9600                  | 3750           | 640              | 250            | 50               | 19.53125       |
| 8333.33               | 3255.208       | 625              | 244.1406       | 48.82812         | 19.07348       |
| 8192                  | 3200           | 614.4            | 240            | 46.875           | 18.31054       |

Frequency (continued)

| Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) | Sample Rate (Hz) | Bandwidth (Hz) |
|------------------|----------------|------------------|----------------|------------------|----------------|
| 40               | 15.625         | 6.510416         | 2.543131       | 1.017252         | 0.3973642      |
| 39.0625          | 15.25878       | 6.4              | 2.5            | 1                | 0.390625       |
| 38.4             | 15             | 6.25             | 2.441406       | 0.976562         | 0.3814697      |
| 38.14697         | 14.90116       | 6.103515         | 2.384185       | 0.953674         | 0.3725290      |
| 37.5             | 14.64843       | 6                | 2.34375        | 0.9375           | 0.3662109      |
| 32.55208         | 12.71565       | 5.859375         | 2.288818       | 0.813802         | 0.3178914      |
| 32               | 12.5           | 5                | 1.953125       | 0.8              | 0.3125         |
| 31.25            | 12.20703       | 4.882812         | 1.907348       | 0.78125          | 0.3051757      |
| 30.51757         | 11.92092       | 4.8              | 1.875          | 0.762939         | 0.2980232      |
| 30               | 11.71875       | 4.768371         | 1.862645       | 0.75             | 0.2929687      |
| 26.04166         | 10.17252       | 4.6875           | 1.831054       | 0.732421         | 0.2861022      |
| 25.6             | 10             | 4.069010         | 1.589457       | 0.625            | 0.2441406      |
| 25               | 9.765625       | 4                | 1.5625         | 0.610351         | 0.2384185      |
| 24.41406         | 9.536743       | 3.90625          | 1.525878       | 0.6              | 0.234375       |
| 24               | 9.375          | 3.814697         | 1.490116       | 0.585937         | 0.2288818      |
| 23.4375          | 9.155273       | 3.75             | 1.464843       | 0.5              | 0.1953125      |
| 20               | 7.8125         | 3.255208         | 1.271565       | 0.476837         | 0.1862645      |
| 19.53125         | 7.629394       | 3.2              | 1.25           | 0.46875          | 0.1831054      |
| 19.2             | 7.5            | 3.125            | 1.220703       | 0.4069010        | 0.1589457      |
| 19.07348         | 7.450580       | 3.051757         | 1.192092       | 0.4              | 0.15625        |
| 18.75            | 7.324218       | 3                | 1.171875       | 0.390625         | 0.1525878      |
| 16.27604         | 6.357828       | 2.929687         | 1.144409       | 0.3814697        | 0.1490116      |
| 16               | 6.25           | 2.5              | 0.9765625      | 0.375            | 0.1464843      |
| 15.625           | 6.103515       | 2.441406         | 0.9536743      | 0.3125           | 0.1220703      |
| 15.25878         | 5.960464       | 2.4              | 0.9375         | 0.3051757        | 0.1192092      |
| 15               | 5.859375       | 2.384185         | 0.9313225      | 0.3              | 0.1171875      |
| 13.02083         | 5.086263       | 2.34375          | 0.9155273      | 0.2929687        | 0.1144409      |
| 12.8             | 5              | 2.034505         | 0.7947285      | 0.25             | 0.0976562      |
| 12.5             | 4.882812       | 1.953125         | 0.7629394      | 0.2384185        | 0.0931322      |
| 12.20703         | 4.768371       | 1.907348         | 0.7450580      | 0.234375         | 0.0915527      |
| 12               | 4.6875         | 1.875            | 0.7324218      | 0.2034505        | 0.0794728      |
| 11.71875         | 4.577636       | 1.627604         | 0.6357828      | 0.2              | 0.078125       |
| 10               | 3.90625        | 1.6              | 0.625          | 0.1953125        | 0.0762939      |
| 9.765625         | 3.814697       | 1.5625           | 0.6103515      | 0.1907348        | 0.0745058      |
| 9.6              | 3.75           | 1.525878         | 0.5960464      | 0.1875           | 0.0732421      |
| 9.536743         | 3.725290       | 1.5              | 0.5859375      | 0.15625          | 0.0610351      |
| 9.375            | 3.662109       | 1.464843         | 0.5722045      | 0.1525878        | 0.0596046      |
| 8.138020         | 3.178914       | 1.25             | 0.4882812      | 0.15             | 0.0585937      |
| 8.3.125          |                | 1.220703         | 0.4768371      | 0.1464843        | 0.0572204      |
| 7.8125           | 3.051757       | 1.2              | 0.46875        |                  |                |
| 7.629394         | 2.980232       | 1.192092         | 0.4656612      |                  |                |
| 7.5              | 2.929687       | 1.171875         | 0.4577636      |                  |                |

<sup>1</sup> These sample rates also have available bandwidths that are 1.15 times the bandwidth of this table.

