## EFM8UB1 Universal Bee STK



## Revision History

| Rev. | Description |
|---|---|
| A00 | Update to new STK platform |

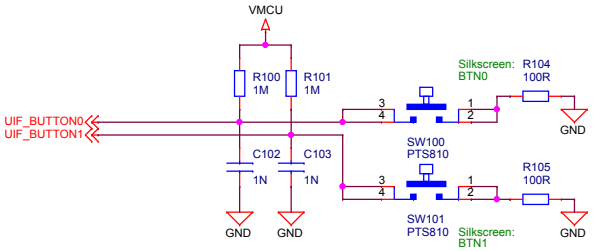
PCB1

PCB5001B

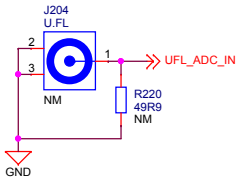


| | | |
|---|---|---|
| Designed: SKV | Approved: RGU | Board Name: **EFM8UB2 Universal Bee STK** |
| Size: A3 | Sheet Modified Date: Friday, July 23, 2021 | Page Title: **Title Page** |
| | | Board Number: **BRD5001B** / Revision: **A00** |
| | | Sheet: 1 of 11 |

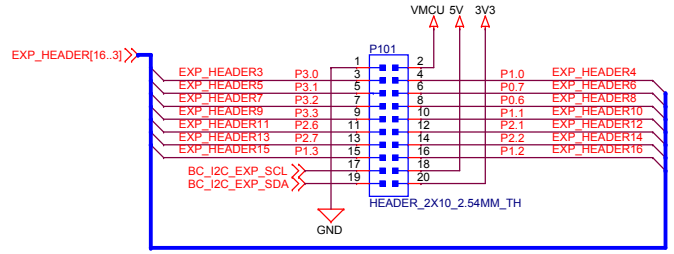
## Push Buttons




## U.FL ADC Connection




## EXP Header

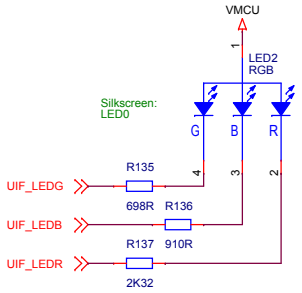



EXP-Header Functionality

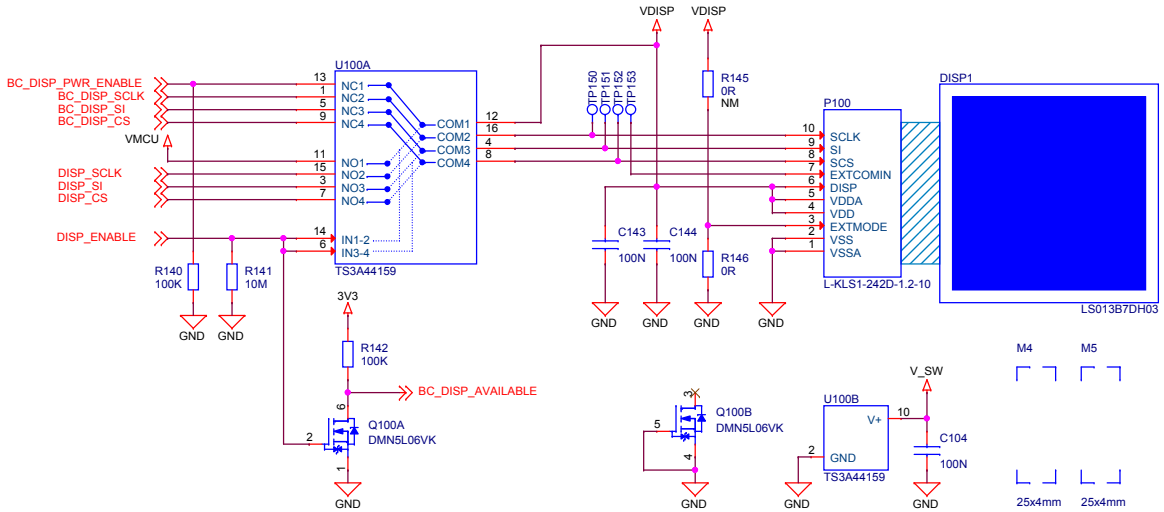
| | | | |
|---|---|---|---|
| 1 | GND | | |
| 3 | P3.0 | | CMPP1.1/ADC0.6 |
| 5 | P3.1 | | CMPN1.1/ADC0.7 |
| 7 | P3.2 | | ADC0.27 |
| 9 | P3.3 | | ADC0.28 |
| 11 | P2.6 | | CMPN0.1/ADC0.5 |
| 13 | P2.7 | | ADC0.26 |
| 15 | P1.3 | I2C0_SCL | ADC0.22 |
| 17 | Reserved for EXP Board Identification | | |
| 19 | Reserved for EXP Board Identification | | |

| | | | |
|---|---|---|---|
| 2 | VMCU | | |
| 4 | P1.0 | SPI0_MOSI | ADC0.21 |
| 6 | P0.7 | SPI0_MISO | |
| 8 | P0.6 | SPI0_SCK | |
| 10 | P1.1 | SPI0_NSS | CMPP1.4/ADC0.19 |
| 12 | P2.1 | UART1_TX | CMPN0.0/ADC0.1 |
| 14 | P2.2 | UART1_RX | CMPP1.0/ADC0.2 |
| 16 | P1.2 | I2C0_SDA | CMPN1.4/ADC0.20 |
| 18 | 5V | | |
| 20 | 3V3 | | |

## RGB LED



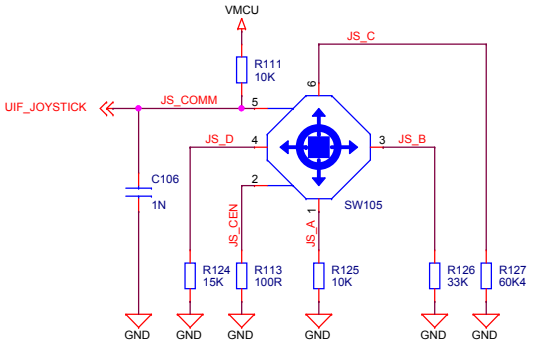

## Memory LCD-TFT Display & Multiplexer




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




SILICON LABS

| | |
|---|---|
| Designed | SKV |
| Approved | RGU |
| Size | A3 |
| Sheet Modified Date | Friday, July 23, 2021 |

