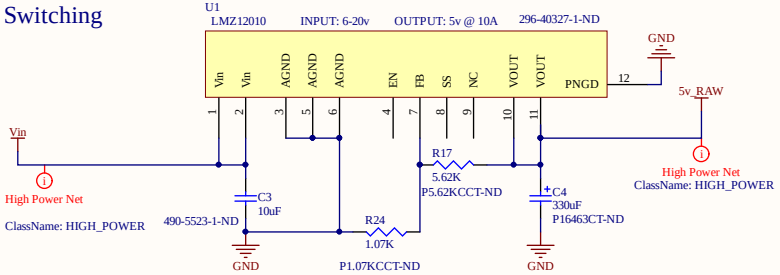
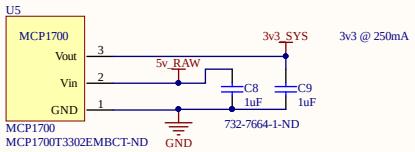
SYS 5v Switching

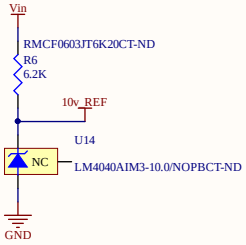


3v3 Linear



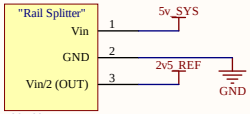
Precision Voltage References

10v Reference



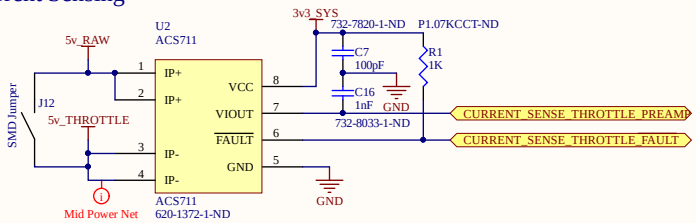
Note: Assumed calculated current of 2mA minimum required current is 100uA

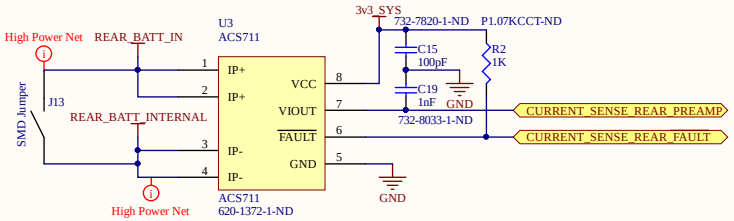
2v5v Reference

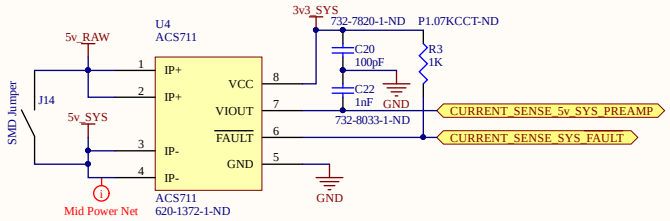


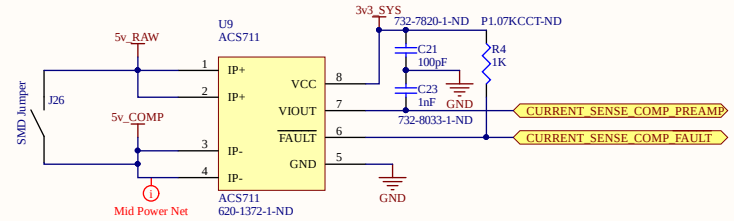
Max Current: 20mA

Current Sensing

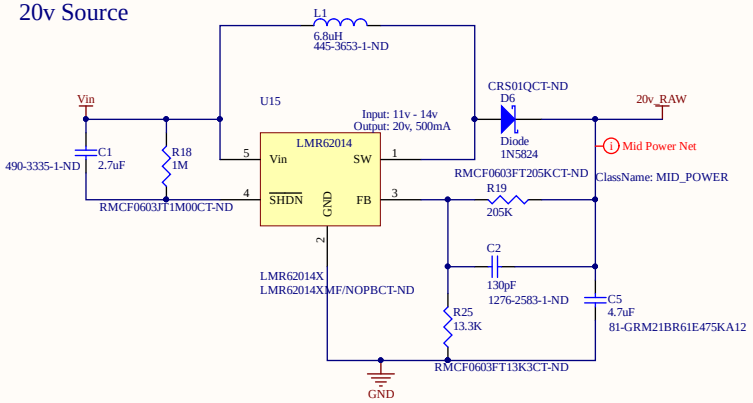








20v Source



GND Power Classification

Note: Even though GND is classified as "MID_POWER" parts of it must be manually routed as "HIGH_POWER" and the GND plane takes care of the rest.

