

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 *InstaCal* utility you installed in the previous section. Refer to the *Quick Start Guide* that came with your board [www.mccdaq.com/PDFs/manuals/DAQ-Software-Quick-Start.pdf](http://www.mccdaq.com/PDFs/manuals/DAQ-Software-Quick-Start.pdf) for information on how to initially set up and load *InstaCal*.

## 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 male D connector
Compatible cables	<ul style="list-style-type: none"> <li>▪ C37FF-x</li> <li>▪ C37FFS-x</li> <li>▪ DFCON-37 (D-connector, D-shell, and termination pins to construct your own cable)</li> </ul>
Compatible accessory products with the C37FF-x cable or C37FFS-x cable	CIO-MINI37 CIO-TERMINAL

#### Information on signal connections

General information regarding signal connection and configuration is available in the *Guide to Signal Connections* (available at [www.mccdaq.com/pdfs/DAQ-Signal-Connections.pdf](http://www.mccdaq.com/pdfs/DAQ-Signal-Connections.pdf)).

### Pinout – main I/O connectors

The CIO-DAC16 I/O connector is a standard 37-pin male D connector that is accessible through the PC/AT expansion bracket.

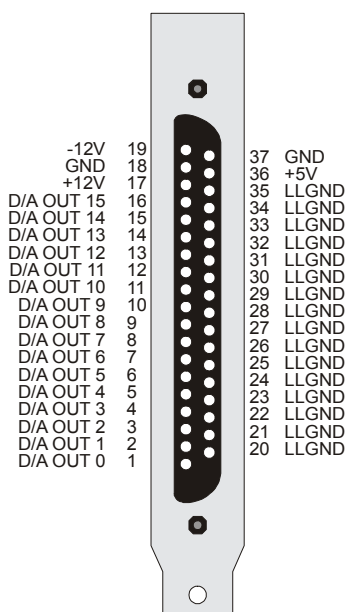


Figure 6. I/O connector pin-out

The analog outputs of the CIO-DAC16 are two-wire hook-ups. Always use low-level ground (LLGND) as the ground reference for all analog hook-ups.

## Cabling

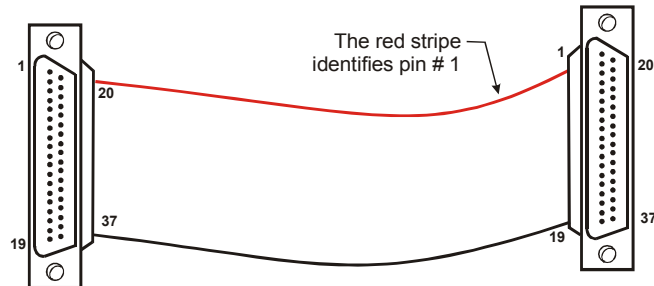


Figure 7. C37FF-x cable

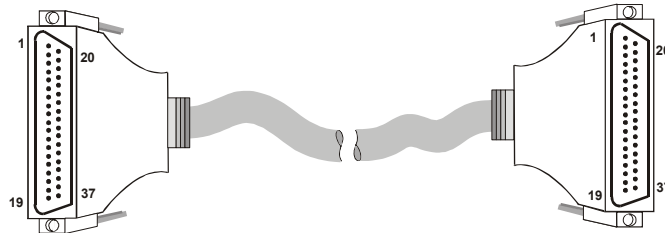


Figure 8. C37FFS-x cable

## Field wiring, signal termination, and conditioning

You can use the following cabling, screw termination, and signal conditioning products with the CIO-DAC16.

- CIO-MINI37 – 37-pin screw terminal board. Details on this product are available at [www.mccdaq.com/cbicatalog/cbiproduct.asp?dept\\_id=102&pf\\_id=255](http://www.mccdaq.com/cbicatalog/cbiproduct.asp?dept_id=102&pf_id=255).
- CIO-TERMINAL – 37-pin screw terminal board with on-board prototyping area. Details on this product are available on our web site at [www.mccdaq.com/cbicatalog/cbiproduct.asp?dept\\_id=102&pf\\_id=282](http://www.mccdaq.com/cbicatalog/cbiproduct.asp?dept_id=102&pf_id=282).
- 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 on this product are available on our web site at [www.mccdaq.com/cbicatalog/cbiproduct.asp?dept\\_id=103&pf\\_id=304](http://www.mccdaq.com/cbicatalog/cbiproduct.asp?dept_id=103&pf_id=304).

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## Programming and Developing Applications

After following the installation instructions in Chapter 2, your board should now be installed and ready for use. In general there may be no correspondence among registers for different boards. Software written at the register level for other models will not function correctly with your board.

### Programming languages

Measurement Computing's Universal Library provides access to board functions from a variety of Windows programming languages. If you are planning to write programs, or would like to run the example programs for Visual Basic® or any other language, please refer to the *Universal Library User's Guide* (available on our web site at [www.mccdaq.com/PDFmanuals/sm-ul-user-guide.pdf](http://www.mccdaq.com/PDFmanuals/sm-ul-user-guide.pdf)).

### Packaged applications programs

Many packaged application programs now have drivers for your board. If the package you own does not have drivers for your board, please fax or e-mail the package name and the revision number from the install disks. We will research the package for you and advise how to obtain drivers.

Some application drivers are included with the Universal Library package, but not with the application package. If you have purchased an application package directly from the software vendor, you may need to purchase our Universal Library and drivers. Please contact us 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](mailto:techsupport@mccdaq.com)

### Register-level programming

You should use the Universal Library or one of the packaged application programs mentioned above to control your board. Only experienced programmers should try register-level programming.

If you need to program at the register level in your application, refer to the *Register Map for the CIO-DAC08 and CIO-DAC16*. This document is available on our website at [www.mccdaq.com/registermaps/RegMapCIO-DAC08\\_16.pdf](http://www.mccdaq.com/registermaps/RegMapCIO-DAC08_16.pdf).

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## Functional Details

### Signal connections

Each of the CIO-DAC16 outputs are individually buffered through an OP07 operational amplifier (OP-AMP). The OP07s are socketed so that if one fails it can be replaced in the field. The OP07 for each channel is located just below the calibration potentiometers for that channel.

At the full rated output swing of  $\pm 10\text{V}$ , each channel is capable of sinking or sourcing  $\pm 5\text{ mA}$ . That means a load of  $2\text{K Ohms}$  can be connected to each channel.

As the load resistance is raised from  $2\text{ K}$  up to  $10\text{ M}\Omega$  or more, the output load on the DAC decreases. Any load resistance greater than  $2\text{K}$  is fine.

As the load resistance decreases, the output load increases. The OP07 responds by producing a lower output voltage. If your CIO-DAC16 will not produce the output voltage specified by the code & range combination, it is a good idea to check the load with an ohm meter.

Under normal circumstances you will not damage the OP07 by connecting the output to ground. If your connection results in a failure of the OP07, chances are good that there was some potential at the connecting point in addition to a load at ground or between  $0$  and  $2\text{ K}\Omega$ . Explore the point with a DVM before reconnecting the CIO-DAC16 (and after replacing the OP07 of course). Connect the negative lead of the DVM to any LLGND pin of the CIO-DAC16.