ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

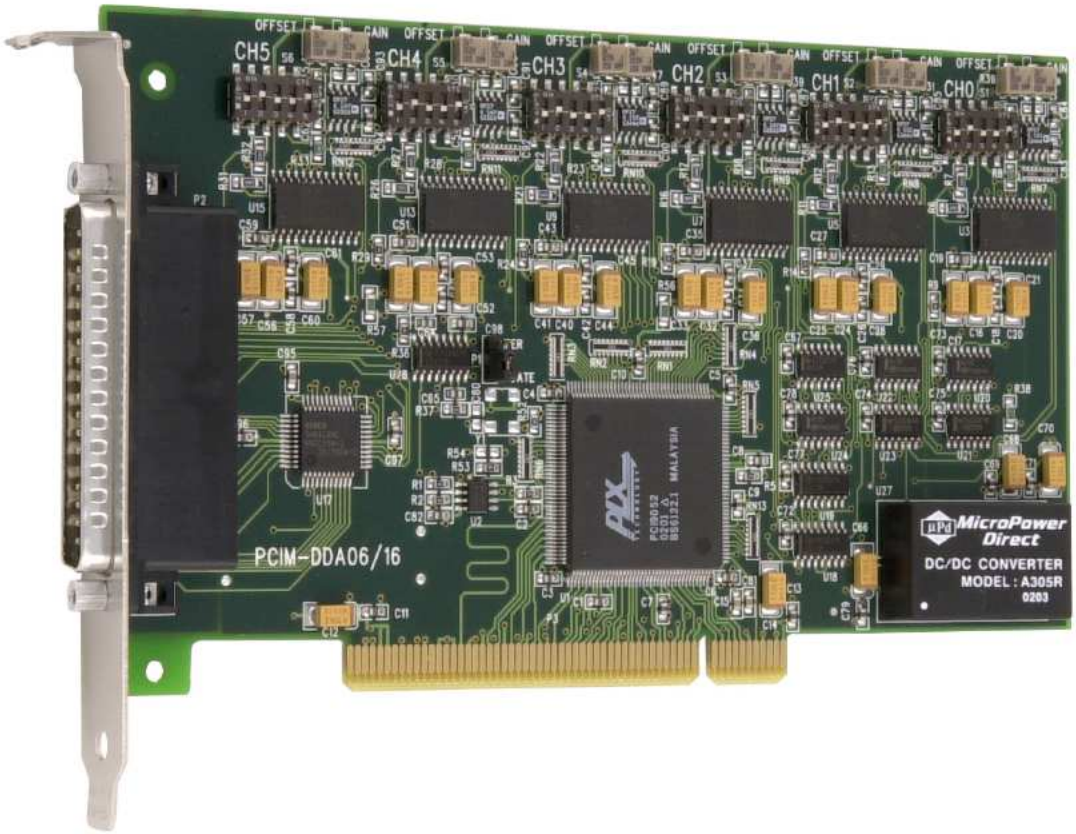
All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Measurement Computing PCIM-DDA06/16* at our website: *Click HERE*

PCIM-DDA06/16

Analog Output & Digital I/O Board

User's Guide



MEASUREMENT COMPUTING.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PCIM-DDA06/16

Analog Output and Digital I/O Board

User's Guide



MEASUREMENT COMPUTING™

Document Revision 7, March, 2007

© Copyright 2007, Measurement Computing Corporation

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Your new Measurement Computing product comes with a fantastic extra —

Management committed to your satisfaction!

Refer to www.mccdaq.com/execteam.html for the names, titles, and contact information of each key executive at Measurement Computing.

Thank you for choosing a Measurement Computing product—and congratulations! You own the finest, and you can now enjoy the protection of the most comprehensive warranties and unmatched phone tech support. It's the embodiment of our mission:

- To provide PC-based data acquisition hardware and software that will save time and save money.

Simple installations minimize the time between setting up your system and actually making measurements. We offer quick and simple access to outstanding live FREE technical support to help integrate MCC products into a DAQ system.

Lifetime warranty: Every hardware product manufactured by Measurement Computing Corporation is warranted against defects in materials or workmanship for the life of the product. Products found defective are repaired or replaced promptly.