Title	PowerManagement.SchDoc		
Size: A4	Number: 1	Engineer: Nick McComb	
Date: 2/8/2016	Time: 2:26:29 PM	Sheet 1 of 7	
File: C:\Users\nrpic_000\Google Drive\PCB Designs\ROSSPowerDistribution\PowerManagement.SchDoc			

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Power Input

J2
Input Power ~12v
Vin
GND
1
2
Vin
GND
Input Power
XT 60 Connector

XTend Power Output

J1
DC Jack
V+
GND
N/C
1
2
3
Vin
GND
BarrelJack_Female
CP-002A-ND

R/C Reciever

J3
Sig
V+
GND
3
2
1
5v_SYS
GND
Molex 3
WM4801-ND

Rear Power Switching

REAR_BATT_INTERNAL
REAR_BATT_OUT
K1
1
2
High Power Net
Note: Only 10mA required to activate
REAR_BATT_RELAY
Relay_CTRL
4
3
+
-
Relay-SPST
GND

Power Status LEDs

5V_RAW
RMCF0603JT330RCT-ND
R20
330
160-1423-1-ND
D7
LED2
REAR_BATT_IN
RMCF0603JT680RCT-ND
R21
680
160-1423-1-ND
D8
LED2
REAR_BATT_OUT
RMCF0603JT680RCT-ND
R5
680
160-1423-1-ND
D1
LED2
3v3_SYS
RMCF0603JT220RCT-ND
R22
220
160-1423-1-ND
D9
LED2
Vin
RMCF0603JT680RCT-ND
R23
680
160-1423-1-ND
D10
LED2
20v_RAW
P1.07KCCT-ND
R7
1.07K
160-1423-1-ND
D11
LED2
GND
Note: All resistors are 0603

Rear Power I/O

J8
Input Power ~12v
Vin
GND
1
2
REAR_BATT_IN
Input Power
XT 60 Connector
REAR_BATT_GND

J11
Input Power ~12v
Vin
GND
1
2
High Power Net
Input Power
XT 60 Connector
REAR_BATT_GND
ClassName: HIGH_POWER
SMD Jumper
J51
BK-6010-ND
F1
Fuse
1
2
High Power Net
REAR_BATT_OUT
High Power Net
ClassName: HIGH_POWER
ClassName: HIGH_POWER
Note: Fuse is standard automotive, ATC, ATO
Note: Fuse should be >= 5A

Rear Manual Bypass

REAR_BATT_INTERNAL
REAR_BATT_OUT
SMD Jumper
J30

Computer Power Connection

UE27AC54100-ND
J27
USB A Conn
V+
D+
D-
GND
1
2
3
4
5v_COMP
GND
USB A Connector

Arduino UNO Power

J40
V+
GND
1
2
5v_SYS
GND
Molex 2-pin
WM4800-ND

Iridium Beacon Power

J31
V+
GND
1
2
Vin
GND
Molex 2-pin
WM4800-ND
Note: Place close to input voltage

AUX Power Access Points

J36
Servo
SIG
V+
GND
3
2
1
AUX_7
5v_SYS
GND
Servo_Connection

J37
Servo
SIG
V+
GND
3
2
1
AUX_6
5v_SYS
GND
Servo_Connection

Title	PowerDistribution.SchDoc		
Size: A4	Number: 2	Engineer: Nick McComb	
Date: 2/8/2016	Time: 2:26:29 PM	Sheet 2 of 7	
File: C:\Users\nrpic_000\Google Drive\PCB Designs\ROSSPowerDistribution\PowerDistribution.SchDoc			

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Steering Input

J4
Sig 3 — STEER_SIG_3v3
V+ 2
GND 1 — GND
Molex 3
WM4801-ND

Steering Output

J5
Sig 3 — STEER_SIG_5v
V+ 2
GND 1 — GND
Molex 3
WM4801-ND

Throttle Input

J6
Sig 3 — THROTTLE_SIG_3v3
V+ 2
GND 1 — GND
Molex 3
WM4801-ND

Throttle Output

J7
Sig 3 — THROTTLE_SIG_5v
5v_THROTTLE
V+ 2
GND 1 — GND
Molex 3
WM4801-ND

XTend Sig Input

J9 WM4803-ND
CURRENT_SENSE 5 — CURRENT_SENSE_XTEND_PREAMP
RSSI 4 — XTEND_RSSI
XT DI 3 — XTEND_DI
XT DO 2 — XTEND_DO
GND 1 — GND
XTEND_FTDI_RX
XTEND_FTDI_TX
MOLEX 5 Pin
XTend DB MCU Connection

