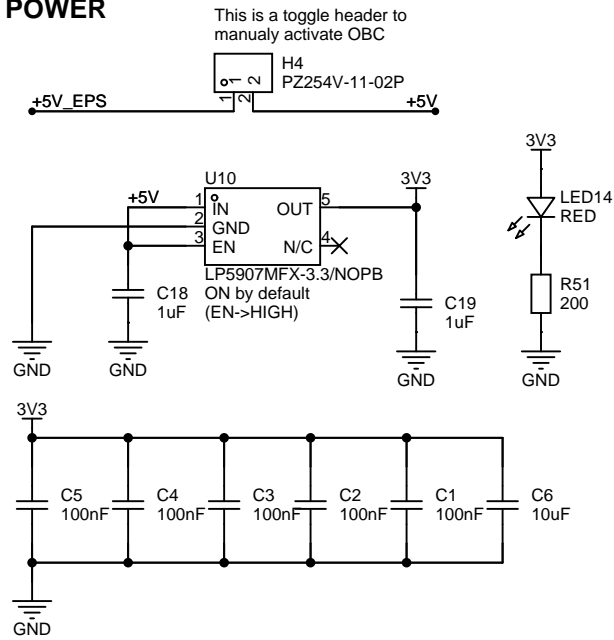
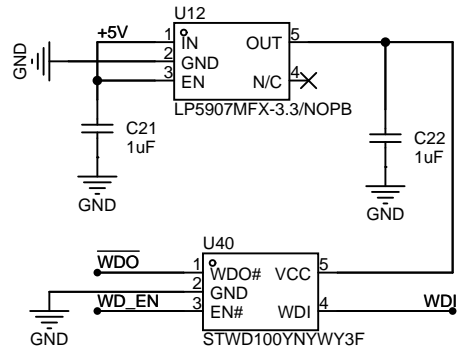


MCU POWER



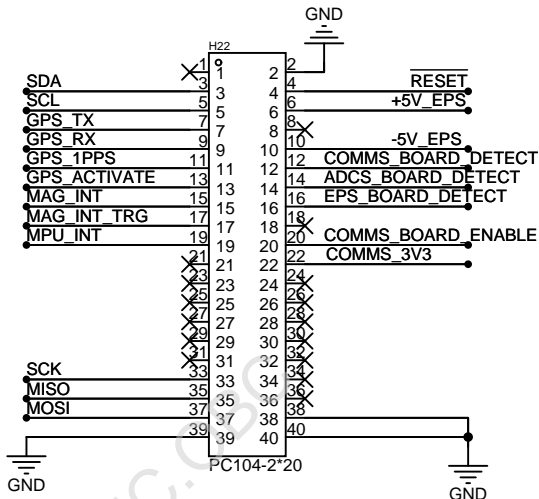
EXTERNAL WATCHDOG



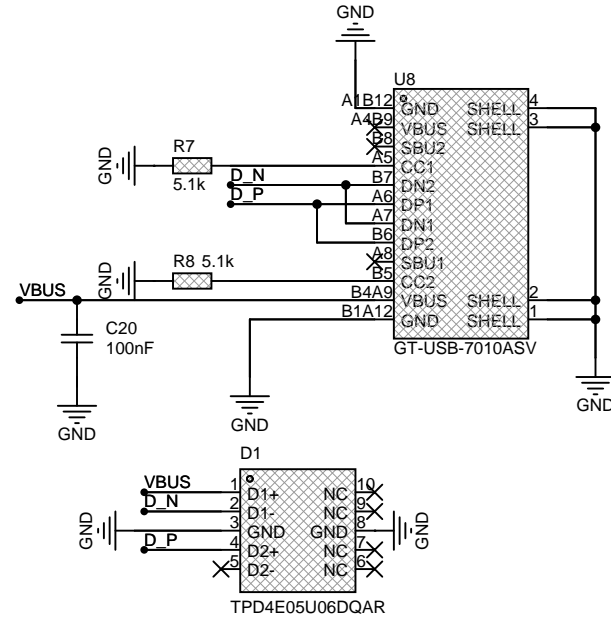
*Watchdog is Enabled from the MCU during system init

*The WDI input has to be toggled within the watchdog timeout period (twd), otherwise the WDO (active low) is asserted and resets the MCU