Board Name: **EFM8UB2 Universal Bee STK**

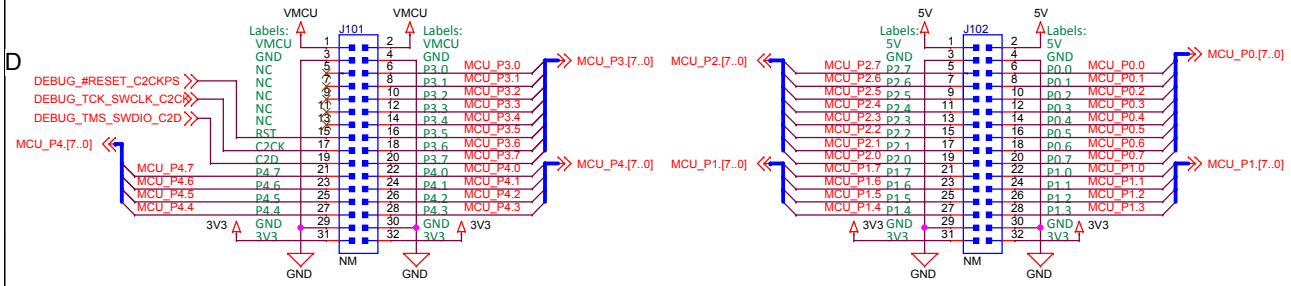
Page Title: **User Interface**

Board Number: **BRD5001B**

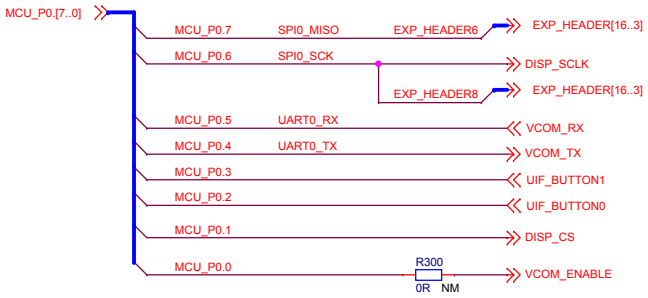
Revision: **A00**

Sheet: 2 of 11

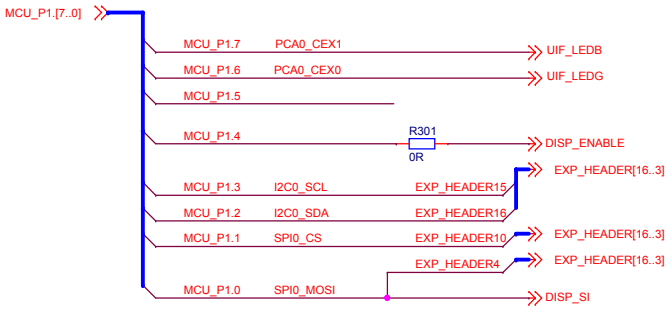
## Breakout Connections



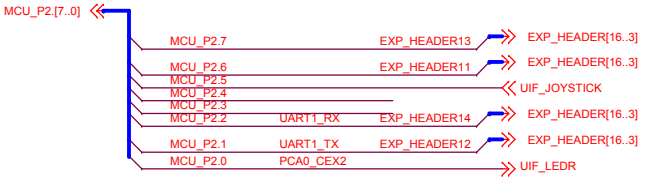

## P0 Connections




## P1 Connections

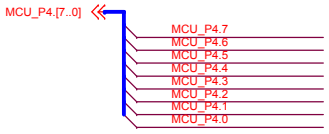



## P2 Connections




## P3 Connections


## P4 Connections




## DEBUG Connections


SILICON LABS

| | |
|---|---|
| Designed: SKV | Approved: RGU |
| Size: A3 | Sheet Modified Date: Friday, July 23, 2021 |

Board Name: **EFM8UB2 Universal Bee STK**

Page Title: **Signal Assignments**

Board Number: **BRD5001B**

Revision: **A00**

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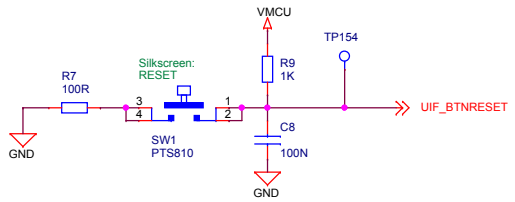
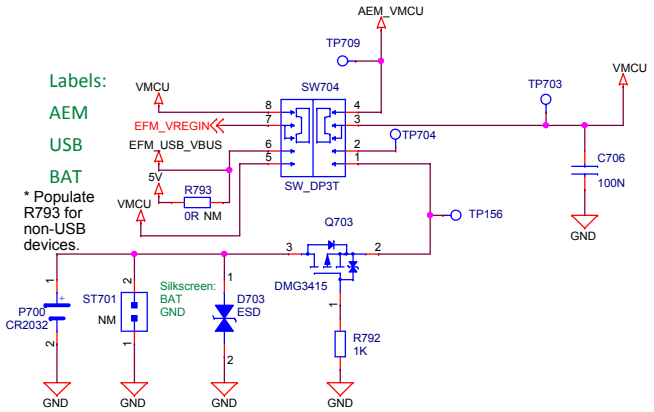
## Reset Push Button

