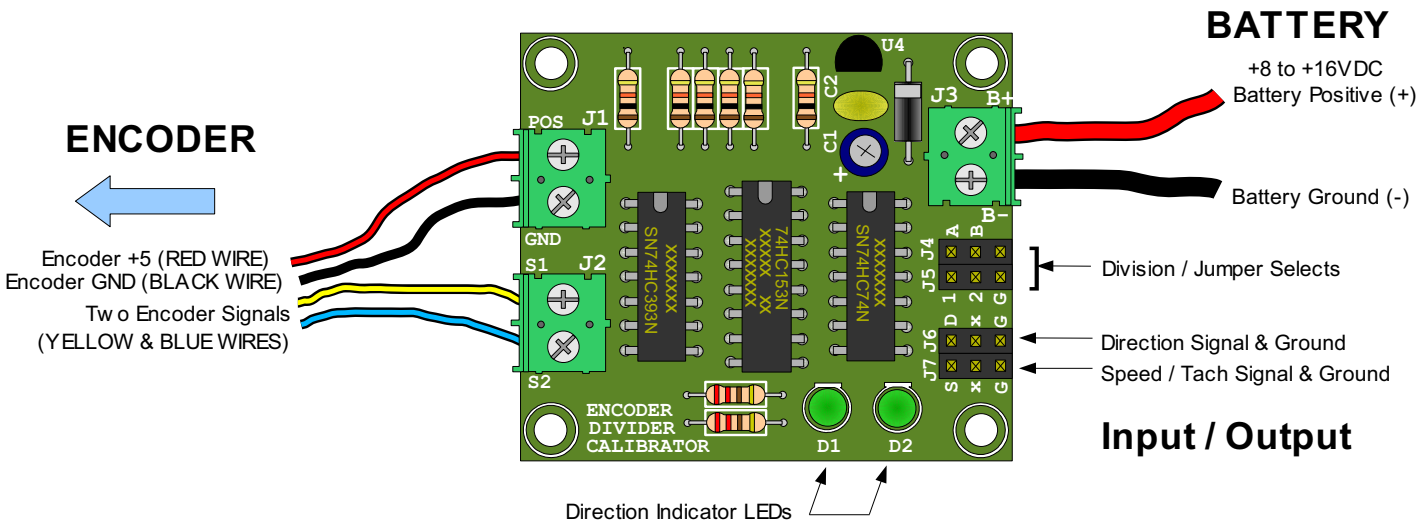
Description

The Encoder / Divider card will allow one of the output quadrature signals from the shaft encoder to be divided by a factor of 1, 4, 8 or 16 and will output this signal. The division factor can be configured using jumpers or digital input signals. The direction will be indicated by an output direction signal and visually by one of the two LED indicators. The division rates are useful to control the interrupt frequency of the encoder. The card also provides the +5VDC required for the encoder. This card also contains reverse battery polarity protection.

