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East Kilbride
G75 0QF

SCHEMATIC

Page	Description	Revision	Change Description
[01]	Cover Sheet	A	Alpha Design
[02]	Top Sheet	B	Beta design, incorporated board bring-up changes resulting in improved performance
[03]	QI Controller	C	Beta design, added external RTC powered directly from battery. Change includes limited net changes to ESP32.
[04]	Battery	D	Power ON/OFF 2s Delay, ESP32-RTC disconnect, Dock Insertion detect, 3V3 shut-off when inserted into dock.
[05]	Power	E	Dev-Inact_off added.
[06]	ESP32		
[07]	IMU & Crypto		
[08]	Board to Board Connector		
[09]	RTC		
[10]			

Notes:

INFORMATIONAL DESIGN NOTE:
General information on design decisions and/or function of specific components. Includes Datasheet/Application Note references.

CRITICAL DESIGN NOTE:
Critical/cautionary information on aspects of design.
Includes Datasheet/Application note references.

LAYOUT DESIGN NOTE:
Layout guidelines for component(s) or circuit.
Includes Datasheet/Application note references.

Symbol Key:

- Differential Signal
- ERC Suppression Directive
- Port with schematic page reference
- Net Label - connection on same page only.
- Part should not be fitted to board

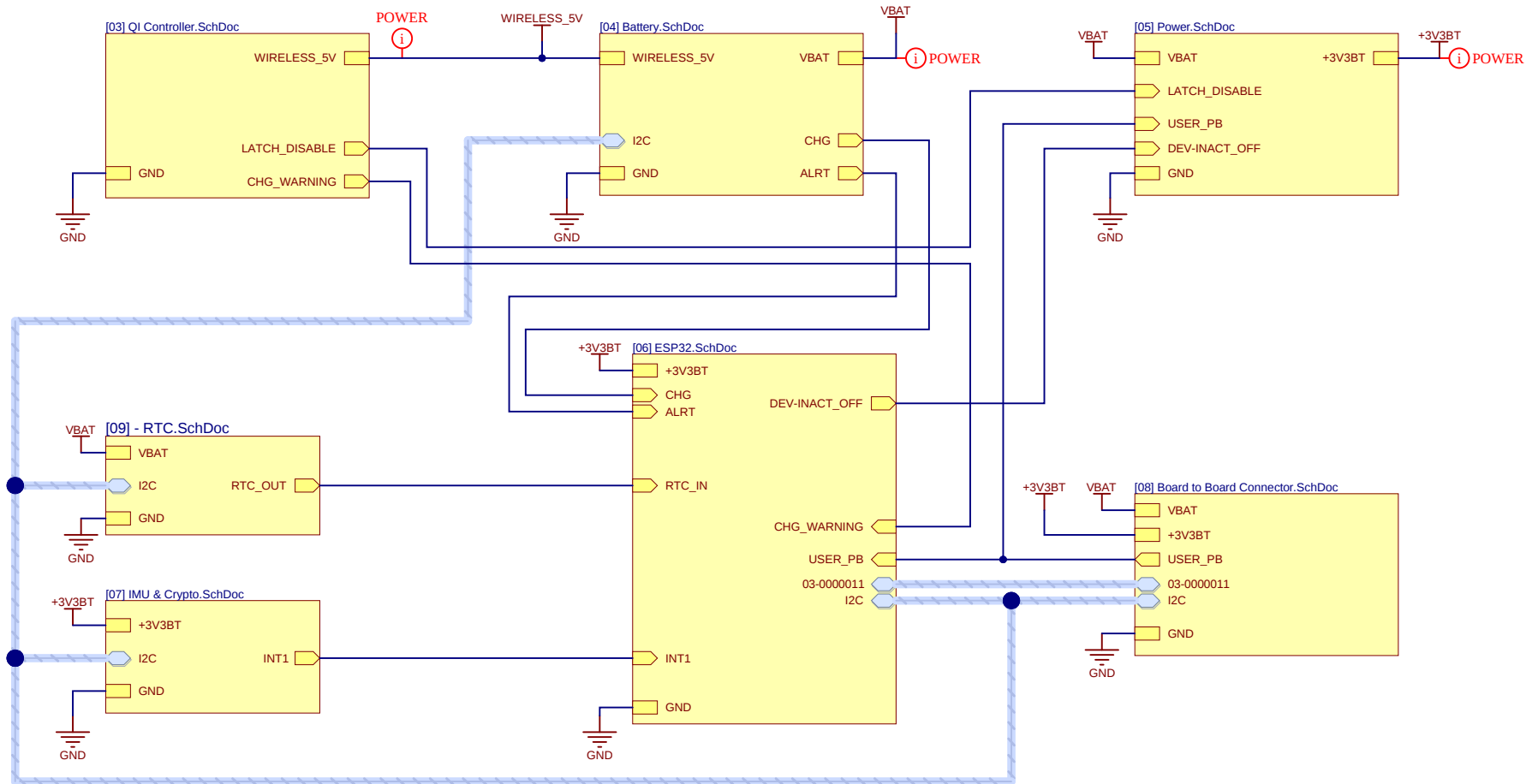
Document Status Key:

