

USB-DIO96H

High-drive Digital I/O

User's Guide

Hardware Revision 2

Trademark and Copyright Information

Measurement Computing Corporation, InstaCal, Universal Library, and the Measurement Computing logo are either trademarks or registered trademarks of Measurement Computing Corporation. Refer to the Copyrights & Trademarks section on mccdaq.com/legal for more information about Measurement Computing trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies.

© 2019 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 that, 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.

Table of Contents

Preface

About this User's Guide	4
What you will learn from this user's guide	4
Conventions in this user's guide	4
Where to find more information	4

Chapter 1

Introducing the USB-DIO96H	5
USB-DIO96H block diagram	6

Chapter 2

Installing the USB-DIO96H	7
Unpacking.....	7
Installing the software	7
Connecting the external power supply.....	7
Installing the hardware	7

Chapter 3

Functional Details	9
Components.....	9
USB IN connector.....	9
External power connector	9
Molex connector	10
Power source jumper JP2.....	10
USB LED.....	10
PWR LED.....	11
User connectors.....	11
Pull-up/pull-down DIP switches	11
Signal connections.....	11
Digital I/O (FIRSTPORTA Bit 0 to FOURTHPORTC Bit 7)	13
Counter input	13
Power outputs	13
Ground.....	13
Mechanical drawings.....	14

Chapter 4

Specifications	15
Digital input/output.....	15
Power.....	16
Counter	16
Environmental	17
USB specifications	17
Data transfer rates.....	17
Mechanical	17
Screw terminal connectors.....	17
Screw terminal pinout.....	18
Ribbon connectors	19
P1 pinout.....	19
P2 pinout.....	20
P3 pinout.....	21
P4 pinout.....	22

Declaration of Conformity.....	23
---------------------------------------	-----------

About this User's Guide

What you will learn from this user's guide

This user's guide describes the Measurement Computing USB-DIO96H data acquisition device and lists device specifications.

This manual applies to revision 2 hardware and later

This manual applies to revision 2 of the USB-DIO96H hardware, which uses a 5 V power supply. Revision 1 of the USB-DIO96H hardware has a 9 V power supply and daisy-chained hub. For information on revision 1 hardware, refer to www.mccdaq.com/pdfs/manuals/USB-DIO96H_R1.pdf.

Conventions in this user's guide

For more information

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.

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

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

Where to find more information

Additional information about the USB-DIO96H is available on our website at www.mccdaq.com. You can also contact Measurement Computing Corporation by phone, fax, or email with specific questions.

- Knowledgebase: kb.mccdaq.com
- Tech support form: www.mccdaq.com/support/support_form.aspx
- Email: techsupport@mccdaq.com
- Phone: 508-946-5100 and follow the instructions for reaching Tech Support

Introducing the USB-DIO96H

The USB-DIO96H is a USB 2.0 full-speed device that provides the following features:

- 96 bits of digital I/O lines in four independent port groups,
 - Each group is divided into two 8-bit ports and two 4-bit ports, and is a discrete emulation of 82C55 mode zero operation
 - Each port is software-selectable for either input or output
 - Each digital port has associated DIP switches to drive the ports high or low during power up and reset (pull-up or pull-down configuration.) All I/O bits are set to input mode on power up and reset.
- High-drive TTL outputs that can source 24 mA and sink 64 mA
- A 32-bit external event counter.
- Screw terminals for signal I/O connections
- 50-pin mass termination connectors for OEM applications (remove enclosure to access mass termination connectors)
- Rugged metal enclosure that can mount on a DIN rail or on a bench. A USB cable is included.

The USB-DIO96H is fully compatible with both USB 1.1 and USB 2.0 ports. Revision G and later devices are also compatible with USB 3.0 ports.

The USB-DIO96H is powered by an external +5 V regulated power supply that is shipped with the device.

A jumper-selectable Molex® connector is also available inside the case if you need an alternate power supply. The cable for this connector is not included.

This manual applies to revision 2 hardware and later

<p>This manual applies to revision 2 of the USB-DIO96H hardware, which uses a 5 V power supply. Revision 1 of the USB-DIO96H hardware has a 9 V power supply and daisy-chained hub. For information on revision 1 hardware, refer to www.mccdaq.com/PDFs/specs/USB-DIO96H_R1-spec.pdf.</p>
--

