CIO-DAS1400 Low Cost - High Speed 16 Channel 12-& 16-Bit Analog Input Board

NEW™

CIO-DAS1401-12

3 YEAR WARRANTY

MADE IN USA
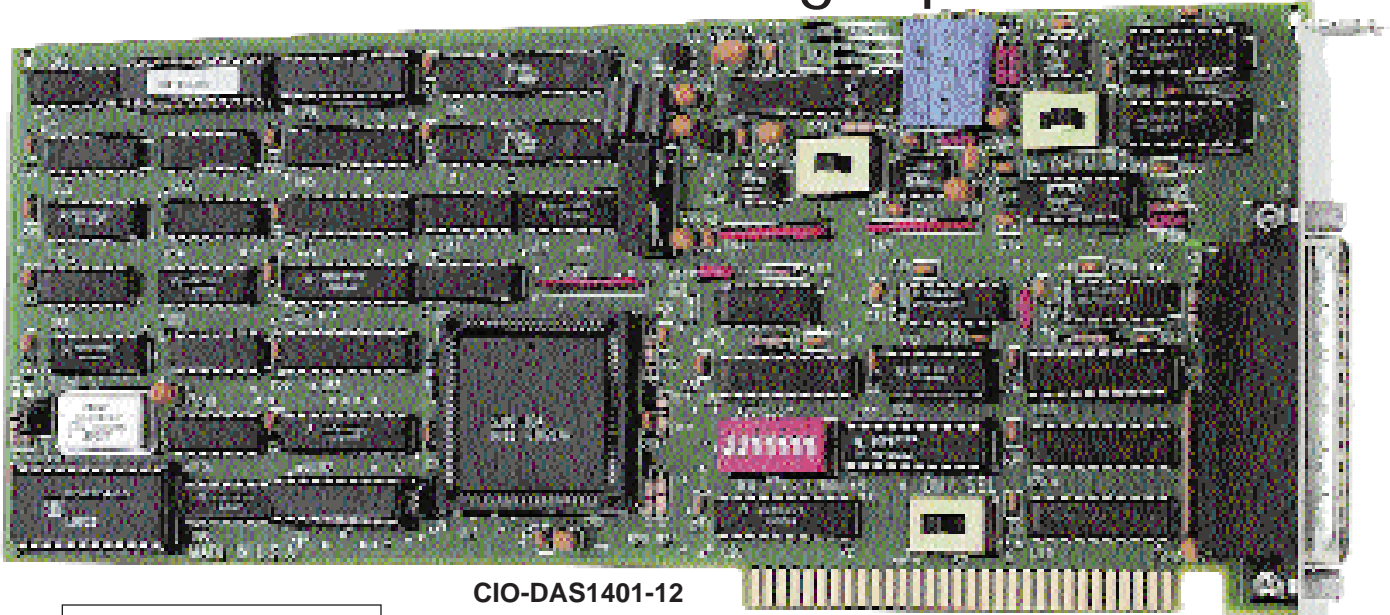
$399
Basic Unit

✔ **16 Single-Ended/8 Differential Analog Inputs**
✔ **Models with 12-or 16-Bit Analog Input Resolution**
✔ **160K Samples/Second A/D (DAS-1400-12)**
✔ **512 Sample FIFO**
✔ **8-Bits Digital I/O**

The CIO-DAS1400 is a high-speed low cost multifunction analog and digital I/O board for IBM PC and compatible computers. The board includes many features found in more expensive boards at a fraction of the price.

The CIO-DAS1400 series includes three models, the CIO-DAS1401-12, the CIO-DAS1402-12 and the CIO-DAS-1402-16. The models differ in A/D resolution and input

range. The CIO-DAS1401-12 is a high gain board featuring gains of 1, 10, 100 and 1000. Both the CIO-DAS-1402-12 and CIO-DAS1402-16 support low gains,1, 2, 4 and 8. The A/D resolution and input range for each board is given in the table below.

Board	Resolution	Max Speed (Samples/Sec)	Ranges
CIO-DAS1401-12	12 bit (1 part in 4,095)	160,000	0-10 V, 0-1 V, 0-1.0 V, 0-0.01V ±10 V, ±5 V, ±2.5 V, ±1.25V
CIO-DAS1402-12	12 bit (1 part in 4,095)	160,000	0-10 V, 0-5 V, 0-2.5 V, 0-1.25 V ±10 V, ±1 V, ±0.1 V, ±0.01V
CIO-DAS1402-16	16 bit (1 part in 65,536)	100,000	0-10 V, 0-5 V, 0-2.5 V, 0-1.25 V ±10 V, ±5 V, ±2.5 V, ±1.25V

Range selection is accomplished by a combination of bipolar/unipolar switch and software programmable gain amplifier.

