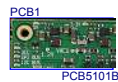




EFM8SB1 Sleepy Bee STK

Board Function	Page
Title Page	1
User Interface	2
Signal Assignments	3
EFM8 Power & I/O	4
Target Voltage Supply	5
AEM	6
Debug Interface	7
Simplicity & VCOM	8
Power	9
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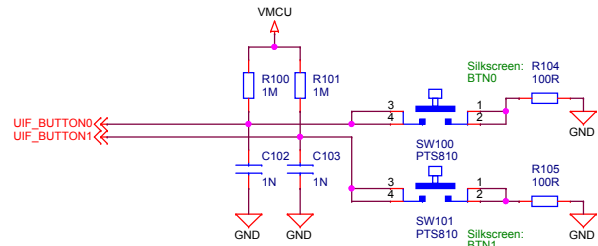
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Revision History

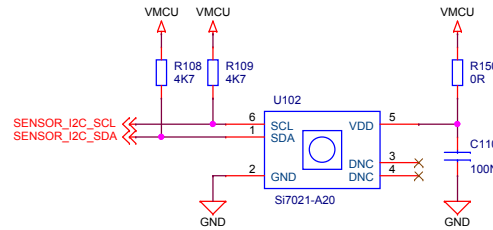
Rev.	Description
A00	Update to new STK platform

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		EFM8SB1 Sleepy Bee STK	
Designed SKV		Approved RGU	
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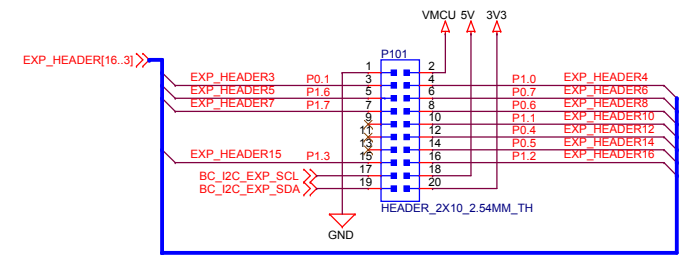
Push Buttons



Relative Humidity & Temperature Sensor



EXP Header



EXP-Header Functionality

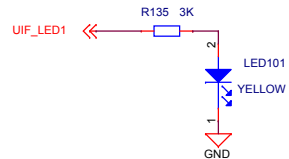
** Indicates potential STK hardware conflicts

1	GND		
3	P0.1		ADC0.1
5	P1.6		
7	P1.7		
9			
11			
13			
15	P1.3	I2C0_SCL	ADC0.11
17	Reserved for EXP Board Identification		
19	Reserved for EXP Board Identification		

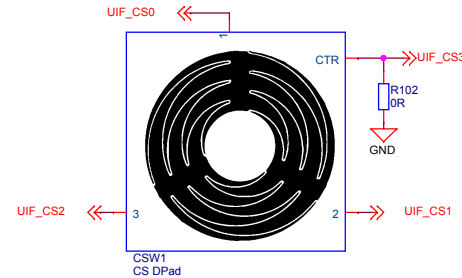
2	VMCU		
4	P1.0	SPI0_MOSI	CMP0P
6	P0.7	SPI0_MISO	ADC0.7
8	P0.6	SPI0_SCK	ADC0.6
10	P1.1	SPI0_NSS	CMP0N
12	P0.4	UART0_TX	ADC0.4
14	P0.5	UART0_RX	ADC0.5
16	P1.2	I2C0_SDA	ADC0.10
18	5V		
20	3V3		

