he	QUANTITY NEED	ITEM DESCRIPTION	ORDERING LINK 1	2	3	4	5		Pack Co	Usage C	Usage C
	FRAME AND AXES										
1	64 [2]	m6x18 zinc plated socket screw	https://www.mcmaster.com/#91502						7.77	5.12 [3]	8.96
	1	m6x25									
2	8 [4]	m6x30 socket screw	https://www.mcmaster.com/#90128								
3	92 [5]	m6 zinc plated nut	https://www.mcmaster.com/#90591						2.6	0.86	1.505
4	15	m3x25 SS socket head screw	https://www.mcmaster.com/91292a	http	htt	htt			7.23	0.87	1.5225
5	19' total [6]	8 mm rods	https://www.mcmaster.com/#5544t	http	htt	htt	htt	htt	14.16	14.16	24.78
6	5	nema 17, 72 oz in stepper motors [10]	https://www.ebay.com/itm/5-x-Step						40	24	42
7	22 [11]	8 mm linear bearing [12]	https://www.aliexpress.com/item/40	http	htt	htt	htt		132.11 [	7.92	13.86
8	14'4" [14]	GT2 belt, 6mm wide	https://www.aliexpress.com/item/32	http	htt				105 [15]	1.12	1.96
9	5	GT2 pulley, 5mm bore, 6mm wide, 20 teeth	https://www.aliexpress.com/item/32	http	htt	htt			89.2	1.34	2.345
10	10	m6x12x4 flanged bearing	https://www.aliexpress.com/item/32	http	htt				33.4	2	3.5
11	24	6mm x 10 mm set screws	https://www.mcmaster.com/91390a								2
12	12	1/8"x1-1/2" angle, 1' long	metal shop								
	8	m3x12 magnets									
13	**CONTROLLLER**										
14	1	RAMPS + MEGA + drivers + USB + LCD	le	http	htt	htt			556.07	23.17	40.5475
15	6 [16]	stepper motor wires	https://smile.amazon.com/UEETEK	http	htt					4.4	7.7
16	2	end stops + wires	https://www.aliexpress.com/item/32	http	htt	htt			79.26 [1	1.1	1.925
17	1	12/24V power supply	https://www.aliexpress.com/item/40	http	htt				59.4 [18	5.94	10.395
18	1	GFCI outlet	https://www.ebay.com/itm/10PK-20	http	htt				290.64 [	7.27	12.7225
19	1	SSR	https://smile.amazon.com/TinaWoo	http					6	6	
20	1	power supply plug	https://www.thehardwarecity.com/p						36.2 [20	1.2	2.1
21	1	power cord	http://www.ebay.com/itm/Lot-of-12-	http						1.42	2.485
22	1	SD card, 8 GB	https://www.aliexpress.com/item/33	http						1.8	3.15
23	1	5V power supply	https://smile.amazon.com/gp/produ						17	1.7	2.975
24	4 feet [21]	**split wire loom, 1/2" flame retardant**	https://www.cablesmanager.com/w	http	htt	htt					
25	3 feet	22 ga wire, 3' extension for fans	https://www.amazon.com/NavePoi	http	htt	htt			158 [25]	0.95	1.6625
		SSR signal wire 2, dupont M-M	https://smile.amazon.com/EDGELE								
26	**HEATBED**									4	4
27	1	1/8" bed plate, 8"x8"	Sweiger Shop							2	2
28		16 ga steel base, 8"x8"							5		
29		heated bed - 16 ga steel - 2"x30.5" - bend it							3		
30	12'	nichrome wire, 26 ga [26]	https://www.amazon.com/gp/produ	http							
31	13'	fiberglass sleeve	https://www.mcmaster.com/7324t1	http							
32	1	PEI surface, 8"x8"	https://www.mcmaster.com/#8685k	http					49.59	4	4
33		2-sided tape (double sided tape)	https://smile.amazon.com/gp/produ	http	htt	htt			3	2.02	2.02
34	1	elongated nut for holding bed plate - 1/4"	https://www.mcmaster.com/93355a						0.5		
35	1	m6x50socket screw [31]	https://www.mcmaster.com/90128a						0.25		
36	3	1/4" washers	https://www.mcmaster.com/92141a						0.25		
37	24"	200C wire, 18 ga	https://www.ebay.com/itm/18-AWG	http					1.2		
38		rock wool	https://www.menards.com/main/bu						0.25		
39		lever nut	https://smile.amazon.com/XHF201	http							0.7
40	**EXTRUDER**								18	0.54	0.54
41											
42	2	m3x35 cap head screw, heat sink	https://www.mcmaster.com/91292a						4.29 [32	0.18	0.18
43	1 [33]	m3x40 cap head screw, idler	https://www.mcmaster.com/91292a						6.32	0.06	0.06
44	1	height sensor- 5V PNP - LJ18A3-8-Z/BY-5V	https://www.aliexpress.com/item/32	http					34.2	3.42	3.42
45		2 screws for fan attachment [34]	https://www.mcmaster.com/92525a	http	htt	htt					0.08
46	1	24V 5015 print cooling blower	https://www.aliexpress.com/item/40	http	htt	htt			28.72	0.96	0.96
47	1	volcano heater block	https://www.aliexpress.com/item/32	http	htt				48.32	1.61	1.61
48	set	0.4, 0.8, and 1.2 mm volcano nozzles	https://www.aliexpress.com/item/32	http	htt				1.82	1.09	1.09
49	1	volcano heater block sock	https://www.aliexpress.com/item/32	http	htt				4.03	0.81	0.81
50	**SUPPLIES**									4	4
51	25	zip ties for wire management	https://smile.amazon.com/Nylon-C	http	htt				6	0.18	0.18
52	0.5 [36]	heat shrink [37]	http://www.ebay.com/itm/22221955	http	htt	htt				0.1	0.1
53	1	solder	https://www.amazon.com/dp/B004F							1	1
54	15	ferrules	https://smile.amazon.com/gp/produ	http	htt					0.75	0.75
~~55~~		~~MTA100 2-pin connector [38]~~	~~https://www.digikey.com/products/e~~								
~~56~~		~~MTA100 2-pin connector cover [39]~~	~~https://www.digikey.com/products/e~~								
57	2	superglue, pack of 6 tubes	https://smile.amazon.com/BAZIC-0	http							
~~58~~	~~1~~	~~capton tape~~	~~http://www.ebay.com/itm/10-Rolls-1~~								
59	1	electrical tape	https://smile.amazon.com/Nova-El								
60		black spray paint	https://www.google.com/shopping/								
61		filament sample									
62	19 unique parts	complete set of 3D Printed Parts	OSE Microfactory							75	75

