

# Bill of Materials for Smart Stepper driven Hangprinter v3

Notes:

Last updated on Sep 22 2020.

This document is supposed to be as complete and up to date as possible.

Open an issue against the hangprinter docs if something is missing: <https://gitlab.com/tobben/hangprinter-org/-/issues/new>

Linked example parts give me (tobben) a small kickback if you buy.

Stls are here: [https://gitlab.com/tobben/hangprinter/tree/OpenSCAD\\_version\\_3/openscad\\_stl](https://gitlab.com/tobben/hangprinter/tree/OpenSCAD_version_3/openscad_stl)

Layout pdf here: [https://gitlab.com/tobben/hangprinter/blob/OpenSCAD\\_version\\_3/layout\\_a4.pdf](https://gitlab.com/tobben/hangprinter/blob/OpenSCAD_version_3/layout_a4.pdf)

Build manual: <http://hangprinter.org/doc/v3>

Usage:

Make a copy of this spreadsheet and start editing on your own.

Download button in top right corner lets you download all at once.

To download single stl file: Click it, then find the button who says "open raw". Right click that and choose "Save as".

Printed parts	Qty per printer	Comment
Beam Slider ABC	3	End points for ABC-lines
Beam Slider D	3	End points for D-lines
Corner Clamp	3	
Extruder Holder	1	May get hot. Use heat resistant plastic.
Lineroller ABC Winch	3	
Lineroller D	3	
Lineroller Anchor template	2	The stl contains 2. Print lineroller_anchor_template.stl once.
Lineroller Anchor	6	The stl contains 2. Print lineroller_anchor.stl 3 times per printer.
Motor Bracket	4	May get hot. Use heat resistant plastic.
Motor Gear	4	
Spool	4	
Spool Gear	4	
Spacer	4	
Spool Core	4	
Cable Clamp	12	Give or take a few
Layout	1	2d-printed part
Mechaduino standoff	32	May get hot. Use heat resistant plastic.

Vitamins	Qty per printer	Comment	Example part	Ebay/Amazon search example
Nema17 steppers	5	> 40 N/cm holding torque, flat shaft. Reduce to 4 per printer if other motor used for extruder.	<a href="#">ebay</a>	Nema17 Stepper Motor 40Ncm
FireLine 0.5 mm	60 m	0.39 mm also works. It makes a big difference how long you cut the lines. See <a href="http://forums.reprap.org">http://forums.reprap.org</a>	<a href="#">ebay</a>	Berkley Fireline Fused
MDF or plywood sheet	50x50 cm	Thickness 10-14 mm		
Arduino Mega	1		<a href="#">ebay</a>	Arduino Mega 2560
RAMPS	1			RAMPS
Stepstick driver	1	For extruder motor		
USB cable, type B plug	1			
40 cm rectangular/square beams	3	Widths from 12.5 mm to 17.5 mm supported, 15 mm recommended		15x15x500mm Carbon Fiber Square Tube
27.5 cm rectangular/square beam	1			15x15x500mm Carbon Fiber Square Tube
Power supply	1	12 V, 12.5 A or higher recommended		Power Supply 12V
Zipties	18	Widths between 4 and 5 mm recommended		
M3 screws, length 5 mm	16			
M3 screws, length 12 mm	12			
M3 screws, length 45 mm?	16	Ca 1 cm longer than your motor body height. For mounting Mechaduino PCB on motor rear.		
M3/M4 screws, length 14 - 20 mm	4	For attaching PSU to sheet		
608 bearings	8		<a href="#">ebay</a>	608 Ball Bearings
623 V-groove bearings	12		<a href="#">ebay</a>	V623 3x12x4mm Bearings V groove
PTFE tube	10 cm	Standard bowden, 4 mm outer dia, any inner dia		Teflon Tube Bowden Reprap 2x4mm PTFE
Self tapping wood screws ca M3x10	ca 90	M[2.5-4.5]x10, head diameter 8-14 mm, non-countersunk. For fastening to ceiling plate	<a href="#">ebay</a>	
Self tapping wood screws M4x45	4	For fastening spool core.	<a href="#">ebay</a>	
Self tapping wood screws M2x[6-14]	4	Head diameter ca 4 mm. For mounting Mega onto sheet material.	<a href="#">ebay</a>	
Self tapping wood screws M3x10	18	Head diameter 7 mm, length 10 mm. Countersunk head. For attaching linerollers on ABC anchors.		
M6 or M8 washers	4	For capping 608 bearings in place on top of spool core		
15-lead ribbon wire	5 m	Or 30-lead 28AWF with quadrupled wires to/from the heater element.	<a href="#">ebay</a>	30 Way Flat Ribbon Cable Wire 28 AWG
M3 Nuts	12			