Lifetime Harsh Environment Warranty®: We will replace any product manufactured by Measurement Computing Corporation that is damaged (even due to misuse) for only 50% of the current list price. I/O boards face some tough operating conditions, some more severe than the boards are designed to withstand. When a board becomes damaged, just return the unit with an order for its replacement at only 50% of the current list price. We don't need to profit from your misfortune. By the way, we honor this warranty for any manufacturer's board that we have a replacement for.

30 Day Money Back Guarantee: You may return any Measurement Computing Corporation product within 30 days of purchase for a full refund of the price paid for the product being returned. If you are not satisfied, or chose the wrong product by mistake, you do not have to keep it. Please call for an RMA number first. No credits or returns accepted without a copy of the original invoice. Some software products are subject to a repackaging fee.

These warranties are in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular application. The remedies provided herein are the buyer's sole and exclusive remedies. Neither Measurement Computing Corporation, nor its employees shall be liable for any direct or indirect, special, incidental or consequential damage arising from the use of its products, even if Measurement Computing Corporation has been notified in advance of the possibility of such damages.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Trademark and Copyright Information

TracerDAQ, Universal Library, Harsh Environment Warranty, Measurement Computing Corporation, and the Measurement Computing logo are either trademarks or registered trademarks of Measurement Computing Corporation.

Windows, Microsoft, and Visual Studio are either trademarks or registered trademarks of Microsoft Corporation

LabVIEW is a trademark of National Instruments.

CompactFlash is a registered trademark of SanDisk Corporation.

XBee and XBee-PRO are trademarks of MaxStream, Inc.

All other trademarks are the property of their respective owners.

Information furnished by Measurement Computing Corporation is believed to be accurate and reliable. However, no responsibility is assumed by Measurement Computing Corporation neither for its use; nor for any infringements of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or copyrights of Measurement Computing Corporation.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form by any means, electronic, mechanical, by photocopying, recording, or otherwise without the prior written permission of Measurement Computing Corporation.

Notice

Measurement Computing Corporation does not authorize any Measurement Computing Corporation product for use in life support systems and/or devices without prior written consent from Measurement Computing Corporation. Life support devices/systems are devices or systems which, a) are intended for surgical implantation into the body, or b) support or sustain life and whose failure to perform can be reasonably expected to result in injury. Measurement Computing Corporation products are not designed with the components required, and are not subject to the testing required to ensure a level of reliability suitable for the treatment and diagnosis of people.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of Contents

Preface
About this User's Guide v
- What you will learn from this user's guide v
- Conventions in this user's guide v
- Where to find more information v

Chapter 1
Introducing the PCIM-DDA06/16 1-1
- Overview: PCIM-DDA06/16 features 1-1
- Software features 1-1
- PCIM-DDA06/16 block diagram 1-2

Chapter 2
Installing the PCIM-DDA06/16 2-1
- What comes with your PCIM-DDA06/16 shipment? 2-1
  - Hardware 2-1
- Additional documentation 2-1
  - Optional components 2-1
- Unpacking the PCIM-DDA06/16 2-2
- Installing the software 2-2
- Configuring the PCIM-DDA06/16 2-2
  - Simultaneous transfer jumper 2-3
  - Analog output range switch 2-3
- Installing the PCIM-DDA06/16 2-4
- Connecting the board for I/O operations 2-4
  - Connectors, cables – main I/O connector 2-4
  - Pinout – main I/O connectors 2-5
  - Cabling 2-5
  - Field wiring, signal termination, and conditioning 2-6

Chapter 3
Programming and Developing Applications 3-1
- Programming languages 3-1
- Packaged applications programs 3-1
- Register-level programming 3-1

Chapter 4
Specifications 4-1
- Analog output 4-1
  - Accuracy 4-1
  - Analog output drift 4-2
- Digital input / output 4-2
- Power consumption 4-2
- Environmental 4-2
- Mechanical 4-2
- Main connector and pin out 4-3

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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 PCIM-DDA06/16 board so that you get the most out of its analog output and digital I/O features. 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 *Insta*Cal 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

The following electronic documents provide information relevant to the operation of the PCIM-DDA06/16.

