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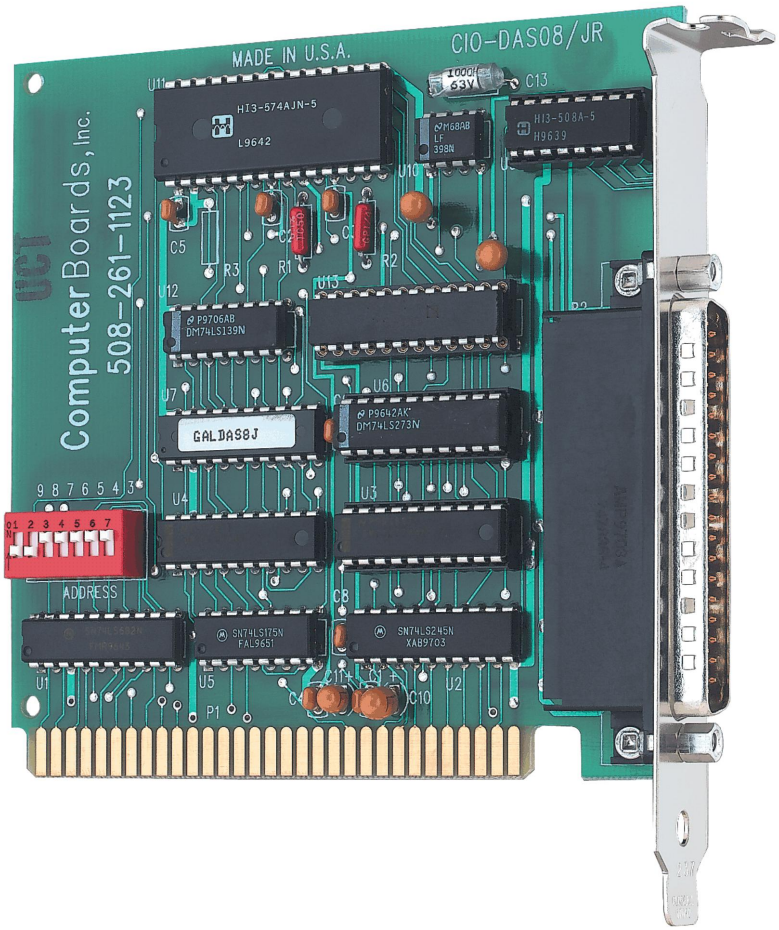
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Find the *Measurement Computing / ComputerBoards CIO-DAS08/JR* at our website: *Click HERE*

CIO-DAS08/JR

Eight analog inputs, eight digital inputs, and eight digital outputs

User's Guide



MEASUREMENT COMPUTING™

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CIO-DAS08/JR

Analog and Digital I/O

User's Guide



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About this User's Guide

What you will learn from this user's guide

This user's guide explains how to install, configure, and use the CIO-DAS08/JR. This user's guide also refers you to related documents available on our web site, and to technical support resources.

Conventions in this user's guide

The following conventions are used in this manual to convey special information:

For more information on …

Text presented in a box signifies additional information and helpful hints related to the subject matter you are reading.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

<#:#> Angle brackets that enclose numbers separated by a colon signify a range of numbers, such as those assigned to registers, bit settings, etc.

bold text **Bold** text is used for the names of objects on the screen, such as buttons, text boxes, and check boxes. For example:

1. Insert the disk or CD and click the **OK** button.

italic text *Italic* text is used for the names of manuals and help topic titles, and to emphasize a word or phrase. For example:

- The software installation procedure is explained in the *Quick Start* Guide.
- Never touch the exposed pins or circuit connections on the board.

Where to find more information

For additional information relevant to the operation of your hardware, refer to the *Documents* subdirectory where you installed the MCC DAQ software (C:\Program Files\Measurement Computing\DAQ by default), or search for your device on our website at www.mccdaq.com.

If you need to program at the register level in your application, refer to the *Register Map for the CIO-DAS08/JR and CIO-DAS08/JR-AO*. This document is available on our website at www.mccdaq.com/registermaps/RegMapCIO-DAS08_JR-AO.pdf.

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Introducing the CIO-DAS08/JR

Overview: CIO-DAS08/JR features

The CIO-DAS08/JR provides eight channels of 12-bit analog input at a fixed ±5V range.

The board also provides eight digital inputs and eight digital outputs for sensing and controlling digital devices. The digital bits are port-addressable, and are dedicated to either input or output. All digital bits are TTL level.