Frequency Accuracy

± 0.012% (120 ppm)

## Input

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**Full Scale Input Ranges** (in volts peak) 5 mV to 10 V (1, 2, 5 steps)

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**Maximum Input Level** 42 V<sub>p</sub>

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### Input Impedance

(dc coupled or ac coupled above 10 Hz)

Differential 2 M $\Omega$  nominal  
Either side-to-chassis 1 M $\Omega$  nominal

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**Programmable AC Coupling 3 dB Corner Frequency** 1 to 100 Hz

[2 pole, 12 dB/oct.]

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### Common Mode Rejection Ratio

ac or dc coupled, 10 Hz to 1 kHz > 70 dB  
Maximum signal, low side to chassis  $\pm 10$  V<sub>pk</sub>  
Maximum signal, high side to chassis ( $V_T = 0$ )  $\pm 11.5$  V<sub>p</sub>  
Maximum signal, high side to chassis  $V_T \pm 10$  V<sub>pk</sub> (must be  $\leq 20$  V)  
( $V_T$  = transducer offset cancellation voltage setting)

---

### Amplitude Over-Range Detection

Common mode overload  $\pm 11.5$  V<sub>p</sub> (typical)  
  
Differential mode overload (dc coupled) 105% of full scale  
  
Differential mode overload (ac coupled)  
for cutoff frequency  $\leq 6$  Hz 100% of full scale  
for cutoff frequency  $> 6$  Hz 50% of full scale, worst case

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**Residual DC** 1% of full scale + 2 mV

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## Amplitude

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**Amplitude Accuracy at 1 kHz**  $\pm 0.5\%$  of reading,  $\pm 0.01\%$  of full scale

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### Flatness (relative to 1 kHz, at full scale)

< 29 kHz  $\pm 1\%$  ( $\pm 0.09$  dB)  
< 88 kHz  $\pm 2\%$  ( $\pm 0.17$  dB)

---

**Amplitude Resolution** 16 bits, less 5 dB over-range

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## Cross Channel Matching (any HP E1433A module in the same mainframe)

---

### Cross Channel Amplitude Match

(full-scale signal, input ranges equal)  
up to 29 kHz  $\pm 0.1$  dB  
29 kHz to 88 kHz  $\pm 0.2$  dB

---

### Cross Channel Phase Match

(full-scale signal, input ranges equal)  
ac coupled (freq  $> 2 \times$  AC HPF corner freq)  
to 750 Hz  $\pm 0.9^\circ$   
750 Hz to 88 kHz  $\pm (f/22000)^\circ$   
  
dc coupled  
10 Hz to 88 kHz  $\pm (f/22000)^\circ$   
at 1 kHz  $\pm 0.045^\circ$

## Dynamic Range

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**Resolution** 16 bits

---

### Spurious Free Dynamic Range\*

(includes spurs, harmonic distortion, intermodulation distortion, alias products and sidebands > 300 Hz)

(source impedance = 50  $\Omega$ )

|                                 |                      |
|---------------------------------|----------------------|
| 51.2 kSa/s $F_s$ , $\leq 1$ 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           |

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**Crosstalk** < -80 dBfs (typical)

(receiving channel source impedance = 50  $\Omega$ , low side grounded, full scale, < 10 kHz signal on other channels, input ranges within 20 dB)

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**Noise** (input terminated with 50  $\Omega$ , 5 mV range)

|                                  |                                |
|----------------------------------|--------------------------------|
| Noise density above 100 Hz       | < 70 nVrms/ $\sqrt{\text{Hz}}$ |
| Total rms noise, 10 Hz to 10 kHz | < 7 $\mu\text{Vrms}$           |

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## Trigger

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**Trigger Detection** Digital

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**Trigger Modes** Input, external, source, TTL TRG, software, RPM (requires option AYP)

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### Max Trigger Delay

(8 channels active)

|                    |                                       |
|--------------------|---------------------------------------|
| Pre-trigger delay  | 262 kSa (4 MB RAM), 2 MSa (32 MB RAM) |
| Post-trigger delay | 16 MSa                                |

\* 5 mV range degrades 4 dB.

