

Trim/extend all alu attachment points for lids so that they have the same fit, the limiting one is now the ones on the axis plate

Change x plate so that it's stronger around x-z mount points

Extend z plate down to cover hole ev combine z plate to one item instead of split in two for stiffness

Adjust holes so alu brakett can be moved up and sunk into wooden dust ledge to give more space for tools and not hit your hands on it. Makes dust from 12mm

Clen up model after moves

Update manuals with better wheel sequence and 4 wheels for x

getting the spindle started problem:

Spindle data 2 poles 3 phase spindle motor cos W 0.75 1.5kw 220V 400hz 8A 24000 rpm

Get spindle going:

Theories

Wrong control schema V/F instead of Vector like Jens said

LL:

Tramming seems to be underestimated, needed to add more excenters and adjust them

Much possible that looser fit during assembly gave more misalignments

Client had to expand some holes to hit his threaded holes with screws. I used 6mm tol, perhaps increase?

Make a milled standoff for the card

Milled dust covers

Milled vipers?!

Kable shoes for probe

Move probe to foot?

sensor mounts can be from wood instead of alu, just annoying to thread and mess withtrapped nuts. use wood screws

Contingencies

Bring 800W spindle and 1.kw vfd as backup and wooden plate so that we can mount it

Other fixing

Card, why no signal on limit X

need to wire externa power for full test bypass reset?

Need a USB cable to test arduino

Then should wire probe also

Spindle PWM control, chekc for >20 mA and see if I can use and scale the 5V

Alternative check if it is easy to route in 10V ref

GRBL notes:

Angående beteende vid pausning så verkar det gå att återskapa Shopbots-pasue-beteende med build options i config.h när man kompilar grbl. Läs kommentarerna i config.h för ENABLE_SAFETY_DOOR_INPUT_PIN och PARKING_ENABLE för mer.

Jag kan dock inte helt rekommendera att jobba på det sättet, vi försöker gå bort från att man interagerar med en powered machine.

Notera dock att en säkrare väg för att kunna fortsätta job man stoppat är att använda USE_LINE_NUMBERS och klippa bort rader i filen innan restart. Men det är dött att misslyckas ibland då det inte står z på alla rader etc...

Kan man jogg maskinen och homea den under en pause? i så fall så är det ju skiltatt att göra en egen pauseknapp som pasuar koden och tar och kör bort maskinen så att man kan stänga av power när den är off the work area. Sen så kan en annan egen resumeknapp re-home och resume.

Value	Unit	Comment	
1000	puls/rot pre gearbox	Stepper driver setting	
7,2	gearbox	ShopBot PRSalpha	
7200	steps per rot,		
0,05	deg per pulse ink gearbox		
130	cicumference ca?		
0,018	mm/pulse	Min movement, ok	
55,38	steps/mm with these settings		
<i>97,748705</i>	<i>steps per mm</i>	<i>Shopbot vaule from jens?</i>	
30000	puls per sec max from arduinno		
4,17	rotations per sec max		
541,67	mm/s	Max travel speed, more than needed	
32,5	m/min		
45,7	<i>m/min</i>	<i>shopbot stock max speed, never used</i>	

I think it would be good to collect and group the features we want or need to see when controlling the shopbot at bitraf. This is a thread to collect and group them into different categories. How to implement them can be discussed in separate threads.

****Bare bones necessary features:****

- * Spindle warmup routine
- * Access gcode file
- * Load gcode file
- * Homeing
- * Probing
- * Run Job
- * Unsafe use is hindered (safety bar, chuck tool detector)
- * Emergency stop
- * Move away from work area (several positions or free jogging)

****Highly appreciated features:****

- * Pause / Resume
- * Preview of the toolpath
- * Go to toolchange position
- * Toolpath is screened for errors
- * Material thickness verification
- * Bit size verification

- * Easy to understand interface (only relevant information present)

****Appreciated features:****

- * (Advanced features available to power users)

Nice to have feaures:

- * Toolpath is projected onto work area

Split into easy to implement and requires work
Prio order

Nice to have feaures:

- * Toolpath is projected onto work area

User experience and functionality:

- * user / machine / material is safe at all steps. Can not be used unsafely
- * Machine stops unsafe acts
- * user is guided through steps
- * No other programs needs to run
- * no unnecessary popups or os things to work around (clean interface as standard boot)
- * informative feedback if the machine does not run (which safety switch etc
- * Restant to errors (fewer steps in the command chain?)
- * Constant control and connection

Guiding power	Feature	Comment		
	1 Access to danger	Kabinett with safety latch		
	Noise exposure	Safety and comfort		
	Dust exposure	Comfort (dangerous materials can not be milled)		
	5 Dust removal	kan vara en vanlig som står på golvet		
	2 Dust protection av guide system			
	Guide system	Square glide blocks eller rollers		

(4-20 mA or 0-20 mA)

20 mA
5 V

Pwm + cap
250 ohm
2,5 V
10 mA

Case
60000 rpm
1 flute
0,1 mm chip load
1000 rps
100 mm/s feed
90 deg corner
300 mm/s² acc
0,3333333333 s to slow to a stop / acc
15 mm travel

Sent in one instruction to the controller
Gbrl sends desired rpm at the end of the move to VFD and the vfd deals with acceleration of spindle, might be fast or too slow, need to scale expectations

Filter
1000 ohm
10 uF
1 kHz PWM;

Signal starts changing instantly and VFD will read fully changed signal after ca 0,05 s
then it will decelerate at it's preset value which is way slower than 0,33 s
so that's faster than needed

noise 0,125 v
2,50%
1500 rpm

5000 ohm reduces noise to
0,025
0,50%
300 rpm

and will reach fully changed signal after 0,3s, however with a serious nonlinear curve

Ideal case, can slow to stop/spin up in that time (spindle less responsive)
3 hz is enough

if we use
5000 ohm
10 uF

Filer then we get
3 Hz cut off frequency

$\Delta V_{pk-pk} = 0,025$

The VFD will hunt
300 rpm

1000 ohm
10 uF

and behaviour at 3 Hz is within 2,5% after
0,03 s

We will only ramp this anyway! We don't need step response

Tested the PWM filter on the shopbot and it has a resistance in the input

10,5 v in
1 k ohm break
20 k ohm bleed
21 tot
10 V in middle of V divider (could be slightly higher to ensure max?)

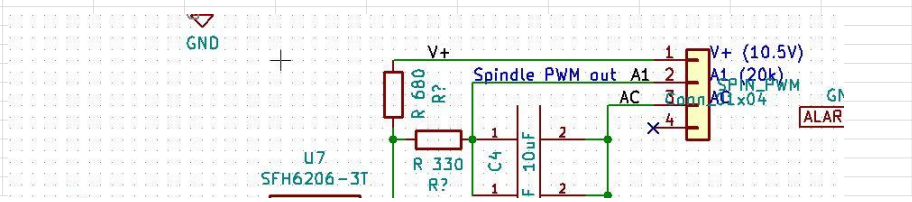
the bleed can't be the same as the break. an

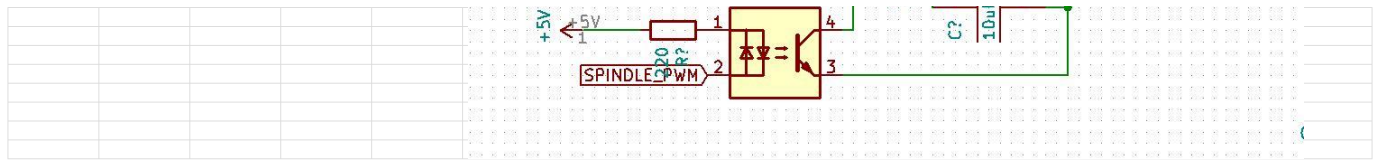
do i have to use the optocoupler in the active state?

