

STELLA Lab Spec parts														
Line	Dgn	Part	Qty	Category	Type	Vendor	PN	\$ ea	\$ line	main	C2	P2	.STL details, or link to part	
4	LS	Adafruit ADS1015 quad 12 bit ADC	1	Common	Electronics	Adafruit	1083	10	10	10	0	0		
18	C2	Adafruit AS7341 spectral sensor	1	Cuvette config	Electronics	Adafruit	4698	19	19	0	19	0		
48	P2	Adafruit AS7341 spectral sensor	1	PCR tube config	Electronics	Adafruit	4698	19	19	0	0	19		
1	LS	Adafruit half size proto board	1	Common	Electronics	Adafruit	1609	4.5	4.5	4.5	0	0		
5	LS	Adafruit MCP4728 quad 12 bit DAC	1	Common	Electronics	Adafruit	4470	7.5	7.5	7.5	0	0		
3	LS	Magnet coupler 3 pins	1	Common	Electronics	Adafruit	5380	6	6	6	0	0		
2	LS	Magnet coupler 4 pins	1	Common	Electronics	Adafruit	5358	6.5	6.5	6.5	0	0		
29	C2	White LED panel	1	Cuvette config	Electronics	Adafruit	1626	2	2	0	2	0		
24	C2	Pin header 3 pos	1	Cuvette config	Electronics	Adafruit	392	0.1	0.1	0	0.1	0	PN 392 order only one package at \$5 for all lines with this part number	
43	P2	Pin header 3 pos	1	PCR tube config	Electronics	Adafruit	392	0.1	0.1	0	0	0.1	PN 392 order only one package at \$5 for all lines with this part number	
45	P2	Pin header 6 pos	1	PCR tube config	Electronics	Adafruit	392	0.1	0.1	0	0	0.1	PN 392 order only one package at \$5 for all lines with this part number	
28	C2	Pin header RA 6 pos	3	Cuvette config	Electronics	Adafruit	1540	0.4	1.2	0	1.2	0	PN 1540 order only one package at \$6 for all lines with this part number	
25	C2	Pin header single	6	Cuvette config	Electronics	Adafruit	392	0.1	0.6	0	0.6	0	PN 392 order only one package at \$5 for all lines with this part number	
44	P2	Pin header single	12	PCR tube config	Electronics	Adafruit	392	0.1	1.2	0	0	1.2	PN 392 order only one package at \$5 for all lines with this part number	
9	LS	100KΩ resistor	4	Common	Electronics	Digikey	RNF14FTD100K	0.1	0.4	0.4	0	0		
8	LS	1Q 1% 1/4W resistor	4	Common	Electronics	Digikey	13-MF0207FRE52-1RTR	0.1	0.4	0.4	0	0		
20	C2	365nm LED 3mm	1	Cuvette config	Electronics	Digikey	1125-MTE3660C5-UV-ND	18	18	0	18	0		
50	P2	365nm LED 3mm	1	PCR tube config	Electronics	Digikey	1125-MTE3660C5-UV-ND	18	18	0	0	18		
10	LS	500 resistor	4	Common	Electronics	Digikey	RNF14FTD49R9	0.1	0.4	0.4	0	0		
26	C2	500 resistor	2	Cuvette config	Electronics	Digikey	RNF14FTD49R9	0.1	0.2	0	0.2	0		
49	P2	50Q resistor	2	PCR tube config	Electronics	Digikey	RNF14FTD49R9	0.1	0.2	0	0	0.2		
21	C2	640nm LED 3mm	1	Cuvette config	Electronics	Digikey	MTE7063C2-UR	2.75	2.75	0	2.75	0		
51	P2	640nm LED 3mm	1	PCR tube config	Electronics	Digikey	MTE7063C2-UR	2.75	2.75	0	0	2.75		
7	LS	PN2222ABU transistor	4	Common	Electronics	Digikey	PN2222AFS-ND	0.3	1.2	1.2	0	0		
13	LS	Socket header 3x1 pos	1	Common	Electronics	Digikey	SAM11930-ND	0.7	0.7	0.7	0	0		
12	LS	Socket header 3x2 pos	1	Common	Electronics	Digikey	SAM12901-ND	1.5	1.5	1.5	0	0		
11	LS	Socket header 3x3 pos	2	Common	Electronics	Digikey	SSW-103-01-G-T	2.6	5.2	5.2	0	0		
27	C2	Socket header 6 pos	1	Cuvette config	Electronics	Digikey	4627-FH254V-06-6TBKG98	0.5	0.5	0	0.5	0		
46	P2	Socket header, RA, 6 pos	1	PCR tube config	Electronics	Digikey	S5481-ND	0.7	0.7	0	0	0.7		
6	LS	Socket headers, 6 pos	4	Common	Electronics	Digikey	4627-FH254V-06-6TBKG98	0.5	2	2	0	0		
16	C2	Sparkfun mini proto board	2	Cuvette config	Electronics	Digikey	PRT-12702	4.3	8.6	0	8.6	0		
