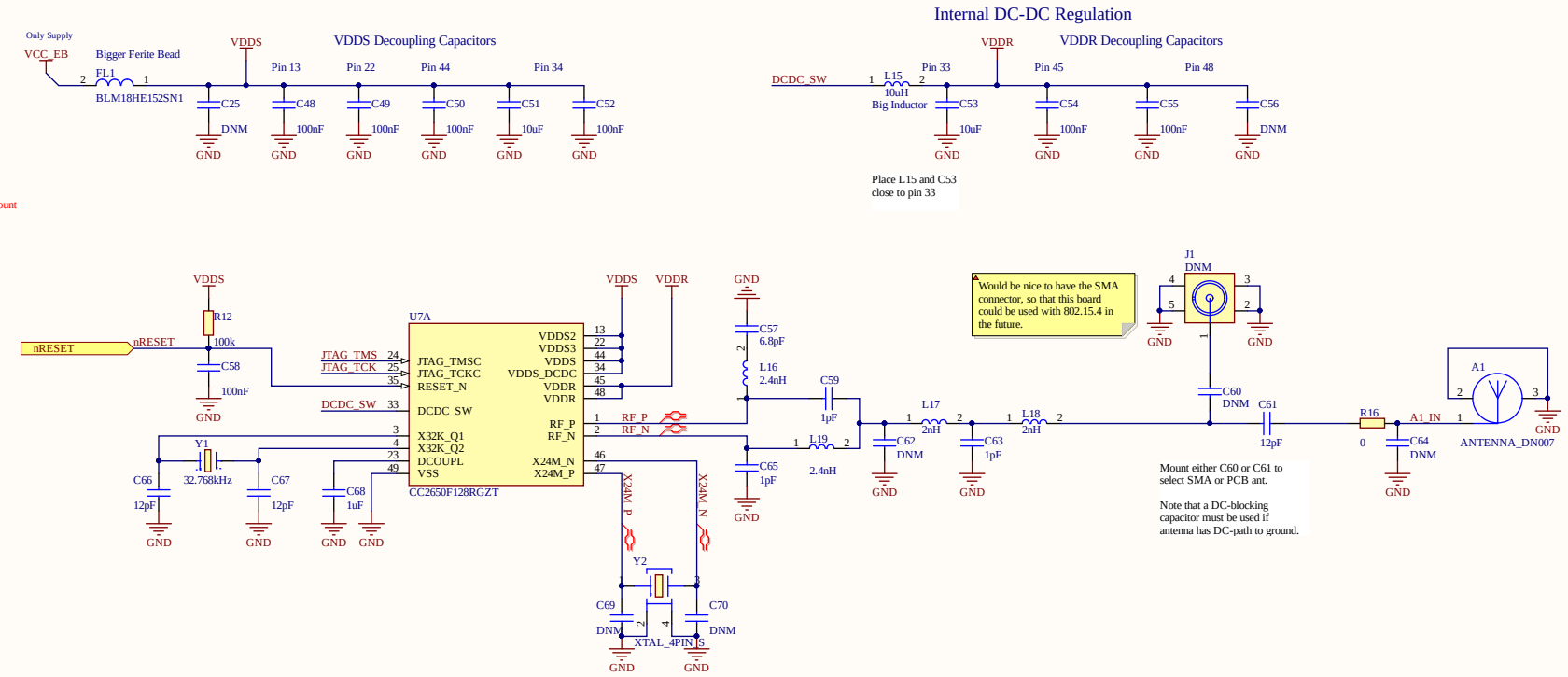
