

# USB-1096HFS

## Specifications



**MEASUREMENT  
COMPUTING™**

Document Revision 2.0, February, 2010  
© Copyright 2010, Measurement Computing Corporation

---

# 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		4.75 V min. to 5.25 V 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

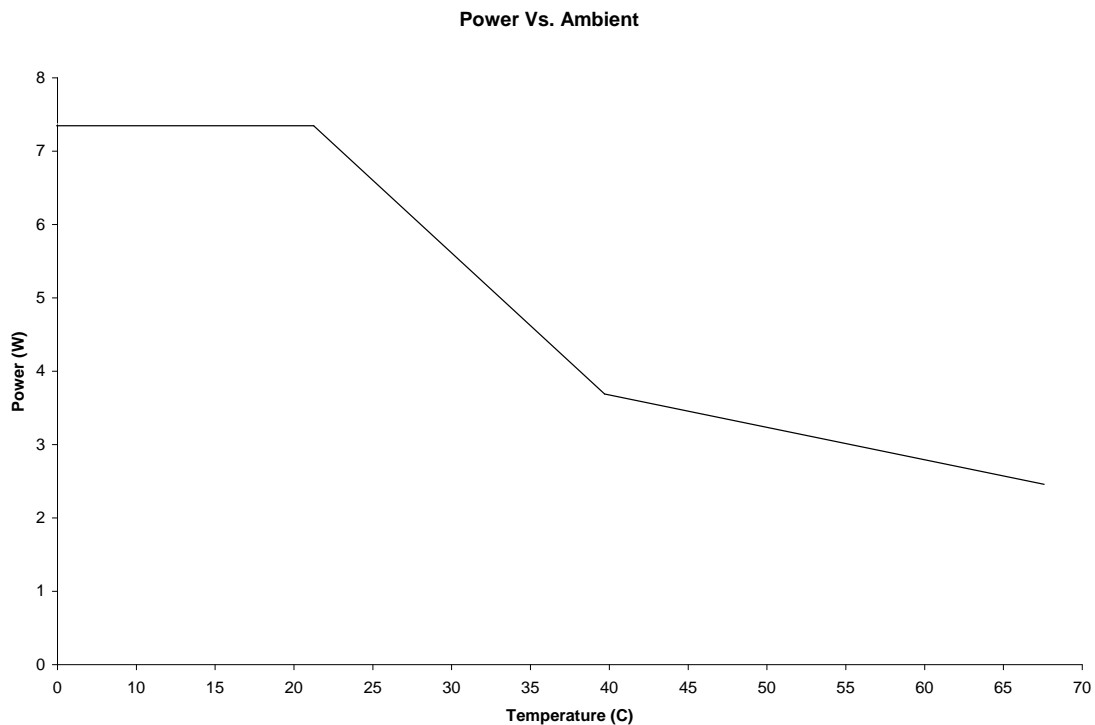
Table 4. Counter specifications

Pin name (Note 2)	CTR
Counter type	Event counter
Number of channels	1
Input type	TTL, rising edge triggered
Input source	CTR screw terminal
Resolution	32 bits
Schmitt trigger hysteresis	20 mV to 100 mV
Input leakage current	$\pm 1 \mu\text{A}$
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

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

## 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
<i>USB cable type (upstream and downstream)</i>	<i>A-B cable, UL type AWM 2527 or equivalent. (min 24 AWG VBUS/GND, min 28 AWG D+/D-)</i>
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 (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 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	SECONDPORC Bit 7	2	GND
3	SECONDPORC Bit 6	4	GND
5	SECONDPORC Bit 5	6	GND
7	SECONDPORC Bit 4	8	GND
9	SECONDPORC Bit 3	10	GND
11	SECONDPORC Bit 2	12	GND
13	SECONDPORC Bit 1	14	GND
15	SECONDPORC Bit 0	16	GND
17	SECONDPORB Bit 7	18	GND
19	SECONDPORB Bit 6	20	GND
21	SECONDPORB Bit 5	22	GND
23	SECONDPORB Bit 4	24	GND
25	SECONDPORB Bit 3	26	GND
27	SECONDPORB Bit 2	28	GND
29	SECONDPORB Bit 1	20	GND
31	SECONDPORB 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	THIRDPORC Bit 7	2	GND
3	THIRDPORC Bit 6	4	GND
5	THIRDPORC Bit 5	6	GND
7	THIRDPORC Bit 4	8	GND
9	THIRDPORC Bit 3	10	GND
11	THIRDPORC Bit 2	12	GND
13	THIRDPORC Bit 1	14	GND
15	THIRDPORC Bit 0	16	GND
17	THIRDPORC Bit 7	18	GND
19	THIRDPORC Bit 6	20	GND
21	THIRDPORC Bit 5	22	GND
23	THIRDPORC Bit 4	24	GND
25	THIRDPORC Bit 3	26	GND
27	THIRDPORC Bit 2	28	GND
29	THIRDPORC Bit 1	20	GND
31	THIRDPORC Bit 0	32	GND
33	THIRDPORC Bit 7	34	GND
35	THIRDPORC Bit 6	36	GND
37	THIRDPORC Bit 5	38	GND
39	THIRDPORC Bit 4	40	GND
41	THIRDPORC Bit 3	42	GND
43	THIRDPORC Bit 2	44	GND
45	THIRDPORC Bit 1	46	GND
47	THIRDPORC Bit 0	48	GND
49	VDD	50	GND

**P4**

Table 15. P4 pin out

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

**Measurement Computing Corporation**  
**10 Commerce Way**  
**Suite 1008**  
**Norton, Massachusetts 02766**  
**(508) 946-5100**  
**Fax: (508) 946-9500**  
**E-mail: [info@mccdaq.com](mailto:info@mccdaq.com)**  
**[www.mccdaq.com](http://www.mccdaq.com)**