



Still use an external ADC because ESP32 ADC impedance is bad, which would require a relatively high-dissipation divider.

When PWR\_EN asserted, Q2 activates and enables FPWM mode on buck-boost for lower ripple

	PWR_EN	V <sub>RF</sub>	FPWM
1	0	0	0
0	1	1	1

**ESP32-S2 Microcontroller**

ESP32 needs adequate capacitance

3V3

U8 ESP32-S2-SOLO

U0RXD/GPIO44/CLK\_OUT2

U0TXD/GPIO43/CLK\_OUT1

36 RXD

37 TXD

14

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27 BOOT

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38 SCL ULP-controllable I2C pins. See Table 40 in Ref. manual

15 SDA

4 LIDAR\_XSHUT

5 LIDAR\_IRQ

6 U1CTS

7 U1RTS

12 U1RX

17 U1TX

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Development programmer. In final version, replace with programming header

+3V3

C27  
1uF

GND

R19  
10K

VBUS

R20  
22K

R21  
33K

GND

U9  
CP2102N-Axx-xQFN28

GND

Pin 1: TXD  
Pin 2: RXD  
Pin 3: RTS  
Pin 4: CTS  
Pin 5: DSR  
Pin 6: DTR  
Pin 7: DCD  
Pin 8: RI/CLK  
Pin 9: SUSPEND  
Pin 10: SUSPEND  
Pin 11: TXT/GPIO.0  
Pin 12: RXT/GPIO.1  
Pin 13: RS485/GPIO.2  
Pin 14: WAKEUP/GPIO.3  
Pin 15: GPIO.4  
Pin 16: GPIO.5  
Pin 17: GPIO.6  
Pin 18: CHREN  
Pin 19: CHRO  
Pin 20: CHR1  
Pin 21: GND  
Pin 22: GND  
Pin 23: GND  
Pin 24: GND  
Pin 25: GND  
Pin 26: GND  
Pin 27: GND  
Pin 28: GND

VDD  
VREGIN  
RST  
VBUS  
D-  
D+  
GND

**Solar Charge Control**

Shunt Regulator  
D1 Regulates to 3.6V  
D

VCC\_SP

R24 33K

R32 75K

SC1 Solar Cell

U2 CJ431

GND

**Batteries (including protection)**

VBATT <= 3.5V  
3x 10400 LiFePO4

VCC\_BAT

U4 XBR35600

R6 100

C9 0.1uF

BN1

+BT1

U5 XBR35600

R10 100

C10 0.1uF

BN2

+BT2

U7 XBR35600

R14 100

C14 0.1uF

BN3

+BT3

GND

R27

**USB Charger**

IC3 BQ25170DSGR

OUT IN

VSET ISET TS

PG STAT

TH1 Temp

R23 100K

R22 2K

GND

**VCC Switch**

R29

LM66200DRLR

VIN1 VIN2

VOUT.1 VOUT.2

ON

GND.1 GND.2

ST

GND

R33

R26

**CAP BANK**

C1 22uF

C2 22uF

C6 22uF

C26 22uF

C28 22uF

VCC\_SW

R25

VCC\_REG

A large filtering bank for MAX MCU to draw from.  
LM slew-rates inputs so charging won't be an issue,  
and STX has a lot to draw from when TX'ing

**3.3V Rail Generation**

LX2 L4 1uH

LX1

FPWM 14

FPWM 7

IN

OUTS OUT

IC2 MAX77827AEFD+T

EN BIAS SEL

PGND AGND

PROG\_GND

R15

R16 510K

C19 1uF

PGOOD\_BATT

PGOOD

C20 22uF

+3V3

GND

**NOTE:**  
VCC SWITCH,  
USB CHARGER,  
USB PORT  
are for blocks for the development prototype.  
They should be removed in or unpopulated any  
production version.  
Charges to 3.5V  
(Shouldn't be interfered with by shunt regulator)

KiCad E.D.A.	kiCad 7.0.6
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