



Electrical Specifications

All specifications are subject to change without notice.
 Typical for 25 °C unless otherwise specified.
 Specifications in *italic text* are guaranteed by design.

Counter

Table 1. Counter specifications

Counter modes	Quadrature (x1, x2, x4), Normal, Non-Recycle, Range Limit, Clear on Read, Modulo-N, 16,32,48-bit counters	
Quadrature mode	Counters	8
	Clock frequency	10 MHz maximum
Count mode	Counters	8
	Clock frequency	10 MHz maximum (Modulo-N TBD)
De-bounce times (programmable)	16 steps from 500 ns to 25 ms; positive or negative edge sensitive; glitch detect mode or de-bounce mode	
Time-base accuracy	30 ppm	
Counter read pacer	On board scan clock	

Input

Table 2. Input specifications

Receiver type	Quad Differential Receiver
Configuration	Each channel consists of PhaseA input, PhaseB input and Index input; each input selectable as single-ended or differential
Differential	<ul style="list-style-type: none"> ▪ PhaseA, PhaseB and Index (+) inputs at user connector routed to (+) inputs of differential receiver. ▪ PhaseA, PhaseB and Index (-) inputs at user connector routed to (-) inputs of differential receiver.
Single - ended	<ul style="list-style-type: none"> ▪ PhaseA, PhaseB and Index (+) inputs at user connector routed to (+) inputs of differential receiver. ▪ PhaseA, PhaseB and Index (-) inputs at user connector routed to ground. (-) inputs of differential receiver routed to +3 V reference.
Number of channels	8
Common mode input voltage range	±12 V maximum
Differential input voltage range	±12 V maximum
Input sensitivity	±200 mV
Input hysteresis	50 mV typical
Input impedance	12 kΩ minimum
Absolute maximum input voltage:	
Differential	±14 V maximum
Miscellaneous	<ul style="list-style-type: none"> ▪ Meets or exceeds ANSI EIA/TIA-422-B, EIA/TIA-423-B, RS-485. ▪ Meets ITU recommendations V.10, V.11, X.26, X.27. ▪ Designed for multipoint busses on long lines and in noisy environments.

Digital input and output

Table 3. Output specifications

Number of I/O	8 bit configurable
Input characteristics	47.5 k Ω series resistor, 20 pF to common
Input high	+2.0 V to 42.4 V
Input low	0 to 0.8 V
Output high	2.0-42.4 V (dependent upon logic supply)
Output low	<0.8 V
Output current	500 mA per pin, 2.5 A max. per device (parallel connections for higher current needs)
Output generation	Counter events; Asynchronous generation

Trigger and pacer

Table 4. Trigger Specifications

Digital type	Edge/level sensitive (programmable)
Trigger types	Start acquisition process
Pacer	Latch counter values for read back
Trigger/pacer inputs	<ul style="list-style-type: none"> ▪ Internal (Software) ▪ External

Indicator LEDs

Table 5. USB +5V voltage specifications

Power LED	Indicates that the device's microcontroller has power and is running.
Status LED	Indicates that the USB is configured; blinks to indicate USB traffic.
Channel LED	Indicates that the Encoder/Counter is receiving a signal on any inputs.

Power

Table 6. Voltage specifications

V _{USB} (+5V)	480 mA maximum
V _{USER} (+5V)	20 mA maximum
Encoder Supply	External supply of 1.5 A @ 5 VDC fused up to 42.4V _{pk} /50 V _{DC} @ 2A Protection diodes to protect against reverse polarity

Environmental

Table 7. Environmental specifications

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

Mechanical

Table 8. Mechanical specifications

Dimensions	127 mm (L) x 88.9 mm (W) x 35.56 (H)
User connection length	3 meters maximum

USB Specifications

Table 9. USB specifications

Parameter	Specification
Device type	USB 2.0 high-speed mode (480 Mbps) if available (recommended), otherwise, USB 1.1 full-speed mode (12 Mbps)
Device compatibility	USB 2.0 (recommended) or USB 1.1
USB cable type	A-B cable, UL type AWM 2725 or equivalent. (min 24 AWG VBUS/GND, min 28 AWG D+/D-)
USB cable length	3 meters maximum