XTend Sig Output

J10 WM4803-ND
CURRENT_SENSE 5
RSSI 4
XT DI 3
XT DO 2
GND 1 — GND
MOLEX 5 Pin
XTend DB MCU Connection

CD0603-S01575CT-ND
Note: ONLY POPULATE ONE BRANCH
D16
Diode S01575
S01575
R51 10K RMCF0603FT10K0CT-ND
R52 5.62K
R53 40K RMCF0603FT40K2CT-ND
CURRENT_SENSE_XTEND
P5.62KCCT-ND
GND
Note: Assuming absolute max XTend Current of 3A (@12v)

Aux Port

J29
AUX Port
AUX_0 AUX_1 AUX_RX AUX_TX AUX_4 AUX_5 AUX_6 AUX_7
0 1 2 3 4 5 6 7
AUX_3 AUX_4 AUX_5 AUX_6 AUX_7

Logic Level Shifting

U8
MAX3374
VL 3 — 3v3_SYS
VCC 7 — 5v_SYS
GND 2 — GND
I VL1 5 — STEER_SIG_3v3
O VCC 1 8 — STEER_SIG_5v
I VL2 4 — THROTTLE_SIG_3v3
O VCC 2 1 — THROTTLE_SIG_5v
THREE STATE 6
MAX3374
Note: Referred to as MAX3374E on datasheet
Note: Supplied by MOUSER
Note: Ensure vias can provide test points when routing

490-1695-1-ND 5v_SYS C6 1uF — C24 .1uF 490-1683-1-ND
3v3_SYS C25 .1uF 490-1683-1-ND
GND

Fault Processing

U10
D 2 — VDD 14 — 3v3_SYS
C 3
B 4
A 5
AND J 1
E 9 — CURRENT_SENSE_THROTTLE_FAULT
F 10 — CURRENT_SENSE_SYS_FAULT
G 11 — CURRENT_SENSE_REAR_FAULT
H 12 — CURRENT_SENSE_COMP_FAULT
AND K 13 — CURRENT_SENSE_FAULT
GND 7 — GND
CD4082
296-31523-1-ND

Test Points

J16 Test Point TestPoint — CURRENT_SENSE_REAR — Labeled: C_REA
J17 Test Point TestPoint — CURRENT_SENSE_THROTTLE — Labeled: C_THR
J18 Test Point TestPoint — CURRENT_SENSE_5v_SYS — Labeled: C_SYS
J19 Test Point TestPoint — VOLTAGE_SENSE_ELECTRONICS_BATT — Labeled: V_EBX
J20 Test Point TestPoint — VOLTAGE_SENSE_REAR_BATT — Labeled: V_REA
J21 Test Point TestPoint — FTDI_RX — Labeled: FT_RX
J22 Test Point TestPoint — FTDI_TX — Labeled: FT_TX
J23 Test Point TestPoint — REAR_BATT_IN — Labeled: R_B_IN
J39 Test Point TestPoint — 3v3_SYS — Note: FT_RX -> uC TX
J24 Test Point TestPoint — 5v_RAW
J28 Test Point TestPoint — GND
J41 Test Point TestPoint — 2v5_REF
J42 Test Point TestPoint — 10v_REF
J43 Test Point TestPoint — 20v_RAW

Title	SignalProcessing.SchDoc		
Size: A4	Number: 3	Engineer: Nick McComb	
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File: C:\Users\nrpic_000\Google Drive\PCB Designs\ROSSPowerDistribution\SignalProcessing.SchDoc			

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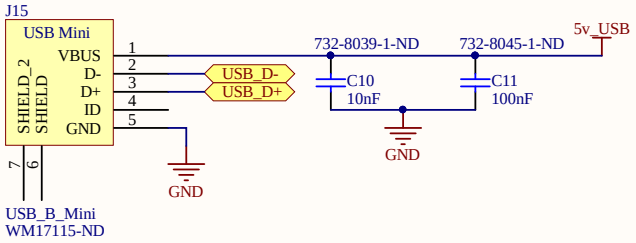
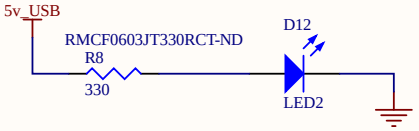
Corvallis, OR

