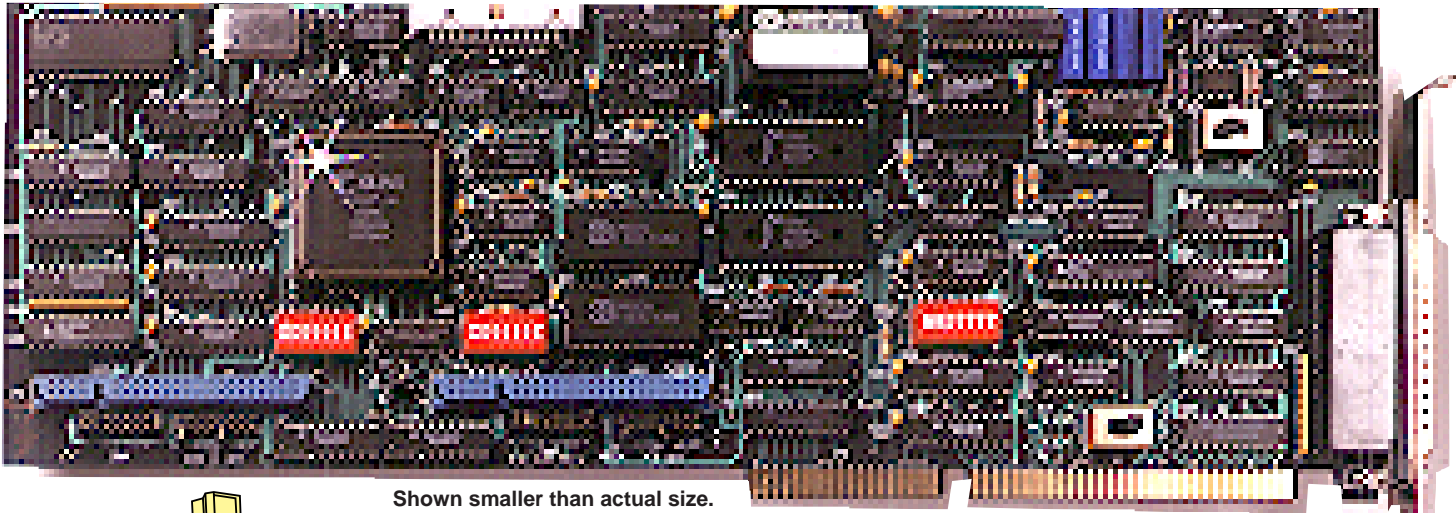




# Very High Speed 16-Channel Analog Input Board

## 2 iSBX Expansion Connectors



Shown smaller than actual size.



A/I/N



IBM AT

**\$799**

- ✓ **Blazing Fast Analog Input of 330KHz Continuous to Memory or RAM Disk with Sample Size Limited Only By the Size of Memory or RAM Disk**
- ✓ **Pre-Trigger and Post-Trigger Buffers**
- ✓ **Programmable 256 Step Channel/Gain Queue**
- ✓ **Two Complete iSBX Expansion Connectors Allow the Addition of Digital I/O Counters, and Analog Output**

The CIO-DAS16/330i multifunction analog and digital I/O board is designed to be a modern improvement upon the traditional DAS-16 architecture with higher speed and additional features, all at a lower cost

### Beyond the 64K Barrier

The CIO-DAS16/330i acquires sample sets of greater than 32K samples (64KB of memory) by employing advanced instructions; just as do LAN and hard disk

controllers. Although transfers to array variables are still limited to 64KB, samples may be streamed to data files far in excess of 64K using the free streaming software supplied.

### Two Modes

On power up, the CIO-DAS16/330i is software compatible with the older, original architecture shared by the DAS-16. In this mode all old DAS-16 type software runs and the new advanced registers are invisible to the PC bus. Set one special control bit and supercharge the CIO-DAS16/330i! In special mode, a new set of registers open up that allow A/D transfers up to 330KHz, and pre/post trigger buffers.

### Free Streaming Software

Streaming high speed samples to memory, RAM disk or hard disk is easy with the CIO-DAS16/330i's advanced architecture. In fact, it is so easy streaming software is included with every CIO-DAS16/330. A STREAM.EXE program will acquire data to the file of your choice and the supplied BASIC CALL includes modes for streaming data to files under program control.

### Analog Inputs

The analog input section of the CIO-DAS16/330i has been designed for high speed, flexibility and accuracy in a number of configurations and ranges. The analog signals are brought on board by a standard 37 pin D connector directly to two

multiplexors. The two multiplexors may be configured as 16 channels of single ended input or 8 channels of differential input. Differential inputs can reject noise and ground loops (common mode voltages) but require a 3 wire hookup as opposed to 2.

Signals are amplified by a programmable gain amplifier prior to conversion by the A/D converter. The possible ranges are shown in the table below.

Input Range
+/- 10 V
+/- 5 V
+/- 2.5 V
+/- 1.25 V
+/- 0.625 V
0 to 10 V
0 to 5 V
0 to 2.5 V
0 to 1.25 V

An integral sample & hold captures the signal which is then converted by the A/D converter. The 12-bit A/D converter provides a resolution of 1 in 4095 parts of full scale.

The speed of data gathering may vary from less than 1Hz to 330KHz. Acquisition speed is dependent on the method of triggering and data transfer.

Software supporting each method is supplied free with every board.

