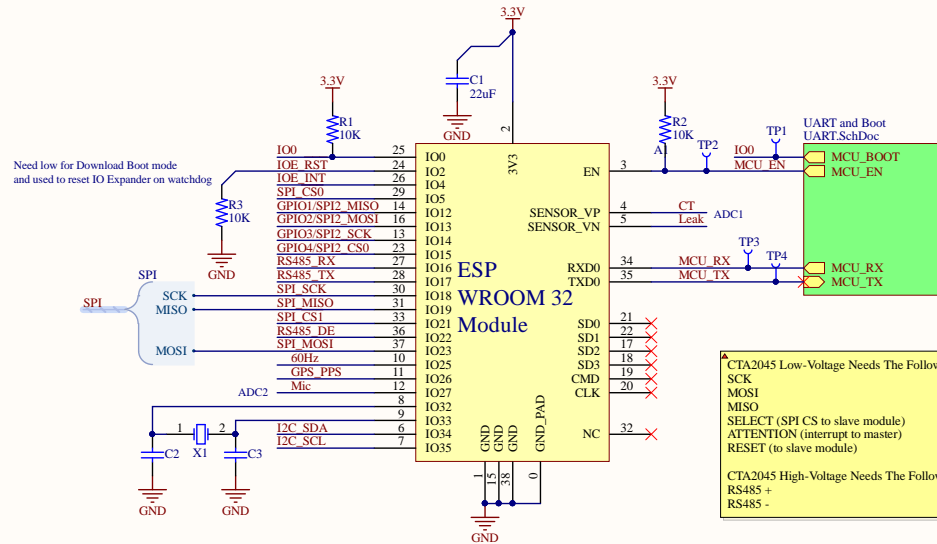
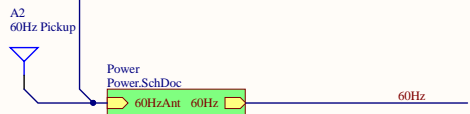
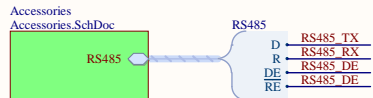
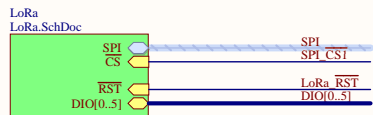
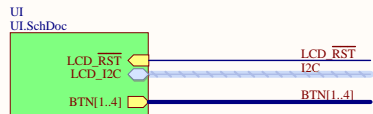
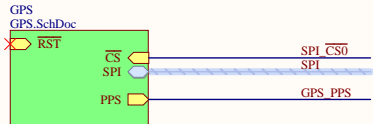


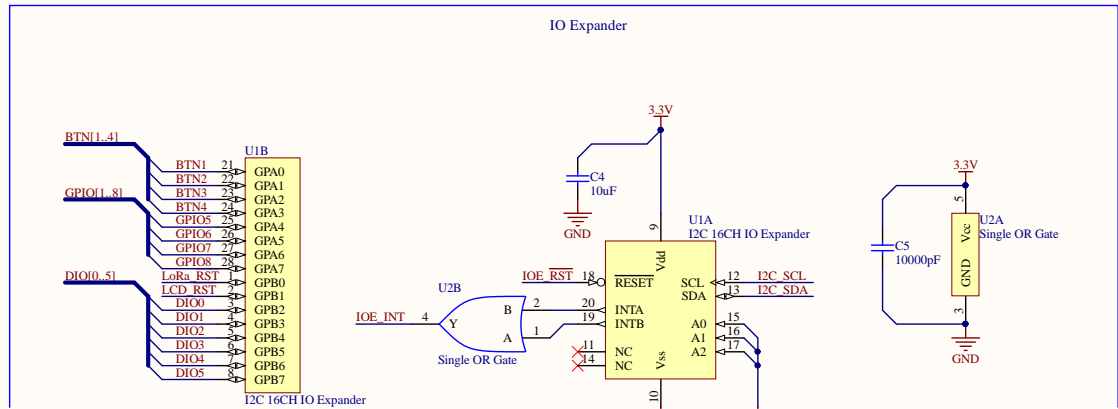
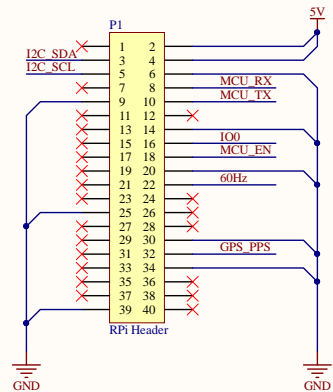
Peripherals Mapping
 U0(UART 0) - Debug/Prgrm
 U2(UART 2) - RS485 CEA2045
 VSPI(SPI3) - GPS and LCD (can do UART to GPS if desired)



