

USB-DIO96H/50

USB-based High-drive Digital I/O Device

User's Guide

Hardware Revision 1

USB-DIO96H/50

USB-based High Drive Digital I/O

User's Guide



**MEASUREMENT
COMPUTING™**

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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 USB-DIO96H/50 so that you get the most out of its 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

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 *InstaCal*® 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

- MCC's *Specifications: USB-DIO96H/50* (the PDF version of the Electrical Specification Chapter in this guide) is available on our web site at www.mccdaq.com/pdfs/USB-DIO96H-50.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.

USB-DIO96H/50 User's Guide (this document) is also available on our web site at www.mccdaq.com/PDFmanuals/USB-DIO96H-50.pdf.

Introducing the USB-DIO96H/50

Overview: USB-DIO96H/50 features

This user's guide contains all of the information you need to connect the USB-DIO96H/50 to your computer and to the signals you want to measure or control.

The USB-DIO96H/50 is supported under popular Microsoft® Windows® operating systems. The USB-DIO96H/50 is fully compatible with both USB 1.1 and USB 2.0 ports.

The USB-DIO96H/50 provides 96 digital I/O lines, high output current, and one 32-bit external event counter. The USB-DIO96H/50 is powered by an external +9 V unregulated power supply that is shipped with the module. A USB cable is also included.

Power OUT and USB OUT connectors let you power and control multiple modules from one external power source and one USB port in a daisy chain fashion. Depending on your load requirement, daisy chained boards may require more than one separate power supply.

The 96 digital I/O lines are accessed through two 50-pin connectors. Each digital port group is divided into two 8-bit ports and two 4-bit ports, and is a discrete emulation of 82C55 mode zero operation. You can configure each port independently for either input or output.

The USB-DIO96H/50 outputs are high-drive TTL that can source 24 mA and sink 64 mA. Additional buffering is typically not required to drive external devices.

Each digital port has an associated pull-up resistor to drive the ports high during power up and reset. You can optionally configure this resistor for a pull-down configuration. All I/O bits are set to input mode on power up and reset.

The USB-DIO96H/50 is shipped in a rugged metal enclosure that you can mount on a DIN rail or on a bench (see Figure 1-1).

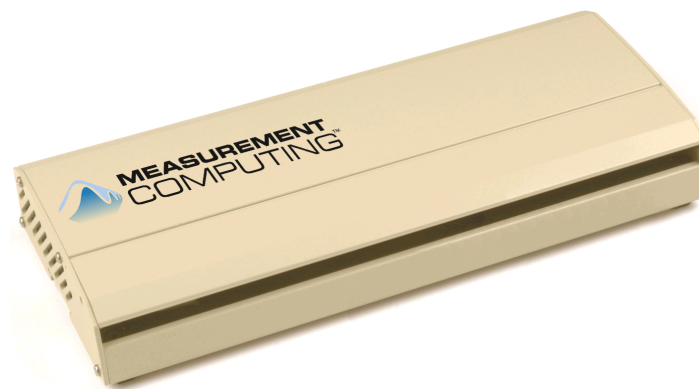


Figure 1-1. USB-DIO96H/50

USB-DIO96H/50 block diagram

USB-DIO96H/50 functions are illustrated in the block diagram shown here.