63	TOOLS									4	4
64	1	5 mm hex key - main tool	https://www.wttool.com/index/page		htt						0.4
65	1	2 mm hex key [41]	https://www.wttool.com/index/page	htt					7.3	1.46	0.14
66	1	2.5 mm hex hey [42]	https://www.wttool.com/index/page	htt	htt	htt			8.49	0.85	0.4
67	1	small philips head screwdriver long bit	https://smile.amazon.com/gp/produ						7.81	0.78	0.78
68	1	3mm flathead screwdriver	https://www.toolpartspro.com/supe	htt					11.72	1.17	1.17
69	1	philips #1 driver bit	https://www.ebay.com/itm/2538453	htt					40	0.4	0.4
		philips #2	https://smile.amazon.com/gp/product								
				TO					1924.1 [	222.72	297.885

ITEM NUMBER	QUANTITY per	ITEM DESCRIPTION	SOURCE FILE	STL	PRINT TIME (min) [44]	WEIGHT (g)	NOTES
1	4	Frame Corners, plain	https://wiki.opens	https://wiki.opens		81	20% infill, 1.2 mm nozzle, 0.4 layers
2	2	left hand corners	https://wiki.opens	https://wiki.opens			
3	2	right hand corners	https://wiki.opens	https://wiki.opens			
4	4	Z axis base attachment		https://wiki.opens			
5	4	Z axis top attachment		https://wiki.opens			
6	7	One Piece Motor		https://wiki.opens			
7	4	Bed Support Carriage		https://wiki.opens			
8	1	One Piece Carriage		https://wiki.opens			
9	1	Y1 New Carriage		https://wiki.opens			
10	1	Y2 New Carriage		https://wiki.opens			
11	7	Carriage Closure		https://wiki.opens			
12	7	One Piece Idler		https://wiki.opens			
13	6	autoparallel pieces [45]		https://wiki.opens			
14	8	bedholder pieces [46]		https://wiki.opens			
15	4	1/4" spacer washer for bed [47]		https://wiki.opens			
16	1	Control Panel	https://wiki.opens	https://wiki.opens	253	130	
17	2	Wire Loom Clip	https://wiki.opens	https://wiki.opens			
18	2	Spool Holders		https://wiki.opens	10	4	
		Needs new rod holder [48]					
19	1	Extruder Main	https://wiki.opens	https://wiki.opens			
20	1	Exturder Secondary	https://wiki.opens	https://wiki.opens			
21	1	Extruder Idler	https://wiki.opens	https://wiki.opens			
22	7	Belt Cylinder		https://wiki.opens			
23	7	Belt Clamp		https://wiki.opens			