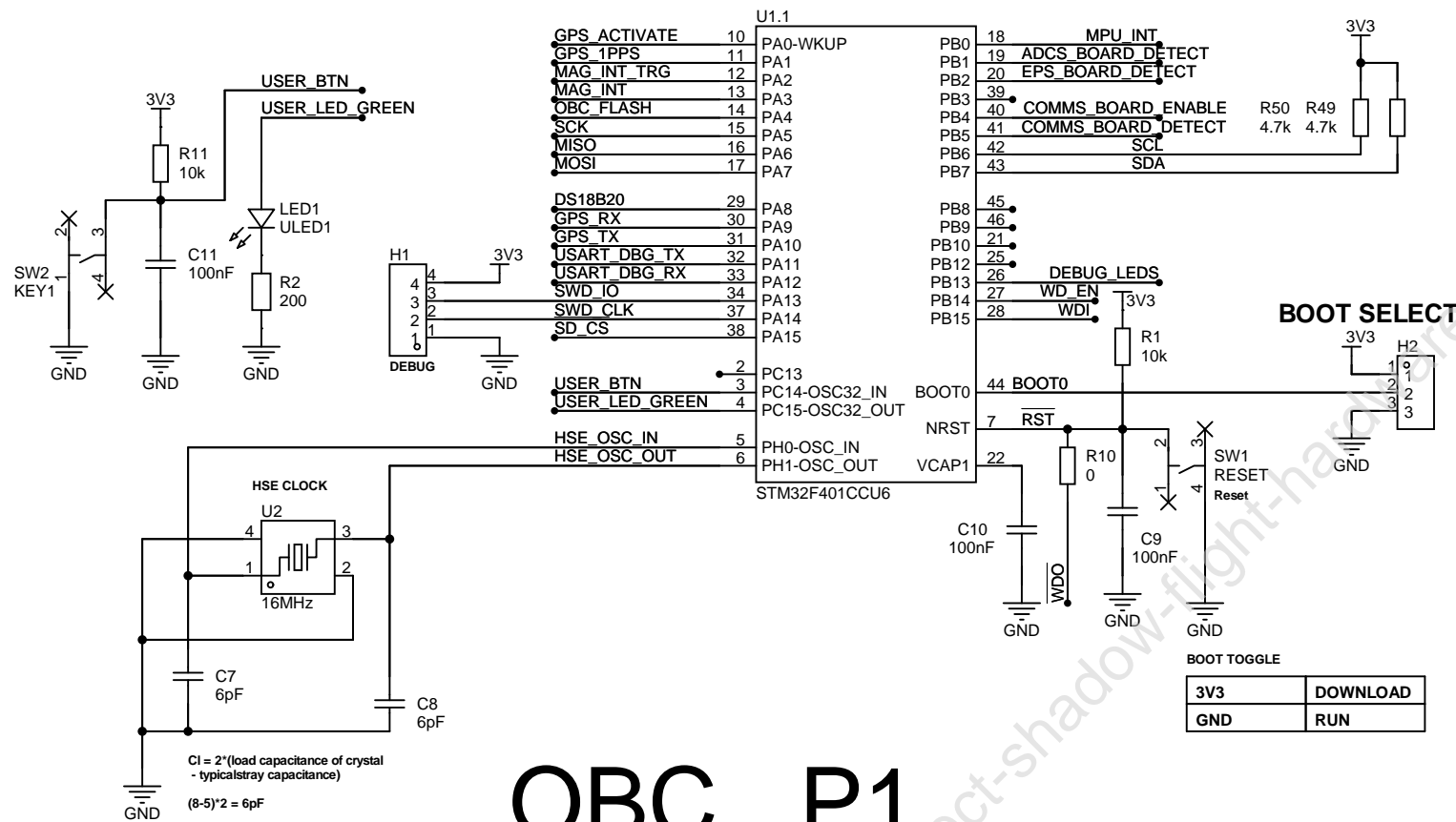
ISA CONNECTOR



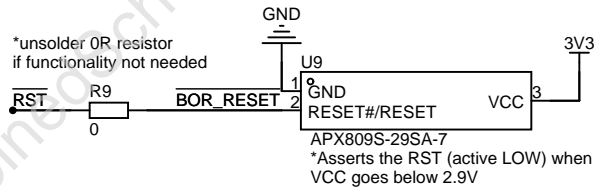
USB-C



MCU

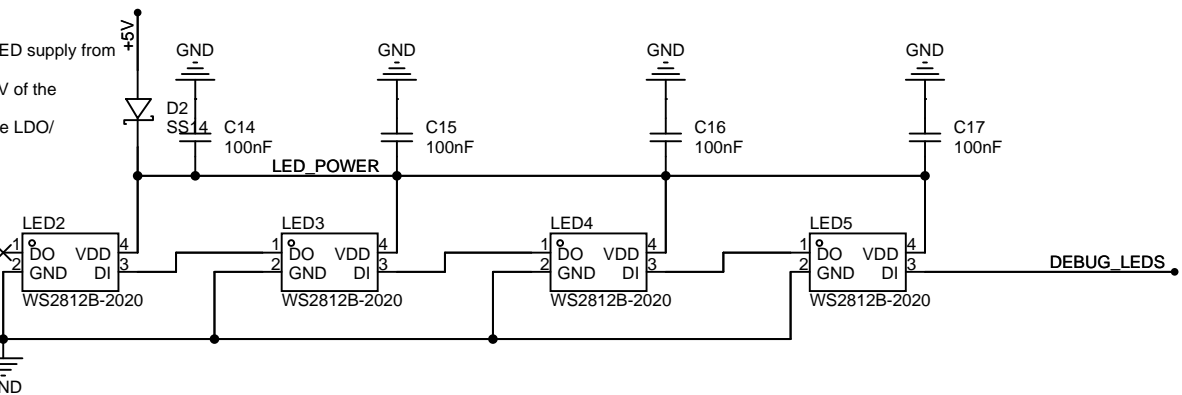


BROWN-OUT RESET

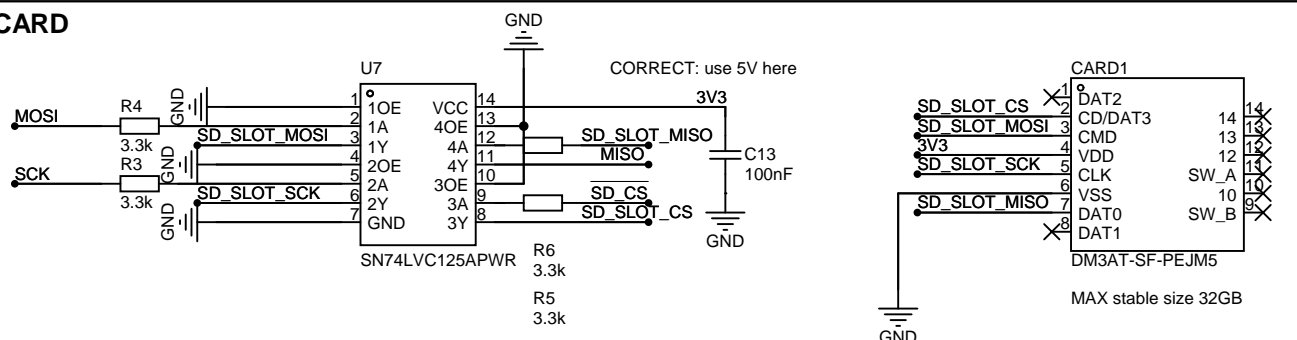


LEDS

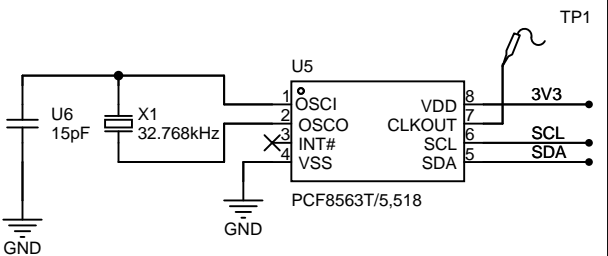
*diode drops LED supply from 5V to 4.5-4.8V to fit within 3.3V of the MCU.
*Avoid separate LDO/level shifter



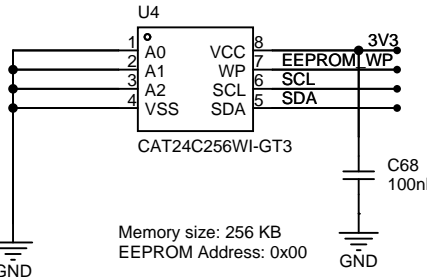
SD CARD



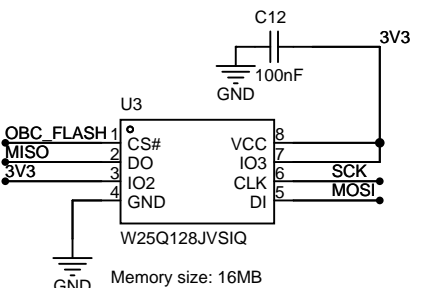
RTC



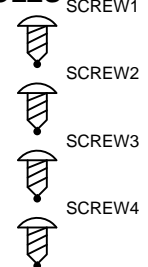
EEPROM




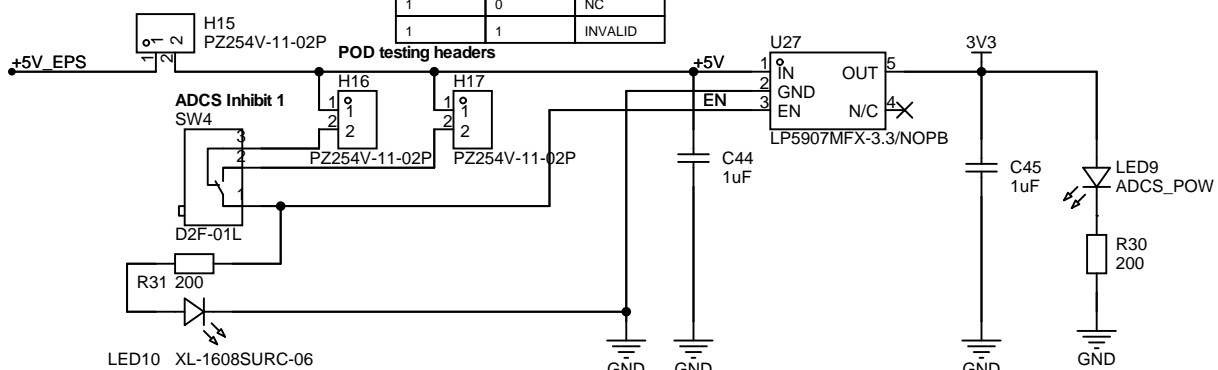
FLASH MEMORY



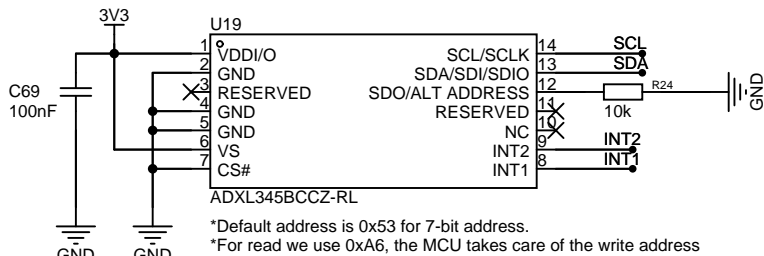
MOUNTING HOLES



Schematic	CombinedSchematicC			Update Date	2025-12-22
				Create Date	2025-04-11
Page	OBC			Part Number	
Drawn	Edwin Mwiti	Project-shadow-flight-hardware			
Reviewed					
		VER	SIZE	PAGE	1 OF 6
		V1.0	A4	EasyEDA.com	

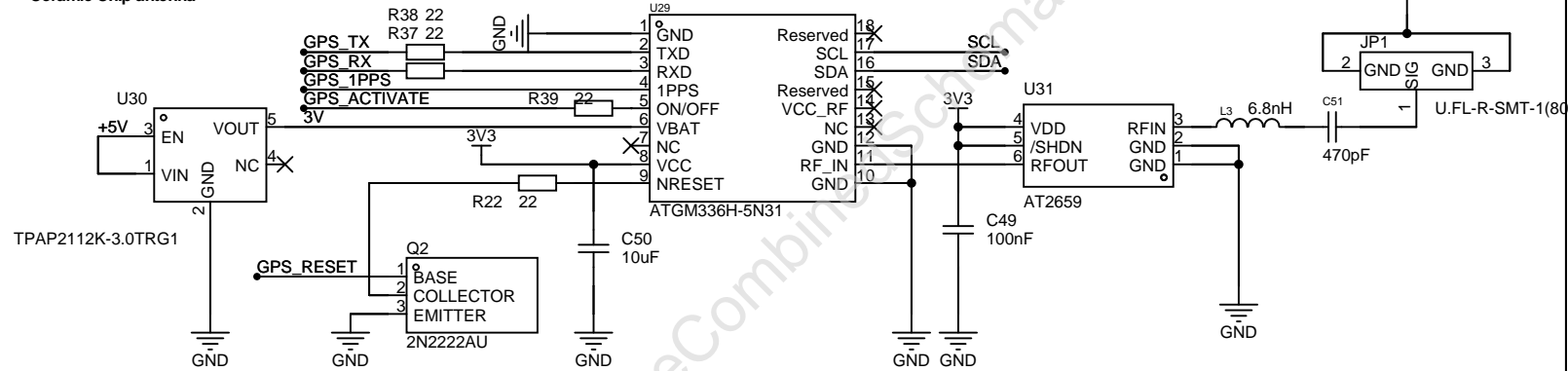


ACCELEROMETER



TEMT6000X01 sun sensors

*Ceramic Chip antenna




Pinout diagram for the PC104-2*20 connector. The diagram shows 40 pins with their functions and connections. Pins 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39 are on the left. Pins 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40 are on the right. Functions include SDA, SCL, GPS TX, GPS RX, GPS 1PPS, GPS ACTIVATE, MAG INT, MAG INT_TRG, MPU_INT, SCK, MISO, MOSI, RESET, +5V_EPS, -5V_EPS, COMMS BOARD DETECT, ADCS BOARD DETECT, EPS BOARD DETECT, COMMS BOARD ENABLE, COMMS_3V3, and GND. Connections are shown with lines and symbols like 'X' for crossed pins and 'H8' for header pins.