DRAFT - Schematics are a work in progress - ignore details.
Checked - Signatory confirms this schematic has no mistakes and can be submitted to approver.
Designer - Signatory confirms schematic design is complete and ready for PCB design.
Approved - Signatory authorises a PCB with this schematic to be released to production.

* To make these schematics as clear as possible to the reader, they should always be printed in colour.

Part Number: 03-0000010		THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CUTITRONICS LTD. AND SHALL NOT BE REPRODUCED OR DISCLOSED TO OTHER PARTIES OR USED FOR ANY PURPOSES OTHER THAN FOR WHICH IT IS PROVIDED WITHOUT PRIOR WRITTEN PERMISSION OF CUTITRONICS LTD.	
Description: Measurement Device (Main)	Revision: E		
Project: Anna			
Designer: M Graham	Date: 19/05/2021	Checked: J. Doyle	Date: 21/05/2021
		Approved: J. Doyle	Date: 21/05/2021
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[02] Top Sheet.SchDoc



Fiducials for Top/Bot



[01] Cover Sheet.SchDoc

RoHS Free
Compliance - RoHS Free

PCB
6-Layer

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J. Doyle

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Approved:
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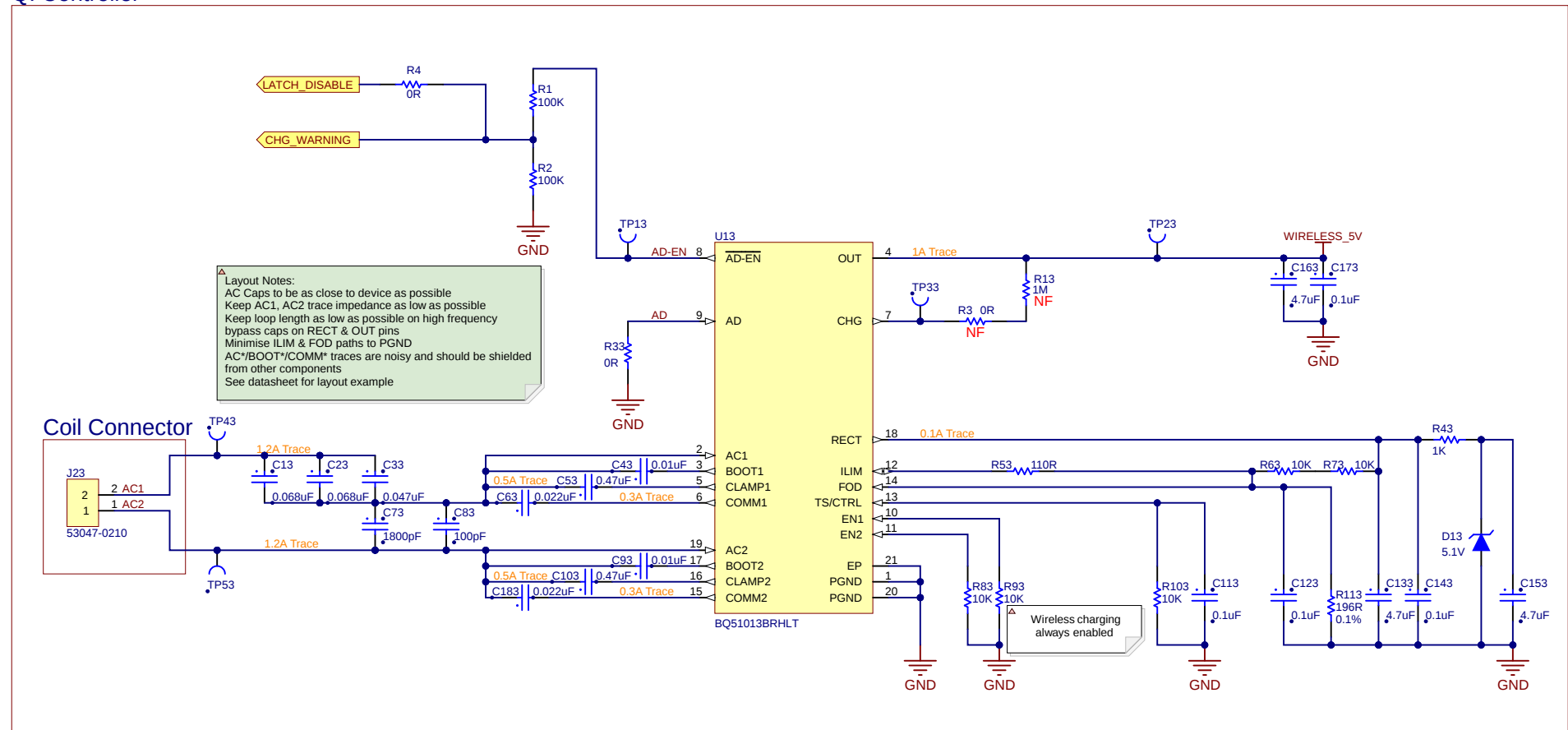
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21/05/2021