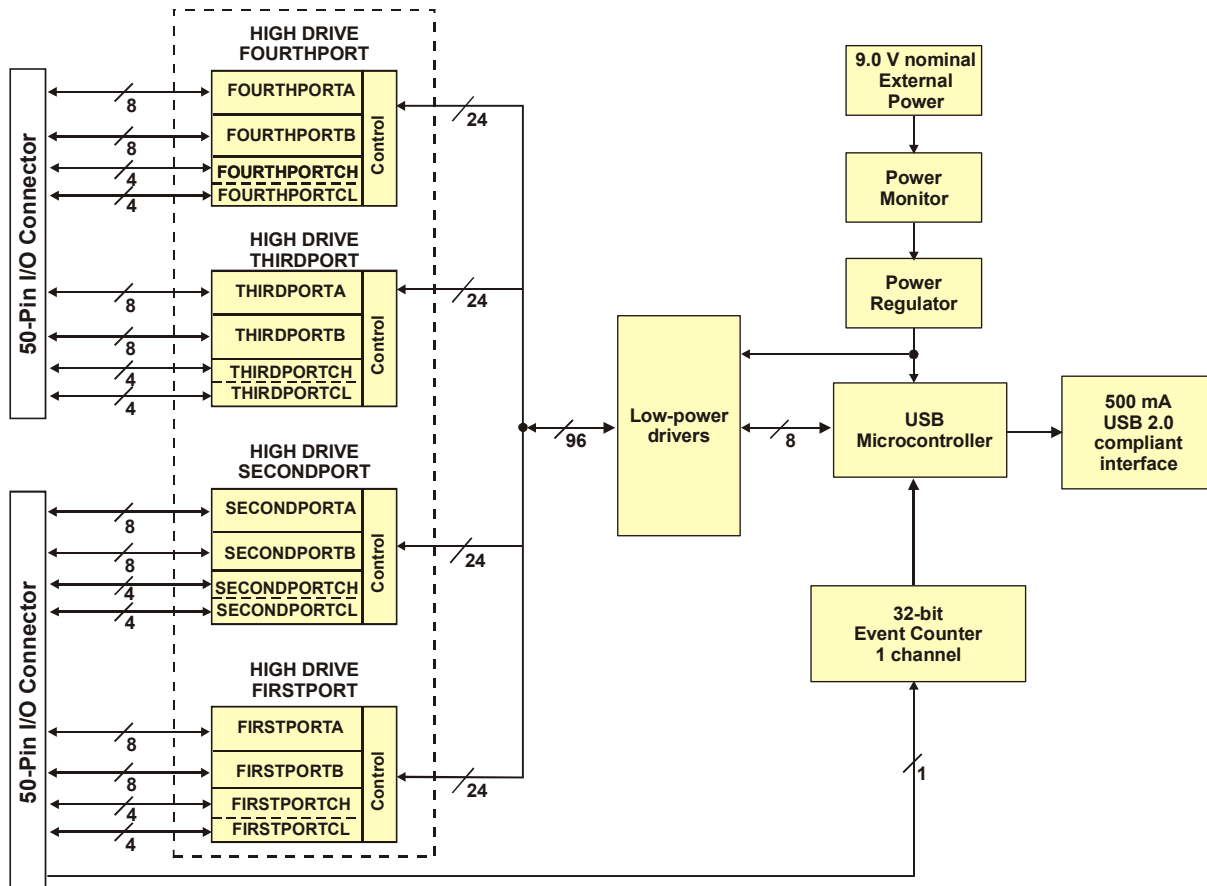


Figure 1-2. USB-DIO96H/50 functional block diagram

Software features

For information on the features of *InstaCal* and the other software included with your USB-DIO96H/50, 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 <http://www.mccdaq.com/download.htm> for the latest software version or versions of the software supported under less commonly used operating systems.

Connecting a USB-DIO96H/50 to your computer is easy

Installing a data acquisition device has never been easier.

- The USB-DIO96H/50 relies upon the Microsoft Human Interface Device (HID) class drivers. The HID class drivers ship with every copy of Windows that is designed to work with USB ports. We use the Microsoft HID because it is a standard, and its performance delivers full control and maximizes data transfer rates for your USB-DIO96H/50. No third-party device driver is required.
- The USB-DIO96H/50 is plug-and-play. There are no jumpers to position, dual in-line package (DIP) switches to set, or interrupts to configure.
- You can connect the USB-DIO96H/50 before or after you install the software, and without powering down your computer first.

When you connect an HID to your system, your computer automatically detects it and configures the necessary software. You can connect and power multiple HID peripherals to your system using a USB hub.

- You can connect your system to various devices using a standard four-wire cable. The USB connector improves upon serial and parallel port connectors with one standardized plug-and-port combination.
- Data can flow two ways between a computer and peripheral over USB connections.

Make sure that you have the latest Windows Updates installed for your USB driver, particularly "XP Hotfix KB822603."

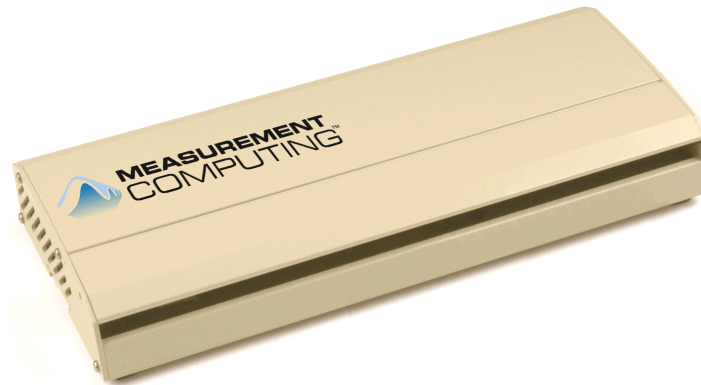
Installing the USB-DIO96H/50

What comes with your USB-DIO96H/50 shipment?

The following items are shipped with the USB-DIO96H/50.

Hardware

- USB-DIO96H/50



- External power supply and cord (CB-PWR-9V3A) – 9 volt, 3 amp DC power supply



- USB cable (2 meter length)



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 USB-DIO96H/50 and information regarding installation of that software. Please read this booklet completely before installing any software or hardware.

Optional components

- C50FF-x cable



Unpacking the USB-DIO96H/50

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the USB-DIO96H/50 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.

Installing the hardware

Before you connect the USB-DIO96H/50 to your computer, connect the external power supply that was shipped with the device.

You can connect up to four MCC USB Series products in a daisy chain configuration to a single USB 1.1 port or USB 2.0 port on your computer.

Connecting the external power supply

Power to the USB-DIO96H/50 is provided with the +9 V external power supply (CB-PWR-9V3A). You must connect the external power supply *before* connecting the USB cable to the USB-DIO96H/50 and your computer.

If you are connecting more than one MCC USB Series product, make sure that you provide adequate power to each device. Refer to the "[Power limitations using multiple USB-DIO96H devices](#)" section on page 3-3.

To connect the power supply to your USB-DIO96H/50, connect the external power cord to the power connector labeled **POWER IN** on the USB-DIO96H/50 enclosure (**J3** on the board). Refer to Figure 3-1 on page 3-1 for the location of this connector.

The **PWR** LED lights up when +9 V power is supplied to the USB-DIO96H/50. If the voltage supply is less than +6.0 V or more than +12.5 V, the **PWR** LED does not light.

Do not connect external power to the POWER OUT connector

The power connector labeled **POWER OUT** on the enclosure (**J4** on the board) is used to provide power to an additional MCC USB Series product. If you connect the external power supply to the **POWER OUT** connector, the USB-DIO96H/50 does not receive power, and the **PWR** LED does not illuminate.