USB-DIO96H block diagram

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

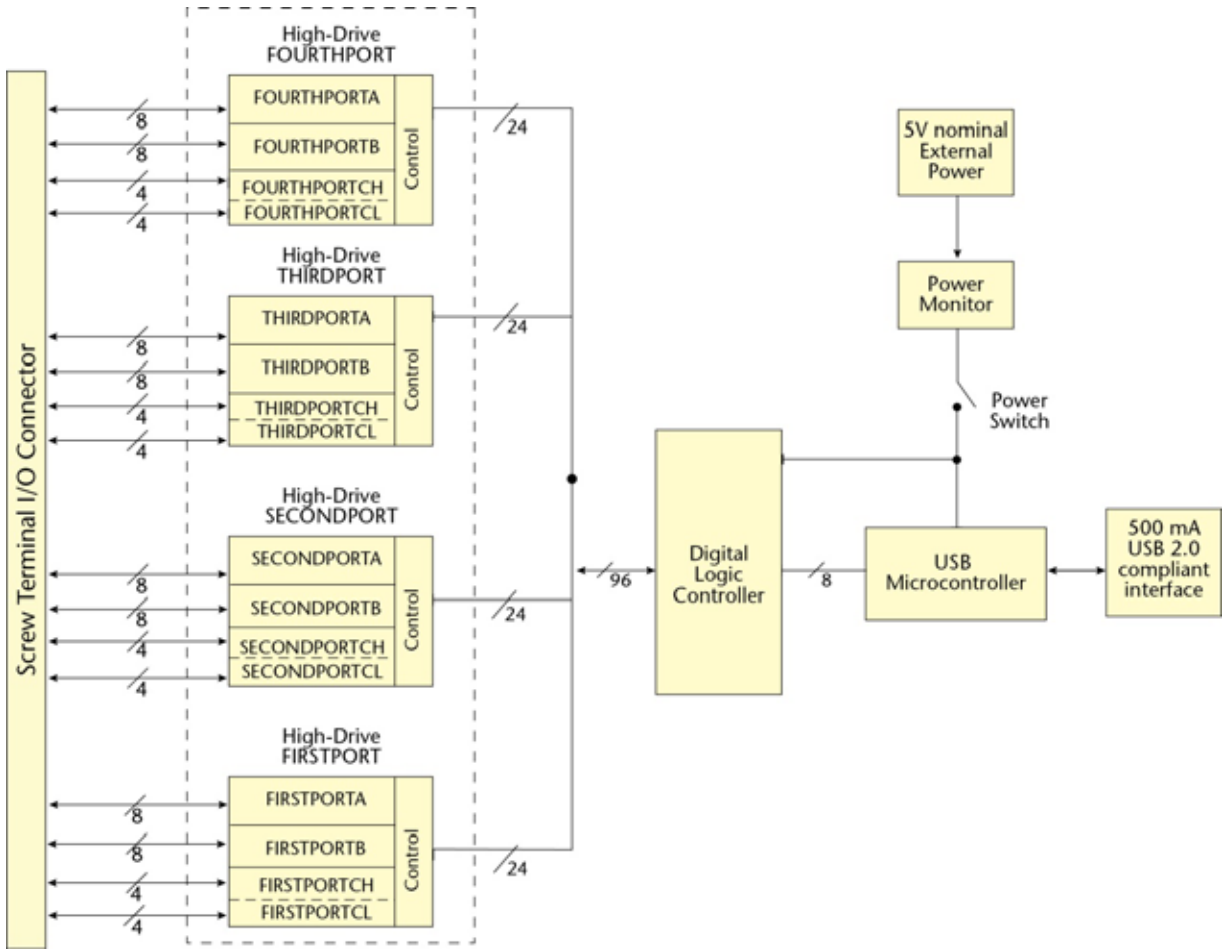


Figure 1. USB-DIO96H functional block diagram

Installing the USB-DIO96H

Unpacking

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

Contact us immediately if any components are missing or damaged.

Installing the software

Refer to the MCC DAQ Quick Start and the USB-DIO96H product page on our website for information about the available software.

Install the software before you install your device

The driver needed to run the USB-DIO96H is installed with the software. Therefore, you need to install the software package you plan to use before you install the hardware.

Connecting the external power supply

Power to the USB-DIO96H is provided with the +5 V external power supply (PS-5V3AEPS). You must connect the external power supply *before* connecting the USB cable to the USB-DIO96H and your computer.

To connect the power supply to the USB-DIO96H, connect the external power cord to the power connector labeled **POWER IN** on the USB-DIO96H enclosure (**P5** on the board). Refer to Figure 2 on page 9 for the location of this connector.

The **PWR** LED lights up when +5 V power is supplied to the USB-DIO96H. If the voltage supply is less than +4.1 V or more than +5.6 V, the **PWR** LED does not turn on.

Installing the hardware

To connect the USB-DIO96H to your system, complete the following steps.

1. Turn your computer on.
2. Connect the USB cable to the USB connector labeled USB IN on the USB-DIO96H.
3. Connect the other end of the USB cable to a USB port on your computer or to an external USB hub that is connected to your computer.

The **USB** LED turns on. Refer to Figure 2 on page 9 for the location of the **USB** LED.

Caution! Do not disconnect the device from the USB bus while the USB LED is on and the computer is communicating with the USB-DIO96H. You may lose data and/or your ability to communicate with the USB-DIO96H.

If the USB LED turns off

If the USB LED turns on but then turns off, the computer has lost communication with the USB-DIO96H. 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*.

If your system does not detect the USB-DIO96H

Perform the following procedure if a "**USB device not recognized**" message appears when you connect the USB-DIO96H:

1. Unplug the USB cable from the USB-DIO96H.
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.

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

Functional Details

Components

These USB-DIO96H components are shown in Figure 2.