** STK LED0

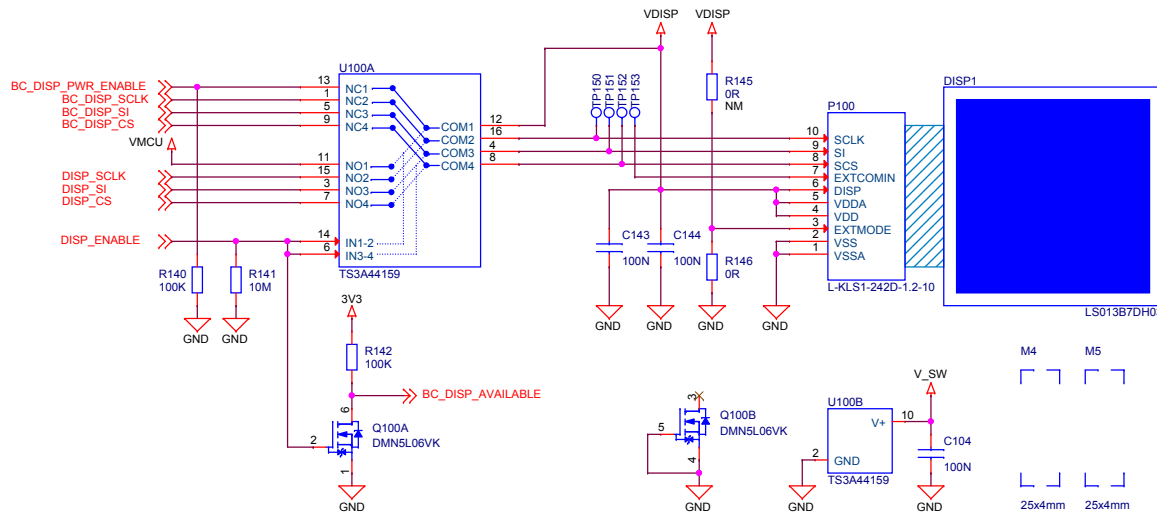
LED



Capsense Rotor



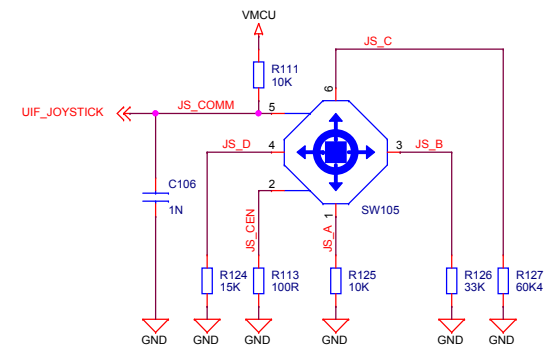
Memory LCD-TFT Display & Multiplexer



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



Board Name

EFM8SB1 Sleepy Bee STK

Page Title

User Interface

Board Number

BRD5101B

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D



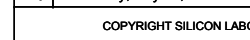
A



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A



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5V

C702 100N

C703 10U

R700 10K

U701 LP3982ILD-ADJ

TP700

R702 180K

C761 10U NM

C762 100N NM

R703 110K

C705 33N

VMCU_R

VMCU_S

R701 4R7

TP701

C700 10U

C701 100N

R760 330K

Bleeder Resistor

Isolation switch

U700 SIP32431

TP715

R763 100K

AEM_VMCU_ENABLE

AEM_VMCU

C708 100N

TP705

U702A TS3A4751

AEM_CALIBRATE0

AEM_CALIBRATE1

AEM_CALIBRATE2

AEM_CALIBRATE3

AEM_CALIBRATE[3..0]

TP711

TP712

TP713

TP714

R705 1K

R706 15K

R707 33K

R708 1M

3V6_SW

L702

74279266

C707 100N

U702B TS3A4751

TP700

TP701

TP715

TP705

TP711

TP712

TP713

TP714

R705

R706

R707

R708

This goes to the slide switch, where it can be selected as the power source.

CALIBRATE	Calibration Current
0x1	13.30 uA
0x2	110 uA
0x4	230 uA
0x6	320 uA
0x8	3.30 mA

Calibration currents include contribution from sense and bleeder resistors.