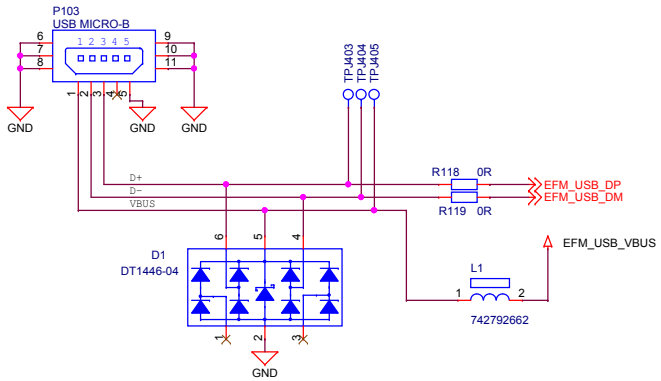



## Power Select Switch: AEM/BAT

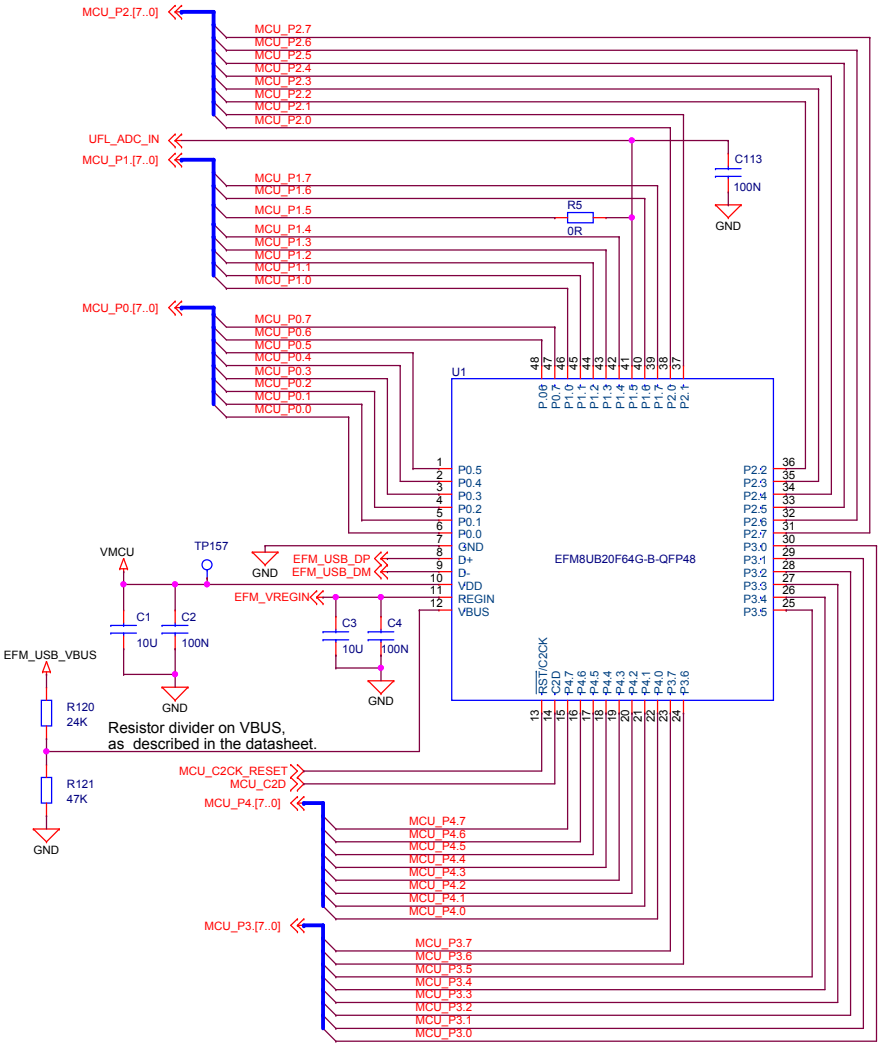
| SWITCH POS | MODE DESCRIPTION |
|---|---|
| AEM | AEM Enabled, VMCU sourced from external 3.3V LDO powered by BC USB 5V supply |
| USB | AEM Disabled, VMCU sourced from internal 3.3V LDO powered by EFM8 USB 5V |
| BAT | AEM Disabled, VMCU sourced from external coin-cell battery or external power supply |
| Layout note | Rotate such that the battery is used when switch is in the left position |




## USB Connection and ESD protection

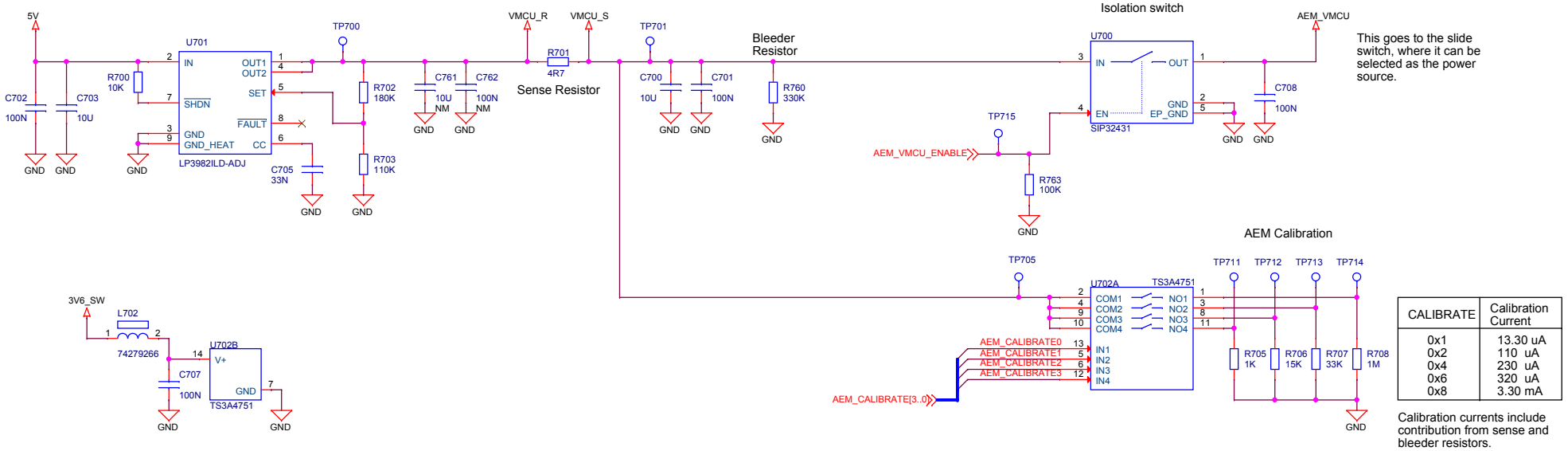



## EFM8 I/O




| | |
|---|---|
| Board Name | **EFM8UB2 Universal Bee STK** |
| Page Title | **EFM8 Power & I/O** |
| Designed: SKV | Approved: RGU |
| Size: A3 | Sheet Modified Date: Friday, July 23, 2021 |
| Board Number | **BRD5001B** |
| Revision | **A00** |
| Sheet | 4 of 11 |