Card Power and Signal Connections

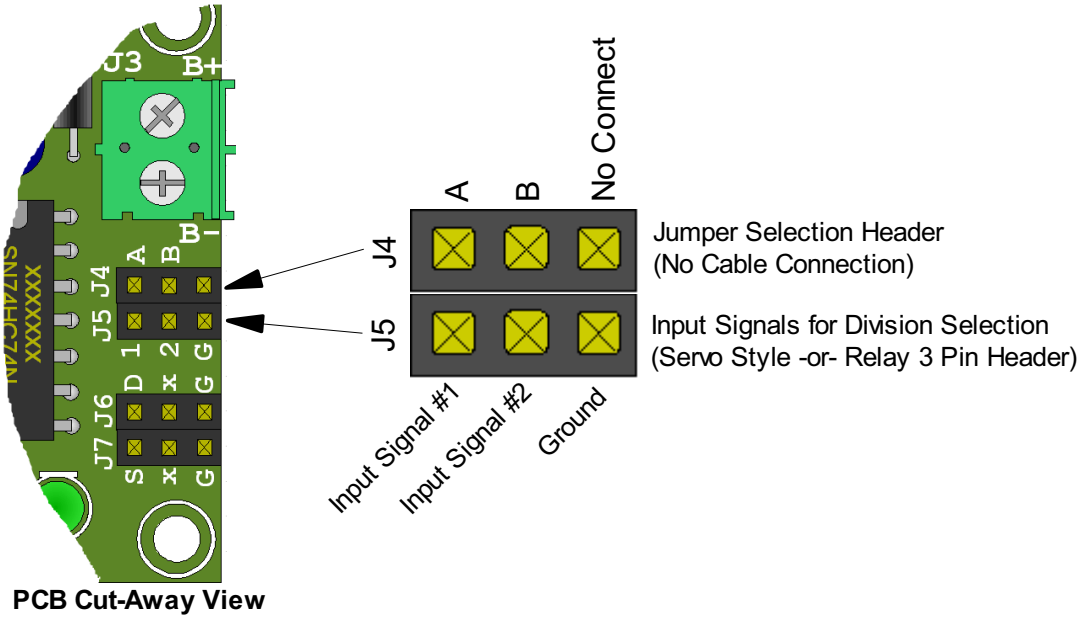


Specifications

Dimensions	2.0” L x 1.75” W x 0.625” H (Assembled)
Voltage Input	Nominal +12VDC ± 4VDC (+8VDC to +16VDC)
Current Consumption	+12VDC = 25mA, 40mA with Encoder
Mounting Pattern	4x Holes, 1.50” X 1.75”. Holes accommodate #4 screws.

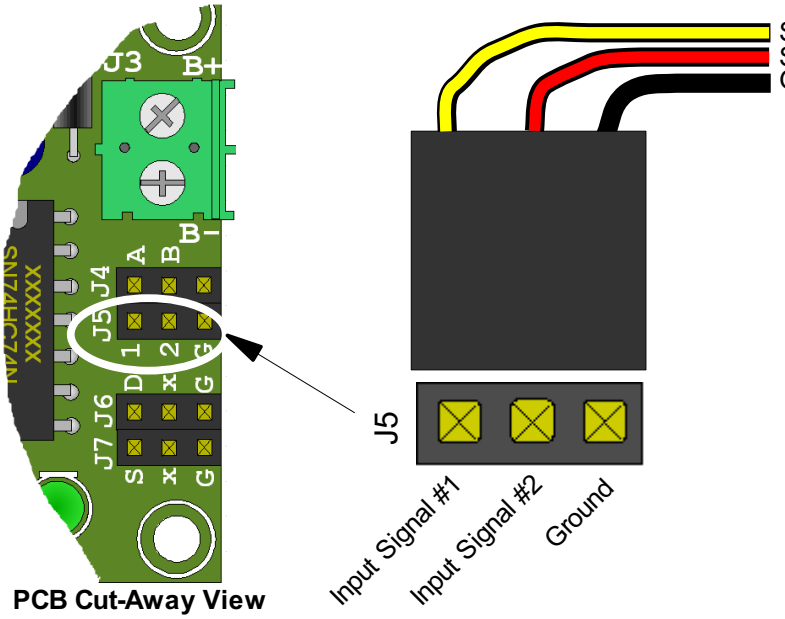
Card Input Configuration and Input Signals

The division rate can be selected using digital inputs or by using jumpers. If digital inputs are used to select the division rate, the jumper block J4 will not be used.



PCB Cut-Away View

Using Digital Inputs For Card Configuration (Non-Jumper Selection)



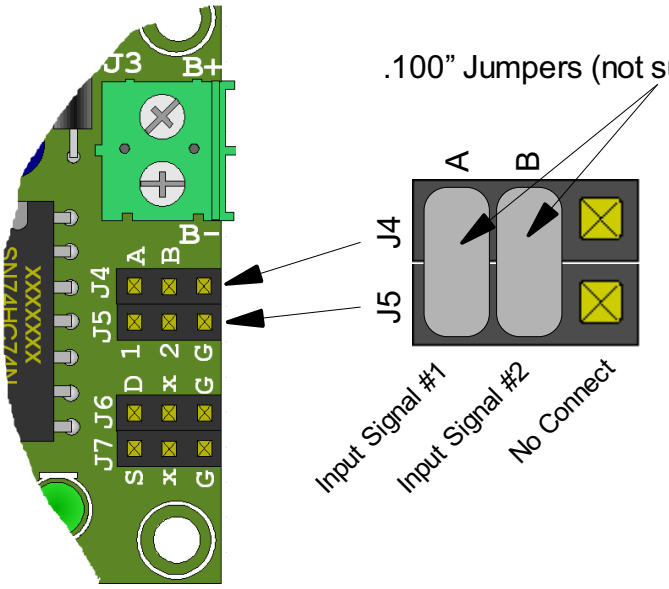
PCB Cut-Away View

Example for using the digital inputs with a 3-pin servo type connector.

The table below shows the input signal levels (0 = Low, 1 = High). These signals are logic level compatible (0-5VDC).