# Option 1D4 Arbitrary Source Specifications

## General

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**Output Modes** Sine and pseudo random with burst , arbitrary waveform with continuous output

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### 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

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

## Signal Output

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**Number of Output Channels** 1

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**Maximum Amplitude** 10 Vp nominal

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**Output Impedance** < 0.5 Ω (typical)

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**Maximum Output Current** 100 mA (typical)

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**Maximum Capacitive Load** 0.01 μF (typical)

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### 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

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**Residual Output Noise Voltage**  
 (Freq > 500 Hz) < 500 nV/√Hz

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### Residual DC Offset

Offset after autozero ± 2 mV  
 Offset after shutdown ± 20 mV  
 Zeroing resolution 100 μV

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**Output Overload Trip** > 17 V

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**Amplitude Ramp-down Time (Programmable)** 0 to 30 seconds

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### Shutdown

Shutdown input TTL levels  
 Shutdown time < 5 s  
 Shutdown time, ac fail < 4 ms

## Sine Output Mode

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### Sine Frequency (65536 Hz Fs)

|                      |               |
|----------------------|---------------|
| Frequency range      | 0 to 25.6 kHz |
| Frequency resolution | 244 $\mu$ Hz  |

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### Amplitude Accuracy

(1 kHz sine wave, into  $\geq 200 \Omega$ )

|                           |                       |
|---------------------------|-----------------------|
| 10 Vp to 0.158 Vp ranges  | $\pm 0.20$ dB (2.3 %) |
| 0.152 Vp to 79 mVp ranges | $\pm 0.40$ dB (4.7 %) |

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|                              |              |
|------------------------------|--------------|
| Flatness (relative to 1 kHz) | $\pm 0.5$ dB |
|------------------------------|--------------|

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### Harmonic and Aliased-harmonic Distortion

( $\geq 1 \text{ k}\Omega$  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 |

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|                    |              |
|--------------------|--------------|
| Spurious responses | $< -60$ dBVp |
|--------------------|--------------|

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## Constant Level Output

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### Output Level at 1 kHz

|  |                |
|--|----------------|
| (after 1 second settling, amplitude scale factor $> 0.001$ ) | 1 Vp (nominal) |
|--|----------------|

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|                  |                                |
|------------------|--------------------------------|
| Output Impedance | 1.2 $\text{k}\Omega$ (typical) |
|------------------|--------------------------------|

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### 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 ( $\pm 1.0$ dB) (typical) |

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|                      |                     |
|----------------------|---------------------|
| Sine Wave Distortion | $-40$ dBc (typical) |
|----------------------|---------------------|

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(at 1 kHz, amplitude scale factor 0.1 to 1.0)

|                    |                    |
|--------------------|--------------------|
| Residual dc Offset | $< 5$ mV (typical) |
|--------------------|--------------------|

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## Summer Input

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|                     |       |
|---------------------|-------|
| Maximum Input Level | 10 Vp |
|---------------------|-------|

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|                                     |                         |
|-------------------------------------|-------------------------|
| Gain, Summer Input to Signal Output | $0 \pm 0.5$ dB at 1 kHz |
|-------------------------------------|-------------------------|

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|                 |                                  |
|-----------------|----------------------------------|
| Input Impedance | $> 10 \text{ k}\Omega$ (typical) |
|-----------------|----------------------------------|

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|                          |                        |
|--------------------------|------------------------|
| Flatness, dc to 25.6 kHz | $\pm 0.5$ dB (typical) |
|--------------------------|------------------------|

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|                      |                     |
|----------------------|---------------------|
| Sine Wave Distortion | $-80$ dBc (typical) |
|----------------------|---------------------|

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|                    |                |
|--------------------|----------------|
| Residual dc Offset | 1 mV (typical) |
|--------------------|----------------|

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# Option AYF Tachometer Input Specifications

## General

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Option AYF, Tachometer Input, provides two tachometer inputs. When this option is installed, 2 of the 3 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.