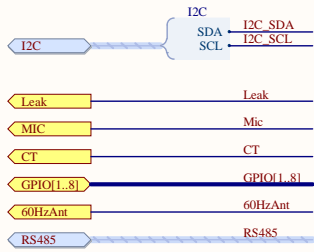
CTA2045 Low-Voltage Needs The Following:
 SCK
 MOSI
 MISO
 SELECT (SPI CS to slave module)
 ATTENTION (interrupt to master)
 RESET (to slave module)

CTA2045 High-Voltage Needs The Following:
 RS485 +
 RS485 -

TODO:
 * Replace Crystal and crystal caps with own part - check crystal caps values



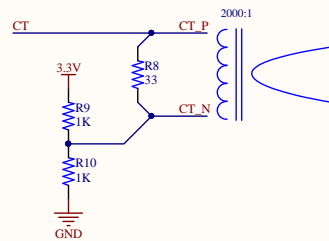
Main Board Interface



The accessories interface was designed around being able to run a CTA2045 Low Power interface(SPI + 2 IO pins) and two relays.

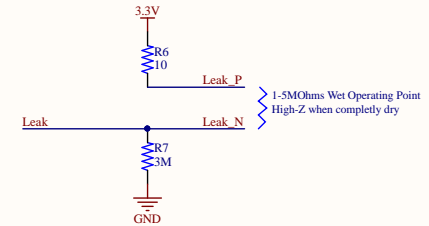
Other potentially useful protocols, like I2C, RS485, and sensor controls have also been exposed into the header.

Current Transformer

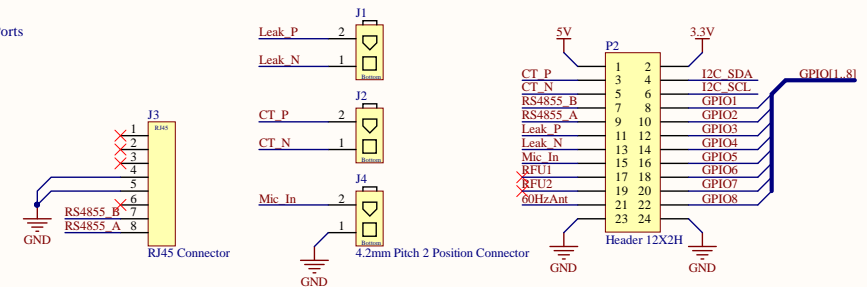


Leak Detection Cable

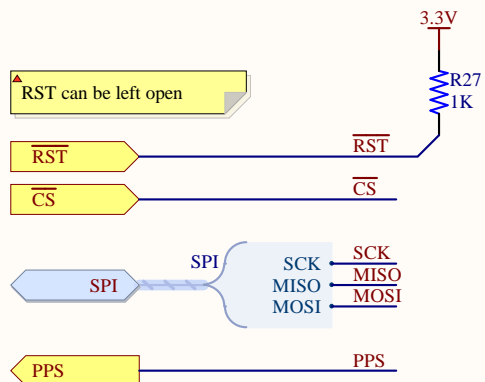
The cable seems to operate between 1 to 5MOhms
Note that it goes high-Z when completely dry