- MCC's *Specifications: PCIM-DDA06/16* (the PDF version of the *Specifications* chapter in this guide) is available on our web site at www.mccdaq.com/pdfs/PCIM-DDA06_16.pdf.
- MCC's *Quick Start Guide* is available on our web site at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.
- MCC's *Guide to Signal Connections* is available on our web site at www.mccdaq.com/signals/signals.pdf.
- MCC's *Universal Library User's Guide* is available on our web site at www.mccdaq.com/PDFmanuals/sm-ul-user-guide.pdf.
- MCC's *Universal Library Function Reference* is available on our web site at www.mccdaq.com/PDFmanuals/sm-ul-functions.pdf.
- MCC's *Universal Library for LabVIEW™ User's Guide* is available on our web site at www.mccdaq.com/PDFmanuals/SM-UL-LabVIEW.pdf.

PCIM-DDA06/16 User's Guide (this document) is also available on our web site at www.mccdaq.com/PDFmanuals/PCIM-DDA06-16.pdf.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Introducing the PCIM-DDA06/16

Overview: PCIM-DDA06/16 features

The PCIM-DDA06/16 has six channels of analog output and 24 bits of digital input/output. Analog outputs are from AD660 DACs, with each output buffered by an OP27. Digital I/O is performed with an 82C55.

Analog output ranges are either Bipolar or Unipolar. Bipolar ranges are ±10 V and ±5 V. Unipolar ranges are 0 to 10 V and 0 to 5 V. You set the analog output range for each DAC with an onboard switch. You set the analog outputs for simultaneous or individual transfer with an on-board jumper.

The PCIM-DDA06/16 digital I/O lines are a direct interface to an 82C55. The 82C55 is a CMOS chip with TTL level inputs and outputs. The 8255 can source or sink about 2.5 mA. This is enough to switch other TTL or similar inputs, but is inadequate to drive relays, LEDs or solid state relays without additional buffering.

The 82C55 digital I/O chip initializes all ports as inputs on power-up and reset.

The PCIM-DDA06/16 digital I/O is controlled by programming the 8255's mode register. There are three possible modes. The most commonly used mode is Mode 0, simple input and output.

Software features

For information on the features of *Insta*Cal and the other software included with your PCIM-DDA06/16, refer to the *Quick Start Guide* that shipped with your device. The *Quick Start Guide* is also available in PDF at www.mccdaq.com/PDFmanuals/DAQ-Software-Quick-Start.pdf.

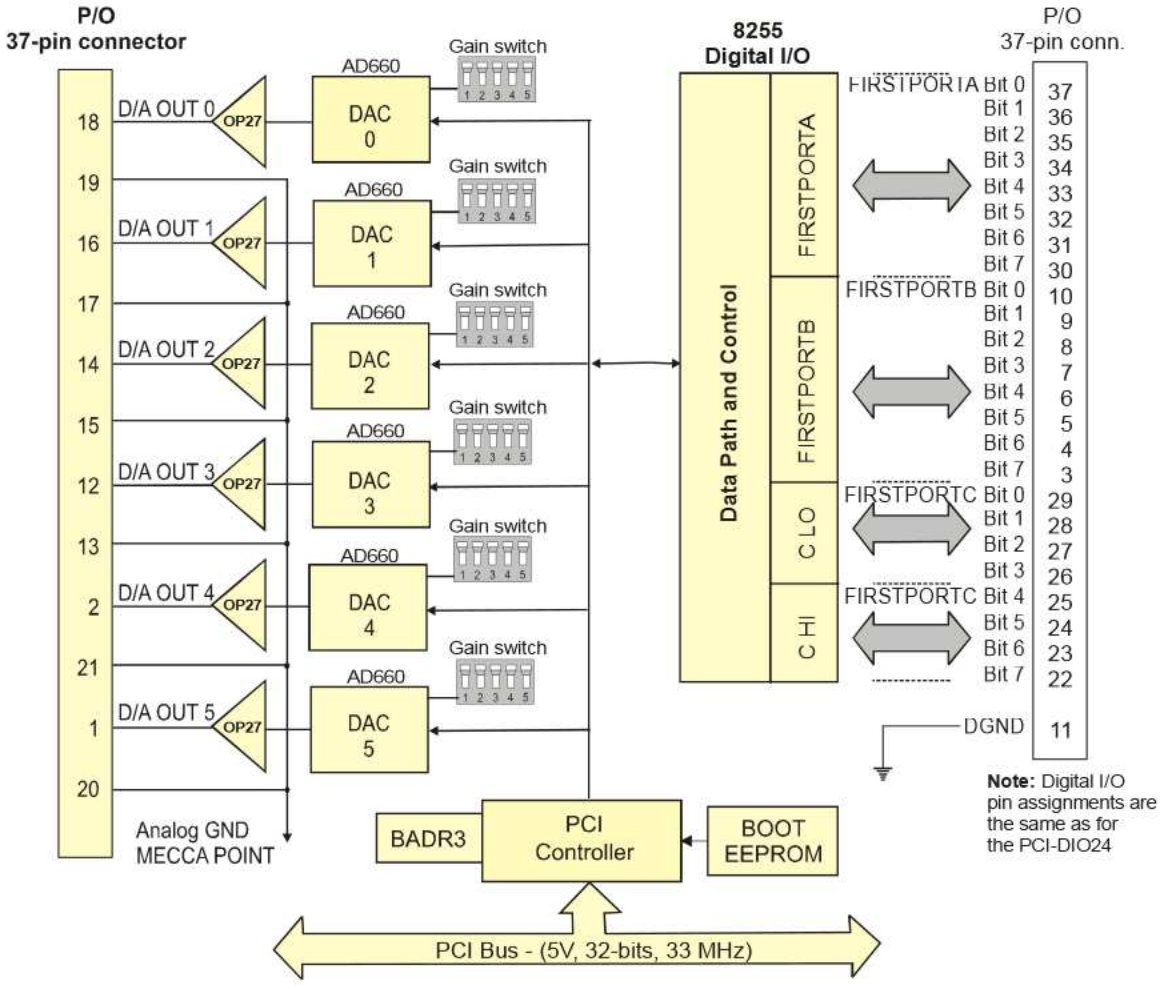
Check www.mccdaq.com/download.htm for the latest software version.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PCIM-DDA06/16 block diagram