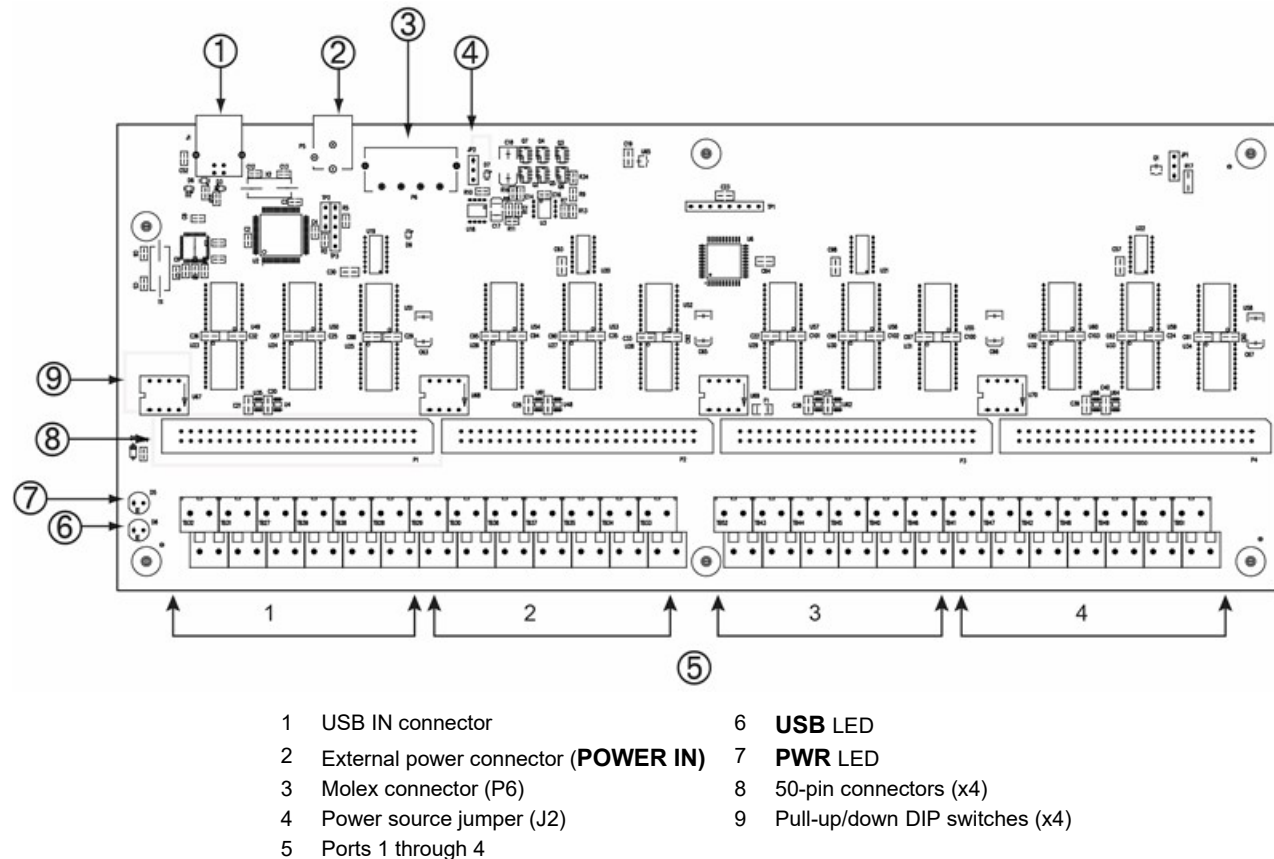


Figure 2. USB-DIO96H components

USB IN connector

The USB in connector is labeled **USB IN** on the enclosure and **J1** on the board. This connector is a USB 2.0 full-speed input connector that you connect to the USB port on your computer (or USB hub connected to your computer). This connector supports USB 1.1 and USB 2.0 devices.

Hardware revision G and later are also compatible with USB 3.0 ports. The board revision may be determined from the part number label on the enclosure that states "193770X-01L", where X is the board revision.

External power connector

The USB-DIO96H has an external power connector labeled **POWER IN** on the enclosure and **P5** on the board.

Connect the **POWER IN** connector to the supplied +5 V external power supply (PS-5V3AEPS). When running at full load, the USB-DIO96H draws 2.7 A from the supply.

Molex connector

The internal Molex connector is labeled **P6** on the board. Remove the device enclosure to access this connector.

Internal power connector pinout

Pin 1	NC (no connect)
Pin 2	GND
Pin 3	GND
Pin 4	5V

Pin 1 (NC) of the Molex connector is directly to the left of the power source jumper (JP2).

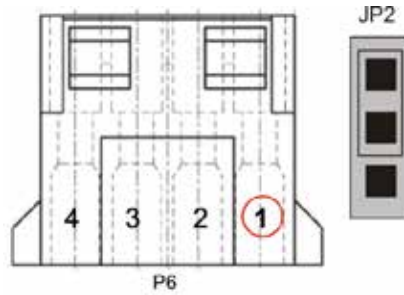


Figure 3. Molex connector (P6) pin assignments

Power source jumper JP2

The power source jumper is labeled **JP2** on the board. Use this jumper to configure the USB-DIO96H to use either the external power connector (**POWER IN**) or the Molex connector. Figure 4 shows the jumper in each configuration mode.

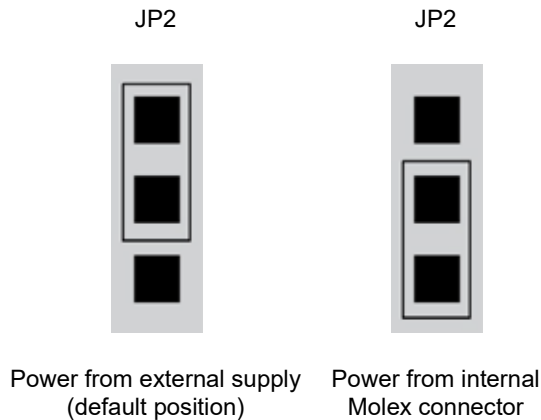


Figure 4. JP2 configuration modes

USB LED

The **USB LED** turns on to indicate the communication status of the USB-DIO96H. It uses up to 5 mA of current and cannot be disabled. The table below explains the behavior of the **USB LED**.

USB LED behavior

LED Behavior	Indication
Steady green	The USB-DIO96H is connected to a computer or external USB hub.
Continuous blink	Initial communication is established between the device and the computer, or data is being transferred.

PWR LED

The **PWR** LED turns on when external power is supplied. The USB-DIO96H incorporates an onboard voltage supervisory circuit that monitors the external power supply and disconnects power from the rest of the board components if the external power supply voltage is too high or too low. The **PWR** LED does not turn on, and power is not supplied to board components under the following circumstances:

- when the input power falls below +4.1 V
- when the input power goes above +5.6 V

User connectors

The USB-DIO96H has screw terminals for user connections. Refer to the [Screw terminal pinout](#) on page 12 for terminal assignments. (There are also optional header connectors available for applications in which the enclosure is not necessary.)

Pull-up/pull-down DIP switches

Use the on-board DIP switches labeled **PORT 1** through **PORT 4** to configure the pull-up/down configuration for each port. Each set of DIP switches includes four switches labeled 1 to 4. Switch 1 controls PORTA, switch 2 controls PORTB, switch 3 controls PORTCL, and switch 4 controls PORTCH.

Figure 5 shows the DIP switches used to configure Port 1.

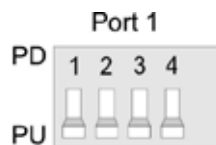


Figure 5. Pull-up/down switch configuration

All DIP switches are configured by default for pull-up (**PU**). To configure for pull-down, slide the switch to the **PD** position.

Signal connections

The USB-DIO96H has four rows of screw terminals labeled **Port 1** through **Port 4** that provide the following connections:

- 96 digital I/O lines (**A0** to **C7** for Port 1 through Port 4)
- One external event counter input (**CTR**)
- Three VDD power outputs (**5V**)
- Four ground terminals (**GND**)

Use 14 AWG to 30 AWG wire for your signal connections. Each screw terminal is identified with a label on the board and on the underside of the enclosure lid. Refer to the [Screw terminal pinout](#) on page 12 for the signal name associated with each board label.