41	P2	Sparkfun mini proto board	1	PCR tube config	Electronics	Digikey	PRT-12702	4.3	4.3	0	0	4.3		
23	C2	Pin header 3x2 pos	1	Cuvette config	Electronics	Digikey	67997-206HLF	0.53	0.53	0	0.53	0		
42	P2	Pin header 3x2 pos	1	PCR tube config	Electronics	Digikey	67997-206HLF	0.53	0.53	0	0	0.53		
22	C2	488nm LED smt	1	Cuvette config	Electronics	Mouser	720-GCVL113KQKSV2V30	1	1	0	1	0		
52	P2	488nm LED smt	1	PCR tube config	Electronics	Mouser	720-GCVL113KQKSV2V31	1	1	0	0	1		
14	LS	LS housing base	1	Common	Print	NA	3d print part	0	0	0	0	0	0.2mm layers	
33	C2	LS-C2 blackout shutter	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
31	C2	LS-C2 cuvette block	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
32	C2	LS-C2 cuvette block foot pair, 2up	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
36	C2	LS-C2 cuvette pedestal	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
37	C2	LS-C2 detector block	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers — add support to center bridge	
38	C2	LS-C2 detector block assembly fixture	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.2mm layers	
30	C2	LS-C2 end cover	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.2mm layers	
35	C2	LS-C2 side LED cover, flag	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
34	C2	LS-C2 side LED cover, plain	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
39	C2	LS-C2 swing lid	1	Cuvette config	Print	NA	3d print part	0	0	0	0	0	0.2mm layers	
54	P2	LS-P2 end cover	1	PCR tube config	Print	NA	3d print part	0	0	0	0	0	0.2mm layers	
58	P2	LS-P2 hinge pin	1	PCR tube config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
57	P2	LS-P2 sensor retainer	1	PCR tube config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
55	P2	LS-P2 swing door	1	PCR tube config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers	
56	P2	LS-P2 test position (single or triple source)	1	PCR tube config	Print	NA	3d print part	0	0	0	0	0	0.1mm layers — Add supports to main overhang, organic style seems to be easier to remove	
19	C2	Proto-Advantage LED2 - DIP adapter	1	Cuvette config	Electronics	Proto-Advantage	IPC0224	3.5	3.5	0	3.5	0	https://www.proto-advantage.com/store/product_info.php?products_id=3100234	
53	P2	Proto-Advantage LED2 - DIP adapter	1	PCR tube config	Electronics	Proto-Advantage	IPC0224	3.5	3.5	0	0	3.5	https://www.proto-advantage.com/store/product_info.php?products_id=3100234	
17	C2	Proto-Advantage small proto board	1	Cuvette config	Electronics	Proto-Advantage	SBB1002-1	1	1	0	1	0	https://www.proto-advantage.com/store/product_info.php?products_id=200009	
47	P2	Proto-Advantage small proto board	1	PCR tube config	Electronics	Proto-Advantage	SBB1002-1	1	1	0	0	1	https://www.proto-advantage.com/store/product_info.php?products_id=200009	
15	C2	Cuvette	1	Cuvette config	Consumables	Thomas Scientific	1180W05	0.3	0.3	0	0.3	0	https://www.thomassci.com/p/spectrophotometer-cuvettes?q=1180W05	\$30 for 100 pcs
40	P2	PCR 0.2mL tube	1	PCR tube config	Consumables	Fisher Scientific	14-222-262	0.033	0.033	0	0	0.033	https://www.fishersci.com/shop/products/costar-pcr-tubes-3/07200681/?keyword=pcr+tube	\$33 for 1000 pcs
		Column cost						158	47	60	53			
	C2	Cost for cuvette config plugin						107						
	P2	Cost for PCR tube plugin						100						
	C2+P2	Cost for set of both						158						

