The STM32 is the main controller, taking data from the rotating section via the fiber cable and GPS data, putting them in packets, and forwarding those. It can also receive feedback from the SD controller if necessary, though currently not needed.

+BATT
R2 18k
VBat_Sense
R3 10k
GND
Setup to work with 2S batteries

+3V3
R1 10k
Reset
J1
C3 1u
GND

+3V3
R4 NP
R5 NP
Boot0 R7 100k
Boot1 R8 100k
R9 0R0
R10 0R0
GND

+3V3
J2 ISP
1 2 3 4
SWDIO
SWCLK
GND

+3V3
C1 0.1u
C2 0.1u
C4 0.1u
C5 0.1u
GND

Y1 8MHz
R6 1M
GND

STM32F103CBT6 U1
Reset NRST 7
Boot0 BOOT0 44
PD0 5
PD1 6
PC13 2
PC14 3
PC15 4
VBat_Sense PB0 18
Boot1 PB1 19
PB2 20
PB3 39
PB4 40
PB5 41
PB6 42
PB7 43
PB8 45
PB9 46
PB10 21
PB11 22
PB12 25
PB13 26
PB14 27
PB15 28
VBAT 1
VDD 24
VDD 36
VDD 48
VDD 9
VDDA
VSS 23
VSS 35
VSS 47
VSSA 8
PA0 10
PA1 11
PA2 12 Unused_Fiber_Ser_TX
PA3 13 Fiber_Serial_In
PA4 14
PA5 15
PA6 16
PA7 17
PA8 29
PA9 30 TX_to_GPS
PA10 31 RX_from_GPS
PA11 32
PA12 33 GPS_PPS
PA13 34 SWDIO
PA14 37 SWCLK
PA15 38

Spare J3
4 3 2 1

RX_FROM_STM R13 0R0
TX_TO_STM R14 0R0

D1 Error
R11 150
R12 150
D2 Run
GND

D3 Power
+3V3
R15 150
GND

Sheet: radio
File: radio.sch

Sheet: SD
File: sd.sch

Sheet: FiberOptics
File: fiber.sch

Sheet: GPS
File: GPS.sch

Sheet: Power
File: Power.sch

FID1 Fiducial
FID2 Fiducial
barepcb
PCB1

H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole
GND

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Sheet: /
File: control_pcb.sch

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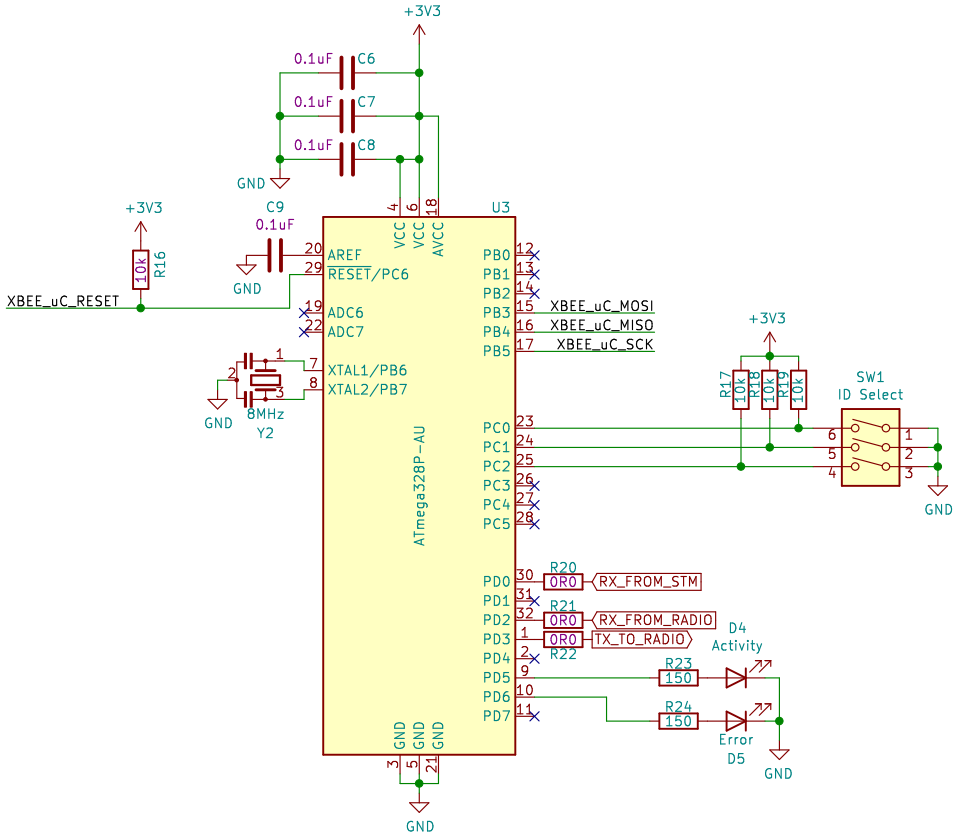
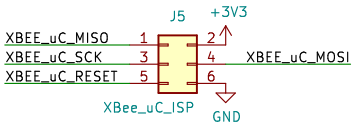
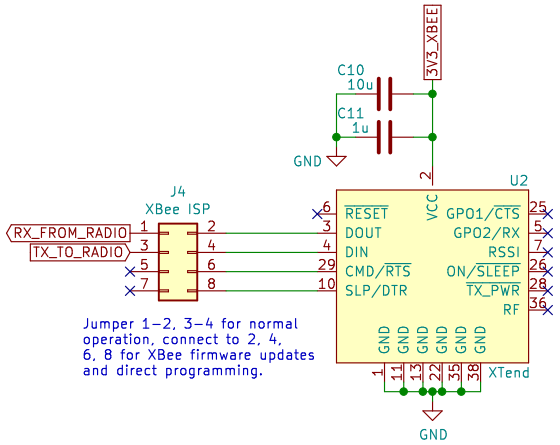
The XBee controller recieves the serial stream from the STM32 of GPS and E-Field data and retransmits it to the ground via XBee XTend in serial pass through mode. The uC can perform downsampling or selective data transmission to reduce the amount of data sent through the link, but currently we simply operate in a pass through mode and it is there to allow for future expansion.







