| ED4 Digital Encoder Display

ED4 Features

- Two input channels for quadrature, analog, or PWM encoder outputs
- Programmable display units, scale, and offsets
- Two alarm outputs and two digital capture inputs
- Quick, intuitive setup with PC GUI software
- Color graphics LCD display with capacitive touchscreen and backlight
- A cable with a USB-B 2.0 connector is required for configuration (not included)

ED4 Product Description

The ED4 is the next generation of US Digital's ED3 encoder display ***(https://www.usdigital.com/products/discontinued-products/discontinued-interfaces/ed3/)*****.**

The ED4 can display:

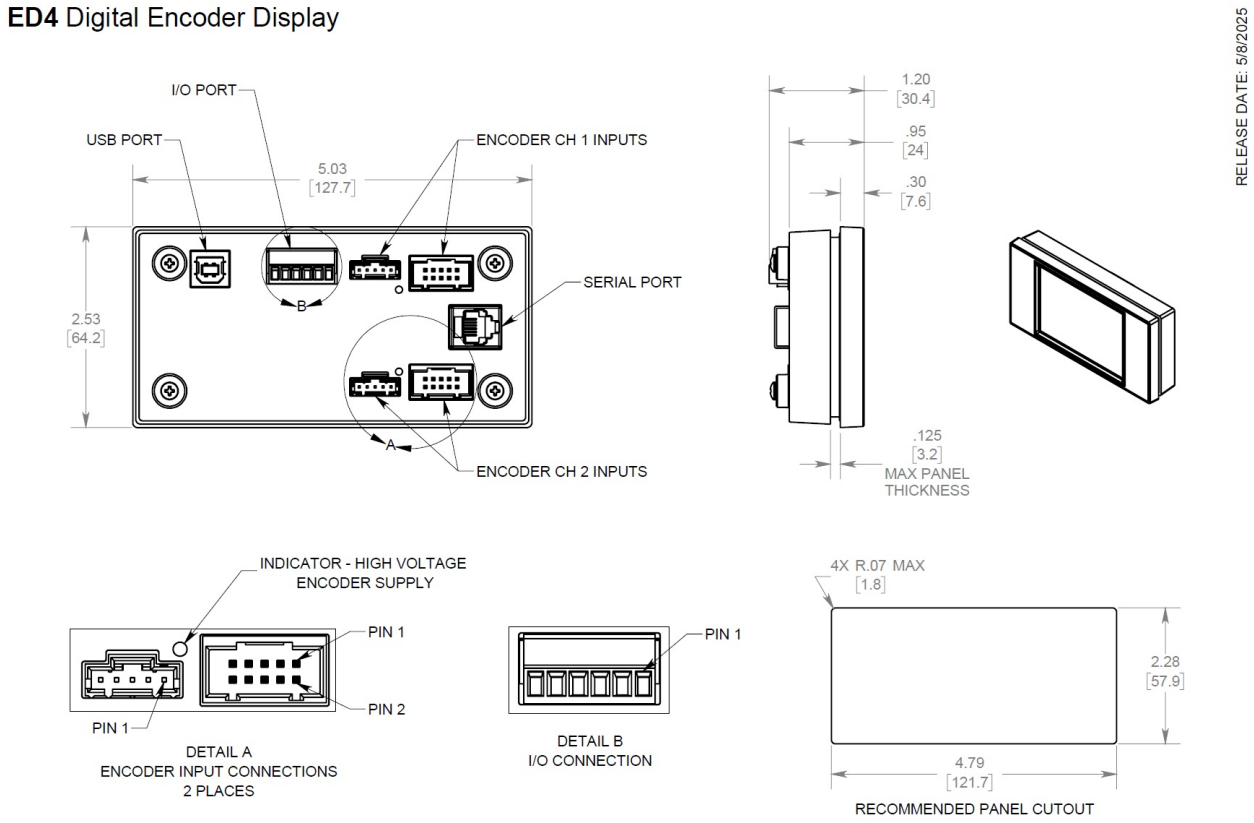
- Rotation speed or position of a quadrature output incremental encoder (single-ended or differential)
- Absolute position of a PWM output encoder
- Absolute position of an Analog output encoder
- Programmable alarm conditions based on the encoder output values

The user configures the ED4 over USB 2.0 using a GUI application running on a PC. The software allows the user to customize the display features for a specific application. A programmable offset/scale factor and unit labels can be applied so the ED4 displays the position or speed in different units such as inches, meters/sec, degrees, etc. The ED4 stores its programmable parameters in non-volatile flash memory.

The ED4 is powered by the USB bus or by an external power supply of +7.5 to +28 VDC. The USB connection can also be used for firmware updates. The ED4 supports quadrature encoder input frequencies up to 3.75 MHz, allowing accurate measurement of high-speed motion.

