Multifunction Analog and Digital
I/O Board for IBM Compatibles

The CIO-DAS16 is an economical multifunction analog and digital I/O card. Installed in any IBM or compatible computer, the CIO-DAS16 transforms your PC into a high-speed data acquisition and control station suitable for laboratory data collection, instrumentation, production testing or industrial monitoring.

The analog input section of the CIO-DAS16 has been designed for 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 multiplexers, which may be configured as 16 channels of single ended input or eight channels of differential input.

Gain switches accessible from the rear of the card provide gain ranges of 0.5, 1, 2, 5 and 10. The 12-bit A/D converter provides a resolution of 1/4095 parts of full scale.

The speed of data gathering is dependent on the method of triggering and data transfer, as the table to the upper right illustrates.

The CIO-DAS16 has 32 digital I/O lines available. Eight digital I/O lines (4 inputs and 4 outputs) are accessed from the CIO-DAS16's main connector from the rear of the computer. The remaining 24 lines, which are programmable as inputs and outputs in groups of eight, are accessed through an auxiliary connector. A separate terminal panel and cable is required for the auxiliary connector.

Analog voltage output is provided by two 12-bit multiplying D/A converters which accept a reference voltage and provide a proportional output. A precision -5 V reference from the A/D converter provides an on-board D/A range of 0-5V. Other ranges between ±10 V are possible if you supply a ±10 V external reference. A trigger is the event that begins an acquisition/transfer cycle. There are three ways to trigger a CIO-DAS16: software, internal or external.

There are also three ways to transfer data from the CIO-DAS16: program, interrupt service routine or DMA.

For simultaneous sample and hold, the CIO-DAS16 works with the CIO-SSH16 simultaneous sample and hold accessory board. The 8254 counter/timer chip has three counters of 16 bits each. Much of the 8254 is used by the CIO-DAS16 as a pacer clock to synchronize A/D conversion. One full counter (counter 0) is available for counting, pulse generation of frequency measurement. The output of counter 2 is available to provide external synchronization the A/D converter or as a programmable rate source.

Optional software drivers are available for users writing their own programs. The UNIV-DRVR universal library packages provides support for Windows 95/98/NT/2000/XP.

Windows support includes Microsoft C, Visual C++, Visual Basic, Borland C, C++ and Delphi. Optional LabVIEW drivers are also available.
Specifications

A/D: 12-bit successive approx.
AD74 Series
Channels: 16 single-ended or 8 differential
Conversion Time: 8.5 μSec for CIO-DAS16F, 15 μSec for CIO-DAS16
A/D Convert & Transfer Speed (DMA): 100Khz CIO-DAS16F; 50Khz CIO-DAS16
Accuracy: 0.01% ±1 Least Significant Bit
Integral Linearity: ±1 LSB
Maximum Overvoltage: ±35 V continuous
Input Leakage Current: 250 nA max @ 25C

ANALOG OUTPUTS
Channels: 2
D/A Type: Multiplying 4 quadrant
Conversion Time: 30 nsec to 0.01%
Integral Linearity: ±1/2 LSB
Differential Linearity: ±1/2 LSB
Reference Range: ±10 V
Output Range: ±10 V; z reference dependent
Current Out: ±5 mA min.

DIGITAL I/O
Input/Output: 24 bits, 8255; three 8-bit ports (located on rear connector of board)
Input Only: 4-bits, 74LS244 (on main connector)
Output Only: 4-bits, 74LS374 (on main connector)
Input Low Volts: 74LS244, 0.8V max; on 8255, 0.5V max
Input High Volts: 74LS374, 2.0V min @ 20mA; on 8255, 2.0V min, 7.0 V max
Output Low Volts: 74LS374, 0.5V max @ 8.0 mA; on 8255, 0.5V max @ 2.5ma

Output High Volts: 74LS374, 2.4V min @ -0.4 ma; on 8255, 2.4V min @ -200 μA

ENVIRONMENTAL
Operating Temp: 0 to 50C (32-122F)
Humidity: 0 to 90% non-condensing
Dimensions: 356 mm W x 101 mm H (14 x 4”)
Weight: 290 g (10.25 oz)

To Order

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>CIO-DAS16</td>
<td>Multifunction Board, 50 Khz max. speed</td>
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<tr>
<td>CIO-DAS16F</td>
<td>Multifunction Board, 100 Khz max. speed</td>
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<tr>
<td>CIO-SSH16</td>
<td>16-channel Simultaneous Sample and Hold board. Only 4 channels installed. Requires any C37FF cable.</td>
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<tr>
<td>CIO-SSH-AMP</td>
<td>Additional sample &amp; hold amps for CIO-SSH16</td>
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<tr>
<td>CIO-TERMINAL</td>
<td>16 x 4” screw terminal board with prototype area, requires any C37FF cable</td>
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<tr>
<td>CIO-MINI37</td>
<td>4” x 4” screw terminal board, requires any C37FF cable</td>
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<tr>
<td>C37FF-2</td>
<td>2’ cable with female connectors</td>
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<tr>
<td>C37FFS-5</td>
<td>5’ foot shielded cable, 37-pin with female connectors</td>
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<tr>
<td>C37FFS-10</td>
<td>10’ shielded cable, 37-pin with female connectors</td>
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<tr>
<td>BP37</td>
<td>Cable assembly. Brings out rear 37-pin digital IO connector on CIO-DAS08 to back of PC. Requires any C37FF cable and CIO-MINI37</td>
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<tr>
<td>SSR-RACK24</td>
<td>24-channel solid state relay rack requires AC or DC modules.</td>
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<tr>
<td>AC05-C</td>
<td>AC output module</td>
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<tr>
<td>AC15-C</td>
<td>AC input module</td>
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<tr>
<td>DCO5-C</td>
<td>DC output module</td>
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<tr>
<td>DC15-C</td>
<td>DC input module</td>
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The CIO-DAS16 includes a complete operator’s manual and calibration and testing software.

Ordering Example: CIO-DAS16 multifunction board, CIO-TERMINAL terminal panel, C37FF-2 cable and OMEGACARE™ 1 year warranty extended for CIO-DAS16 (adds 1 year to standard 3 year warranty).