

Sheet: Isolated Spindle

File: iso_pwm.sch

Sheet: Power and Miscellaneous Features

File: Power_and_misc.sch

Sheet: Teensy 4.1

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Sheet: Digital Outputs and Relay drivers

File: digital_outputs.sch

Sheet: Isolated Limit and Control Inputs

File: limit_and_control_inputs.sch

Sheet: Digital Inputs

File: Digital_Inputs.sch

Sheet: Axis output Terminals & Headers

File: Axis_output_terminals_and_headers.sch

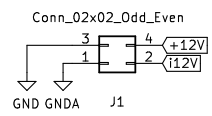
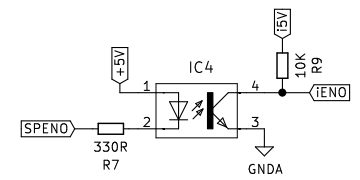
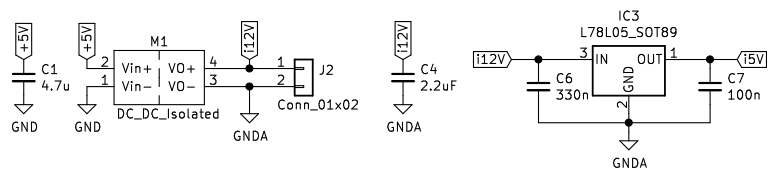
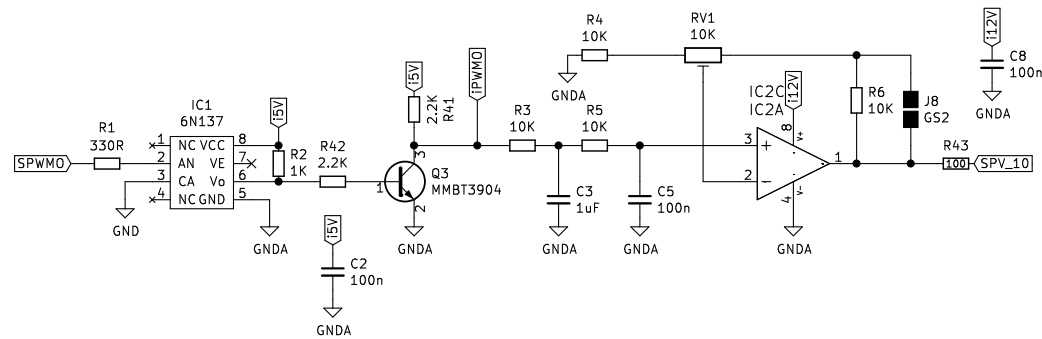
Brookwood Design

Sheet: /
File: T41Pro.sch

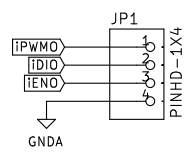
Title: T41BB5X

Size: USLetter | Date: 2021-05-01
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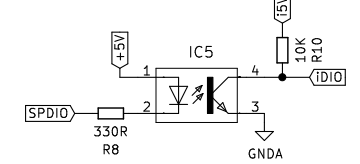
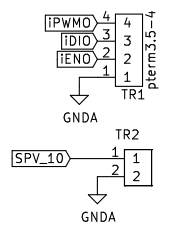
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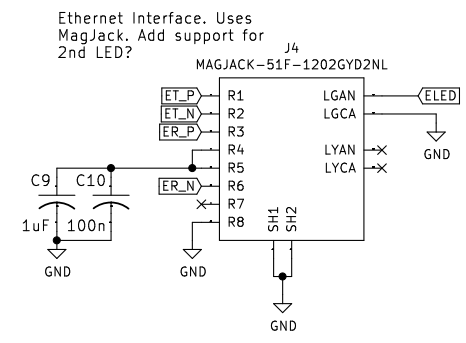
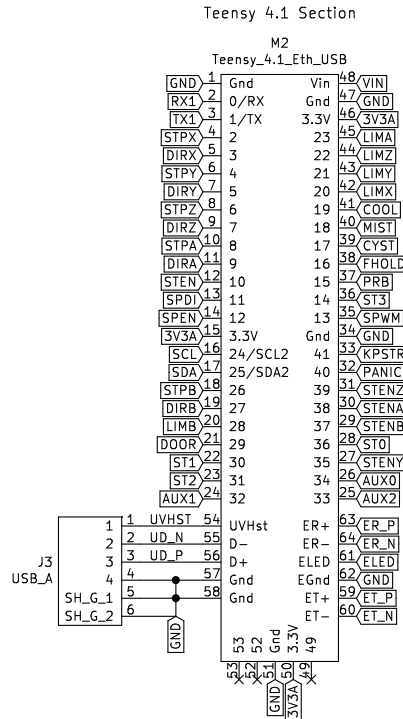
Jumper to connect isolated 12V to rest of board..