Input Signal #1	Input Signal #2	Output Division Factor
0	0	1
0	1	4
1	0	8
1	1	16

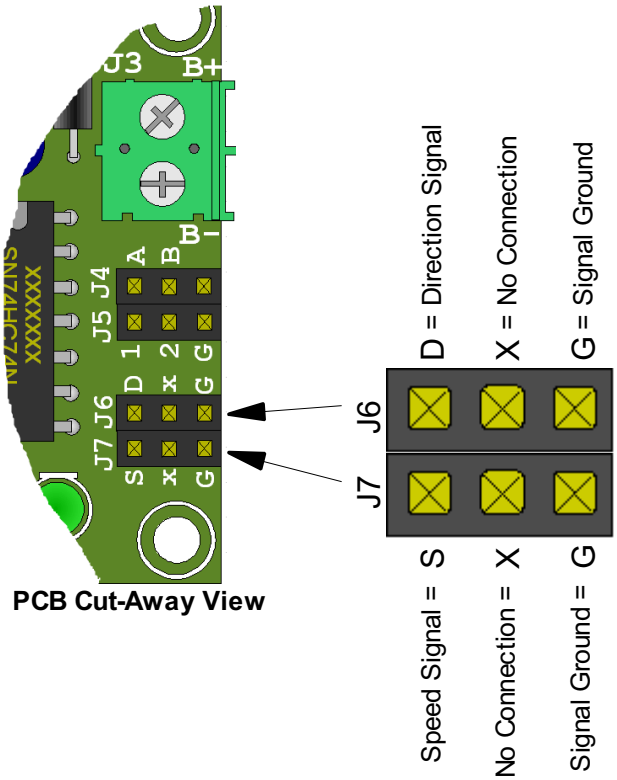
Using Jumpers for Card Configuration



PCB Cut-Away View

A	B	Output Division Factor
In	In	1
In	Out	4
Out	In	8
Out	Out	16

Card Signal Outputs (Direction and Speed)



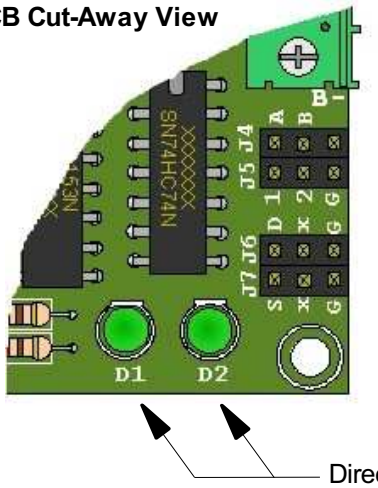
PCB Cut-Away View

The direction signal will be a digital '1' or '0' (+5VDC or 0VDC) depending on a couple of factors: which encoder signal (yellow or blue wire) is wired to each card encoder signal input terminal and which direction the shaft is turning.

The speed output signal will be the quadrature signal connected to the encoder terminal 'S1'. This signal will be scaled by the division factor selected by the digital inputs or by the use of jumpers.

Direction Indicators (LEDs)

PCB Cut-Away View



The direction indicator LEDs are multipurpose:
1. Card power indication
2. Shaft rotation / direction (Clockwise or Counter Clockwise)
3. Visual encoder calibration status

Depending on the status of the card on power-up, one or both of the LEDs will turn on indicating power.

If the encoder has been correctly calibrated, only one LED will turn on for each direction of shaft rotation.

The LEDs can be used to check for encoder calibration. (See ' Encoder Calibration Status and Adjustment' below).

