

DVX 25XX Series

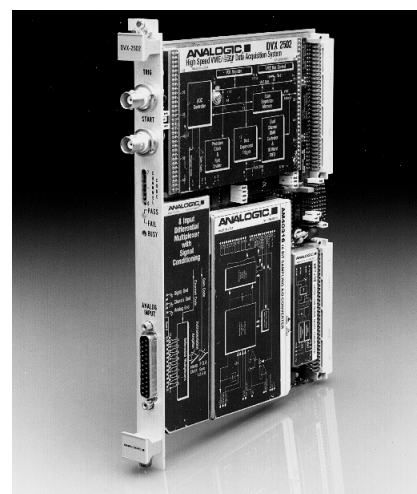
Multichannel Data Acquisition/ Digitizer Systems

The DVX 25XX Series of high resolution, multichannel Data Acquisition/ Digitizer Systems combines the superior precision of 14-, or 16-bit measurements with the high throughput of 200 kHz, 400 kHz, and 1 MHz, and the compactness of a dual eurocard (6U) VME format (VXI size B). Fully compatible with the VME specification Rev. C1, and VXI specification Rev. 1.3, the DVX 25XX Series occupies a single slot in a VME chassis and provides unparalleled price/performance ratio when used either alone or in combination with other VXI/VME based boards (multiplexers, digital-to-analog converters) of the Analogic DVX 2xxx family of cards. Reflecting Analogic's experience in precision instrumentation, the DVX 25XX Series has been designed to meet the stringent demands of fast and accurate measurements associated with multichannel data acquisition applications.

Eight shielded, differential inputs are provided with both voltage and current protection. Each unit is directly expandable to 256 channels with the Analogic family of DVX multiplexer boards. The eight input signals are multiplexed via an instrumentation amplifier and a programmable gain amplifier, with four software selectable gains, into an ultrafast, high resolution, sampling analog-to-digital converter. The front-end switching and settling time of the DVX 25XX Series have been optimized to support the high performance of the A/D converter.

The DVX 25XX Series provides a powerful 2-channel on-board DMA controller as a standard feature. The DMA controller executes fast transfers over the VMEbus sending data directly to system memory, significantly enhancing total system performance by dramatically reducing the I/O overhead of the bus. Once initialized by the host computer, the DMA controller operates in transparent mode.

Three flexible trigger sources are available: a user supplied external trigger, an internal trigger, and a data-dependent trigger produced by the occurrence of a prespecified event on a selected channel. Before beginning the data acquisition, trigger information, as well as channel selection inside a scan, and gain setting are downloaded into the timing and control unit resident on the DVX 25XX Series of cards. For ease of integration, fully compatible software drivers are available. No coding is required; all necessary commands are included in the drivers.



FEATURES

- ☐ 14-, 16-Bit Resolution
- ☐ 200, 400 kHz; or 1 MHz Throughput
- ☐ Dual Channel DMA Controller
- ☐ 8 Differential Inputs
- ☐ Expandability up to 256 Channels
- ☐ Voltage & Current Input Protection
- ☐ Excellent CMRR
- ☐ Dynamically Set Gain per Channel on DVX 2502 & 2503
- ☐ Every Cycle on DVX 2504
- ☐ Variable Sampling Rate
- ☐ Multiple Sample Clock Sources
- ☐ Precision Internal Clock
- ☐ Versatile Trigger Unit
- ☐ Seven Level Interrupt
- ☐ VXI Support
- ☐ DC to DC Converter, Powered by +5V Only
- ☐ Self-Test Capability
- ☐ Software Drivers Available

APPLICATIONS

- ☐ Real Time Data Acquisition
- ☐ Precision Instrumentation
- ☐ Automatic Test Equipment
- ☐ Monitoring and Control
- ☐ Audio
- ☐ Sonar

