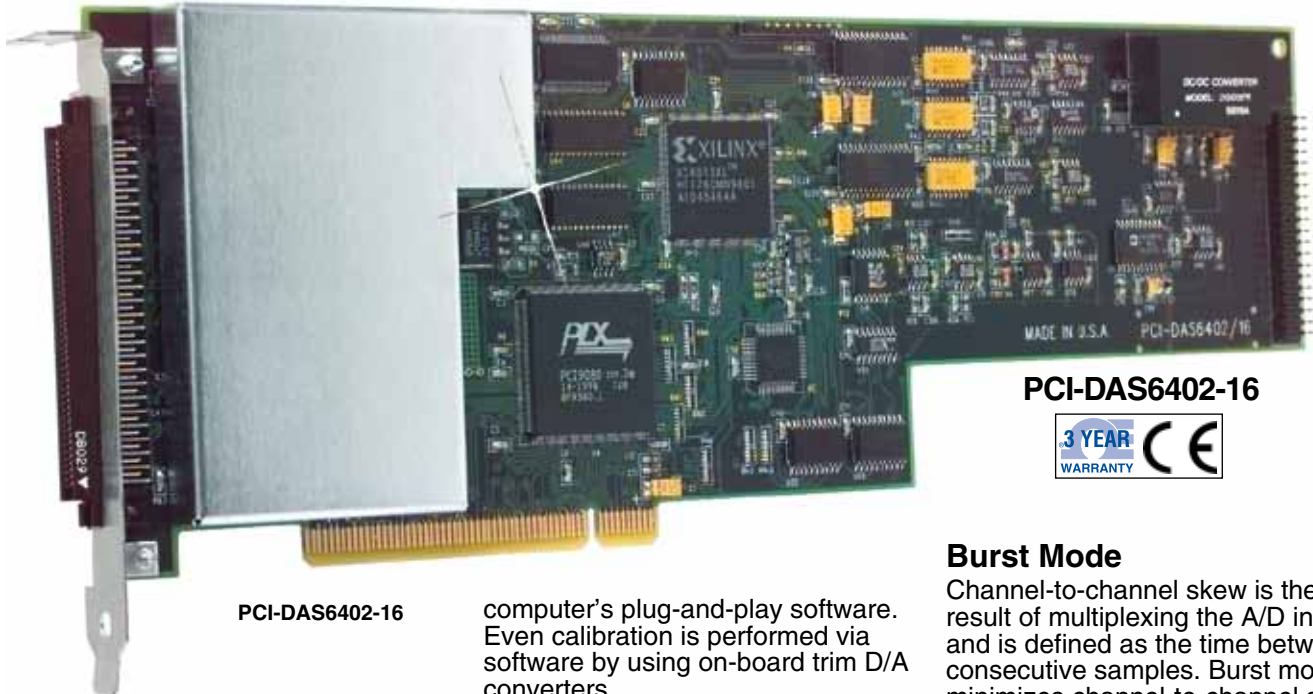


High Speed, 16-Bit, 64 Channel Analog Input Board with Analog Outputs and Digital I/O for the PCI Bus



PCI-DAS6402-16

PCI-DAS6402-16



- ✓ 64 Channel Single-Ended or 32 Differential Inputs
- ✓ 16-Bit A/D Resolution
- ✓ 200 kHz Sample Rate
- ✓ Analog Trigger
- ✓ Two 16-Bit D/A Outputs
- ✓ One 16-Bit Counter and 32 Bits Digital I/O
- ✓ Fully Plug-and-Play and Auto-Calibrating

The PCI-DAS6402-16 analog and digital I/O board sets a new standard for high channel count, high resolution data acquisition on the PCI-bus. Offering 64 single-ended or 32 differential 16-bit analog inputs with sample rates up to 200 kHz, two 16-bit analog outputs, 32 bits of digital I/O and one 16-bit counter. The board offers a variety of analog and digital trigger modes with trigger levels and direction selectable by software.

The PCI-DAS6402-16 is completely plug-and-play. There are no switches, jumpers or potentiometers on the board. All board addresses, interrupt channels, etc. are set by your

computer's plug-and-play software. Even calibration is performed via software by using on-board trim D/A converters.

