



# Thunderboard Sense

EFR32MG12P332F1024GL125

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## Revision History

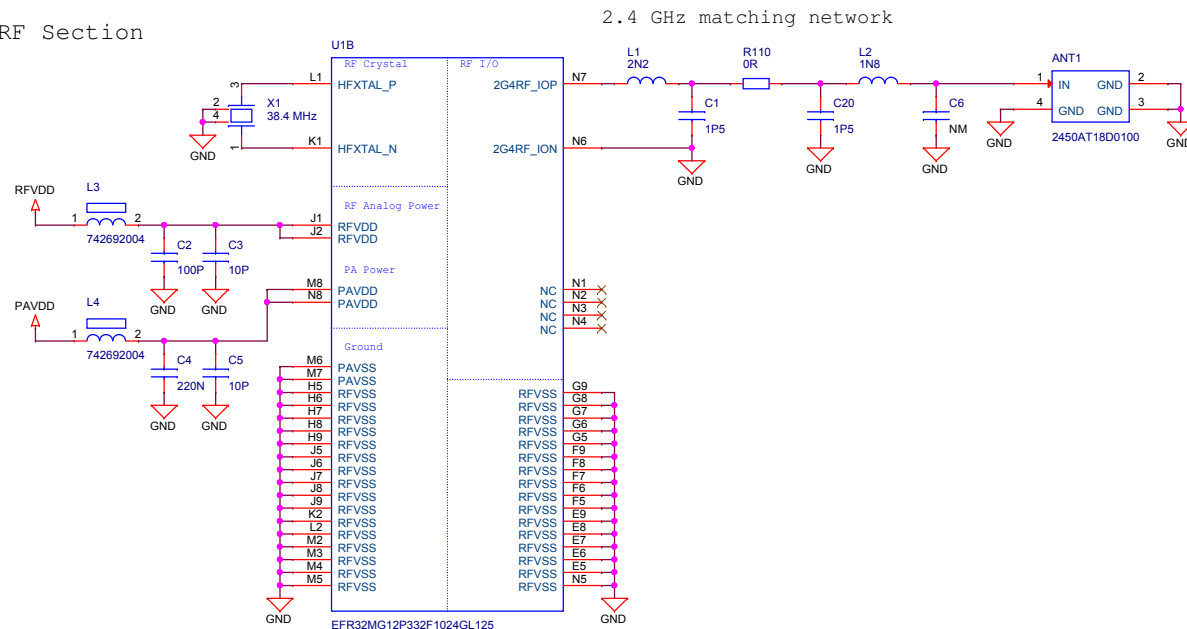
Rev.	Description
A00	Initial prototype version.
B00	Updated EFR32 and debugger IC revisions. Replaced analog microphone with an I2S-based digital one.
B01	Changed microphone to Knowles SPH0645LM4H-B
C00	Updated microphone and SPI Flash pinout. Changed to Invensense microphone and 9-axis IMU.
C01	Updated hall effect sensor (si7210) revision.
D00	Changed back to Invensense 6-axis IMU.



### SCHEMATIC1

<p><b>SILICON LABS</b></p>		Schematic Title	
		<b>Thunderboard Sense</b>	
Designed: DDB Approved: JNO		Page Title	
		<b>Title Page</b>	
Size: A3	BOM Doc No: <Cage Code>	Document number	Revision
Design Created Date: Wednesday, November 30, 2016	Sheet Created Date: Wednesday, November 30, 2016	Document number: <b>BRD4166A</b>	Revision: D00
	Sheet Modified Date: Monday, September 25, 2017		Sheet 1 of 7

