

### Description

The **EQUAD** converts any clock source into optical encoder quadrature outputs. When up clock / down clock mode is selected (via DIP SW1) up-clocks generate an A leads B quadrature sequence and down clocks generate a B leads A quadrature sequence. Alternatively, DIP SW1 may be set for clock and direction inputs; each active edge of the clock input will advance or retard the quadrature output according to the level present on the direction input.

The **EQUAD** may be placed in-line between a clock source, such as a PLC or indexer, and will output TTL quadrature signals in response to rising or falling edges on its inputs. In situations where the clocks are generated by mechanical contacts such as switches or relays, an internal debounce digital filtering can be enabled with the DIP switch to debounce those signals and prevent multiple triggers. The filtering works by not recognizing a clock edge unless the level is stable for 9 milliseconds after the edge. The inputs have 5K Ohm pull-up resistors to +5V. The inputs can be driven with TTL levels, or open collector type outputs. The **EQUAD** samples its input at the crystal frequency of 3.58 MHz, which allows the circuit to respond to input frequencies in excess of 800 kHz in 1x mode, and 100 kHz in 4x mode.

Four DIP switches allow the **EQUAD** to select the input mode, trigger on rising or falling edges, output one or four quadrature state changes per trigger (x1 or x4 mode), and enable or disable the debounce feature.

DIP SW1 selects the input mode, either up clock / down clock, or clock / direction. DIP SW2 selects x1 or x4 mode. In x1 mode, a trigger will generate a single quadrature state change. In x4 mode, a single trigger will generate four quadrature state changes (a full encoder cycle). When in the x4 mode, the time period for each state change is 4.47 microseconds (13.4 microseconds for the full cycle). DIP SW3 optionally inverts the inputs so that a falling edge may be made the active edge. DIP SW4 enables the debounce feature.

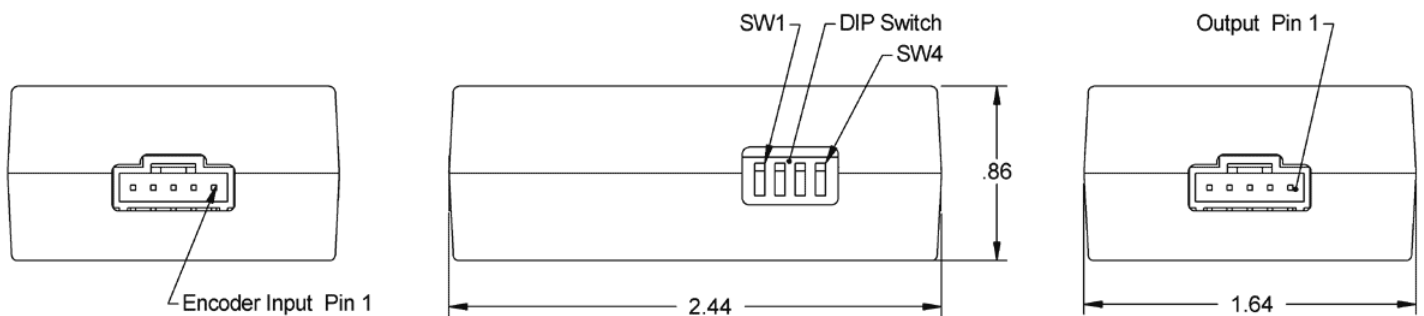
The **EQUAD** draws its +5V power from either the input or output connectors. Connectors are 5-pin positive finger-latching. DIN rail mounting is available.



### Features

- Simple in-line installation
- Rising or falling edge triggering
- x1 or x4 quadrature mode
- Selectable debounce option

### Mechanical Drawing



### Absolute Maximum Ratings

Parameter	Min.	Max.	Units
Storage Temperature	-40	100	C
Operating Temperature	0	70	C
Humidity (non-condensing)	0	95	%
Digital Inputs (diode clamped)	-0.6	5.6	V

### Electrical

Parameter	Min.	Typ.	Max.	Units
Supply Voltage (Vcc)	4.75	5.0	5.25	V
Supply Current		120		mA
Input Low Voltage	0		0.8	V
Input High Voltage	2.0		Vcc	V
Output Low (8mA current sink)			0.4	V
Output High (4mA current source)	2.4			V
Max. Input Frequency - 1x mode			800	kHz
Max. Input Frequency - 4x mode			100	kHz
Max. Phase Delay - Debounce on			2.0	usec.
Max. Phase Delay - Debounce off			9.2	usec.

### Pin-outs

#### Input Pin-out:

Pin	Description
1	Ground
2	NC
3	Up clock / clock
4	+5V power (directly connected to pin 4 of Output connector)
5	Down clock / direction

#### Output Pin-out:

Pin	Description
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1	Ground
2	Index (always low)
3	A channel
4	+5V power
5	B channel

### DIP Switch Settings

Switch	Description
1	Input Mode: switch down = up/down clock mode switch up = clock/direction mode
2	Output Quadrature Mode: switch down = x1 quadrature switch up = x4 quadrature
3	Input Clock Polarity: switch down = falling edge triggered switch up = rising edge triggered
4	Input Debounce: switch down = no debounce switch up = 9 millisecond debounce

### Product Change Notifications

Title	Date	Description	Download
PCN 1011	9/21/2011	The AD2B, AD4B, AD7, EADAPT, EDAC2, EDIVIDE, EPOT, EQUAD, ESUM, ESWITCH, ETACH2, SEI-USB, USB-232 currently utilizes a printed thermal transfer label. This label will no longer be used and will be replaced by laser marking directly onto the housing of the product. The purpose for this change is to create a more durable solution, and eliminate the possibility of the label being inadvertently removed from the housing.	<a href="#">Download</a>
EOL EQUAD - PCN 1025	6/17/2013	This PCN is a formal notification that US Digital is discontinuing the EQUAD.	<a href="#">Download</a>

## Ordering Information

EQUAD -

**Mounting**

D =Default

R =DIN rail (35mm wide)

**Notes**

- Cables and connectors are not included and must be ordered separately.
- US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.

## Base Pricing

Quantity	Price
1	\$103.95
10	\$95.55

For volume discounts, please contact us at sales@usdigital.com or 800.736.0194.

- Add \$10.00 per unit for **Mounting** of DIN rail (35mm wide)