SILICON LABS

Board Name
EFM8SB1 Sleepy Bee STK

Page Title
Target Voltage Supply

Designed SKV Approved RGU

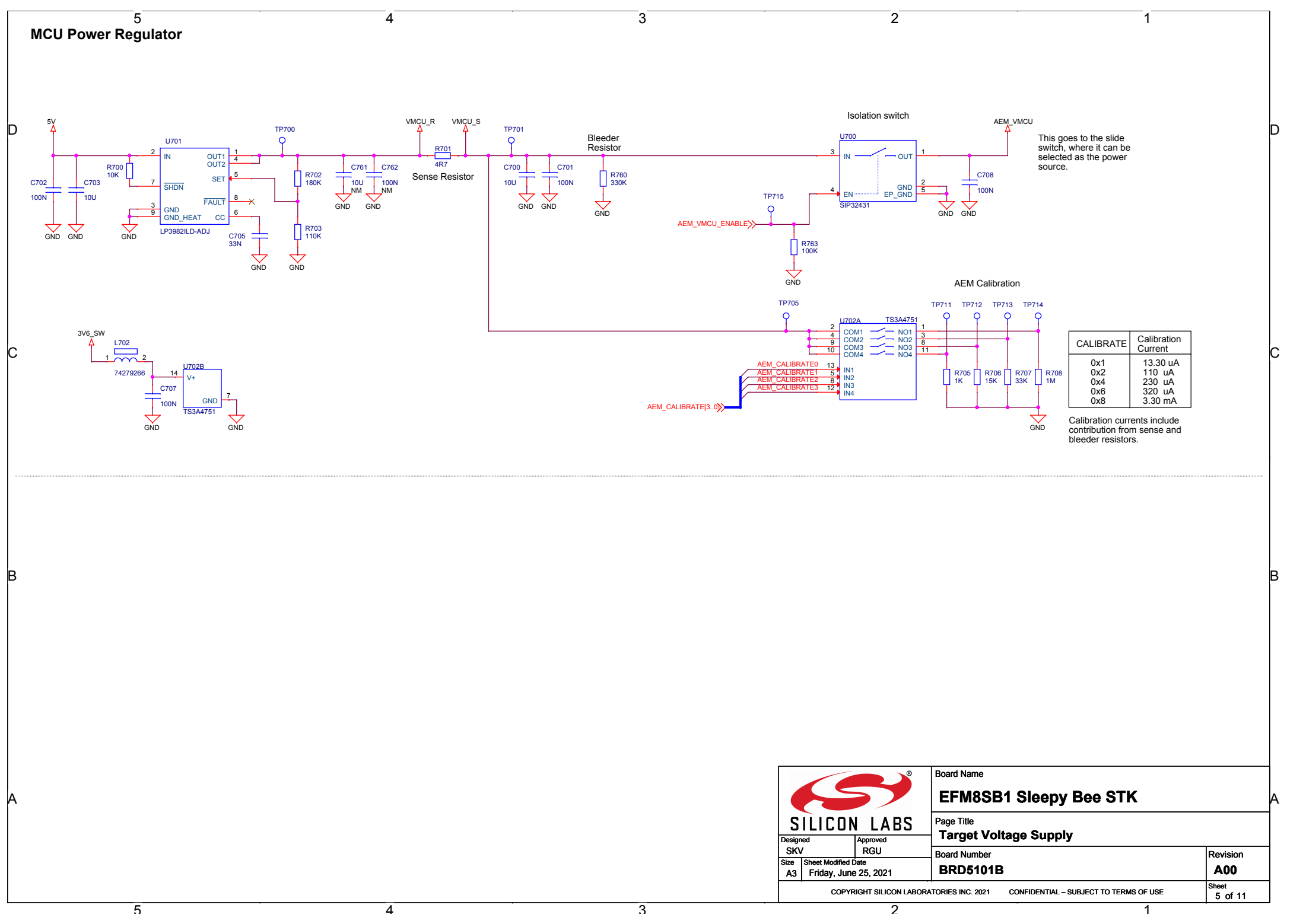
Board Number
BRD5101B

Size A3 Sheet Modified Date Friday, June 25, 2021

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MCU Power Regulator

The schematic shows the power regulation and calibration circuitry for the MCU. Key components include:

- Voltage Regulation:** A 5V input is filtered by capacitors C702 and C703. The signal passes through a sense resistor R700 and is regulated by the LP3982ILD-ADJ (U701) to provide VMCU_R and VMCU_S.
- Isolation Switch:** An isolation switch U700 (SIP32431) controls the power source selection via AEM_VMCU_ENABLE and AEM_VMCU.
- AEM Calibration:** The TS3A4751 (U702A) multiplexer selects between different calibration currents (AEM_CALIBRATE[0] to [3]) for testing.
- Test Points:** Various test points (TP700, TP701, TP705, TP711, TP712, TP713, TP714) are provided for measurement during development.

CALIBRATE	Calibration Current
0x1	13.30 uA
0x2	110 uA
0x4	230 uA
0x6	320 uA
0x8	3.30 mA

