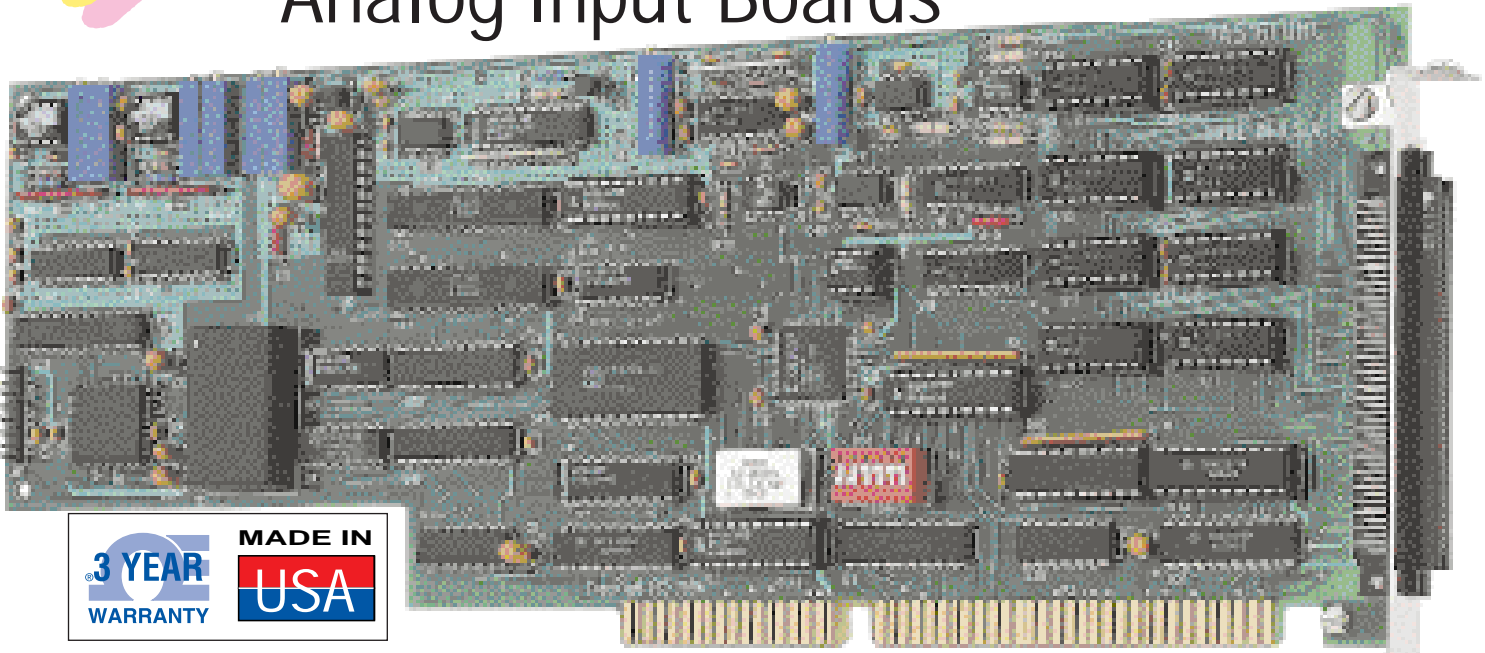




CIO-DAS6402 High Speed 64-Channel Analog Input Boards



CIO-DAS6402-12

\$ 799
Basic Unit

- ✓ 32 Differential / 64 Single-Ended Analog Inputs
- ✓ Models with 12 or 16-bit A/D Resolution
- ✓ 100KHz Sample Rate
- ✓ Dual 12 or 16-Bit Analog Outputs
- ✓ 1024 Sample FIFO
- ✓ 16-bits Digital I/O
- ✓ 3 Counter Timers

The CIO-DAS6402 multifunction analog and digital I/O boards set the new standard for high channel count, high speed data acquisition. Installed in any ISA-bus compatible personal computer, the CIO-DAS6402 turns your personal computer into a high speed data acquisition and control station suitable for laboratory data collection, instrumentation, production test, or industrial monitoring.