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Sheet: /radio/
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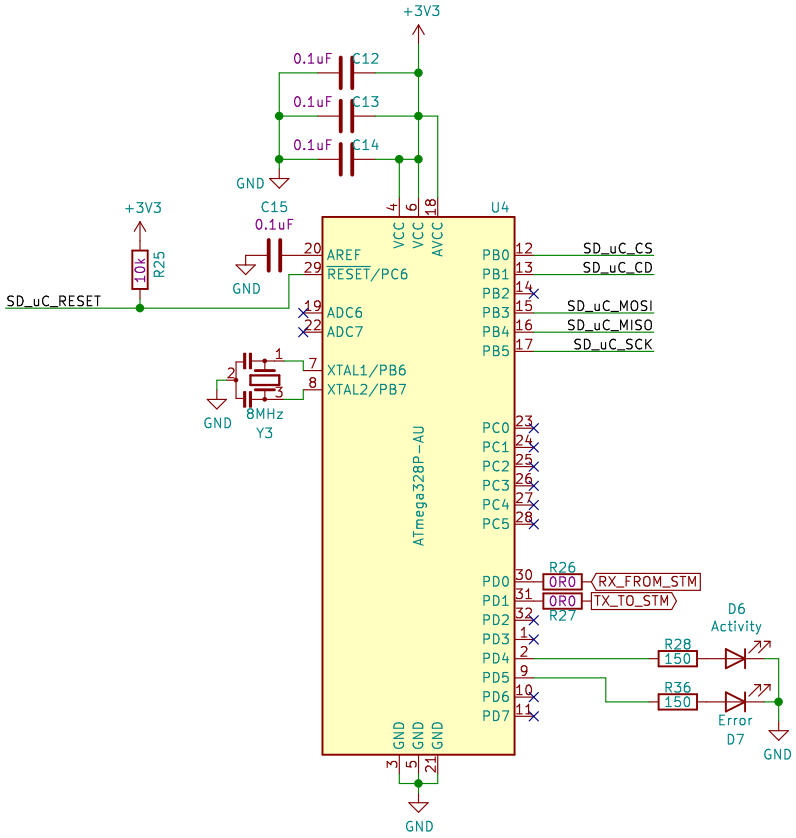
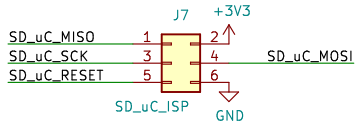
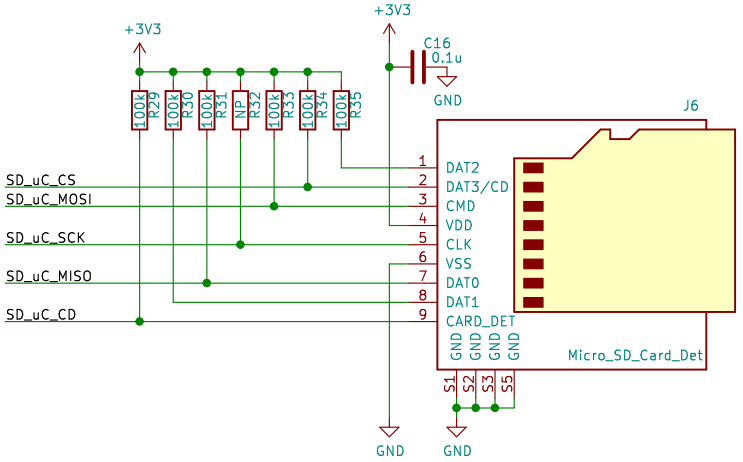
SD uC gets the serial data stream from the STM32 and writes it all to the SD card. It handles rolling the file name to the next available and then simply dumps everything it receives which should only be complete packets since the STM32 takes care of that.