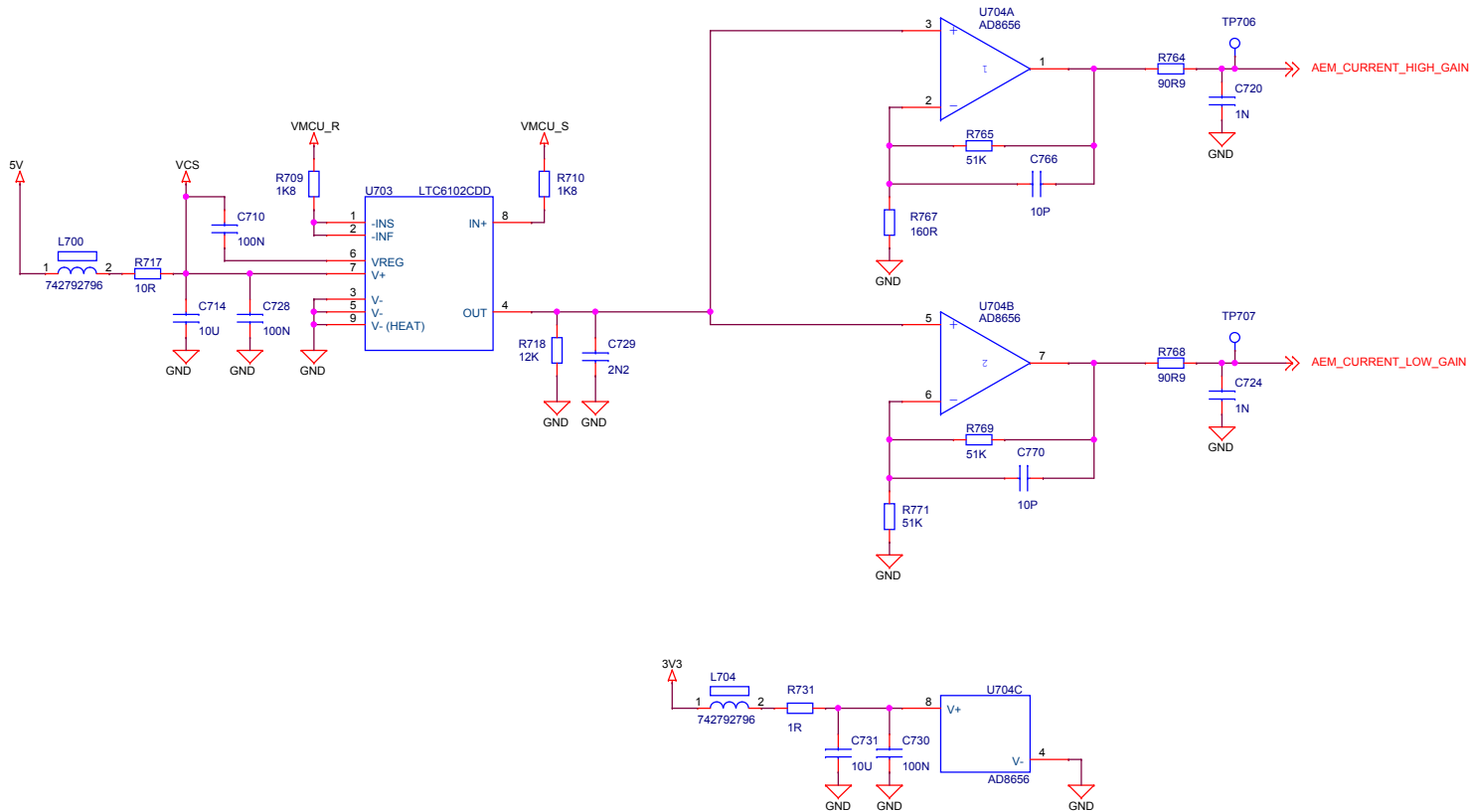
Calibration currents include contribution from sense and bleeder resistors.

SILICON LABS

Board Name: EFM8SB1 Sleepy Bee STK
Page Title: Target Voltage Supply
Designed SKV Approved RGU
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MCU Current Sense