Connecting the USB-DIO96H/50 to your system

To connect the USB-DIO96H/50 to your system, connect the USB cable to a USB port on your computer or to an external USB hub that is connected to your computer. The USB cable provides communication to the USB-DIO96H/50.

When you connect the USB-DIO96H/50 for the first time, multiple **Found New Hardware** popup balloons (Windows XP) or dialogs (other Windows versions) appear as the USB-DIO96H/50 is detected.



If you are running Windows XP and connect the USB-DIO96H/50 to a USB 1.1 port, a balloon displays the message *Your USB device can perform faster if you connect to a USB 2.0 port*. You can ignore this message. The USB-DIO96H/50 does function properly when connected to a USB 1.1 port, although USB bandwidth will be limited.

When installation is complete, the **USB LED** should flash and then remain lit. This indicates that communication is established between the USB-DIO96H/50 and your computer.

If the USB LED turns off

If the USB LED is lit but then turns off, the computer has lost communication with the USB-DIO96H/50. To restore communication, disconnect the USB cable from the computer, and then reconnect it. This should restore communication, and the USB LED should turn back *on*.

Caution! Do not disconnect **any** device from the USB bus while the computer is communicating with the USB-DIO96H/50, or you may lose data and/or your ability to communicate with the USB-DIO96H/50.

If your system does not detect the USB-DIO96H/50

If a "**USB device not recognized**" message appears when you connect the USB-DIO96H/50, do the following.

1. Unplug the USB cable from the USB-DIO96H/50.
2. Unplug the external power cord from the **POWER IN** connector on the enclosure.
3. Plug the external power cord back into the **POWER IN** connector.
4. Plug the USB cable back into the USB-DIO96H/50.

Your system should now properly detect the USB-DIO96H/50 hardware. Contact technical support if your system still does not detect the USB-DIO96H/50.

Connecting the module for I/O operations

Connectors, cables – main I/O connector

Table 2-1 lists the board connectors, applicable cables, and compatible accessory boards.

Table 2-1. Board connectors, cables, accessory equipment

Connector (P1 and P2)	50-pin 0.1" IDC type box header
Compatible cables	C50FF-x, 50-pin ribbon cable. x = 3 or 6 feet (Figure 2-1)
Compatible accessory products	SCB-50 CIO-MINI50 (2) CIO-TERM100 CIO-SPADE50 (2) CIO-ERB24 CIO-SERB24/FD CIO-ERB48 CIO-SERB48 SSR-RACK24 SSR-RACK48

Pinout – main I/O connectors

Table 2-2. 50-pin connector pinout (P1)

Pin	Signal name		Pin	Signal name
50	GND	◦ ◦	49	+5V
48	FIRSTPORTC Bit 0	◦ ◦	47	FIRSTPORTC Bit 1
46	FIRSTPORTC Bit 2	◦ ◦	45	FIRSTPORTC Bit 3
44	FIRSTPORTC Bit 4	◦ ◦	43	FIRSTPORTC Bit 5
42	FIRSTPORTC Bit 6	◦ ◦	41	FIRSTPORTC Bit 7
40	FIRSTPORTB Bit 0	◦ ◦	39	FIRSTPORTB Bit 1
38	FIRSTPORTB Bit 2	◦ ◦	37	FIRSTPORTB Bit 3
36	FIRSTPORTB Bit 4	◦ ◦	35	FIRSTPORTB Bit 5
34	FIRSTPORTB Bit 6	◦ ◦	33	FIRSTPORTB Bit 7
32	FIRSTPORTA Bit 0	◦ ◦	31	FIRSTPORTA Bit 1
30	FIRSTPORTA Bit 2	◦ ◦	29	FIRSTPORTA Bit 3
28	FIRSTPORTA Bit 4	◦ ◦	27	FIRSTPORTA Bit 5
26	FIRSTPORTA Bit 6	◦ ◦	25	FIRSTPORTA Bit 7
24	SECONDPORTC Bit 0	◦ ◦	23	SECONDPORTC Bit 1
22	SECONDPORTC Bit 2	◦ ◦	21	SECONDPORTC Bit 3
20	SECONDPORTC Bit 4	◦ ◦	19	SECONDPORTC Bit 5
18	SECONDPORTC Bit 6	◦ ◦	17	SECONDPORTC Bit 7
16	SECONDPORTB Bit 0	◦ ◦	15	SECONDPORTB Bit 1
14	SECONDPORTB Bit 2	◦ ◦	13	SECONDPORTB Bit 3
12	SECONDPORTB Bit 4	◦ ◦	11	SECONDPORTB Bit 5
10	SECONDPORTB Bit 6	◦ ◦	9	SECONDPORTB Bit 7
8	SECONDPORTA Bit 0	◦ ◦	7	SECONDPORTA Bit 1
6	SECONDPORTA Bit 2	◦ ◦	5	SECONDPORTA Bit 3
4	SECONDPORTA Bit 4	◦ ◦	3	SECONDPORTA Bit 5
2	SECONDPORTA Bit 6	◦ ◦	1	SECONDPORTA Bit 7

Table 2-3. 50-pin connector pinout (P2)