SPECIFICATIONS¹

ANALOG INPUTS

Number of Channels

DXV 2502

8 differential,
expandable to 256

DVX 2503

8 differential,
expandable to 256

DVX 2504

8 differential,
expandable to 256

Input Ranges

Gain 1	±5V, ±10V, 0 to +10V
Gain 2	±2.5V, ±5V, 0 to +5V
Gain 4	±1.25V, ±2.5V, 0 to +2.5V
Gain 8	±0.625V, ±1.25V, 0 to +1.25V

±5V, ±10V, 0 to +10V	±10V
±2.5V, ±5V, 0 to +5V	±5V
±1.25V, ±2.5V, 0 to +2.5V	±2.5V
±0.625V, ±1.25V, 0 to +1.25V	±1.25V

Input Bias Current

5 nA Max.

5 nA Max.

5 nA Max.

Input Resistance

100 MΩ Typ.

100 MΩ Typ.

100 MΩ Typ.

Input Capacitance

70 pF Max.

70 pF Max.

70 pF Max.

Common Mode Voltage

±10V Max.

±10V Max.

±10V Max.

Input Overvoltage Protection

±25V Max.

±25V Max.

±25V Max.

Input Current Protection

50 mA Max.

50 mA Max.

25 mA Max.

CLOCK/TRIGGER INPUTS

Logic Levels, LSTTL/CMOS Compatible

Logic "0" 0.8V Max.

0.8V Max.

0.8V Max.

Logic "1" 2.0V Min.

2.0V Min.

2.0V Min.

Termination

50Ω

50Ω

50Ω

AMPLIFIER CHARACTERISTICS

Gain 1, 2, 4, 8 (±0.02% Max.)

1, 2, 4, 8 (±0.02% Max.)

1, 2, 4, 8 (±0.02% Max.)

Offset Voltage ±10 mV Max.

±10 mV Max.

±55 mV Max

Slew Rate 12 V/μs Min.

80 V/μs Min.

18 V/μs Min.

CMRR 100 dB @ 60 Hz Typ.

100 dB @ 60 Hz Typ.

86 dB @ 60 Hz Min.

Full Power Bandwidth 200 kHz

400 kHz

0.6 MHz

Settling Time
(10V Step, Gain = 1) 1.5 μs Typ. to ±0.001%

1.5 μs Typ. to ±0.001%

0.9 μs Typ. to ±0.008%

DYNAMIC CHARACTERISTICS

Maximum Sampling Rate 204.8 kHz

409.6 kHz

1.024 MHz

Noise (0.5 LSB + 30 μV) rms

(0.5 LSB + 50 μV) rms

800 μV RMS Max. (@ Unity Gain)

(Referred to input and measured over
700 kHz equivalent noise bandwidth)

Differential Crosstalk -96 dB (@ 1 kHz) Typ.

-90 dB (@ 1 kHz) Typ.

-83 dB (@ 20 kHz) Max.

S/H Aperture Delay 25 ns Typ.

25 ns Typ.

20 ns Typ.

S/H Aperture Jitter ±400 ps RMS Max.

±100 ps RMS Max.

±100 ps RMS Max.

S/H Feedthrough -90 dB (@ 1 kHz) Typ.

-90 dB (@ 1 kHz) Typ.

-75 dB (@ 20 kHz) Typ.

Peak Distortion^(2,4) -96 dB Typ. (@ 10 kHz)

-91 dB Typ. (@ 10 kHz)

-82 dB Typ. (@ 50 kHz)

Total Harmonic Distortion^(3,4) -91 dB Typ. (@ 10 kHz)

-90 dB Typ. (@ 10 kHz)

-80 dB Typ. (@ 50 kHz)

TRANSFER CHARACTERISTICS

Resolution 16 Bits

16 Bits

14 Bits

Quantization Error ±0.5 LSB Max.

±0.5 LSB Max.

±0.5 LSB Max.

Integral Non-Linearity ±0.003% FSR Max.

±0.003% FSR Max.

±0.006% FSR Max.