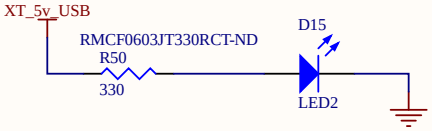
Microcontroller USB Connection



FTDI Status Indicators

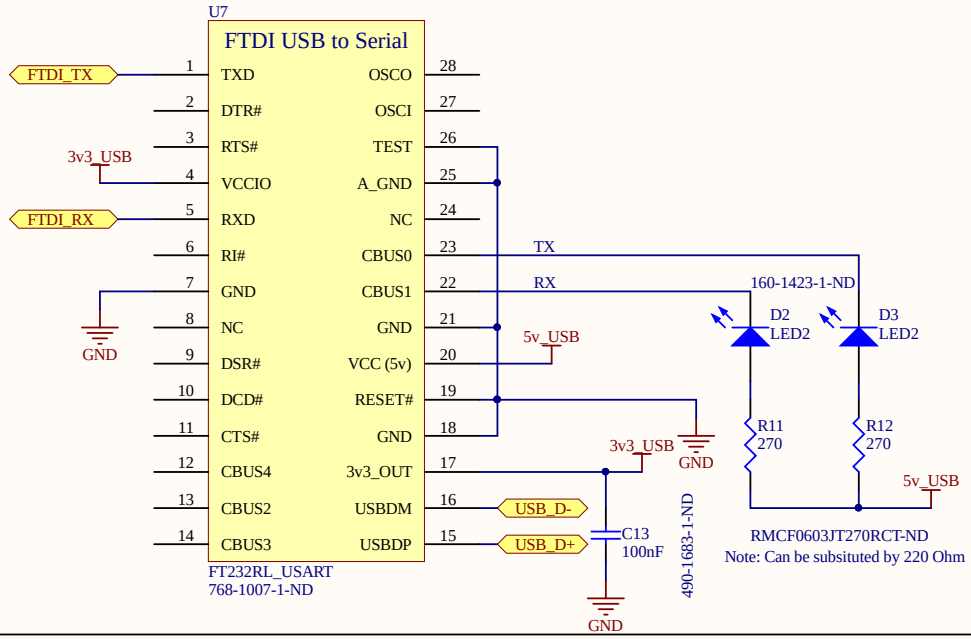


Note: Indicates the status of the USB power.
Note: uC Indicator



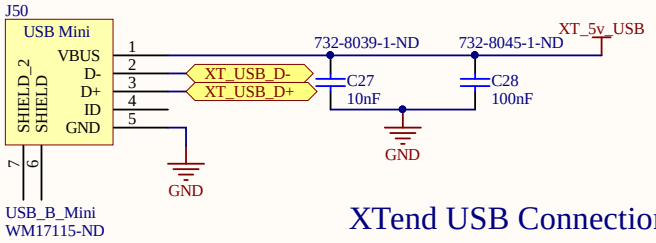
Note: Indicates the status of the USB power.
Note: uC Indicator