Accessory Ports

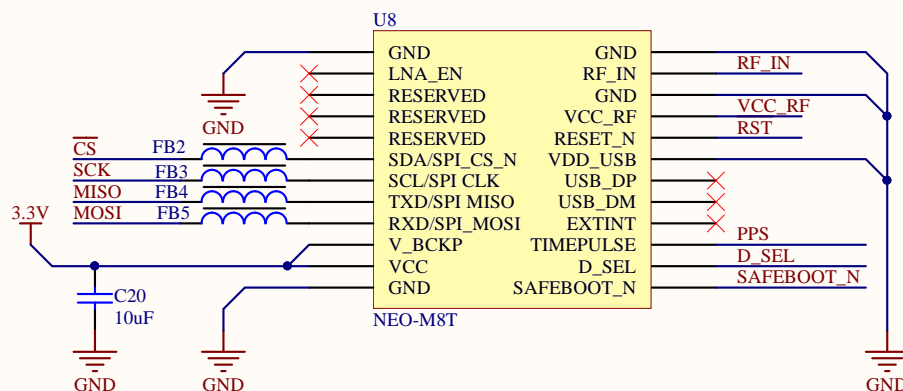


A

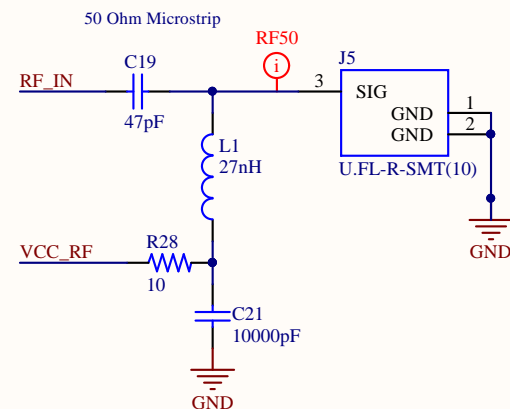


B

V_BCKP:
vcc = Unused
Can use as coin
cell battery backup



C

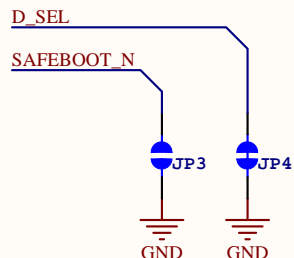


D

D_SEL:
open = UART/DDC
low = SPI

SAFEBOOT_N:
open = Unused
(do not pull low on boot)