FIFO Provides Full Data Rate Under Windows

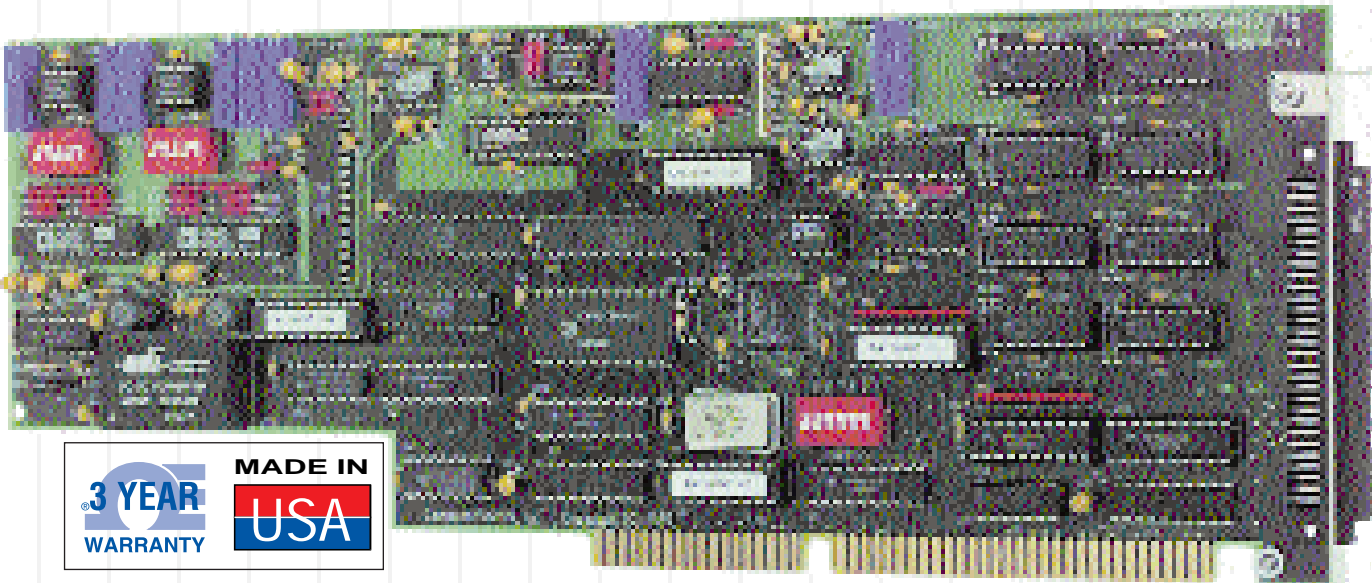
The on-board 1024 sample FIFO buffer collects the results of A/D conversions and stores them until the computer's CPU is able to transfer the data into PC memory. The FIFO buffer allows the PC to store up the A/D transfer requests, then service the requests in batches. The FIFO is necessary to obtain the full data acquisition rates under multitasking operating systems like Windows.

Connector

All I/O signals are brought through a 100-pin high-density connector. Field wiring is greatly simplified by using the optional C100-FF2 cable and CIO-TERM100 screw terminal board. The pinout of the CIO-DAS6402 is shown at right.

CIO-DAS6402 Signal Connector

LLGND	1	●	51	LLGND
IN0+	2	●	52	IN16+
IN0-/IN32+	3	●	53	IN16-/IN48+
IN1+	4	●	54	IN17+
IN1-/IN33+	5	●	55	IN17-/IN49+
IN2+	6	●	56	IN18+
IN2-/IN34+	7	●	57	IN18-/IN50+
IN3+	8	●	58	IN19+
IN3-/IN35+	9	●	59	IN19-/IN51+
IN4+	10	●	60	IN20+
IN4-/IN36+	11	●	61	IN20-/IN52+
IN5+	12	●	62	IN21+
IN5-/IN37+	13	●	63	IN21-/IN53+
IN6+	14	●	64	IN22+
IN6-/IN38+	15	●	65	IN22-/IN54+
IN7+	16	●	66	IN23+
IN7-/IN39+	17	●	67	IN23-/IN55+
LLGND	18	●	68	LLGND
IN8+	19	●	69	IN24+
IN8-/IN40+	20	●	70	IN24-/IN56+
IN9+	21	●	71	IN25+
IN9-/IN41+	22	●	72	IN25-/IN57+
IN10+	23	●	73	IN26+
IN10-/IN42+	24	●	74	IN26-/IN58+
IN11+	25	●	75	IN27+
IN11-/IN43+	26	●	76	IN27-/IN59+
IN12+	27	●	77	IN28+
IN12-/IN44+	28	●	78	IN28-/IN60+
IN13+	29	●	79	IN29+
IN13-/IN45+	30	●	80	IN29-/IN61+
IN14+	31	●	81	IN30+
IN14-/IN46+	32	●	82	IN30-/IN62+
IN15+	33	●	83	IN31+
IN15-/IN47+	34	●	84	IN31-/IN63+
GROUND FOR DAC0	35	●	85	DOUT0
DAC0 OUTPUT	36	●	86	DOUT1
GROUND FOR DAC1	37	●	87	DOUT2
DAC1 OUTPUT	38	●	88	DOUT3
CTR0 CLK IN	39	●	89	CHASSIS GND
DIN2/CTR0 GATE	40	●	90	+12V SUPPLY OUT
COUNTER 0 OUTPUT	41	●	91	CHASSIS GND
DIN0/AD PACER IN	42	●	92	-12V SUPPLY OUT
DIN1/AD GATE/AD TRIG	43	●	93	DIN6
DIN 3	44	●	94	DIN7
DIN 4	45	●	95	DOUT4
DIN 5	46	●	96	DOUT5
-5V REF OUT	47	●	97	DOUT6
+5V SUPPLY OUT	48	●	98	DOUT7
SSH OUT	49	●	99	EXTERNAL INTERRUPT
CHASSIS GND	50	●	100	CHASSIS GND



