

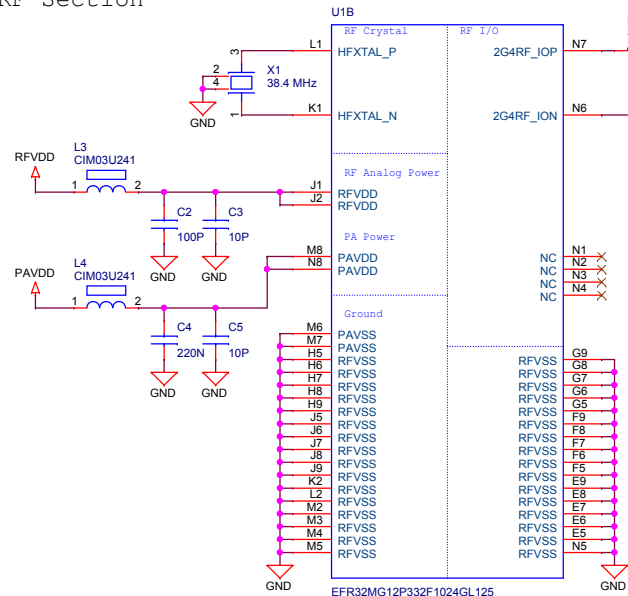


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Revision History	
Rev.	Description
A00	Initial prototype version.
B00	Updated EFR32 and debugger IC revisions. Replaced analog microphone with an I2S-based digital one.
B01	Changed microphone to Knowles SPH0645LM4H-B

SCHEMATIC1			
		Schematic Title	
SILICON LABS		Thunderboard Sense 2	
Designed: DDB		Page Title	
Approved: JNO		Title Page	
Size: A3	BOM Doc No: <Cage Code>	Document number	Revision
Design Created Date: Wednesday, November 30, 2016		BRD4166A	B01
Sheet Created Date: Wednesday, November 30, 2016		Sheet Modified Date: Wednesday, February 08, 2017	Sheet 1 of 7



M1 M2
2.2 MM 2.2 MM



The schematic diagram illustrates the power and decoupling circuit for the EFR32MG12P332F1024GL125. The central component is the U1C chip, which is divided into several functional blocks: DC/DC Regulator, Digital Regulator, Digital Logic, and I/O Supply. The chip is powered by VMCU and RFVDD, with various ground connections and decoupling capacitors throughout. Key components include resistors R2, R98, capacitors C7, C8, C9, C10, C11, C12, C13, C14, C75, C76, C77, and inductors L5, L6. The circuit is designed to provide stable power to the chip and its peripherals, with decoupling capacitors used to filter out noise and maintain a steady voltage level.

The schematic diagram illustrates the power and decoupling circuit for the EFR32MG12P332F1024GL125. The central component is the U1C chip, which contains several internal blocks: DC/DC Regulator, Digital Regulator, Digital Logic, and I/O Supply. The circuit is powered by VMCU and RFVDD, with various pins connected to ground or other components. Key components include resistors (R2, R98), capacitors (C7, C8, C9, C10, C11, C12, C13, C14, C75, C76, C77), and inductors (L5, L6). The diagram shows the internal blocks of the U1C chip, including the DC/DC Regulator, Digital Regulator, Digital Logic, and I/O Supply. External components include resistors (R2, R98), capacitors (C7, C8, C9, C10, C11, C12, C13, C14, C75, C76, C77), and inductors (L5, L6). The circuit is powered by VMCU and RFVDD, with various pins connected to ground or other components.