Onboard Microcontroller FTDI

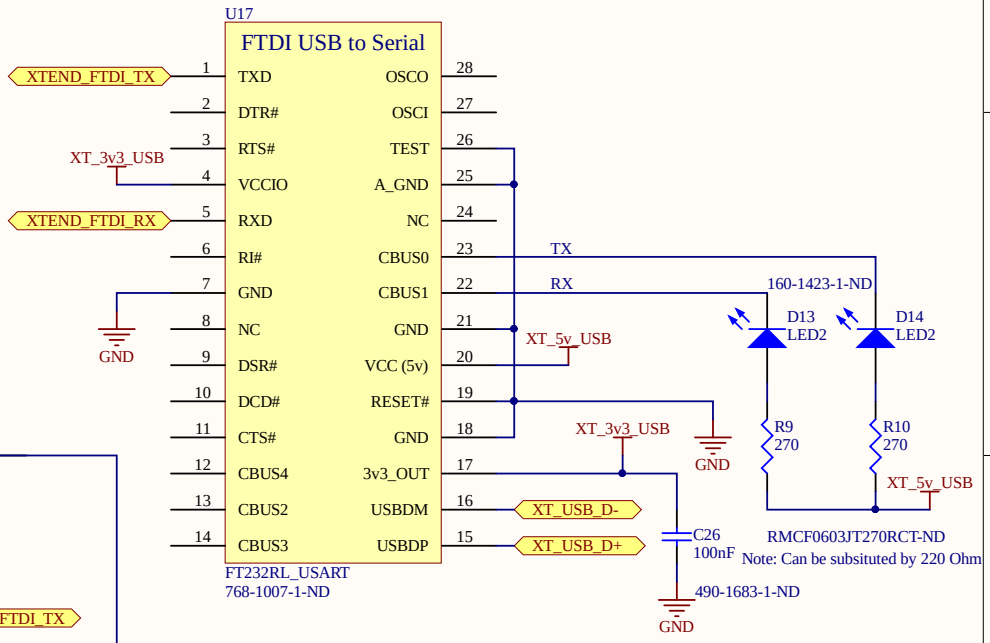


Note: Can be subsituted by 220 Ohm

XTend USB Connection



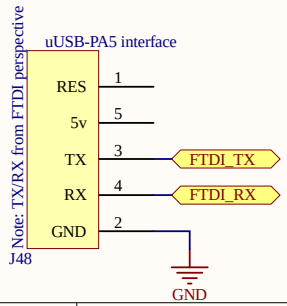
XTend FTDI

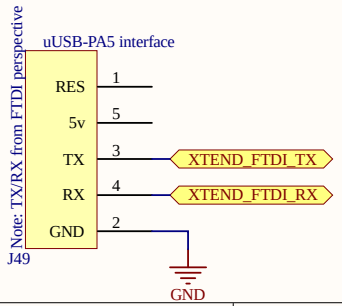


Note: Can be subsituted by 220 Ohm

USB To Serial IC (FTDI)

Note: Backup, do not populate unless onboard FTDI chips do not work





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Date: 2/8/2016	Time: 2:26:29 PM	Sheet 4 of 7	
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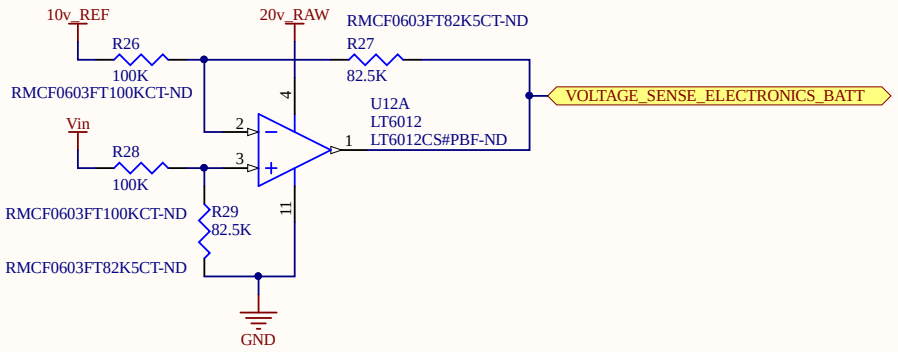
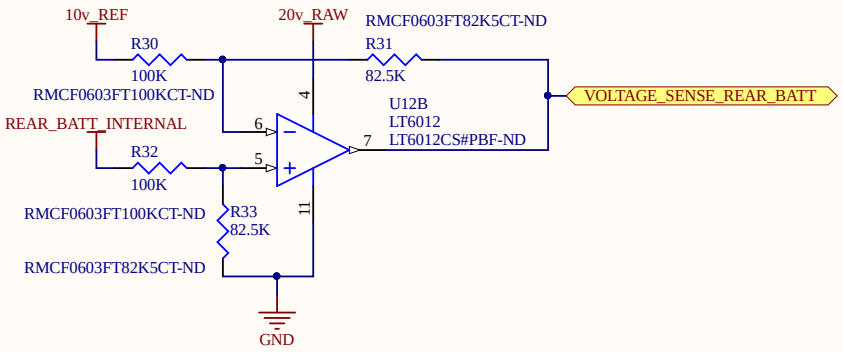
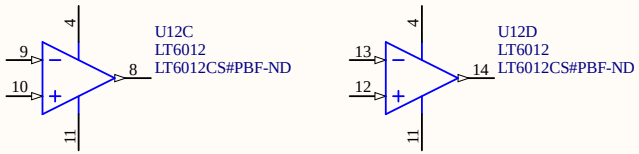
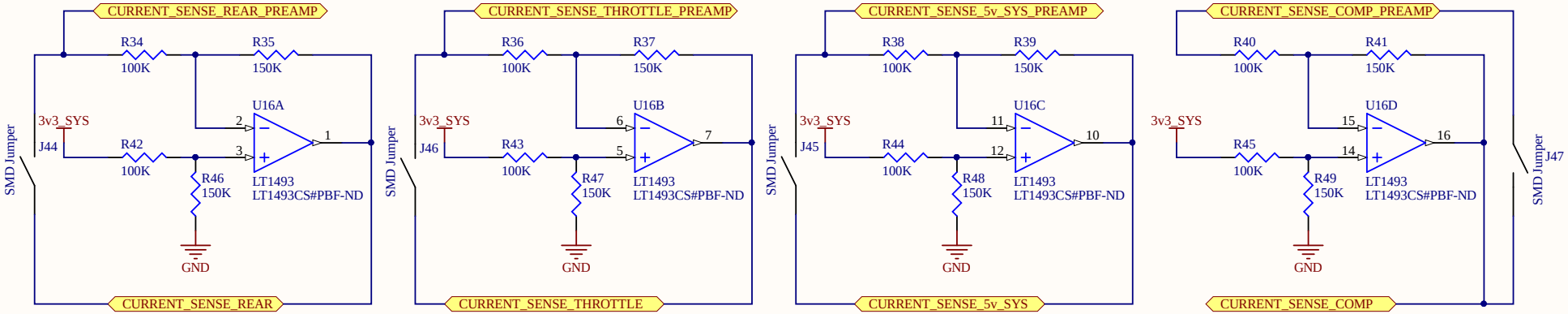