CIO-DAS6402-16

Models with 12 and 16 Bit Resolution

The CIO-DAS6402-16 provides 16 bits of analog input and analog output resolution (1 part in 65,536) while the CIO-DAS6402-12 provides 12-bit resolution (1 part in 4096) for its analog inputs and outputs.

The only difference between the 12-and-16 bit A/D control registers

is the A/D least significant byte data register. Shown below are the A/D data registers for the CIO-DAS-6402-12 and CIO-DAS-6402-16. The 16-bit board simply has useful data in the 4 least significant bits (instead of 0). This is also the format difference when writing to the D/A registers.

12-Bit Board A/D data format

D15	D14	D13 ...	D5	D4	D3	D2	D1	D0
A/D11	A/D10	A/D9 ...	A/D1	A/D0	0	0	0	0

16-Bit Board A/D data format

D15	D14	D13 ...	D5	D4	D3	D2	D1	D0
A/D15	A/D14	A/D13 ...	A/D5	A/D4	A/D3	A/D2	A/D1	A/D0

Analog Input Ranges

All A/D range selection on the CIO-DAS6402 is selected via software. The D/A range on the CIO-DAS6402/12 is also set via

software while the output range of the CIO-DAS6402/16 is set by DIP switches on the board. The ranges and resolutions available on the CIO-DAS6402 boards are shown below.

Bipolar Range	12-bit Resolution	16-bit Resolution	Unipolar Range	12-bit Resolution	16-bit Resolution
±10 V	4.88 mV	305 µV	0 - 10 V	2.44 mV	153 µV
±5 V	2.44 mV	153 µV	0 - 5 V	1.22 mV	76.3 µV
±2.5 V	1.22 mV	76.3 µV	0 - 2.5 V	0.61 mV	38.1 µV
±1.25 V	0.61 mV	38.1 µV	0 - 1.25 V	0.305 mV	19.1 µV

Minimizing Channel to Channel Skew

All of the channels on the CIO-DAS6402 are multiplexed into a single A/D converter. Since there is only one A/D converter on the

board, a channel to channel time skew (delay) occurs when scanning multiple channels. With many A/D boards, the time skew is equal to the sample rate, so a 1 KHz sample rate would produce a 1 millisecond

skew time. The CIO-DAS6402 features an enhanced triggering mode called the burst mode. In the burst mode the A/D converter is run at its maximum rate for the entire multi-channel scan, thus reducing the channel to channel skew time to the maximum A/D rate which is 4 µS for the 12-bit board and 10µS for the 16-bit board.

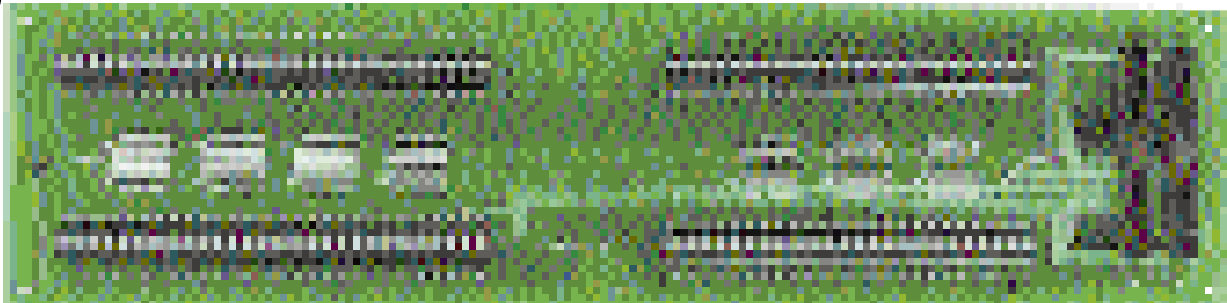
Software

The CIO-DAS6402 includes a complete test and calibration program. The program provides a step-by-step procedure for installing and configuring the card. It also creates a configuration file used 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 DOS and Windows based languages and supports the entire CIO family of boards. The Library includes an extensive set of programming examples written in Visual Basic, C and Pascal for both Windows and DOS languages.

