

BOM

Lily 'F' delta printer (formerly HXM), build with mechanical
Complementary Bill Of Material, parts needed in extra c
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Screw length are given for wood panel thickness of 18mm
Note that screw length is cylindrical length only for hex,
countersunk head screws

In some cases, you shall either make a recess in the pa

Part	Qty
Fan Sunon Maglev 25x25x10, 5V, 5m3/h	2
Low forward voltage diode, SB340	2
Cable dupont 4 pins M/F	1
Molex female connector , 2 pins	1
Molex female connector , 2 pins	1
Molex male connector, 3 pins	1
Male/female junction with 100mm wires, JST	2
Eyed insulated terminal	2
'Bootlace' Ferrules , small size	8
Wire pair , 600mm	2
JST plug pair or M/F dupont cables, 2 wires	2
Prepared cables for fan, with dupont terminals	2
Screw terminal block x 2	2
Textile sleeve 500 mm	1
Fiber gasket 20/27 (3/4") thickness 1.5mm	1
Threaded rods M4, length 1m	2
Threaded rods M3, length 1m	2
Nuts M5	24
Washer M5, small	24
Screw M4x80, countersunk head	3
Screw M4x50 domed head	6
Screw M4x30	6
Screw M4x30	2
Screw M4x30	2
Washer M4, small	3
Washer M4, large	
Screw M3x40, flat head	12
Screw M3x30, flat/hex head	3
Screw M3x25, countersunk head	3
Screw M3x15,flat head	4
Screw M3x12 domed head	6
spacer 10~15mm (cut aluminium tube)	4

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Part	Qty
Nuts M3	salvage
Washers M3, Medium	25
Extruder bolts and nuts	
Screw M3x35, countersunk head	3
Bolt M3x40	2
Screw M3x25, hex head	1
Bolt M3x20, countersunk head	1
Bolt M3x20, countersunk head	1
Screw M3x20, countersunk head	1
Washers small M3	8
Washer medium M3	1
Stainless steel bolting for the hotend	
Bolt M3x35, countersunk head, Stainless steel	4
Washers M3, Medium, Stainless steel	10
Wood screw 4x20	
Wood screw 4x25	
Nylon wire resistance 10 kg (needed ~3m)	1
Rubber band (tube)	salvage
bowden tube	0.25m
Aluminium sheet 150x200 thk 8/10	1
Buildtak diameter 203mm	1
Options	
fan 40x40x7, 5V	1
DC/DC 24 to 12V supply, for independent supply	1
DC/DC 24 to 5V supply, for independent supply	1
Flanged bearing F623	6
High end SD card	1
Note: it may be safer to use 12V instead of 5V fans, but	
Take a lot of caution while wiring fans, 19V connection	
Consumables :	
400g of Filament	1
'Dremel' cutting disks	3
Melaminated chip boards, thickness 18mm	
Panels dimensions are linked to the size of the printer, v	
For HXM 131 (usable space Diam 170x242)	
Side panel 150 x 500	2
Back panel 340 x 500	1
Top and bottom panels 320x370	2
Extruder support plate 172x40, thickness 5mm	1
M5 and M3 rod lengths to be cutted	
Rod M3x105	3

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Part	Qty
For HXM131/500 (usable space Diam 170x242)	
Measurement stick 172mm	1
Rod M5x214	3
Rod M5x225	3
Rod M3x40	6
Rod M3x147	6
For HXM139/500	
Measurement stick 188mm	1
Rod M5x230	3
Rod M5x241	3
Rod M3x40	6
Rod M3x161	6

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cal parts of the Fisher delta.
 of the Fisher parts
 cence CERN OHL V1.2 – January 2016

1m
 flat, domed, .. head screws, but is total screw length for

inel, or use cutted screws

Usage
hotend fan + part fan
secure the fan power supply, other solution remove board LED
Prolonge 1 motor wire
5V connection on board
Connect controlled fan on board – use only 1 wire
Connect fixed fan on existing loom – could be replaced by soldering
connect effector sensor and adjustable fan on hotend side
connect effector sensor standoff. Existing not usable because insufficient clearance
connect the fans on screw terminals
Adjustable fan and effector sensor connection
Connection of the calibration sensor and of the controlled fan on Effector
Fan plugs on effector
Fan connection to 5V
Effector cables maintain
Hotend insulator
triangle, cuts 3x225, 3x214
arms 6x40, 6x147
triangle rods
Tensioner screw
bottom attach rod locks
bottom support attach to wall
Top attach motor support
Top attach extruder
Tensioner screw
Motor attach
carriage lock
tensioner bearing shaft
extruder plate attach
kinematic cylinders
Board support