The PCIM-DDA06/16 board consists of two functional sections: analog output and digital I/O. The digital I/O section consists of a single 82C55, and a 24-line digital I/O chip. The analog output section consists of six identical circuits, each consisting of a DAC, an OP27 output buffer, and a gain range control switch. You can control each analog output individually, or control all six outputs simultaneously.

PCIM-DDA06/16 functions are illustrated in the block diagram shown here.



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installing the PCIM-DDA06/16

What comes with your PCIM-DDA06/16 shipment?

The following items are shipped with the PCIM-DDA06/16.

Hardware

- PCIM-DDA06/16



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 PCIM-DDA06/16 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 products to use with your PCIM-DDA06/16.

- Cables



C37FF-x



C37FFS-x

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- Signal termination and conditioning accessories

  MCC provides signal conditioning and termination products for use with the PCIM-DDA06/16. Refer to Field wiring, signal termination, and conditioning on page 2-6 for a complete list of compatible accessory products.

Unpacking the PCIM-DDA06/16

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the PCIM-DDA06/16 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 PCIM-DDA06/16

The PCIM-DDA06/16 board has six banks of five switches for setting the gain for each DAC, and one simultaneous transfer jumper to set the DAC update mode.

Each analog channel also has an associated gain and offset potentiometer for calibrating the channel, if necessary.

The PCIM-DDA06/16 is shipped with the factory-default settings listed in Table 2-1.

Table 2-1. Switch/jumper factory-configured defaults

Board label	Switch/jumper description	Default setting
XFER or **UPDATE**	Simultaneous or individual DAC update jumper	UPDATE position (single channel update)
CH0 through **CH5** (**S1** through **S6**)	Analog output range DIP switches	±5V

Before installing the PCIM-DDA06/16 in the computer, verify that the board is configured with the settings that you want. Review the following information to change the default configuration of a jumper or switch on the PCIM-DDA06/16 board.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Simultaneous transfer jumper

The simultaneous transfer jumper controls whether to update DAC channels individually (default) or as a group. This jumper is shown in Figure 2-1 configured in its default **UPDATE** position.



Figure 2-1. Simultaneous transfer jumper

- Set the jumper to **XFER** to update the DAC voltage outputs as a group.

  New output data is held until all DACs are loaded with their new digital data.

  The data for each DAC is simultaneously transferred and the DAC voltage outputs are updated as a group when any of the addresses BADR3 + 0 to BADR3 + B are read. Writing new digital values to the DAC control register does not cause an update of the DAC's voltage output. Update of the output occurs only after the DAC control register address (any of the addresses BADR3 + 0 to BADR3 + B) is read

  In this way, the PCIM-DDA06/16 can be set to hold new values until all channels are loaded, then update all six channels simultaneously. This is a very useful feature for multi-axis motor control.