## MCU Power Regulator

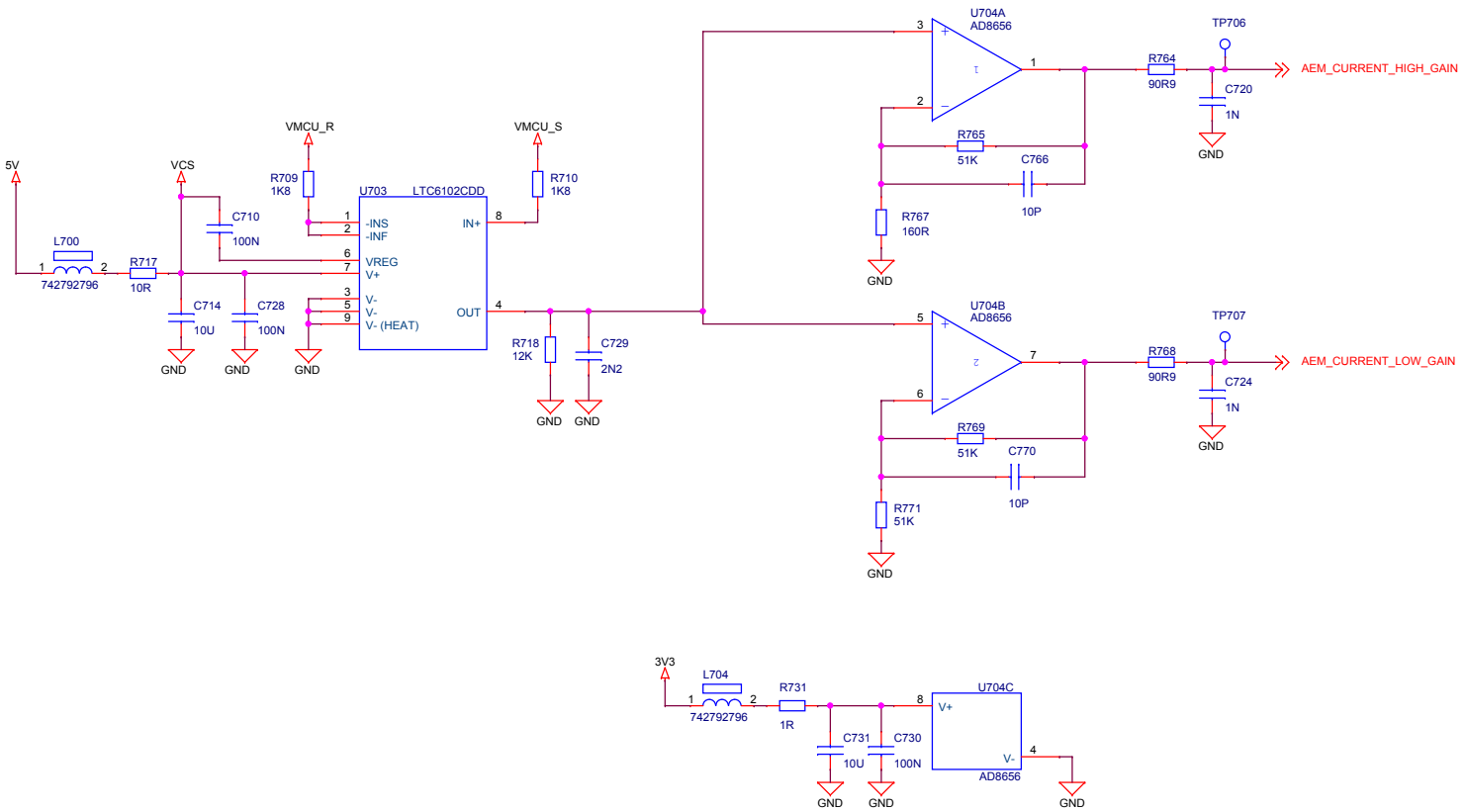



| CALIBRATE | Calibration Current |
|---|---|
| 0x1 | 13.30 uA |
| 0x2 | 110 uA |
| 0x4 | 230 uA |
| 0x6 | 320 uA |
| 0x8 | 3.30 mA |

Calibration currents include contribution from sense and bleeder resistors.

| | |
|---|---|
| Designed: SKV | Approved: RGU |
| Size: A3 | Sheet Modified Date: Friday, July 23, 2021 |
| Board Name: **EFM8UB2 Universal Bee STK** | |
| Page Title: **Target Voltage Supply** | |
| Board Number: **BRD5001B** | Revision: **A00** |
| Sheet: 5 of 11 | |