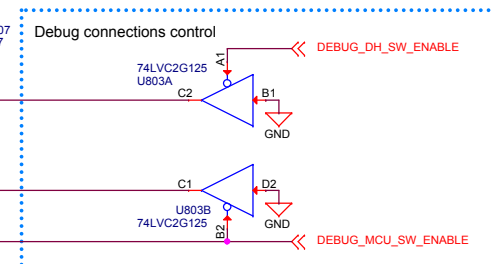
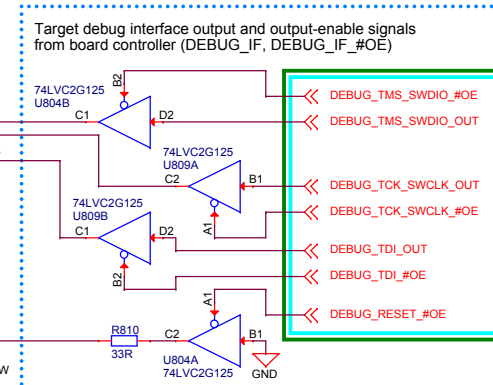
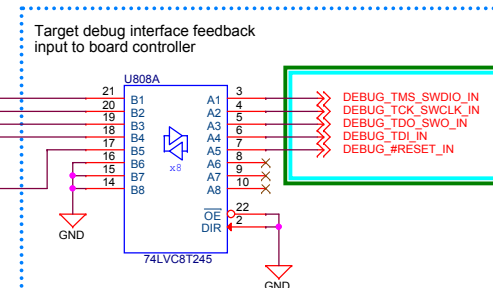
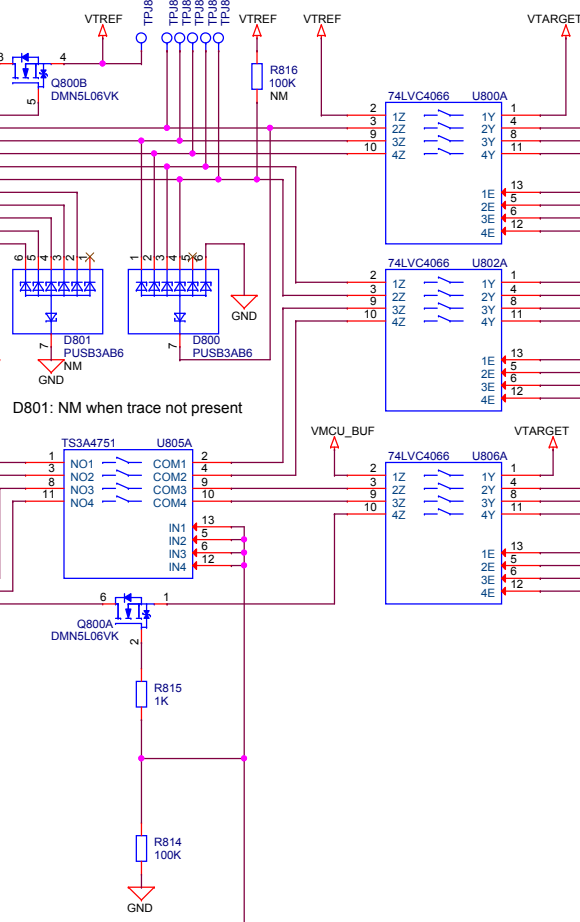
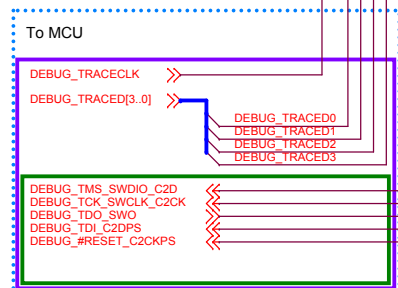
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ARM Coresight 20-pin
Debug + ETM header

P800

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

GND