Pin	Function	Connection
1	SDA	PC104-2*20 Pin 1
2	RESET	PC104-2*20 Pin 2
3	SCL	PC104-2*20 Pin 3
4	+5V_EPS	PC104-2*20 Pin 4
5	GPS TX	PC104-2*20 Pin 5
6		PC104-2*20 Pin 6
7	GPS RX	PC104-2*20 Pin 7
8		PC104-2*20 Pin 8
9	GPS 1PPS	PC104-2*20 Pin 9
10	-5V_EPS	PC104-2*20 Pin 10
11	GPS ACTIVATE	PC104-2*20 Pin 11
12	COMMS BOARD DETECT	PC104-2*20 Pin 12
13	MAG INT	PC104-2*20 Pin 13
14	ADCS BOARD DETECT	PC104-2*20 Pin 14
15	MAG INT	PC104-2*20 Pin 15
16	EPS BOARD DETECT	PC104-2*20 Pin 16
17	MAG INT_TRG	PC104-2*20 Pin 17
18		PC104-2*20 Pin 18
19	MPU_INT	PC104-2*20 Pin 19
20	COMMS BOARD ENABLE	PC104-2*20 Pin 20
21		PC104-2*20 Pin 21
22	COMMS_3V3	PC104-2*20 Pin 22
23		PC104-2*20 Pin 23
24		PC104-2*20 Pin 24
25		PC104-2*20 Pin 25
26		PC104-2*20 Pin 26
27		PC104-2*20 Pin 27
28		PC104-2*20 Pin 28
29		PC104-2*20 Pin 29
30		PC104-2*20 Pin 30
31		PC104-2*20 Pin 31
32		PC104-2*20 Pin 32
33	SCK	PC104-2*20 Pin 33
34	MISO	PC104-2*20 Pin 34
35		PC104-2*20 Pin 35
36		PC104-2*20 Pin 36
37	MOSI	PC104-2*20 Pin 37
38		PC104-2*20 Pin 38
39		PC104-2*20 Pin 39
40		PC104-2*20 Pin 40

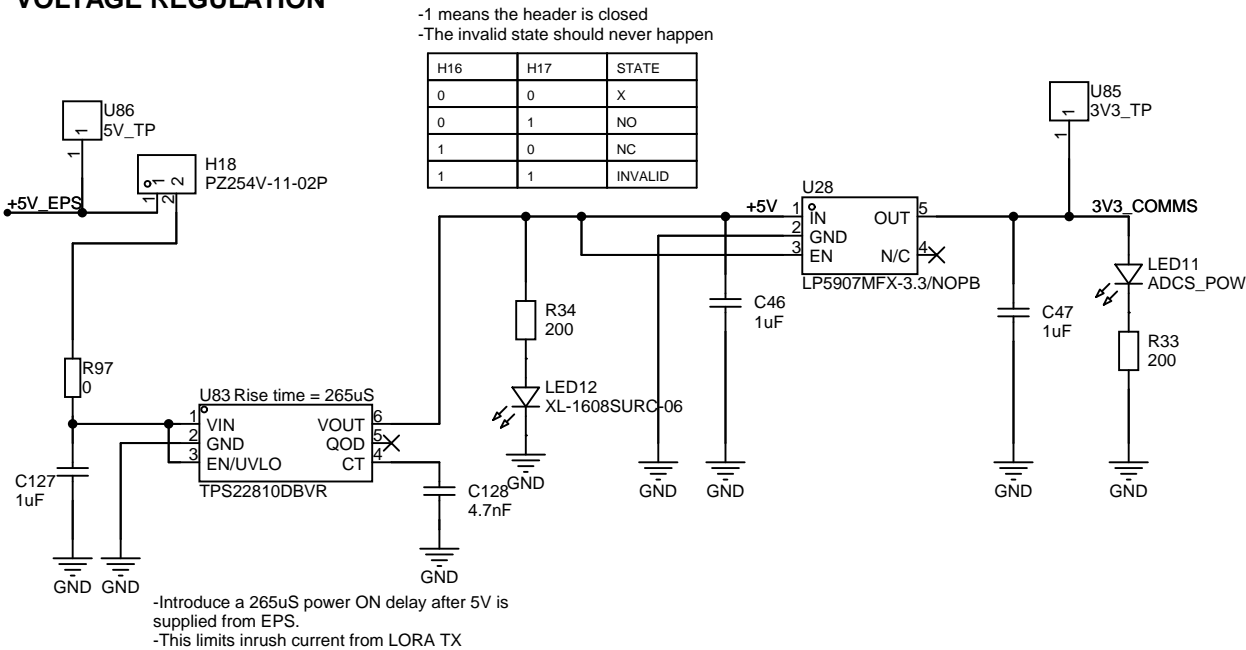
The top diagram shows the connection of module U25 (ADS1015IDGSR). The module's pins are connected as follows: ADDR (pin 1) to ADC1_RDY; ALERT/RDY (pin 2) to SUN_1; GND (pin 3) to GND; VDD (pin 8) to 3V3; SCL (pin 10) to 3V3; SDA (pin 9) to 3V3; AIN0 (pin 4) to SUN_2; AIN1 (pin 5) to GND; AIN2 (pin 6) to SUN_3; AIN3 (pin 7) to SUN_4. A 100nF capacitor (C42) is connected between the 3V3 supply and GND.

The bottom diagram shows the connection of module U26 (ADS1015IDGSR). The module's pins are connected as follows: ADDR (pin 1) to ADC1_RDY; ALERT/RDY (pin 2) to SUN_5; GND (pin 3) to GND; VDD (pin 8) to 3V3; SCL (pin 10) to 3V3; SDA (pin 9) to 3V3; AIN0 (pin 4) to SUN_6; AIN1 (pin 5) to GND; AIN2 (pin 6) to GND; AIN3 (pin 7) to GND. A 100nF capacitor (C43) is connected between the 3V3 supply and GND.

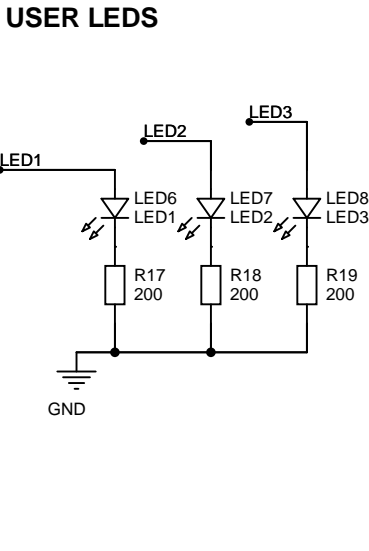
Diagram illustrating the vertical arrangement of four screws, labeled SCREW5, SCREW6, SCREW7, and SCREW8, from bottom to top.