No Missing Codes Guaranteed from
0°C to +50°C

Guaranteed from
0°C to +50°C

Guaranteed from
0°C to +50°C

Monotonicity Guaranteed

Guaranteed

Guaranteed



STABILITY (0°C TO +50°C)**Required Warm-up Time
(for ultimate specifications)****Offset Tempco****Gain Tempco****Differential Non-Linearity Tempco****Precision Clock****Recommended Recalibration****DXV 2502**

15 minutes

50 $\mu\text{V}/^\circ\text{C}$ Max.20 ppm FSR/ $^\circ\text{C}$ Max. ± 1 ppm FSR/ $^\circ\text{C}$ Max. ± 10 ppm, 0-50 $^\circ\text{C}$

6 months

DVX 2503

15 minutes

50 $\mu\text{V}/^\circ\text{C}$ Max.20 ppm FSR/ $^\circ\text{C}$ Max. ± 1 ppm FSR/ $^\circ\text{C}$ Max. ± 10 ppm, 0-50 $^\circ\text{C}$

6 months

DVX 2504

15 minutes

200 $\mu\text{V}/^\circ\text{C}$ Max.20 ppm FSR/ $^\circ\text{C}$ Max. ± 2 ppm/ $^\circ\text{C}$ Max. ± 10 ppm, 0-50 $^\circ\text{C}$

6 months

TRIGGER (START/STOP) MODES**Internal**Software write to register.
Automatically synchronized
with on-board precision clock.Software write to register
Automatically synchronized
with on-board precision clock.Software write to register.
Automatically synchronized
with on-board precision clock.**External (TTL Active Low)**

Via front panel BNC

Via front panel BNC

Via front panel BNC

Data DependentGenerated at the occurrence
of a predefined value, at a
monitored channelGenerated at the occurrence
of a predefined value, at a
monitored channelGenerated at the occurrence
of a predefined value, at a
monitored channel**SAMPLE CLOCK****DVX 2502**Internal via programmable
divider and 3.6864 MHz
 $\pm 0.001\%$ Clock.
Produces 3.6k samples/sec
to 204.8k samples/sec in
1006 steps.External, 2.5 MHz to 4.0 MHz,
TTL, 50% duty cycle clock via
front panel BNC connector &
Internal, programmable 10-bit
divider. Min. sample rate =
2.5 MHz $\lceil 1023 = 2.4\text{k}$
samples/sec.External, 0 to 204.8 kHz
sample clock via front panel
BNC connector or P2
TTLTRG line per VXI spec.
Clock signal is TTL active
low, edge triggered with
low period = 150-200 ns.Master/slave(s) for
synchronizing multiple
modules via P2 TTLTRG
line per VXI spec.**DVX 2503**Internal via programmable
divider and 3.6864 MHz
 $\pm 0.001\%$ Clock.
Produces 3.6k samples/sec
to 409.6k samples/sec in
1015 steps.External, 2.5 MHz to 4.0 MHz,
TTL, 50% duty cycle clock via
front panel BNC connector &
Internal, programmable 10-bit
divider. Min. sample rate =
2.5 MHz $\lceil 1023 = 2.4\text{k}$
samples/sec.External, 0 to 409.6 kHz
sample clock via front panel
BNC connector or P2
TTLTRG line per VXI spec
Clock signal is TTL active
low, edge triggered with
low period = 150-200 ns.Master/slave(s) for
synchronizing multiple
modules via P2 TTLTRG
line per VXI spec.**DVX 2504**Internal via programmable
divider and 3.072 MHz
 $\pm 0.001\%$ Clock.
Produces 3.0k samples/sec
to 1024k samples/sec in
1021 steps.External, 2.5 MHz to 4.0 MHz,
TTL, 50% duty cycle clock via
front panel BNC connector &
Internal, programmable 10-bit
divider. Min. sample rate =
2.5 MHz $\lceil 1023 = 2.4\text{k}$
samples/sec.External, 0 to 1024 kHz
sample clock via front panel
BNC connector or P2
TTLTRG line per VXI spec
Clock signal is TTL active
low, edge triggered with
low period = 150-200 ns.Master/slave(s) for
synchronizing multiple
modules via P2 TTLTRG
line per VXI spec.**DATA TRANSFER****Output Coding**Binary, Offset Binary, Two's
ComplementBinary, Offset Binary, Two's
ComplementBinary, Offset Binary, Two's
Complement**Via VMEbus**16-bit word transfer via
on-card DMA using a 1k
word FIFO buffer16-bit word transfer via
on-card DMA using a 1k
word FIFO buffer16-bit word transfer via
on-card DMA using a 1k
word FIFO buffer**Interrupts**FIFO status or
DMA buffer filledFIFO status or
DMA buffer filledFIFO status or
DMA buffer filled**Via VXI Local Bus**2 successive bytes
transfer to adjacent slot2 successive bytes
transfer to adjacent slot2 successive bytes
transfer to adjacent slot**VXI/VME COMPLIANCE****VXI**Register Based,
Local Bus UserRegister Based,
Local Bus UserRegister Based,
Local Bus User**VME**A24/16, D16, I1, Slave
A24, D16 Master (DMA)A24/16, D16, I1, Slave
A24, D16 Master (DMA)A24/16, D16, I7, Slave
A24, D16, RWD, Master (DMA)