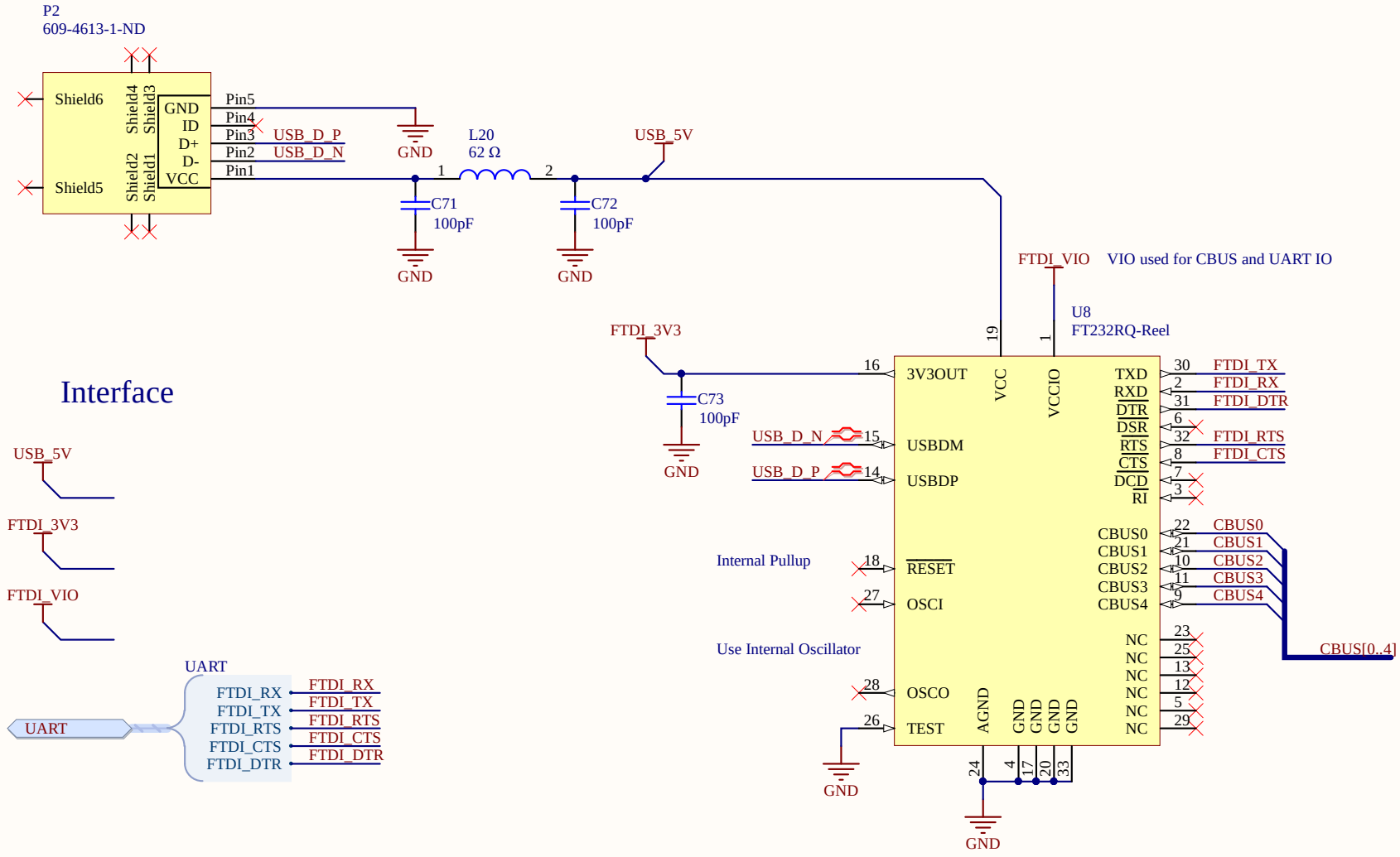
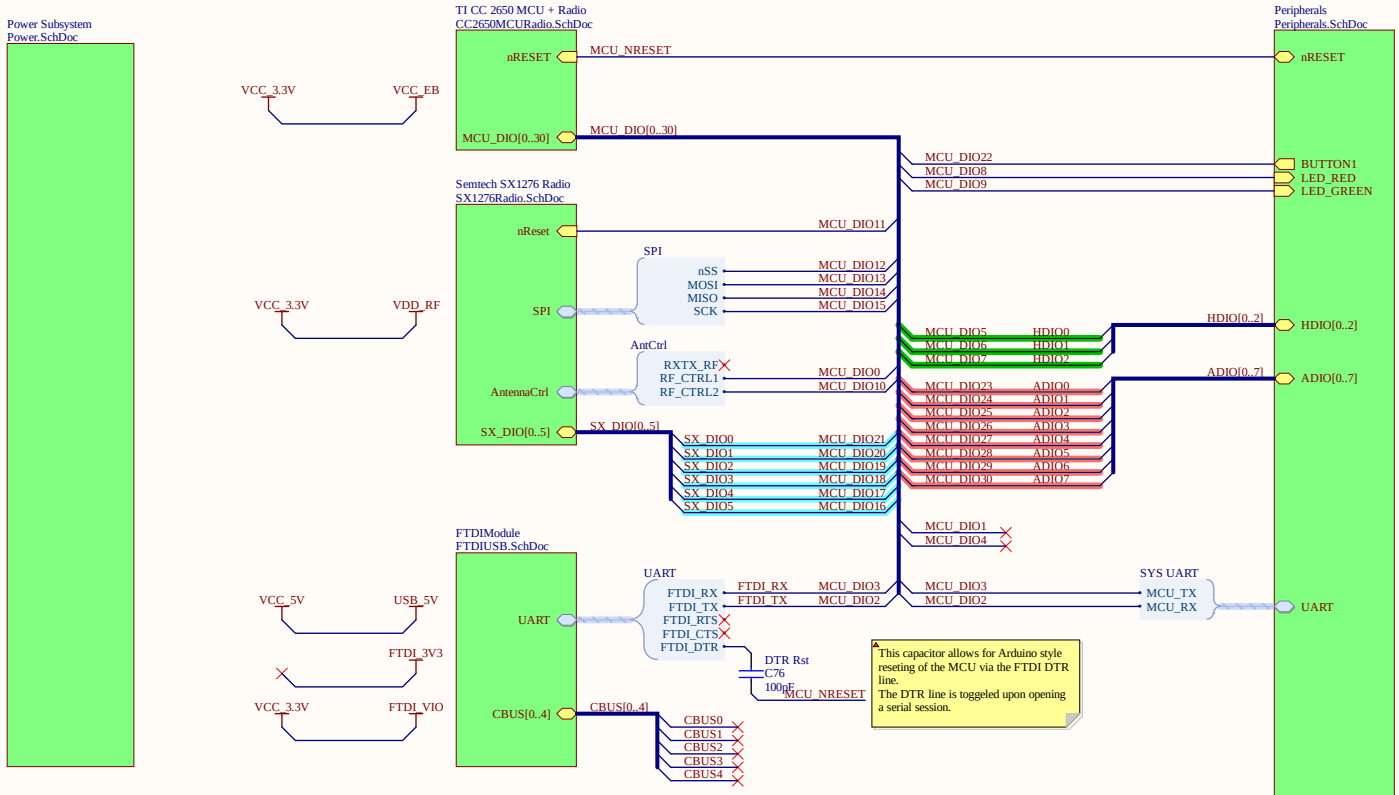
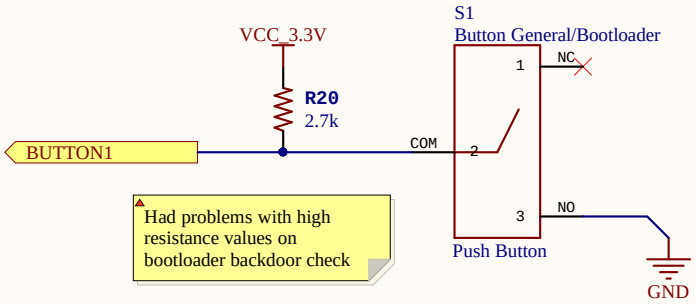