Schematic		CombinedSchematicC			Update Date		2025-12-30		
					Create Date		2025-04-11		
Page		ADCU			Part Number				
Drawn		Edwin Mwiti		Project-shadow-flight-hardware					
Reviewed									
		VER		SIZE		PAGE		2 OF 6	
 EasyEDA		V1.0		A4		EasyEDA.com			

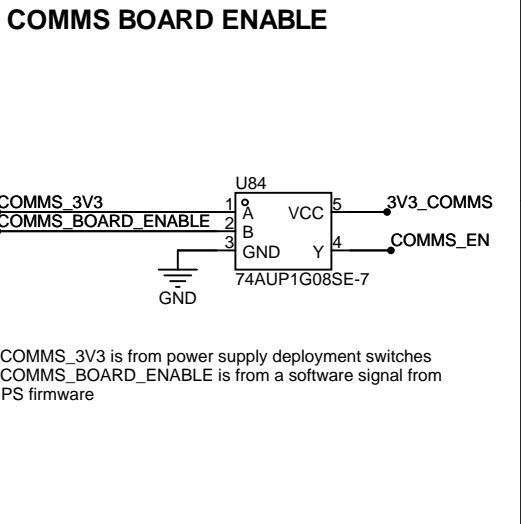
VOLTAGE REGULATION



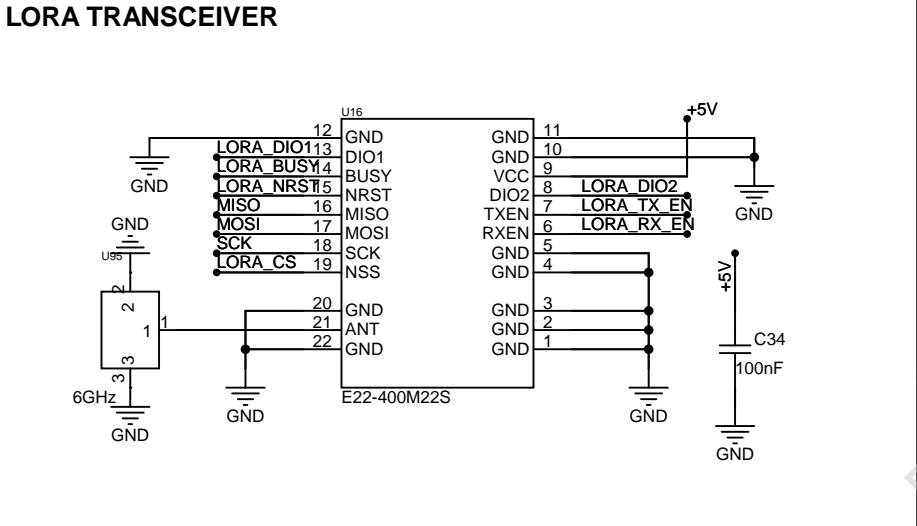
USER LEDS



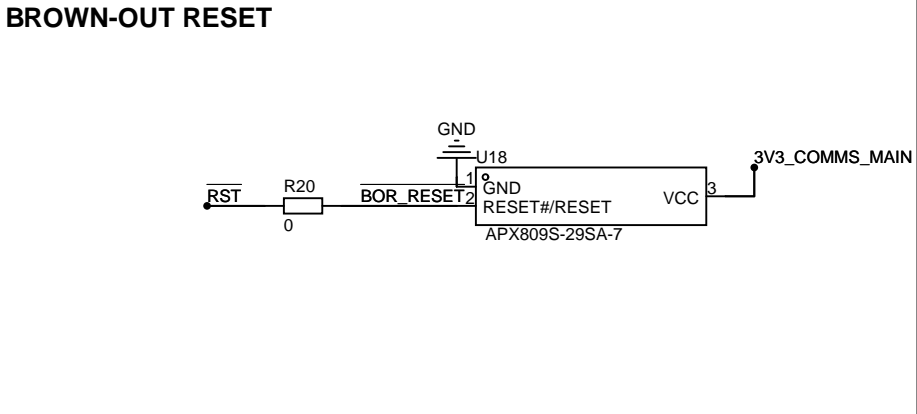
COMMS BOARD ENABLE



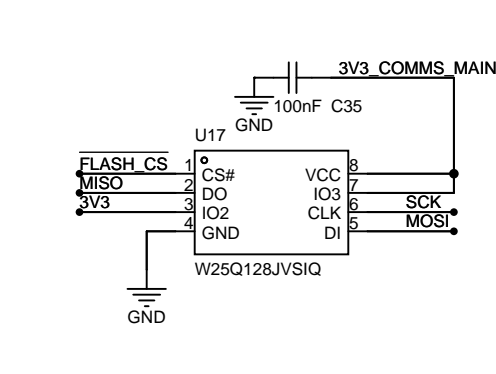
LORA TRANSCEIVER



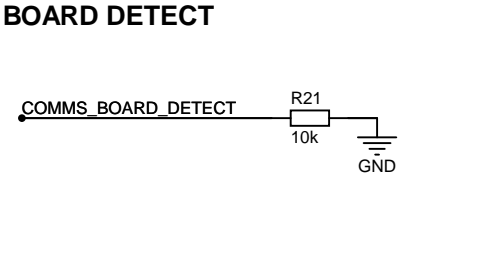
BROWN-OUT RESET



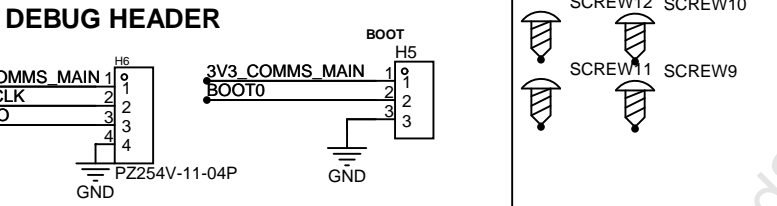