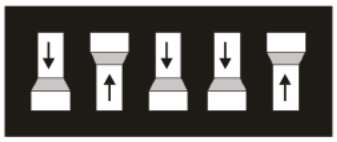
- Set the jumper to **UPDATE** to update the DAC voltage outputs individually.

  The analog outputs are controlled by writing a digital control word as two bytes to the DAC's control register. The control register is double-buffered, so the DAC output is not updated until both bytes (first low byte, then high byte) are written to the DAC control register when the simultaneous transfer jumper is in the default **UPDATE** position.

Analog output range switch

You set the analog output voltage range of each with a five-position DIP switch. The switches are located on the board directly above the DACs and are labeled **CH5** through **CH0** (**S6** through **S1**). Bipolar ranges are ±10 V and ±5 V. Unipolar ranges are 0 to 10 V and 0 to 5 V.

Figure 2-2 lists the range value and associated settings for each switch.



Range	1	2	3	4	5
±10	D	U	D	U	D
±5.0	D	U	D	D	U (shown)
0-10	U	D	U	U	D
0-5	U	D	U	D	U

Figure 2-2. Analog output range switch—one per DAC

To set a channel to a particular range, read the switch positions as **U** (up) or **D** (down) from left to right in the row beside the range you want to set.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installing the PCIM-DDA06/16

After you configure the board's switches and jumpers, install the PCIM-DDA06/16 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 PCI slot.
2. Close your computer and turn it on.

   If you are using an operating system with support for plug-and-play (such as Windows 2000 or Windows XP), a dialog box pops up as the system loads indicating that new hardware has been detected. If the information file for this board is not already loaded onto your PC, you will be prompted for the disk containing this file. The MCC DAQ software contains this file. If required, insert the *Measurement Computing Data Acquisition Software* CD and click **OK**.
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.

If your board has been powered-off for more than 10 minutes, allow your computer to warm up for at least 15 minutes before acquiring outputting analog data with this board. This warm-up period is required for the board to achieve its rated accuracy. The high speed components used on the board generate heat, and it takes this amount of time for a board to reach steady state if it has been powered off for more than 10 minutes.

Connecting the board for I/O operations

Connectors, cables – main I/O connector

Table 2-2 lists the board connector, applicable cables, and compatible accessory products.

Table 2-2. Board connector, cables, and accessory equipment

Connector type	37-pin male D connector
Compatibility	Pinout identical to CIO-DDA06/16
Compatible cables	▪ C37FF-x ▪ C37FFS-x ▪ DFCON-37 (D-connector, D-shell, and termination pins to construct your own cable)
Compatible accessory products with the C37FF-x cable or C37FFS-x cable	CIO-MINI37 CIO-TERMINAL SCB-37 SSR-RACK24 ENC-MINI37

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).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Pinout – main I/O connectors

The PCIM-DDA06/16 I/O connector is a standard 37-pin male connector that is accessible through the PC/AT expansion bracket.

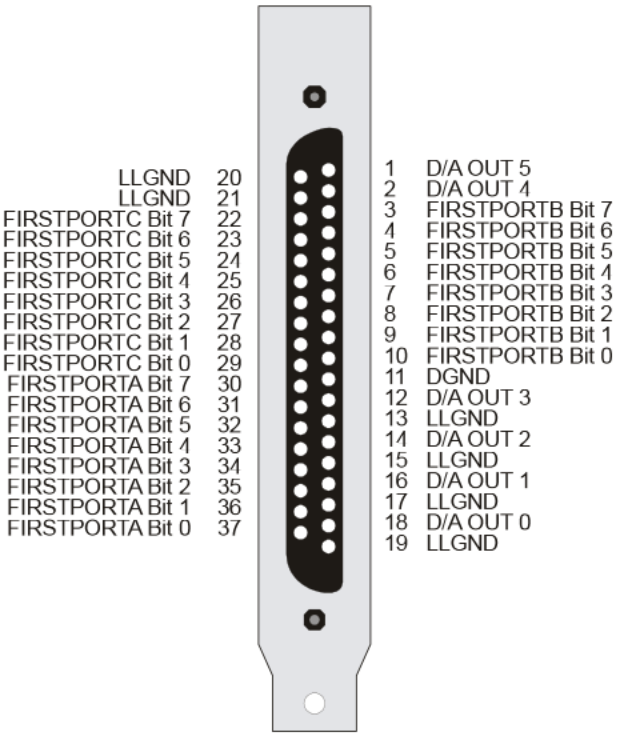


Figure 2-3. I/O connector pin-out

The analog outputs of the PCIM-DDA06/16 are two-wire hook-ups. Always use analog ground (LLGND) as the ground reference for all analog hook-ups.