Analog Inputs

The PCI-DAS6402-16 provides 32 fully differential or 64 single-ended analog inputs. The input mode is software selectable, with no switches or jumpers to set. The board offers a 200 kHz maximum sample rate at any gain setting (for multiple channel scanning, divide 200 kHz by the number of channels). An 8 Kilosample gain/channel queue is available making long, complex sample sequencing simple. An 8 K sample FIFO assures data taken from the board is transferred into computer memory without the possibility of missed samples.

Software or the gain/channel queue selects the bipolar/unipolar input configuration as well as selecting among the input ranges. The table below details the input ranges and resolutions for the available input configurations and gains.

| BIPOLAR: | | UNIPOLAR: | |
|----------|-------------|-------------|-------------|
| RANGE: | RESOLUTION: | RANGE: | RESOLUTION: |
| ±10 V | 305 μV | 0 TO 10 V | 153 μV |
| ±5 V | 153 μV | 0 TO 5 V | 76.3 μV |
| ±2.5 V | 76.3 μV | 0 TO 2.5 V | 38.3 μV |
| ±1.25 V | 38.1 μV | 0 TO 1.25 V | 19.1 μV |

Burst Mode

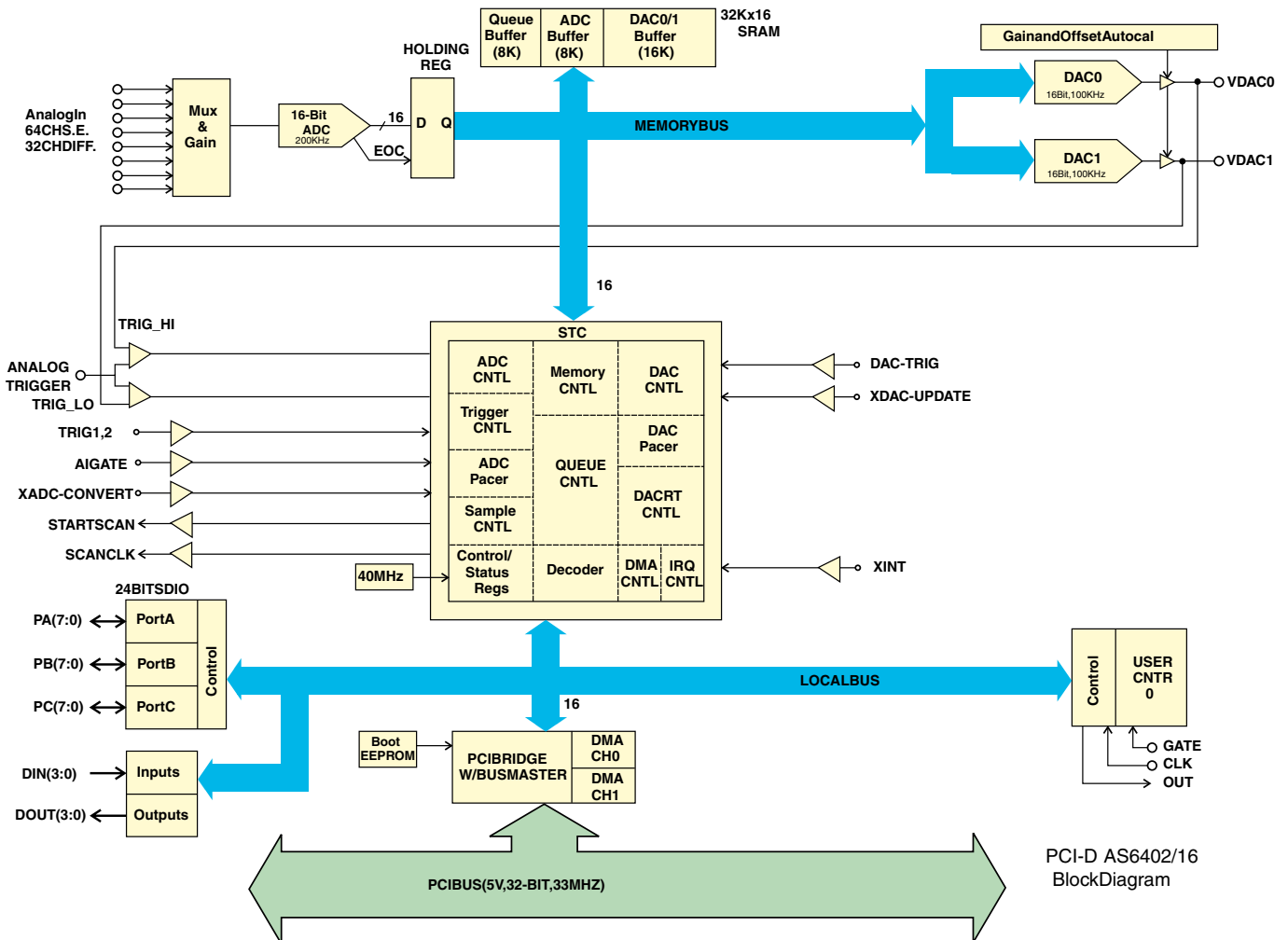
Channel-to-channel skew is the result of multiplexing the A/D inputs and is defined as the time between consecutive samples. Burst mode minimizes channel-to-channel skew by clocking the A/D at a high rate between successive samples within a scan, and then waiting a specified time before starting a new scan. The PCI-DAS6402 provides burst mode with a 5μs minimum sample skew/delay.