	DXV 2502	DVX 2503	DVX 2504
SCAN SEQUENCE CONTROLLER			
Number of Steps	1024	1024	1024
Gain Change Capability	Every scan list entry. Rated performance maintained.	Every scan list entry. Rated performance maintained.	Once per Scan Sequence Cycle. All entries within a scan list must be at same gain
Maxi. No. of Multiplexed Channels	256	256	256
FRONT PANEL INDICATORS			
Pass/Fail LED	Green/Red	Green/Red	Green/Red
Busy LED	Red	Red	Red
Channel Selection	Green	Green	Green
POWER REQUIRED			
+5V Supply	+4.75V Min., +5.25V Max.	+4.75V Min., +5.25V Max.	+4.75V Min., +5.25V Max.
Power Consumption	20W Max.	20W Max.	22W Max.
ENVIRONMENTAL AND MECHANICAL			
Temperature Range			
Rated Performance	0°C to +50°C	0°C to +50°C	0°C to +50°C
Storage	-25°C to +75°C	-25°C to +75°C	-25°C to +75°C
Relative Humidity	0 to 85% non-condensing up to +40°C	0 to 85% non-condensing up to +40°C	0 to 85% non-condensing up to +40°C
Recommended Forced Air Cooling	10 cubic feet per minute	10 cubic feet per minute	10 cubic feet per minute
Dimensions	6U (B VXI)	6U (B VXI)	6U (B VXI)
Front Panel Potential	Chassis Ground	Chassis Ground	Chassis Ground
Weight	1.75 Lb/.79 Kg	1.75 Lb/.79 Kg	1.75 Lb/.79 Kg

NOTES:

1. Unless otherwise noted all specifications apply at +25°C.
2. Peak Distortion represents the ratio between the highest spurious frequency component below the Nyquist rate and the signal.
3. Total Harmonic Distortion represents the ratio between the rms sum of all harmonics up to the 20th harmonic and the RMS value of the signal.
4. $\pm 10V$ input signal.
5. Single gain setting per scan.

Specifications subject to change without notice.

Ordering Guide

DVX 2502

16-Bit, 200 kHz DAS/Digitizer

DVX 2502 – B05 – Bipolar, $\pm 5V$

DVX 2502 – B10 – Bipolar, $\pm 10V$

DVX 2502 – U10 – Unipolar, 0 to $\pm 10V$

DVX 2503

16-Bit, 400 kHz DAS/Digitizer

DVX 2503 – B05 – Bipolar, $\pm 5V$

DVX 2503 – B10 – Bipolar, $\pm 10V$

DVX 2503 – U10 – Unipolar, 0 to $\pm 10V$

DVX 2504-B10

14-Bit, 1 MHz DAS/Digitizer

82-5041

DVX 2502 Manual

82-5059

DVX 2503 Manual

82-5085

DVX 2504 Manual