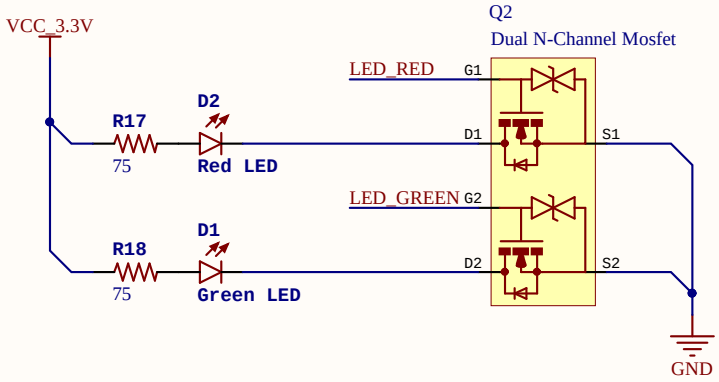
Title	TI CC2650 Radio and MCU	
Size: A3	Number:	Revision: 3
Date: 12/8/2016	Sheet of	
File: C:\Users\..\CC2650MCURadio.SchDoc	Drawn By: Craig Hesling	

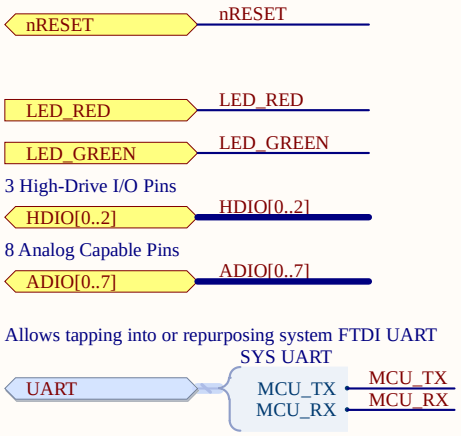


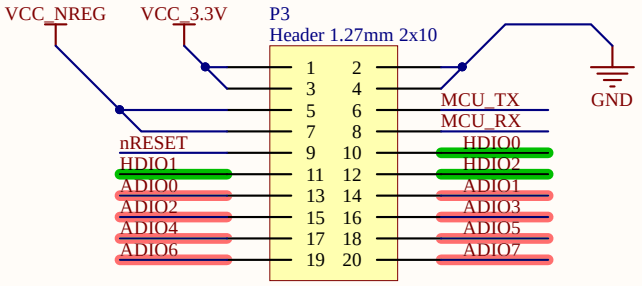
Title: FTDI USB		
Size: A	Number:	Revision: 3
Date: 12/8/2016		Sheet of
File: C:\Users\..\FTDIUSB.SchDoc		Drawn By: Craig Hesling


Power Subsystem
Power.SchDoc
TI CC 2650 MCU + Radio
CC2650MCURadio.SchDoc
nRESET
MCU_NRESET
VCC_3.3V
VCC_EB
MCU_DIO[0..30]
MCU_DIO[0..30]
Semtech SX1276 Radio
SX1276Radio.SchDoc
nReset
MCU_DIO11
SPI
nSS
MOSI
MISO
SCK
MCU_DIO12
MCU_DIO13
MCU_DIO14
MCU_DIO15
VCC_3.3V
VDD_RF
SPI
AntCtrl
RXTX_RF
RF_CTRL1
RF_CTRL2
MCU_DIO0
MCU_DIO10
AntennaCtrl
SX_DIO[0..5]
SX_DIO[0..5]
SX_DIO0
SX_DIO1
SX_DIO2
SX_DIO3
SX_DIO4
SX_DIO5
MCU_DIO21
MCU_DIO20
MCU_DIO19
MCU_DIO18
MCU_DIO17
MCU_DIO16
FTDIModule
FTDIUSB.SchDoc
UART
FTDI_RX
FTDI_TX
FTDI_RTS
FTDI_CTS
FTDI_DTR
FTDI_RX
FTDI_TX
MCU_DIO3
MCU_DIO2
VCC_5V
USB_5V
FTDI_3V3
VCC_3.3V
FTDI_VIO
UART
CBUS[0..4]
CBUS[0..4]
CBUS0
CBUS1
CBUS2
CBUS3
CBUS4
DTR Rst
C76
100nF
MCU_NRESET
This capacitor allows for Arduino style reseting of the MCU via the FTDI DTR line.
The DTR line is toggeled upon opening a serial session.
Peripherals
Peripherals.SchDoc
nRESET
BUTTON1
LED_RED
LED_GREEN
MCU_DIO22
MCU_DIO8
MCU_DIO9
HDIO[0..2]
HDIO[0..2]
MCU_DIO5
MCU_DIO6
MCU_DIO7
HDIO0
HDIO1
HDIO2
ADIO[0..7]
ADIO[0..7]
MCU_DIO23
MCU_DIO24
MCU_DIO25
MCU_DIO26
MCU_DIO27
MCU_DIO28
MCU_DIO29
MCU_DIO30
ADIO0
ADIO1
ADIO2
ADIO3
ADIO4
ADIO5
ADIO6
ADIO7
MCU_DIO1
MCU_DIO4
SYS UART
MCU_TX
MCU_RX
MCU_DIO3
MCU_DIO2
UART
Use DIO0 as bootloader backdoor pin if I can't get FTDI to enter bootloader
Fid1
Fiducial
Fid2
Fiducial
Fid3
Fiducial
Fid4
Fiducial
Title
LoRaBug Main
Size
A3
Number
Revision
3
Date:
12/8/2016
Sheet of
File:
C:\Users\..\Main.SchDoc
Drawn By:
Craig Hesling