Pin	Signal name		Pin	Signal name
100	GND	o o	99	+5V
98	THIRDPORTC Bit 0	o o	97	THIRDPORTC Bit 1
96	THIRDPORTC Bit 2	o o	95	THIRDPORTC Bit 3
94	THIRDPORTC Bit 4	o o	93	THIRDPORTC Bit 5
92	THIRDPORTC Bit 6	o o	91	THIRDPORTC Bit 7
90	THIRDPORTB Bit 0	o o	89	THIRDPORTB Bit 1
88	THIRDPORTB Bit 2	o o	87	THIRDPORTB Bit 3
86	THIRDPORTB Bit 4	o o	85	THIRDPORTB Bit 5
84	THIRDPORTB Bit 6	o o	83	THIRDPORTB Bit 7
82	THIRDPORTA Bit 0	o o	81	THIRDPORTA Bit 1
80	THIRDPORTA Bit 2	o o	79	THIRDPORTA Bit 3
78	THIRDPORTA Bit 4	o o	77	THIRDPORTA Bit 5
76	THIRDPORTA Bit 6	o o	75	THIRDPORTA Bit 7
74	FOURTHPORTC Bit 0	o o	73	FOURTHPORTC Bit 1
72	FOURTHPORTC Bit 2	o o	71	FOURTHPORTC Bit 3
70	FOURTHPORTC Bit 4	o o	69	FOURTHPORTC Bit 5
68	FOURTHPORTC Bit 6	o o	67	FOURTHPORTC Bit 7
66	FOURTHPORTB Bit 0	o o	65	FOURTHPORTB Bit 1
64	FOURTHPORTB Bit 2	o o	63	FOURTHPORTB Bit 3
62	FOURTHPORTB Bit 4	o o	61	FOURTHPORTB Bit 5
60	FOURTHPORTB Bit 6	o o	59	FOURTHPORTB Bit 7
58	FOURTHPORTA Bit 0	o o	57	FOURTHPORTA Bit 1
56	FOURTHPORTA Bit 2	o o	55	FOURTHPORTA Bit 3
54	FOURTHPORTA Bit 4	o o	53	FOURTHPORTA Bit 5
52	FOURTHPORTA Bit 6	o o	51	FOURTHPORTA Bit 7

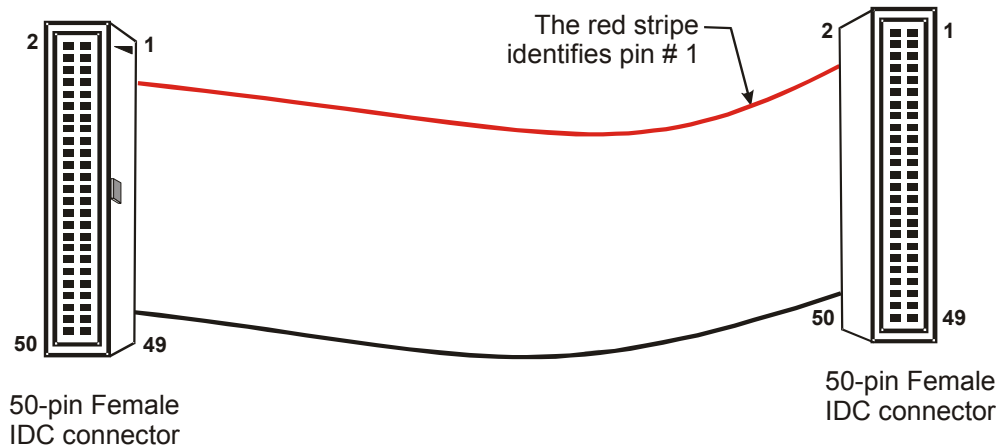


Figure 2-1. C50FF-x cable

Field wiring and signal termination accessories

You can use the following screw terminal boards to terminate field signals and route them into the USB-DIO96H/50 using the C50FF-x cable.

- SCB-50 – 50-conductor, shielded signal connection box.
- CIO-MINI50 – 50-pin screw terminal board.
- CIO-TERM100 – 100-pin screw terminal board (two 50-pin IDC connectors).
- CIO-SPADE50 — 16" X 4" termination panel which mates with both 37-pin and 50-pin connectors.

- SCB-50 – 50 conductor, shielded signal connection/screw terminal box provides two independent 50-pin connectors.
- CIO-ERB24 – 24 Form C relays, 6 amp relay accessory board for digital signal conditioning.
- CIO-SERB24/FD – 24 Form C relays, 10 amp, fault detecting relay accessory board with socketed and field-replaceable relays
- CIO-ERB48 – 48 Form C relays, 6 amp, relay, 50-pin accessory board for digital signal conditioning.
- CIO-SERB48 – 24 Form C relays, 10 amp relay accessory board with socketed and field-replaceable relays
- SSR-RACK24 – 24-channel, solid-state relay mounting rack for digital signal conditioning.
- SSR-RACK48 – 48-channel, solid-state relay mounting rack with quad-format modules.

For additional information about digital interfacing...

Detailed information regarding digital interfacing is contained in MCC's *Guide to Signal Connections*. This document is available on our web site at www.measurementcomputing.com/signals/signals.pdf.

Functional Details

Internal components

These USB-DIO96H/50 components are shown in Figure 3-1.