## MCU Current Sense

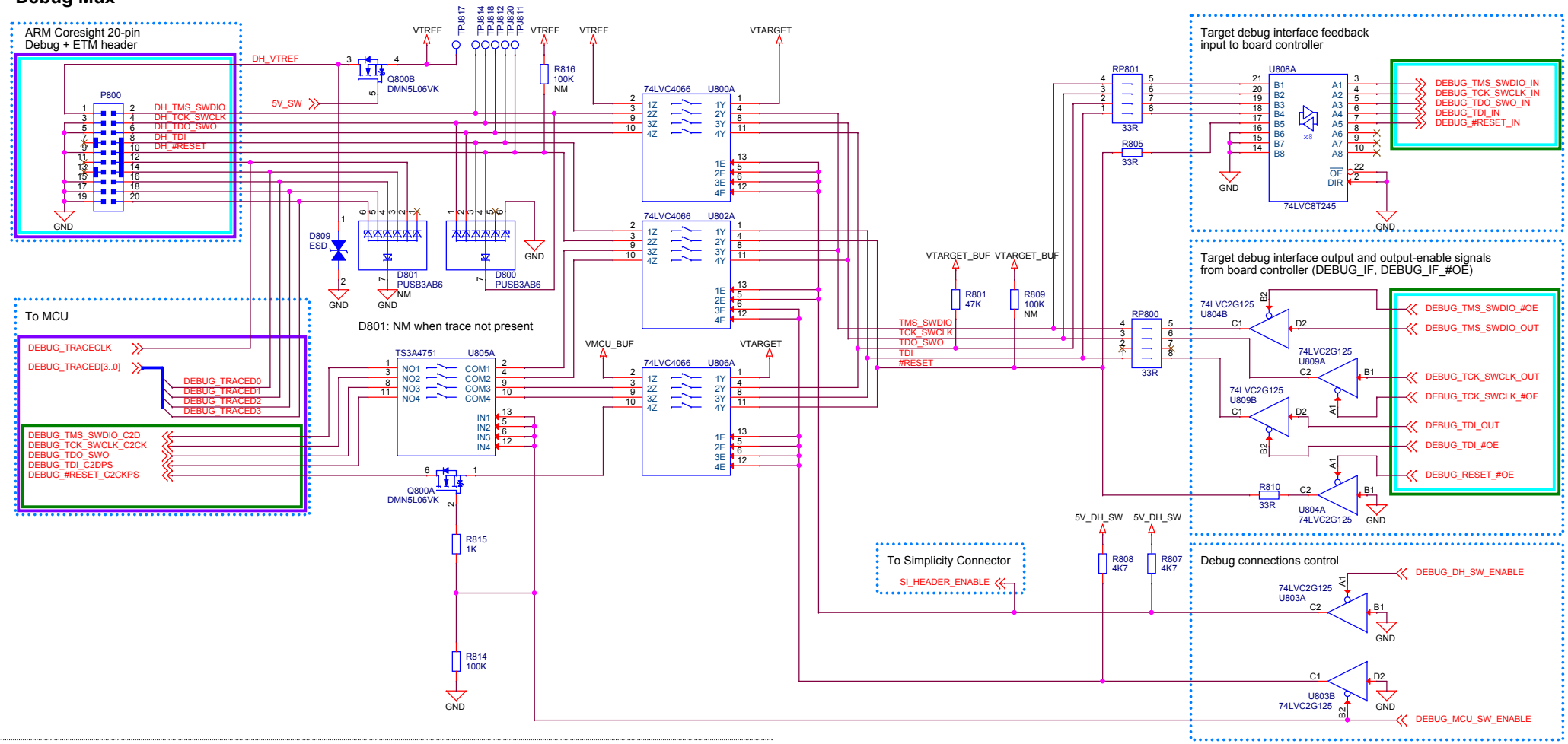




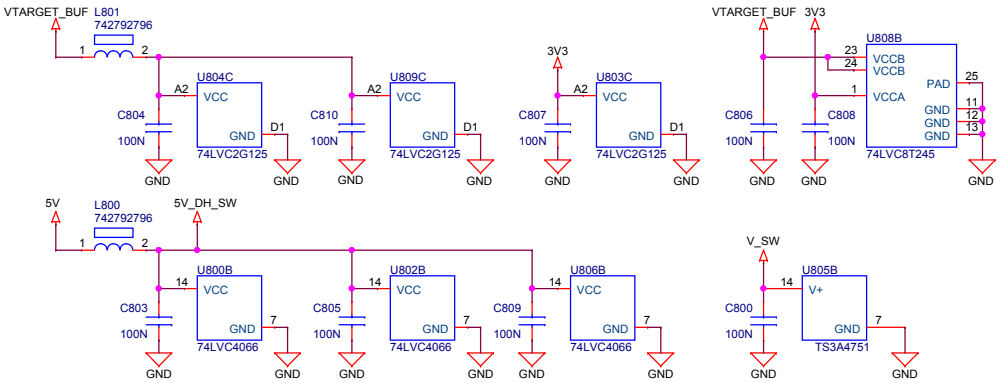


| | |
|---|---|
| SILICON LABS | Board Name: **EFM8UB2 Universal Bee STK** |
| | Page Title: **AEM** |
| Designed: SKV / Approved: RGU | |
| Size: A3 / Sheet Modified Date: Friday, July 23, 2021 | Board Number: **BRD5001B** / Revision: **A00** |
|  | Sheet: 6 of 11 |

## Debug Mux




## Power & Decoupling




| 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

SILICON LABS

| | |
|---|---|
| Designed | SKV |
| Approved | RGU |
| Size | A3 |
| Sheet Modified Date | Friday, July 23, 2021 |

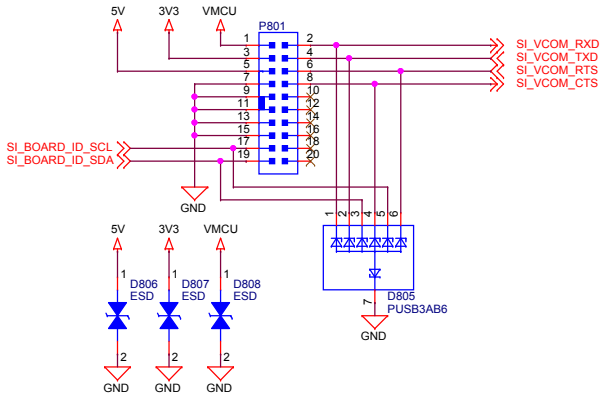
Board Name
**EFM8UB2 Universal Bee STK**