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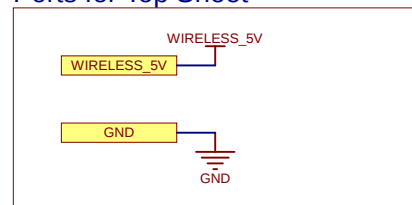
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[03] QI Controller.SchDoc

QI Controller



Ports for Top Sheet



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Description:
Measurement Device (Main)

Project:
Anna

Designer:
M Graham

Date:
19/05/2021

Checked:
J. Doyle

Date:
21/05/2021

Approved:
J. Doyle

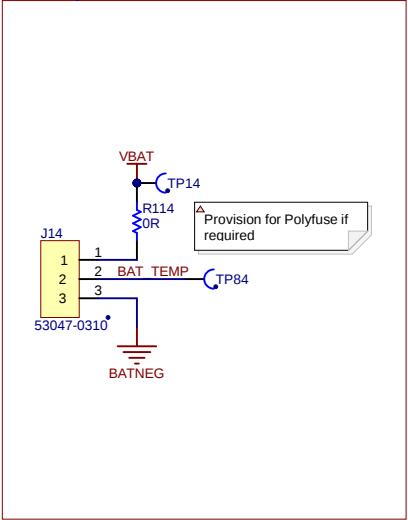
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21/05/2021

Sheet:
3 / 9

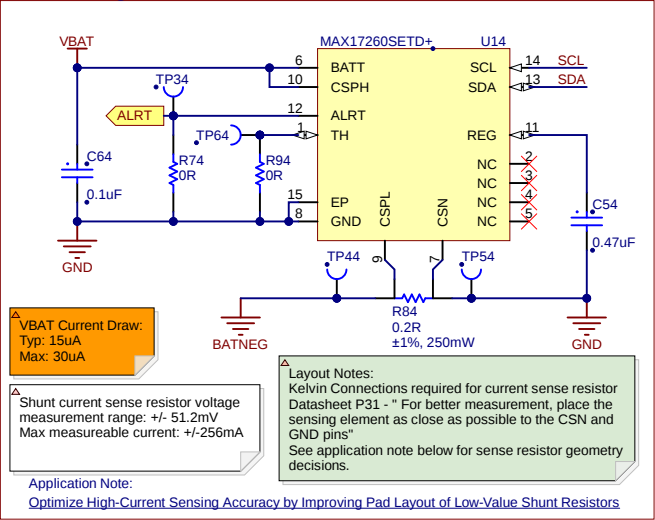
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[04] Battery.SchDoc