Line	Dgn	Drawing	PDF
1	LS	LS Main board	yes
2	LS-C2	LS-C2 Cuvette board join	yes
3	LS-C2	LS-C2 Cuvette cantilever board	yes
4	LS-C2	LS-C2 Cuvette cantilever board w fixture	yes
5	LS-C2	LS-C2 Cuvette drop board	yes
6	LS-C2	LS-C2 Cuvette excitation board	yes
7	LS-C2	LS-C2 Cuvette drop and excitation join	yes
8	LS-C2	LS-C2 Cuvette optics	yes
9	LS-C2	LS-C2 Cuvette optics	TBD
10	LS-C2	LS-C2 Assembly drawing	TBD
11	LS-P2	LS-P2 PCR tube cantilever board	yes
12	LS-P2	LS-P2 PCR tube excitation board	yes
13	LS-P2	LS-P2 sensor block board set	yes
14	LS-P2	LS-P2 PCR tube optics	yes
15	LS-P2	LS-P2 Assembly drawing	TBD

STELLA Lab Spec Main Board

Step	Action	What value?	Where?
1	Get board	Adafruit Permaproto Half Size	
2	Cut traces		29,30: A-B, B-C, C-D, H-i, i-J
3	Install magnetic couplers	3 pos pins, 4 pos pins	30: A, B, C, D; H, i, J
4	Install transistors	2N2222 or PN2222ABU	All flats towards J: B12-13-14; B16-17-18; G12-13-14; G16-17-18
5	Install shunt resistors	1Ω 1% tol or better	B to GND each: 21, 22, 23, 24
6	Install pull down resistors	100kΩ	B to GND each: 5, 6, 7, 8
7	Install bias limit resistors	50Ω	C11-E13, C15-E17; H11-J13; H15-J17
8	Install socket headers for devices	6 pos, 4 places	G4-G9, D4-D9, G20-G25, D20-D25
9	Install board to board stacking headers	3x3, 2 places	ON BACK: A,B,C x 1,2,3; H,i,J x 1,2,3
10	Install board to board stacking headers	3 pos, 3 places	ON BACK: SDA 1,2,3; GND 1,2,3; 3V 1,2,3
11	Install ground wires		B29-30 to GND; B9 to GND; F24 to GND
12	Install power wires		A29-30 to 3V; B4 to 3V; F25 to 3V
13	Install SCL wires		C29-30 to SCL; J23 to SCL; J7 to SCL; G3 to SCL
14	Install SDA wires		E30 to SDA; J6 to SDA; J22 to SDA
15	Install 5V wire		J29-30 to G2
16	Install channel 0 wires		F1 to E12; C8 to A11; A14 to C21
17	Install channel 1 wires		E1 to A16; C7 to A15; E18 to E22
18	Install channel 2 wires		E2 to F12; E6 to F11; F14 to E23
19	Install channel 3 wires		E3 to F16; E5 to F15; F18 to E24
20	Test board for continuity and shorts		
21	Install MCP4728 12 bit DAC		D4-D9; Vcc, VD, VC, VB, VA, GND // G4-G9: RDY, LDAC, SDA, SCL, GND, Vcc
22	Install ADS1015 12 bit ADC		D20-D25; A-, A0, A1, A2, A3, A+ // G20-G25; ALRT, ADDR, SDA, SCL, GND, Vin

Step	What color?		Note
1	White	<input type="checkbox"/>	
2		<input checked="" type="checkbox"/>	
3		<input checked="" type="checkbox"/>	
4		<input checked="" type="checkbox"/>	Solder the center pin first, then straighten the body before soldering the other two pins
5		<input checked="" type="checkbox"/>	
6		<input checked="" type="checkbox"/>	
7		<input checked="" type="checkbox"/>	49.9Ω in photos. Either value is OK.
8		<input checked="" type="checkbox"/>	
9		<input checked="" type="checkbox"/>	
10		<input checked="" type="checkbox"/>	
11	GND	<input checked="" type="checkbox"/>	
12	+3.3V	<input checked="" type="checkbox"/>	
13	i2c Serial Clock	<input checked="" type="checkbox"/>	
14	i2c Serial Data	<input checked="" type="checkbox"/>	
15	5V	<input checked="" type="checkbox"/>	
16	CH0	<input checked="" type="checkbox"/>	
17	CH1	<input checked="" type="checkbox"/>	
18	CH2	<input checked="" type="checkbox"/>	
19	CH3	<input checked="" type="checkbox"/>	
20		<input type="checkbox"/>	
21		<input checked="" type="checkbox"/>	
22		<input checked="" type="checkbox"/>	

STELLA Lab Spec Cuvette Cantilever Board

Step	Action	What value?	Where?	What color?
1	Get board	Sparkfun mini		Red
2	Using main board as a template, install pin headers	3 pos in three places, 1 pos in six places	1-2ABC, A4, B5, C6, C13, B14, A16, 17ABC	
3	Fixture detector board at right angles to cantilever board	6 pos right angle pin header	G7-12	
4	Install socket header for drop board	6 pos stacking socket header	G1-6	
5	Note: for the wiring, install them flat along the F row	They can stick up between D, E and F		
6	Install ground wires		E2-F11	GND
7	Install power wires		E1-F12	+3.3V
8	Install SCL wires		E15-F10	i2c Serial Clock
9	Install SDA wires		E17-F9	i2c Serial Data
10	Install 5V wire		E14-F6	5V
11	Install channel 0 wires		E13-F5	CH0
12	Install channel 1 wires		E6-F4	CH1
13	Install channel 2 wires		E5-F3	CH2
14	Install channel 3 wires		E4-F2	CH3
15	Omit	Ground connection	at F1	
16	Test board for continuity and shorts			