The CIO-DAS08/JR can be upgraded to a CIO-DAS08/JR-AO by purchasing and installing the CIO-DUAL-DAC.

Software features

For information on the features of *Insta*Cal and the other software included with your CIO-DAS08/JR, refer to the *Quick Start Guide* that shipped with your device.

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Installing the CIO-DAS08/JR

What comes with your CIO-DAS08/JR shipment?

The following items are shipped with the CIO-DAS08/JR.

Hardware

- CIO-DAS08/JR



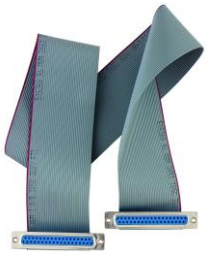
Additional documentation

In addition to this hardware user's guide, you should also receive the *Quick Start Guide* (available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf). This booklet supplies a brief description of the software you received with your CIO-DAS08/JR and information regarding installation of that software. Please read this booklet completely before installing any software or hardware.

Optional components

You can also order the following MCC product to use with your CIO-DAS08/JR.

- C37FF-x cable



- Signal termination and conditioning accessories

  MCC provides signal conditioning and termination products for use with the CIO-DAS08/JR. Refer to Field wiring, signal termination, and conditioning on page 11 for a list of compatible accessory products.

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Unpacking the CIO-DAS08/JR

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the CIO-DAS08/JR from its packaging, ground yourself using a wrist strap or by simply touching the computer chassis or other grounded object to eliminate any stored static charge.

If any components are missing or damaged, notify Measurement Computing Corporation immediately by phone, fax, or e-mail:

- Phone: 508-946-5100 and follow the instructions for reaching Tech Support.
- Fax: 508-946-9500 to the attention of Tech Support
- Email: techsupport@mccdaq.com

Installing the software

Refer to the *Quick Start Guide* for instructions on installing the software on the *Measurement Computing Data Acquisition Software CD*. This booklet is available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.

Configuring the CIO-DAS08/JR

Before you install the CIO-DAS08/JR in your computer, you must set the base address by using the dip switch labeled **ADDRESS** located on the board. By default, this address is set to 300 h (768 decimal). The easiest way to set the base address switch is to let *Insta*Cal show you the correct settings. However, if are already familiar with setting ISA base addresses, you may use the base address switch description below to guide your base address selection. The example shown in Figure 1 shows the settings for the factory-default base address of 300 hex.

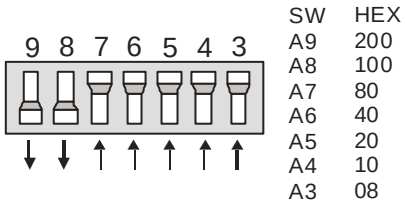


Figure 1. Base address switches

The address logic works by adding up the weights of individual switches to make up a base address. In the default configuration shown in Figure 1, addresses 9 and 8 are DOWN, and all others are UP.
Address 9 = 200 hex (512 decimal) and address 8 = 100 hex (256 decimal); when added together they equal 300 hex (768 decimal).

Disregard the numbers printed on the switch

When setting the base address, refer to the numbers printed in white on the printed circuit board.

PC I/O addresses

Hex Range	Function	Hex Range	Function
000-00F	8237 DMA #1	2C0-2CF	EGA
020-021	8259 PIC#1	2D0-2DF	EGA
040-043	8253 Timer	2E0-2E7	GPIB (AT)
060-063	8255 PPI (XT)	2E8-2EF	Serial Port
060-064	8742 Controller (AT)	2F8-2FF	Serial Port
070-071	CMOS RAM & NMI mask (AT)	300-30F	Prototype card

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Hex Range	Function	Hex Range	Function
080-08F	DMA page registers	310-31F	Prototype card
0A0-0A1	8259 PIC #2 (AT)	320-32F	Hard disk (XT)
0A0-0AF	NMI mask (XT)	378-37F	Parallel printer
0C0-0DF	8237 #2 (AT)	380-38F	SDLC
0F0-0FF	80287 numeric CO-P (AT)	3A0-3AF	SDLC
1F0-1FF	Hard disk (AT)	3B0-3BB	MDA
200-20F	Game control	3BC-3BB	Parallel printer
210-21F	Expansion unit (XT)	3C0-3CF	EGA
238-23B	Bus mouse	3D0-3DF	CGA
23C-23F	ALT bus mouse	3E8-3EF	Serial port
270-27F	Parallel printer	3F0-3F7	Floppy disk
2B0-2BF	EGA	3F8-3FF	Serial port

Installing the CIO-DAS08/JR

After you configure the board's switches and jumpers, you can install the CIO-DAS08/JR into your computer. To install your board, follow the steps below.