Title: Peripherals		
Size: A	Number:	Revision: 3
Date: 12/8/2016		Sheet of
File: C:\Users\..\Peripherals.SchDoc		Drawn By: Craig Hesling

FIX the diode part to reflect new better diode.
It is a normal didode

VCC_5V
D3
Schottky Diode
VCC_NREG

Battery connects directly to 3.3V rail

VCC_BAT
VCC_3.3V

J2
Battery Terminal
BAT
pos
neg
VCC_BAT
GND

VNRG
VCC_NREG

GND
GND

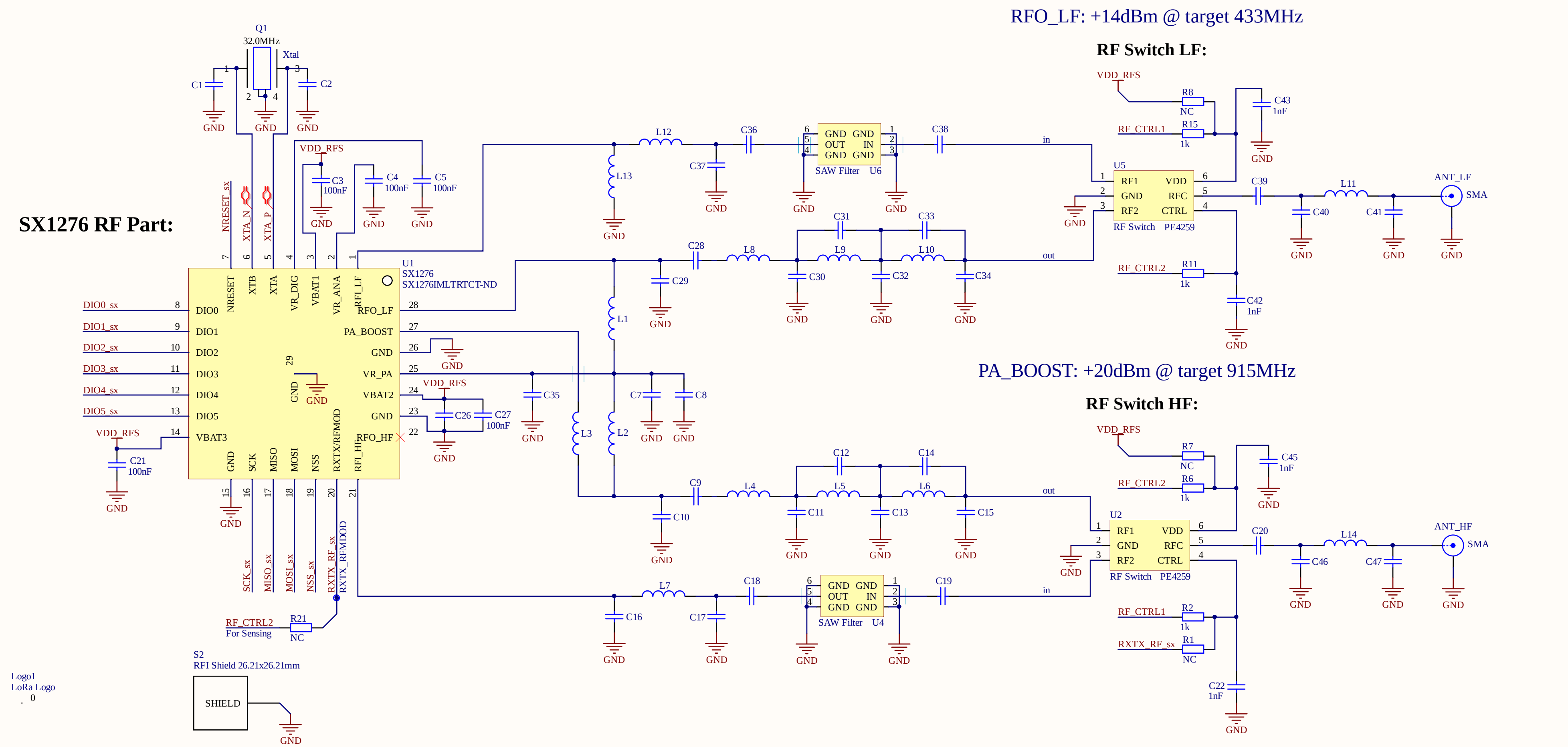