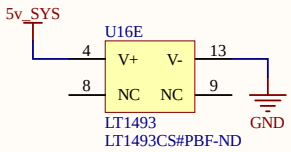
Note: VOLTAGE_SENSE_ELECTRONICS_BATT can be calculated as the following: VEBAT = (Vin - 10.0v) * .825



Note: VOLTAGE_SENSE_ELECTRONICS_BATT can be calculated as the following: VEBAT = (Vin - 10.0v) * .825







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Size: A4	Number: 5	Engineer: Nick McComb	
Date: 2/8/2016	Time: 2:26:29 PM	Sheet 5 of 7	
File: C:\Users\nrpic_000\Google Drive\PCB Designs\ROSSPowerDistribution\SignalProcessing_Amplifiers.SchDoc			

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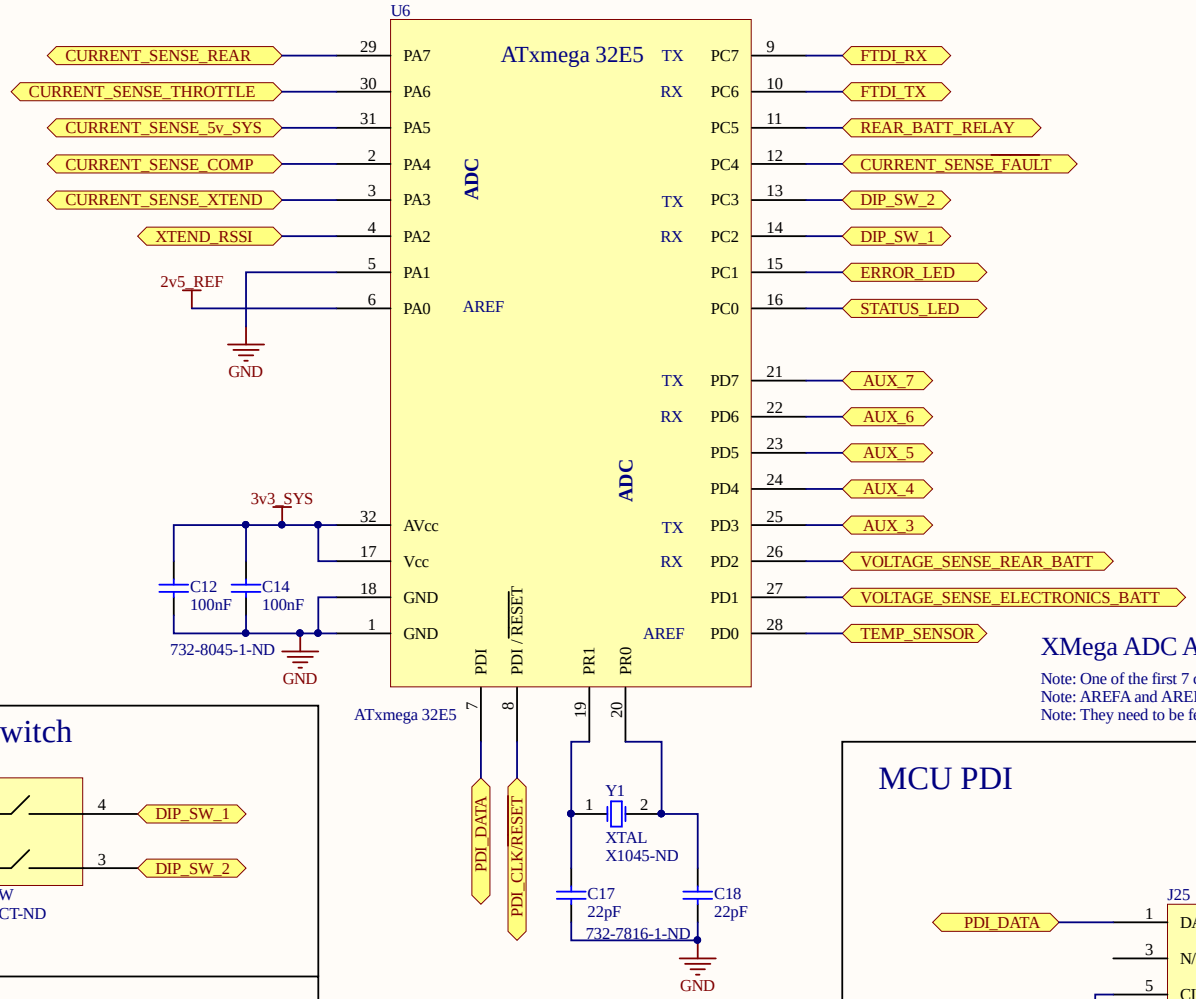
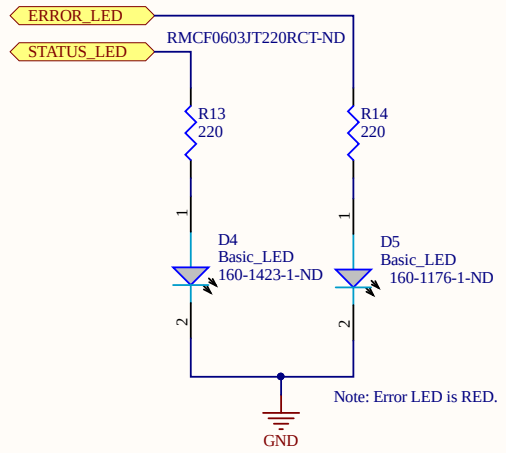
MCU