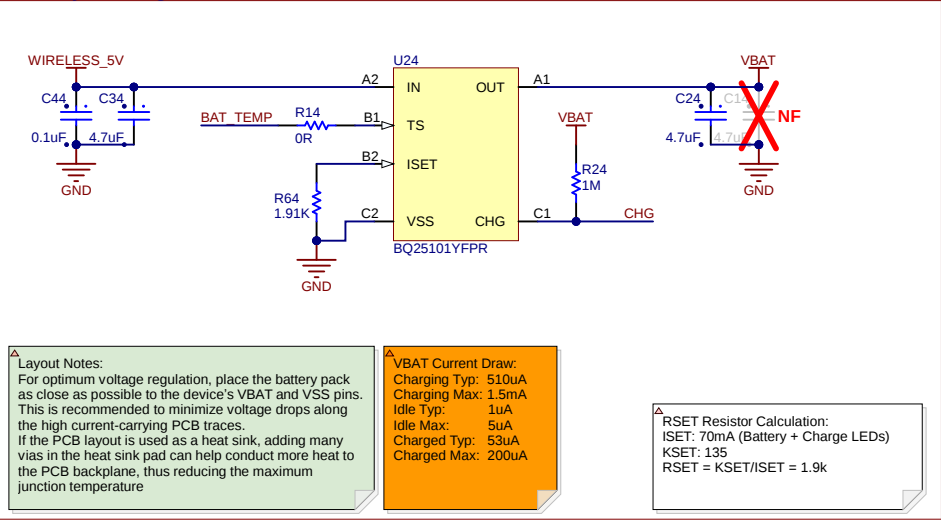
Battery Connector



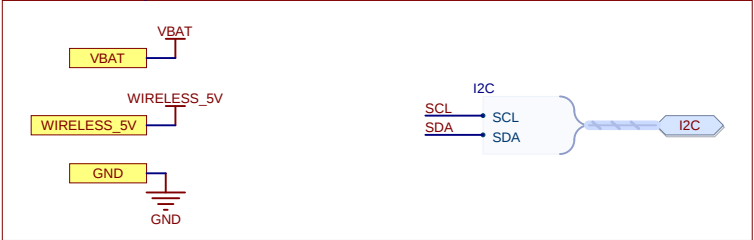
Fuel Gauge



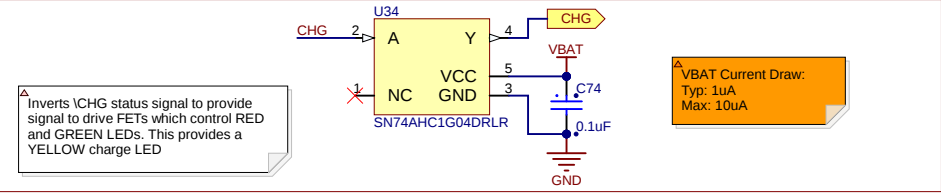
Battery Charge Controller



Ports for Top Sheet



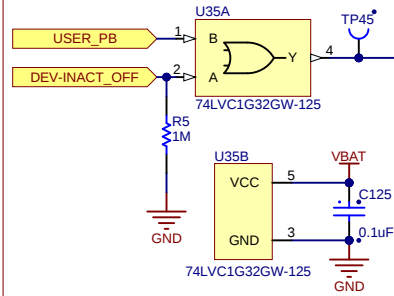
Charge output inverter



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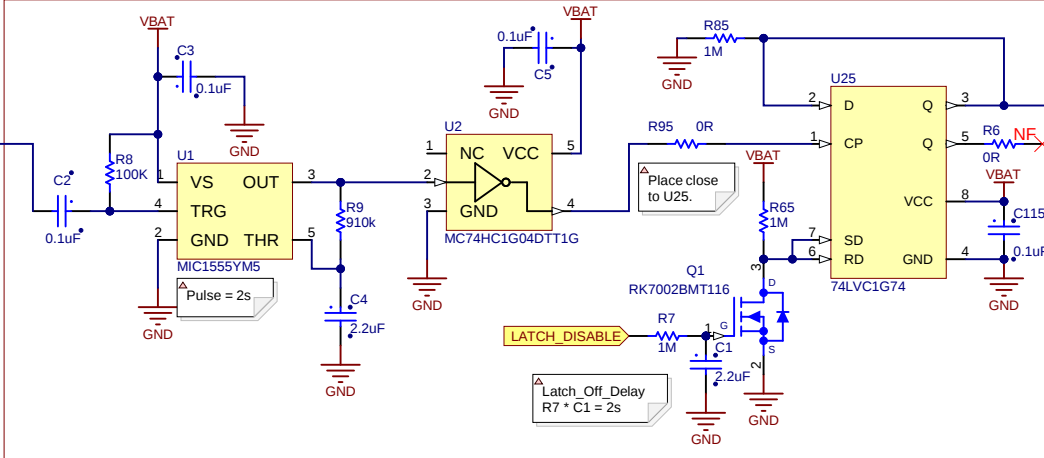
[05] Power.SchDoc