16MB FLASH MEMORY



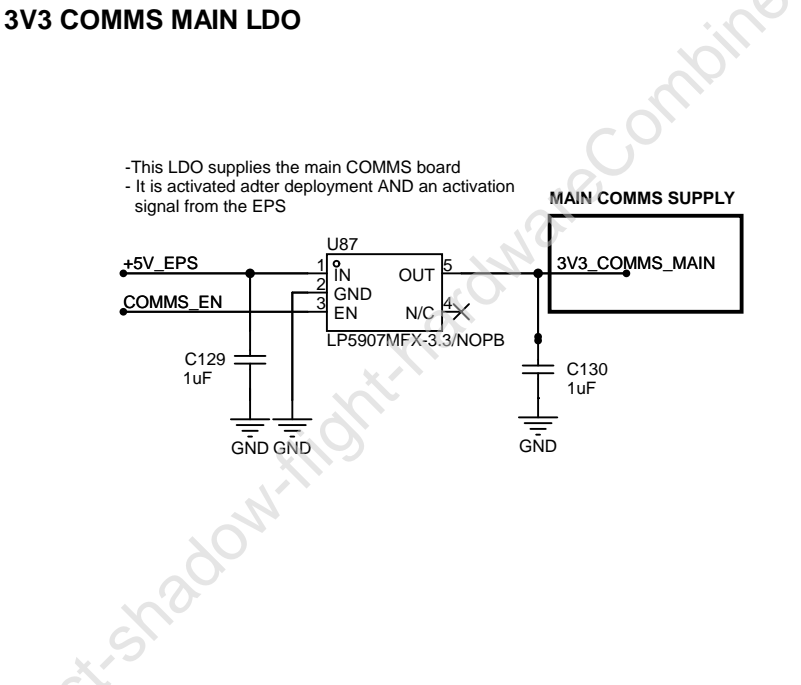
BOARD DETECT



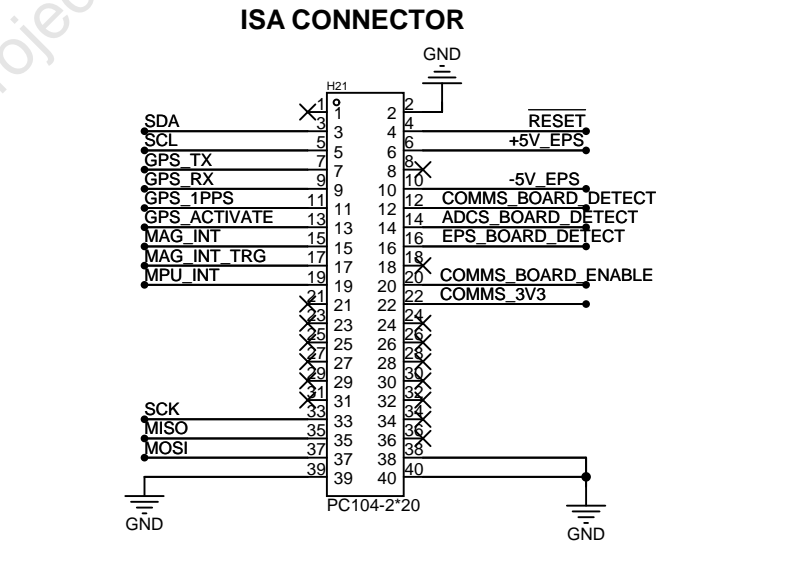
DEBUG HEADER



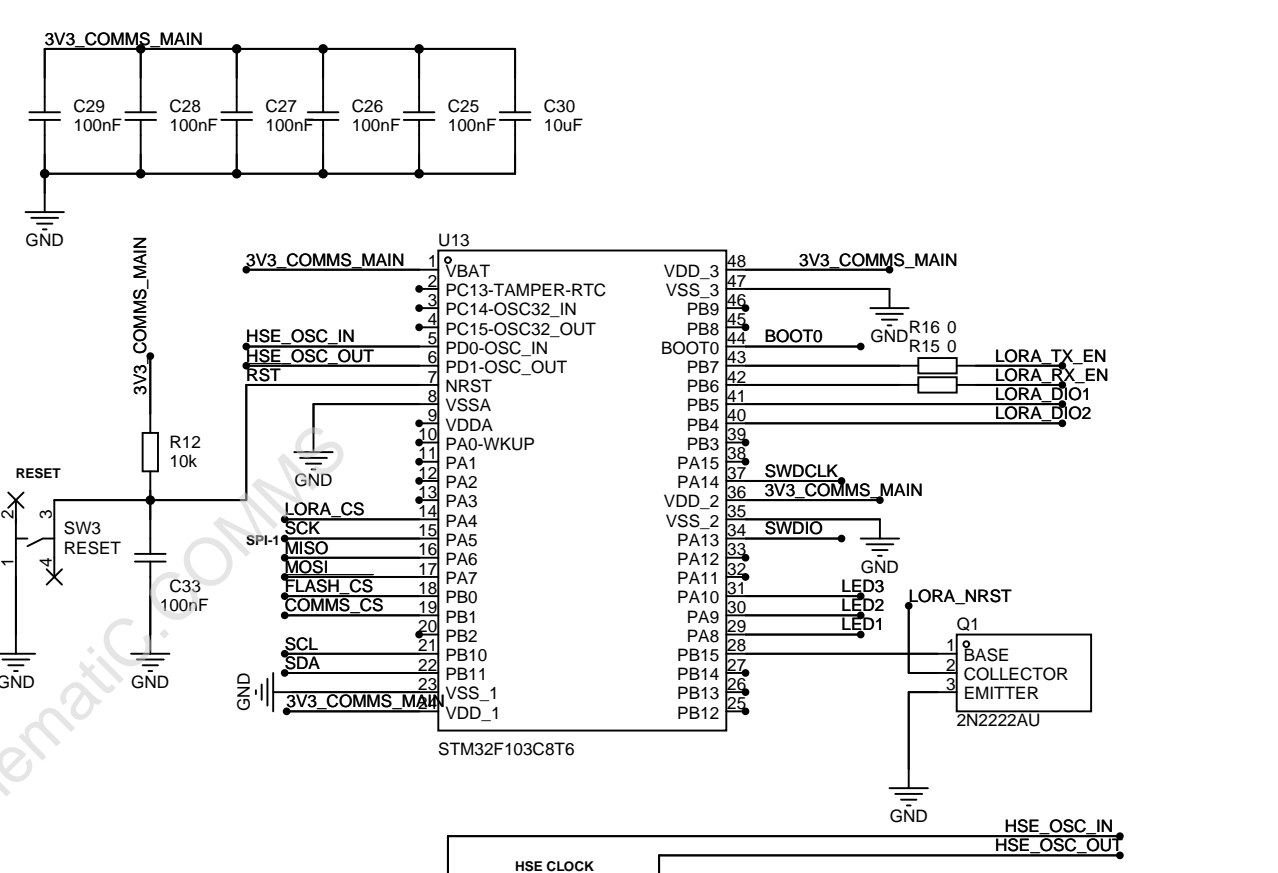
3V3 COMMS MAIN LDO



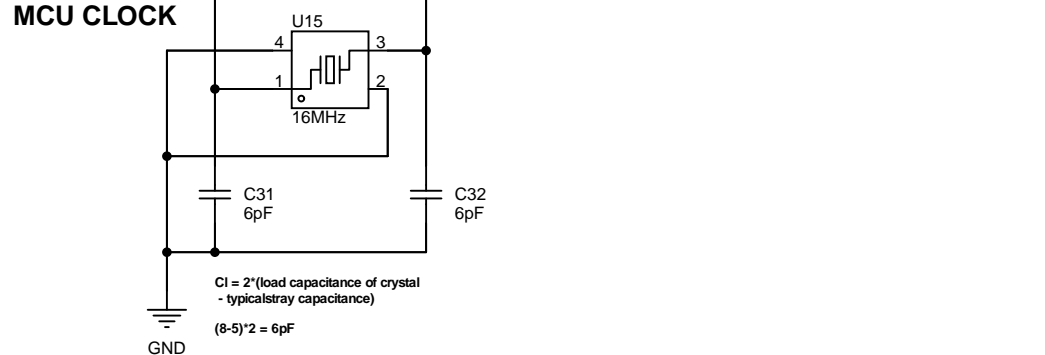
ISA CONNECTOR




MCU



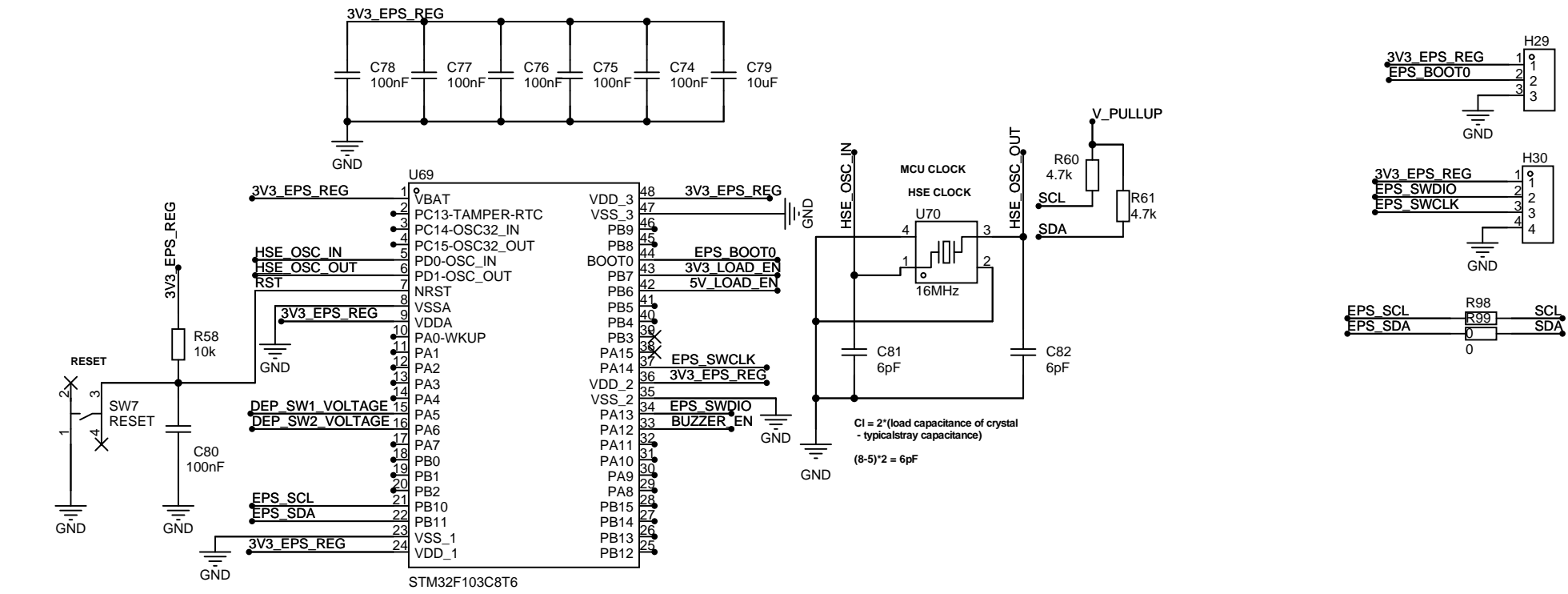
MCU CLOCK



COMMS_P3

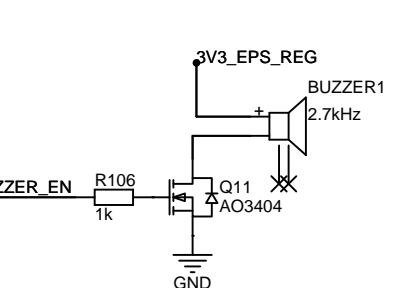
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				Create Date	2025-08-02		
Page	COMMS			Part Number			
Drawn		Project-shadow-flight-hardware					
Reviewed							
		VER	SIZE	PAGE	3	OF	6
 EasyEDA		V1.0	A4	EasyEDA.com			