Usage
d
Motor attach
Tensioner
Main gear axis
Bearing axis
Lever axis
Motor attach
1rst washer on main gear
Hotend attach
arms tension
effector maintain
filament inlet
board cover
printing surface
board cooling
to use 12V fans instead of 5V – safer
belt pulleys
To speed up transfer – could go up to 350 kB/sec
you need a DC/DC converter 19V → 12V
on 5V input will burn the board
The base material
To cut M3 rods. M5 rods are sawed
which is defined by the radius of the rod axis
switch actuation (option)

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Usage
Bottom triangle
Top triangle
Arm, short side
Arms, long side (for arms L190mm)
Bottom triangle
Top triangle
Arm, short side
Arms, long side (for arms L204mm)

Weights

Printed parts for Lily F delta Printer (c) Pierre ROUZEAU - cc BY-SA

Weights in grams, time in minutes

Part	Weight		Time (total)		Comments
Tensioner	7		60	Layer 0.3	
base support	30		240	Layer 0.3	
motor support	20		150	Layer 0.3	
carriage	15		175	Layer 0.3	
rod joint	2		20	Layer 0.3	
	74	222			
hotend support	20		85	Layer 0.25	
effector	19		48	Layer 0.3	
		39			
arm links (6)	-	8		Layer 0.3	
extruder base	16		50	Layer 0.25	
extruder lever	7		-	Layer 0.2	
pinion	4		-	Layer 0.2	
gear	8		90	Layer 0.2	gears+lever common print
		35			
Extruder plate brackets	7	7	20	Layer 0.3	
Spool support	-		-	Layer 0.3	
Axis	-			Layer 0.3	
Spool ring	-	30	-	Layer 0.3	
			90		all spool
		341			
			15.30		

Direct extruder print is only 50 min, so that same 1h and an half on printing time.

If printed on the Fisher in PETG, there is no point to print in layer 0.3, as the extruder cannot have sufficient flowrate at 80 mm/s, so you could print with layer 0.3 and reduced speed (~50mm/s) or with layers 0.25 at full speed (80 mm/s). Temperature shall be high, but you may face problems for parts with bridging or small area.

The hotend support shall absolutely be in plastic somewhat resistant to heat. PLA WILL melt.

The given times are for a hotend with long heat zone adapted for PETG printing.

Also, there is controlled cooling, which allow shorter cooling time and faster prints for some parts
For the fisher, printing time may be increased approximately by 20%

Weights Standard

Printed parts for Lily 'F' (formerly HXM) delta Printer (c) Pierre ROUZEAU - cc BY-SA

Weights in grams, time in minutes

Part	Nb	Weight		Time (total)		Comments
Tensioner	6 or 7	7		60	Layer 0.3	Part 6 for plain bearings, part 7 for flanged bearings
foot	2	12		-	Layer 0.3	
Intermediate support	3	7		145	Layer 0.3	
motor support	4	20		150	Layer 0.3	
carriage	5	15		175	Layer 0.3	
tensioner thumbwheel	8	1		5	Layer 0.3	
arm links (6)	9	2		20	Layer 0.3	
		64	192			
hotend support 1		9		-	Layer 0.3	
hotend support 2		6		38	Layer 0.3	
effector		19		48	Layer 0.3	
Duct		4		15		
			28			
Direct extruder base		10		-	Layer 0.3	
Tensioner		1		-	Layer 0.3	
extruder lever		6		-	Layer 0.25	
thumbwheel		1			Layer 0.25	
				55		
			18			
Extruder plate brackets		7	7	20	Layer 0.3	
Board supports	11	4		14	Layer 0.3	
Glass supports		8		24		
			12			
Spool support		-		-	Layer 0.3	
Axis		-			Layer 0.3	
Spool ring		-	30	-	Layer 0.3	
				90		all spool
			287			
				14.32		

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"c:\Program Files\OpenSCAD\c:\Program Files\OpenSCAD\openscad.exe' -o Lily_part3 -D part=3 dat  
"c:\Program Files\OpenSCAD\openscad" data_HXM.scad
```

a_HXM.scad