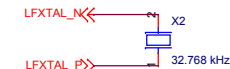
RF Section



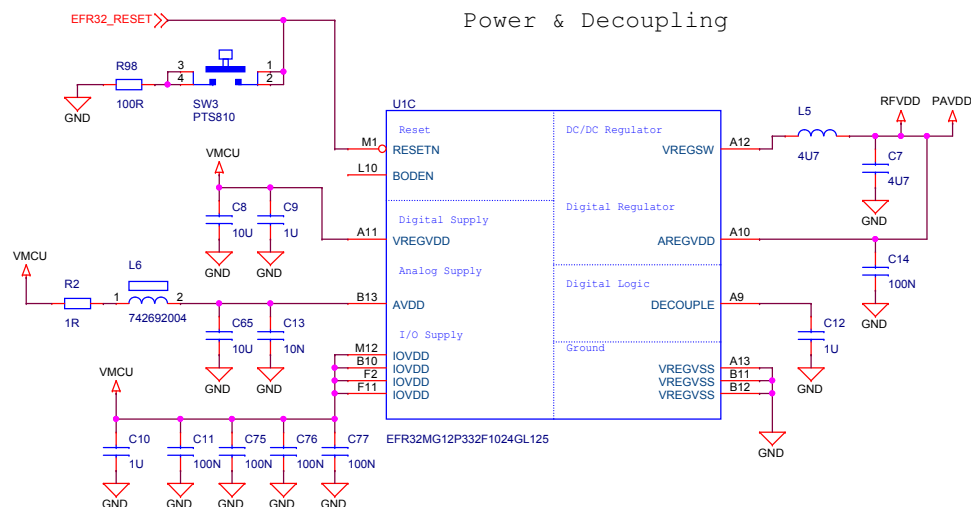
Mounting Holes




Low Frequency Crystal

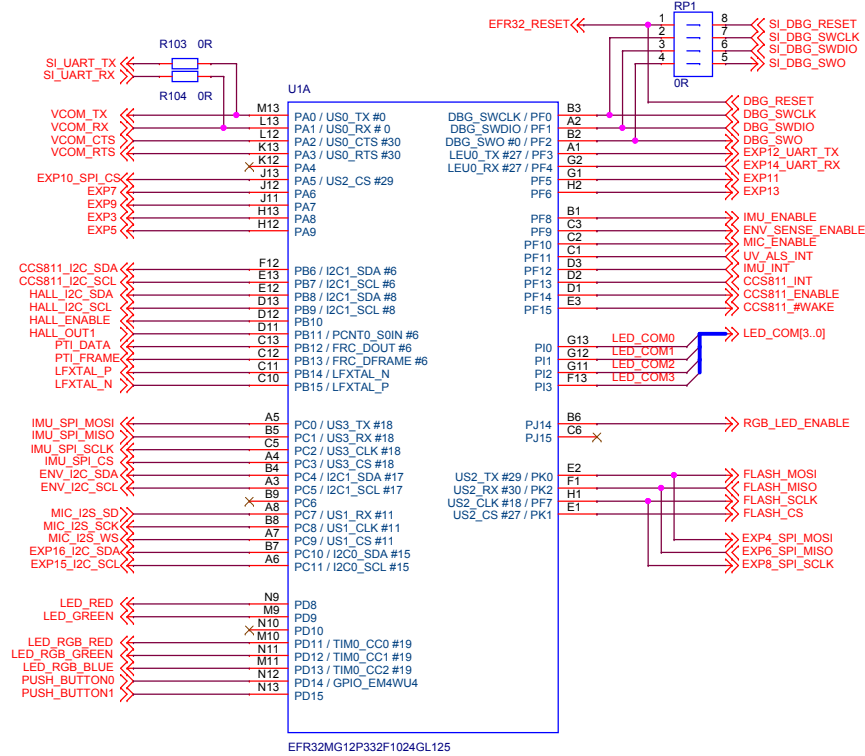


Reset button

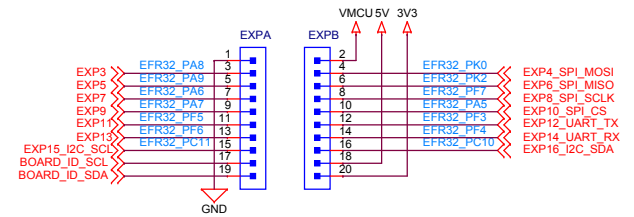


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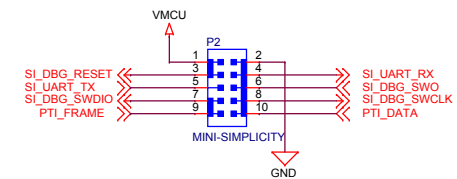
 <b>SILICON LABS</b>		Schematic Title	
		<b>Thunderboard Sense 2</b>	
Designed: DDB Size: A3 Design Created Date: Wednesday, November 30, 2016		Page Title	
		<b>EFR32 - RF, power &amp; IO</b>	
Approved: JNO BOM Doc No: <Cage Code>		Document number	Revision
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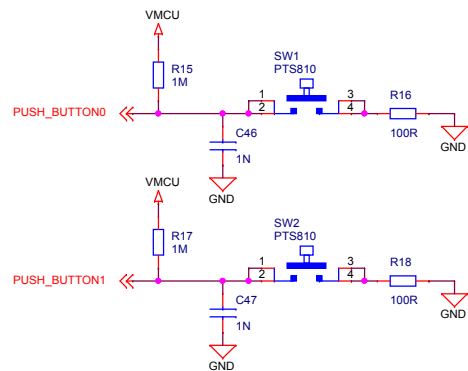
### Breakout Pads - EXP Header



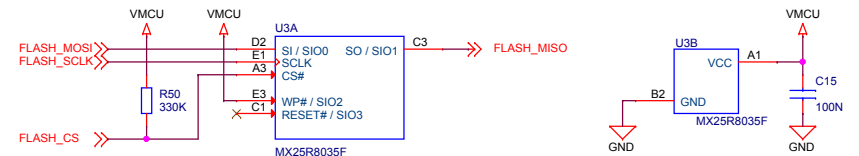
### Mini Simplicity Connector



### Push Buttons & LEDs



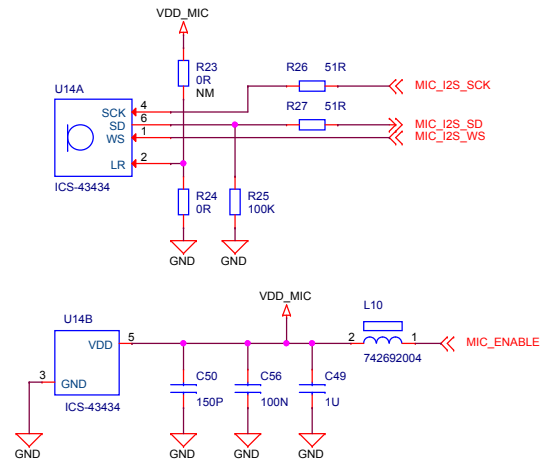
### SPI Flash



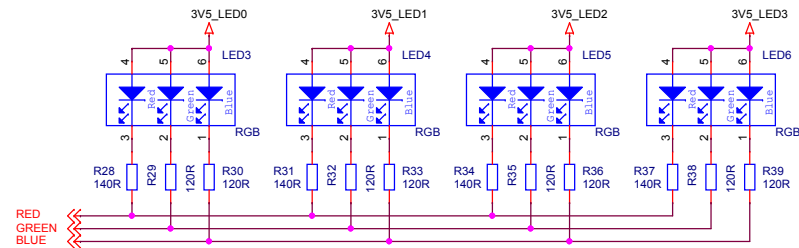
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		<b>Thunderboard Sense 2</b>	
Designed: DDB Size: A3 Design Created Date: Wednesday, November 30, 2016		Page Title	
		<b>EFR32 connections &amp; interfaces</b>	
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BOM Doc No: <Cage Code>		<b>BRD4166A</b>	<b>D00</b>
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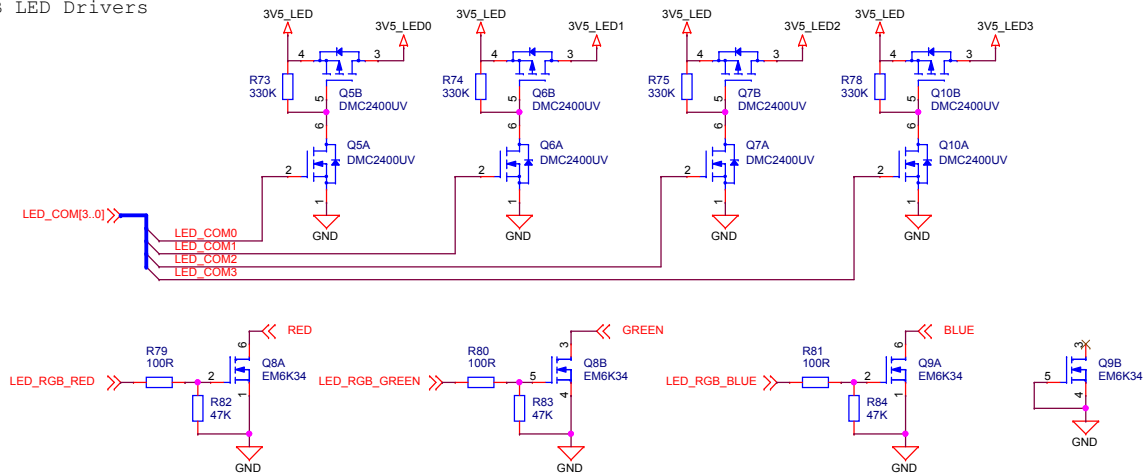
MEMS Microphone



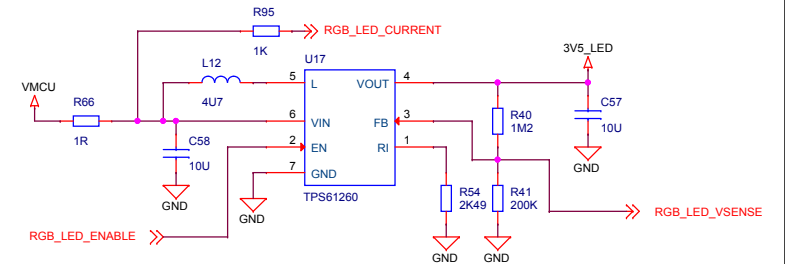
RGB LEDs




RGB LED Drivers



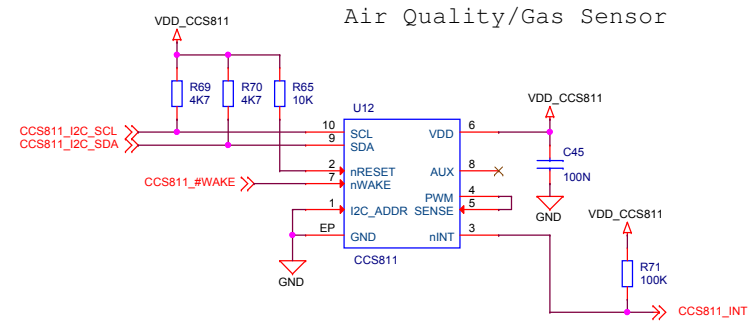
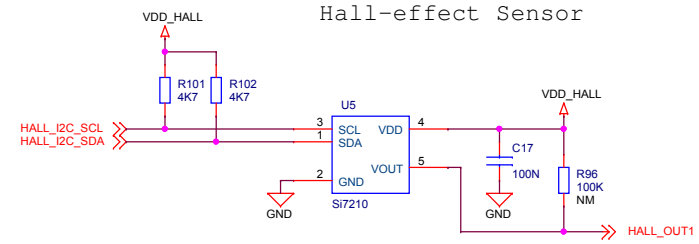
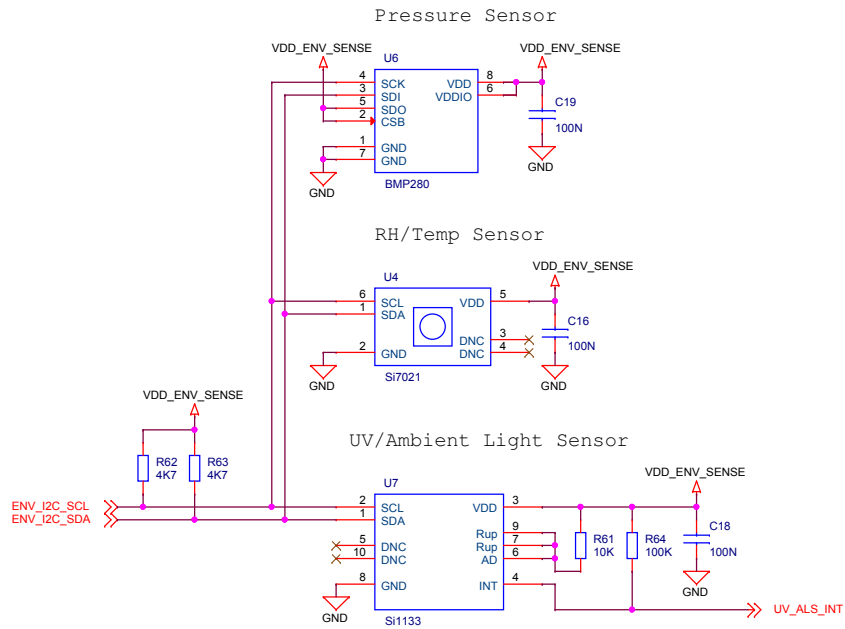
RGB LED power supply



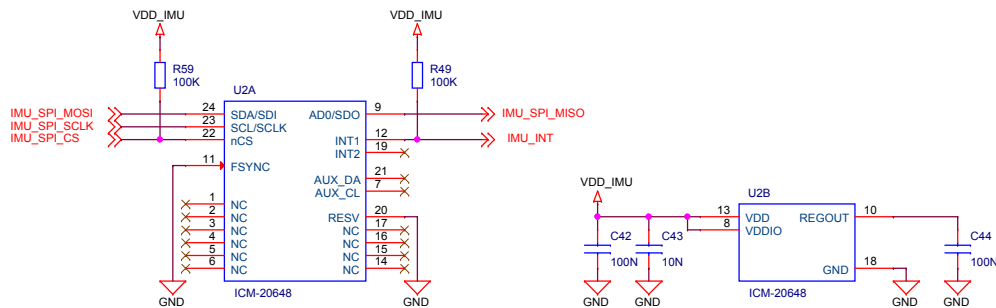
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		<b>Thunderboard Sense 2</b>	
Designed: DDB Approved: JNO		Page Title	
		<b>MEMS Microphone &amp; RGB LEDs</b>	
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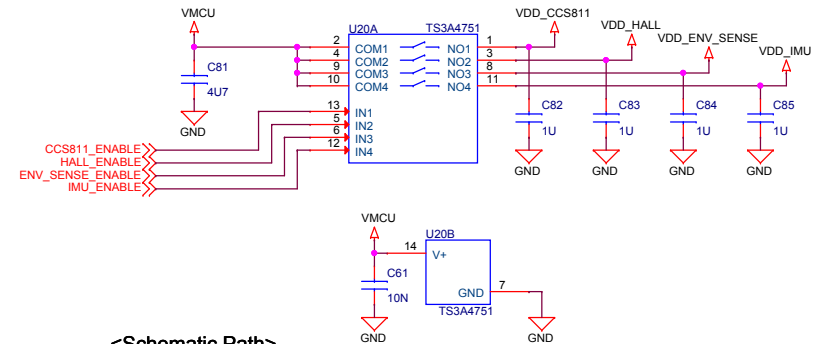
# Environmental Sensors



# 6-axis inertial sensor



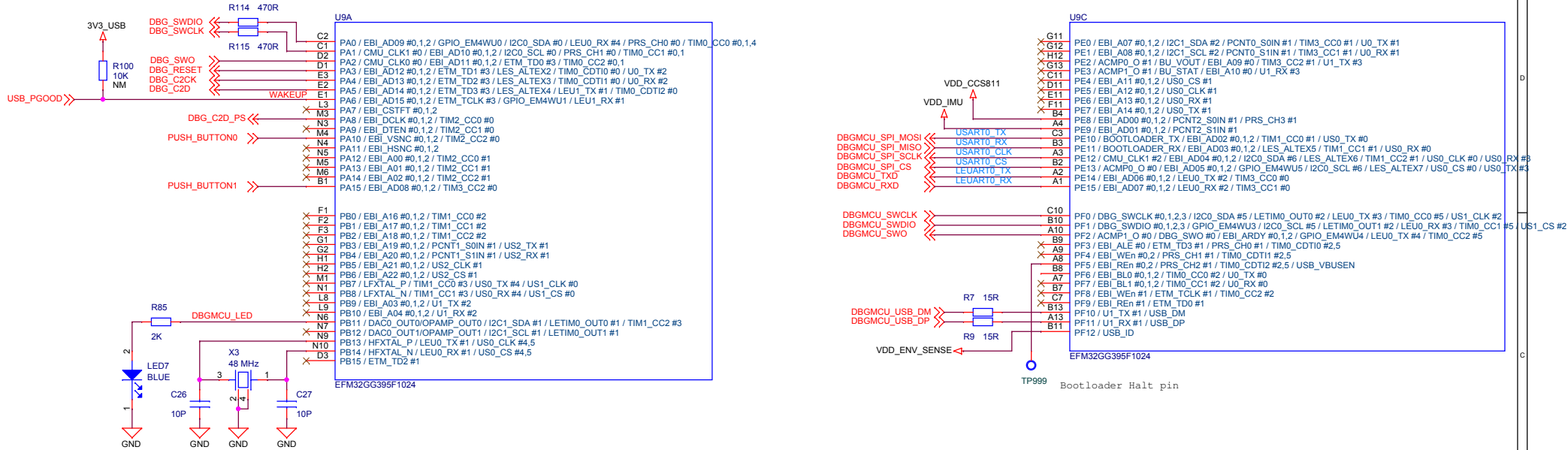
# Sensor Power Control



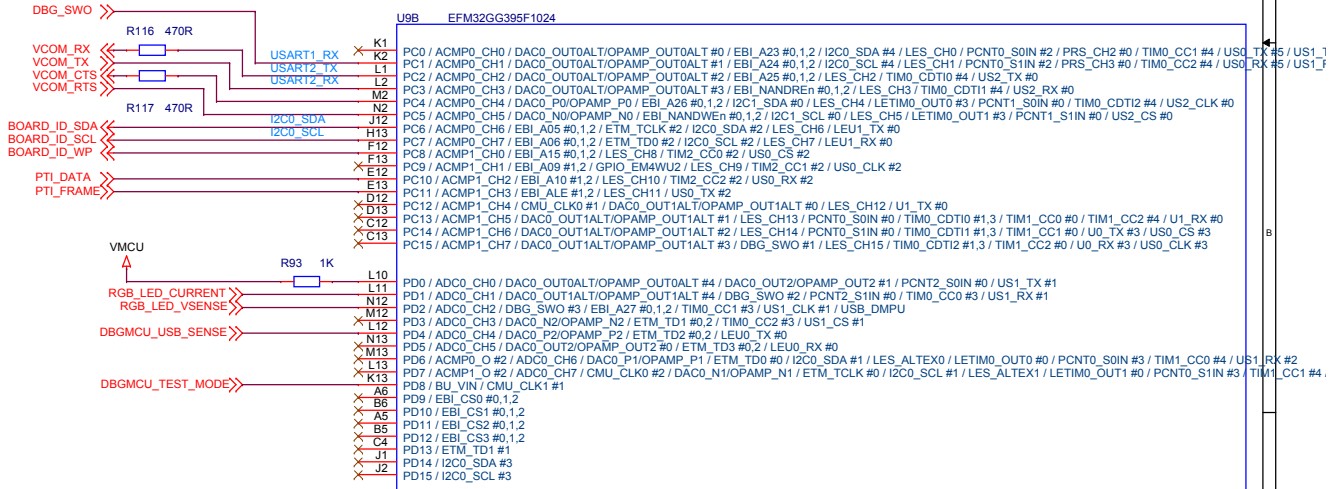
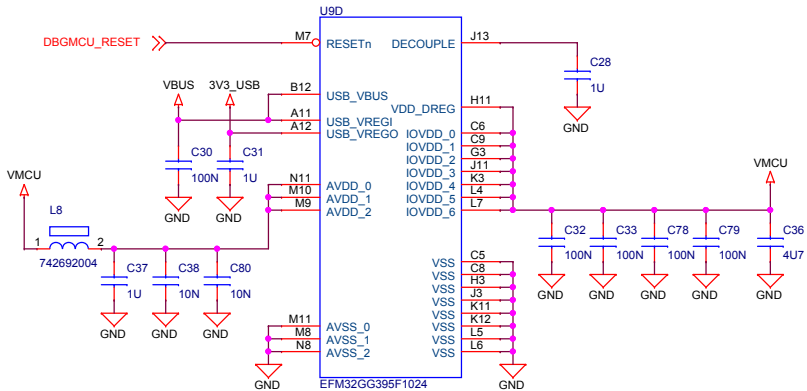
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Designed: DDB Approved: JNO		Page Title	
		<b>I2C &amp; SPI Sensors</b>	
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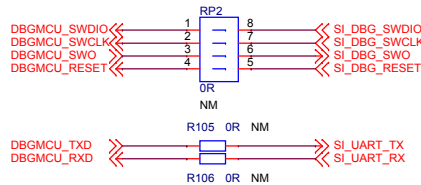
### Debug MCU Connections



### Debug MCU Decoupling



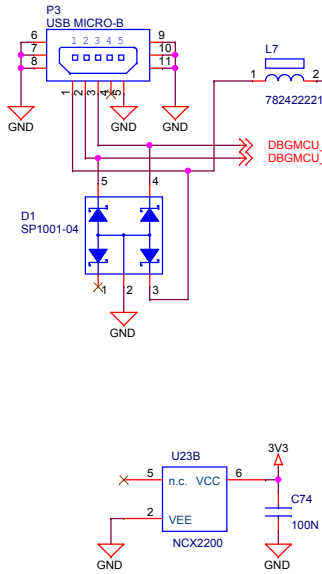
### Debug MCU Connections to Mini Simplicity Header



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SCHEMATIC1

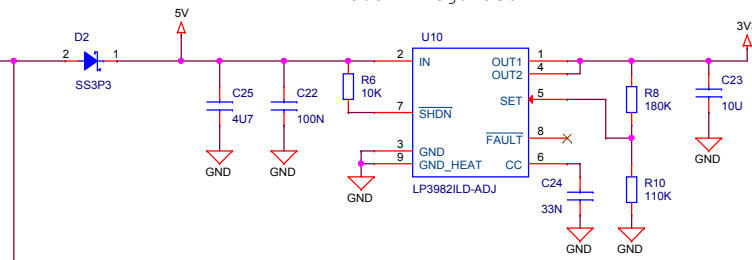
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		<b>Thunderboard Sense 2</b>	
Designed: <b>DDB</b> Approved: <b>JNO</b>		Page Title	
		<b>Debug MCU</b>	
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### USB Connector

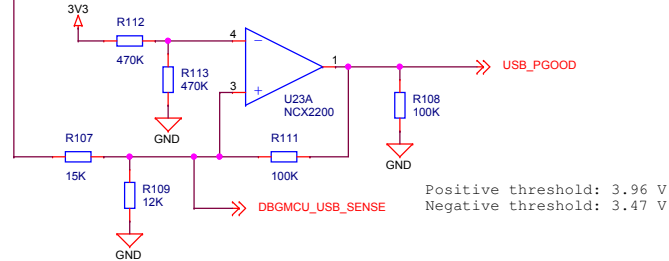


User can supply 3.6 - 5.5 on "5V" pin instead of using the USB cable

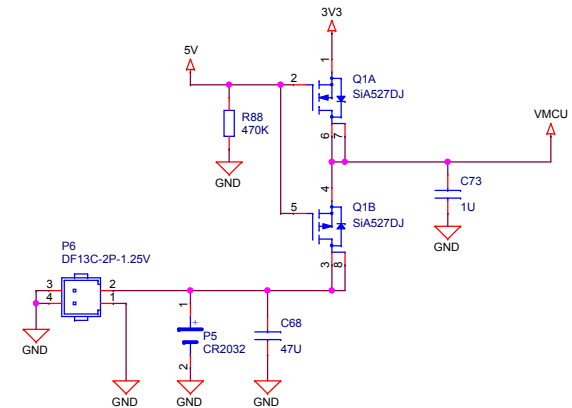
### 3.3 V Regulator



### USB Cable Detect

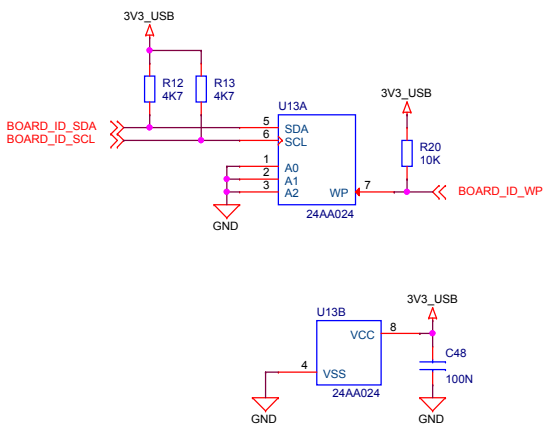


### Board power select circuit

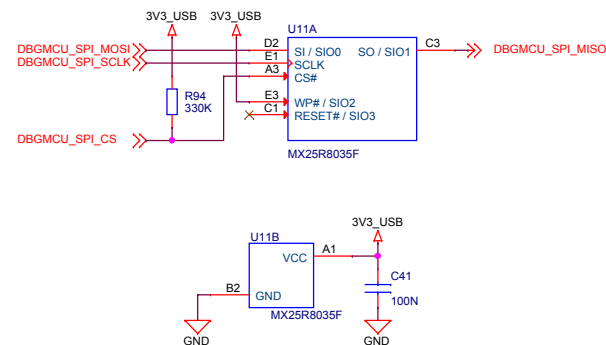


Q1 switches from battery power to USB when USB is plugged in. Additionally, the Mini Simplicity Debug connector can supply power directly to the target voltage domain.

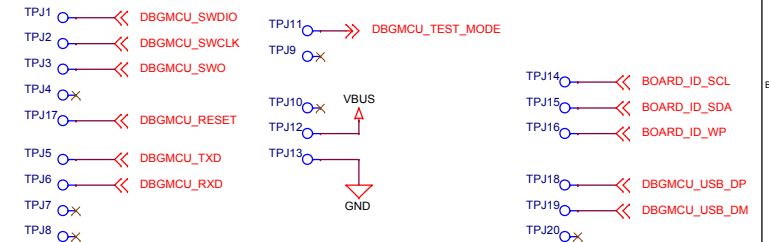
### Board ID EEPROM



### SPI Flash




### Test Points



Note: The SPI flash is only available to the debug mcu when the USB cable is plugged in!

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Designed: <b>DDB</b> Approved: <b>JNO</b>		Page Title	
		<b>Debug Misc. &amp; Power</b>	
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