- Two (2) USB connectors
- Two (2) external power connectors
- USB LED
- PWR LED
- 12 pull-up/pull-down resistors
- Two 50-pin connectors

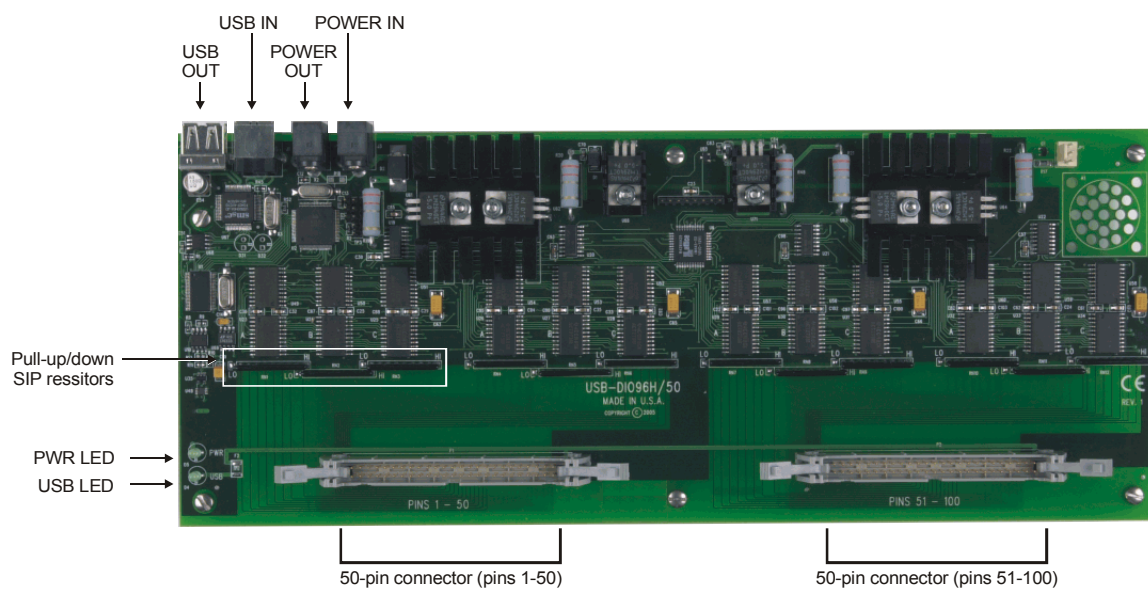


Figure 3-1. USB-DIO96H/50 components

USB OUT connector

The **USB OUT** connector is a downstream hub output port intended for use with other MCC USB Series products only. The USB hub is self-powered, and can provide 100 mA maximum current at 5 V. The USB out connector is labeled **USB OUT** on the enclosure and **J2** on the board.

When connecting to another MCC USB Series product, connect the **USB OUT** connector on the USB-DIO96H/50 to the **USB IN** connector on the next device in the chain. Refer to "[Daisy chaining additional modules to the USB-DIO96H/50](#)" on page 3-2 for information on how to connect multiple MCC USB Series products.

USB IN connector

Connect the **USB IN** connector to the USB port on your computer (or USB hub connected to your computer) using the supplied USB cable. The USB in connector is labeled **USB IN** on the enclosure and **J1** on the board.

When connecting to another MCC USB Series product, connect the **USB IN** connector on the USB-DIO96H/50 to the **USB OUT** connector on the next device in the chain. Refer to "[Daisy chaining additional modules to the USB-DIO96H/50](#)" on page 3-2 for more information on how to connect multiple MCC USB Series products.

External power connectors

The USB-DIO96H/50 has two external power connectors labeled **POWER IN** and **POWER OUT** on the enclosure. The **POWER IN** connector is labeled **J3** on the board, and the **POWER OUT** connector is labeled **J4**.

Connect the **POWER IN** connector to the supplied +9 V external power supply (CB-PWR-9V3A). The **POWER OUT** connector lets you power additional daisy chained MCC USB Series products from a single external power supply. When running at full load, the USB-DIO96H/50 draws 2.6 A from the supply. When using the USB-DIO96H/50 under full load conditions, do not daisy chain power to another MCC USB Series product. Depending on your load requirements, daisy-chained products may require a separate power supply. Refer to "[Power limitations using multiple USB-DIO96H/50](#)" on page 3-3 for more information.

USB LED

The **USB** LED indicates the communication status of the USB-DIO96H/50. It uses up to 5 mA of current and cannot be disabled. Table 3-4 explains the function of the **USB** LED.

Table 3-4. USB LED illumination

LED Illumination	Indication
Steady green	The USB-DIO96H/50 is connected to a computer or external USB hub.
Blinks continuously	Initial communication is established between the USB-DIO96H/50 and the computer, or data is being transferred.

PWR LED

The **PWR** LED illuminates when external power is supplied. The USB-DIO96H/50 incorporates an on-board voltage supervisory circuit that monitors the external power supply. The **PWR** LED does not light under the following circumstances:

- when the input power falls below +6.0 V
- when the input power goes above +12.5 V
- when you connect the external power supply to the **POWER OUT** connector (**J4**)

Pull-up / pull-down resistors

Each digital port group has three associated 10 kΩ pull-up/pull-down SIP resistor locations. Each SIP resistor is shipped from the factory configured for pull-up. To configure individual ports for pull-down, de-solder the SIP resistor pin connections and install the resistor with the common line at the **LO** end. Then re-solder the SIP resistor pin connections.

Daisy chaining additional modules to the USB-DIO96H/50

Daisy chained MCC USB Series products connect to the USB bus through the high-speed hub on the USB-DIO96H/50. You can daisy chain a maximum of four compatible MCC USB Series products to a single USB 2.0 port or USB 1.1 port on your computer. Use the supplied cable or an equivalent cable when daisy chaining MCC USB Series products.