Caution! Keep the length of stripped wire at a minimum to avoid a short to the enclosure! When connecting your field wiring to the screw terminals, use the strip gage on the terminal strip, or strip to 5.5 mm to 7.0 mm (0.215 in. to 0.275 in.) long.

Screw terminal pinout

Board label		Signal name	Board label		Signal name
Port 1	A0	P1A0 (FIRSTPORTA Bit 0)	Port 3	A0	P3A0 (THIRDPORATA Bit 0)
	A1	P1A1 (FIRSTPORTA Bit 1)		A1	P3A1 (THIRDPORATA Bit 1)
	A2	P1A2 (FIRSTPORTA Bit 2)		A2	P3A2 (THIRDPORATA Bit 2)
	A3	P1A3 (FIRSTPORTA Bit 3)		A3	P3A3 (THIRDPORATA Bit 3)
	A4	P1A4 (FIRSTPORTA Bit 4)		A4	P3A4 (THIRDPORATA Bit 4)
	A5	P1A5 (FIRSTPORTA Bit 5)		A5	P3A5 (THIRDPORATA Bit 5)
	A6	P1A6 (FIRSTPORTA Bit 6)		A6	P3A6 (THIRDPORATA Bit 6)
	A7	P1A7 (FIRSTPORTA Bit 7)		A7	P3A7 (THIRDPORATA Bit 7)
	B0	P1B0 (FIRSTPORTB Bit 0)		B0	P3B0 (THIRDPORATB Bit 0)
	B1	P1B1 (FIRSTPORTB Bit 1)		B1	P3B1 (THIRDPORATB Bit 1)
	B2	P1B2 (FIRSTPORTB Bit 2)		B2	P3B2 (THIRDPORATB Bit 2)
	B3	P1B3 (FIRSTPORTB Bit 3)		B3	P3B3 (THIRDPORATB Bit 3)
	B4	P1B4 (FIRSTPORTB Bit 4)		B4	P3B4 (THIRDPORATB Bit 4)
	B5	P1B5 (FIRSTPORTB Bit 5)		B5	P3B5 (THIRDPORATB Bit 5)
	B6	P1B6 (FIRSTPORTB Bit 6)		B6	P3B6 (THIRDPORATB Bit 6)
	B7	P1B7 (FIRSTPORTB Bit 7)		B7	P3B7 (THIRDPORATB Bit 7)
	C0	P1C0 (FIRSTPORTC Bit 0)		C0	P3C0 (THIRDPORATC Bit 0)
	C1	P1C1 (FIRSTPORTC Bit 1)		C1	P3C1 (THIRDPORATC Bit 1)
C2	P1C2 (FIRSTPORTC Bit 2)	C2	P3C2 (THIRDPORATC Bit 2)		
C3	P1C3 (FIRSTPORTC Bit 3)	C3	P3C3 (THIRDPORATC Bit 3)		
C4	P1C4 (FIRSTPORTC Bit 4)	C4	P3C4 (THIRDPORATC Bit 4)		
C5	P1C5 (FIRSTPORTC Bit 5)	C5	P3C5 (THIRDPORATC Bit 5)		
C6	P1C6 (FIRSTPORTC Bit 6)	C6	P3C6 (THIRDPORATC Bit 6)		
C7	P1C7 (FIRSTPORTC Bit 7)	C7	P3C7 (THIRDPORATC Bit 7)		
5V	5V	5V	5V		
GND	GND	GND	GND		
Port 2	A0	P2A0 (SECONDPORATA Bit 0)	Port 4	A0	P4A0 (FOURTHPORATA Bit 0)
	A1	P2A1 (SECONDPORATA Bit 1)		A1	P4A1 (FOURTHPORATA Bit 1)
	A2	P2A2 (SECONDPORATA Bit 2)		A2	P4A2 (FOURTHPORATA Bit 2)
	A3	P2A3 (SECONDPORATA Bit 3)		A3	P4A3 (FOURTHPORATA Bit 3)
	A4	P2A4 (SECONDPORATA Bit 4)		A4	P4A4 (FOURTHPORATA Bit 4)
	A5	P2A5 (SECONDPORATA Bit 5)		A5	P4A5 (FOURTHPORATA Bit 5)
	A6	P2A6 (SECONDPORATA Bit 6)		A6	P4A6 (FOURTHPORATA Bit 6)
	A7	P2A7 (SECONDPORATA Bit 7)		A7	P4A7 (FOURTHPORATA Bit 7)
	B0	P2B0 (SECONDPORATB Bit 0)		B0	P4B0 (FOURTHPORATB Bit 0)
	B1	P2B1 (SECONDPORATB Bit 1)		B1	P4B1 (FOURTHPORATB Bit 1)
	B2	P2B2 (SECONDPORATB Bit 2)		B2	P4B2 (FOURTHPORATB Bit 2)
	B3	P2B3 (SECONDPORATB Bit 3)		B3	P4B3 (FOURTHPORATB Bit 3)
	B4	P2B4 (SECONDPORATB Bit 4)		B4	P4B4 (FOURTHPORATB Bit 4)
	B5	P2B5 (SECONDPORATB Bit 5)		B5	P4B5 (FOURTHPORATB Bit 5)
	B6	P2B6 (SECONDPORATB Bit 6)		B6	P4B6 (FOURTHPORATB Bit 6)
	B7	P2B7 (SECONDPORATB Bit 7)		B7	P4B7 (FOURTHPORATB Bit 7)
	C0	P2C0 (SECONDPORATC Bit 0)		C0	P4C0 (FOURTHPORATC Bit 0)
	C1	P2C1 (SECONDPORATC Bit 1)		C1	P4C1 (FOURTHPORATC Bit 1)
C2	P2C2 (SECONDPORATC Bit 2)	C2	P4C2 (FOURTHPORATC Bit 2)		
C3	P2C3 (SECONDPORATC Bit 3)	C3	P4C3 (FOURTHPORATC Bit 3)		
C4	P2C4 (SECONDPORATC Bit 4)	C4	P4C4 (FOURTHPORATC Bit 4)		
C5	P2C5 (SECONDPORATC Bit 5)	C5	P4C5 (FOURTHPORATC Bit 5)		
C6	P2C6 (SECONDPORATC Bit 6)	C6	P4C6 (FOURTHPORATC Bit 6)		
C7	P2C7 (SECONDPORATC Bit 7)	C7	P4C7 (FOURTHPORATC Bit 7)		
CTR	CTR	5V	5V		
GND	GND	GND	GND		

Digital I/O (FIRSTPORTA Bit 0 to FOURTHPORTC Bit 7)

You can connect up to 96 digital I/O lines to the four banks of screw terminals (Port 1 to Port 4). Connect up to 24 DIO lines to each screw terminal group:

- Connect up to 24 FIRSTPORT signals to the **PORT 1** terminals.
- Connect up to 24 SECONDPORT signals to the **PORT 2** terminals.
- Connect up to 24 THIRDPORT signals to the **PORT 3** terminals.
- Connect up to 24 FOURTHPORT signals to the **PORT 4** terminals.