Spindle Control interfaces. PWM, Direction, Enable and 0-10V analog.



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Sheet: /Isolated Spindle/ File: iso_pwm.sch	
Title: T41BB5X	
Size: A4	Date: 2021-05-01
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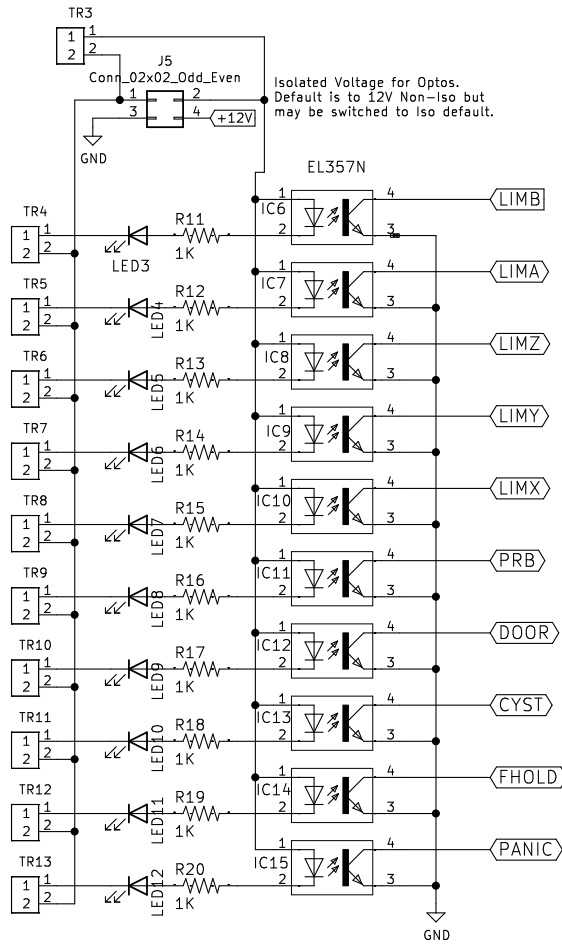
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Sheet: /Teensy 4.1 /
File: Teensy_4.1.sch

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Limit and Probe Interfaces.
5V operation on LED side.
3.3V operation on photo-
transistor side. LED If set to
slightly higher than 10 mA.

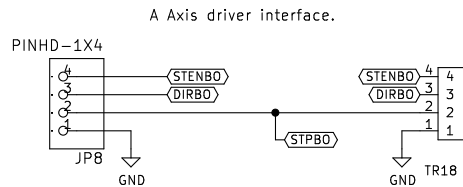
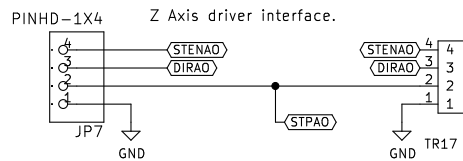
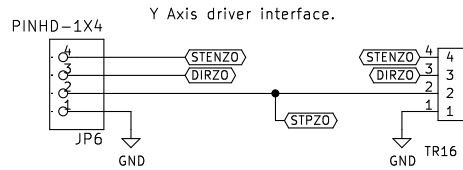
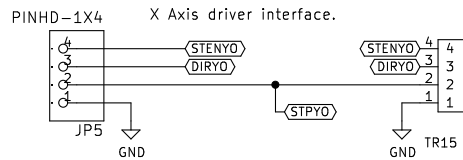
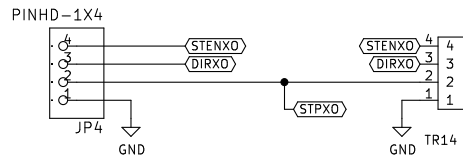
Brookwood Design

Sheet: /Isolated Limit and Control Inputs/
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Title: T41BB5X

Size: A4 Date: 2021-05-01
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B Axis driver interface.