Page Title
**Debug Interface**

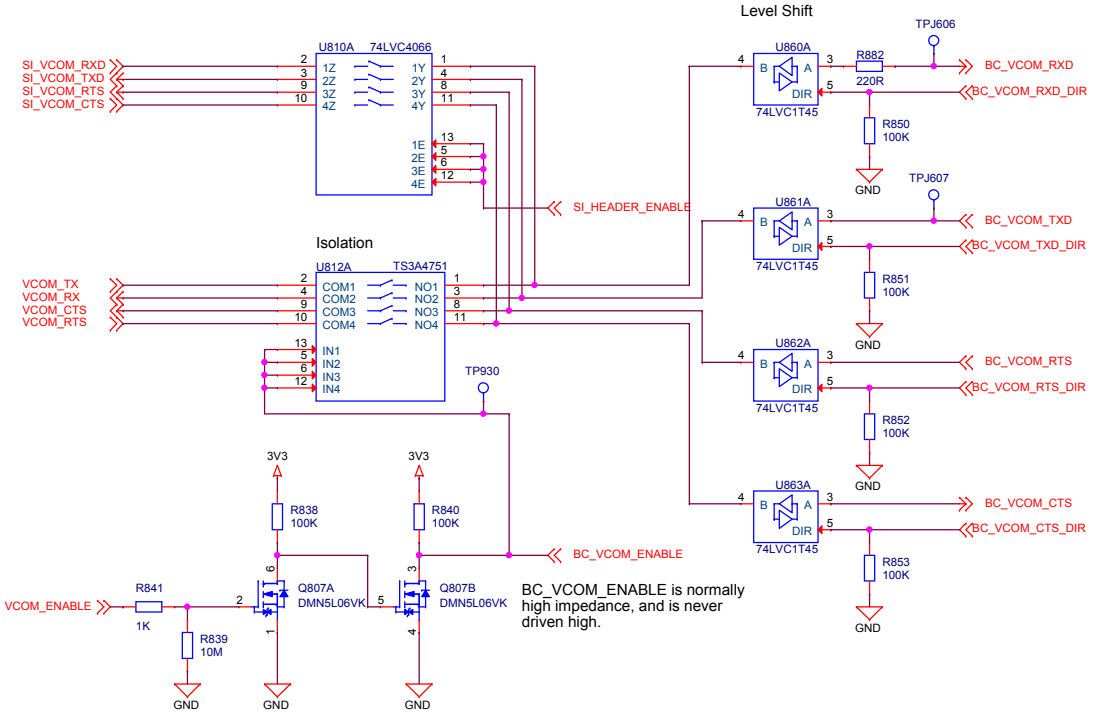
Board Number
**BRD5001B**

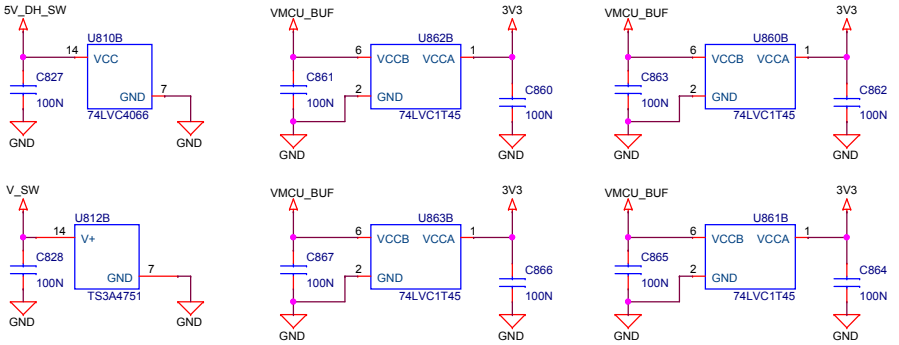
Revision
**A00**

## Simplicity Connector




## VCOM Interface




| | |
|---|---|
| Board Name | **EFM8UB2 Universal Bee STK** |
| Page Title | **Simplicity & VCOM** |
| Designed: SKV / Approved: RGU | |
| Size: A3 / Sheet Modified Date: Friday, July 23, 2021 | Board Number: **BRD5001B** / Revision: **A00** |
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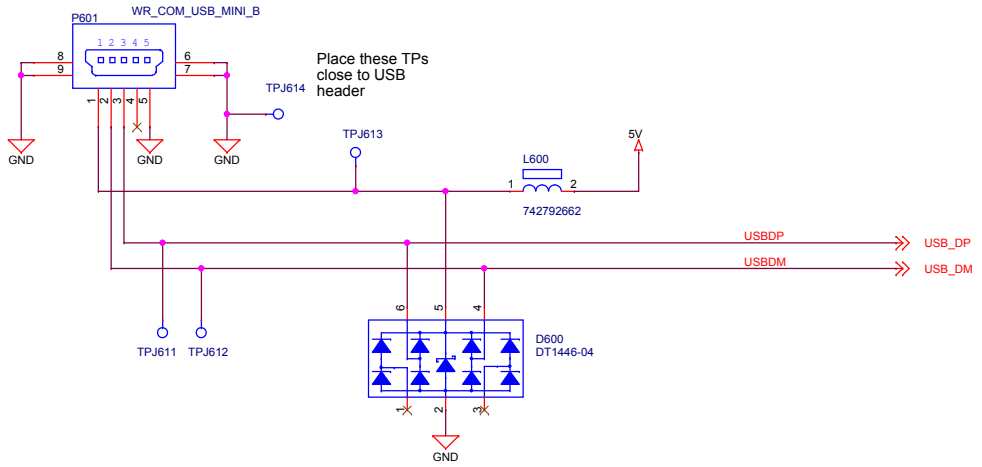
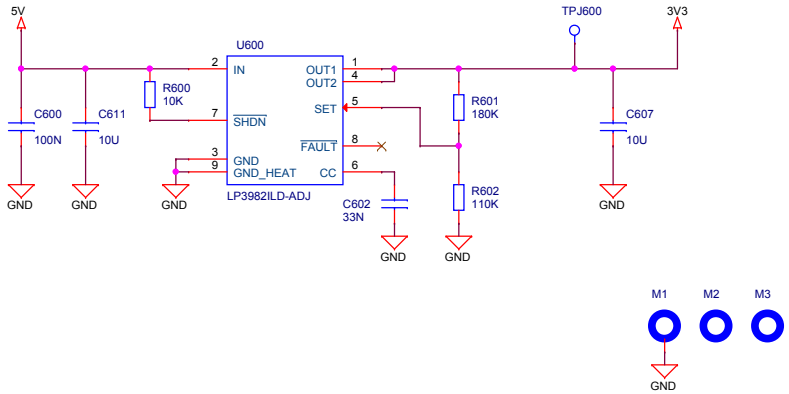
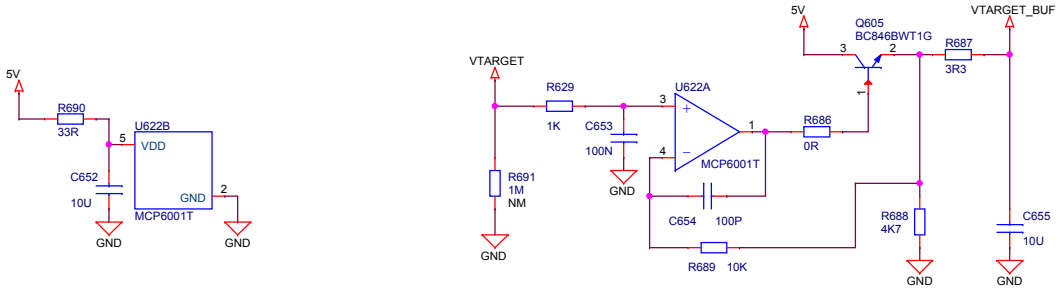
## J-Link USB Port