VDD_USB:
LDO'ed 3.3V = USB Active
gnd = Unused



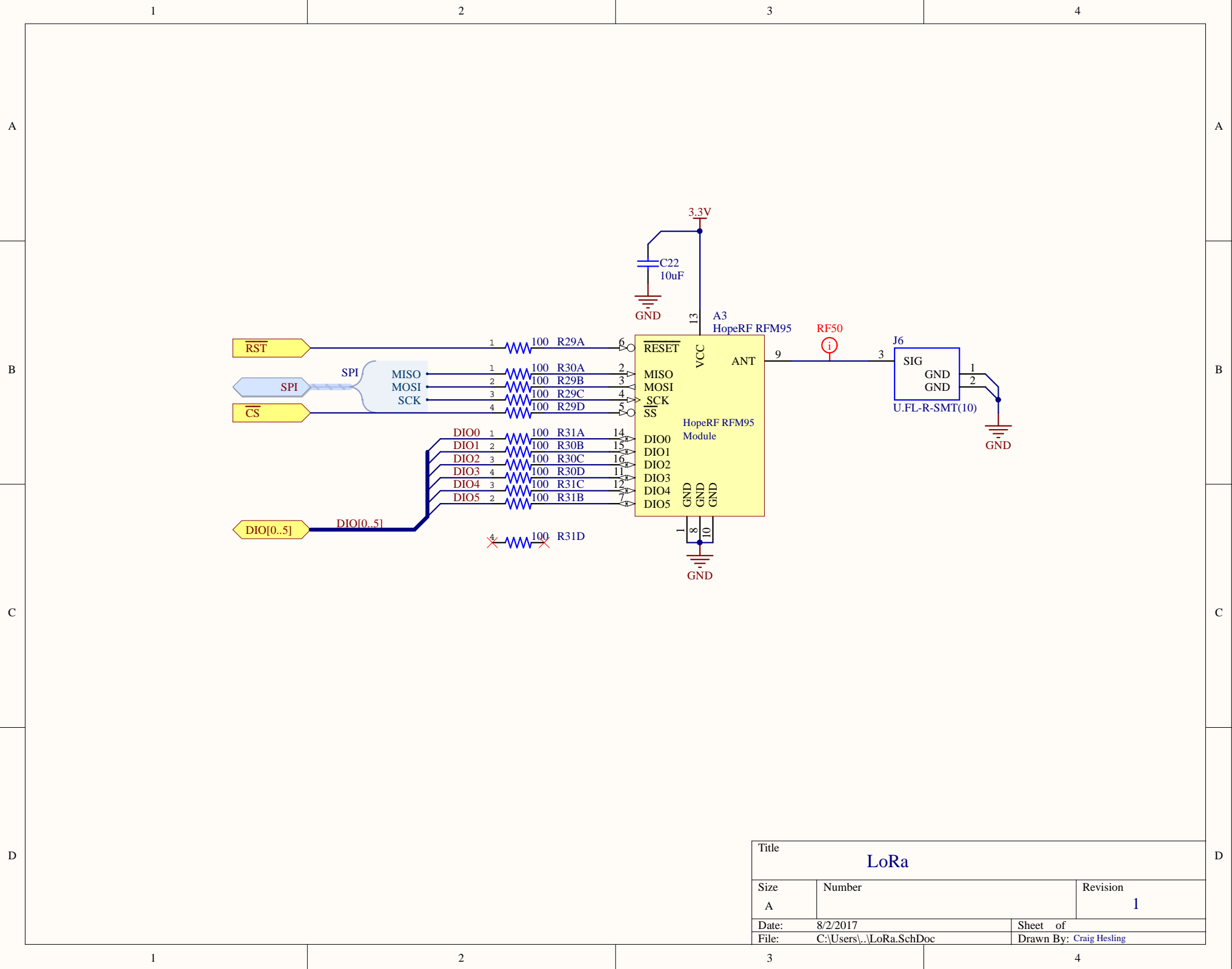
Title		
GPS		
Size	Number	Revision
A		1
Date:	8/2/2017	Sheet of
File:	C:\Users\...\GPS.SchDoc	Drawn By: Craig Hesling