		HARDWARE BAG [49]	WEIGHT	TOTAL WEIGHT
1	8 autoparallel, 1 probe, 2 endstops, 4 bed clamps, 5 idlers, 4 wire clamps, 1 panel = 25 tot [50]	m6x18 zinc plated socket screw		
	1 extruder	m6x25		
2	16 - 4 for mounting each axis [51]	m6x30 socket screw		
3	8 - y axis mount, 1 sensor, 5 idlers, 24 corners = 38 tot	m6 zinc plated nut		
4	1	m6x50socket screw [52]		
5	20 axes, 2 spool holder, 4 z axis attach, 24 corners = 50 tot	6 mm x 10 mm set screws		
6	15	m3x25 SS socket head screw	21	
10	5	GT2 pulley, 5mm bore, 6mm wide, 20 teeth		
11	22 [53]	8 mm linear bearing [54]		
12	10	m6x12x4 flanged bearing		
13	1 [55]	lever nut		
14	1	5 mm, 2.5 mm, 2 mm hex keys		
15	1	3 mm flathead screwdriver - **only one?**		
16	1	philips #1 driver bit		
17	1	crazy glue for magnets for bed		
18	**25**	zip ties for wire management	6	
19	set	0.4, 0.8, and 1.2 mm nozzles		
20	1	volcano heater block sock		
21	1	volcano heater block. 24V heater if needed		
22	1	5V power supply		
23	2	end stops		
24	1	plug with small wires + 200C wire for power supply		
25	1	SSR with signal wire		
26	14'	nichrome wire, 26 ga [56]		
27	14'4" [57]	GT2 belt, 6mm wide		
		64 3D PRINTED PARTS [58]		
28	see last page			
		FLAT AND HEAVY MATERIALS		
48	**1**	bed box with insulation, top plate, PEI		
49	19' total [59]	8 mm rods		
50	12	1/8"x1-1/2" angle, 10" long		
51	1	filament sample		
52	5 [60]	stepper motors [61]		
		UNIVERSAL GEARLESS EXTRUDER [62]		
		ELECTRONICS AND WIRE BUNDLES [63]		
53	[2] 18"	200C wire		
54	5'	1/8" of fiberglass sleeve		
55	10" and 48"	1/4" fiberglass sleeve		
56	1	GFCI outlet with cord		
57	2	end stop wires		
58	5 [64]	stepper motor wires		
59	1	USB cord		
61	**4 feet**	split wire loom - VERIFY		
62	1	24V 5015 print cooling blower		
63	1	height sensor- 5V PNP - LJ18A3-8-Z/BY-5V		
		CONTROLLER		
64	1	RAMPS + MEGA + drivers		
65	1	LCD with wires and SD card		
66	1	Power Supply with power wire to RAMPS		
				total: 38 LB 7.4 OZ