Extruder + hot end	1	Any setup that fits Nema17 mount will work	
Red and black power cable	ca 2.5 m	For connecting 12 V to RAMPS and Mechaduinos	
Smart Stepper PCB	4	Mechaduino versions 0.2 and 0.1 are also ok.	
Jumper cables	ca 50	7 colors is enough to color-code everything	<a href="#">ebay</a>
5V regulator	1	For powering Mechaduino directly from PSU. Recommended for reliable long term operation.	
5V->3V3 level converter	1	For i2c RAMPS->SmartStepper. Small breadboard handy for connecting this.	<a href="#">ebay</a>

## Preparing a wiring loom

If you want to prepare a wiring loom, these are some suggested wire lengths and connectors. They assume you lay out your electronics like shown [here](#)

You find a corresponding layout\_a4 pdf [here](#)

You also need to solder pins to the Mechaduino's D0, D1, 20, 21, V+, GND, 5V, and 3V3 connectors.

This guide also doesn't include a wire for 5V power to the Mechaduino. Instead it assumes you've soldered a 5V regulator (for example a L7805CV or R-78E5.0-0.5)

The wiring diagram should be at the bottom of the assembly manual linked above. A direct link to the wiring diagram is provided [here](#)

Same color means same signal, but not necessarily same voltage, since i2c signal is converted between 3V3 and 5V.

		A step/dir	
female	51 cm	male	-----
female	51 cm	male	-----
		B step/dir	
female	40 cm	male	-----
female	40 cm	male	-----
		C step/dir	
female	43 cm	male	-----
female	43 cm	male	-----
		D step/dir	
female	68 cm	male	-----
female	68 cm	male	-----
		3V3 side of A i2c	
female	40 cm	male	-----
female	40 cm	male	-----
		3V3 side of B i2c	
female	33 cm	male	-----
female	33 cm	male	-----
		3V3 side of C i2c	
female	31 cm	male	-----
female	31 cm	male	-----
		3V3 side of D i2c	
female	57 cm	male	-----
female	57 cm	male	-----
		5V side of i2c	
female	12 cm	male	-----
female	12 cm	male	-----
		3V3 reference (drawn from B-motor to i2c level shifter breadboard)	
female	33 cm	male	-----
		GND reference (drawn from B-motor to i2c level shifter breadboard)	

	female	33 cm	male	-----			
		5V reference (drawn from RAMPS to i2c level shifter breadboard)					
	female	12 cm	male	-----			
		GND reference (drawn from RAMPS to i2c level shifter breadboard)					
	female	12 cm	male	-----			
		12V to motor A					
	cable shoe	55 cm	stripped				
	cable shoe	55 cm	stripped				
		12V to motor B					
	cable shoe	36 cm	stripped				
	cable shoe	36 cm	stripped				
		12V to motor C					
	cable shoe	43 cm	stripped				
	cable shoe	43 cm	stripped				
		12V to motor D					
	cable shoe	63 cm	stripped				
	cable shoe	63 cm	stripped				
		12V to motor RAMPS					
	cable shoe	12 cm	stripped				
	cable shoe	12 cm	stripped				
	RAMPS side	Effector cables. Length depends on anchor placement.	Effector side. These might not be correct for you. Check your extruder connectors before crimping.				
	female	E-motor wire 1B	female				
	female	E-motor wire 1A	female				
	female	E-motor wire 2A	female				
	female	E-motor wire 2B	female				
	female	Thermistor wire 1	male	-----			
	female	Thermistor wire 2	male	-----			
	stripped	Hot end fan 12V	male	-----			
	stripped	Hot end fan GND	male	-----			
	stripped	Heater cartridge wire 1. This needs to be very thick.	Solder/cable shoe				
	stripped	Heater cartridge wire 2. This needs to be very thick.	Solder/cable shoe				
	Note:	You probably want some extra wires for optionally adding a print fan and bed leveling sensor later.					
	Note:	Wrap your effector cables in something heat resistant and insulate your heater block. This helps prevent shorts caused by hot ends melting cables.					