A

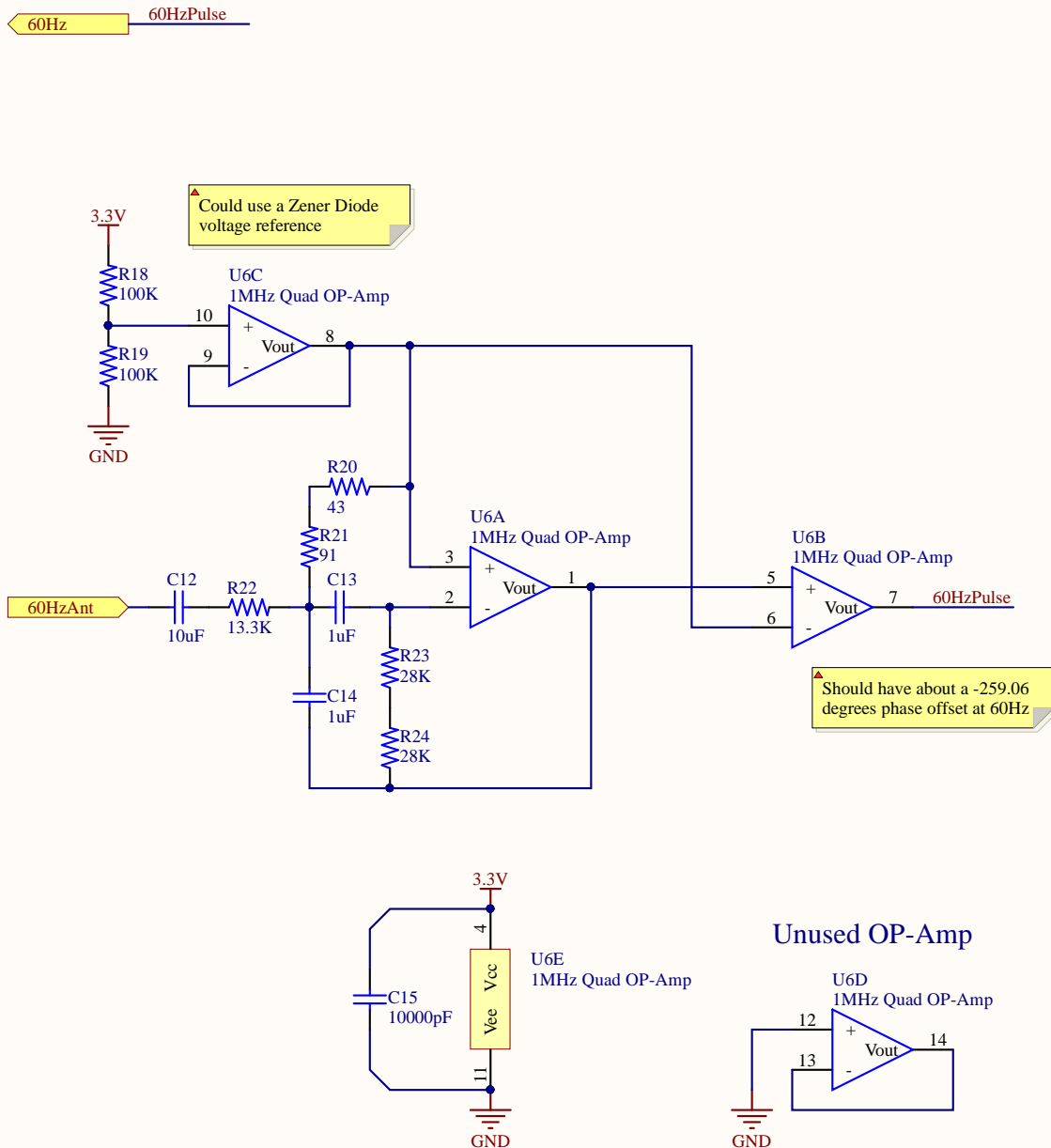
B

C

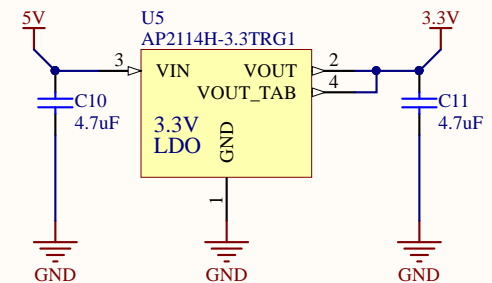
D



60Hz Zero Crossing Pulse



3.3V Regulation



Title

Power

Size

A

Number

Revision

1

Date: 8/2/2017

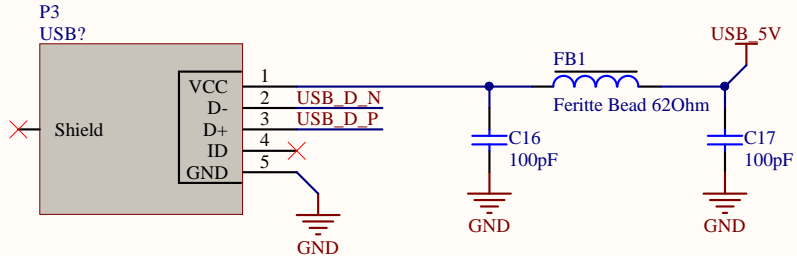
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Drawn By: Craig Hesling