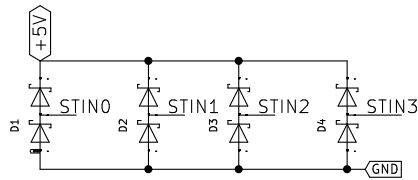
Brookwood Design

Sheet: /Axis output Terminals & Headers/
 File: Axis_output_terminals_and_headers.sch

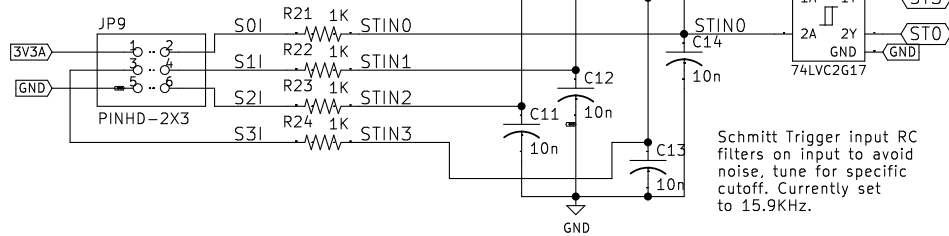
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Size: A4 Date: 2021-05-01
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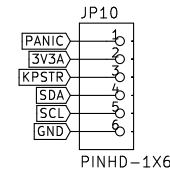


Digital input group. 4 inputs are 5V tolerant, diode protected with schmitt triggers. RC Low Pass noise filters.

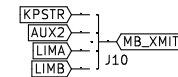


Schmitt Trigger input RC filters on input to avoid noise, tune for specific cutoff. Currently set to 15.9KHz.

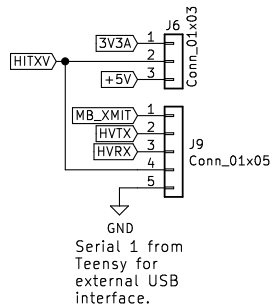
I2C Header



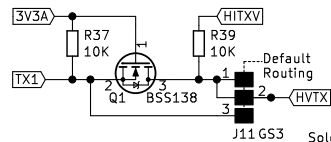
I2C interface tied to 3rd channel on Teensy 4.x. Strobe provided for signaling to minimize I2C traffic. Halt/Panic provided to allow direct signaling to grblHAL core.



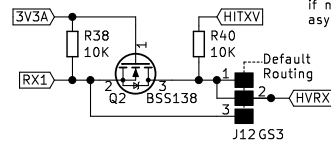
Modbus Transmit Pin Configuration Requires Map file configuration also



Serial 1 from Teensy for external USB interface.



Solder Jumpers are used to remove translation if needed for high speed async.



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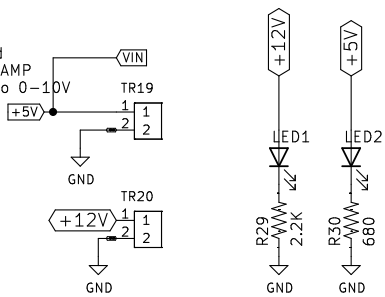
Sheet: /Digital Inputs/
File: Digital_Inputs.sch

Title: T41BB5X

Size: A4 Date: 2021-05-01
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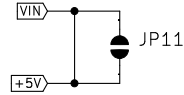
12V Input. Needed for relays and OPAMP for spindle PWM to 0-10V conversion.



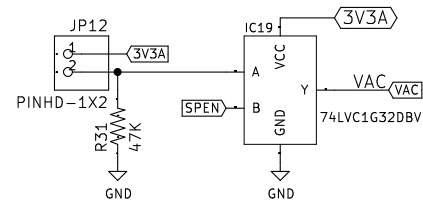
Misc Input Interfaces.
5V operation.

5V output (from USB)
Max 150 mA.