The analog input section of the CIO-DAS1400 has been designed for flexibility and accuracy in a number of configurations. A standard 37 pin D connector brings the analog signals directly into two multiplexers. The two multiplexers may be configured as

16 channels of single-ended input or 8 channels of differential input. A programmable gain amplifier amplifies the signals before entering the A/D converter. The data throughput rate is dependent on the method of triggering and data transfer, as the table below illustrates.

A/D Conversion and Transfer Speed (samples/sec)

Transfer Method	4.77 MHz PC	386/20 MHz PC
Polled Transfer to variable	320	2,200
Interrupt/Variable or array	4,000	20,000
DMA (CIO-DAS1400-12)	160,000	160,000
DMA (CIO-DAS1400-16)	100,000	100,000

FIFO Provides Full Data Rate Under Windows

The on-board 512 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.

Minimizing Channel to Channel Skew

All of the channels on the CIO-DAS1400 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-DAS1400 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 3.3 µS for the 12-bit boards and 10µS for the 16-bit board.

If even less skew is required, the optional CIO-SSH16 simultaneous sample and hold accessory board can be used to reduce the channel to channel time skew to 0 with 50 nS aperture uncertainty.

Software

The CIO-DAS1400 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-DAS1400 in LabView.
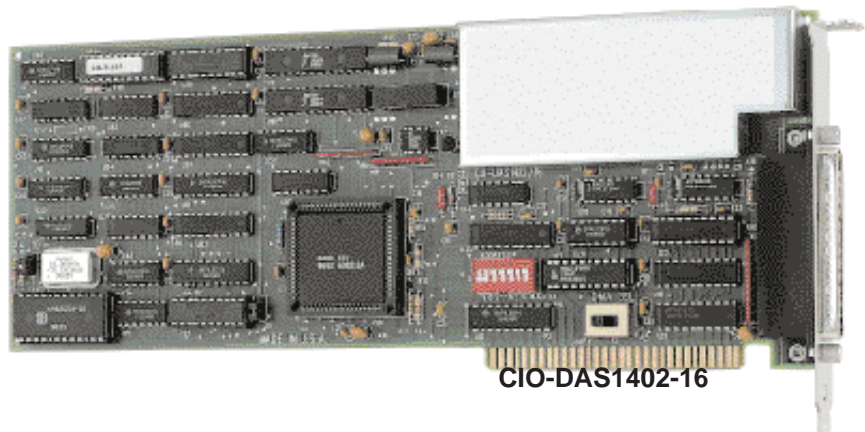
CIO-DAS1402-16

SPECIFICATIONS
Analog Inputs

	CIO-DAS1401/1402-12	CIO-DAS1402-16
Channels	16 single-ended or 8 differential	16 single-ended or 8 differential
Resolution	12 bit	16 bit
Accuracy	0.01% of reading ±1 bit	0.01% of reading ±1.5 bit
Conversion Speed	3.3 µS	10 µS
Ranges	See table	
Overvoltage	±35 V continuous	
Linearity	±1 bit	±1.5 bit
Impedance	10 MΩ	
Zero Drift	10 ppm/°C max.	2 ppm/°C max.
Gain Drift	30 ppm/°C max.	7 ppm/°C max.

Digital I/O

Inputs: 4 bits

Input Voltage: Low = 0.8V max, High = 2.0V min @20µA

Outputs: 4 bits

Output Voltage: Low = 0.5V max @ 8.0 mA (sink), High = 2.4V min@ -0.4mA(source)

Counter/Timer

Type: 82C54

Counters: Three 16 bit, two dedicated to A/D pacer

XTAL: 1 or 10 MHz

Environmental

Temperature Range: 0-50°C (operating), -20 to 70°C (storage)

Humidity: 0-90% non-condensing

Weight: 11.2 oz.

To Order *(Specify Model Number)*

Model Number	Price	Description
CIO-DAS1401-12	$399	160 KHz, 12 bit board with gains of 1, 10, 100 and 1000
CIO-DAS1402-12	399	160 KHz ,12 bit board with gains of 1, 2, 4 and 8
CIO-DAS1402-16	499	100 KHz, 16 bit board with gains of 1, 2, 4 and 8

All boards include a user's manual and test and calibration software.

Ordering Example: *CIO-DAS1402-16 board, CIO-MINI37 screw terminal panel, C37FF-2 cable and UNIV-DRVR Universal Driver Library = $499 + 49 + 25 + 49 = **$622.***

Accessories

Model No.	Price	Description
CIO-TERMINAL	$99	Screw terminal panel, 16"X4" with prototype area, requires cable
CIO-MINI37	49	Screw terminal panel, 4"X4" with prototype area, requires cable
CIO-SSH16	399	16 channel simultaneous sample and hold accessory board, 4 channels installed, requires cable (see CIO-SSH16 page for additional details)
C37FF-2	25	2' ribbon cable, used with screw terminal panels
C37FFS-10	40	10' shielded cable, used with screw terminal panels
UNIV-DRVR	49	Universal Driver Library
CIO-LABVIEW-DRVR	49	LabVIEW driver, requires Universal Driver Library