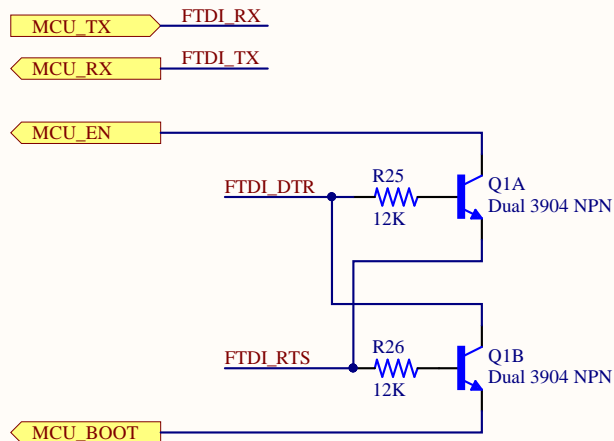
A

A



B

B

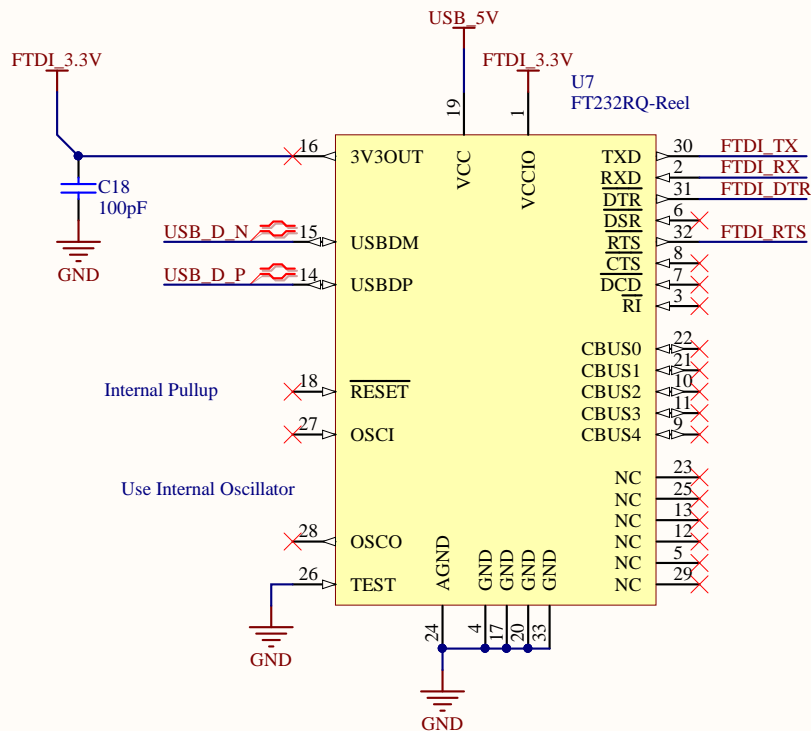


C

C

D

D



Title
UART

Size

A

Number

Revision

2

Date:

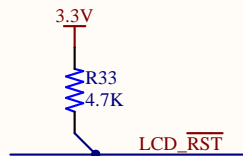
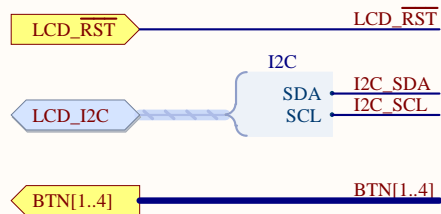
8/2/2017

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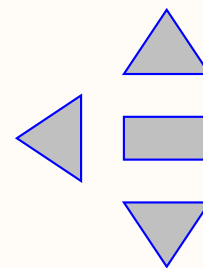
File:

C:\Users\...\UART.SchDoc

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Display Navigation Buttons



$$R1 = [(V_{out} - 3V) - 0V] / 10\mu A$$

$$R1 = [(12.0985V - 3V) - 0V] / 10\mu A$$

$$R1 = 909.853k\Omega$$

Using V_{out_min} , V_{out_max} , and the 910kOhm 1% tolerance, we have the following:

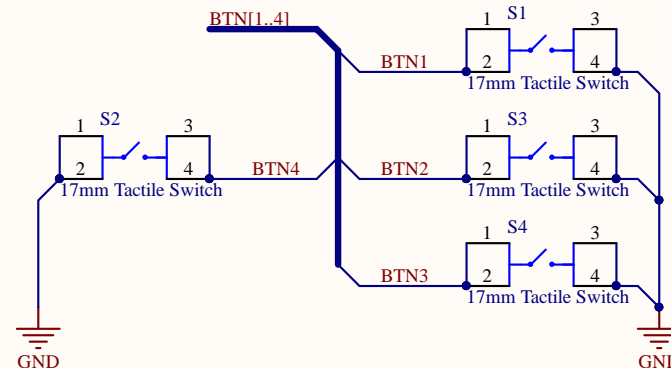
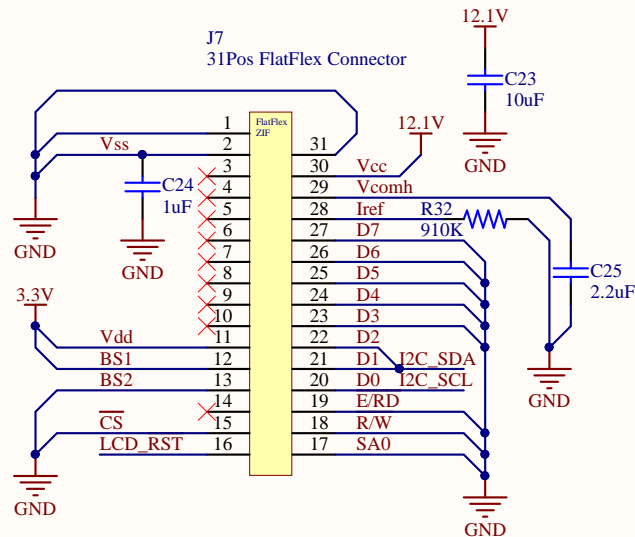
$$I_{ref_min} = [(V_{out_min} - 3V) - 0V] / (910k\Omega * (1+.01))$$

$$I_{ref_min} = 9.66523 \mu A$$

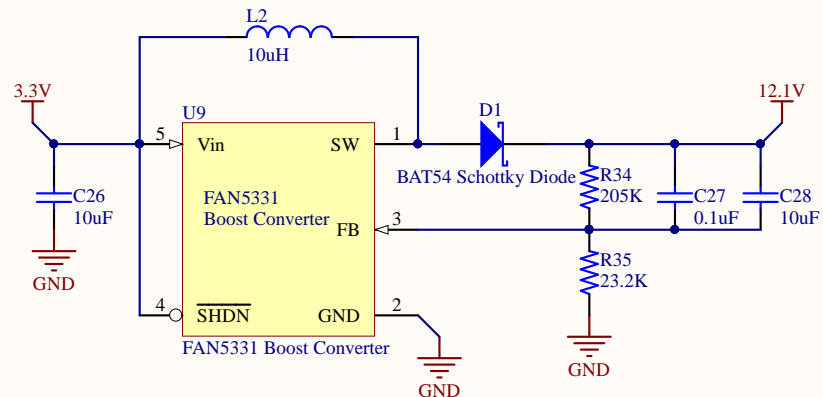
$$I_{ref_max} = [(V_{out_max} - 3V) - 0V] / (910k\Omega * (1-.01))$$

$$I_{ref_max} = 10.3431 \mu A$$

I_{ref_min} and I_{ref_max} are within 10uA+-2uA.



This is the boost converter for the OLED's display 12.1V supply.



$$V_{out} = 1.23V * (1 + 205k / 23.2k)$$

$$V_{out} = 12.0985V$$

Using the resistor's 1% tolerance, we have the following:

$$V_{out_min} = 1.23V * [1 + (205k * (1-.01)) / (23.2k * (1+.01))]$$

$$V_{out_min} = 11.8833V$$

$$V_{out_max} = 1.23V * [1 + (205k * (1+.01)) / (23.2k * (1-.01))]$$

$$V_{out_max} = 12.3181V$$

Title

User Interface

Size

A

Number

Date:

8/2/2017

File:

C:\Users\...\UI.SchDoc

Revision

1

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