Please note: A cable with a USB-B 2.0 connector is required to configure the ED4. This cable is not included and must be purchased separately from a third-party supplier.

Mechanical Drawings



Specifications

APPLICATIONS

- Quadrature Counter, Tachometer
- Quadrature encoder CPR tester
- Up/Down Pulse Counter, Frequency Counter
- Position or velocity display
- Distance display
- Digital level display
- Speed zone alarm indicator
- Programmable tilt switch

ENVIRONMENTAL

PARAMETER	VALUE	UNITS
Operating Temperature	-20 to 70	C
Electrostatic Discharge, IEC 61000-4-2	± 8	kV
Vibration (10Hz to 500Hz, sinusoidal)	10	G
Shock (11 milliseconds, half-sine)	50	G

OPERATIONAL PARAMETERS

PARAMETER	MIN.	MAX.
Encoder Name String Length		15 chars
Encoder Units String Length		7 chars
Encoder Value Display Range (including decimal fraction)		12 digits
Encoder Value Decimal Resolution	0	6 digits
Quadrature Count Range	-2^31	2^31 - 1

ELECTRICAL

PARAMETER	MIN.	TYP.	MAX.	UNITS
Supply Voltage, external (1)	7.5	12	28	V
Supply Current (2)				
50% Backlight	26	50	73	mA
100% Backlight	31	60	93	mA
Encoder Supply Voltage Output (3)	4.75	5.0	5.25	V
Encoder Supply Current (each output)			150	mA
Digital Input Voltage	0		28	V
Digital Input Logic Low			0.4	V
Digital Input Logic High	2.3			V
Open-drain Output Voltage Range (4)	0		28	V
Open-drain Output Current			1	A
Open-drain FET resistance @ 1A		0.06		Ohms
Quadrature Encoder A/B or Step/Dir Frequency	0		3.75	MHz
Quadrature Speed Measurement Range (x4)	0.5		320k	Counts/Sec
Quadrature Speed Measurement Sample Period		0.1	2	Seconds
Speed Measurement Error		< 0.1%		
Moving Average Speed Filter	0		15	Samples
Analog Encoder Input Voltage	0		5	V
Analog Encoder A/D resolution		12		bits
Analog Encoder Input Bandwidth		240		Hz
Anlog Encoder Source Impedance			50	Ohms
PWM Encoder Resolution (5)		16		bits
PWM Frequency	10		4000	Hz
PWM Encoder Input Voltage	0		28	V
Encoder Single-ended Interface				
Logic Low	0.0		0.4	V
Logic High	2.3		28	V
Encoder Differential Interface				
Minimum Differential Voltage	200			mV
Common Mode Voltage	0		30	V
Input Voltage Range	0		30	V

(1) The ED4 can also be USB bus powered. An external supply is not needed in this case. If both USB and external power is connected,

external power is used.

(2) Does not include current drawn by an external encoder.

(3) In Default mode, the 5V nominal encoder supply is generated from the 7-28V power supply voltage. In USB bus powered mode, the 5V nominal USB voltage powers the encoders directly. In HV Mode, the encoders are powered from the power supply voltage input.

(4) An external clamp diode should be used when switching inductive loads.

(5) PWM duty cycle is measured once per cycle. 16-bit resolution at 915Hz and below. 60000 count resolution at 1kHz, 15000 count resolution at 4kHz

OPERATING MODE

The ED4 is configured over a USB 2.0 interface using an easy-to-use PC application.The ED4 can display two encoder channels on its color LCD display. SIngle-ended/Differential Quadrature, Analog and PWM encoder outputs are supported. The encoder reading can be scaled and offset so the reading is in arbitrary units. The encoder name and display units are editable. The ED4 firmware is field upgradeable by the user over USB.

The ED4 has a capacitive touch screen for the user to interact with the display. See the **ED4 Quick Start Guide** for more information.