Depending on your load requirements, you may need to supply external power to each MCC USB Series product that you want to daisy chain. Refer to the section "[Power limitations using multiple USB-DIO96H/50](#)" on page 3-3 for more information.

To daisy-chain two or more USB-DIO96H/50 modules, follow the steps below. This procedure assumes you already have one USB-DIO96H/50 connected to a computer and to the external power source. The USB-DIO96H/50 already connected to the computer is referred to as the *connected module*. The USB-DIO96H/50 you want to daisy-chain to the connected module is referred to as the *new module*.

1. Connect the **USB OUT** connector on the connected module to the **USB IN** connector on the new module.
2. Connect the **POWER OUT** connector on the connected module to the **POWER IN** connector on the new module.
3. For each additional module you want to add, repeat steps 1-2, with the module you just daisy chained now being the *connected module*.

A daisy chain system requiring only one external power source is shown in Figure 3-2.

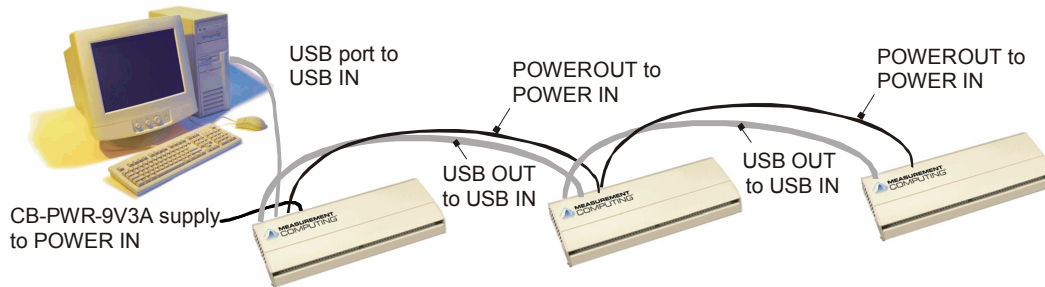


Figure 3-2. USB-DIO96H/50 daisy-chain connections (configuration not near full power load)

Power limitations using multiple USB-DIO96H/50 modules

When daisy chaining additional MCC USB Series products to the USB-DIO96H/50, you must ensure that you provide adequate power to each module that you connect. The USB-DIO96H/50 is supplied with a 9 VDC nominal, 3.0 A external power supply.

Supply current

Running one USB-DIO96H/50 at full load draws 2.6 A from the 3A supply. When using the USB-DIO96H/50 under full load conditions, you cannot daisy chain additional MCC USB Series products unless you supply external power to each module in the chain.

If you are not sure how much current your application requires, we recommend that you provide separate power to each MCC USB Series product that you connect.

Voltage drop

A drop in voltage occurs within each module connected in a daisy chain system. The voltage drop between the power input of each MCC USB Series products and its power output is 0.5 V maximum. Factor in this voltage drop when you configure a daisy chain system to ensure that adequate power is provided to the last modules in the chain. A daisy chain system in a full-power-load configuration is shown in Figure 3-3.

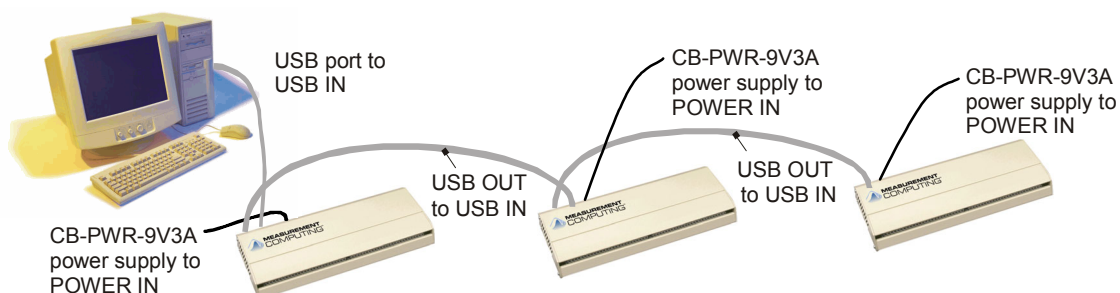


Figure 3-3. USB-DIO96H/50 daisy-chain connections (configuration requiring full power load)

Specifications

Typical for 25 °C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

Digital input / output

Table 1. Digital I/O specifications

Output	74ABT244A
Input	74ACT373
Configuration	8 banks of 8, 8 banks of 4, programmable by bank as input or output
Number of I/O	96
Output high	2.0 volts min @ -24 mA
Output low	0.5 volts max @ 64 mA
Input high	2.0 volts min, 5.5 volts max
Input low	0.8 volts max, -0.5 volts absolute min
Source current	Maximum = 24 mA per output
Sink current	Maximum = 64 mA per output
Power up / reset state	Input mode (10 K ohm pulled-up by default)

Power

Table 2. Power specifications

Parameter	Conditions	Specification
USB +5 V input voltage range		4.75V min. to 5.25V max.
USB +5 V supply current	All modes of operation	<100 mA
External power input		6.0 VDC to 12.5 VDC (9 VDC power supply provided)
External power supply (included)	MCC p/n CB-PWR-9V3A	9 V \pm 10% @ 3 A
Voltage supervisor limits - PWR LED	6.0 V > V _{ext} or V _{ext} > 12.5 V	PWR LED = Off (power fault)
	6.0 V < V _{ext} < 12.5 V	PWR LED = On
Power supply current		2.6 A max
User 5 V output voltage range	Available at 5 V output pins (pin 49)	4.0 V min., 5.25 V max.
User 5 V output current available	Total from all 5 V output pins	50 mA max