Install the MCC DAQ software before you install your board

The driver needed to run your board is installed with the MCC DAQ software. Therefore, you need to install the MCC DAQ software before you install your board. Refer to the *Quick Start Guide* for instructions on installing the software.

1. Turn your computer off, open it up, and insert your board into an available ISA slot.
2. Close your computer and turn it on.
3. To test your installation and configure your board, run the *Insta*Cal utility you installed in the previous section. Refer to the *Quick Start Guide* that came with your board www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf for information on how to initially set up and load *Insta*Cal.

Connecting the board for I/O operations

Connectors, cables – main I/O connector

The table below lists the board connector, applicable cables, and compatible accessory products.

Board connector, cables, and accessory equipment

Connector type	37-pin D type connector
Compatible cable	C37FF-x DFCON-37 (mating connector)
Compatible accessory products with the C37FF-x cable	CIO-MINI37 CIO-LAB8-TERM

Information on signal connections

General information regarding signal connection and configuration is available in the *Guide to Signal Connections* (available at www.mccdaq.com/signals/signals.pdf).

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Pinout – main I/O connector

The CIO-DAS08/JR I/O connector is a standard 37-pin male D connector that is accessible from the rear of the computer through the expansion backplate.

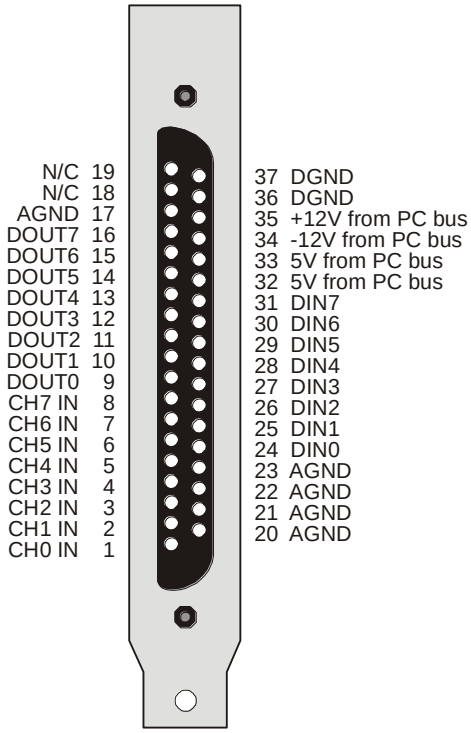


Figure 2. CIO-DAS08/JR pin-out

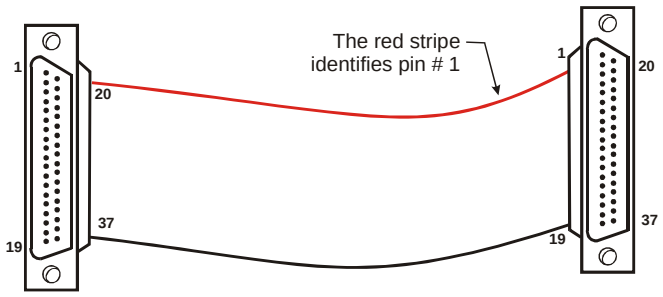


Figure 3. C37FF-x cable

Field wiring, signal termination, and conditioning

You can use the following cabling, screw termination, and signal conditioning products with the CIO-DAS08/JR.

- CIO-MINI37 – 37-pin screw terminal board. Details are available at www.mccdaq.com/products/screw_terminal_bnc.aspx
- DFCON37 – Connector kit that includes a 37-pin female D-connector, D-shell, 37 crimp pins, and cable termination kit to construct your own cable. Details are available at www.mccdaq.com/daq-accessory/DFCON-37.aspx
- CIO-LAB8-TERM – Experimentors Laboratory Screw Terminal Board for the DAS08 series.

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Optional analog output capability

- You can add analog output capability to the CIO-DAS08/JR with the CIO-DUAL-DAC upgrade kit. This kit includes a two channel D/A AD7237 chip that when installed add two analog outputs to the board.
- To install, insert the AD7237 chip into the socket labeled U13. Align the notch or dimple indicating pin 1 on the chip with the notch in the white silkscreen outline printed on the board at the U13 position. Details on the CIO-DUAL-DAC kit are available on our web site at www.mccdaq.com/isa-data-acquisition/CIO-DUAL-DAC.aspx.