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



	Board Name
--	------------

EFM8SB1 Sleepy Bee STK

Page Title
Debug Interface

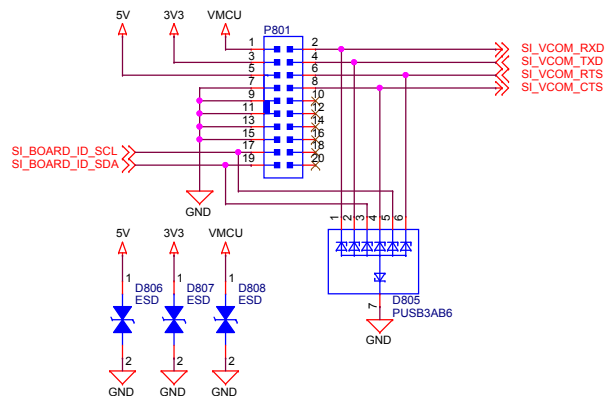
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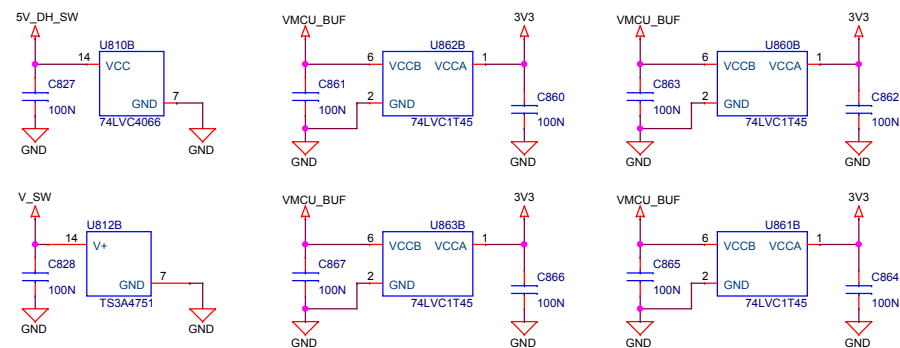
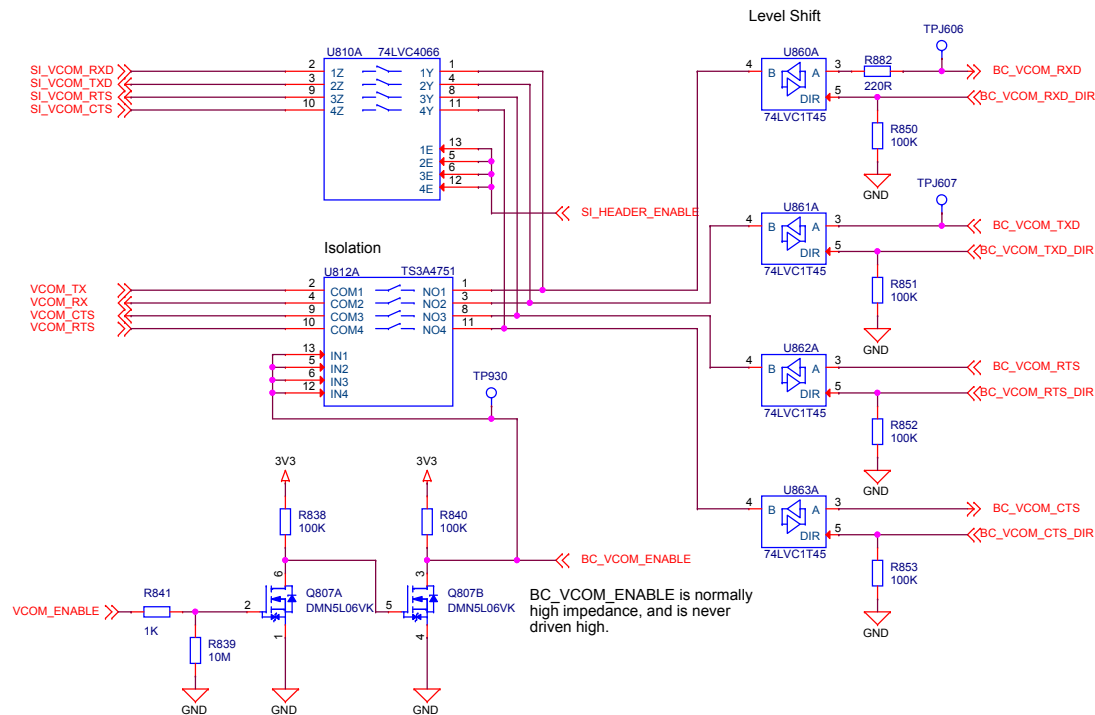
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Simplicity Connector