EPS MCU

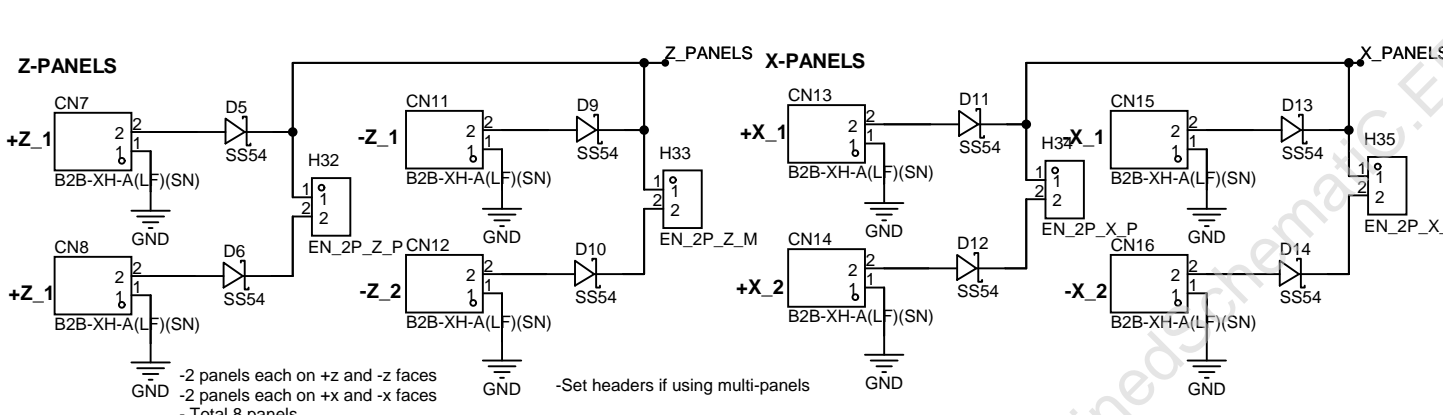


12V in DONE
5V reg DONE
3.3 reg DONE
252P battery charger controller DONE
6 solar panels connectors
Remove before flight DONE
STM32F103 MCU DONE
Current measurement with INA for voltage buses DONE
Fallback voltage measurement with STM and ADC (12 – 18 bit) externa ADC
Indicator LED for 12V with turn off ability from MCU
Indicator LED for each PV cell
Load switches for power sequencing DONE
buzzer
fallback single cell charger for a single 3.6V LION
Boost converter for single 3.6V LION
fallback Current pump when using a single LION 3.6V cell
board temperature sensor (NTC)
battery temperature sensing (NTC)
solar->battery ORing with Low voltage diodes
backfeeding-control with high-side PMOS