Voltage regulation when USB present

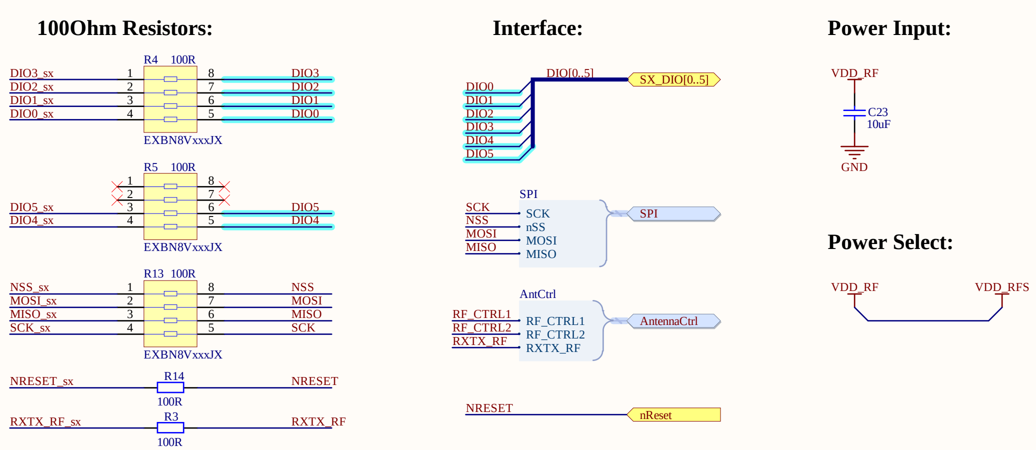
Typically 60-80nA reverse leakage w/ 2AA batteries

VCC_NREG
U9
3.3V 600mA LDO
VIN
VOUT
EN
GND
NC
VCC_3.3V
C74
1uF
GND
C75
1uF
GND

VCC_5V
R19
47k
G1
D1
G2
D2
S1
S2
Q4
Dual N-Channel Mosfet
GND

Title: Power		
Size: A	Number:	Revision: 3
Date: 12/8/2016		Sheet of
File: C:\Users\..\Power.SchDoc		Drawn By: Craig Hesling