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Sheet: /SD/
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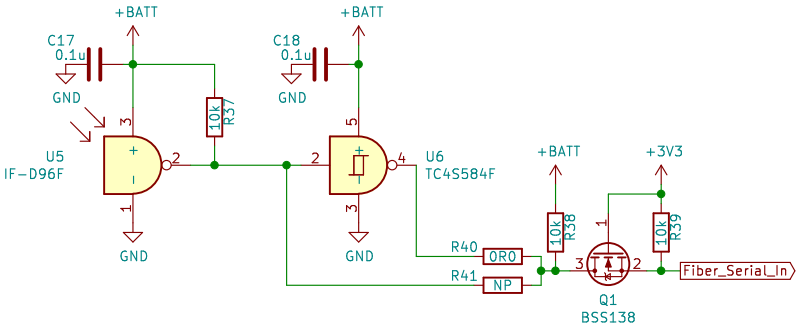
Receives the fiber optic signal, buffers, and creates a level shifted serial output of the signal. Optionally can invert the signal if the transmitter is ever changed.



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Sheet: /FiberOptics/
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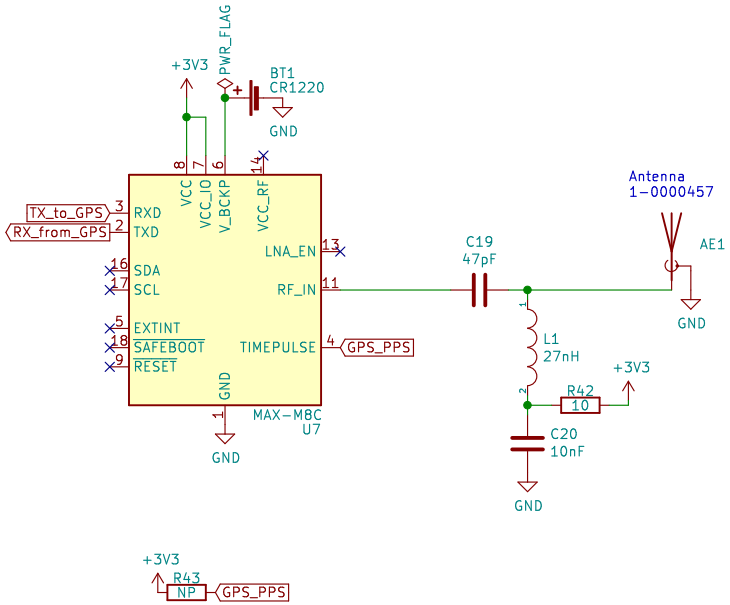
Active antenna GPS receiver sends GPS packets via serial to the STM32.



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Sheet: /GPS/
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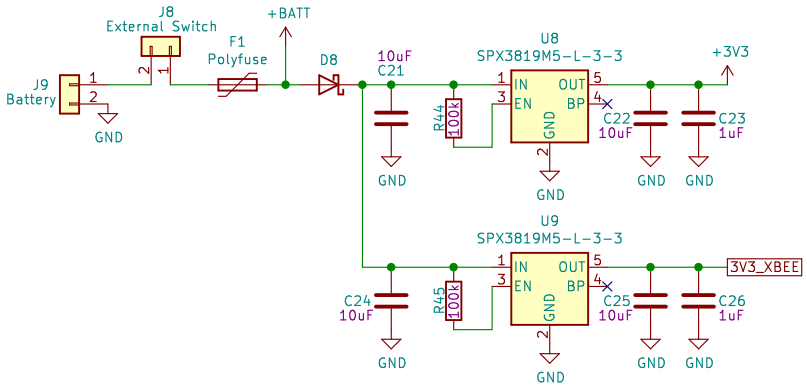
Regulate the incoming voltage to the 3V3 needed for almost all components in the design. The fiber receiver/buffer uses raw battery voltage.



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Sheet: /Power/
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