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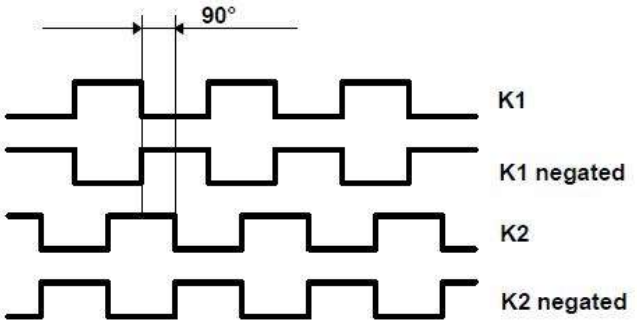
ENCODER OUTPUT FORMATS 101

Incremental Encoders

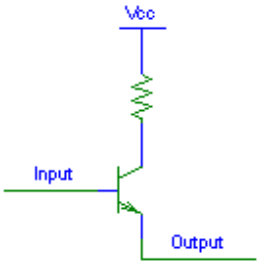
Encoder Output Formats 101 (Incremental Encoders)

Kevin Condorato March 2009



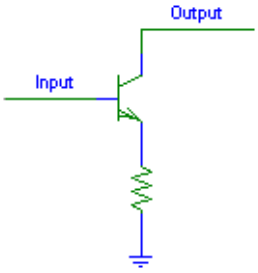
Quadrature outputs are typically found with Incremental or ISI encoders. The term comes from the fact that there are four data signals for position, they are A, /A, B, and /B. A and B Channels or data lines, have signals which are inverse or negative of each other, /A (A Not) and /B (B Not). These are also referred to as A+/A- and B+/B-. A and B are phase shifted by 90 degrees, allowing for determination of direction of rotation. Quadrature outputs can also have an index or reference pulse which pulses once per revolution of the encoder. It is important to note that the Quadrature output is a Square Wave and has a DC voltage level of either 5Vdc or 11-27Vdc.

Quadrature outputs can come in one of the following formats:



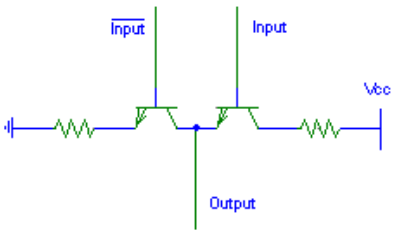
LINE DRIVER (5VDC)

A Line Driver is a sourcing output. When in the ON state, a line driver will supply Vcc (Supply Voltage). In the OFF state, a line driver will float. Because of this, a sinking input is required for proper operation.



OPEN COLLECTOR

An Open Collector is a sinking output. In the OFF state, an open collector will supply a path to ground. When in the ON state, an open collector will float. For proper operation, a Sourcing input is required.



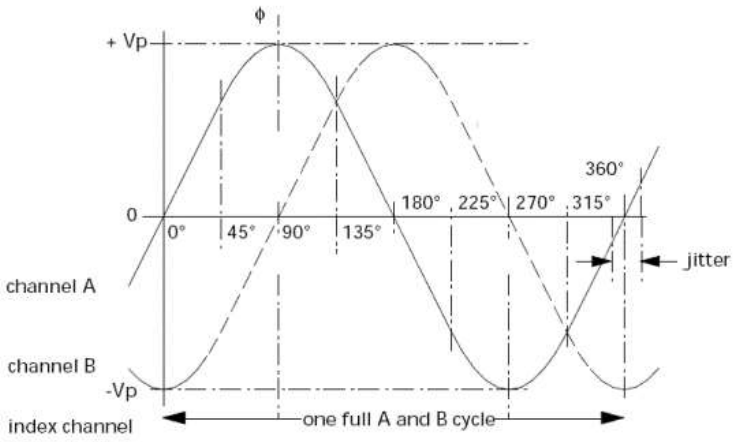
PUSH-PULL (11-27VDC) (5VDC)

A Push-Pull output is a combination of a line driver and an open collector. In the OFF state it will supply a path to ground and in the ON state it will supply Vcc (Supply Voltage).

TTL (5VDC)

Transistor Transistor Logic (TTL) uses the digital electronic principles of Logic High (>=2.5Vdc) and Logic Lo (<=0.5Vdc). This form of output can often be replaced, mimicked using a RS422 Line Driver at 5Vdc. (Totem Pole)

Sin/Cos is similar to Quadrature in that it provides four data lines or signals. The primary difference being the wave is not square, it is a true Sinosoidal Wave or Curve. The Cosine wave follows the same wave pattern as the Sine Wave, however is phase shifted by 90 degrees. Sin/Cos signals are usually 1Vss peek to peek.



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USA 1.800.709.3309 | CAN 1.800.265.9493

customercare@trelectronic.com