he	QUANTITY NEED	ITEM DESCRIPTION	ORDERING LINK 1	2	3	4	5	Pack Co	Usage C	Usage C
	FRAME AND AXES									
1	60 [66]	m6x18 zinc plated socket screw	https://www.mcmaster.com/#91502					7.77	5.12 [67	8.96
2	8 [68]	m6x30 socket screw	https://www.mcmaster.com/#90128							
3	92 [69]	m6 zinc plated nut	https://www.mcmaster.com/#90591					2.6	0.86	1.505
4	15	m3x25 SS socket head screw	https://www.mcmaster.com/91292a	http	http	htt		7.23	0.87	1.5225
5	6 [70]	8 mm rods	https://www.mcmaster.com/#5544	http	http			14.16	14.16	24.78
6	5	nema 17, 72 oz in stepper motors [71]	https://www.ebay.com/itm/5-x-Step					40	24	42
7	22 [72]	8 mm linear bearing [73]	https://www.aliexpress.com/item/40	http	http	htt	htt	132.11 [	7.92	13.86
8	14'4" [75]	GT2 belt, 6mm wide	https://www.aliexpress.com/item/32	http	http			105 [76]	1.12	1.96
9	5	GT2 pulley, 5mm bore, 6mm wide, 20 teeth	https://www.aliexpress.com/item/32	http	http	htt		89.2	1.34	2.345
10	10	m6x12x4 flanged bearing	https://www.aliexpress.com/item/32	http	http			33.4	2	3.5
11	24	6mm x 10 mm set screws	https://www.mcmaster.com/91390a							2
12	12	1/8"x1-1/2" angle, 1' long	metal shop							
13	**CONTROLLLER**									
14	1	RAMPS + MEGA + drivers + USB + LCD	https://www.aliexpress.com/item/40	http	http	htt		556.07	23.17	40.5475
15	6 [77]	stepper motor wires	https://smile.amazon.com/UEETEK	http	http				4.4	7.7
16	2	end stops + wires	https://www.aliexpress.com/item/32	http	http	htt		79.26 [7	1.1	1.925
17	1	12/24V power supply	https://www.aliexpress.com/item/40	http	http			59.4 [79	5.94	10.395
18	1	GFCI outlet	https://www.ebay.com/itm/10PK-20	http	http			290.64 [	7.27	12.7225
19	1	SSR	https://smile.amazon.com/TinaWoo	http				6		
20	1	power supply plug	https://www.thehardwarecity.com/p					36.2 [81	1.2	2.1
21	1	power cord	http://www.ebay.com/itm/Lot-of-12-	http					1.42	2.485
22	1	SD card, 8 GB	https://www.aliexpress.com/item/33	http					1.8	3.15
23	1	5V power supply	https://smile.amazon.com/gp/produ					17	1.7	2.975
24	4 feet [82]	split wire loom	https://www.delcity.net/store/1/2"-U							
25	3 feet	22 ga wire, 3' extension for fans	https://www.amazon.com/NavePoi	http	http			158 [86]	0.95	1.6625
26	**HEATBED**								4	4
27	1	1/8" bed plate, 8"x8"	Sweiger Shop						2	2
28		16 ga steel base, 8"x8"						5		
29		heated bed - 16 ga steel - 2"x30.5" - bend it						3		
30	12'	nichrome wire, 26 ga [87]	https://www.amazon.com/gp/produ	http						
31	13'	fiberglass sleeve	https://www.mcmaster.com/7324t1							
32	1	PEI surface, 8"x8"	https://www.mcmaster.com/#8685k	http				49.59	4	4
33		2-sided tape (double sided tape)	https://smile.amazon.com/gp/produ	http	http			3	2.02	2.02
34	3	elongated nut for holding bed plate - 1/4"	https://www.mcmaster.com/93355a					0.5		
35	1	m6x50socket screw [91]	https://www.mcmaster.com/90128a					0.25		
36	3	1/4" washers	https://www.mcmaster.com/92141a					0.25		
37	24"	200C wire	https://www.ebay.com/itm/16-AWG					1.2		
38		rock wool	https://www.menards.com/main/bu					0.25		
39		lever nut	https://smile.amazon.com/gp/produ							0.7
40	**EXTRUDER**							18	0.54	0.54
41		Titan Aero 24V Extruder, 3mm								
42	2	m3x35 cap head screw, heat sink	https://www.mcmaster.com/91292a					4.29 [92	0.18	0.18
43	1 [93]	m3x40 cap head screw, idler	https://www.mcmaster.com/91292a					6.32	0.06	0.06
44	1	height sensor- 5V PNP - LJ18A3-8-Z/BY-5V	https://www.aliexpress.com/item/32	http				34.2	3.42	3.42
45		2 screws for fan attachment [94]	https://www.mcmaster.com/92525a	http	http	htt				0.08
46	1	24V 5015 print cooling blower	https://www.aliexpress.com/item/40	http	http	htt		28.72	0.96	0.96
47	1	volcano heater block	https://www.aliexpress.com/item/32	http	http			48.32	1.61	1.61
48	set	0.4, 0.8, and 1.2 mm volcano nozzles	https://www.aliexpress.com/item/32	http				1.82	1.09	1.09
49	1	volcano heater block sock	https://www.aliexpress.com/item/32	http	http			4.03	0.81	0.81
50	**SUPPLIES**								4	4
51	25	zip ties for wire management	https://smile.amazon.com/Nylon-C	http	http			6	0.18	0.18
52	0.5 [96]	heat shrink [97]	http://www.ebay.com/itm/22221955	http	http	htt			0.1	0.1
53	1	solder	https://www.amazon.com/dp/B004						1	1
54	15	ferrules	https://smile.amazon.com/gp/produ						0.75	0.75
~~55~~		~~MTA100 2-pin connector [98]~~	~~https://www.digikey.com/products/e~~							
~~56~~		~~MTA100 2-pin connector cover [99]~~	~~https://www.digikey.com/products/e~~							
57	2	superglue, pack of 6 tubes	https://smile.amazon.com/BAZIC-0	http						
~~58~~	~~1~~	~~capton tape~~	~~http://www.ebay.com/itm/10-Rolls-1~~							
59	1	electrical tape	https://smile.amazon.com/Nova-El							
60		black spray paint	https://www.google.com/shopping/							
61		filament sample								
62	19 unique parts	complete set of 3D Printed Parts	OSE Microfactory						50	50
63	**TOOLS**								4	4

64	1	5 mm hex key - main tool	https://www.wttool.com/index/page		htt					0.2
65	1	2 mm hex key	https://www.wttool.com/index/page	htt				7.3	1.46	1.46
66	1	2.5 mm hex hey [101]	https://www.wttool.com/index/page	htt	htt	htt		8.49	0.85	0.85
67	1	small philips head screwdriver long bit	https://smile.amazon.com/gp/produ					7.81	0.78	0.78
68	1	3mm flathead screwdriver	https://smile.amazon.com/gp/produ					11.72	1.17	1.17
69	1	philips #1 driver bit	https://www.ebay.com/itm/2538453	htt				40	0.4	0.4
		philips #2	https://smile.amazon.com/gp/product							
				TO				**1924.1 [**	**191.72**	**274.455**