Analog Outputs

The PCI-DAS6402-16 provides two high speed 16-bit analog outputs. The analog outputs are updated via on-board 16 K FIFO and provide a 100 KHz max. update rate. Repetitive D/A-based waveforms can be stored in on-board memory and generated without requiring ongoing PCI bus transfers. Software selectable ranges of 0 to 10 V, 0 to 5 V, ±10 V and ±5 V are available, and channels may be set at different ranges. The board supports simultaneous full speed operation of both the A/D and D/A.

Parallel Digital I/O

The PCI-DAS6402-16 provides 32 bits of digital I/O. An 82C55 chip provides 24 bits of CMOS compatible I/O at the board's 40-pin auxiliary connector. Four LSTTL compatible digital inputs and four outputs are also provided on the main 100-pin.



Counter/Timers

The PCI-DAS6402-16 provides one 16-bit down counter (1/3 of an 82C54). The counter provides clock, gate and output connections at the user I/O connector.

Wiring

All analog, triggering and counter/timer connections are through a 100-pin high-density connector. The C100FF-XX series cable splits the 100 pins into separate 50-pin cables. The first 50-pin cable contains the signals from pins 1-50, while the second carries pins 51-100. These 50-pin connectors are compatible with the CIO-MINI50, and BNC-series of interconnects. The 24-bits of high current digital I/O are available on an 40 pin header. From the 40-pin header the user connect to the optional BP40-37 which brings these pins out to the standard

connector and installs in any unused slot. This 37-pin connector is then pin compatible with all DIO24 series boards (and all of our 8- and 24-bit digital signal conditioning boards). Alternatively, the 40-pin header may be brought out directly with the C40FF-2 cable and connected directly to a CIO-MINI40 screw terminal board.

Software Support

The PCI-DAS6402 series is supplied with InstaCal software for calibration and test. In addition, it is also supported by the optional Universal Library. The Universal Library is a set of I/O libraries and drivers for those users creating their own custom programs. The Universal Library is compatible with most Windows (32-bit) based languages and supports the entire PCI-DAS and CIO families of boards. An optional driver for LabVIEW is also available.

Specifications

ANALOG INPUT

Resolution: 16-bits

Number of Channels: 32 diff/ 64 SE, software selectable

A/D Conversion Time: 5 μ s

Sample Rate: 200 KHz (divide by number of channels in use)

Programmable Ranges: ± 10 V, ± 5 V, ± 2.5 V, ± 1.25 V, 0 to 10 V, 0 to 5 V, 0 to 2.5 V, 0 to 1.25 V

A/D Pacing: programmable: internal counter, external source or software polled

Channel/Gain Queue: 8192 samples.

Burst Mode: software selectable option, skew = 5 μ s



PCI-DAS6402-16 40 Pin Connector

A/D Trigger Sources:

External: analog or digital

A/D TRIGGERING MODES

Digital: SW configurable for edge (triggered) or level-activated (gated), programmable polarity (rising/falling edge, high/low gate).