Fill res = bleed res

case 1 case 2
b exist no a a exist no b

10,5 v in
680 ohm source throttle
220 ohm filter break 10,15837321 "Charging voltage"
20 k ohm in signal is 10,04784689 peak v at sensor
20900 tot R when full cap
900 R to charge cap
15,44117647 mA Burn at open transistor





bed	x	1.493E+07 mm ³	14930000	11,1975				
	y	1.541E+07 mm ³	15410000	11,5575				
	rest no legs	1.434E+08 mm ³	143400000	107,55	130,305			
	just the spoilboard	5.578E+07 mm ³	55780000	41,835	88,47	without spoilboard		
					kg/mm ³	mm ³		
gantry no feet	6.689E+06 mm ³	2,700 kg/m³		2700	0,0000027	6689000	18,0603	
	8mm	8mm - 6kg	per m ²					
	8000000	6	0,00000075	kg/mm ³				
6.847E+05 mm	647000	1,7469						
Weight humphrey parts								
Torison box	130 kg	(no legs)	19 mm standard spoilboard					
Gantry	25,0 kg		with feet and motors					
X-carriage with	16,6 kg		and motors					
3,25 spindle								
Vfd 1,5 kg								
						7.062E+07 mm ³	70620000	52,965
X carriage	14,8 kg							
Vikt 1,77kg stepper motor plus motor plate o spacers								
16,6 kg tot weight x carriage								
X plate 1,22kg								
Z axis 1,7 kg								
Weight humphrey parts								
Torison box	130 kg	(no legs)	19 mm standard spoilboard					
Gantry	25,0 kg		with feet and motors					
X-carriage with	16,6 kg		and motors					
Weight humphrey:								
Torsion box	88 kg							
19 mm Spoilboard	42 kg							
Gantry	25 kg							
Carriage	9 kg							
Spindle (2,2kW)	3 kg							
kg/mm ³	0,0000027							
x								
7.461E+05 mm	2,01447							
z								
5.590E+05 mm	1,5093							

z-axis									
4.565E+05 mm	1,23255								
motors									
2 of	1,77								
	1,77								
	8,29632								
Weight humphrey:									
Torsion box	106 kg		no y-rails						
Gantry	25 kg								
Carriage	9 kg								
Total:	141 kg								

Description	Issue	Prio	Status	Comment			
What to add/change on shopbot version of card				Make list?			
Can new card be new generic?				Complete and check diff, then decide			
I can not remember if the sensors are NC or NO. But isnt that easy to change in GRBL firmware anyway?	lim switches			Check schematic			lim switch
Missing diode components							
Need more connectors!							

Interesting suggestion! I really like the idea of using the IDC to save time connecting things and I think you have a smart cable layout.

""Some wire calculations""

Your link says IDC 16pin 1.27mm pitch ""0.127mm"" cable, this is not correct. The 0.127mm is the diameter of each copper strand in each wire. The copper cross section diameter of the linked ribbon cable is 0.081mm² (correct for AWG28).

(I found that using the AWG values are the best way to get the actual mm² copper in the wire, they are exactly what you get if you add up the 7 * Ø0.127mm copper strands areas. The conductor diameter is also misleading since its all between the strands, so I suggest we stick to the AWG values.)

I see that the total copper area when using 4 of AWG28 wires for each polarity is 0.32 mm², this can be compared to the single AWG20 (rainbow ribbon) we used before, it has 0.52mm². So even using 8 of the 16 wires for power delivery gets us to 63% of the copper area we had with the rainbow cables.

Funnily enough it might not matter so much. The stepper driver chops the voltage until it gets the current it wants through the motor coils, so it will not ""notice"" the resistance in the wires. As long as the wires don't heat up too much or we choose a too small power supply it might be just fine using those wires. Regarding wire heating, they power wires are on the sides, that's good, and it's 3W of heat in total over a 1 meter ribbon and that sounds like very little.

However, I would like to raise an alternative for it to be evaluated against.

8pin Ribbon and IDC connector

<https://www.farnell.com/datasheets/1812108/a100cncpwrk4-8-2-54mm-8pin/182215231>

<https://www.farnell.com/datasheets/1001000/cable-8-way-30-5m-cncpwrk4-8-2-54mm-8pin/1001000>

2 power wire straight from PSU

2 power wire