Load Switch Control



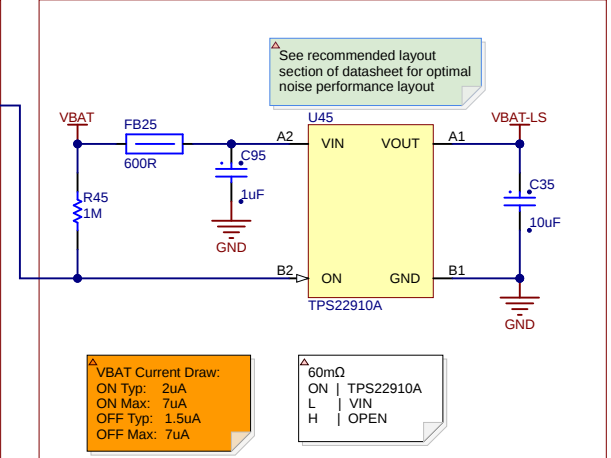
VBAT Current Draw:
Typ: 1uA
Max: 20uA

Delay timer and D-Type Latch Circuit



Latch Off Delay
 $R7 \cdot C1 = 2s$

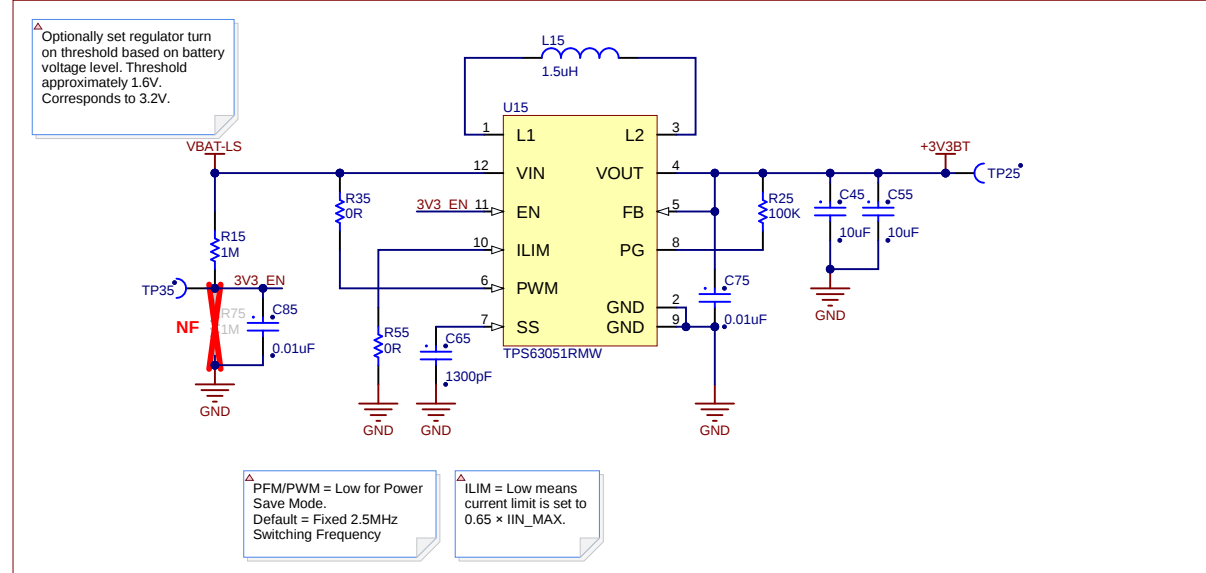
Load Switch



VBAT Current Draw:
ON Typ: 2uA
ON Max: 7uA
OFF Typ: 1.5uA
OFF Max: 7uA

60mQ
ON | TPS22910A
L | VIN
H | OPEN

3.3V Buck/Boost Regulator

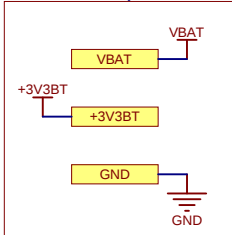


Optionally set regulator turn on threshold based on battery voltage level. Threshold approximately 1.6V. Corresponds to 3.2V.