he	QUANTITY I	ITEM DESCRIPTION			
	FRAME AND AXES			**SUPPLIES**	
1	60 [103]	m6x18 zinc plated socket screw	48	25	zip ties for wire management
2	8 [104]	m6x30 socket screw	49	0.5 [10	heat shrink [106]
3	68	m6 zinc plated nut	50	1	solder
4	15	m3x25 SS socket head screw	51	15	ferrules
5	6 [107]	8 mm rods	52		MTA100 2-pin connector [108]
6	5	nema 17, 72 oz in stepper motors [109]	53		MTA100 2-pin connector cover [110]
7	22 [111]	8 mm linear bearing [112]	54	2	superglue, pack of 6 tubes
8	14 feet [113	GT2 belt, 6mm wide	55	1	capton tape
9	5	GT2 pulley, 5mm bore, 6mm wide, 20 teeth	56	1	electrical tape
10	10	m6x12x4 flanged bearing	57		black spray paint
11	24	6mm x 10 mm set screws	58		filament sample
12	12	1/8"x1-1/2" angle, 1' long	59	19 uniq	complete set of 3D Printed Parts
13	**CONTROLLLER**			**TOOLS**	
14	1	RAMPS + MEGA + drivers + USB + LCD	60	1	5 mm hex key - main tool
15	6 [114]	stepper motor wires	61	1	2 mm hex key
16	2	end stops + wires	62	1	2.5 mm hex hey [115]
17	1	12/24V power supply	63	1	small philips head screwdriver
18	1	GFCI outlet	64	1	small flathead screwdriver
19	1	SSR	65	1	philips driver bit
20	1	power supply plug		**PRINTED PARTS**	
21	1	power cord	1	4	Frame Corners, plain
22	1	SD card, 8 GB	2	2	left hand corners
23	1	5V power supply	3	2	right hand corners
24	4 feet [116]	split wire loom	4	7	Motor Piece
25	3 feet	22 ga wire, 3' extension for fans	5	2	Z Motor Piece with bracket
	HEATBED		6	2	Z Idler piece with bracket
26	1	1/8" bed plate, 8"x8"	7	5	Carriage
27		16 ga steel base, 8"x8"	8	1	Half Carriage
28		heated bed - 16 ga steel - 2"x30.5" - bend it	9	1	Carriage-integrated Extruder Mount
29	12'	nichrome wire	10	12	Universal Axis idler piece
30	13'	fiberglass sleeve	11	1	Y to X motor piece
31	1	PEI surface, 8"x8"	12	1	Y to X parallel piece
32		2-sided tape (double sided tape)	13	2	bed holders
33	3	elongated nut for holding bed plate - 1/4"	14	10	10 Belt Pegs
34	1	m6x50socket screw [117]	15	2	Wire Loom Clip
35	3	1/4" washers	16	1	Control Panel
36	24"	200C wire	17	1	Sensor Holder
37		rock wool	18	2	Endstops
38		lever nut	19	2	Spool Holders
	EXTRUDER				
39		Titan Aero 24V Extruder, 3mm			
40	2	m3x35 cap head screw, heat sink			
41	1 [118]	m3x40 cap head screw, idler			
42	1	height sensor- 5V PNP - LJ18A3-8-Z/BY-5V			
43		2 screws for fan attachment [119]			
44	1	24V 5015 print cooling blower			
45	1	volcano heater block			
46	set	0.4, 0.8, and 1.2 mm volcano nozzles			
47	1	volcano heater block sock			

#	QUANTITY	D3D PRO CUT AND PREP LIST
		MATERIALS
1	13", 5-14", 6-17.5" [12	cut 8 mm rods
2	12 pieces	cut angle, 1.5"x2" - 10" long [121]
3	1 set	cut bed plate steel
4	6"x6"	cut PEI surface, glue on to bed plate [122]
5	3 feet, 1 feet	cut split wire loom
6	1/8" - [7]; 1/4" - 1 [123]	heat shrink [124]
7	1	heater sock - cut off tip
		WIRING
8		get soldering iron, solder, ferrules, crimp tool, strippers, sidecutter
9	1	height sensor- tin, solder, heat-shrink triple connector of endstop
10	1	power cord - cut end, tin 3 wires, attach to GFCI
11	[4] 3' - [2] 10" - [2] 6"	cut 22 ga wire
12	[2]	attach double Dupont to ferrule - for SSR signal wire 1
13	[2] 8" or 10"	prepare M-F Dupont signal wire to SSR
14	1	24V 4040 fan - put ferrules on ends of wire
15	1	24V 5015 blower - cut and extend - solder + heatshrink + ferrule
16	2 [125]	ferrule up 2 power supply wires (from PS to RAMPS)
17	[2] 6", [1] 12", [2] 24"	cut 200C wire
18	2	tin both ends of plug wire, solder to 200C wire, assemble plug
19	5'	cut 1/8" of fiberglass sleeve
20	10" and 48"	cut 1/4" fiberglass sleeve
21	12'	cut ga 26 nichrome and wrap on spool
22	[2]	electric fence wire, 4"
23		solder fence wire to 200C wire
	1	**EXTRUDER**
24	2	add ferrules to fan wire extension
25	1	heater block substitution
26	1	heater sock substitution
27	set	1.2 mm nozzles substitiution
28	1	40W 24V heater element if needed
		ELECTRONICS
29		pull 2 mm, 2.5 mmhex key, small Philips, 3 mm flathead
30		use philips #2 driver bit to take off shock absorbers from motors
31	[126]	attach power plug to GFCI outlet
32		assemble RAMPS (24V mod) + MEGA + drivers + LCD + SD
33		attach USB cable to USB power supply and power up Mega
34		power the power supply with secondary plug [127]
35	[128]	connect nema 17, 72 oz in stepper motors with stepper wires [129]
		ELECTRONICS TEST
36		note that fan runs, screen turns on, 2 thermistors are reading Ts
37		turn on blower by printing a dummy file then turning on blower
38		turn on SSR
39		prepare->home axes - test end stops and motors this way
40		test z probe
41		Test extruder. Measure pull strength of filament. 5 lb+ goal.