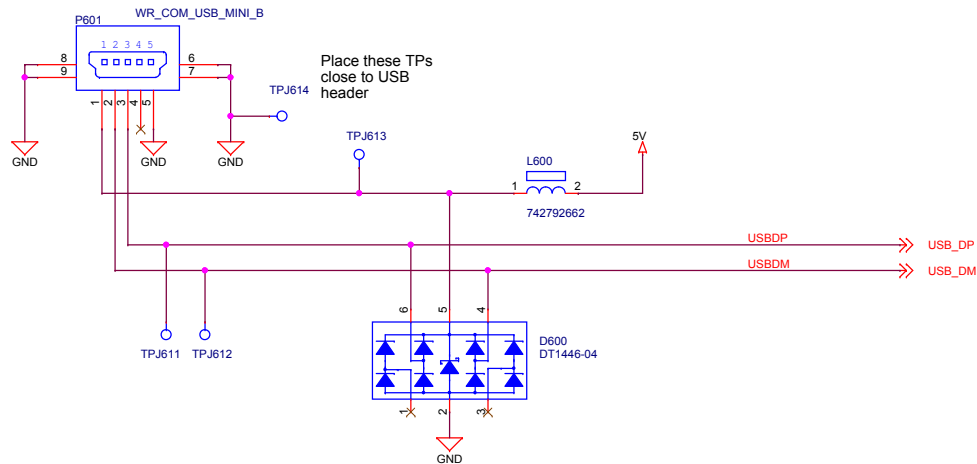


VCOM Interface

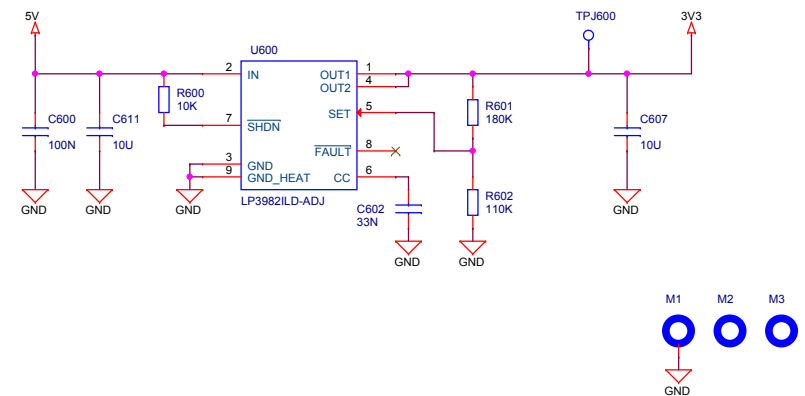


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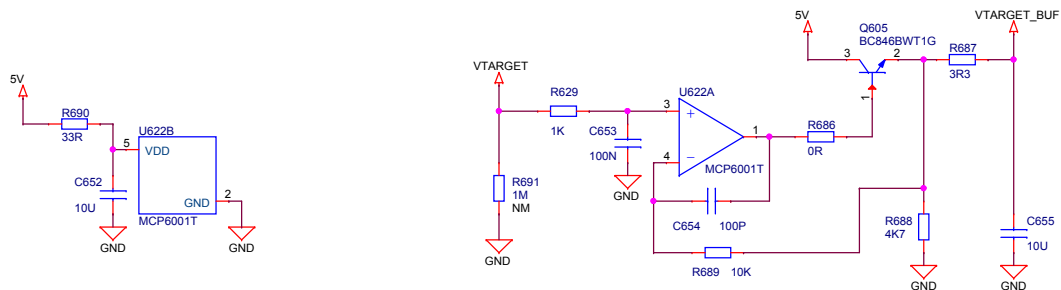
J-Link USB Port



3V3 Regulator



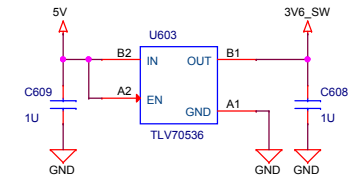
VTarget Voltage Mirror



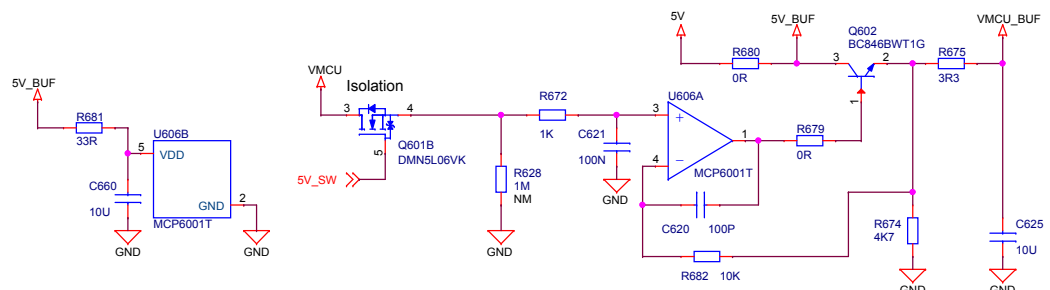
Power Supply for Analog Switches

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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Board Controller

U900A

PA0, PA1, PA2, PA3, PA4 / UART0_RX #2, PA5, PA6, PA7, PA8, PA9, PA10, PA11, PA12, PA13, PA14, PA15, PB0, PB1, PB2, PB3, PB4, PB5, PB6, PB7, PB8, PB9, PB10 / ADC1_CH26, PB11 / VDAG0_OUT0, PB12, PB13 / HFXTAL_P, PB14 / HFXTAL_N, PB15 / ETM_TD2 #1

U900B

PC0 / USART2_RTS #0, PC1 / USART2_CTS #0, PC2 / USART2_TX #0, PC3 / USART2_RX #0, PC4, PC5, PC6 / I2C0_SDA #2, PC7 / I2C0_SCL #2, PC8, PC9, PC10, PC11, PC12, PC13, PC14 / USART1_CS #3, PC15 / USART1_CLK #3, PD0, PD1, PD2 / ADC0_CH2, PD3 / ADC0_CH3, PD4, PD5 / ADC0_CH5, PD6 / ADC_EXTTP, PD7, PD8, PD9 / USART4_TX #1, PD10 / USART4_RX #1, PD11 / USART4_CLK #1, PD12 / USART4_CS #1, PD13 / ETM_TD1 #1, PD14, PD15

U900C

PE0, PE1, PE2, PE3, PE4, PE5, PE6 / TIM3_CC1 #3, PE7, PE8, PE9, PE10 / USART0_TX #0, PE11 / USART0_RX #0, PE12 / USART0_CLK #0, PE13 / USART0_CS #0, PE14 / LEUART0_TX #2, PE15 / LEUART0_RX #2, PF0 / DBG_SWCLK, PF1 / DBG_SWIO, PF2 / DBG_SWO #0, PF3 / ETM_TD3 #1, PF4, PF5, PF6 / USART1_TX #3, PF7 / TIM0_CC1 #1, PF8 / ETM_TCLK #1, PF9 / ETM_TD0 #1, PF10 / USART_DM, PF11 / USART_DP, PF12

Components and Connections:

- X900** 48 Mhz
- TPJ960** BC_TRACED2
- TPJ950** 3V3
- TPJ912** 10MHz reference clock input
- TPJ913** GND
- R902** 33R
- R904** 33R
- EFM32GG12B410F1024GL120-A**
- EFM32GG12B410F1024GL120-A**
- EFM32GG12B410F1024GL120-A**

