Teensy 4.0 GRBL Pin Assignment working document

V 0.2

Goals:

1. Common Function on TH Pins for easy prototyping/testing. Simple machine should be possible with TH pins only.
2. Less Common Function of SMT “Back Side” Pins
3. Grouping of similar functions on nearby pins to simplify usage and PCB layout.

Issues/questions:

1. No onboard EEPROM. Use EEPROM emulation? How frequently does EEPROM get written? See (alt) Pin assignment.
2. Does USB use Ser 1? Pins need to be reserved?
3. Pin 13 is LED, output only. Currently on spindle enable. Is there a better use for that pin as a diagnostic?
4. Stepper enable is often unused in simple machines. Move that to back side to free up a TH pin?

Standard vs alternate assignment. Most pin assignments are the same for both. Main difference is the use of I2C channels on the through hole pins.

Through Hole Pins

Pin	Standard assignment	Alternate assignment
0	Reserved RX1	Reserved RX1
1	Reserved TX1	Reserved TX1
2	Step X	Step X
3	Dir X	Dir X
4	Step Y	Step Y
5	Dir Y	Dir Y
6	Step Z	Step Z
7	Dir Z	Dir Z
8	Step A	Step A
9	Dir A	Dir A
10	Stepper Enable 0	Stepper Enable 0
11	Spindle Dir	Spindle Dir
12	Spindle Enable	Spindle Enable
13 LED	Spindle PWM	Spindle PWM
14	Reset/Abort	Reset/Abort
15	Probe	Probe
16 I^2C 0	Feed/Hold	I2C SCL ch 0
17 I^2C 0	Cycle Start	I2C SDA ch 0

18 I²C 1	Mist Enable	I2C SDA ch 1
19 I²C 1	Flood Enable	I2C SCL ch 1
20	Lim X	Lim X
21	Lim Y	Lim Y
22	Lim Z	Lim Z
23	Lim A	Lim A

Back Side SMT Pins

Pin	Function assignment	Alternate assignment
24 I2C 2	I2C SCL ch 2	Feed/Hold
25 I2C 2	I2C SDA ch 2	Cycle Start
26	Step B	Step B
27	Dir B	Dir B
28	Lim B	Lim B
29	Door	Door
30	Stepper Enable 1	Stepper Enable 1
31	Relay 5	Relay 5
32	Relay 6	Relay 6
33	GPIO 1	Relay 7
34	Stepper Enable 2	Stepper Enable 2
35	Stepper Enable 3	Mist Enable
36	Stepper Enable 4	Flood Enable
37		
38		
39		

Simple Machine Definition

This section defines the functions needed to build a simple CNC/Laser machine. The goal is to be able to do this only with through hole pins. This allows easy prototyping and testing.

Note that strictly speaking, Stepper Enable is unnecessary and Feed/Hold, Cycle Start are often omitted in basic machines. For Lasers, I believe Spindle pins are used for control.

Step X	Stepper Enable 0	Lim Y	
Dir X	Spindle PWM	Lim Z	
Step Y	Spindle Enable	Lim A	

Dir Y	Reset/Abort	Feed/Hold	
Step Z	Probe	Cycle Start	
Dir Z	Lim X		

Note this is somewhat stating the obvious but I think it worthwhile to have written down.