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Thunderboard Sense 2

EFR32 - RF, power & IO

BRD4166A

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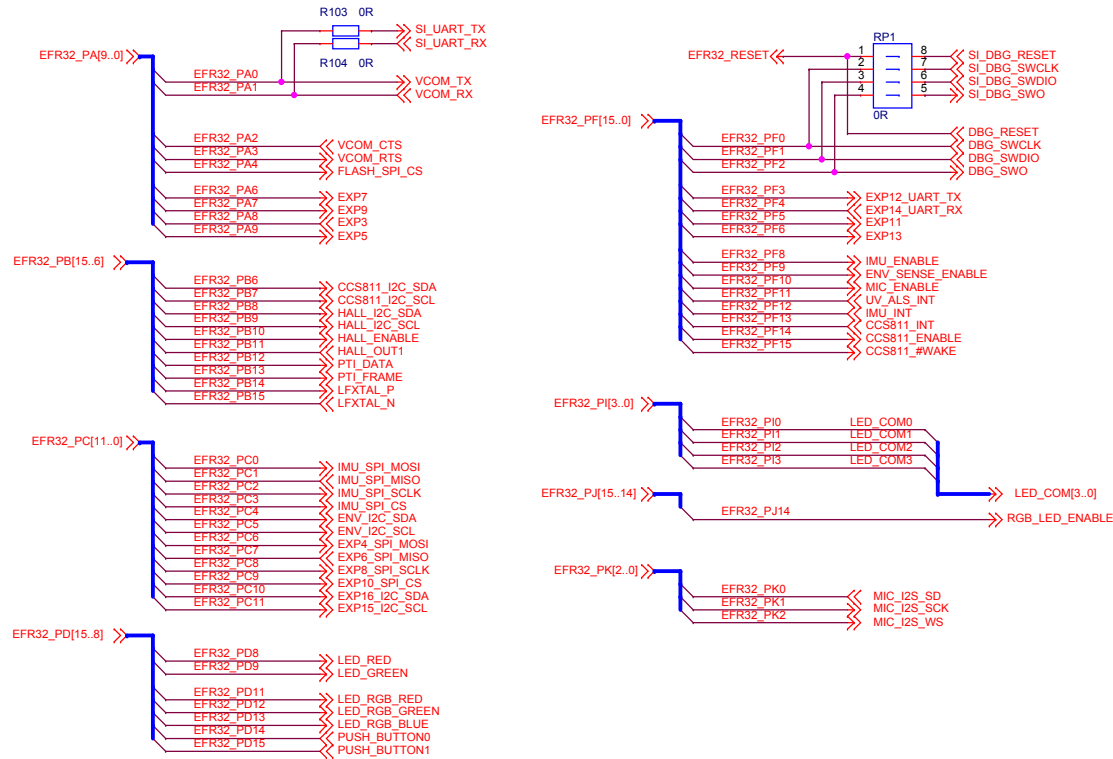
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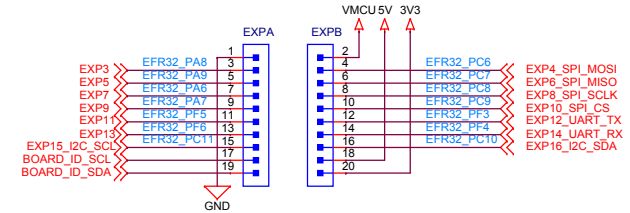
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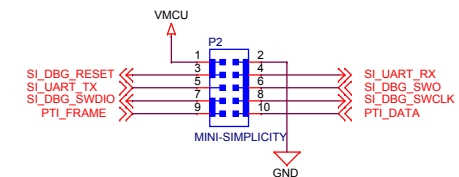
EFR32 I/O Connections



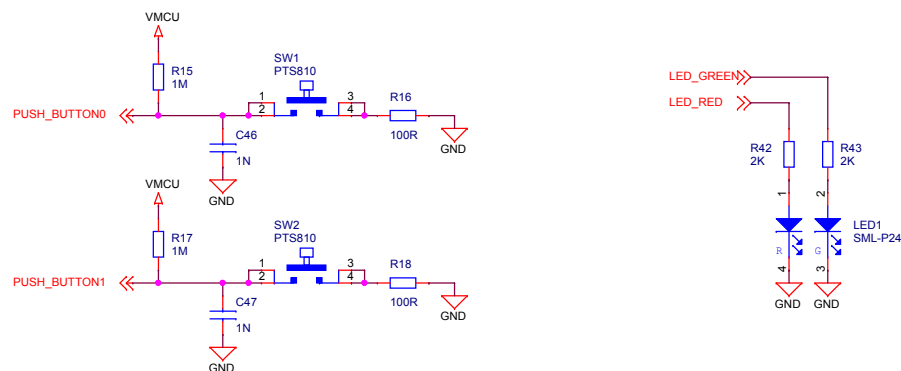
Breakout Pads - EXP Header



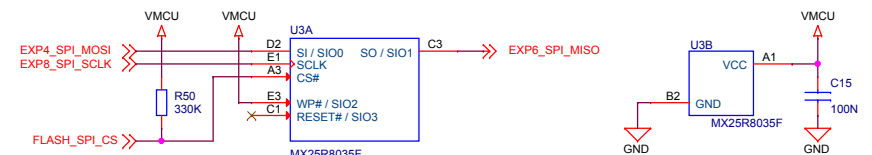
Mini Simplicity Connector



Push Buttons & LEDs



SPI Flash



<Schematic Path> SCHEMATIC1

		Schematic Title	
		Thunderboard Sense 2	
Designed: DDB		Page Title	
Size A3		EFR32 connections & interfaces	
Design Created Date: Wednesday, November 30, 2016		Document number	Revision
		BRD4166A	B01
		Sheet Created Date	Sheet Modified Date
		Wednesday, November 30, 2016	Wednesday, February 15, 2017
		Sheet	Sheet
		3	of 7

The schematic diagram illustrates the MIC_I2S module, divided into two main sections: U14A and U14B.

U14A Section:

- Component:** U14A (SPH0645LM4H-B).
- Inputs/Outputs:**
 - BCLK (Pin 4):** Connected to VDD_MIC through resistor R23 (51R).
 - DATA (Pin 6):** Connected to VDD_MIC through resistor R23 (51R).
 - WS (Pin 1):** Connected to VDD_MIC through resistor R23 (51R).
 - SELECT (Pin 2):** Connected to GND through resistor R24 (0R).
- Outputs:**
 - MIC_I2S_SCK:** Connected to the DATA pin (Pin 6) through resistor R26 (51R).
 - MIC_I2S_SD:** Connected to the WS pin (Pin 1) through resistor R27 (51R).
 - MIC_I2S_WS:** Connected to the SELECT pin (Pin 2) through resistor R27 (51R).

U14B Section:

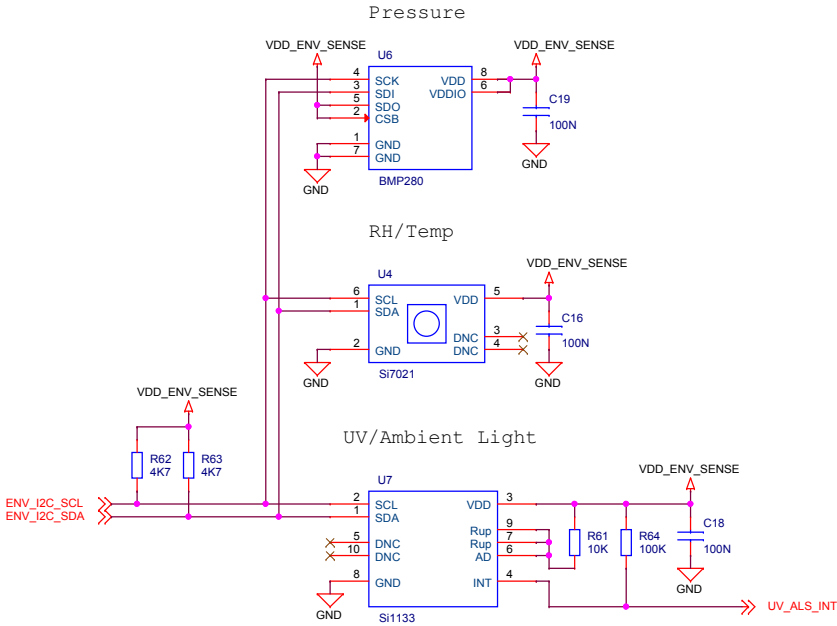
- Component:** U14B (SPH0645LM4H-B).
- Inputs/Outputs:**
 - VDD (Pin 5):** Connected to VDD_MIC through capacitor C50 (150P).
 - GND (Pin 3):** Connected to GND through capacitor C56 (100N).
- Outputs:**
 - MIC_ENABLE:** Connected to the VDD pin (Pin 5) through capacitor C49 (1U) and inductor L10 (CIM03U601).

The diagram shows four identical RGB LED circuits connected in parallel to a 3V5V supply. Each LED (LED3, LED4, LED5, LED6) has three current-limiting resistors (R28-R39) connected to its Red, Green, and Blue pins. The resistors are labeled with their values: R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, and R39, all with a value of 140R or 120R. The LEDs are connected to a common ground, and the 3V5V supply is connected to the common anode of each LED.

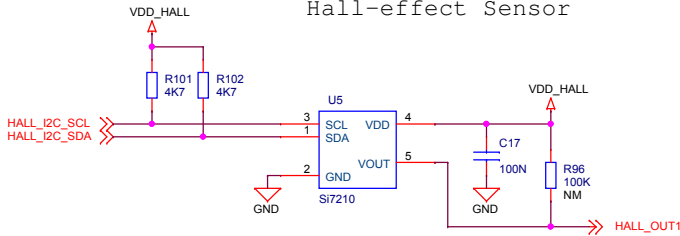
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Design Created Date: Wednesday, November 30, 2016			

Sheet
4 of 7

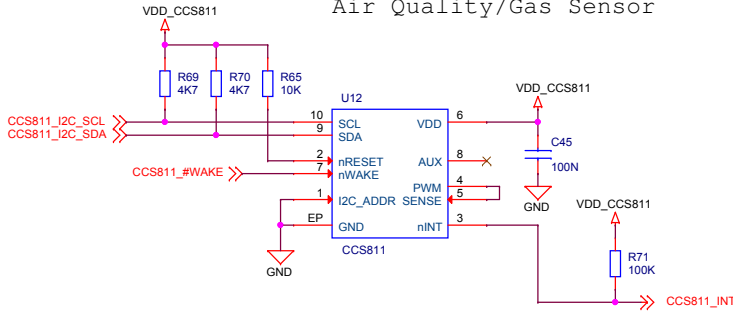
Environmental Sensors



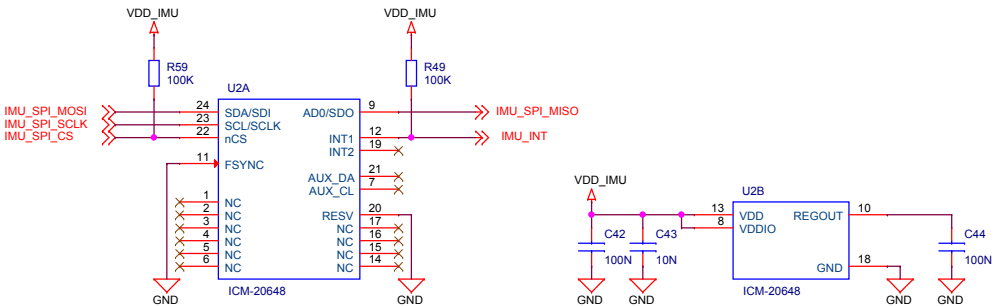
Hall-effect Sensor



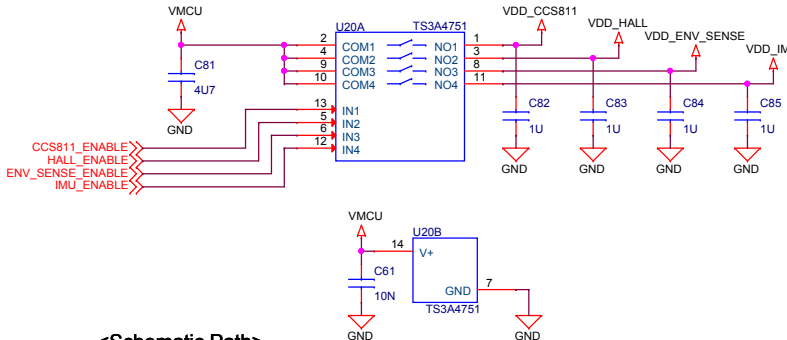
Air Quality/Gas Sensor



6-axis inertial sensor



Sensor Power Control



<Schematic Path>
SCHEMATIC1

 SILICON LABS	Schematic Title	
	Thunderboard Sense 2	
Designed: DDB	Approved: JNO	Page Title
Size A3	BOM Doc No: <Cage Code>	I2C & SPI Sensors
Design Created Date: Wednesday, November 30, 2016	Document number BRD4166A	Revision B01
Sheet Created Date Wednesday, November 30, 2016	Sheet Modified Date Wednesday, February 08, 2017	Sheet 5 of 7

The image shows a detailed PCB layout for an EFM32GG395F1024 microcontroller. The layout is a top-down view of the PCB, showing the placement of components and the routing of signals. The microcontroller is located in the center of the board, with various peripheral components connected to it. The layout includes a USB interface, a VMCU interface, and a debug interface. The USB interface is connected to a USB_VBUS line, which is connected to a USB_VBUS pin on the microcontroller. The VMCU interface is connected to a VMCU line, which is connected to a VMCU pin on the microcontroller. The debug interface is connected to a debug line, which is connected to a debug pin on the microcontroller. The layout also shows the connection of various peripheral components, including a USB_VBUS line, a VMCU line, and a debug line. The layout is a top-down view of the PCB, showing the placement of components and the routing of signals.

Debug MCU Connections to Mini Simplicity Header

RP2

DBGMCU_SWDIO <-- 1 8 --> SI_DBG_SWDIO

DBGMCU_SWCLK <-- 2 7 --> SI_DBG_SWCLK

DBGMCU_SWO <-- 3 6 --> SI_DBG_SWO

DBGMCU_RESET <-- 4 5 --> SI_DBG_RESET

OR

NM

R105 OR NM

DBGMCU_TXD <-- <--> SI_UART_TX

DBGMCU_RXD <-- <--> SI_UART_RX

R106 OR NM

 SILICON LABS		Schematic Title	
		Thunderboard Sense 2	
Designed: DDB Approved: JNO		Page Title Debug MCU	
Size A3 BOM Doc No: <Cage Code>	Document number BRD4166A		Revision B01
Design Created Date: Wednesday, November 30, 2016	Sheet Created Date Wednesday, November 30, 2016	Sheet Modified Date Wednesday, February 08, 2017	Sheet 6 of 7