[illegible]

Board ID & Button Isolation

3

BC Serial Flash

1

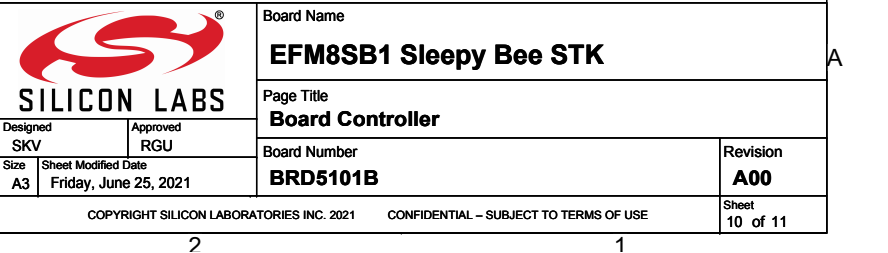
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BC Serial Flash

U902A (MX25R8035F) and U902B (MX25R8035F) are connected to the BC_SPI_COP1, BC_SPI_SCLK, BC_SPI_CS, and BC_SPI_CPO signals. The circuit includes a 3V3 supply, a 100nF capacitor (C914), and two 1K resistors (R931, R930) connected to GND. The diagram also shows connections to various pins like D2, E1, A3, E3, C1, SO/SIO1, SI/SIO0, SCLK, CS#, WP#/SIO2, and RESET#/SIO3.

BC Serial Flash

U902A (MX25R8035F) and U902B (MX25R8035F) are connected to the BC_SPI_COP1, BC_SPI_SCLK, BC_SPI_CS, and BC_SPI_CPO signals. The circuit includes a 3V3 supply, a 100nF capacitor (C914), and two 1K resistors (R931, R930) connected to GND. The diagram also shows connections to various pins like D2, E1, A3, E3, C1, SO/SIO1, SI/SIO0, SCLK, CS#, WP#/SIO2, and RESET#/SIO3.



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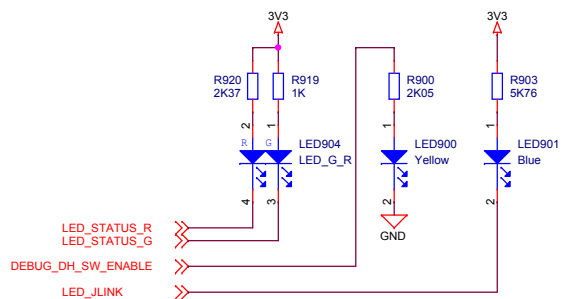
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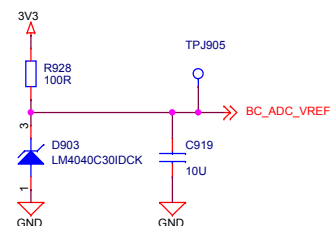
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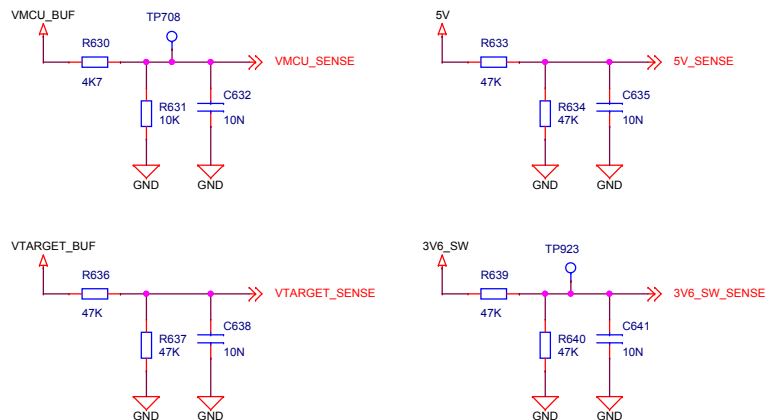
Indicator LEDs



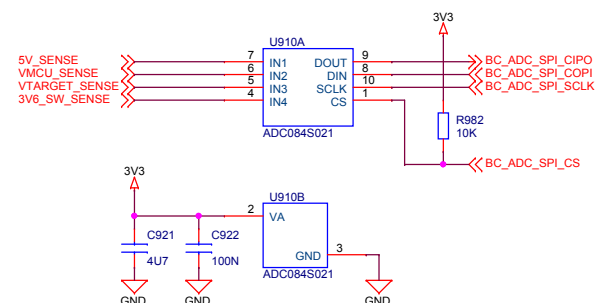
BC ADC Reference



BC Voltage Sense



BC Voltage Sense ADC



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