An optional driver for LabView is also available. The LabView driver works in conjunction with the Universal Library, so both are needed to use the CIO-DAS6400 in LabView.

The CIO-DAS6400 is also compatible with many off-the-shelf programs including Labtech, DASyLab and SnapMaster.



Specifications

(Typical for 25°C unless otherwise specified.)

CIO-TERM100 Terminal Panel

ANALOG INPUTS

	CIO-DAS-6402-16	CIO-DAS-6402-12
A/D Resolution	16 bits	12 bits
A/D Conversion Time	5 μ S	3 μ S
Throughput	100KHz min	333 KHz min
Integral Linearity error	± 2 LSB max	± 0.5 LSB max
Gain Drift (A/D specs)	± 7 ppm/ $^{\circ}$ C, all ranges	± 6 ppm/ $^{\circ}$ C, all ranges
Zero Drift (A/D specs)	± 2 ppm/ $^{\circ}$ C, all ranges	± 1 ppm/ $^{\circ}$ C, all ranges
Input Leakage Current	200 nA	
Input Impedance	10 M Ω	
Absolute Maximum Input Voltage	± 15 V	
A/D Triggering Modes	Edge or level, programmable polarity unlimited pre and post trigger samples	

ANALOG OUTPUTS

	CIO-DAS-6402-16	CIO-DAS-6402-12
D/A Resolution	16 bits	12 bits
Number of Channels	2	
Voltage Ranges	± 2.5 V, ± 5 V, ± 10 V, 0-2.5 V, 0-5 V, 0-10 V switch selectable	± 5 , ± 10 , 0-5, 0-10 software selectable
Differential Linearity	± 2 LSB	± 1 LSB
Integral Linearity	± 2 LSB	± 1 LSB
Gain Drift	± 15 ppm/ $^{\circ}$ C	
Bipolar Offset Drift	± 5 ppm/ $^{\circ}$ C	
Unipolar Offset Drift	± 3 ppm/ $^{\circ}$ C	
Settling Time (20V step)	19 μ S max	8 μ S max
Slew Rate	2.8 V/ μ S typ	4 V/ μ S typ
Current Drive	± 5 mA min	± 2 mA min
Short Circuit Protection	40 mA Continuous	25 mA Continuous
Output Impedance	0.1 Ω max	

To Order (*Specify Model Number*)

Model No.	Price	Description
CIO-DAS6402-16	\$999	64 channel, 16-bit analog I/O board
CIO-DAS6402-12	799	64 channel, 12-bit analog I/O board

Each CIO-DAS6400 includes a user's manual and test and calibration software.

Ordering Example: CIO-DAS6402-16 board, CIO-TERM100 terminal board and C100FF2 cable, \$999 + 149 + 49 = \$1197.

Model No.	Price	Description
CIO-TERM100	\$149	100 terminal screw terminal adapter board, requires cable
C100-FF2	49	100 conductor cable
UNIV-DRVR	49	Universal Driver Library
CIO-LABVIEW-DRVR	49	LabVIEW driver, requires Universal Driver Library

DIGITAL INPUT / OUTPUT

Digital Type:

Output - 74LS244,
Input - 74LS273

Configuration:

Two dedicated ports,
8 input and 8 output

Output High:

2.7 volts @ -0.4mA min

Output Low: 0.4 volts @ 8 mA min

Input High: 2.0 volts min,
7 volts absolute max

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

COUNTER

Counter type: 82C54

Configuration:

3 down counters,
16 bits each

ENVIRONMENTAL

Operating temperature range:

0 to 70 $^{\circ}$ C

Storage temperature range:

-40 to 100 $^{\circ}$ C

Humidity:

0 to 90% non-condensing

POWER CONSUMPTION

I_{cc}: Operating (CIO-DAS6402-16):
1.17A typical, 1.67A max

I_{cc}: Operating (CIO-DAS6402-12):
1.05A typical, 1.6A max