

Thunderboard Sense	
EFR32MG12P332F1024GL125	
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Debug Misc. & Power	7

The Silicon Labs logo, featuring a stylized red 'S' shape above the text 'SILICON LABS' in a bold, black, sans-serif font.

A small image of a green printed circuit board (PCB) with various components, labeled 'PCB4166'.

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.
D01	Updated EFR32MG12 to IC rev. C.

SCHEMATIC1

		Schematic Title	
SILICON LABS		Thunderboard Sense	
Page Title		Title Page	
Designed: DDB		Approved: JNO	
Size: A3		BOM Doc No: <Cage Code>	
Design Created Date: Wednesday, November 30, 2016		Sheet Created Date: Wednesday, November 30, 2016	
		Sheet Modified Date: Friday, December 14, 2018	
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		Document number: BRD4166A	
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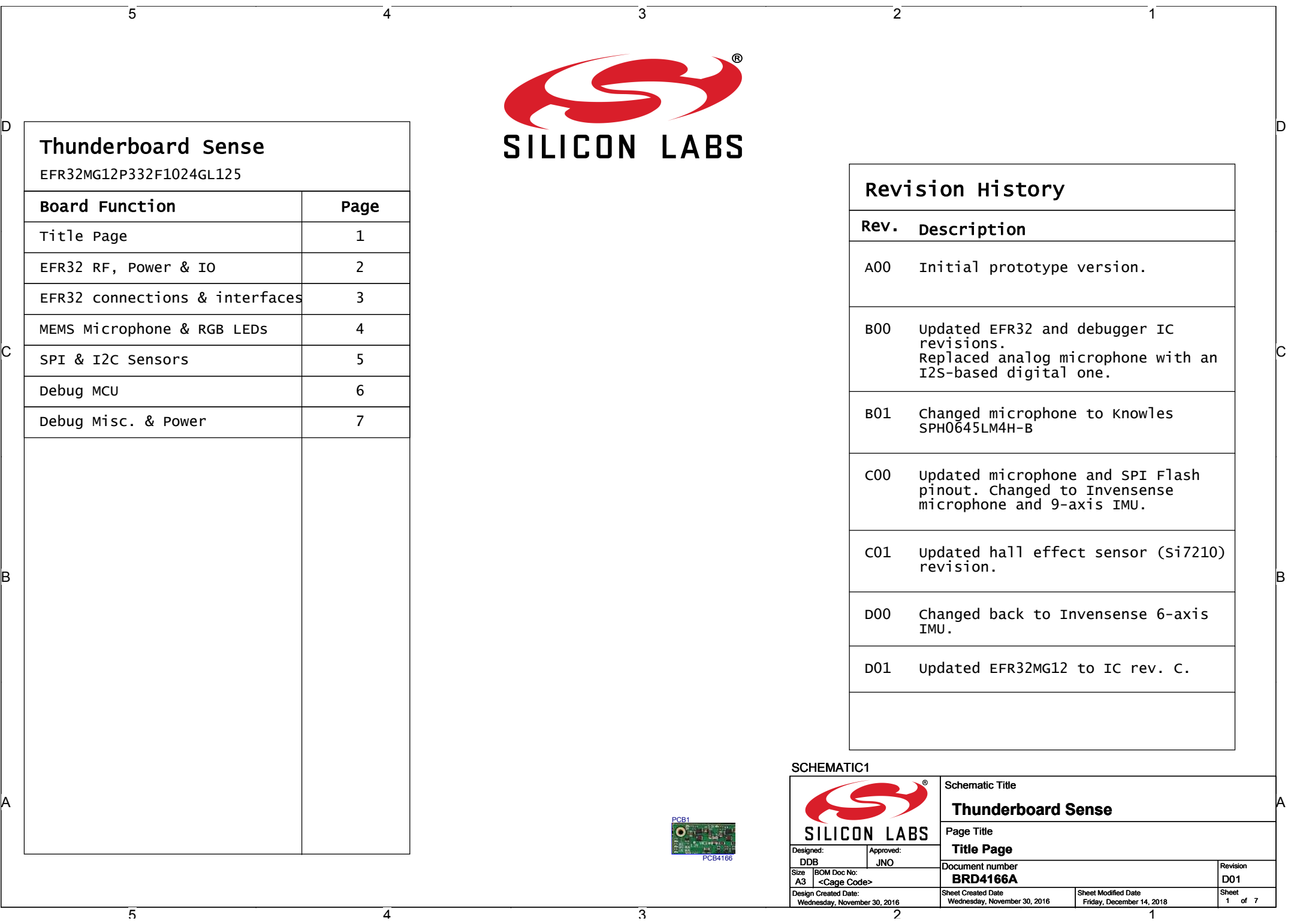
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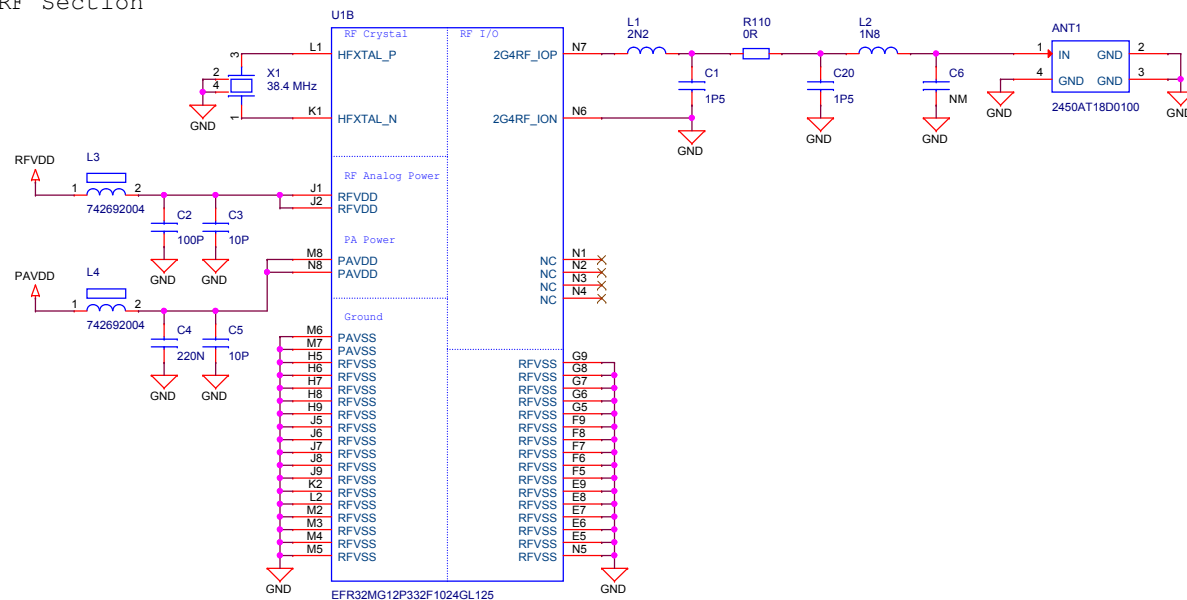
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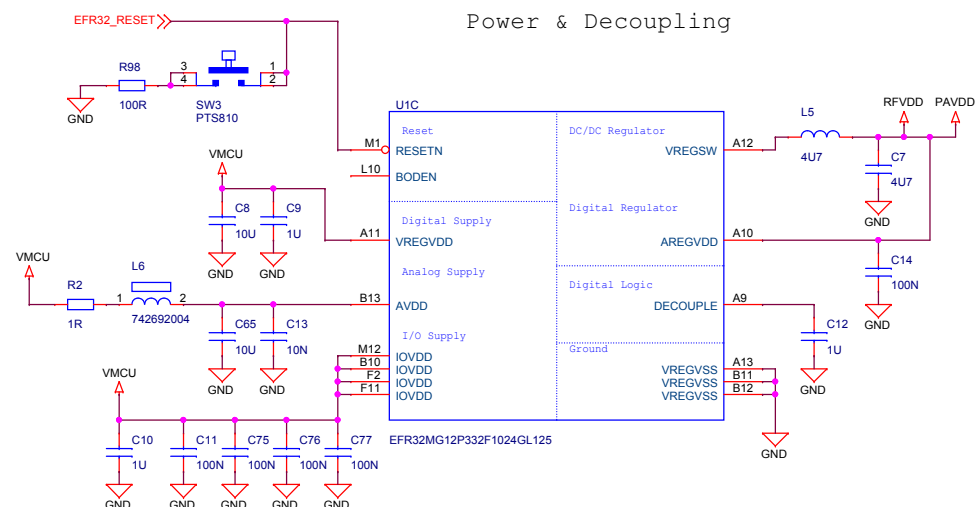
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M1 2.2 MM

M2 2.2 MM



## Power & Decoupling

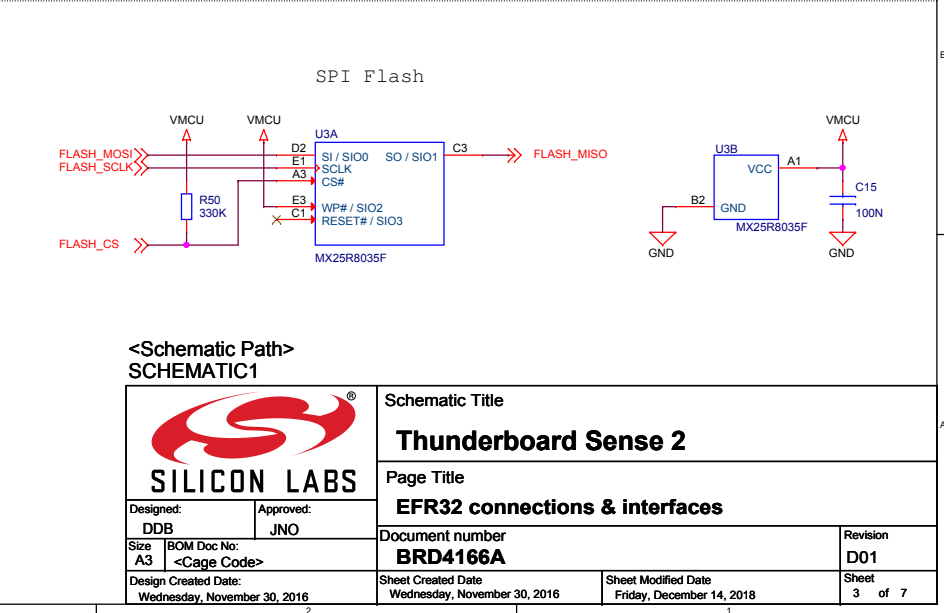
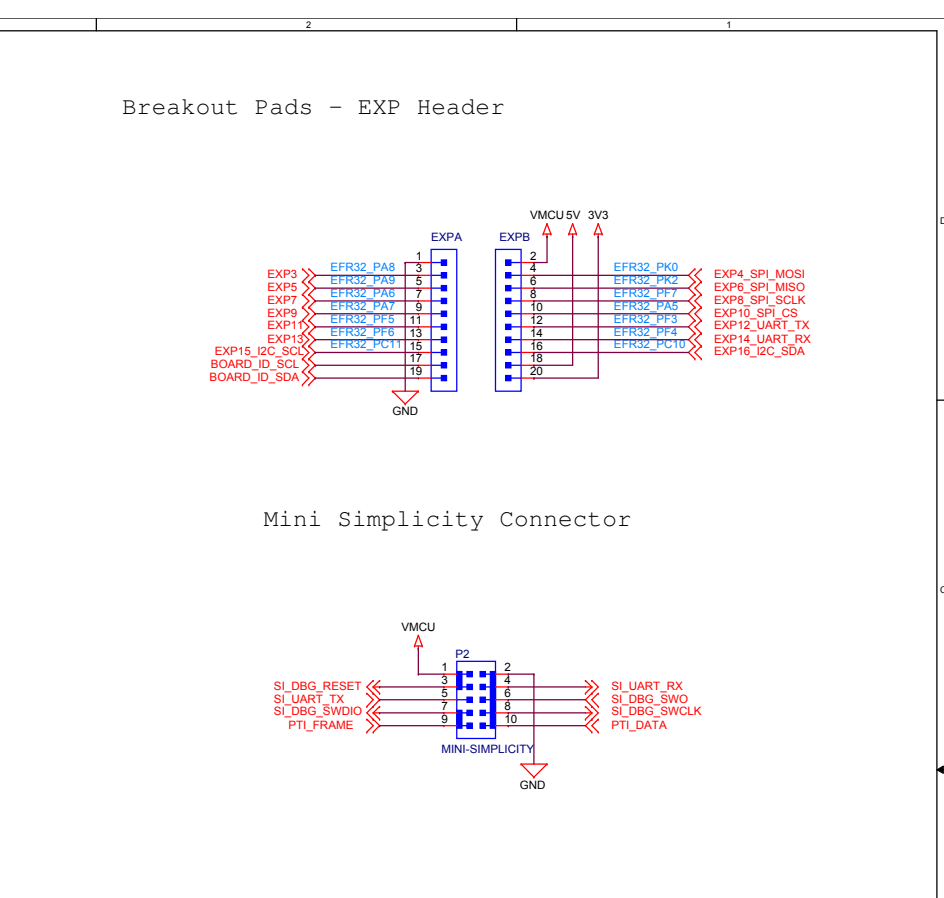
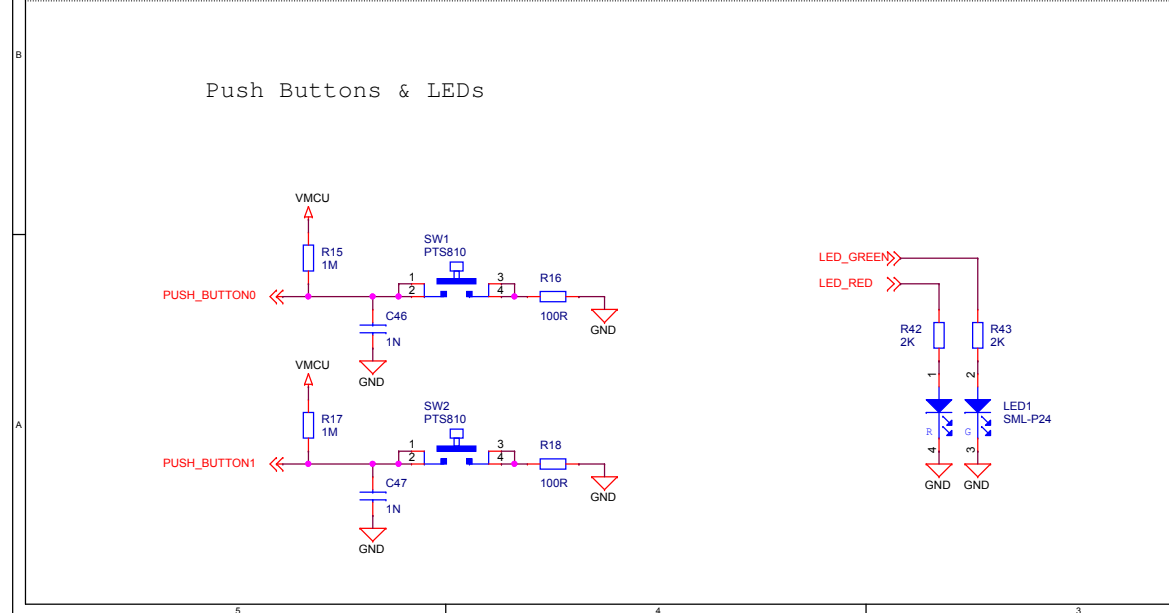
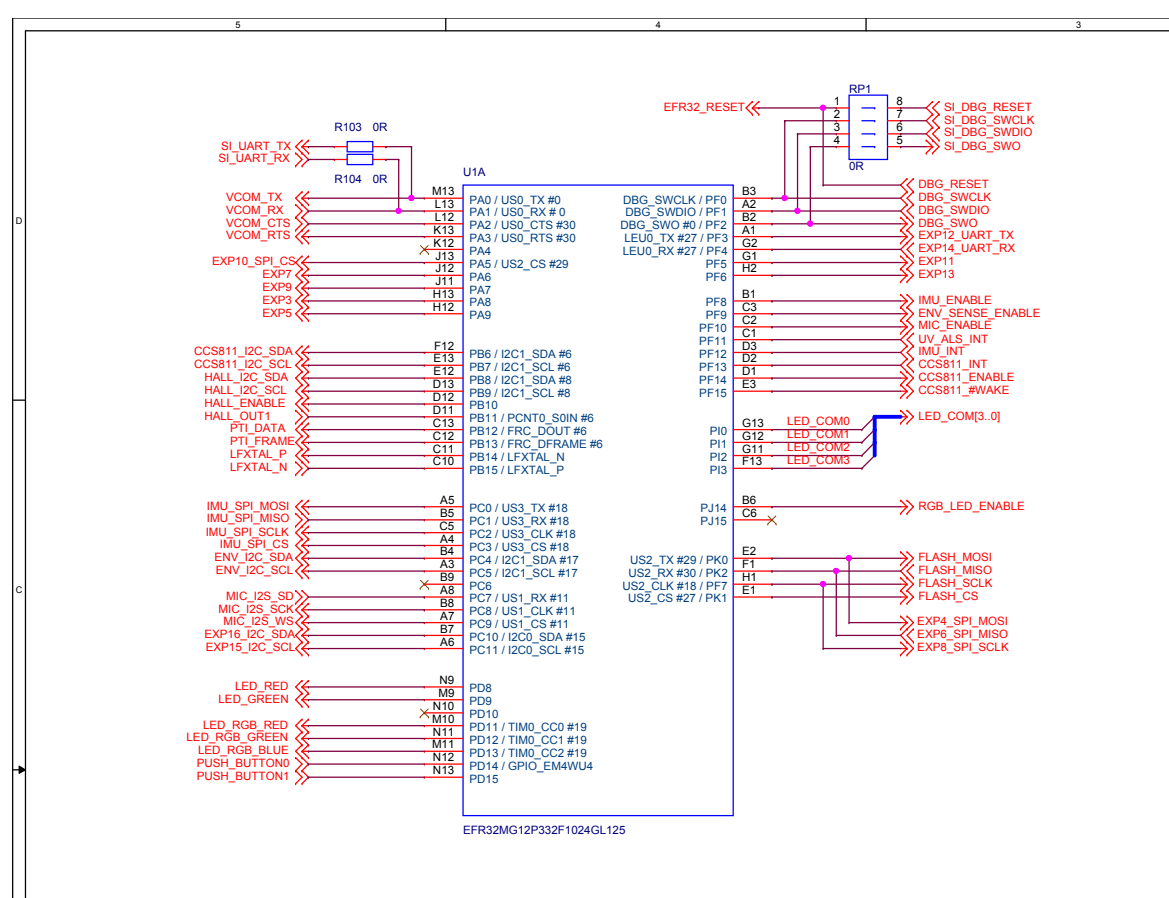


**SILICON LABS**

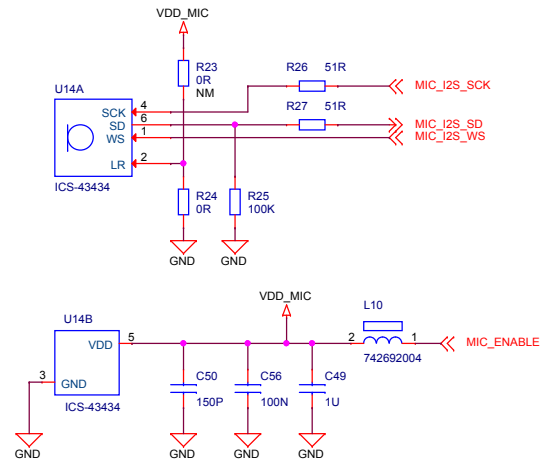
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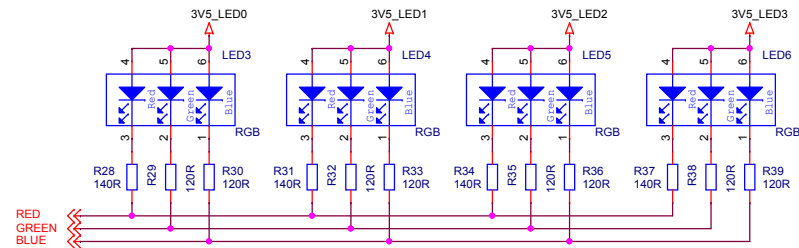
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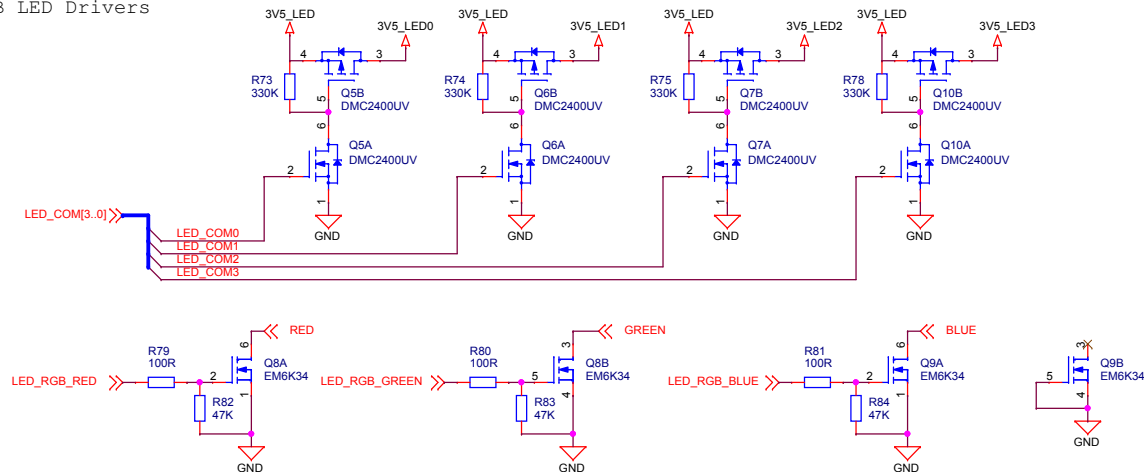
## MEMS Microphone



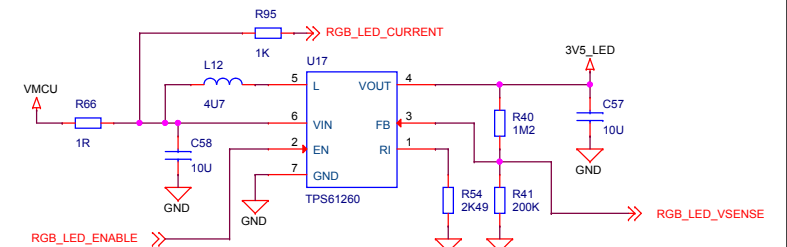
## RGB LEDs




## RGB LED Drivers



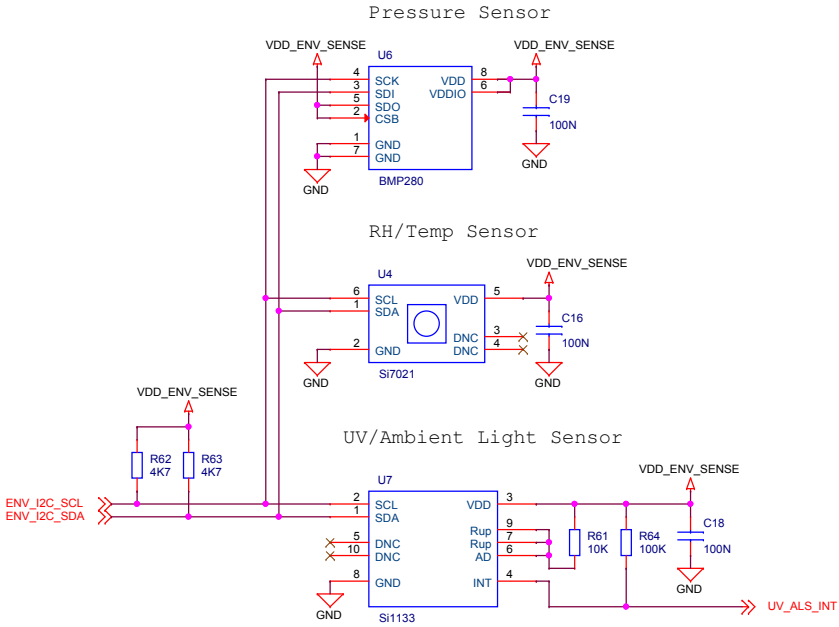
## RGB LED power supply



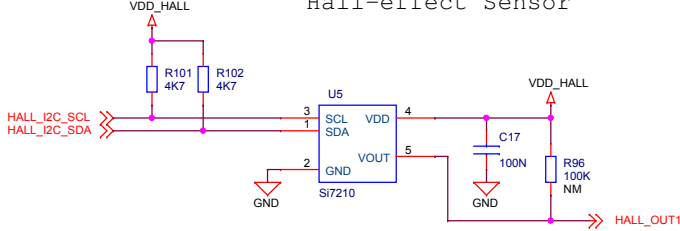
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Approved: JNO		MEMS Microphone & RGB LEDs	
Size A3		Document number	
BOM Doc No: <Cage Code>		BRD4166A	
Design Created Date: Wednesday, November 30, 2016		Revision	
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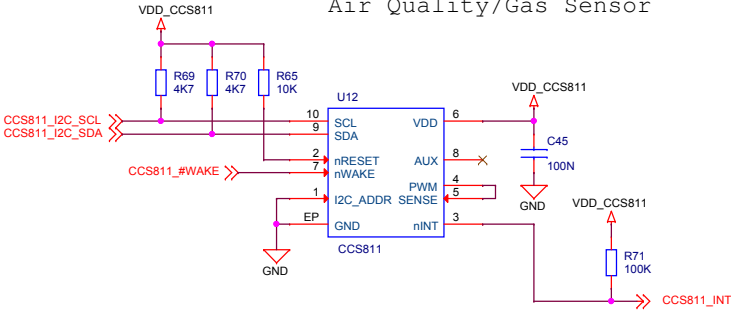
Environmental Sensors



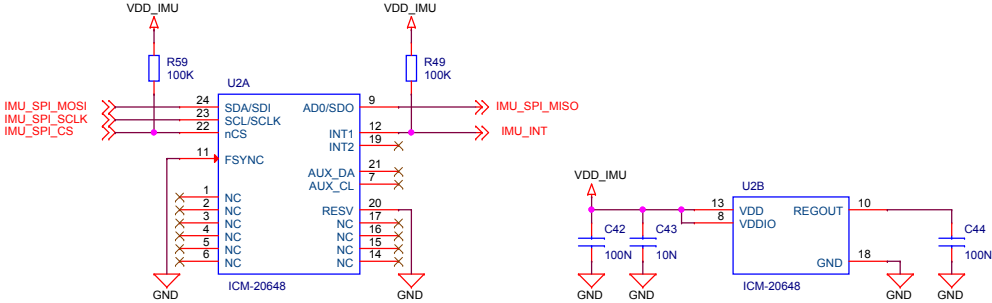
Hall-effect Sensor



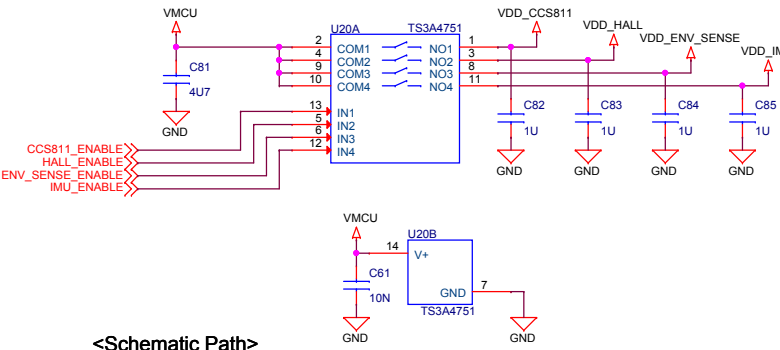
Air Quality/Gas Sensor




6-axis inertial sensor



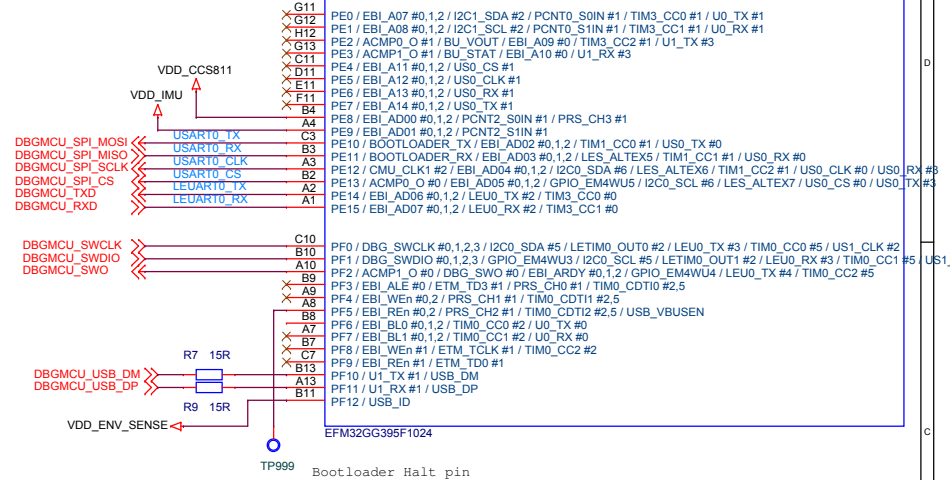
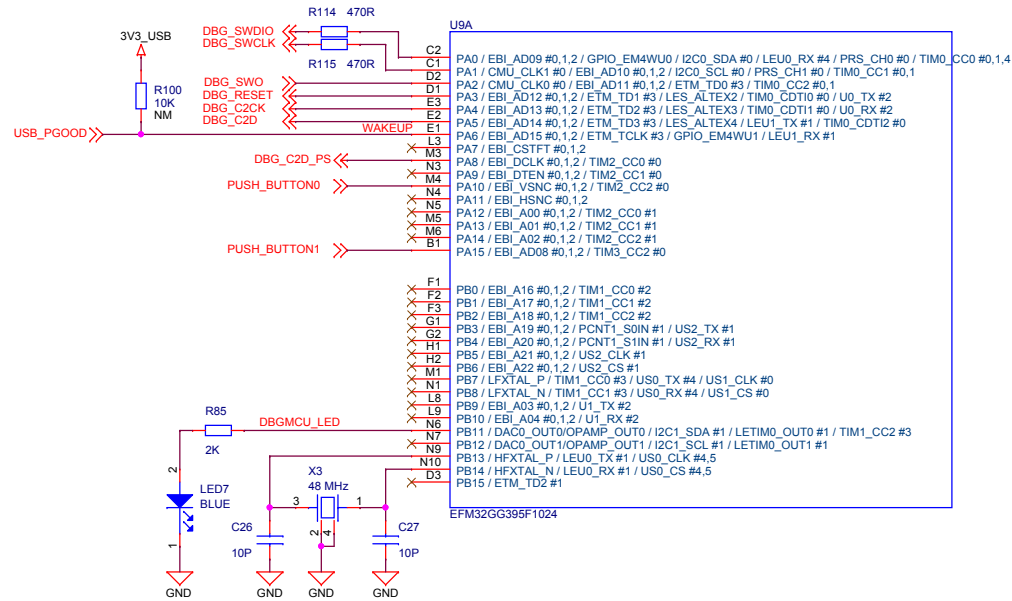
Sensor Power Control



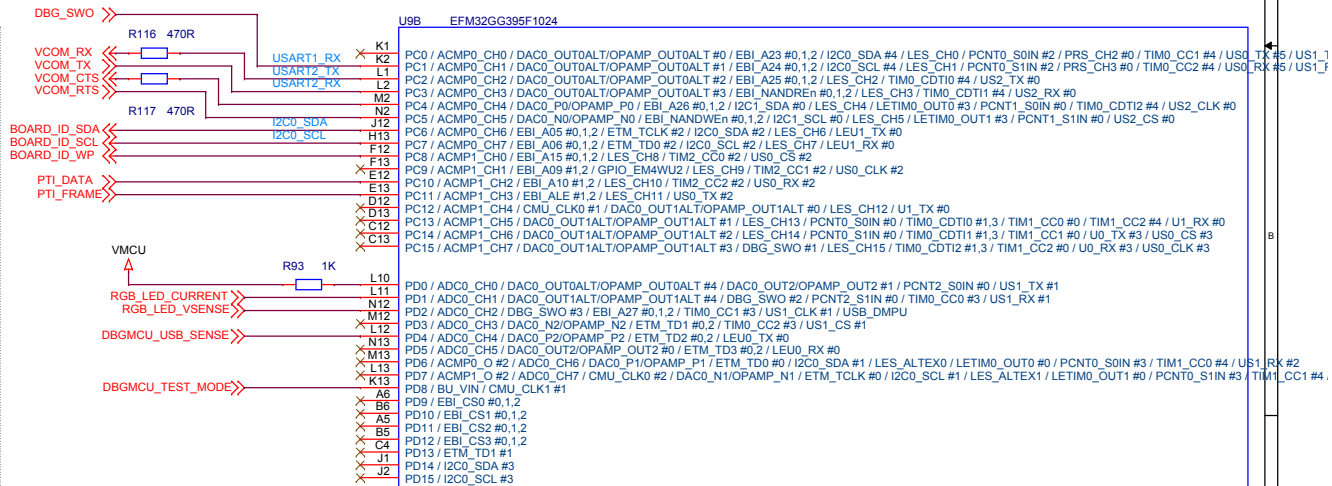
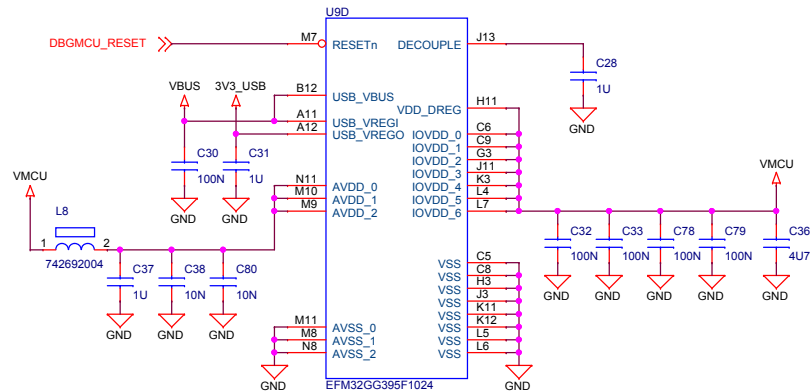
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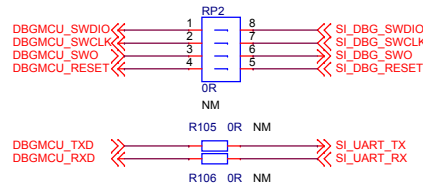
## Debug MCU Connections




## Debug MCU Decoupling



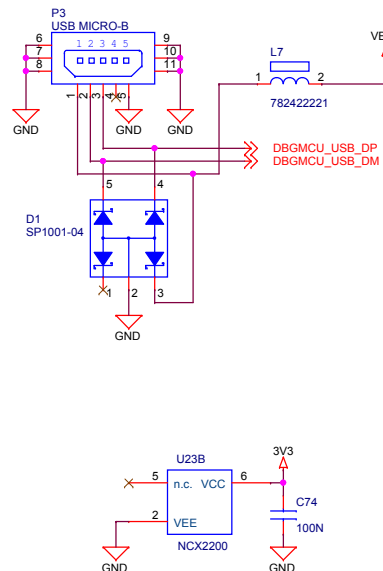
## Debug MCU Connections to Mini Simplicity Header



## <Schematic Path> SCHEMATIC1

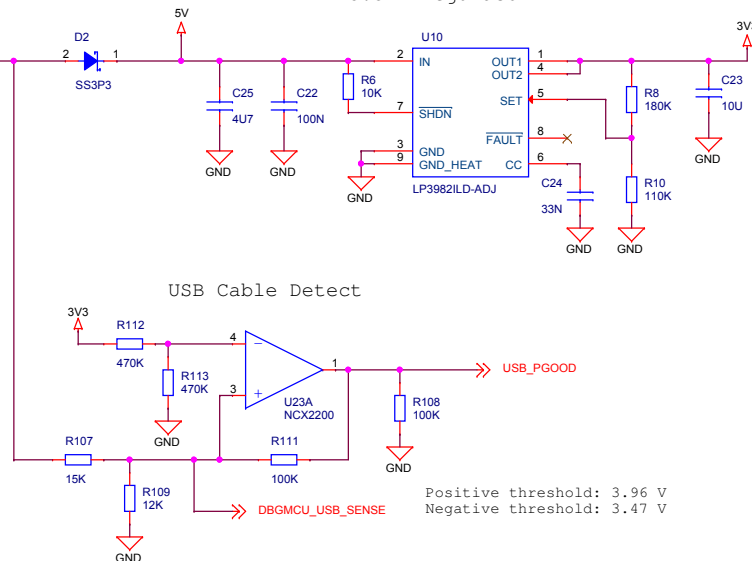
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## USB Connector

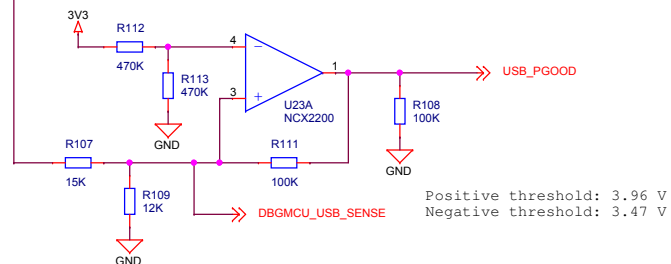


User can supply 3.6 - 5.5 on "5V" pin instead of using the USB cable

## 3.3 V Regulator

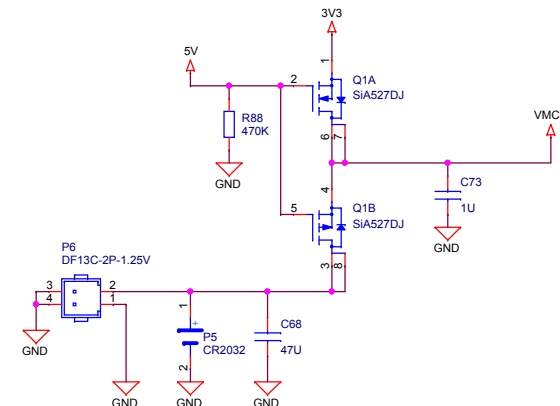


## USB Cable Detect



Positive threshold: 3.96 V  
Negative threshold: 3.47 V

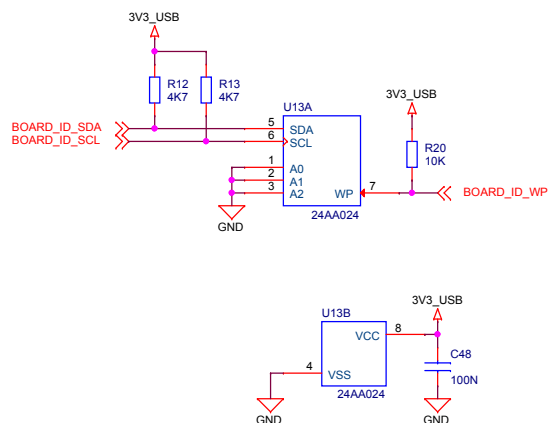
## Board power select circuit



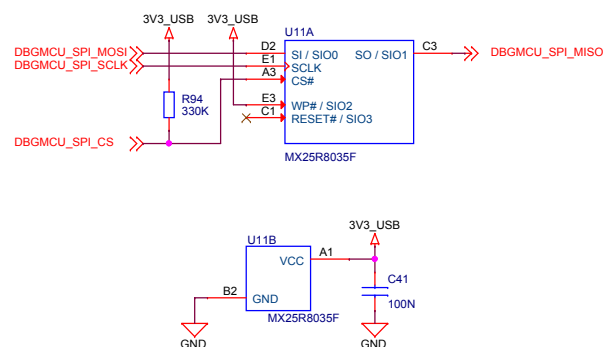
Q1 switches from battery power to USB when USB is plugged in.

Additionally, the Mini Simplicity Debug connector can supply power directly to the target voltage domain.

## Board ID EEPROM

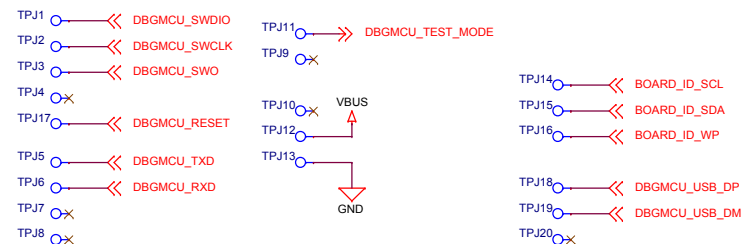


## SPI Flash




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

## Test Points



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