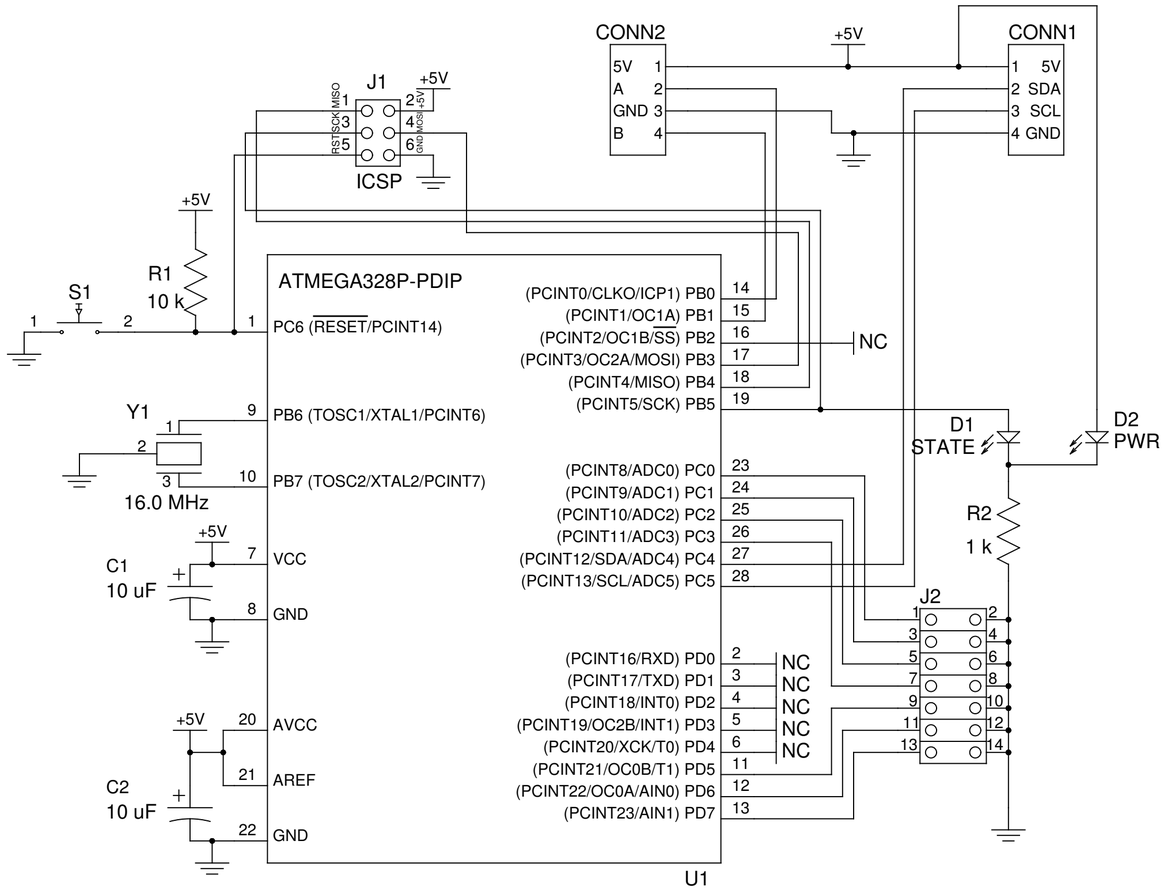

Overview

This I²C-connected circuit acts as a dedicated decoder for the rotation sensors (encoders) connected to the Hydra's motor shafts, which output a two-bit Gray Code. Most of its behavior is software-defined.

Jumper block J2 is used to set the AVR's I²C slave address; AVR-internal pull-ups, enabled in software, on the attached I/O pins ensure that these pins are not left floating when no jumpers are present.

Notes

* U1: *socketed* ATmega328P-PU --- i.e., an ATmega328P packaged in a 28-lead 0.300"-wide PDIP. I already have these.

  - Power connections: yes, we *do* need to connect AVCC (20) and AREF(21) to Vcc, even when not using the ADC.

  - C1, C2: Atmel application note AVR042 states "[f]or devices with multiple pairs of power and ground pins, it is essential that every pair of pins get its own decoupling capacitor." I chose the 10 uF caps because I had a bunch sitting around; I know they're overkill. :)

  - Y1: three-pin 16.0 MHz ceramic resonator with "built-in capacitors". I already have these.

* J1: 2x3 ICSP header. Optional since we're using an IC socket, but handy nonetheless.

* J2: if one's available, it would be nice to use a DIP switch instead of the header block.

* R1, R2: 1/8 Watt carbon-film should be sufficient for these; tolerance isn't critical at all (10% would be just fine).

* S1: micro tactile switch (commonly found in a four-pin 6x6 mm square package); current and voltage ratings shouldn't matter for use as a reset switch.

* CONN1: something convenient for running from (a shield on) the drive-control Arduino to this circuit.

* CONN2: female header or other connector. Since this will be supplying 5V to the encoder, we need to be careful about exposing the pins to something that could short them when the encoder isn't plugged in. The (somewhat odd) pinout matches the labeling on the encoders.

* D1, D2: LEDs. Preferably green for D1 (STATE), red for D2 (PWR).

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