You can configure each digital port for either input or output. When configured for input, you can use the digital I/O terminals to detect the state of any TTL level input. Refer to the schematic shown in Figure 6.

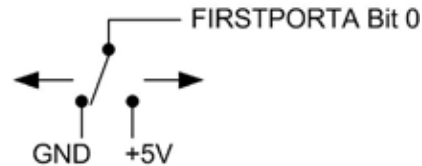


Figure 6. Schematic showing switch connection to digital channel FIRSTPORTA Bit 0

When set to the +5V input, FIRSTPORTA Bit 0 reads 1. When set to GND, FIRSTPORTA Bit 0 reads 0.

Output (sink) current limits

Each DIO pin can sink 64 mA maximum when configured for output.

Output (source) current limits

Each DIO pin can source 24 mA maximum when configured for output.

More information about digital signal connections

Additional information about digital signal connections and I/O techniques is available in the *Guide to DAQ Signal Connections* (available on our web site at www.mccdaq.com/support/DAQ-Signal-Connections.aspx).

Counter input

Connect an external TTL signal to the screw terminal labeled **CTR**. The internal counter increments when the TTL level transitions from low to high (rising edge transitions) and can count frequencies up to 1 MHz.

Power outputs

The USB-DIO96H has three +5 V power output terminals. Each power output terminal is labeled **5V**. A total of 50 mA may be drawn from the three terminals.

Caution! Each **5V** power terminal is an output. Do not connect to an external power supply or you may damage the USB-DIO96H and possibly the computer.

Ground

The USB-DIO96H has four identical and interconnected ground (**GND**) connections - one ground terminal per digital port group. The ground terminals provide a common ground for all USB-DIO96H functions.