Analog: SW configurable for above/below reference, in/out window and hysteresis.

Pre-Trigger: unlimited pre- and post-trigger sample sizes, compatible with digital and analog trigger modes

Diff. Linearity Error: ±1.25 V range, ±3 LSB, all other ranges ±1 LSB

Integral Linearity Error: ±1.25 V range, ±3 LSB. all other ranges, ±1.5 LSB

Input Leakage Current: 200 nA (25 Deg C)

Input Impedance: 10 Meg Ohms, min

Maximum Input Voltage: ±15 V

COUNTERS

Configuration: one 16-bit down counter (1/3 of an 82C54)

Clock Input Frequency: 10 Mhz max

High Pulse Width (clk input): 30 ns min

Low pulse Width (clk input): 50 ns min

Gate Width High or Low: 50 ns min

Input Low Voltage: 0.8 V max

Input High Voltage: 2.0 V min

Output Low Voltage: 0.4 V max

Output High Voltage: 3.0 V min

ANALOG OUTPUTS

Resolution: 16-bits

Number of Channels: 2

Voltage Ranges: ±10 V, ±5 V, 0 to 5 V, 0 to 10 V. (each channel independently programmable)

D/A Update Rate: 100 KHz on each D/A operating in single channel or simultaneous update mode

Arbitrary Waveform Mode: supports repetitive waveforms to 16 Ksample

D/A Pacing: internal or external clock or software paced

D/A Trigger Modes: software or external gate

Offset Error: ±100 uV max, all ranges

Differential Nonlinearity: ±1 LSB max

Integral Nonlinearity: ±1 LSB max

Settling Time (10V step to .0008%): 6µs typ

Slew Rate: 10 V ranges, 6 V/uS. 5 V ranges, 3 V/uS

Current Drive: ±5 mA min

Short-Circuit Current: ± 35 mA indefinite

Output Impedance: 0.1 Ohms max

Miscellaneous: power up/reset, all DAC's set to 0 volts

PCI-DAS6402-16 100 Pin Connector

| | | | | | |
|------|----|---|-----|---|---|
| IN1 | IN | 0 | 1 | 0 | 0 |
| IN2 | IN | 0 | 2 | 0 | 0 |
| IN3 | IN | 0 | 4 | 0 | 0 |
| IN3 | IN | 0 | 6 | 0 | 0 |
| IN5 | IN | 0 | 8 | 0 | 0 |
| IN5 | IN | 0 | 10 | 0 | 0 |
| IN6 | IN | 0 | 12 | 0 | 0 |
| IN6 | IN | 0 | 14 | 0 | 0 |
| IN7 | IN | 0 | 16 | 0 | 0 |
| IN7 | IN | 0 | 18 | 0 | 0 |
| IN8 | IN | 0 | 20 | 0 | 0 |
| IN8 | IN | 0 | 22 | 0 | 0 |
| IN9 | IN | 0 | 24 | 0 | 0 |
| IN9 | IN | 0 | 26 | 0 | 0 |
| IN10 | IN | 0 | 28 | 0 | 0 |
| IN10 | IN | 0 | 30 | 0 | 0 |
| IN11 | IN | 0 | 32 | 0 | 0 |
| IN11 | IN | 0 | 34 | 0 | 0 |
| IN12 | IN | 0 | 36 | 0 | 0 |
| IN12 | IN | 0 | 38 | 0 | 0 |
| IN13 | IN | 0 | 40 | 0 | 0 |
| IN13 | IN | 0 | 42 | 0 | 0 |
| IN14 | IN | 0 | 44 | 0 | 0 |
| IN14 | IN | 0 | 46 | 0 | 0 |
| IN15 | IN | 0 | 48 | 0 | 0 |
| IN15 | IN | 0 | 50 | 0 | 0 |
| IN16 | IN | 0 | 52 | 0 | 0 |
| IN16 | IN | 0 | 54 | 0 | 0 |
| IN17 | IN | 0 | 56 | 0 | 0 |
| IN17 | IN | 0 | 58 | 0 | 0 |
| IN18 | IN | 0 | 60 | 0 | 0 |
| IN18 | IN | 0 | 62 | 0 | 0 |
| IN19 | IN | 0 | 64 | 0 | 0 |
| IN19 | IN | 0 | 66 | 0 | 0 |
| IN20 | IN | 0 | 68 | 0 | 0 |
| IN20 | IN | 0 | 70 | 0 | 0 |
| IN21 | IN | 0 | 72 | 0 | 0 |
| IN21 | IN | 0 | 74 | 0 | 0 |
| IN22 | IN | 0 | 76 | 0 | 0 |
| IN22 | IN | 0 | 78 | 0 | 0 |
| IN23 | IN | 0 | 80 | 0 | 0 |
| IN23 | IN | 0 | 82 | 0 | 0 |
| IN24 | IN | 0 | 84 | 0 | 0 |
| IN24 | IN | 0 | 86 | 0 | 0 |
| IN25 | IN | 0 | 88 | 0 | 0 |
| IN25 | IN | 0 | 90 | 0 | 0 |
| IN26 | IN | 0 | 92 | 0 | 0 |
| IN26 | IN | 0 | 94 | 0 | 0 |
| IN27 | IN | 0 | 96 | 0 | 0 |
| IN27 | IN | 0 | 98 | 0 | 0 |
| IN28 | IN | 0 | 100 | 0 | 0 |