he	QUANTITY	ITEM DESCRIPTION	
		HARDWARE AND TOOL BAG [130]	**WEIGHT**
1	64 [131]	m6x18 zinc plated socket screw	
2	1 [132]	m6x25 zinc plated socket screw	
3	34	m6 zinc plated nut	
4	12	m3x25 SS socket head screw	
5	12	3x12mm N52 magnets [133]	
6	19	1-1/4" screws [134]	
7	3	GT2 pulley	
8	12	8 mm linear bearing [135]	
9	6	m6x12x4 flanged bearing	
10	2 [136]	608 ZZ skate bearings	
11	1	5 mm, 2.5 mm, 2 mm hex keys	
12	1	3 mm flathead screwdriver - **only one?**	
13	1	crazy glue for magnets to carriage	
14	**25**	zip ties for wire management	
15	set	0.4, 0.8, and 1.2 mm nozzles	
		FLAT MATERIALS	
16	**6"x6"**	spring steel	
17	1	bed plate, 6"x6"	
18	**6"x6"**	Buildtak surface [137]	
19	1	black contact paper	
20	6 [138]	rods	
21	**3 [139]**	**STEPPER MOTORS [140]**	
		3D PRINTED PARTS [141]	
		ELECTRONICS AND WIRE BUNDLES [142	
34	1	GFCI outlet with cord	
35	2	22 ga ferruled wire from Power Supply to RA	
36	2	end stops + wires	
37	4 [143]	stepper motor wires	
38	1	plug with small wires for power supply	
39	1	5V power supply + USB cord	
40	7 feet [144]	GT2 belt, 6mm wide	
41	**3 feet**	split wire loom	
42	1	filament sample	
43		**CIRCUIT BOARDS - Power Supply, RAMP**	
44		**FULL EXTRUDER WITH WIRING BUNDLE**	
	FRAME AND AXES		
		1/8" sleeve	
		1/4" sleeve	
	[2]	4" fence wire	
	[8]	magnets	
2	8 [147]	m6x30 socket screw	
3	68 [148]	m6 zinc plated nut	
4	15	m3x25 SS socket head screw	
5	6 [149]	8 mm rods	
6	5	nema 17, 72 oz in stepper motors [150]	
7	22 [151]	8 mm linear bearing [152]	
8	14'4" [153	GT2 belt, 6mm wide	
9	5	GT2 pulley, 5mm bore, 6mm wide, 20 teeth	
10	10	m6x12x4 flanged bearing	
11	24	6mm x 10 mm set screws	

12	12	1/8"x1-1/2" angle, 1' long	
13	**CONTROLLLER**		
14	1	RAMPS + MEGA + drivers + USB + LCD	
15	6 [154]	stepper motor wires	
16	2	end stops + wires	
17	1	12/24V power supply	
18	1	GFCI outlet	
19	1	SSR	
20	1	power supply plug	
21	1	power cord	
22	1	SD card, 8 GB	
23	1	5V power supply	
24	4 feet [15	split wire loom	
25	3 feet	22 ga wire, 3' extension for fans	
26	**HEATBE**		
27	1	1/8" bed plate, 8"x8"	
28		16 ga steel base, 8"x8"	
29		heated bed - 16 ga steel - 2"x30.5" - bend it	
30	12'	nichrome wire, 26 ga [156]	
31	13'	fiberglass sleeve	
32	1	PEI surface, 8"x8"	
33		2-sided tape (double sided tape)	
34	3	elongated nut for holding bed plate - 1/4"	
35	1	m6x50socket screw [157]	
36	3	1/4" washers	
37	24"	200C wire	
38		rock wool	
39		lever nut	
40	**EXTRUD**		
41		Titan Aero 24V Extruder, 3mm	
42	2	m3x35 cap head screw, heat sink	
43	1 [158]	m3x40 cap head screw, idler	
44	1	height sensor- 5V PNP - LJ18A3-8-Z/BY-5V	
45		2 screws for fan attachment [159]	
46	1	24V 5015 print cooling blower	
47	1	volcano heater block	
48	set	0.4, 0.8, and 1.2 mm volcano nozzles	
49	1	volcano heater block sock	
50	**SUPPLIE**		
51	25	zip ties for wire management	
52	0.5 [160]	heat shrink [161]	
53	1	solder	
54	15	ferrules	
57	2	superglue, pack of 6 tubes	
~~58~~	~~1~~	~~capton tape~~	
59	1	electrical tape	
60			
61		filament sample	
62	19 unique	complete set of 3D Printed Parts	
63	**TOOLS**		
64	1	5 mm hex key - main tool	
65	1	2 mm hex key	
66	1	2.5 mm hex hey [162]	

