STELLA-1.2 main board build procedure — updated 20251002

Line	Description	Function / instructions	MC pin	Front/ Rear	Location 1	Location 2	color/ note	done
1	3D print	coupler installation fixture		-	-	-	magnetic coupler alignment fixture	☐
2	3D print	clock spacer		-	-	-	clock holder	☐
3	soldering tools	use SAC305 alloy solder					lead-free solder (SAC 305 alloy, 0.020” = 0.5mm diameter), safety glasses, fume exhauster, iron tip size: 1.5-2.0mm, iron temperature 290ºC/550ºF	☐
4	cut traces	bus traces		Rear	1 AB, BC, CD	2 AB, BC, CD	cut traces with a sharp knife, remove segment	☐
5	cut traces	analog traces		Rear	1 Hi, iJ	2 Hi, iJ	cut traces with a sharp knife, remove segment	☐
6	magnet coupler 4 pos	4 pin, flat face		Front	1A, 1B, 1C, 1D	[x]	use alignment fixture labelled “Flats”	☐
7	magnet coupler 3 pos	3 pin, flat face		Front	1H, 1i, 1J	[x]	use alignment fixture labelled “Flats”	☐
8	test before install	microcontroller					TEST A. microcontroller: Install CircuitPython by clicking reset twice in the specified cadence. Then copy the UF2 file onto the FEATHER…TBD drive. Connect to Mu Editor, ctrl-c, ctrl-d, check outputs. TBD details	☐
9	install pins on microcontroller						NOTE: install the header pins long ends from the bottom of the microcontroller board to the top, sticking out about 4mm above the top of the microcontroller board, with the plastic spacer up against the bottom of the microcontroller board. Neatness is important: the sticking out portion of the pins will be used to connect to later accessories, so keeping the upper portion of the pin free of solder is important. Do not trim the pins, even after installation is complete.	☐
10	install microcontroller on rear of main board.	install microcontroller on rear of main board		Rear	C44-C59	i44-i55		☐
11	ground	microcontroller ground	GND	Front	A56	GND (-) below A	GND	☐
12	power	microcontroller 3V3 out	3V	Front	A57	3V (+) below A	+3.3V	☐
13	SCL	microcontroller SCL	SCL	Front	J45	SCL (-) above J	i2c Serial Clock	☐
14	SDA	microcontroller SDA	SDA	Front	J44	SDA (+) above J	i2c Serial Data	☐
15	bus coupler wires	GND		Front	B2 short to B1	GND (-) below 2A	GND	☐

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16	bus coupler wires	3V		Front	A2 short to A1	3V (+) below 2A	+3.3V	
17	bus coupler wires	I2C_SDA		Front	E1	SDA (+) above 2J	i2c Serial Data	
18	bus coupler wires	I2C_SCL		Front	C2 short to C1	SCL (-) above 2J	i2c Serial Clock	
19	clock battery	insert clock battery						
20	test bus coms	QT connect test/ clock set			clock module	qwiic connector	TEST B. clock set	
21	install rotary encoder	rotary encoder		Rear	H37, H39	D37, D38, D39	trim off the bottoms of the mounting ears, then install the encoder on the rear of the board	
22	rotary encoder	GND		Front	A38	GND (-) below A	GND	
23	rotary encoder	GND		Front	F35	GND (-) below A	GND	
24	rotary encoder	GND		Front	i35	i37	GND	
25	rotary encoder	rotary line B	A4	Front	B39	B51	rotary line B	
26	rotary encoder	rotary line A	A3	Front	B37	B52	rotary line A	
27	rotary encoder	pushbutton switch	A2	Front	i39	B53	pushbutton switch	
28	test rotary encoder	rotary encoder test					TEST C. rotary encoder	
29	solder pins onto eyespi	instructions TBD: Use breadboard as a fixture						
30	install display eyespi breakout board	tape the eyespi board in place		Front	D24-32	G24-32	connector latch bar [black] towards J	
31	trim pins							
32	display breakout	3V		Front	A24	3V (+) below A	+3.3V	
33	display breakout	GND		Front	A26	GND (-) below A	GND	
34	display breakout	SCL		Front	J27	SCL (-) above J	i2c Serial Clock	
35	display breakout	SDA		Front	J28	SDA (+) above J	i2c Serial Data	
36	display breakout	TFT_CS	D12	Front	A32	J51	TFT_CS	
37	display breakout	TFT_D/C	D11	Front	B30	J50	TFT_D/C	
38	display breakout	MISO	MISO	Front	A29	A47	MISO	