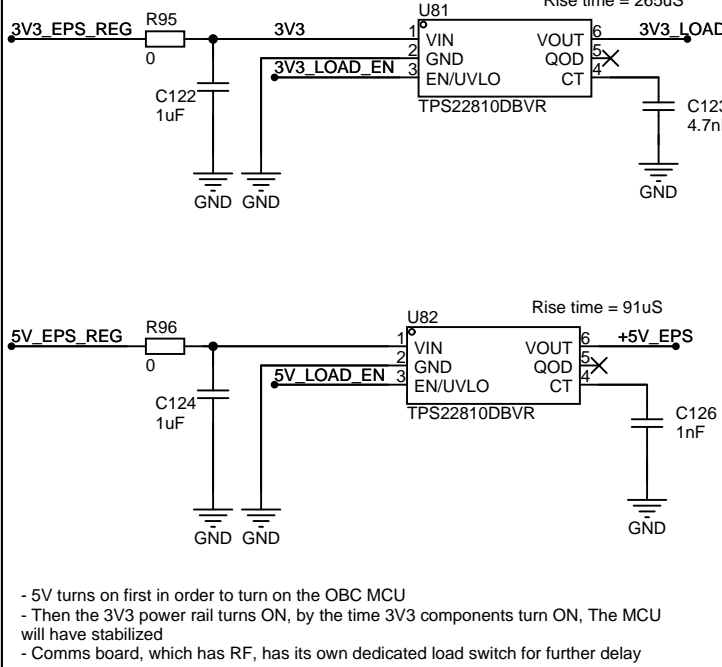
BUZZER



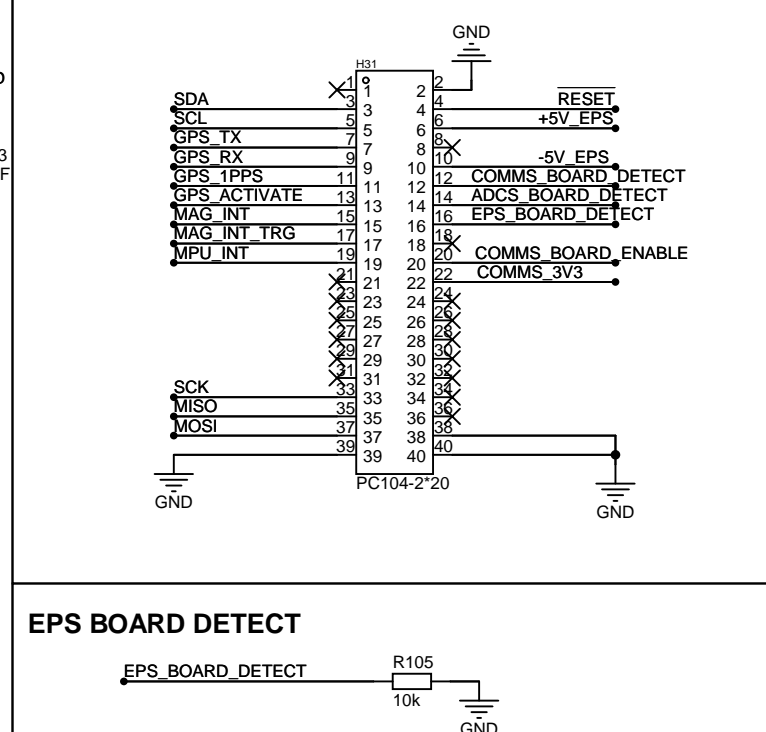
SOLAR PANELS



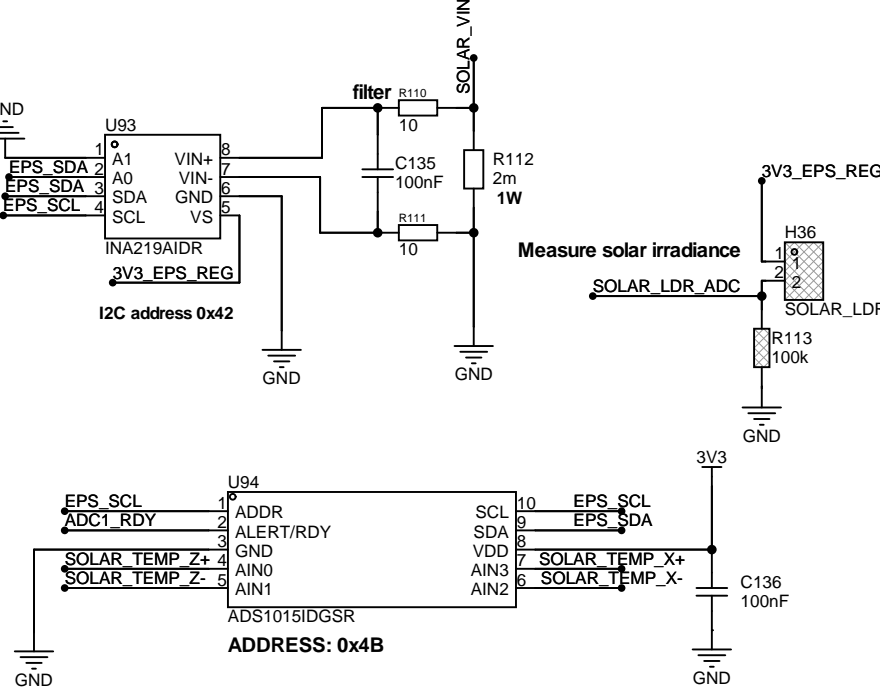
LOAD SWITCHES



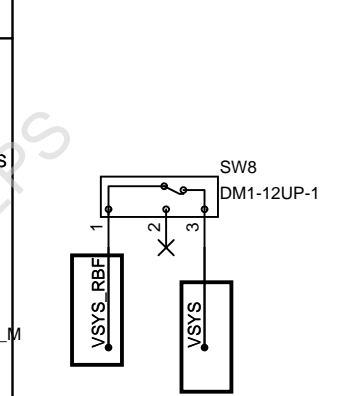
ISA CONNECTOR



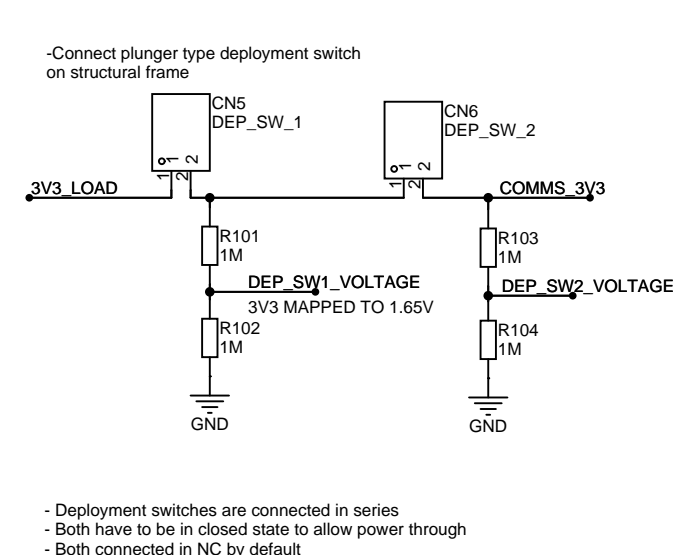
SOLAR POWER BUS MONITOR + MPPT



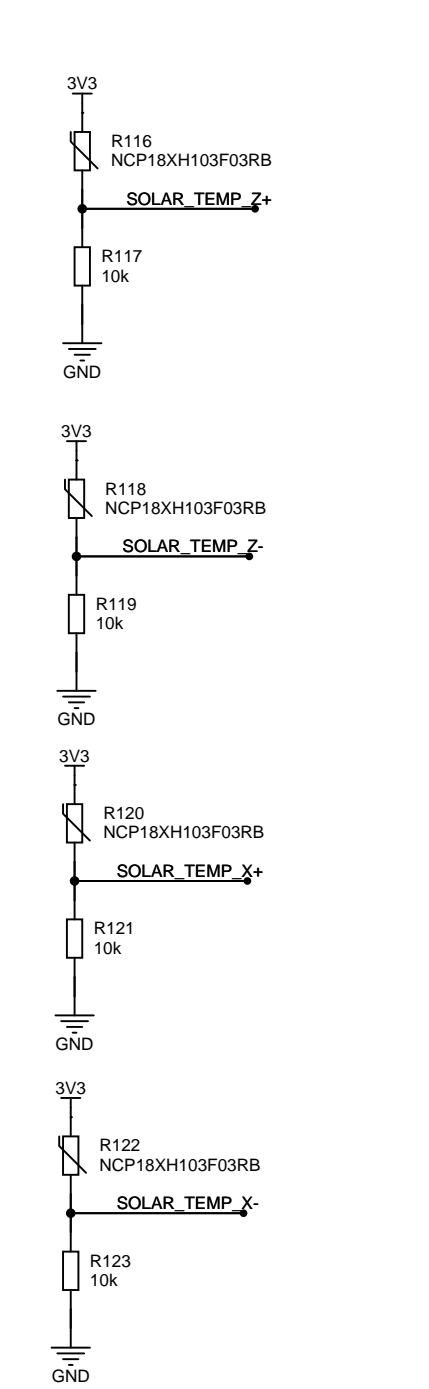
REMOVE BEFORE FLIGHT



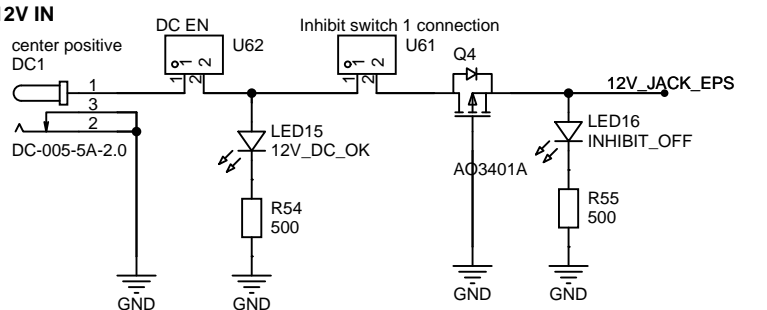
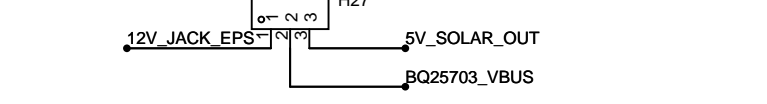
DEPLOYMENT SWITCHES