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|                     |  |
|---------------------|--|
| <b>Tach Counter</b> | 32-bit counter with roll-over detector bit |
|---------------------|--|

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|                         |                |
|-------------------------|----------------|
| <b>Decimate Counter</b> | 16-bit counter |
|-------------------------|----------------|

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### 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 |

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### Input Signal Timing

|                     |                          |
|---------------------|--------------------------|
| Minimum pulse width | 5 μs                     |
| Maximum pulse rate  | 100 kHz                  |
| Trigger holdoff     | 1 to 65536 clock periods |

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|                        |                 |
|------------------------|-----------------|
| <b>Input Impedance</b> | 20 kΩ (typical) |
|------------------------|-----------------|

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## Features

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### VXI Standard Information

Conforms to VXI revision 1.4  
C-size, single slot width  
Register-based programming  
"Slave" Data Transfer Bus functionality  
A24 address capability  
D32 data capability  
Optional Local Bus capability  
SMBUS driver and receiver  
Requires 2 or 4 TTLTRG\_ lines for multi-module synchronization

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### Signal Processing

33 MHz Motorola 96002 DSP  
2 banks of 128 K word static RAM  
4 M bytes dynamic RAM (32 M bytes with option ANC)  
128 K bytes Flash ROM  
Direct Memory Access (DMA) data transfer

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## Software Drivers

### Driver Type

C libraries with source code

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### Supported Operating Systems

Microsoft Windows 95 and NT<sup>®</sup>, and HP-UX 10.20

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### Supply Media

CD-ROM

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### VXI Plug & Play Compliance

C libraries support MS Windows 95 and NT, and HP-UX.

HP-UX 10.X for HP 9000  
Series 700 and 800 computers are  
X/Open Company UNIX 93  
branded products.

MS Windows is a U.S. registered  
trademark of Microsoft Corporation.

## Regulatory Compliance

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### Safety Standards

Designed for compliance to:  
UL 1244, 4th Edition  
IEC 348, 2nd Edition, 1978  
CSA C22.2, No. 231

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### Radiated Emissions

(tested in a "typical" system configuration, consisting of an HP E1401B Mainframe, HP V743 Controller, and HP E1432A module with option 1D4 or AYP)

CISPR 11: 1990, Group 1, Class A  
(requires connector shields HP E1400-80920 or HP E1421-80920)

Tested for compliance to the European Economic Area's EMC directive

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### Electrostatic Discharge

Tested for compliance to the European Economic Area's EMC directive

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### Radiated Immunity

Tested for compliance to the European Economic Area's EMC directive

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## Environmental

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### 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)

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### 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

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### 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  | 0.01 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 (1 D4)

|         |        |
|---------|--------|
| +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

|         |        |
|---------|--------|
| +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 |

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### VXI Cooling Requirements

5.08 liters/second  
0.51 mm H<sub>2</sub>O

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### Warm-up Time

15 minutes

## 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 E1433A DRAM to VXI V743 Controller                            | 6.5 MB/s |
| From HP E1433A DRAM to MXI to external HP Series 700 Controller       | 1.5 MB/s |
| From HP E1433A DRAM to VXLink interface                               | 345 kB/s |
| From HP E1433A DRAM to E6233A Pentium Controller                      | 1.6 MB/s |
| From HP E1433A DRAM to National MXI-2 to external 200 MHz Pentium Pro | 1.2 MB/s |

### Local Bus Data Transfer Rate

|   |                      |
|---|----------------------|
| From HP E1433A DRAM, one block, during continuous acquisition.                      | 15.7 MB/s            |
| From HP E1433A's DRAM to HP E1562D  | 5 MB/s to 7.8 MB/s   |
| From HP E1433A'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, 4MB DRAM installed)   | 2 MSa/number active channels (standard)  |
| (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

**F<sub>s</sub>** = sample rate of ADC.  
**F<sub>c</sub>** = cut off frequency of high pass or low pass filters.  
**dB<sub>f</sub>s** = dB relative to full scale amplitude range.  
**dB<sub>c</sub>** = dB relative to carrier amplitude.  
**Typical** = typical, non-warranted, performance specification included to provide general product information.

## Warranty Information

The HP E1433A comes with a 3-yr warranty. During that period, the unit will either be replaced or repaired, at HP's option, and returned to the customer without charge. There is an option available at extra cost which extends the repair support to five years.

## For More Information

[www.hp.com/go/data\\_acq](http://www.hp.com/go/data_acq)

HP E1432/33/34A  
Product Overview  
5965-9834E

For more information on Hewlett-Packard test & measurement products, applications, services, and for a current sales office listing, visit our web site, <http://www.hp.com/go/tmdir>. You can also contact one of the following centers and ask for a test and measurement representative.

### United States:

Hewlett-Packard Company  
Test and Measurement Call Center  
P.O. Box 4026  
Englewood, CA 90155-4026  
1 800 452 4844

### Canada:

Hewlett-Packard Canada Ltd.  
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### Europe:

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### Japan:

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