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39	display breakout	MOSI	MOSI	Front	A28	A48	MOSI	☐
40	display breakout	SCK	SCK	Front	A27	A49	SCK	☐
41	modify display	close jumpers on back of display			IM1, IM2, IM3		Do Not close IM0	☐
42	test display	display test					TEST D. display	☐
43	test touch screen input	touch screen test					TEST E. touch screen	☐
44	install boost pins	pins only, 4 positions		Front	G17-20	[-]	pins	☐
45	install resistor	10kΩ resistor (not polarized)		Front	H20	H23	brown-black-orange, enable pull-down	☐
46	install resistor	10kΩ resistor (not polarized)		Front	H16	H19	brown-black-orange, divider high	☐
47	install resistor	10kΩ resistor (not polarized)		Front	G13	G16	brown-black-orange, divider low	☐
48	boost GND	GND (leave some slack to make room for the clock module spacer)		Front	F13	GND (-) below A	GND	☐
49	boost GND	GND		Front	J13	J18	GND	☐
50	boost GND	GND (TBD reroute on schematic)		Front	i18	i23	GND	☐
51	boost enable	5V boost enable	D10	Front	J20	J49	5V enable	☐
52	boost 5 monitor	5V/2 monitor	A1	Front	i16	B54	5V monitor at 2.5V	☐
53	Vbat distribution	Vbat	Vbat	Front	J12	J55	Vbat, unregulated lithium battery output	☐
54	Vbat supply to boost	Vbat	Vbat	Front	i12	J17	Vbat, unregulated lithium battery output	☐
55	boost 5V out	5V power		Front	J2, J1	J19	5V	☐
56	install boost module	boost module		Front	G17-20	[-]	components up, body towards J	☐
57	test 5V power	5V test					TEST F. 5V boost (connect LiPo battery for test)	☐
58	cut trace	disable clock LED					front of the clock module	☐
59	clock header pins	TBD direction: on front of board, use breadboard as fixture						☐
60	install clock module	install clock module on printed spacer.		Front	B16-20	[-]	on printed spacer, battery up, body towards J	☐
61	clock	GND		Front	A19	GND (-) below A	GND	☐

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62	clock	3V		Front	A20	3V (+) below A	+3.3V	
63	clock	SCL, run under spacer		Front	A18	SCL (-) above J	i2c Serial Clock	
64	clock	SDA, run under spacer		Front	A17	SDA (+) above J	i2c Serial Data	
65	test clock	clock test					repeat TEST B. clock set	
66	analog input	Analog input 0	A0	Front	i2, i1	B55	Analog input 0	
67	test analog inputs	analog input test					TEST	
68	SD card pins	install pins, 9 positions		Rear	B3-B11	[-]		
69	GPS pins	install pins, 9 positions		Rear	H3-H11	[-]		
70	trim pins	trim pins						
71	SD card power	3V	3V	Front	D3	3V (+) below A	+3.3V	
72	GPS enable	GPS enable		Front	E3	F10	GPS Enable	
73	SD card & GPS ground	GND	GND	Front	D4	GND (-) below A	GND	
74	GPS ground	GND		Front	E4	F5	GND	
75	GPS power	Vbat		Front	G4	G12	Vbat, unregulated lithium battery output	
76	GPS power noise filter	capacitor 0.1µF (not polarized)		Front	i4	i5	component	
77	SD card reader spi	SCK	SCK	Front	D5	B27	SCK	
78	SD card reader spi	MOSI	MOSI	Front	D7	B28	MOSI	
79	SD card reader spi	MISO	MISO	Front	D6	B29	MISO	
80	SD card reader spi	SD_CS	A5	Front	D8	A50	SD_CS	
81	GPS module uart	TX0 to RXin	TX	Front	F6	B45	TX0 to RXin	
82	GPS module uart	RX0 from TXout	RX	Front	F7	B46	RX0 from TXout	
83	install SD card reader	SD card		Rear	B3-B11	[-]	on rear, SD card socket visible, body towards A	
84	test SD card reader	SD card test					TEST G. sdcard	
85	GPS module	GPS module		Rear	H3-H11	[-]	on rear, square body unit visible, body towards J	
86	test GPS	GPS test					TEST H. GPS (connect LiPo battery for test)	

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87	power control	3V system regulator enable / disable	En	Front	J54	B43	3.3V Supply Enable	☐
88	power switch	switch		Rear	A43	GND (-) below A43	trim solder joints at B45, B46, and A47 flush to board, then install switch with body parallel to the board edge, with body towards A60	☐
89	test power control	power switch test					TEST: unit should cycle off on alternate click of power button.	☐
90	test system	system test					TEST	☐