Mechanical drawings

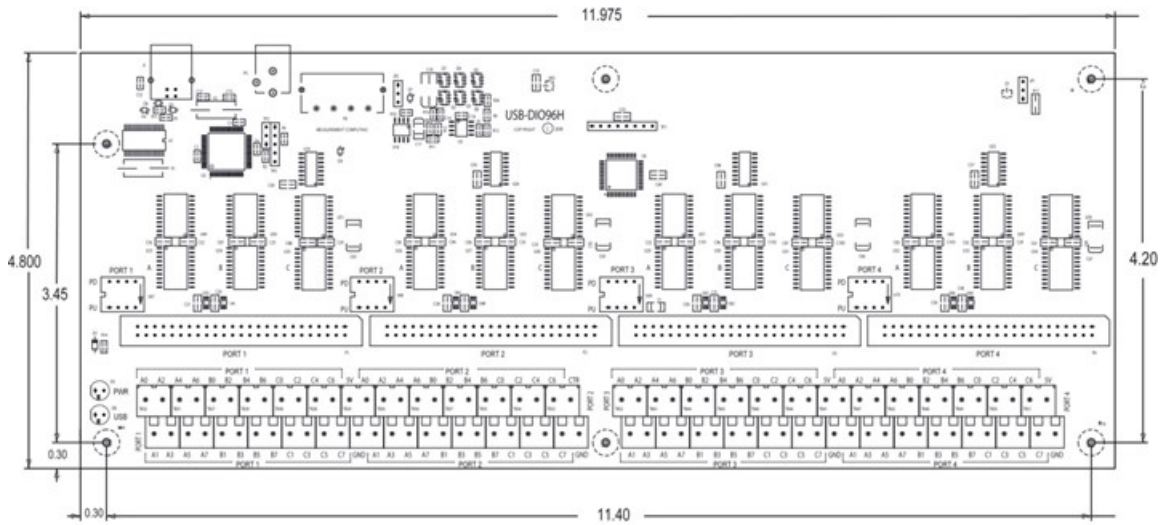


Figure 7. Circuit board dimensions

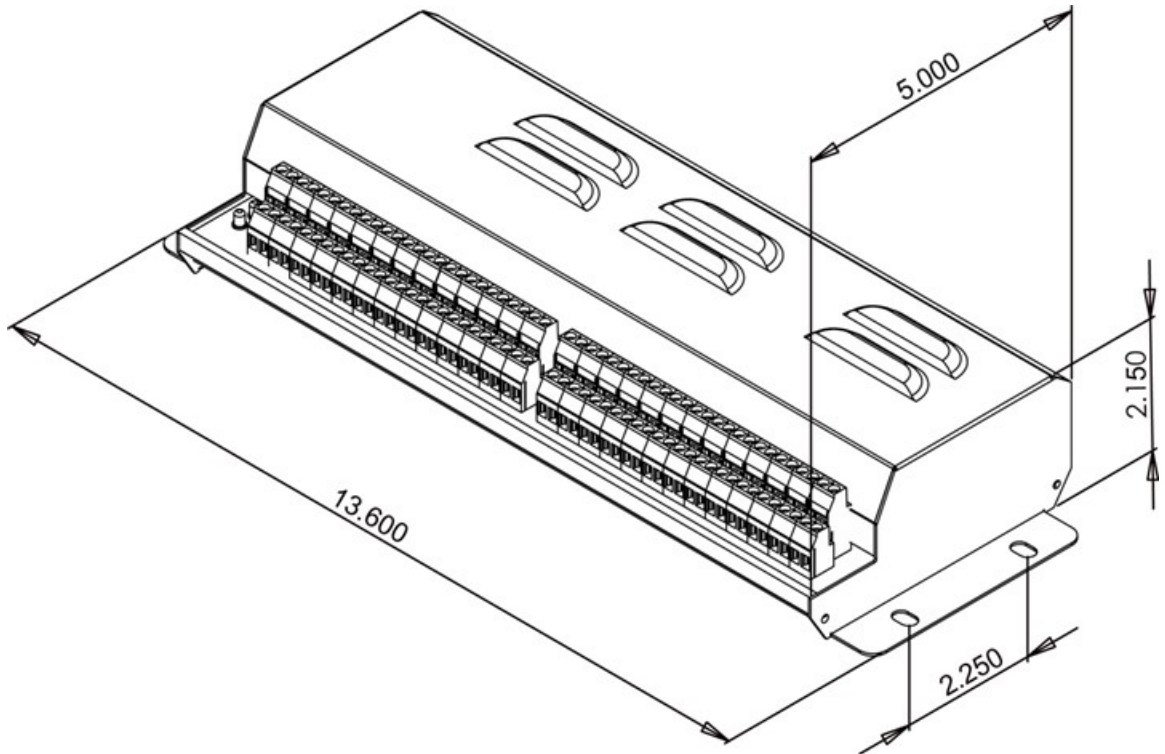


Figure 8. Enclosure dimensions

Specifications

This specification applies to revision 2 hardware and later

This specification applies to revision 2 of the USB-DIO96H hardware, which uses a 5 V power supply. Revision 1 of the USB-DIO96H hardware was designed with a 9 V power supply and daisy chained hub. For revision 1 hardware specifications, refer to www.mccdaq.com/PDFs/specs/USB-DIO96H_R1-spec.pdf.

All specifications are subject to change without notice.

Typical for 25 °C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

Digital input/output

Table 1. Digital I/O specifications

Parameter	Specification
Output	74ABT244A
Input	74ACT373 74LCX245 for revision G or later (see Note 1)
Configuration	Eight banks of 8, eight banks of 4, programmable by bank as input or output
Pull-up/down	High-impedance pull-up/down selectable with DIP switch for each digital input port.
Number of I/O	96
Output high	2.0 V min @ -24 mA
Output low	0.5 V max @ 64 mA
Input high	2.0 V min, 5.5 V max
Input low	0.8 V max, -0.5 V absolute min
Input impedance	47 k Ω (series resistance)
Source current	Maximum = 24 mA per output
Sink current	Maximum = 64 mA per output
Power up state	Input mode
Debounce mode	Debouncing option available through firmware that samples all inputs eight times over a specified interval and latches out the input state only when eight consecutive samples are identical (all 0s or all 1s). Available debouncing intervals are 1 ms, 2 ms, 5 ms, 10 ms, 20 ms, 50 ms, 100 ms, 200 ms, and 400 ms.

Note 1: The board revision may be determined from the part number label on the housing that states "193770X-01L", where X is the board revision.

Power

Table 2. Power specifications

Parameter	Conditions	Specification
USB +5 V input voltage range		4.75 V min to 5.25 V max
USB +5 V supply current	All modes of operation	<100 mA
External power input (Note 2)		5 VDC \pm 5% (5 VDC power supply provided)
External power supply (included)	MCC p/n PS-5V3AEPS	5 VDC, 15 W, 5% regulation
Alternate external power supply	From PC auxiliary power (cable not included)	Jumper-selectable Molex [®] connector internal to case
Voltage supervisor limits	$4.2\text{ V} > V_{\text{ext}}$ or $V_{\text{ext}} > 5.6\text{ V}$	PWR LED = Off; (power fault)
	$4.2\text{ V} < V_{\text{ext}} < 5.6\text{ V}$	PWR LED = On
Power supply current		2.7 A max
User 5 V output voltage range	Available at 5 V screw terminals	4.0 V min, 5.25 V max
User 5 V output current available	Total from all 5 V screw terminals	50 mA max

Note 2: Voltage specification applies at barrel plug power input. The power supply provided with the board meets this specification at the rated total power supply current. If a different power supply is used, small line resistances could cause significant voltage drop between the power supply and the barrel plug input.

Counter

Table 3. Counter specifications

Parameter	Specification
Pin name	CTR
Counter type	Event counter
Number of channels	1
Input source	CTR screw terminal
Resolution	32 bits
Input high voltage limit	5.0 V recommended max 5.5 V absolute max
Input low voltage limit	0 V recommended min -0.5 V absolute min
Maximum input frequency	1 MHz
High pulse width	500 ns min
Low pulse width	500 ns min
Revisions F and earlier (Note 1 on page 15)	
Input type	Schmitt trigger, rising edge triggered, 1.5 k Ω input series resistor
Schmitt trigger hysteresis	20 mV min 100 mV max
Input high voltage threshold	4.0 V max
Input low voltage threshold	1.0 V min
Revisions G and later (Note 1 on page 15)	
Input type	Schmitt trigger, rising edge triggered, fixed 47.5 k Ω pull-down resistor, 1.5 k Ω input series resistor
Schmitt trigger hysteresis	0.6 V min 1.7 V max
Input high voltage threshold	3.6 V max
Input low voltage threshold	1.0 V min

Environmental

Table 4. Environmental specifications

Parameter	Specification
Operating temperature range	0 °C to 60 °C
Storage temperature range	-40 °C to 85 °C
Humidity	0% to 90% non-condensing

USB specifications

Table 5. USB specifications

Parameter	Specification
USB "B" connector	Input
USB device type	USB 2.0 (full-speed)
Device compatibility	USB 1.1, USB 2.0 (hardware revision G and later are also compatible with USB 3.0; see Note 1 on page 15 for information on how to determine the hardware revision)
USB cable type	A-B cable, UL type AWM 2527 or equivalent. (min 24 AWG VBUS/GND, min 28 AWG D+/D-)
USB cable length	3 m (9.84 ft) max

Data transfer rates

Table 6. Data transfer rate specifications

Parameter	Specification
Digital I/O transfer rates (software paced)	System dependent, 33 to 250 port reads/writes or single bit reads/writes per second typ
Counter/timer read/write rates (software paced)	Counter read – system dependent, 33 to 250 reads per second
	Counter clear – system-dependent, 33 to 250 writes per second

Mechanical

Table 7. Mechanical specifications

Parameter	Specification
Board dimensions (L × W × H)	304.8 × 121.9 × 20.0 mm (12.0 × 4.8 × 0.8 in.)
Enclosure dimensions (L × W × H)	342.9 × 125.7 × 58.9 mm (13.50 × 4.95 × 2.32 in.)