MCU LEDs

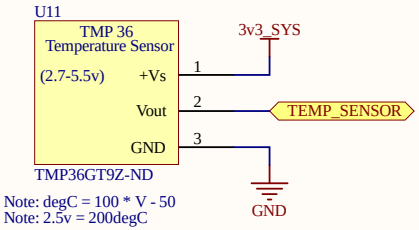


XMega ADC Application Notes

Note: One of the first 7 channels needs to be GND, for our reference
Note: AREFA and AREFD are pin 0
Note: They need to be fed 3.3-.6 volts

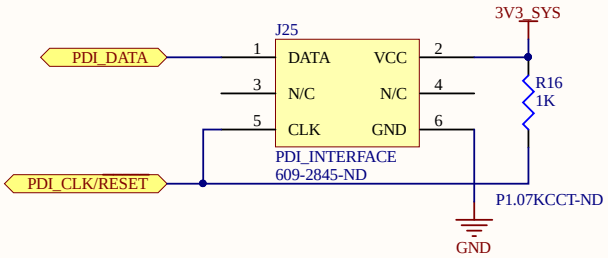
Settings Switch

Temperature Sensor

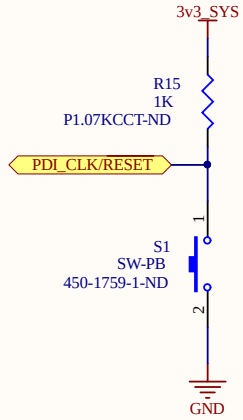


Note: degC = 100 * V - 50
Note: 2.5v = 200degC

MCU PDI



MCU Reset



Title	Microcontroller.SchDoc		
Size: A4	Number: 6	Engineer: Nick McComb	
Date: 2/8/2016	Time: 2:26:29 PM	Sheet 6 of 7	
File:	C:\Users\nrpic_000\Google Drive\PCB Designs\ROSSPowerDistribution\Microcontroller.SchDoc		

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Mounting Hardware

J32
Mounting Hole
MountingHoles

J33
Mounting Hole
MountingHoles

J38
Mounting Hole
MountingHoles

J34
Mounting Hole
MountingHoles

J35
Mounting Hole
MountingHoles

Title	Hardware.SchDoc		
Size: A4	Number: 7	Engineer: Nick McComb	
Date: 2/8/2016	Time: 2:26:30 PM	Sheet 7 of 7	
File:	C:\Users\nrpic_000\Google Drive\PCB Designs\ROSSPowerDistribution\Hardware.SchDoc		