STELLA Lab Spec Cuvette Drop Board

Step	Action	What value?	Where?	What color?
1	Get board	Proto-Advantage 1.1x1.7"		Epoxy color
2	Cut traces		F1-2, F2-3, F3-4, F4-5, F5-6 F6-7	
3	install right angle pin headers, long pins towards the edges of the board	6 pos, two places	B1-6, G1-6	
4	Install current limit resistors, short to G pins on header	50Ω, three places	FG2-C2, FG3-C3, FG4-C4	
5	Install channel 0 wires, short to G pin on header		FG5-C5	CH0
7	Install 5V wire, short to G pin on header		FG6-C6	5V
7	Test board for continuity and shorts			

STELLA Lab Spec Cuvette Excitation Board

Step	Action	What value?	Where?	What color?
1	Get board	Sparkfun mini		Red
2	Cut traces		F1-G1, F16-G16	
3	Install bottom LED, smt	488nm	(+) FG10, (dot) FG7	
4	Trim backlight LED panel (score with knife and snap)	Shorten the panel by 15mm		
5	Install CH3 backlight LED panel		(+) J9, (-) J8	
6	Bend CH1 and CH2 LEDs, match polarity and height below			
7	Install CH1 LED, set height with cuvette block	365nm (for DAPI)	(+) F1, (-) G1	
8	Install CH2 LED, set height with cuvette block	640nm (for Cy5)	(+) F16 (-) G16	
9	Install 5V wires		B12 - F1 (on leg), E12 - F13, G13 - F16 (on leg), i13 - i10+i9	5V
10	Install channel 0 wires		B13 - i7	CH0
11	Install channel 1 wires		B14 - i1	CH1
12	Install channel 2 wires		B15- i16	CH2
13	Install channel 3 wires		B16 - i8	CH3
14	Test board for continuity and shorts			

	pull 6 pins from a spare header			
	use the remaining plastic bar to double the spacer off the A side of the drop board			
	connect the boards at A12 on the cantilever board, A17 on the excitation board			

STELLA Lab Spec PCR Tube Cantilever Board

Step	Action	What value?	Where?	What color?
1	Get board	Sparkfun mini		Red
2	Cut traces		GH7, ...GH12	
3	Pull 6 pins from a spare pin header			
4	Install the pins, sticking up from the board, into a right angle socket header		F7,...F12	
5	Using main board as a template, install pin headers	3 pos in three places, 1 pos in six places	1ABC, A4, B5, C6, C13, B14, A16, 17ABC	
6	Install ground wires	REAR, single layer, no crossovers	H8 - E2	GND
7	Install power wires	REAR, single layer, no crossovers	H7 - E1	+3.3V
8	Install SCL wires	REAR, single layer, no crossovers	H9 - E13	i2c Serial Clock
9	Install SDA wires	REAR, single layer, no crossovers	i10 - E17	i2c Serial Data
10	Install 5V wire	REAR, single layer, no crossovers	G10 - D14	5V
11	Install channel 0 wires	REAR, single layer, no crossovers	G11 - E15	CH0
12	Install channel 1 wires	REAR, single layer, no crossovers	G12 - E6	CH1
13	Install channel 2 wires	REAR, single layer, no crossovers	G8 - E5	CH2
14	test the sensor function with the qwiic connect cable before installing			
15	Mount the detector board, face up, extending off the cantilever board		J7, ...J12	
16	Test board for continuity and shorts			

STELLA Lab Spec PCR tube excitation board

Step	Action	What value?	Where?	What color?
1	Get board	Proto-Advantage 1.1x1.7"		Epoxy color
2	Cut trace		E6-E7	
3	install right angle pin headers	6 pos, 2 places	i4, ... i9	
4	test the CH0 LED polarity before installing			
5	install CH0 LED		[+,2] G6,G7 [-,1, dot] D6,D7	
6	install CH1 LED		[+] F11, [-] E11	
7	install CH2 LED		[+] F2, [-] E2	
8	Install channel 0 wires		REAR: G8 - C7	CH0
9	Install current limit resistor CH1	50Ω	REAR: G9 - E10	CH1
10	Install current limit resistor CH2	50Ω	REAR: G4 - G1	CH2
11	Test board for continuity and shorts			