External power output

Table 3. External power output specifications

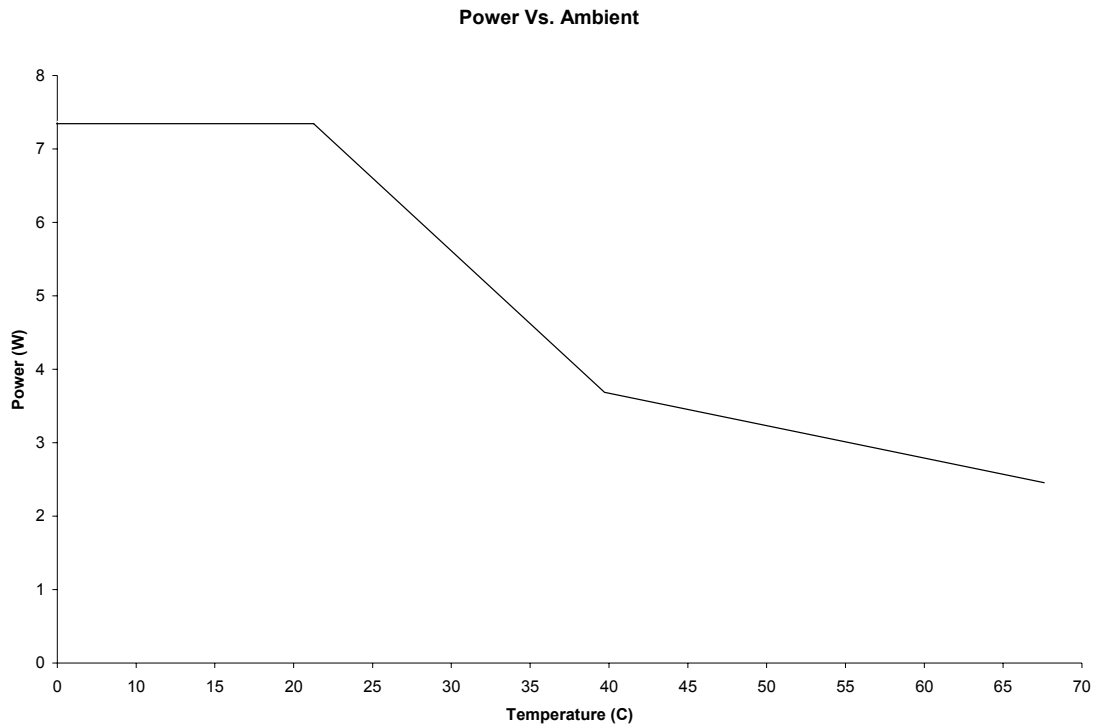
Parameter	Conditions	Specification
External power output - current range	Note 1	4.0 A max. @ 25 °C
External power output - voltage range	The input voltage minus the output voltage at the daisy chain output	0.5 V max
Compatible cable(s) for daisy chain	C-MAPWR-x	x = 2, 3, or 6 feet

Note 1: The daisy chain power output allows multiple MCC USB Series boards with a USB hub output port to be powered from a single external power source in a daisy chain fashion.

The voltage drop between the input of one module and its daisy chain output is 0.5 V maximum. You should plan for this voltage drop when configuring a daisy chain system to assure functionality of the last board in the chain.

Environmental

Graph 1. Operating temperature de-rating curve (Note 2)



Note 2: There is a total of 24 I/O per bank (PORTA, PORTB, PORTCH, PORTCL). These specifications are for a power supply input voltage of 9 volts. Higher input voltages will increase the power dissipation and will further reduce the total current available from each port.

Table 4. Environmental specifications

Operating temperature range	0 to 70 °C
Storage temperature range	-40 to 85 °C
Humidity	0 to 90% non-condensing

USB specifications

Table 5. USB specifications

USB "B" connector	Input
USB device type	USB 2.0 (full-speed)
Device compatibility	USB 1.1, USB 2.0
USB "A" connector	Downstream hub output port
USB hub type	Supports USB 2.0 high-speed, full-speed and low-speed operating points Self-powered, 100 mA max downstream VBUS capability
Compatible products	MCC USB Series products with a USB hub output port
USB cable type (upstream and downstream)	A-B cable, UL type AWM 2527 or equivalent. (min 24 AWG VBUS/GND, min 28 AWG D+/D-)
USB cable length	3 meters max.

Data transfer rates

Table 6. Data transfer rate specifications

Digital I/O transfer rates (software paced)	System dependent, 33 to 1000 port reads/writes or single bit reads/writes per second typ.
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Mechanical

Table 7. Mechanical specifications

Card dimensions	304.8 mm (L) x 121.9 mm (W) x 15.2 mm (H)
	12.0" (L) x 4.8" (W) x 0.6" (H)
Enclosure dimensions	309.9 mm (L) x 132.1 mm (W) x 40.6 mm (H)
	12.2" (L) x 5.2" (W) x 1.6" (H)

Main connector and pin outs

Table 8. Ribbon connector specifications

Connector	P1-P2. 50-pin 0.1" IDC type box header
Compatible cables	C-50FF-x, 50-pin ribbon cable
Compatible accessory products	SCB-50 CIO-MINI50 (2) CIO-TERM100 CIO-SPADE50 (2) CIO-ERB24 CIO-SERB24/FD CIO-ERB48 CIO-SERB48 SSR-RACK24 SSR-RACK48