Encoder Calibration Status and Adjustment

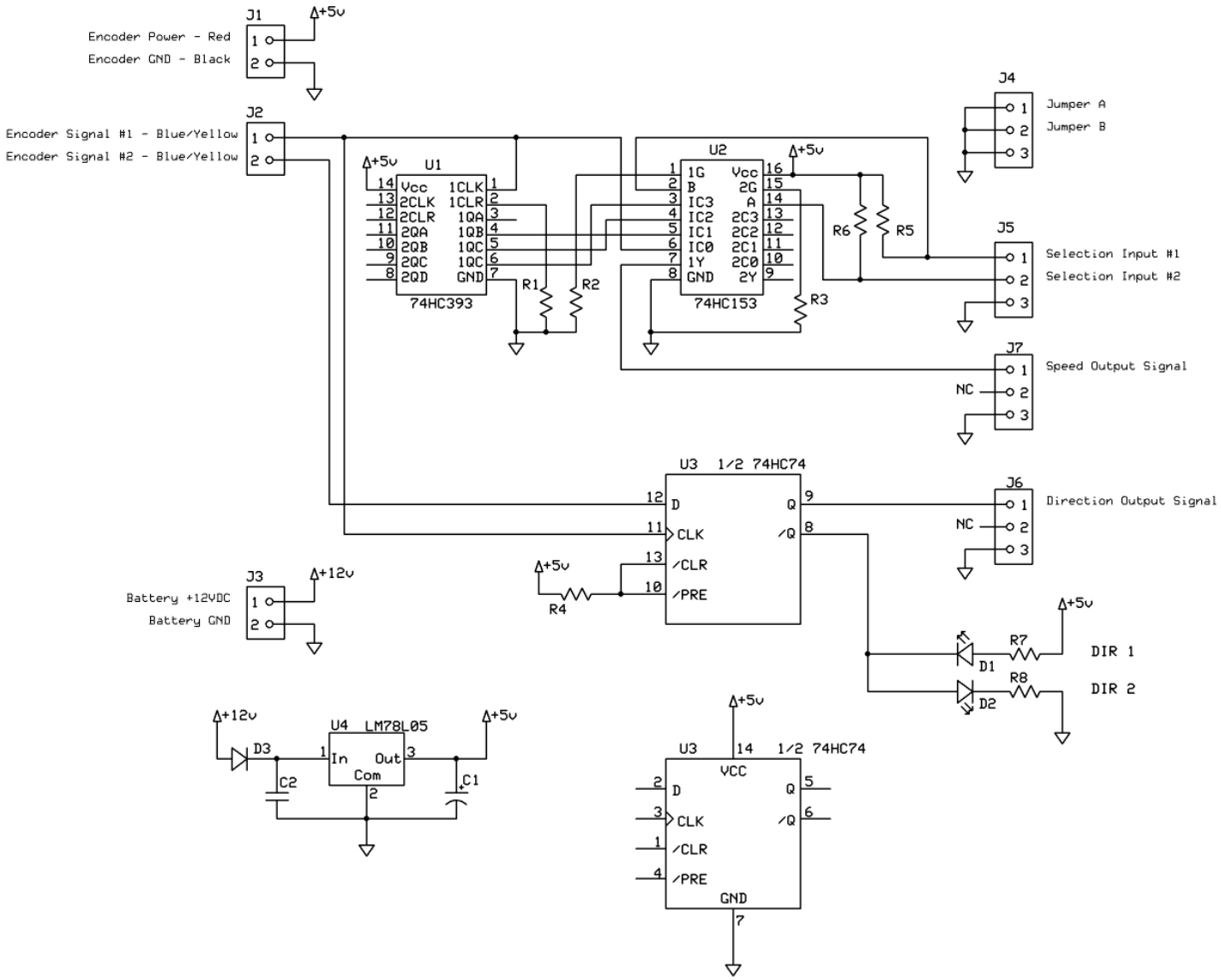
The Direction Indicator LEDs can be utilized to make encoder calibration adjustments and to show calibration status. This is useful if other types of measurement equipment are not available, i.e. : dual trace oscilloscope. It is important to note that this is a coarse adjustment of the encoder and should not be considered calibration.

To check calibration status of the encoder, turn on power to the Encoder / Divider card and run the motor in each direction. Verify that only one direction indicator LED is on for each direction. Example: Clockwise rotation turns on only D1 and counter clockwise rotation turns on only D2. If any of the following instances is seen on the direction indicator LEDs, adjustments may be needed on the encoder mounting position:

- One LED is on continuously and the other LED turns on intermittently
- Both LEDs are on
- No LEDs turn on
- One LED is off and the other LED turns on intermittently
- Both LEDs turn on intermittently

To make encoder mounting adjustments (refer to the Encoder Manual for a more detailed description), loosen the two encoder PCB mounting screws and carefully re-position the encoder PCB until only one LED is on for each direction and then tighten the encoder PCB mounting screws and re-test.

Schematic


J1
+5v
Encoder Power - Red
Encoder GND - Black
J2
Encoder Signal #1 - Blue/Yellow
Encoder Signal #2 - Blue/Yellow
U1
74HC393
U2
74HC153
J4
Jumper A
Jumper B
J5
Selection Input #1
Selection Input #2
J7
Speed Output Signal
NC
U3 1/2 74HC74
J6
Direction Output Signal
J3
+12v
Battery +12VDC
Battery GND
U4 LM78L05
D1
D2
D3
DIR 1
DIR 2
R1
R2
R3
R4
R5
R6
R7
R8
C1
C2