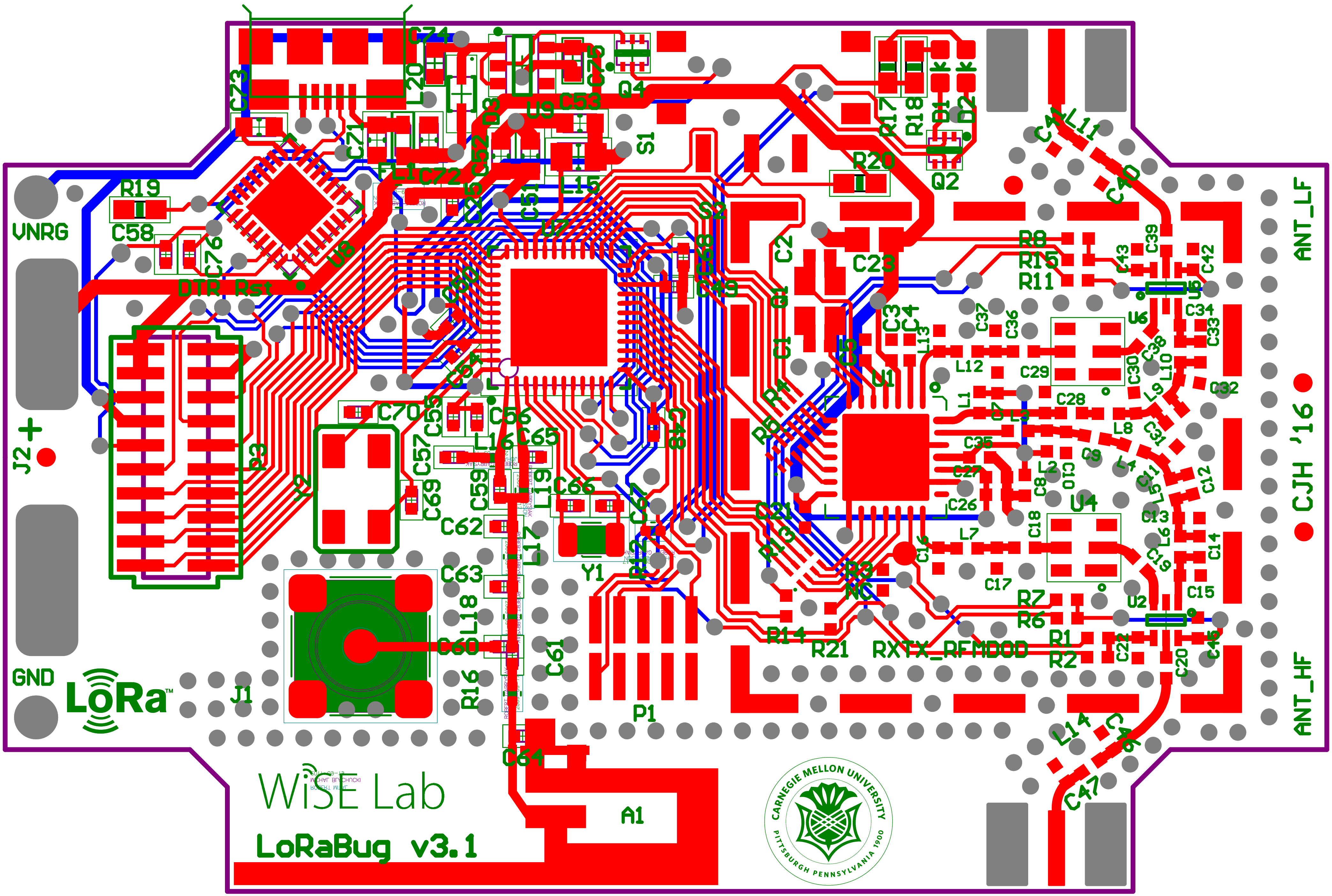


Design Notes

* PA_BOOST (Power Amplifier Boost) is configured for the high frequencie(HF) side. This provieds the +20dBm to the HF side. So, we do not use RFO_HF.
* The LF side can only do +14dBm with the RFO_LF
* Saw filter U4 should be 16MHz wide and centered at 915MHz
* Saw filter U6 should be centered at 433MHz
* When RF Switch CTRL is high RF1 is selected

RF Switch Configuration:
* The given resistor configuration is for linked control of both RF switches through the complement pair RF_CTRL1 and RF_CTRL2. This is so that you can disable all power to the RF switches in sleep mode.
* When RF_CTRL1 is high and RF_CTRL2 is low, both RF switches are in TX mode.
  When RF_CTRL1 is low and RF_CTRL2 is high, both RF switches are in RX mode.
  When RF_CTRL1 and RF_CTRL2 are low, both RF switches are disabled and no power is consumed.
  When RF_CTRL1 and RF_CTRL2 are high, both RF switches are in TX mode.

Title			
Semtech SX1276 Radio			
Size: A3	Number		Revision: 3.1
Date: 12/8/2016		Sheet of	
File: C:\Users\..\SX1276Radio.SchDoc		Drawn By: Craig Hesling	



VNRG
GND
J2
J1
DTR
Rst
RXTX_RFMOD
ANT_LF
ANT_HF
CJH '16
A1
P1
Y1
Y2
U1
U2
U4
U5
U6
U7
U8
U9
S1
S2
Q1
Q2
Q4
D1
D2
D3
F1
LoRa
WiSE Lab
LoRaBug v3.1
CARNEGIE MELLON UNIVERSITY
PITTSBURGH PENNSYLVANIA 1900