USB-DIO96H

Specifications

Document Revision 2.0, February, 2010

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 ± 10% @ 3 A
Voltage supervisor limits - PWR LED	6.0 V > Vext or Vext > 12.5 V	PWR LED = Off (power fault)
	6.0 V < Vext < 12.5 V	PWR LED = On
Power supply current		2.6 A max
User 5 V output voltage range	Available at 5 V screw terminals (25, 77 and 103)	4.0 V min., 5.25 V max.
User 5 V output current available	Total from all 5 V screw terminals	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 option 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.

Counter section

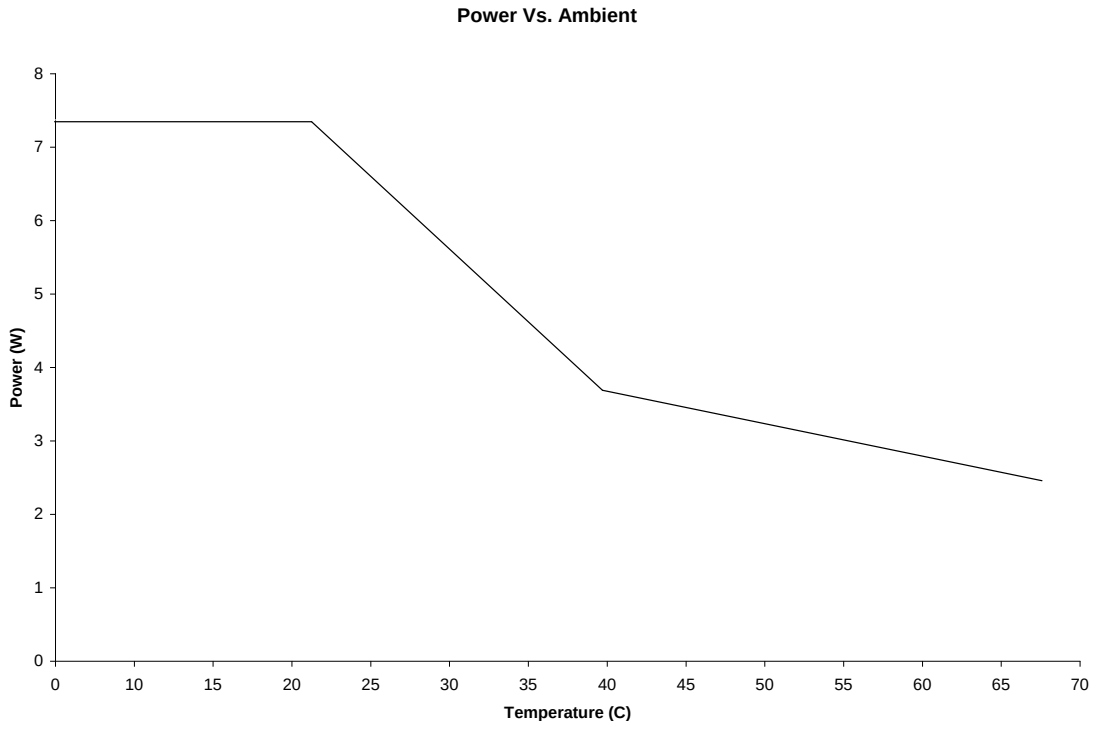
Table 4. Counter specifications

Pin name (Note 2)	CTR
Counter type	Event counter
Number of channels	1
Input source	*CTR screw terminal*
Input type	TTL, rising edge triggered
Resolution	32 bits
Schmidt trigger hysteresis	*20 mV to 100 mV*
Input leakage current	*±1 µA*
Maximum input frequency	1 MHz
High pulse width	*500 ns min*
Low pulse width	*500 ns min*
Input high voltage	4.0 V min, 5.5 V absolute max
Input low voltage	1.0 V max, –0.5 V absolute min

Note 2: CTR is a Schmitt trigger input protected with a 1.5 K Ohm series resistor.

Environmental

Graph 1.Operating temperature de-rating curve (Note 3)



Note 3: 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 5. Environmental specifications

Operating temperature range	*0 to 70 °C (see de-rating curve in* Graph 1*)*
Storage temperature range	*-40 to 85 °C*
Humidity	*0 to 90% non-condensing*

USB specifications

Table 6. 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 7. 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.
Counter/timer read/write rates (software paced)	Counter Read – System dependent, 33 to 1000 reads per second.
	Counter Clear – System-dependent, 33 to 1000 writes per second.

Mechanical

Table 8. Mechanical specifications

Card dimensions	304.8 mm (L) x 121.9 mm (W) x 20.0 mm (H)
	12.0" (L) x 4.8" (W) x 0.8" (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-out

Table 9. Connector specifications

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

Table 10. Screw terminal pin out

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

Ribbon connector and pin-outs

Table 11. Ribbon connector specifications

Connector	P1-P4. 50-pin 0.1" IDC type box header
Compatible cables	C-50FF-x, 50-pin ribbon cable
Compatible accessory products*	SSR-PB24

* P1-P4 connectors are not accessible within the enclosure but are available for applications where the enclosure is not required.

P1

Table 12. P1 pin-out

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

Table 13. P2 pin-out

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

Table 14. P3 pin-out

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

Table 15. P4 pin-out

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

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