67	1	small philips head screwdriver long bit	
68	1	3mm flathead screwdriver	
69	1	philips #1 driver bit	
70	1	philips #2	
		[163]	

[1] Includes 1.75 the cost for the first 20 items, which approximates cost from Amazon vs China

[2] 14 x
14 y
22 z
6 bed -
4 wire loom clip
4 bed holders

[3] 33÷50×7.77=5.12

[4] 4 y1
4 y2

[5] + 24 for frame set screws

[6]
[4] 13" verticals (but axes are really 14" for Z
[6] 17.5" X and Y
[5] 14" for spool holder and bed holder
=70+52+105

[7] 7.50 for 10' of 1018 steel

$17 for 10' of 304 stainless, 5/16" rods

[8] 5/16" 1018 is only $6.50/6 ft.

[9] Stainless is cheaper than 12L14 steel.

[10] .5 Nm = 71 oz in

[11] 5 axes + 2 auto paralleling
10 can be metal

[12] Use plastic for abrasion resistance with non-hardened steel rods.

You can use cheaper metal bearing on the Z axis, which moves slowly. Need plastic for high speed abrasion resistance or wherever large forces are present.

[13] for 200

[14] belt:
[2] 30"
[3] 37" =>

60+111 = 171"=

[15] For 200 meters or 656 feet.
Shipping remains at $2.2 with epacket.

[16] 5 if extruder comes with stepper motor and wires

[17] For 144

[18] For 10 pieces.

[19] For 40 pieces

[20] For 30

[21] 36" and 18" lengths?

Total 4'6"

[22] 1.5 cents/foot

[23] 5.5 cents/foot

[24] 4.8 cents/foot

Note that alarm wire of same gauge is much cheaper (no EMF protection) - but be careful regarding CCA vs pure copper

[25] for 500 feet

[26] Switched to 24 ga, 14', for 600W element in D3D Pro 2

[27] 6 mm and 3 mm for inner

22 cents/foot for 6 mm thick

[28] Total from Mcmaster is 1200.81 including $60 shipping.

[29] Cheaper for 8" bed to get the 10" version

[30] Looks like $60 for 60 yards of 9" tape is a major sale.

[31] for heated bed
and 2 18 mm long 6 mm

[32] Per 50

[33] 2 of 40

[34] 2.3 x 12 mm?
2.9x13 mm?

[35] Fan for D3D Simple

[36] 6" per printer

[37] for connecting probe to plug, fan to plug, and extending wires if needed

[38] can substitute with 2-pin dupont connector

[39] can substitute with 2-pin dupont connector

[40] 3 rolls only

[41] For pulleys

[42] for extruder screws + stepper motor holding screws

[43] Doesn't include McMaster-Carr shipping, tax. Includes Aliexpress ship

[44] 0.4 mm nozzle

[45] Autoparallel is used on the Y axis and 2 more pieces are used on X to prevent the idler from moving. 2 more are used for endstops

[46] The bed is supported by 2 axes. That means 4 rods - or 8 bed holder pieces.

[47] For 18" bed, we have 4 bolts holding down print surface.

[48] Rod holder for spool needs to be redone, as mount for rods gets loose over time. First assignment for Lesego?

[49] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[50] 14 x
14 y
22 z
4 bed -
4 wire loom clip
2 skew
2 sensor
2 X idler blocks

[51] 4 y1
4 y2

[52] for heated bed
and 2 18 mm long 6 mm

[53] 5 axes + 2 auto paralleling
10 can be metal

[54] Use plastic for abrasion resistance with non-hardened steel rods.

You can use cheaper metal bearing on the Z axis, which moves slowly. Need plastic for high speed abrasion resistance or wherever large forces are present.

[55] 2 for spool holder
one more is included inside extruder

[56] 14' of ga 26 for 380W 1000F

[57] belt:
[2] 30"
[3] 37" =>

60+111 = 171"=

[58] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[59]
[4] 13" verticals (but axes are really 14" for Z
[6] 17.5" X and Y
[5] 14" for spool holder and bed holder
=70+52+105

[60] including extruder

[61] .5 Nm = 71 oz in

[62] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[63] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[64] 5 if extruder comes with stepper motor and wires

[65] Includes 1.75 the cost for the first 20 items, which approximates cost from Amazon vs China

[66] 14 x
14 y
22 z
6 bed -
4 wire loom clip

[67] 33÷50×7.77=5.12

[68] 4 y1
4 y2

[69] + 24 for frame set screws

[70]
[4] 13" verticals (but axes are really 14" for Z
[6] 17.5" X and Y
[3] 14" for spool holder

[71] .5 Nm = 71 oz in

[72] 5 axes + 2 auto paralleling
10 can be metal

[73] Use plastic for abrasion resistance with non-hardened steel rods.

You can use cheaper metal bearing on the Z axis, which moves slowly. Need plastic for high speed abrasion resistance or wherever large forces are present.

[74] for 200

[75] belt:
[2] 30"
[3] 37" =>

60+111 = 171"=

[76] For 200 meters or 656 feet.
Shipping remains at $2.2 with epacket.