## 3V3 Regulator



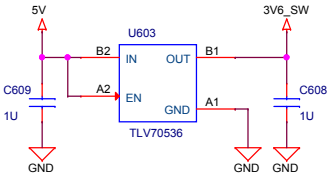

## VTarget Voltage Mirror

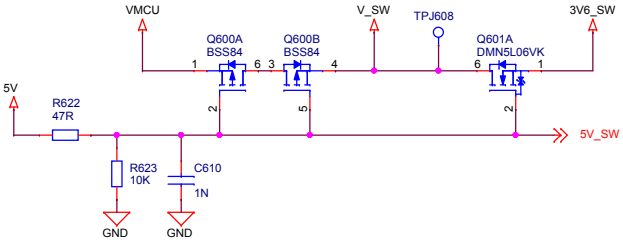



## Power Supply for Analog Switches

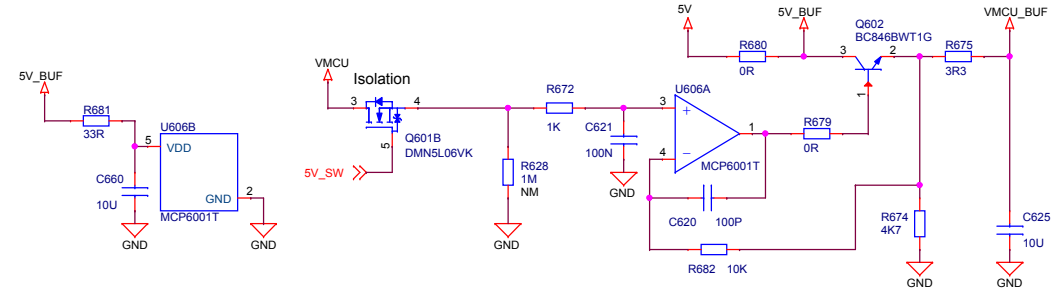
Analog switches used for isolation are powered by 3V6_SW when the USB cable is connected, otherwise by VMCU.

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



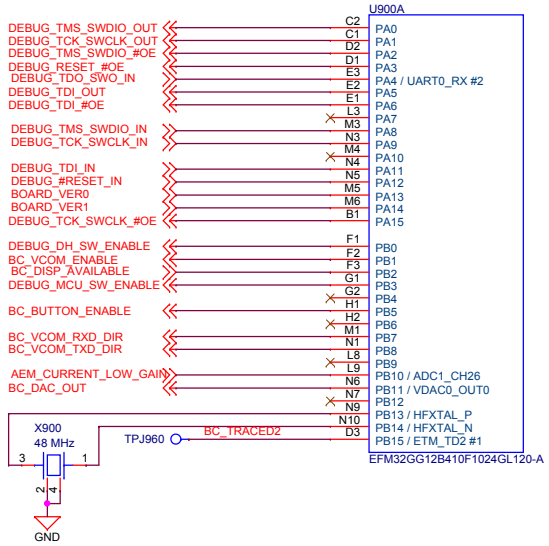



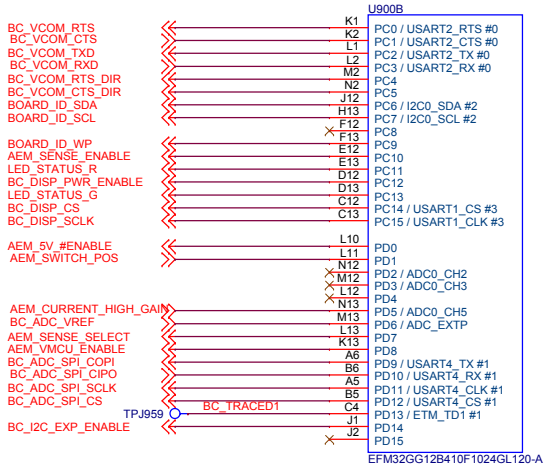

## VMCU Voltage Mirror

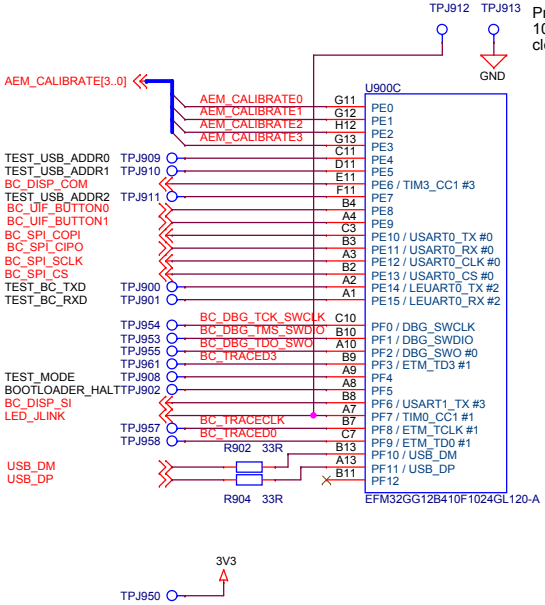



| | |
|---|---|
| Board Name | **EFM8UB2 Universal Bee STK** |
| Page Title | **Power** |
| Designed: SKV / Approved: RGU | |
| Size: A3 / Sheet Modified Date: Friday, July 23, 2021 | |
| Board Number: **BRD5001B** | Revision: **A00** |
| Sheet: 9 of 11 | |