Calibrating the CIO-DAS08/JR

You can quickly calibrate the CIO-DAS08/JR using *Insta*Cal. The CIO-DAS08/JR has a fixed input range and does not have any input amplification or gain/offset compensation electronics. When using the optional Universal Library, all compensation for gain/offset errors is done in software after the signal is acquired. The gain and offset calibration factors are stored in the CB.CFG configuration file and applied to the analog samples after they are acquired.

Run the **Calibrate** option from *Insta*Cal to set the calibration factors.

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Specifications

Typical for 25°C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

Analog input

Table 1. Analog input specifications

Parameter	Specification
A/D converter type	*AD574*
Resolution	12 bits
Number of channels	8 single-ended
Input ranges	±5 V
A/D pacing	Software polled
Data transfer	Software polled
A/D conversion time	*25 µs*
Throughput	System dependant
Gain drift (A/D specs)	*±50 ppm/°C*
Zero drift (A/D specs)	*±10 ppm/°C*
Absolute maximum input voltage	*±30 V continuous*
Noise Distribution (Rate = N/A, Average % +/- 2 bins, Average % +/- 1 bin, Average # bins)	
Bipolar (5 V)	100% / 100% / 3 bins

Digital input/output

Table 2. Digital I/O specifications

Digital type	*Output 74LS273* *Input 74LS244*
Configuration	8 fixed input, 8 fixed output
Number of channels	8
Output high	2.7 volts min @ -0.4 mA
Output low	0.5 volts max @ 8 mA
Input high	2.0 volts min, 7 volts absolute max
Input low	0.8 volts max, -0.5 volts absolute min

Power consumption

Table 3. Power consumption specifications

+5V	200 mA typical, 240 A max
+12V	17 mA typical, 22 mA max
-12V	28 mA typical, 36 mA max

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Environmental

Table 4. Environmental specifications

Operating temperature range	*0 to 50°C*
Storage temperature range	*-20 to 70°C*
Humidity	*0 to 90% non-condensing*

Main connector and pin out

Table 5. Main connector specifications

Connector type	37-pin D type connector
Compatible cable	C37FF-x DFCON-37 (mating connector kit)
Compatible accessory products with the C37FF-x cable	CIO-MINI37 CIO-LAB8-TERM

Table 6. Connector pin out

Pin	Signal Name	Pin	Signal Name
1	CH0 IN	20	AGND
2	CH1 IN	21	AGND
3	CH2 IN	22	AGND
4	CH3 IN	23	AGND
5	CH4 IN	24	DIN0
6	CH5 IN	25	DIN1
7	CH6 IN	26	DIN2
8	CH7 IN	27	DIN3
9	DOUT0	28	DIN4
10	DOUT1	29	DIN5
11	DOUT2	30	DIN6
12	DOUT3	31	DIN7
13	DOUT4	32	5V from PC bus
14	DOUT5	33	5V from PC bus
15	DOUT6	34	-12V from PC bus
16	DOUT7	35	+12V from PC bus
17	AGND	36	DGND
18	N/C	37	DGND
19	N/C		

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CE Declaration of Conformity

Manufacturer:	Measurement Computing Corporation
Address:	10 Commerce Way Suite 1008 Norton, MA 02766 USA
Category:	Electrical equipment for measurement, control and laboratory use.

Measurement Computing Corporation declares under sole responsibility that the product

CIO-DAS08/JR

to which this declaration relates is in conformity with the relevant provisions of the following standards or other documents:

EU EMC Directive 89/336/EEC: Electromagnetic Compatibility, EN55022 (1987), EN50082-1

Emissions: Group 1, Class B

- EN55022 (1987): Radiated and Conducted emissions.

Immunity: EN50082-1

- IEC 801-2 (1987): Electrostatic Discharge immunity, Criteria A.
- IEC 801-3 (1984): Radiated Electromagnetic Field immunity Criteria A.
- IEC 801-4 (1988): Electric Fast Transient Burst immunity Criteria A.

Declaration of Conformity based on tests conducted by Chomerics Test Services, Woburn, MA 01801, USA in November, 1995. Test records are outlined in Chomerics Test Report #EMI0168A.95.

We hereby declare that the equipment specified conforms to the above Directives and Standards.



Carl Haapaoja, Director of Quality Assurance

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