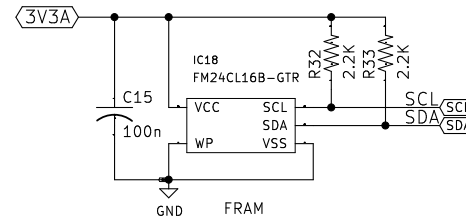
Board can be powered from external 5V or via USB power (Vin). To connect via USB and use external +5V, cut JP105. If connected via ethernet, use external +5V, either from the microUSB connector or the +5V screw terminal.



Note also that flood will auto bridge Vin and +5V so must manually exclude Vin pin on Teensy in Pcbnew.



Independent Control for Dust Extractor. A switch attached to the pin header can turn on the DE separately from the spindle. Can also detach the DE from spindle control. Default is attached.



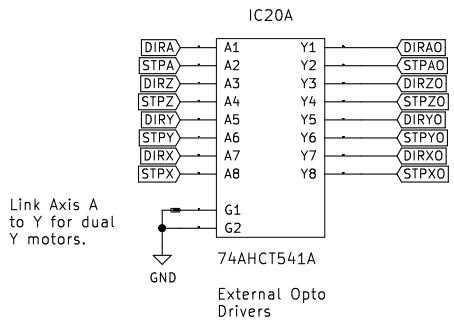
Brookwood Design

Sheet: /Power and Miscellaneous Features/
File: Power_and_misc.sch

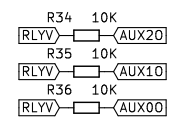
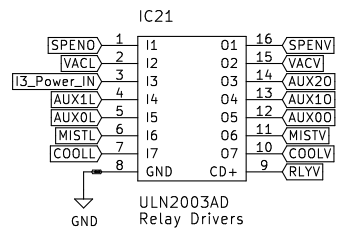
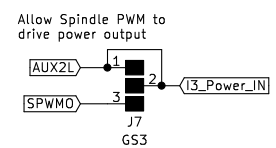
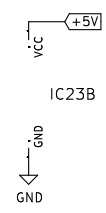
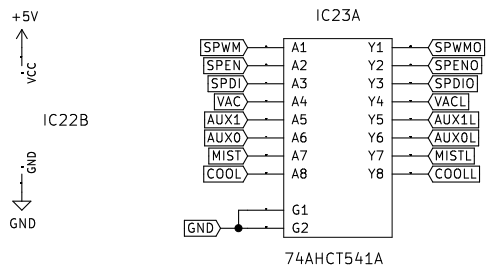
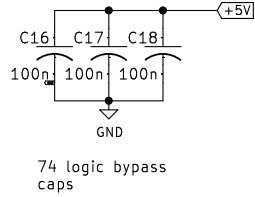
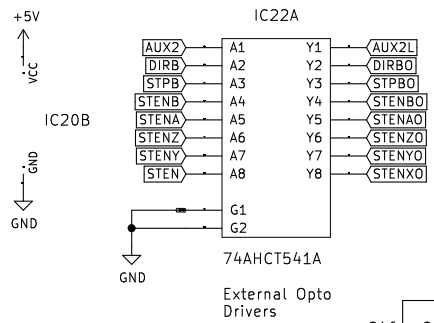
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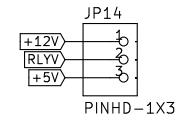
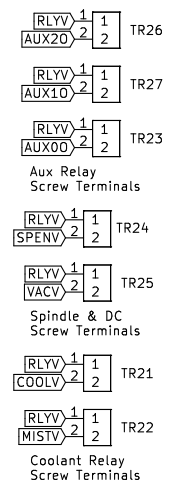
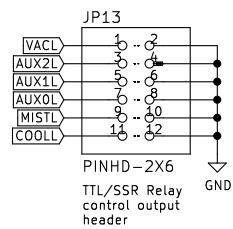
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Digital output section. 3.3V inputs, 5V outputs. Use of AHCT logic allows this. Drive capability of 8mA.



Optional Pull Up resistors for drive output. DNP and place on bottom of PCB



Relay Power Jumper
Relay section. Driver has 5V input which is also routed to pin headers. Relay coil voltage is configurable via jumpers 5V or 12V.

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