PFM/PWM = Low for Power Save Mode.
Default = Fixed 2.5MHz Switching Frequency

ILIM = Low means current limit is set to $0.65 \times IIN_MAX$.

Ports for Top Sheet



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03-000010

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Project:
Anna

Designer:
M Graham

Date:
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J. Doyle

Date:
21/05/2021

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J. Doyle

Date:
21/05/2021

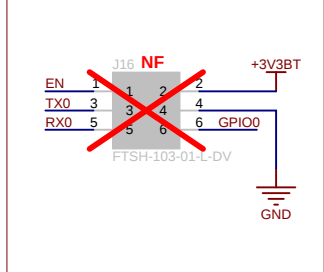
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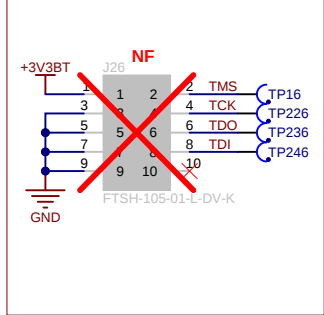
[06] ESP32.SchDoc

Label the JTAG and Programming connectors on Silkscreen.

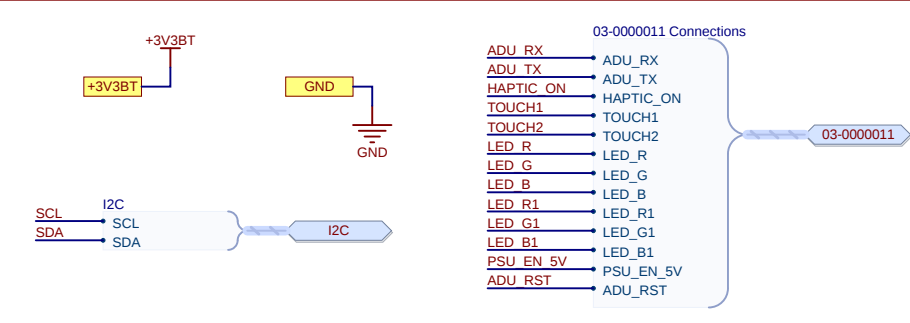
ESP32 Programming Header



ESP32 JTAG Header



Ports for Top Sheet

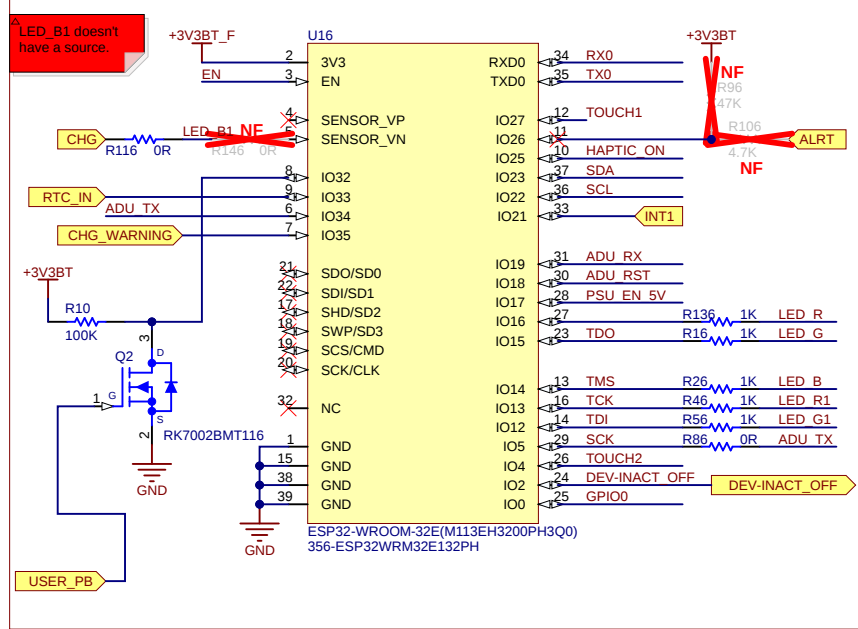


NOTE TO FIRMWARE ENGINEER:

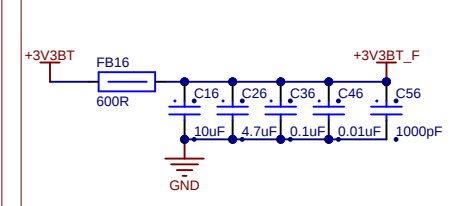
To increase EMC performance and avoid extra power consumption, unused clocks, counters or I/Os, should not be left free. I/Os should be connected to a fixed logic level of 0 or 1 by an external or internal pull-up or pull-down on the unused I/O pin.

Unused features should be frozen or disabled, whichever is their default value.

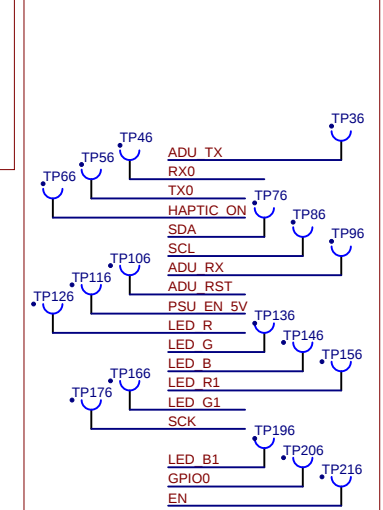
ESP32 Module



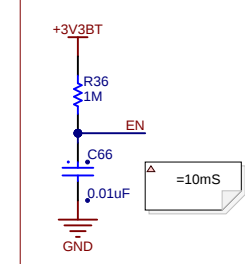
Supply Decoupling



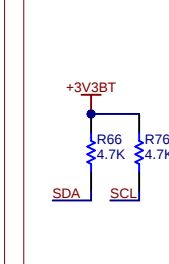
Test Points



Enable/Reset



I2C Pull-Ups



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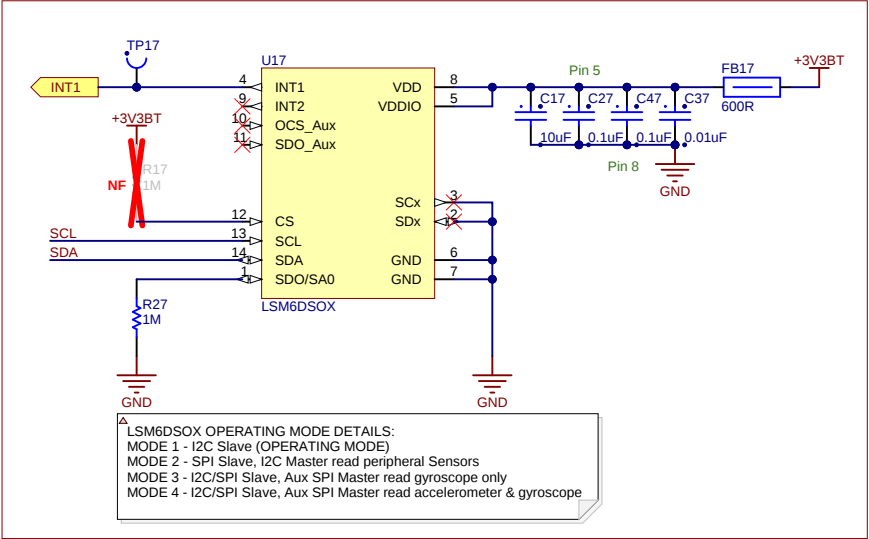
Approved:
J. Doyle

