USB-DIO24H/37

Specifications

Document Revision 1.1, 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

Digital input type	74ACT373
Digital output type	74FCT244
Number of I/O	24 (Port A Bit 0 through Port C Bit 7)
Configuration	2 banks of 8 and 2 banks of 4, or 3 banks of 8
Pull up/pull-down configuration	Internal 47K resistors configured for pull-up to +5 V
Input high voltage	2.0 V min, 5.5 V absolute max
Input low voltage	0.8 V max, –0.5 V absolute min
Output high voltage (IOH = -15 mA)	2.4 V min
Output low voltage (IOL=64 mA)	0.55 V max
Source current – (Note 1) Self -powered hub Externally-powered root port hub	Maximum = 15 mA per output
Source current – (Note 2) Bus-powered hub Battery-powered root port hub.	Not supported
Sink current – (Note 3)	Current sink max: 365 mA / [number of outputs]. 64 mA max sink current for any single output.
Power up/reset state	Input mode (high impedance)

Note 1: "Self-powered hub" refers to a USB hub with an external power supply. Self-powered hubs allow a connected USB device to draw up to 500 mA. "Root port hubs" reside in the PC's USB Host Controller. The USB port(s) on your PC are root port hubs. All externally powered root port hubs (i.e. desktop PC's) provide up to 500 mA of current for a USB device. In this configuration, all 24 digital outputs of the USB-DIO24H/37 can source their per-pin maximum of 15 mA. This provides a total requirement of 15 mA*24 = 360 mA. Combining this with the USB-DIO24H/37 operating current of 135 mA a fully-loaded current draw of 495 mA is realized.

Note 2: "Bus-powered hub" refers to a USB hub that derives power directly from the USB +5 V and does not have its own power supply. These hubs allow a connected USB device to draw up to 100 mA. Battery-powered root port hubs provide 100 mA or 500 mA, depending upon the manufacturer. A laptop PC that is not connected to an external power adapter is an example of a battery-powered root port hub. If your laptop is constrained to the 100 mA maximum a USB-DIO24H/37 is not guaranteed to work. In order to use the product you will need to purchase a self-powered hub.

Note 3: A low-side resettable fuse protects the USB-DIO24H/37. This is designed to protect the host PC or hub from an over current condition. Assuming all return currents in sinking applications return via the USB cable ground signal, the maximum allowable return current is 500 mA. Please include the USB-DIO24H/37 unloaded operating current (135 mA) in your power budget.

Counter

Table 2. Counter specifications

Pin name (Note 4)	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 low voltage	0 V min, 1.0 V max
Input high voltage	4.0 V min, 15.0 V max

Note 4: CTR is a Schmitt trigger input.

Data transfer rates

Table 3. Data transfer rate specifications

Digital I/O transfer rates (software paced)	
Digital input	62 port reads or single bit reads per second (typical)
Digital output	125port writes or single bit writes per second (typical)
Counter/timer read/write rates (software paced)	
Counter read	62 port reads per second (typical)
Counter clear	125 port writes per second (typical)

Power

Table 4. Power specifications

Parameter	Conditions	Specification
Supply current (Note 5)	No Load	100mA typ, 135 mA max
Input power requirements (Note 6)		4.75 V min, 5.25 V max
USB +5 V power available	Measured at "USB +5 V" screw terminals (pins 10, 14, and 30)	4.4 V min, 5.25 V max
USB +5 V power output current (Note 7)	Connected to: ▪ Self-powered hub ▪ Externally-powered root port hub	[350 mA] – [total output source current]
USB +5 V over-current protection	Resettable fuse	Hold current: 350 mA, typical
		Trip current: 700 mA typical
		Trip/recovery time: 100 mS, max
		On resistance: 1.3 Ohms max

Note 5: This is the total (no load) current requirement for the USB-DIO24H/37.

Note 6: Bus-powered hubs are allowed to provide downstream USB power as low as 4.4 V. Although your USB-DIO24H/37 will typically function at this 4.4 V minimum, guaranteed performance requires a minimum power supply voltage of 4.75 V. All self-powered and root port hubs will meet this 4.75 V minimum.

Note 7: Refer to the available source/sink current level listed in the "Digital input/output" section.

General

Table 5. General specifications

Parameter	Conditions	Specification
USB controller clock error	*25 °C*	*±30 ppm max*
	0 to 70 °C	*±50 ppm max*
Device type		USB 1.1 low-speed
Device compatibility		USB 1.1, USB 2.0

Environmental

Table 6. Environmental specifications

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

Mechanical

Table 7. Mechanical specifications

Dimensions	119 mm (L) x 84 mm (W) x 14 mm (H)
USB cable length	*3 meters max*
USB cable type	*A-B cable, UL type AWM 2527 or equivalent. (min 24 AWG VBUS/GND, min 28 AWG D+/D-)*
User connection length	*3 meters max*

Main connector and pin out

Table 8. Connector specifications

Connector type	37-pin D-type
Compatible cables	C37FF-x unshielded ribbon cable. x = length in feet. C37FFS-x cable shielded round cable. x = length in feet.
Compatible accessory products (with the C37FFS-*x* and C37FF-x cable)	SCB-37 CIO-MINI37 CIO-MINI37-VERT CIO-ERB08 CIO-SERB08 CIO-ERB24 CIO-SPADE50 SSR-RACK08 SSR-RACK24

Table 9. Connector pin out

Pin	Signal name	Pin	Signal name
1	CTR	20	+5
2	NC	21	GND
3	Port B Bit 7	22	Port C Bit 7
4	Port B Bit 6	23	Port C Bit 6
5	Port B Bit 5	24	Port C Bit 5
6	Port B Bit 4	25	Port C Bit 4
7	Port B Bit 3	26	Port C Bit 3
8	Port B Bit 2	27	Port C Bit 2
9	Port B Bit 1	28	Port C Bit 1
10	Port B Bit 0	29	Port C Bit 0
11	GND	30	Port A Bit 7
12	NC	31	Port A Bit 6
13	GND	32	Port A Bit 5
14	NC	33	Port A Bit 4
15	GND	34	Port A Bit 3
16	NC	35	Port A Bit 2
17	GND	36	Port A Bit 1
18	+5	37	Port A Bit 0
19	GND		

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