FACTORY DEFAULT CONFIGURATION

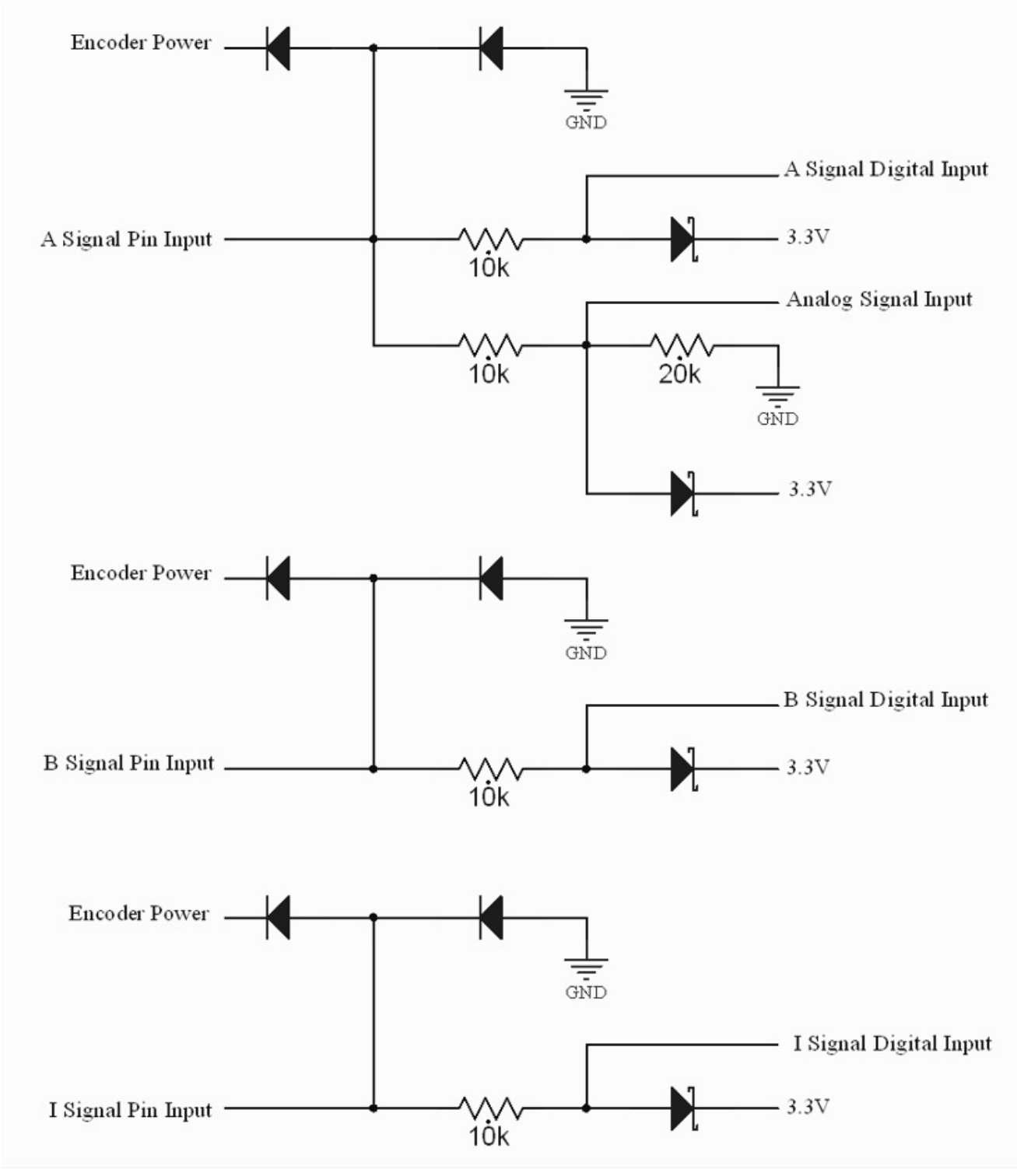
- I/O Alarms disabled
- Display Alarms disabled
- Quadrature Mode: Encoder 1 and Encoder 2 – single ended, X1 mode
- Quadrature positive count, reset on index
- Encoder #1 Name = “Encoder 1:”
- Encoder #2 Name = “Encoder 2:”
- Encoder #1 Units = “ct”
- Encoder #2 Units = “ct”
- Display Decimal Precision = 0
- Scale factor = 1
- Offset = 0
- Display Limits disabled
- LCD Backlight Level = 50%