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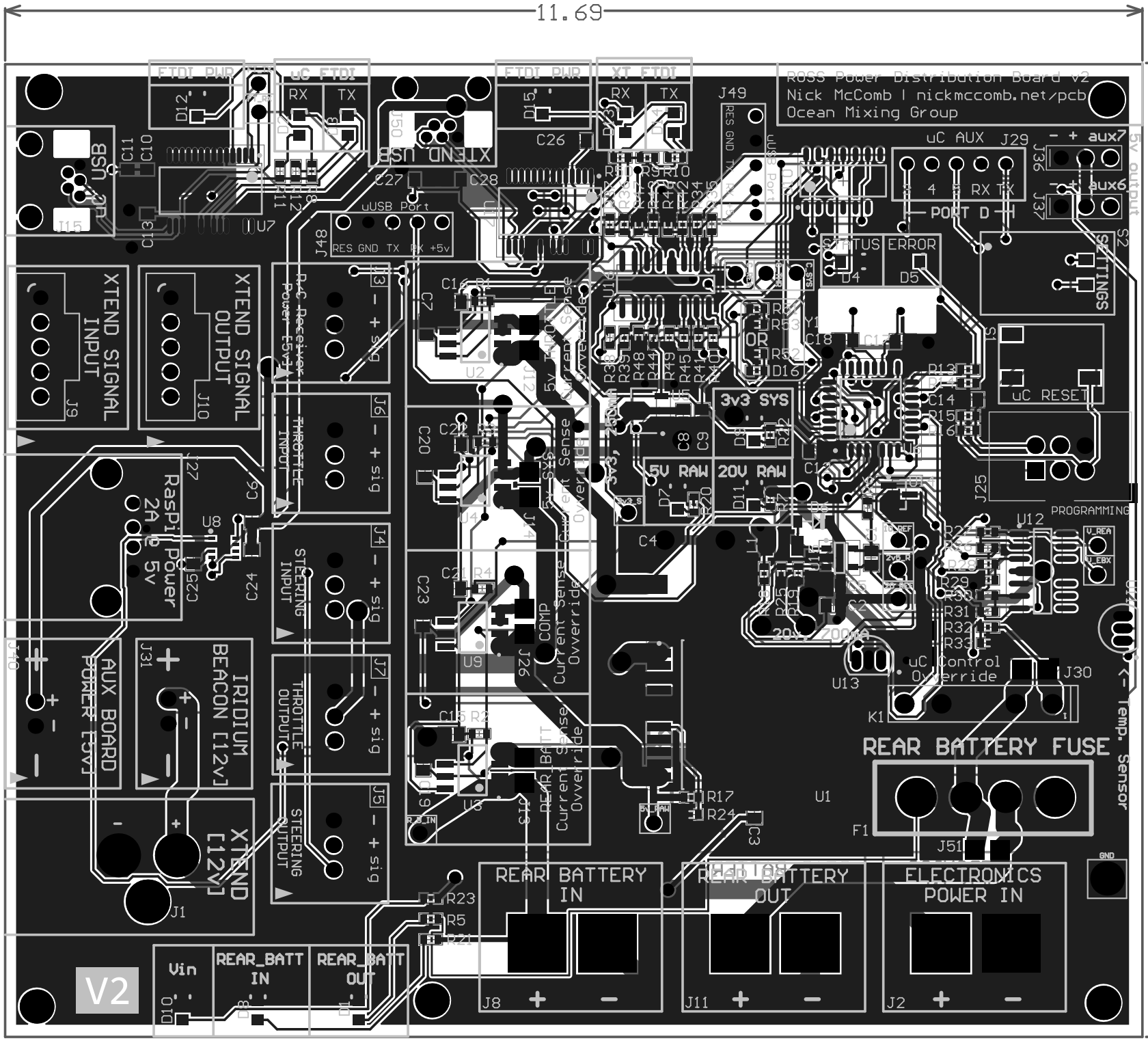
11.69
10.01
ROSS Power Distribution Board v2
Nick McComb | nickmccomb.net/pcb
Ocean Mixing Group
FTDI PWR
uC FTDI
XT FTDI
RX
TX
XTEND USB
uUSB Port
RES GND TX RX +5v
uC AUX
PORT D
STATUS
ERROR
SETTINGS
uC RESET
XTEND SIGNAL INPUT
XTEND SIGNAL OUTPUT
R/C Receiver Power [5v]
THROTTLE INPUT
STEERING INPUT
THROTTLE OUTPUT
STEERING OUTPUT
RaspPi Power 2A @ 5v
AUX BOARD POWER [5v]
IRIDIUM BEACON [12v]
XTEND [12V]
3v3 SYS
5V RAW
20V RAW
5v SYS
PROGRAMMING
uC Control Override
REAR BATTERY FUSE
REAR BATTERY IN
REAR BATTERY OUT
ELECTRONICS POWER IN
Temp. Sensor
Vin
REAR_BATT IN
REAR_BATT OUT
V2