The C10-MINI50 screw terminal board



OMEGACARESM extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARESM covers parts, labor and equivalent loaners.



DAS Wizard is an optional software program that provides direct data collection into Microsoft Excel.

DIGITAL I/O

Digital Bits: 32

Configuration: 24-bit, 82C55 at Aux 40-pin connector, 4 dedicated input & 4 dedicated output bits on 100-pin main connector

Configuration: 2 banks of 8, 2 banks of 4, programmable by bank as input or output

Default/Reset State: input, high impedance 82C55

Output High: 2.4 volts @ -2.5 mA min

Output Low: 0.5 volts @ 2.5 mA min

Input High: 2.0 volts min, 7 volts absolute max

Input Low: 0.8 volts max, -0.5 volts absolute min

DEDICATED I/O BITS (4 input, 4 output)

Input / Output Device: 74LS175

Default/Reset State: all 4 outputs to logic low

Output High: 2.4 volts @ -0.4 mA min

Output Low: 0.5 volts @ 8.0 mA min

Input High: 2.0 volts min, 7 volts absolute max

Input Low: 0.8 volts max, -0.5 volts absolute min

INTERRUPTS

Interrupt Enable: software programmable

Interrupt Sources: external (rising TTL edge event) or a variety of internal FIFO status sources

ENVIRONMENTAL

Operating Temperature Range: 0 to 70°C

Storage Temperature Range: -40 to 100°C

Humidity: 0 to 90% non-condensing

Power Consumption: operating, +5 V @ 2.7 A typical, 3.1 A max

To Order

| Model No. | Description |
|----------------|--|
| PCI-DAS6402-16 | 64-channel, 200 KHz, 16-bit board with two D/A and 32 Digital I/O for PCI-bus computers. |
| C10-MINI50 | 50-pin, screw terminal board (two are required) |
| C10-MINI40 | 40-pin, screw terminal board for digital I/O auxiliary connector. (requires C40FF-2) |
| BNC-16SE | BNC interface box for single-ended mode. Four are required to connect all 64 channels. |
| BNC-16DI | BNC interface box for differential mode. Four are required to connect to all 32 channels. |
| C100FF-2 | 100 pin ribbon cable, 2' long. Splits 100 pin connector into two 50-pin connectors.(one is required) |
| C40FF-2 | 40-pin ribbon cable, 2' long, for C10-MINI40 |
| C37FF-2 | 37-pin ribbon cable, 2' long, for C10-ERB24 |
| BP40-37 | 40 pin to 37 pin adapter. Brings out the 40-pin aux. Connector to back of PC. Uses additional PC slot. |

PCI-DAS6402-16 series comes with Instacal test software and a complete operator's manual.

Ordering Example: PCI-DAS6402-16 card, two C10-MINI50 terminal panels, one C100FF-2 cable, one C10-MINI40 terminal panel, one C40FF-2 cable, and OMEGACARESM 1-year extended warranty for PCI-DAS6402-16 (adds 1 year to standard 3-year warranty).