Method	Max. A/D Speed
Polled by software	4KHz-20KHz
Interrupt Service Routine (no REP INSW)	4KHz-20KHz
DMA	160KHz
REP INSW	330KHz

### The REP INSW Story

REP INSW (Repeat Input String) is a 286/386/486 class CPU instruction which allows the PC to transfer large amounts of data using one instruction. The data is transferred at the maximum rate allowed by the bus. On a typical 286 AT, this rate is 2Mbyte/sec or 1 sample every microsecond.

In order to employ REP INSW the A/D board must have a FIFO buffer to accumulate sample data. The CIO-DAS16/330i has a 1024 sample buffer. When it is half full (512 samples), an interrupt generated by the DAS16/330i starts an interrupt service routine which executes the instruction REP INSW transfers the data to PC memory and empties the FIFO buffer.

The data is transferred completely in the background and no unreasonable demands are placed on the PC's resources.

### Gain Queue Programming

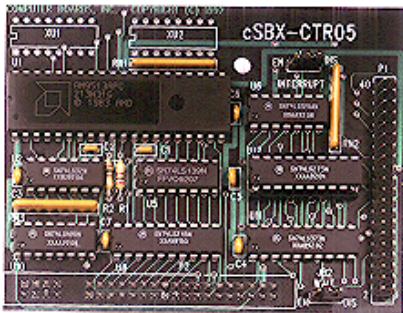
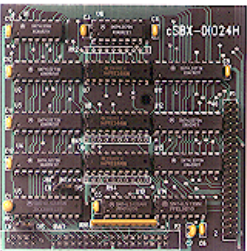
A 256 Byte channel gain queue adds to the CIO-DAS16/330i's sampling capabilities. Non sequential channel lists with unique channel gains can be stored in on-board memory. This allows channels to be sampled virtually in any order, each with a unique gain.

### Customize Your DAS16/330i

The "i" in CIO-DAS16/330i stands for TWO iSBX expansion connectors. Expansion I/O boards plug into the iSBX connector and add features such as digital I/O, counter/timers and analog output.

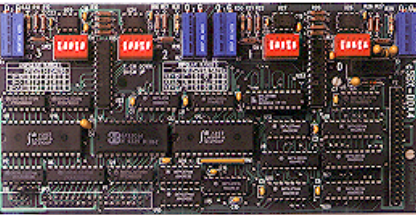
### cSBX-DIO24H

Digital I/O from an 82C55 in exactly the same form and function as the familiar CIO-DIO24H (PIO-12). Twenty-four TTL I/O lines in 2 eight bit and 2 four bit ports.



### cSBX-CTR05

Complex data acquisition schemes often require sophisticated counters, such as the 9513 found on the CIO-CTR05 (CTM-05). Add these five counters to your DAS16/330i just by snapping on a cSBX-CTR05.



### cSBX-DDA04/F

Add 4 independent D/A channels running at 250 KHz and 14 digital outputs at 500 KHz. The cSBX-DAC04/F takes advantage of advanced REP OUTSW routines and FIFO buffers to move large blocks (>64K) at blazing speeds using Streaming software.

The cSBX boards have a single 40-pin header. You may cable to

them directly, but, for a more stable mount we recommend the BP40-37. This cable has a 40 pin header at one end and a 37 pin D connector and backplate at the other. The 37-pin D connector will mate with all our screw terminal boards. The BP40-37 uses an additional PC slot.

### Simultaneous Sample & Hold

Capture 16 channels simultaneously with less than 50 ns of aperture uncertainty at 130 kHz. The CIO-SSH16 expands the CIO-DAS16/330i's 16 single ended, multiplexed inputs into 16 fully differential inputs with individual, switch selectable gains of up to 800 on every channel. No software modifications are required to realize the benefits of simultaneous sample & hold.

### Specifications

**Channels:** 16 SE or 8 Differential

**A/D Type:** Successive Approx. ADS 7800

**Conversion Time:** 3  $\mu$ S

**A/D Convert & Transfer Speed:** 330 KHz

**Accuracy:** 0.01%  $\pm$ 1 LSB

**Integral Linearity:**  $\pm$ 1 LSB

**No missing codes guaranteed over temp. range.**

**Maximum Overvoltage:**  $\pm$ 35 V Continuous

**Input Leakage Current:** 250 nA Max @ 25°C

**Gain Drift:**  $\pm$ 25 ppm/Deg C Max

**Zero Drift:**  $\pm$ 10 ppm/Deg C Max

### To Order (Specify Model Number)

Model Number	Price	Description
CIO-DAS16/330i	\$799	High performance analog & digital I/O board
CIO-SSH16	399	16-Channel simultaneous sample and hold accessory board, 4 channels installed
CIO-SSH-AMP	39	Additional S&H + amps Installed, up to 12 additional
CIO-TERMINAL	99	16" x 4" screw terminal board with prototype area, requires C37FF cable
CIO-MINI37	49	4" x 4" screw terminal board, requires C37FF-2 cable
C37FF-2	25	Cable
C37FFS-5	30	5-foot shielded cable, 37-pin female connectors
BP40-37	25	cable adaptor, converts 40-pin header from cSBX boards to 37-pin D connector
CSBX-DIO24	59	Digital I/O expansion board for CIO-DAS16/330i
CSBX-CTR05H	119	Counter timer expansion board for CIO-DAS16/330i
CSBX-DDA04/F	399	Analog and digital output expansion for CIO-DAS16/330i

**Ordering Example:** CIO-DAS16/330i high performance analog and digital I/O accessory board, with CIO-TERMINAL terminal panel and C37FF-2 cable, \$799 + 99 + 25 = **\$923.**