Main connector and pin out

Table 10. Main connector specifications

Connector type	37-pin D type connector (two) Detachable screw terminals
Compatible cable with the 37-pin connectors	C37F-4X9F-1M
Wire gauge range for screw terminals	14 AWG to 30 AWG

Differential mode

Table 11. Differential mode pin out

Pin	Signal Name	Pin	Signal Name
1	Encoder Power*	41	GND
2	0 Phase A+	42	1 Index-
3	0 Phase A-	43	1 Index+
4	0 Phase B+	44	1 Phase B-
5	0 Phase B-	45	1 Phase B+
6	0 Index+	46	1 Phase A-
7	0 Index-	47	1 Phase A+
8	GND	48	Encoder Power*
9	Encoder Power*	49	GND
10	2 Phase A+	50	3 Index-
11	2 Phase A-	51	3 Index+
12	2 Phase B+	52	3 Phase B-
13	2 Phase B-	53	3 Phase B+
14	2 Index+	54	3 Phase A-
15	2 Index-	55	3 Phase A+
16	GND	56	Encoder Power*
17	Encoder Power*	57	GND
18	4 Phase A+	58	5 Index-
19	4 Phase A-	59	5 Index+
20	4 Phase B+	60	5 Phase B-
21	4 Phase B-	61	5 Phase B+
22	4 Index+	62	5 Phase A-
23	4 Index-	63	5 Phase A+
24	GND	64	Encoder Power*
25	Encoder Power*	65	GND
26	6 Phase A+	66	7 Index-
27	6 Phase A-	67	7 Index+
28	6 Phase B+	68	7 Phase B-
29	6 Phase B-	69	7 Phase B+
30	6 Index+	70	7 Phase A-
31	6 Index-	71	7 Phase A+
32	GND	72	Encoder Power*
33	+5V User	73	+5V User
34	ExtTrigger	74	Clamp (DIO Supply +VDIO)
35	ExtPacer	75	Encoder Power Input*
36	Supply GND	76	Supply GND
37	DIO0	77	DIO1
38	DIO2	78	DIO3
39	DIO4	79	DIO5
40	DIO6 / Timer Output 0**	80	DIO7 / Timer Output 1**

* External Supply

** Either DIO or Timer Output only

Single-ended mode

Table 12. Single-ended mode pin out

Pin	Signal Name	Pin	Signal Name
1	Encoder Power*	41	GND
2	0 Phase A+	42	No Connect
3	No Connect	43	1 Index+
4	0 Phase B+	44	No Connect
5	No Connect	45	1 Phase B+
6	0 Index+	46	No Connect
7	No Connect	47	1 Phase A+
8	GND	48	Encoder Power*
9	Encoder Power*	49	GND
10	2 Phase A+	50	No Connect
11	No Connect	51	3 Index+
12	2 Phase B+	52	No Connect
13	No Connect	53	3 Phase B+
14	2 Index+	54	No Connect
15	No Connect	55	3 Phase A+
16	GND	56	Encoder Power*
17	Encoder Power*	57	GND
18	4 Phase A+	58	No Connect
19	No Connect	59	5 Index+
20	4 Phase B+	60	No Connect
21	No Connect	61	5 Phase B+
22	4 Index+	62	No Connect
23	No Connect	63	5 Phase A+
24	GND	64	Encoder Power*
25	Encoder Power*	65	GND
26	6 Phase A+	66	No Connect
27	No Connect	67	7 Index+
28	6 Phase B+	68	No Connect
29	No Connect	69	7 Phase B+
30	6 Index+	70	No Connect
31	No Connect	71	7 Phase A+
32	GND	72	Encoder Power*
33	+5V User	73	+5V User
34	ExtTrigger	74	Clamp (DIO Supply +VDIO)
35	ExtPacer	75	Encoder Power Input*
36	Supply GND	76	Supply GND
37	DIO0	77	DIO1
38	DIO2	78	DIO3
39	DIO4	79	DIO5
40	DIO6 / Timer Output 0**	80	DIO7 / Timer Output 1**

* External Supply

** Either DIO or Timer Output only

37-pin connectors

Table 13. 37-pin connector mode pin out