Screw terminal connectors

Table 8. Connector specifications

Parameter	Specification
Connector type	Screw terminal
Wire gauge range	14 AWG to 30 AWG

Screw terminal pinout

Table 9. Screw terminal pinout

Board label	Signal name	Board label	Signal name		
Port 1	A0	P1A0 (FIRSTPORTA Bit 0)	Port 3	A0	P3A0 (THIRDPORATA Bit 0)
	A1	P1A1 (FIRSTPORTA Bit 1)		A1	P3A1 (THIRDPORATA Bit 1)
	A2	P1A2 (FIRSTPORTA Bit 2)		A2	P3A2 (THIRDPORATA Bit 2)
	A3	P1A3 (FIRSTPORTA Bit 3)		A3	P3A3 (THIRDPORATA Bit 3)
	A4	P1A4 (FIRSTPORTA Bit 4)		A4	P3A4 (THIRDPORATA Bit 4)
	A5	P1A5 (FIRSTPORTA Bit 5)		A5	P3A5 (THIRDPORATA Bit 5)
	A6	P1A6 (FIRSTPORTA Bit 6)		A6	P3A6 (THIRDPORATA Bit 6)
	A7	P1A7 (FIRSTPORTA Bit 7)		A7	P3A7 (THIRDPORATA Bit 7)
	B0	P1B0 (FIRSTPORTB Bit 0)		B0	P3B0 (THIRDPORATB Bit 0)
	B1	P1B1 (FIRSTPORTB Bit 1)		B1	P3B1 (THIRDPORATB Bit 1)
	B2	P1B2 (FIRSTPORTB Bit 2)		B2	P3B2 (THIRDPORATB Bit 2)
	B3	P1B3 (FIRSTPORTB Bit 3)		B3	P3B3 (THIRDPORATB Bit 3)
	B4	P1B4 (FIRSTPORTB Bit 4)		B4	P3B4 (THIRDPORATB Bit 4)
	B5	P1B5 (FIRSTPORTB Bit 5)		B5	P3B5 (THIRDPORATB Bit 5)
	B6	P1B6 (FIRSTPORTB Bit 6)		B6	P3B6 (THIRDPORATB Bit 6)
	B7	P1B7 (FIRSTPORTB Bit 7)		B7	P3B7 (THIRDPORATB Bit 7)
	C0	P1C0 (FIRSTPORTC Bit 0)		C0	P3C0 (THIRDPORATC Bit 0)
C1	P1C1 (FIRSTPORTC Bit 1)	C1	P3C1 (THIRDPORATC Bit 1)		
C2	P1C2 (FIRSTPORTC Bit 2)	C2	P3C2 (THIRDPORATC Bit 2)		
C3	P1C3 (FIRSTPORTC Bit 3)	C3	P3C3 (THIRDPORATC Bit 3)		
C4	P1C4 (FIRSTPORTC Bit 4)	C4	P3C4 (THIRDPORATC Bit 4)		
C5	P1C5 (FIRSTPORTC Bit 5)	C5	P3C5 (THIRDPORATC Bit 5)		
C6	P1C6 (FIRSTPORTC Bit 6)	C6	P3C6 (THIRDPORATC Bit 6)		
C7	P1C7 (FIRSTPORTC Bit 7)	C7	P3C7 (THIRDPORATC Bit 7)		
5V	5V	5V	5V		
GND	GND	GND	GND		
Port 2	A0	P2A0 (SECONDPORATA Bit 0)	Port 4	A0	P4A0 (FOURTHPORATA Bit 0)
	A1	P2A1 (SECONDPORATA Bit 1)		A1	P4A1 (FOURTHPORATA Bit 1)
	A2	P2A2 (SECONDPORATA Bit 2)		A2	P4A2 (FOURTHPORATA Bit 2)
	A3	P2A3 (SECONDPORATA Bit 3)		A3	P4A3 (FOURTHPORATA Bit 3)
	A4	P2A4 (SECONDPORATA Bit 4)		A4	P4A4 (FOURTHPORATA Bit 4)
	A5	P2A5 (SECONDPORATA Bit 5)		A5	P4A5 (FOURTHPORATA Bit 5)
	A6	P2A6 (SECONDPORATA Bit 6)		A6	P4A6 (FOURTHPORATA Bit 6)
	A7	P2A7 (SECONDPORATA Bit 7)		A7	P4A7 (FOURTHPORATA Bit 7)
	B0	P2B0 (SECONDPORATB Bit 0)		B0	P4B0 (FOURTHPORATB Bit 0)
	B1	P2B1 (SECONDPORATB Bit 1)		B1	P4B1 (FOURTHPORATB Bit 1)
	B2	P2B2 (SECONDPORATB Bit 2)		B2	P4B2 (FOURTHPORATB Bit 2)
	B3	P2B3 (SECONDPORATB Bit 3)		B3	P4B3 (FOURTHPORATB Bit 3)
	B4	P2B4 (SECONDPORATB Bit 4)		B4	P4B4 (FOURTHPORATB Bit 4)
	B5	P2B5 (SECONDPORATB Bit 5)		B5	P4B5 (FOURTHPORATB Bit 5)
	B6	P2B6 (SECONDPORATB Bit 6)		B6	P4B6 (FOURTHPORATB Bit 6)
	B7	P2B7 (SECONDPORATB Bit 7)		B7	P4B7 (FOURTHPORATB Bit 7)
	C0	P2C0 (SECONDPORATC Bit 0)		C0	P4C0 (FOURTHPORATC Bit 0)
C1	P2C1 (SECONDPORATC Bit 1)	C1	P4C1 (FOURTHPORATC Bit 1)		
C2	P2C2 (SECONDPORATC Bit 2)	C2	P4C2 (FOURTHPORATC Bit 2)		
C3	P2C3 (SECONDPORATC Bit 3)	C3	P4C3 (FOURTHPORATC Bit 3)		
C4	P2C4 (SECONDPORATC Bit 4)	C4	P4C4 (FOURTHPORATC Bit 4)		
C5	P2C5 (SECONDPORATC Bit 5)	C5	P4C5 (FOURTHPORATC Bit 5)		
C6	P2C6 (SECONDPORATC Bit 6)	C6	P4C6 (FOURTHPORATC Bit 6)		
C7	P2C7 (SECONDPORATC Bit 7)	C7	P4C7 (FOURTHPORATC Bit 7)		
CTR	CTR	5V	5V		
GND	GND	GND	GND		