Date:
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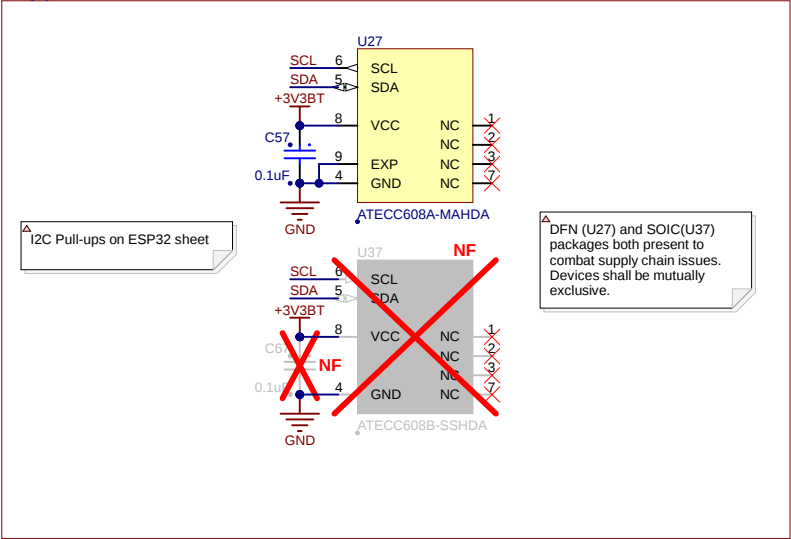
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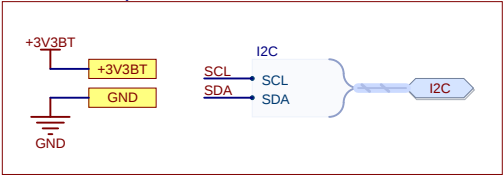
6-Axis IMU



Cryptoauthentication IC

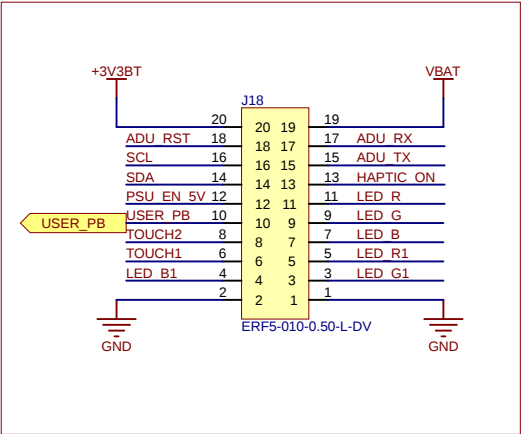


Ports for Top Sheet

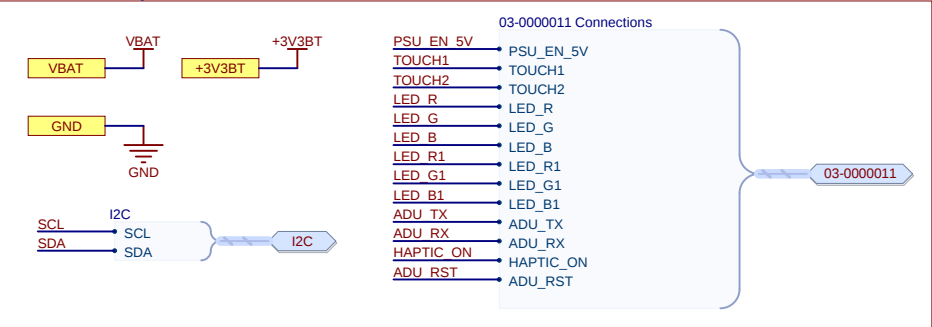


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04-0000011 Board to Board Connector

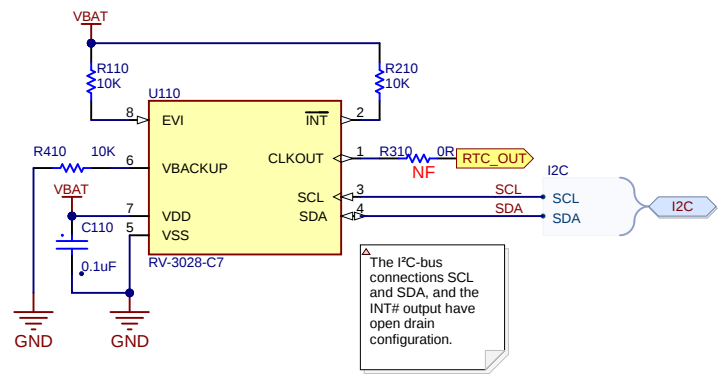


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[09] - RTC.SchDoc



Power Ports



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