P1

Table 9. P1 pin out

Pin	Signal Name	Pin	Signal Name
50	GND	49	+5V
48	FIRSTPORTC Bit 0	47	FIRSTPORTC Bit 1
46	FIRSTPORTC Bit 2	45	FIRSTPORTC Bit 3
44	FIRSTPORTC Bit 4	43	FIRSTPORTC Bit 5
42	FIRSTPORTC Bit 6	41	FIRSTPORTC Bit 7
40	FIRSTPORTB Bit 0	39	FIRSTPORTB Bit 1
38	FIRSTPORTB Bit 2	37	FIRSTPORTB Bit 3
36	FIRSTPORTB Bit 4	35	FIRSTPORTB Bit 5
34	FIRSTPORTB Bit 6	33	FIRSTPORTB Bit 7
32	FIRSTPORTA Bit 0	31	FIRSTPORTA Bit 1
30	FIRSTPORTA Bit 2	29	FIRSTPORTA Bit 3
28	FIRSTPORTA Bit 4	27	FIRSTPORTA Bit 5
26	FIRSTPORTA Bit 6	25	FIRSTPORTA Bit 7
24	SECONDPORC Bit 0	23	SECONDPORC Bit 1
22	SECONDPORC Bit 2	21	SECONDPORC Bit 3
20	SECONDPORC Bit 4	19	SECONDPORC Bit 5
18	SECONDPORC Bit 6	17	SECONDPORC Bit 7
16	SECONDPORB Bit 0	15	SECONDPORB Bit 1
14	SECONDPORB Bit 2	13	SECONDPORB Bit 3
12	SECONDPORB Bit 4	11	SECONDPORB Bit 5
10	SECONDPORB Bit 6	9	SECONDPORB Bit 7
8	SECONDPORA Bit 0	7	SECONDPORA Bit 1
6	SECONDPORA Bit 2	5	SECONDPORA Bit 3
4	SECONDPORA Bit 4	3	SECONDPORA Bit 5
2	SECONDPORA Bit 6	1	SECONDPORA Bit 7

P2

Table 10. P2 pin out

Pin	Signal Name	Pin	Signal Name
100	GND	99	+5V
98	THIRDPORC Bit 0	97	THIRDPORC Bit 1
96	THIRDPORC Bit 2	95	THIRDPORC Bit 3
94	THIRDPORC Bit 4	93	THIRDPORC Bit 5
92	THIRDPORC Bit 6	91	THIRDPORC Bit 7
90	THIRDPORB Bit 0	89	THIRDPORB Bit 1
88	THIRDPORB Bit 2	87	THIRDPORB Bit 3
86	THIRDPORB Bit 4	85	THIRDPORB Bit 5
84	THIRDPORB Bit 6	83	THIRDPORB Bit 7
82	THIRDPORA Bit 0	81	THIRDPORA Bit 1
80	THIRDPORA Bit 2	79	THIRDPORA Bit 3
78	THIRDPORA Bit 4	77	THIRDPORA Bit 5
76	THIRDPORA Bit 6	75	THIRDPORA Bit 7
74	FOURTHPORC Bit 0	73	FOURTHPORC Bit 1
72	FOURTHPORC Bit 2	71	FOURTHPORC Bit 3
70	FOURTHPORC Bit 4	69	FOURTHPORC Bit 5
68	FOURTHPORC Bit 6	67	FOURTHPORC Bit 7
66	FOURTHPORB Bit 0	65	FOURTHPORB Bit 1
64	FOURTHPORB Bit 2	63	FOURTHPORB Bit 3
62	FOURTHPORB Bit 4	61	FOURTHPORB Bit 5
60	FOURTHPORB Bit 6	59	FOURTHPORB Bit 7
58	FOURTHPORA Bit 0	57	FOURTHPORA Bit 1
56	FOURTHPORA Bit 2	55	FOURTHPORA Bit 3
54	FOURTHPORA Bit 4	53	FOURTHPORA Bit 5
52	FOURTHPORA Bit 6	51	FOURTHPORA Bit 7

CE Declaration of Conformity

Manufacturer: Measurement Computing Corporation
Address: 16 Commerce Boulevard
Middleboro, MA 02346
USA

Category: Electrical equipment for measurement, control and laboratory use.

Measurement Computing Corporation declares under sole responsibility that the product

USB-DIO96H/50

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, EN 61326 (1997) Amendment 1 (1998)

Emissions: Group 1, Class A

- EN 55011 (1990)/CISPR 11: Radiated and Conducted emissions.

Immunity: EN61326, Annex A

- IEC 1000-4-2 (1995): Electrostatic Discharge immunity, Criteria C.
- IEC 1000-4-3 (1995): Radiated Electromagnetic Field immunity Criteria C.
- IEC 1000-4-4 (1995): Electric Fast Transient Burst immunity Criteria A.
- IEC 1000-4-5 (1995): Surge immunity Criteria C.
- IEC 1000-4-6 (1996): Radio Frequency Common Mode immunity Criteria A.
- IEC 1000-4-8 (1994): Magnetic Field immunity Criteria A.
- IEC 1000-4-11 (1994): Voltage Dip and Interrupt immunity Criteria A.

Declaration of Conformity based on tests conducted by Chomerics Test Services, Woburn, MA 01801, USA in February, 2005. Test records are outlined in Chomerics Test Report #EMI4133.05.

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



Carl Haapaoja, Director of Quality Assurance

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