Ribbon connectors

Table 10. Ribbon connector specifications

Parameter	Specification
Connectors	P1-P4: 50-pin 0.1" IDC type box header
Compatible cables	C-50FF-x 50-pin ribbon cable
Compatible accessory products (Note 3)	SSR-PB24 SCB-50 CIO-MINI50 (2) CIO-TERM100 CIO-SPADE50 (2) CIO-ERB24 CIO-SERB24/FD CIO-ERB48 CIO-SERB48 SSR-RACK24 SSR-RACK48

Note 3: P1-P4 connectors are located inside the enclosure. These connectors are available for applications where the enclosure is not required.

P1 pinout

Table 11. P1 pinout

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

P2 pinout

Table 12. P2 pinout

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

P3 pinout

Table 13. P3 pinout

Pin	Signal name	Pin	Signal name
1	THIRDPORTC Bit 7	2	GND
3	THIRDPORTC Bit 6	4	GND
5	THIRDPORTC Bit 5	6	GND
7	THIRDPORTC Bit 4	8	GND
9	THIRDPORTC Bit 3	10	GND
11	THIRDPORTC Bit 2	12	GND
13	THIRDPORTC Bit 1	14	GND
15	THIRDPORTC Bit 0	16	GND
17	THIRDPORTB Bit 7	18	GND
19	THIRDPORTB Bit 6	20	GND
21	THIRDPORTB Bit 5	22	GND
23	THIRDPORTB Bit 4	24	GND
25	THIRDPORTB Bit 3	26	GND
27	THIRDPORTB Bit 2	28	GND
29	THIRDPORTB Bit 1	20	GND
31	THIRDPORTB Bit 0	32	GND
33	THIRDPORTA Bit 7	34	GND
35	THIRDPORTA Bit 6	36	GND
37	THIRDPORTA Bit 5	38	GND
39	THIRDPORTA Bit 4	40	GND
41	THIRDPORTA Bit 3	42	GND
43	THIRDPORTA Bit 2	44	GND
45	THIRDPORTA Bit 1	46	GND
47	THIRDPORTA Bit 0	48	GND
49	VDD	50	GND

P4 pinout

Table 14. P4 pinout

Pin	Signal name	Pin	Signal name
1	FOURTHPORTC Bit 7	2	GND
3	FOURTHPORTC Bit 6	4	GND
5	FOURTHPORTC Bit 5	6	GND
7	FOURTHPORTC Bit 4	8	GND
9	FOURTHPORTC Bit 3	10	GND
11	FOURTHPORTC Bit 2	12	GND
13	FOURTHPORTC Bit 1	14	GND
15	FOURTHPORTC Bit 0	16	GND
17	FOURTHPORTB Bit 7	18	GND
19	FOURTHPORTB Bit 6	20	GND
21	FOURTHPORTB Bit 5	22	GND
23	FOURTHPORTB Bit 4	24	GND
25	FOURTHPORTB Bit 3	26	GND
27	FOURTHPORTB Bit 2	28	GND
29	FOURTHPORTB Bit 1	20	GND
31	FOURTHPORTB Bit 0	32	GND
33	FOURTHPORTA Bit 7	34	GND
35	FOURTHPORTA Bit 6	36	GND
37	FOURTHPORTA Bit 5	38	GND
39	FOURTHPORTA Bit 4	40	GND
41	FOURTHPORTA Bit 3	42	GND
43	FOURTHPORTA Bit 2	44	GND
45	FOURTHPORTA Bit 1	46	GND
47	FOURTHPORTA Bit 0	48	GND
49	VDD	50	GND

CE Declaration of Conformity
According to ISO/IEC 17050-1:2010

Manufacturer: Measurement Computing Corporation
Address: 10 Commerce Way
Norton, MA 02766
USA
Product Category: Electrical equipment for measurement, control and laboratory use.
Date and Place of Issue: May 3, 2016, Norton, Massachusetts USA
Test Report Number: EMI4813.07

Measurement Computing Corporation declares under sole responsibility that the product

USB-DIO96H

Complies with the essential requirements of the following applicable European Directives:

Electromagnetic Compatibility (EMC) Directive 2004/108/EC
Low Voltage Directive 2006/95/EC
RoHS Directive 2011/65/EU

Conformity is assessed in accordance to the following standards:

EMC:

Emissions:

- EN 61326-1:2013 (IEC 61326-1:2012), Class A
- EN 55011: 2009 + A1:2010 (IEC CISPR 11:2009 + A1:2010), Group 1, Class A

Immunity:

- EN 61326-1:2013 (IEC 61326-1:2012), Controlled EM Environments
- EN 61000-4-2:2008 (IEC 61000-4-2:2008)
- EN 61000-4-3 :2010 (IEC61000-4-3:2010)

Safety:

- EN 61010-1 (IEC 61010-1)

Environmental Affairs:

Articles manufactured on or after the Date of Issue of this Declaration of Conformity do not contain any of the restricted substances in concentrations/applications not permitted by the RoHS Directive.



Carl Haapaoja, Director of Quality Assurance

Measurement Computing Corporation
10 Commerce Way
Norton, Massachusetts 02766
(508) 946-5100
Fax: (508) 946-9500
E-mail: info@mccdaq.com
www.mccdaq.com

NI Hungary Kft
H-4031 Debrecen, Hátar út 1/A, Hungary
Phone: +36 (52) 515400
Fax: +36 (52) 515414
<http://hungary.ni.com/debrecen>