Cabling

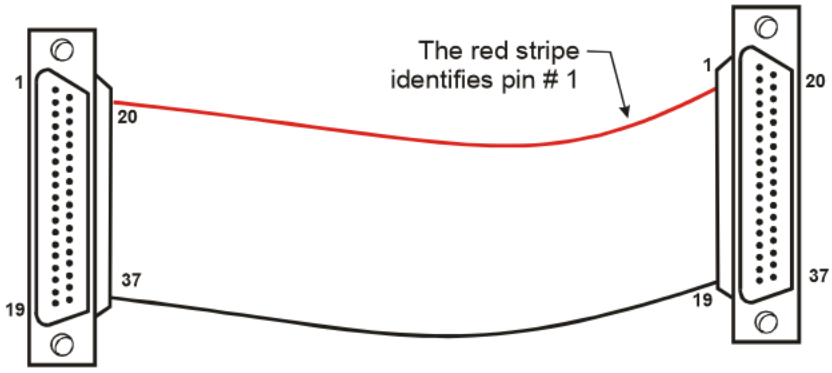


Figure 2-4. C37FF-*x* cable

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

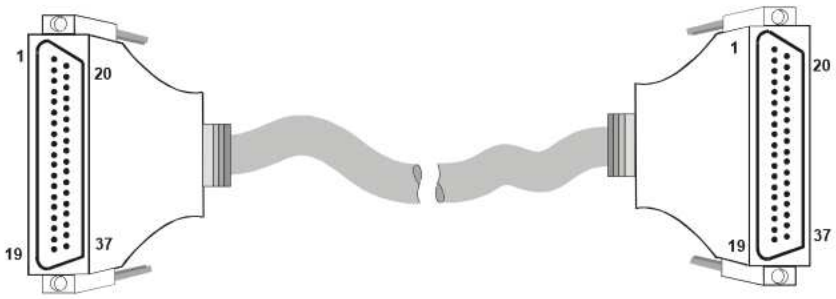


Figure 2-5. C37FFS-*x* cable

Field wiring, signal termination, and conditioning

You can use the following cabling, screw termination, and signal conditioning products with the PCIM-DDA06/16.

- 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.
- 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.
- SCB-37 – 37 conductor, shielded signal connection/screw terminal box that provides two independent 50-pin connections. Details on this product are available at www.mccdaq.com/cbicatalog/cbiproduct.asp?dept_id=196&pf_id=1166.
- SSR-RACK24 – 24-channel, solid-state relay mounting and interface board for digital signal conditioning. Details on this product are available on our web site at www.mccdaq.com/cbicatalog/cbiproduct.asp?dept_id=122&pf_id=1193.
- ENC-MINI37 – Enclosure for the MINI37. Details on this product are available at www.mccdaq.com/cbicatalog/cbiproduct.asp?dept_id=98&pf_id=318.
- 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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).

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

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 PCIM-DDA06/16*. This document is available on our website at www.mccdaq.com/registermaps/RegMapPCIM-DDA06-16.pdf.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Specifications

Typical for 25 °C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

Analog output

Table 1. Analog output specifications

D/A converter type	AD660BR
Resolution	16 bits
Number of channels	6
Voltage ranges	±10 V, ±5, 0 to 10 V, 0 to 5 V. Ranges are switch selectable
D/A pacing	Software paced
Throughput	System-dependent. Using the Universal Library programmed output function (`cbAOut()`) in a loop, in Visual Basic, a typical update rate of 150 kHz (± 70 nS jitter) can be expected. The rate was measured on a 500 MHz Pentium III based PC.
Data transfer	Programmed I/O
Monotonicity	*15 bits guaranteed over temperature*
Slew rate	1.7 V/µs minimum, 2.4 V/µS typical.
Current drive	±5 mA min
Output short-circuit duration	*Indefinite*
Power-on reset voltage	0 V ±15 mV
Miscellaneous	Double buffered output latches Update DACs individually or simultaneously (jumper selectable)