[77] 5 if extruder comes with stepper motor and wires

[78] For 144

[79] For 10 pieces.

[80] For 40 pieces

[81] For 30

[82] 36" and 18" lengths?

Total 4'6"

[83] 1.5 cents/foot

[84] 5.5 cents/foot

[85] 4.8 cents/foot

Note that alarm wire of same gauge is much cheaper (no EMF protection) - but be careful regarding CCA vs pure copper

[86] for 500 feet

[87] Switched to 24 ga, 14', for 600W element in D3D Pro 2

[88] Total from Mcmaster is 1200.81 including $60 shipping.

[89] Cheaper for 8" bed to get the 10" version

[90] Looks like $60 for 60 yards of 9" tape is a major sale.

[91] for heated bed
and 2 18 mm long 6 mm

[92] Per 50

[93] 2 of 40

[94] 2.3 x 12 mm?
2.9x13 mm?

[95] Fan for D3D Simple

[96] 6" per printer

[97] for connecting probe to plug, fan to plug, and extending wires if needed

[98] can substitute with 2-pin dupont connector

[99] can substitute with 2-pin dupont connector

[100] 3 rolls only

[101] for extruder screws + stepper motor holding screws

[102] Doesn't include McMaster-Carr shipping, tax. Includes Aliexpress ship

[103] 14 x
14 y
22 z
6 bed -
4 wire loom clip

[104] 4 y1
4 y2

[105] 6" per printer

[106] for connecting probe to plug, fan to plug, and extending wires if needed

[107]
[4] 13" verticals
[6] 17.5" X and Y
[3] 14" for spool holder

[108] can substitute with 2-pin dupont connector

[109] .5 Nm = 71 oz in

[110] can substitute with 2-pin dupont connector

[111] 5 axes + 2 auto paralleling
10 can be metal

[112] Use plastic for abrasion resistance with non-hardened steel rods.

You can use cheaper metal bearing on the Z axis, which moves slowly. Need plastic for high speed abrasion resistance or wherever large forces are present.

[113] belt:
[2] 28"
[3] 37" = 56+111 = 167"

[114] 5 if extruder comes with stepper motor and wires

[115] for extruder screws + stepper motor holding screws

[116] 36" and 18" lengths?

Total 4'6"

[117] for heated bed
and 2 18 mm long 6 mm

[118] 2 of 40

[119] 2.3 x 12 mm?
2.9x13 mm?

[120] [4] 13" verticals
[6] 17.5" X and Y
[3] 14" for spool holder

[121] .5 Nm = 71 oz in

[122] A print surface in included with Overture filament orders for free. Can this be used?

[123] 6" per printer

[124] for connecting probe to plug, fan to plug, and extending wires if needed

[125] 36" and 18" lengths?

Total 4'6"

[126] 12" each, so 6' total

[127] for heated bed
and 2 18 mm long 6 mm

[128] including extruder

[129] .5 Nm = 71 oz in

[130] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[131] 14 x
14 y
22 z
4 bed -
4 wire loom clip
2 skew
2 sensor
2 X idler blocks

[132] 1 for tool attach

[133] 2 end stops - 4 ea => 8
4 for spool holder

[134] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[135] Use plastic for abrasion resistance with non-hardened steel rods.

You can use cheaper metal bearing on the Z axis, which moves slowly. Need plastic for high speed abrasion resistance or wherever large forces are present.

[136] 2 for spool holder
one more is included inside extruder

[137] A print surface in included with Overture filament orders for free. Can this be used?

[138] 12" each, so 6' total

[139] including extruder

[140] .5 Nm = 71 oz in

[141] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[142] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[143] 5 if extruder comes with stepper motor and wires

[144] 26 x 3 = 78 inches

[145] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[146] 1 lb Box. Size 6x1-1/4" Quantity per box 256

[147] 4 y1
4 y2

[148] none for frame set screws
none for skew correction (2), bed holders (4), sensor holders (2), and X idler blocks (2)

[149]
[4] 13" verticals (but axes are really 14" for Z
[6] 17.5" X and Y
[3] 14" for spool holder

[150] .5 Nm = 71 oz in

[151] 5 axes + 2 auto paralleling
10 can be metal

[152] Use plastic for abrasion resistance with non-hardened steel rods.

You can use cheaper metal bearing on the Z axis, which moves slowly. Need plastic for high speed abrasion resistance or wherever large forces are present.

[153] belt:
[2] 30"
[3] 37" =>

60+111 = 171"=

[154] 5 if extruder comes with stepper motor and wires

[155] 36" and 18" lengths?

Total 4'6"

[156] Switched to 24 ga, 14', for 600W element in D3D Pro 2

[157] for heated bed
and 2 18 mm long 6 mm

[158] 2 of 40

[159] 2.3 x 12 mm?
2.9x13 mm?

[160] 6" per printer

[161] for connecting probe to plug, fan to plug, and extending wires if needed

[162] for extruder screws + stepper motor holding screws

[163] for extruder screws + stepper motor holding screws