PANEL MOUNTING INSTRUCTIONS

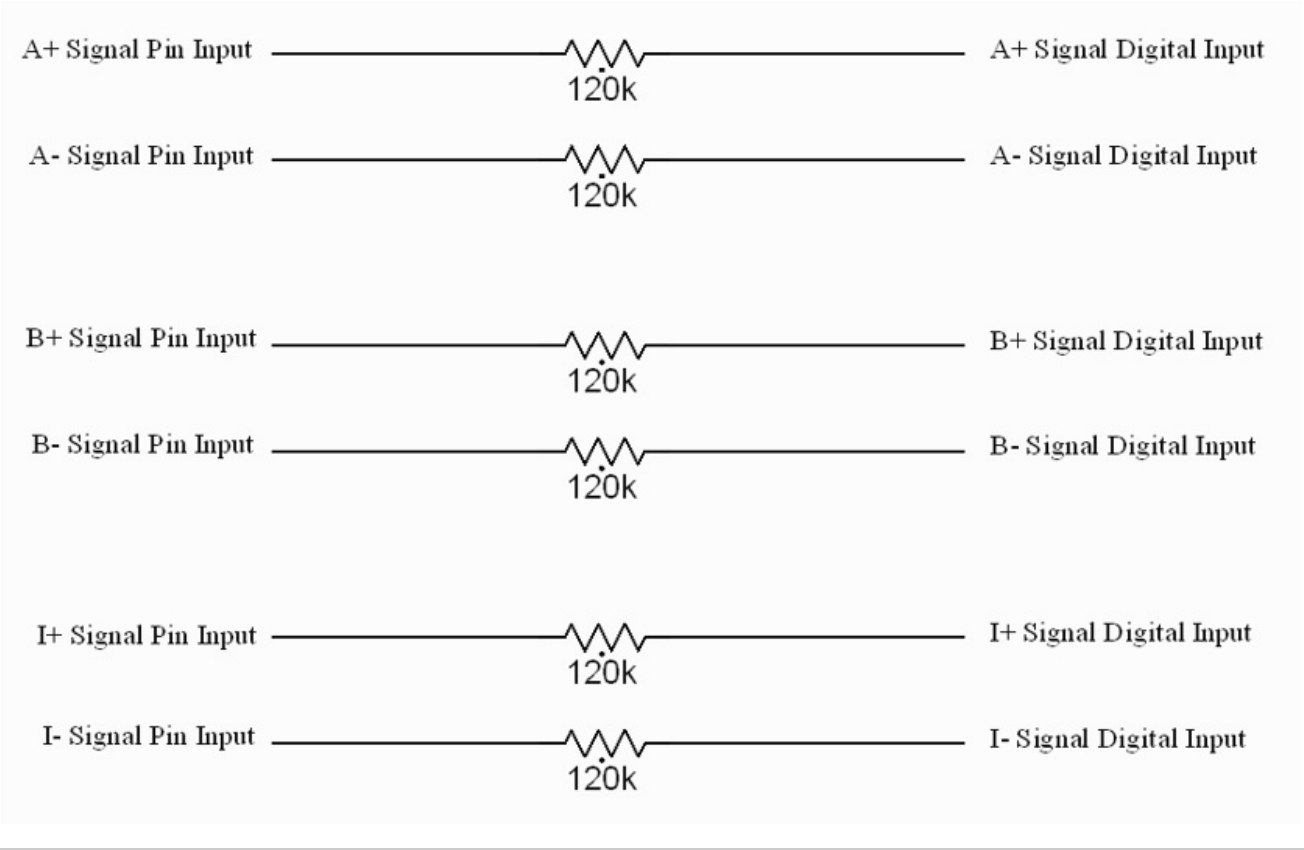
1. Remove the rear cover by removing the four screws in the back.
2. Insert the display through the rectangular opening in the front panel so that the gasket seals against the front.
3. Reassemble the rear cover to secure the display into the front panel.
4. The recommended mounting screw torque is 2 to 4 in-lbs.

INPUT CIRCUIT

SINGLE-ENDED:



DIFFERENTIAL:


A+ Signal Pin Input
120k
A+ Signal Digital Input
A- Signal Pin Input
120k
A- Signal Digital Input
B+ Signal Pin Input
120k
B+ Signal Digital Input
B- Signal Pin Input
120k
B- Signal Digital Input
I+ Signal Pin Input
120k
I+ Signal Digital Input
I- Signal Pin Input
120k
I- Signal Digital Input

CONNECTOR PINOUTS

Encoder Channel 1/2 Connectors

PIN	5-PIN Analog	5-PIN PWM	5-PIN SINGLE-ENDED	10-PIN DIFFERENTIAL
1	Ground	Ground	Ground	Ground
2	NC	NC	Index	Ground
3	Analog	PWM	A channel	Index-
4	DC power out (1)	DC power out (1)	DC power out (1)	Index+
5	NC	NC	B channel	A- channel
6				A+ channel
7				DC power out (1)
8				DC power out (1)
9				B- channel
10				B+ channel

(1) External DC power is output in HV mode, +5V out in standard mode

I/O Connector

PIN	DESCRIPTION
1	External DC Power Input (7.5-28V)
2	GND
3	Channel 1 Quadrature Capture Input (Weak internal pullup, Falling edge triggered)
4	Channel 2 Quadrature Capture Input (Weak internal pullup, Falling edge triggered)
5	Channel 1 Alarm Output (Open Drain)
6	Channel 2 Alarm Output (Open Drain)

Notes

- US Digital® warrants its products against defects in materials and workmanship for two years. See complete warranty *(https://www.usdigital.com/company/warranty)* for details.
- Cables and connectors are not included and must be ordered separately.
- Power supply is not included

Configuration Options

ED4

PLEASE NOTE: This chart is for informational use only. Certain product configuration combinations are not available. Visit the ED4 product page *(https://www.usdigital.com/products/ED4)* for pricing and additional information.