Accuracy

Table 2. Analog output accuracy specifications

Absolute accuracy	±2.0 LSB max
Typical accuracy	±1.0 LSB max
Gain error	Trimmable by potentiometer to 0
Offset error	Trimmable by potentiometer to 0
Integral linearity error	±1.0 LSB max, ±0.5 LSB typ
Differential linearity error	*±1.0 LSB max, ±0.5 LSB typ*

Each PCIM-DDA06/16 is tested at the factory to assure the board's overall error does not exceed ±2.0 LSB.

Total board error is a combination of gain, offset, integral linearity and differential linearity error. The theoretical worst-case error of the board may be calculated by summing these component errors. Worst case error is realized only in the unlikely event that each of the component errors are at their maximum level, and causing error in the same direction.

Typical accuracy is derived directly from the various component typical errors. This typical, maximum error calculation for the PCIM-DDA06/16 yields ±1.0 LSB.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Analog output drift

Table 3. Worst case analog output drift specifications

Range	Gain Drift (LSB/°C)	Offset Drift (LSB/°C)	Overall Drift (LSB/°C)
±10.0 V	1.0	0.3	1.3
±5.00 V	4.0	0.3	4.3
0 to 10.0 V	1.9	0.3	2.2
0 to 5.0 V	6.0	0.3	6.3

Digital input / output

Table 4. DIO specifications

Digital type	One 82C55
Number of I/O	24
Configuration	▪ 2 banks of 8 and 2 banks of 4 or ▪ 3 banks of 8 or ▪ 2 banks of 8 with handshake
Output high	*3.0 volts min @ -2.5mA*
Output low	*0.4 volts max @ 2.5mA*
Input high	*2.0 volts min, 5.5 volts absolute max*
Input low	*0.8 volts max, -0.5 volts absolute min*
Power-up / reset state	Input mode (high impedance)

Power consumption

Table 5. Power Consumption specifications

+5V supply	965mA typical, 1206mA maximum

Environmental

Table 6. Environmental specifications

Operating temperature range	*0 to 70 °C*
Storage temperature range	*-40 to 100 °C*
Humidity	*0 to 95% non-condensing*

Mechanical

Table 7. Mechanical specifications

Card dimensions	PCI half card: 174.4 mm (L) x 100.6 mm (W) x 11.65 mm (H)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Main connector and pin out

Table 8. Main connector specifications

Connector type	37-pin male D connector
Compatibility	Pinout identical to CIO-DDA06/16
Compatible cables	▪ C37FF-x ▪ C37FFS-x DFCON-37 (D-connector, D-shell, and termination pins to construct your own cable)
Compatible accessory products with the C37FF-x cable or C37FFS-x cable	CIO-MINI37 CIO-TERMINAL SCB-37 SSR-RACK24 ENC-MINI37

Table 9. Main connector pin out

Pin	Signal Name	Pin	Signal Name
1	D/A Out 5	20	LLGND
2	D/A Out 4	21	LLGND
3	FIRSTPORTB Bit 7	22	FIRSTPORTC Bit 7
4	FIRSTPORTB Bit 6	23	FIRSTPORTC Bit 6
5	FIRSTPORTB Bit 5	24	FIRSTPORTC Bit 5
6	FIRSTPORTB Bit 4	25	FIRSTPORTC Bit 4
7	FIRSTPORTB Bit 3	26	FIRSTPORTC Bit 3
8	FIRSTPORTB Bit 2	27	FIRSTPORTC Bit 2
9	FIRSTPORTB Bit 1	28	FIRSTPORTC Bit 1
10	FIRSTPORTB Bit 0	29	FIRSTPORTC Bit 0
11	DGND	30	FIRSTPORTA Bit 7
12	D/A Out 3	31	FIRSTPORTA Bit 6
13	LLGND	32	FIRSTPORTA Bit 5
14	D/A Out 2	33	FIRSTPORTA Bit 4
15	LLGND	34	FIRSTPORTA Bit 3
16	D/A Out 1	35	FIRSTPORTA Bit 2
17	LLGND	36	FIRSTPORTA Bit 1
18	D/A Out 0	37	FIRSTPORTA Bit 0
19	LLGND		

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP