



## EFM8BB50 Pro Kit

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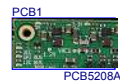
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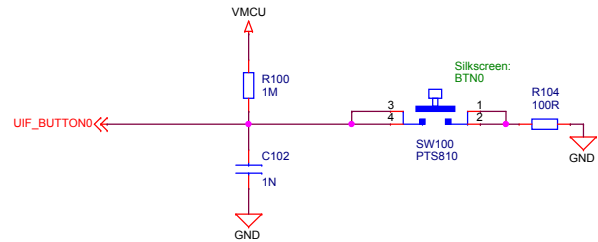
## Revision History

Rev.	Description
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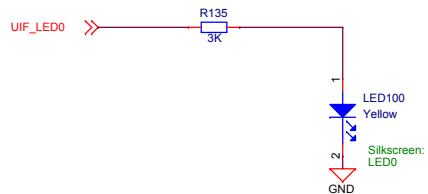
A00	Initial version
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 <b>SILICON LABS</b>		Board Name <b>EFM8BB50 Pro Kit</b>	
		Page Title <b>Title Page</b>	
Designed <b>PEP</b>		Approved <b>RGU</b>	
Size <b>A3</b>	Sheet Modified Date <b>Friday, September 03, 2021</b>		Revision <b>A00</b>
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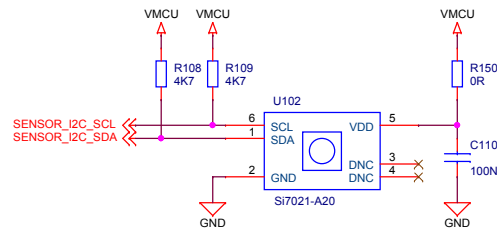
## Push Buttons



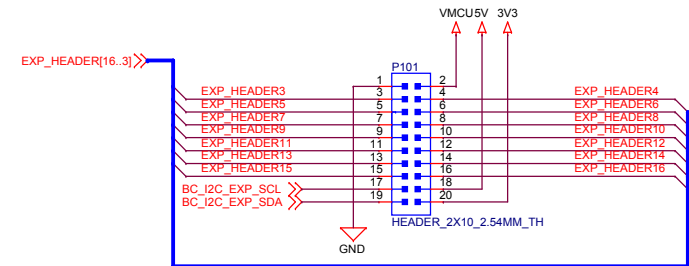
## User LEDs



## Relative Humidity & Temperature Sensor



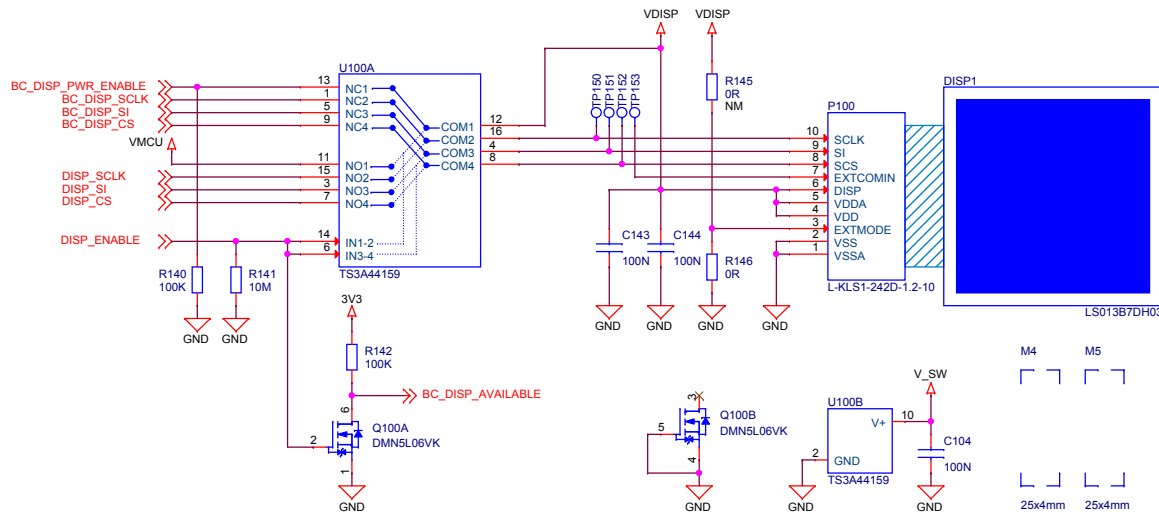
## EXP Header



### EXP Header Functionality

Top Row			
1	GND		
3	P0.2	BTN	
5	P0.3	LED	
7	P0.7	JOYSTICK	
9	NC		CMP1.2/ADC0.11
11	NC		
13	NC		
15	P1.2	I2C_SCL	CMP1.1/ADC0.8
17	Reserved for EXP Board Identification		
19	Reserved for EXP Board Identification		
Bottom Row			
2	VMCU		
4	NC		CMP1.0/ADC0.5
6	NC		CMP0.2/ADC0.4
8	NC		CMP0.4
10	NC		CMP1.0/ADC0.6
12	P0.4	UART_TX	CMP0.1/ADC0.2
14	P0.5	UART_RX	CMP0.3/ADC0.3
16	P1.1	I2C_SDA	CMP1.1/ADC0.7
18	5V		
20	3V3		

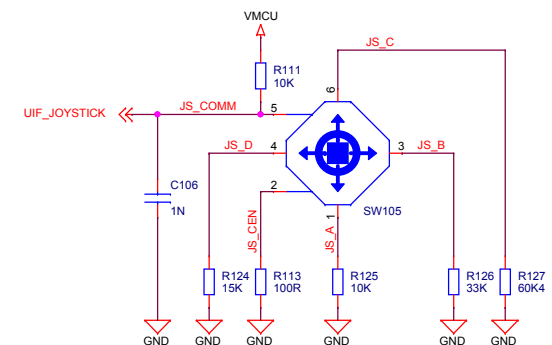
## Memory LCD-TFT Display & Multiplexer



The EFM8 always controls ownership of the display using the DISP\_ENABLE signal.

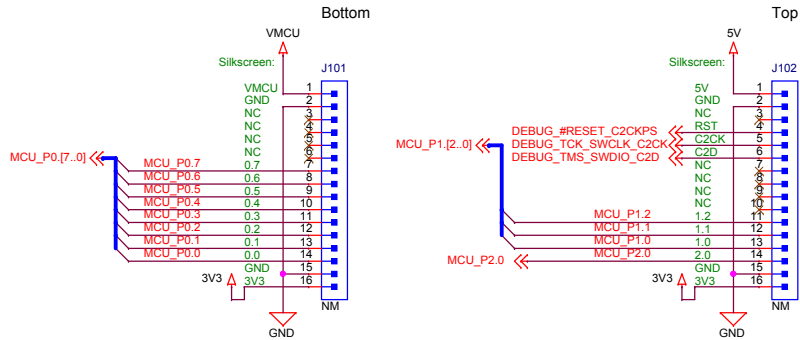
DISP_ENABLE	Connected	VDISP	BC_DISP_AVAILABLE
1	MCU	VMCU	GND
0	BC	BC_DISP_PWR_ENABLE	3V3

## Analog Joystick

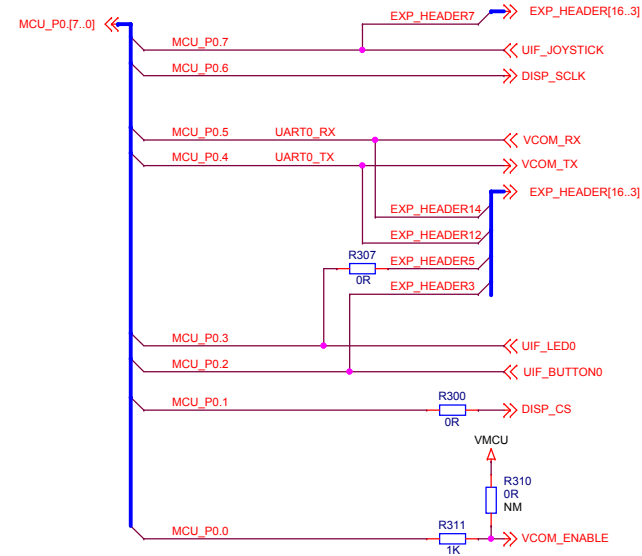


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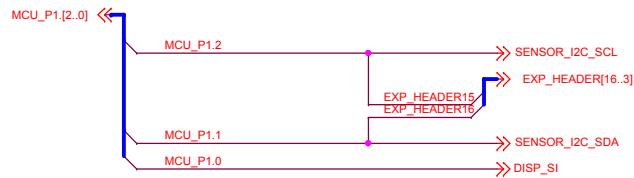
## Breakout Connections



## P0 Connections



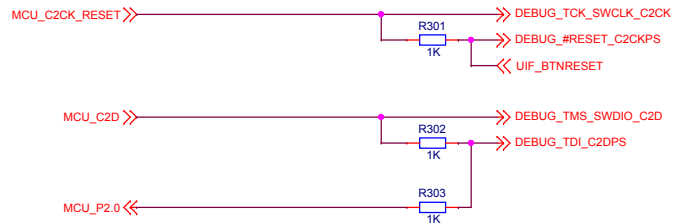
## P1 Connections




## P2 Connections

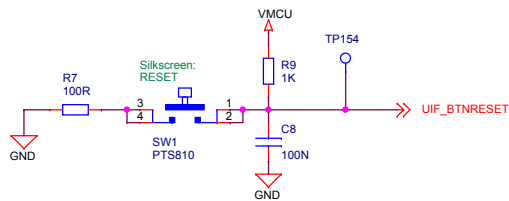


## Debug Connections



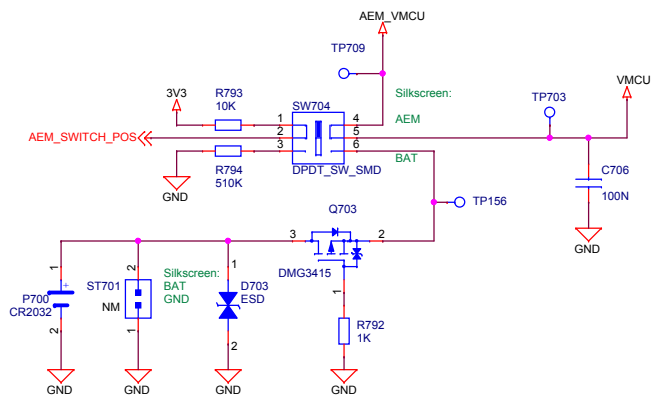
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## Reset Push Button

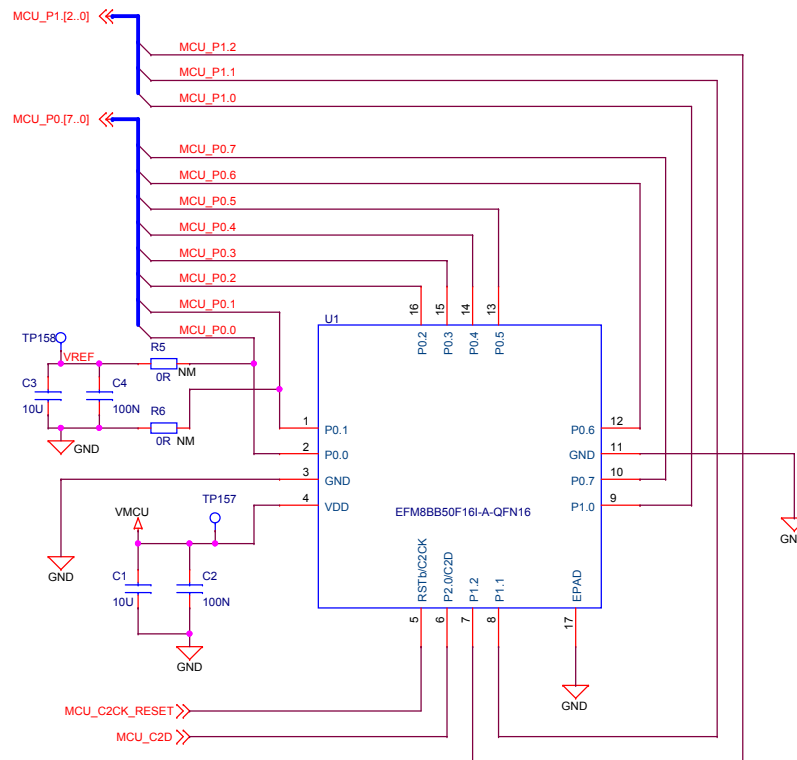



## Power Select Switch: AEM/BAT

SWITCH POS	MODE DESCRIPTION
AEM	AEM Enabled, VMCU sourced from external 3.3V LDO powered by BC USB 5V supply
BAT	AEM Disabled, VMCU sourced from coin-cell battery or external power supply

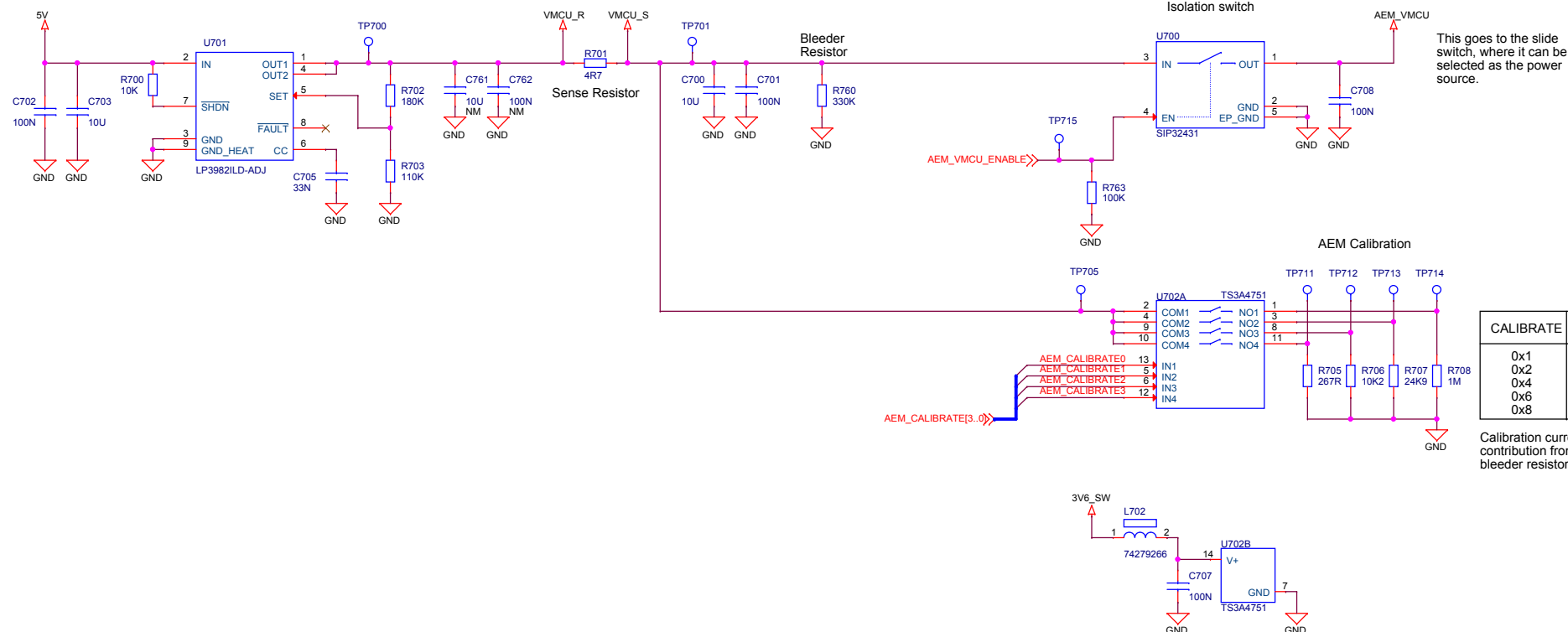


## EFM8 I/O




 <b>SILICON LABS</b>		Board Name	
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Designed PEP		Page Title	
Size A3		<b>EFM8 Power &amp; I/O</b>	
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# MCU Power Regulator



CALIBRATE	Calibration Current
0x1	3.30 uA
0x2	132.5 uA
0x4	323.5 uA
0x6	456.1 uA
0x8	12.34 mA

Calibration currents include contribution from sense and bleeder resistors.

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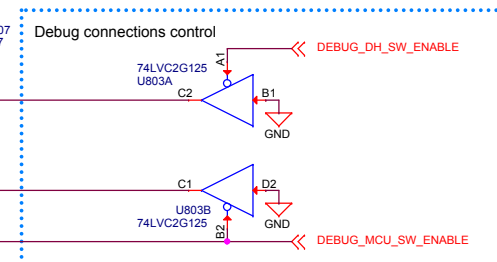
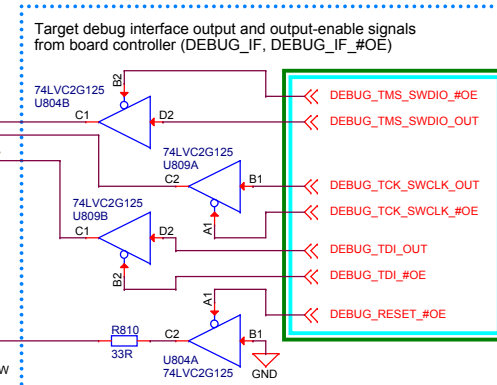
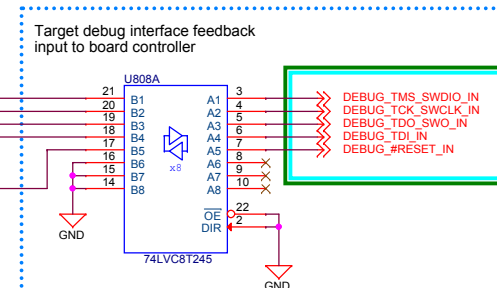
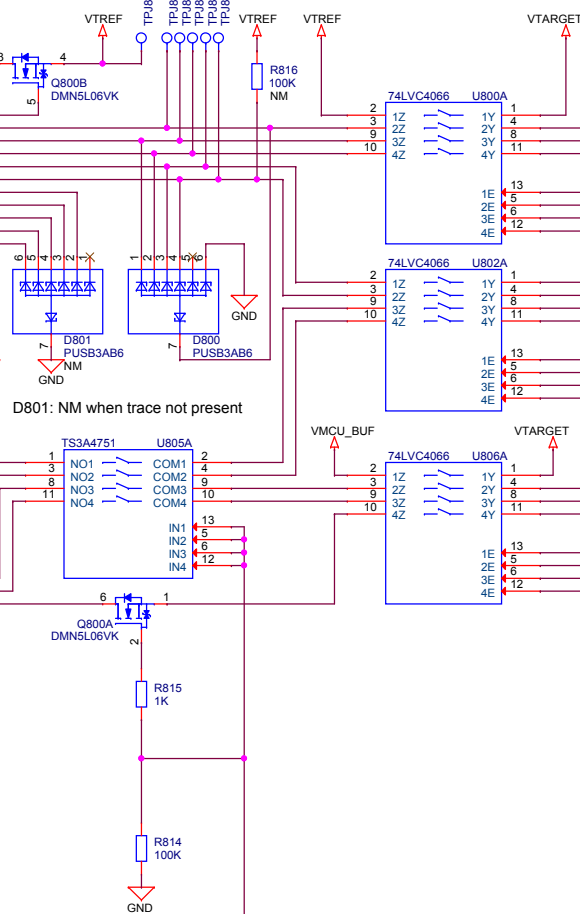
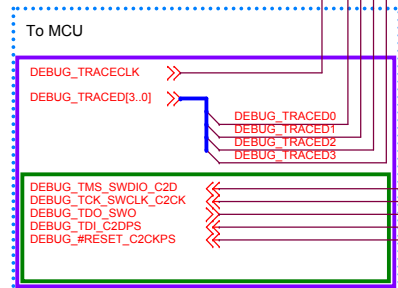
## A



ARM Coresight 20-pin  
Debug + ETM header

Diagram showing the pinout for the ARM Coresight 20-pin Debug + ETM header (P800). The pins are numbered 1 through 20, and the connections are as follows:

- Pin 1: GND
- Pin 2: DH TMS SWDIO
- Pin 3: DH TCK SWCLK
- Pin 4: DH TDO SWO
- Pin 5: DH TDI
- Pin 6: DH #RESET
- Pin 7: (Unlabeled)
- Pin 8: (Unlabeled)
- Pin 9: (Unlabeled)
- Pin 10: (Unlabeled)
- Pin 11: (Unlabeled)
- Pin 12: (Unlabeled)
- Pin 13: (Unlabeled)
- Pin 14: (Unlabeled)
- Pin 15: (Unlabeled)
- Pin 16: (Unlabeled)
- Pin 17: (Unlabeled)
- Pin 18: (Unlabeled)
- Pin 19: (Unlabeled)
- Pin 20: (Unlabeled)



Mode	DEBUG_DH_SW_ENABLE	DEBUG_MCU_SW_ENABLE	DEBUG_IF_#OE	VTREF	VTARGET
Debug Out	1	0	0/1	External voltage	External voltage
MCU Debug	0	1	0/1	Disconnected	VMCU
Debug In	1	1	1	VMCU	VMCU
Debug Off	0	0	1	-	-

Color coded frames indicates which groups of signal nodes that are active in a given debug mode



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Page Title
<b>Debug Interface</b>

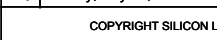
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## A

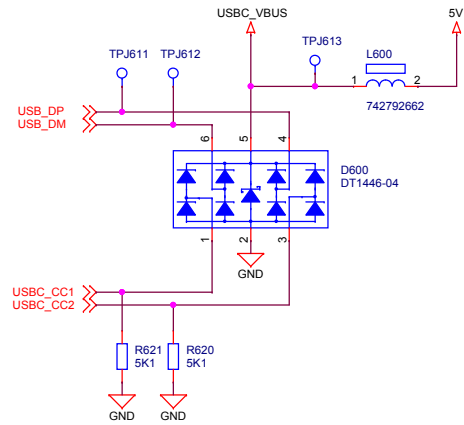
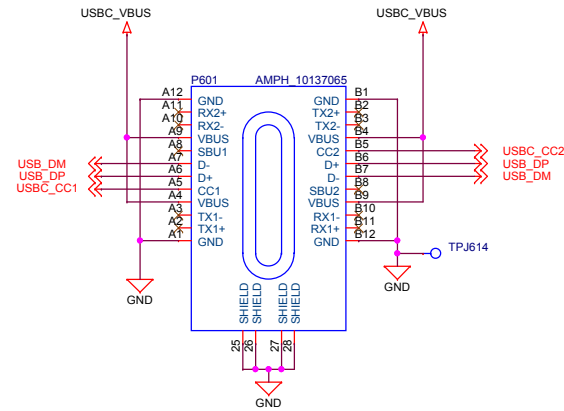


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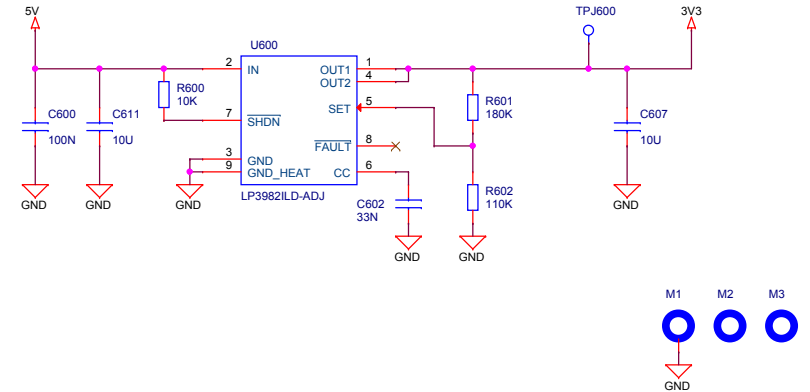
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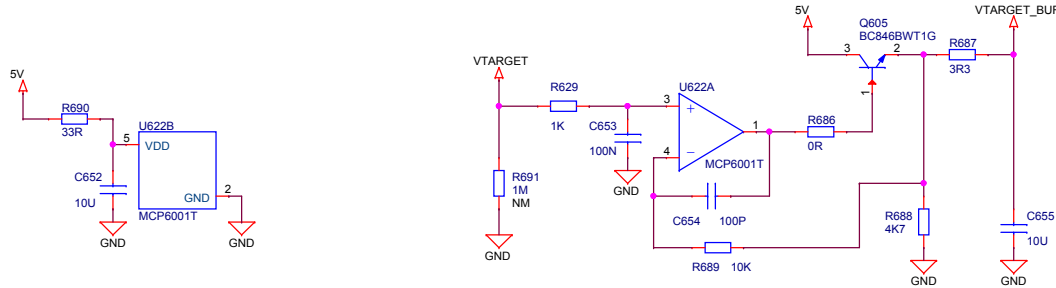
## J-Link USB Port



## 3V3 Regulator



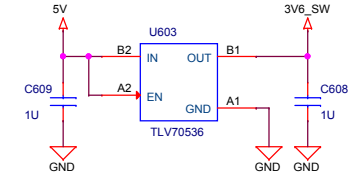
## VTarget Voltage Mirror



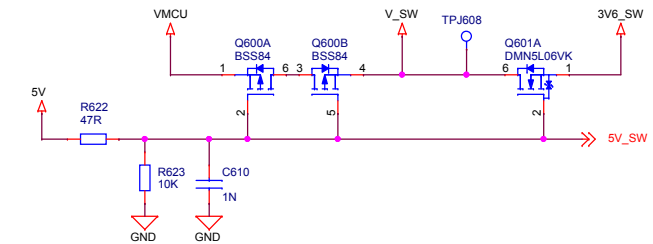
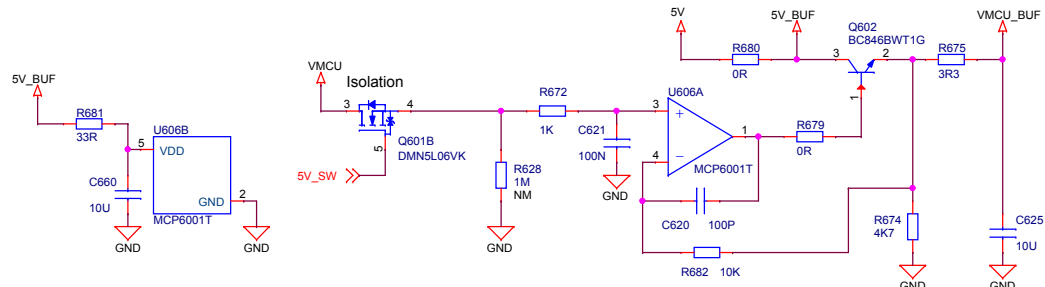
## Power Supply for Analog Switches


Analog switches used for isolation are powered by 3V6\_SW when the USB cable is connected, otherwise by VMCU.

J-Link USB Cable	PMOS State	NMOS State	V_SW	VMCU_SENSE
Connected	Off	On	3.6V	VMCU
Disconnected	On	Off	VMCU	Isolated



## VMCU Voltage Mirror



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The diagram illustrates the Board Controller's internal components and their interconnections. It features three microcontroller packages: U900A, U900B, and U900C. U900A is connected to a 48 MHz crystal (X900) and a 3V3 power supply (TPJ950). U900B and U900C are connected to various peripheral components, including a 10MHz reference clock input (TPJ912, TPJ913), a 3V3 power supply (TPJ950), and a 10MHz reference clock input (TPJ912, TPJ913). The layout also shows connections to a 10MHz reference clock input (TPJ912, TPJ913) and a 10MHz reference clock input (TPJ912, TPJ913).

[illegible]

### Board ID & Button Isolation

BOARD\_ID\_SDA  
BOARD\_ID\_SCL  
3V3  
3V3  
R907 4K7  
R908 4K7  
U901A  
SDA  
SCL  
1  
2  
A0  
A1  
A2  
WP  
M24C02  
3V3  
R909 10K  
BOARD\_ID\_WP  
3V3  
3V3  
R951 100K NM  
R952 100K NM  
BC\_UIF\_BUTTON0  
BC\_UIF\_BUTTON1  
U950A  
COM1  
COM2  
COM3  
COM4  
NO1  
NO2  
NO3  
NO4  
TPJ650 TPJ651  
SI\_BOARD\_ID\_SDA  
SI\_BOARD\_ID\_SCL  
BC\_I2C\_EXP\_SDA  
BC\_I2C\_EXP\_SCL  
TPJ652 TPJ653  
UIF\_BUTTON0  
UIF\_BUTTON1  
BC\_I2C\_EXP\_ENABLE  
BC\_BUTTON\_ENABLE  
R981 100K  
R950 100K  
GND  
GND  
U950B  
V+  
GND  
TS3A4751  
V\_SW  
C950 10N  
GND  
U901B  
VCC  
VSS  
M24C02  
3V3  
C951 100N  
GND

### BC Serial Flash

3V3  
3V3  
BC\_SPI\_COP1  
BC\_SPI\_SCLK  
R906 10K  
BC\_SPI\_CS  
BC\_SPI\_CIP0  
U902A  
SI / SIO0  
SCLK  
CS#  
SO / SIO1  
WP# / SIO2  
RESET# / SIO3  
MX25R8035F  
C3  
3V3  
U902B  
VCC  
GND  
B2  
MX25R8035F  
C914 100N  
GND

### Board Version

BOARD\_V0  
BOARD\_V1  
R931 1K  
R930 1K  
GND  
GND

**SILICON LABS**

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**BC Serial Flash**

BC\_SPI\_COPI  
BC\_SPI\_SCLK  
3V3  
R906 10K  
BC\_SPI\_CS  
BC\_SPI\_CPO  
U902A  
D2 SI / SIO0 SO / SIO1 C3  
E1 SCLK  
A3 CS#  
E3 WP# / SIO2  
C1 RESET# / SIO3  
MX25R8035F  
3V3  
U902B  
VCC A1  
GND B2  
C914 100N  
GND  
MX25R8035F  
GND  
BOARD\_VER0  
BOARD\_VER1  
R931 1K  
R930 1K  
GND  
GND

**Board Version**

BOARD\_VER0  
BOARD\_VER1  
R931 1K  
R930 1K  
GND  
GND

Name

**FM8BB50 Pro Kit**

Title

ard Controller

l Number

**D5208A**

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**BC Serial Flash**

BC\_SPI\_COP1  
BC\_SPI\_SCLK  
3V3  
R906 10K  
BC\_SPI\_CS  
BC\_SPI\_CPO  
U902A  
SI / SIO0  
SCLK  
CS#  
WP# / SIO2  
RESET# / SIO3  
MX25R8035F  
C3  
3V3  
D2  
E1  
A3  
C1  
U902B  
VCC  
GND  
B2  
MX25R8035F  
C914 100N  
3V3  
GND  
A1  
BOARD\_VER0  
BOARD\_VER1  
R931 1K  
R930 1K  
GND  
GND

**Board Version**

BOARD\_VER0  
BOARD\_VER1  
R931 1K  
R930 1K  
GND  
GND

Name

**FM8BB50 Pro Kit**

Title

ard Controller

l Number

**D5208A**

Revision

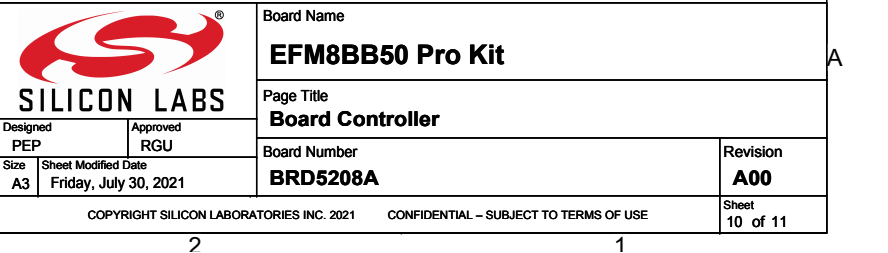
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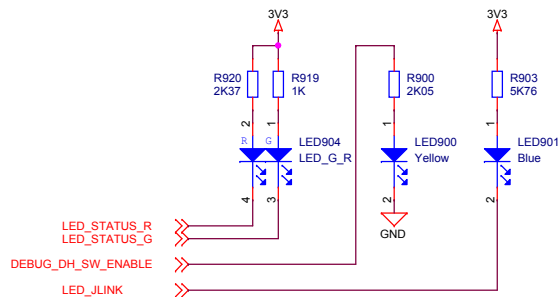
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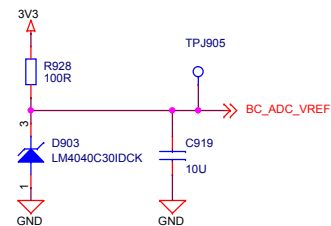
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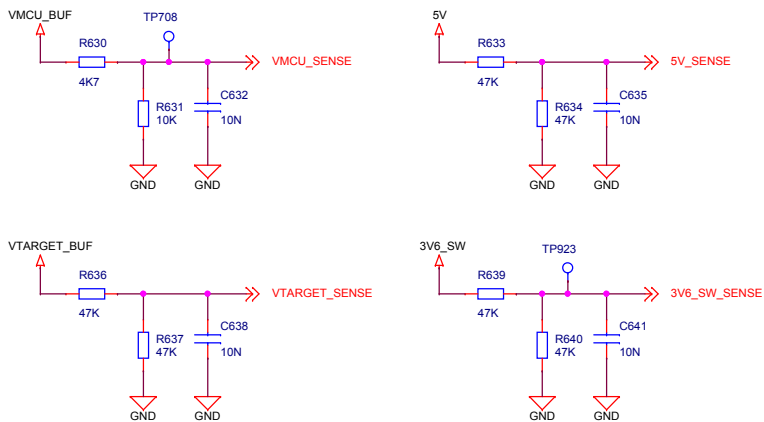
## Indicator LEDs



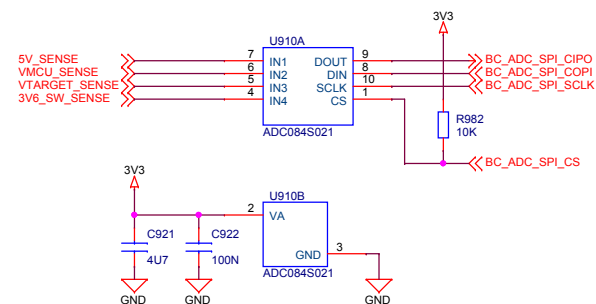
## BC ADC Reference



## BC Voltage Sense



## BC Voltage Sense ADC



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