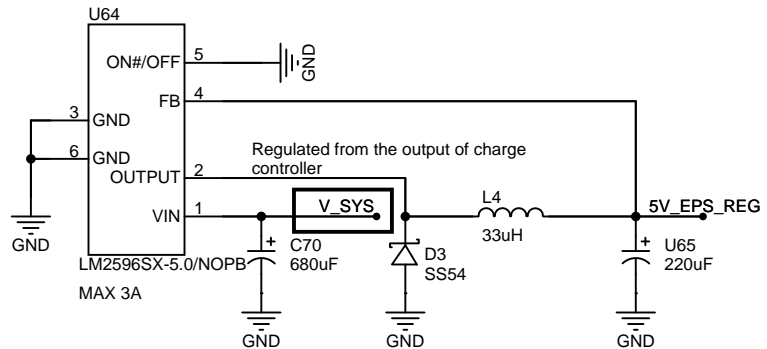
SOLAR PANEL TEMP



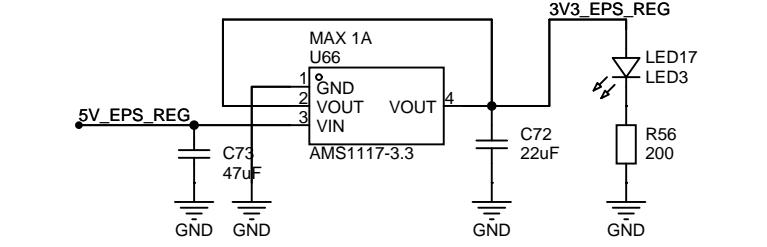
SOURCE SELECT



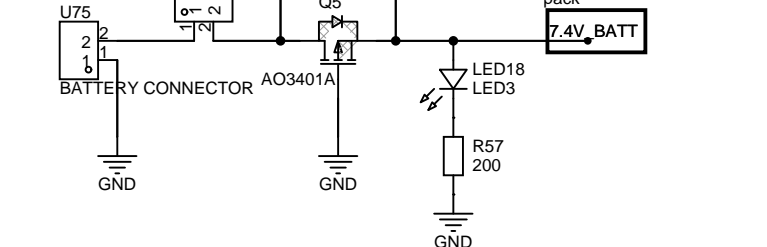
REGULATED 5V



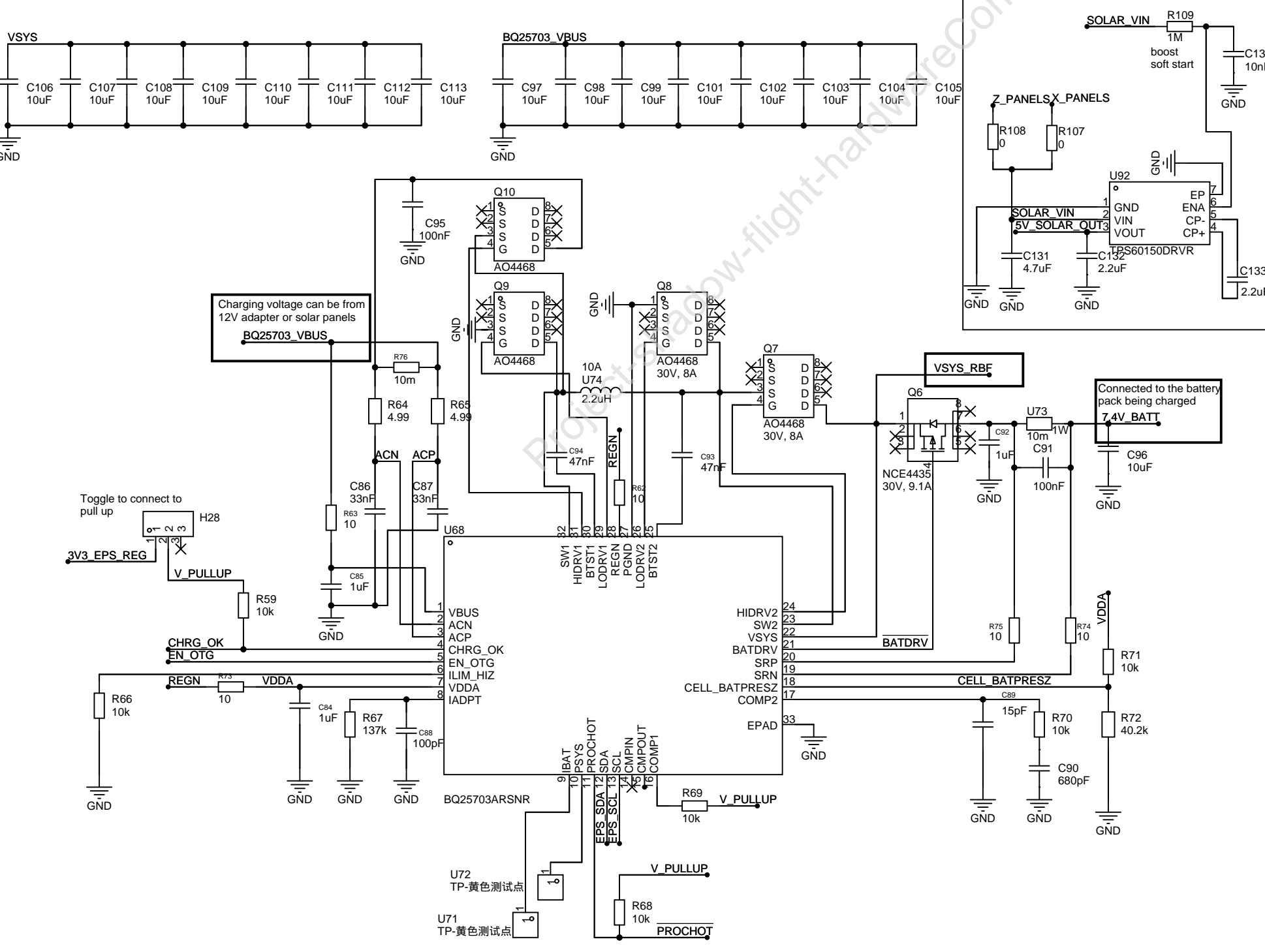
REGULATED 3.3V



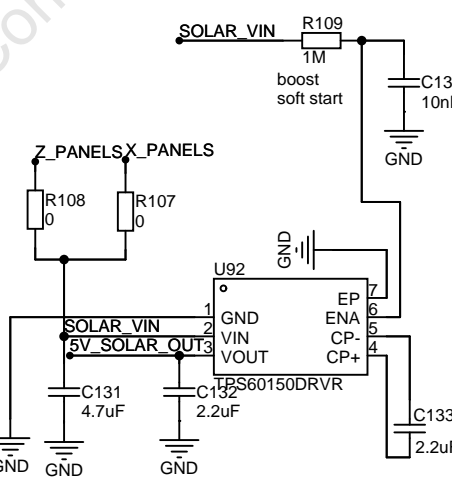
BATTERY



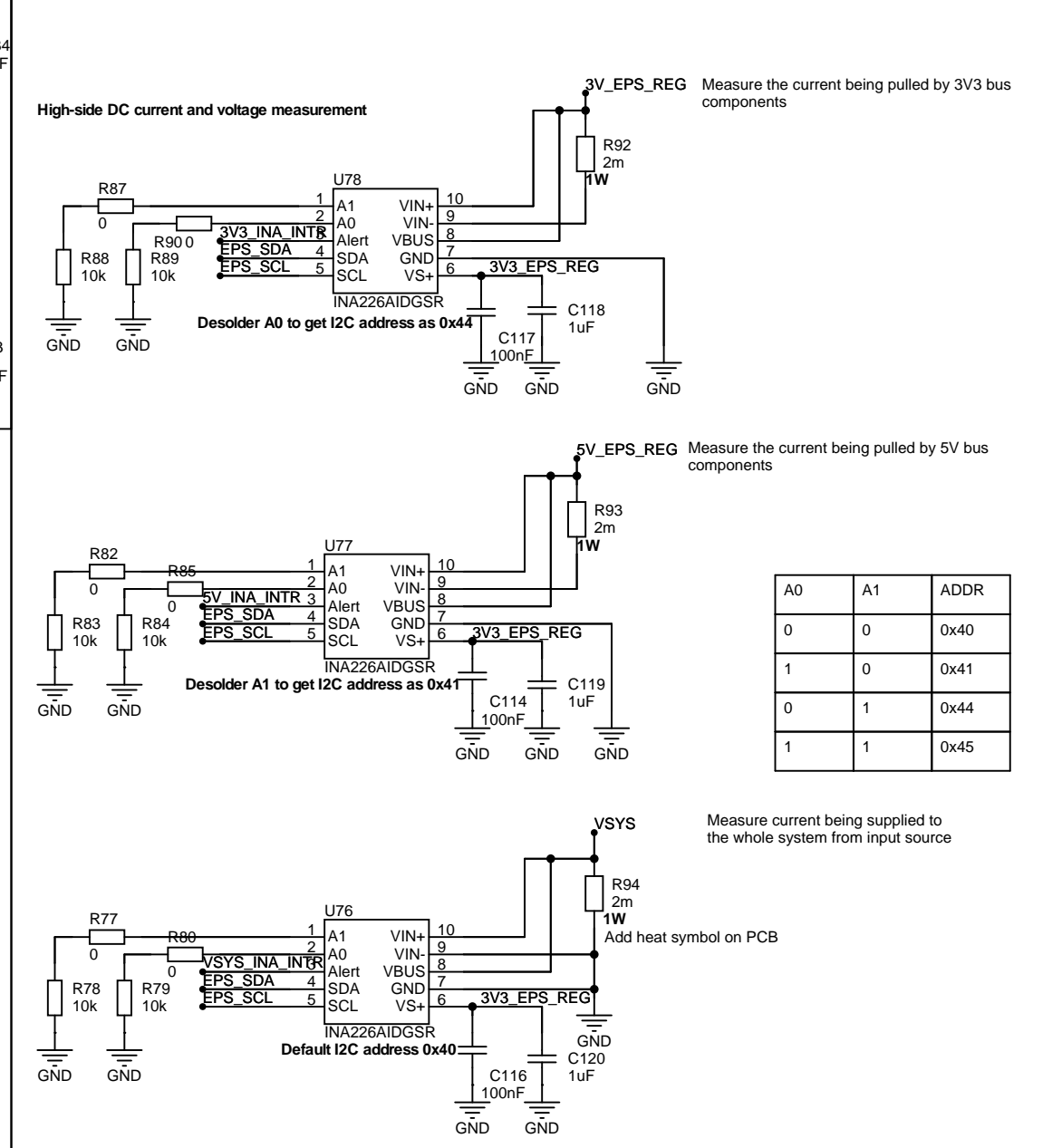
BUCK-BOOST CHARGE CONTROLLER



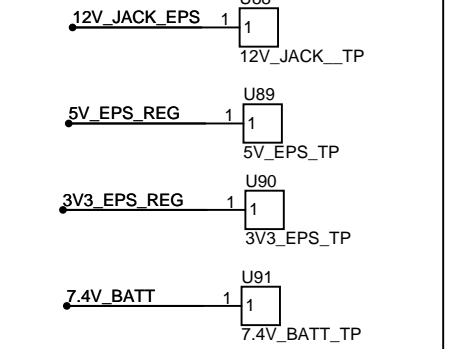
SOLAR BOOST CONVERTER




REGULATORS POWER MONITOR

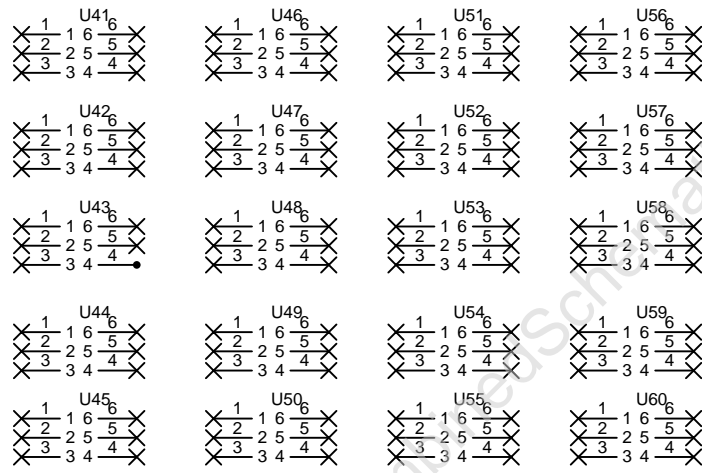


TEST POINTS



EPS_P4

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Page	EPS			Create Date	2025-09-11	
Drawn	Edwin Mwiti	Project-shadow-flight-hardware				
Reviewed						
		VER	SIZE	PAGE	5	OF 6
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PANEL_P5

Schematic	CombinedSchematiC		Update Date	2025-12-22
			Create Date	2025-09-11
Page	MOUSE-BITES		Part Number	
Drawn		Project-shadow-flight-hardware		
Reviewed				
		VER	SIZE	PAGE 6 OF 6
EasyEDA		V1.0	A4	EasyEDA.com