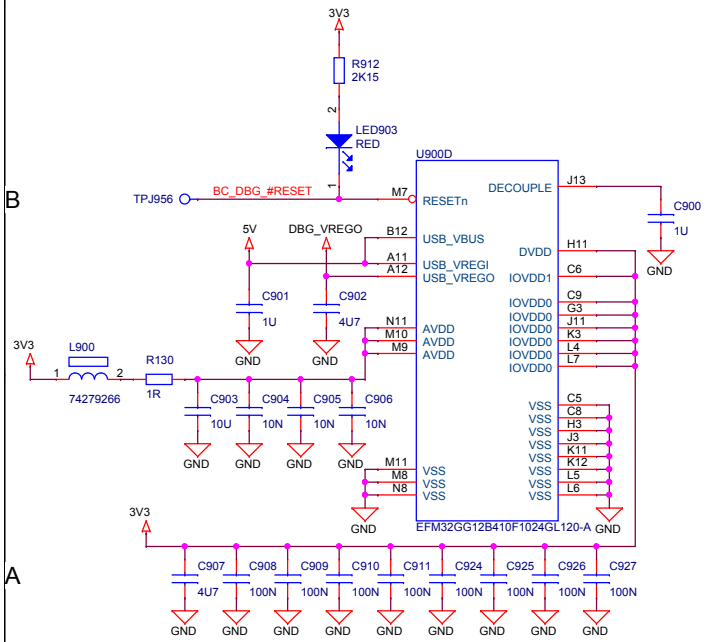
## Board Controller



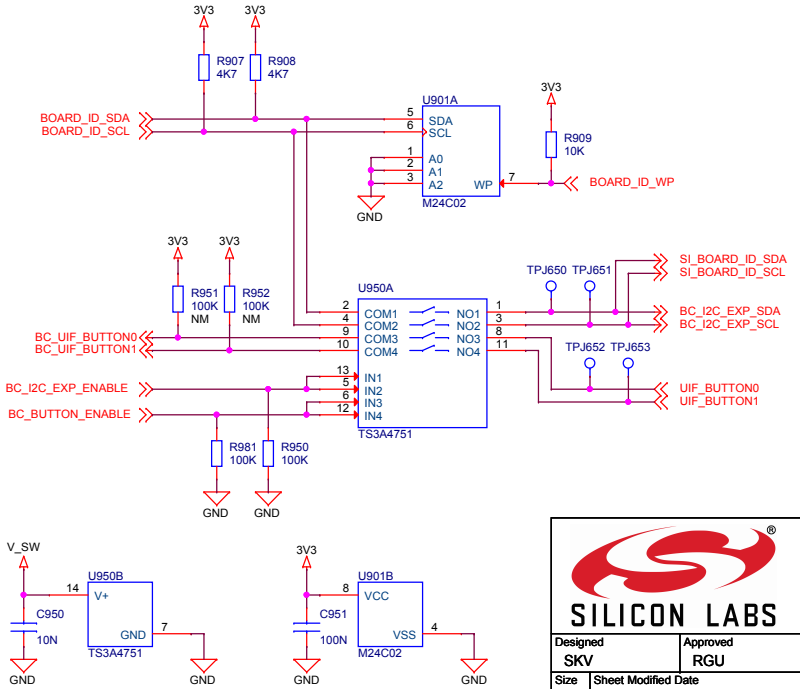



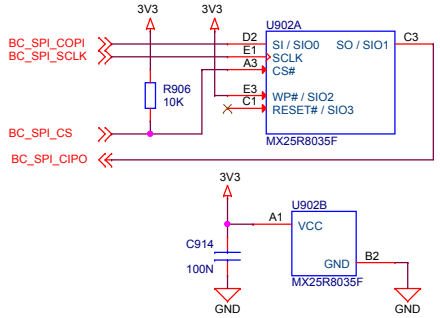

## Power & Decoupling



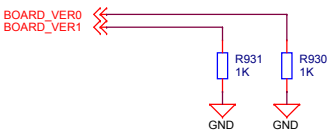

## Board ID & Button Isolation




## BC Serial Flash




## Board Version




SILICON LABS

| | |
|---|---|
| Designed: SKV | Approved: RGU |
| Size: A3 | Sheet Modified Date: Friday, July 23, 2021 |

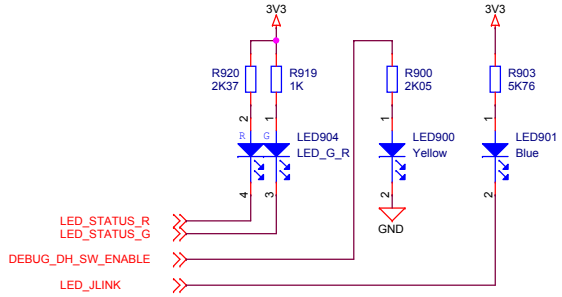
Board Name: **EFM8UB2 Universal Bee STK**

Page Title: **Board Controller**

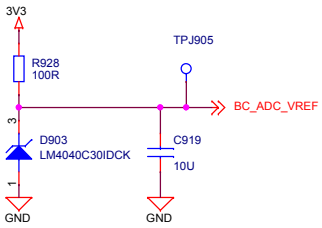
Board Number: **BRD5001B**

Revision: **A00**

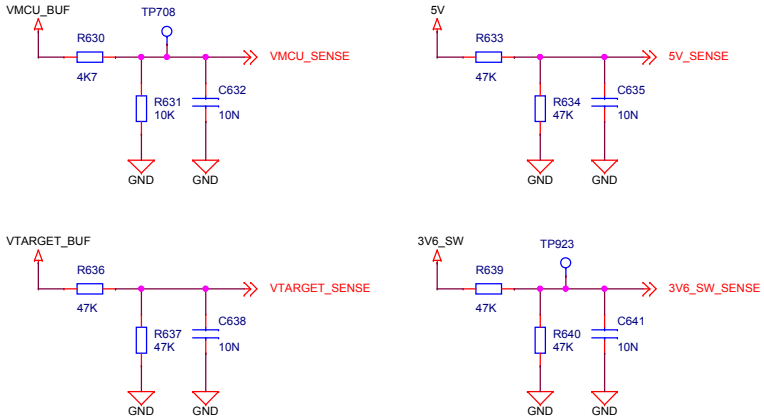
## Indicator LEDs



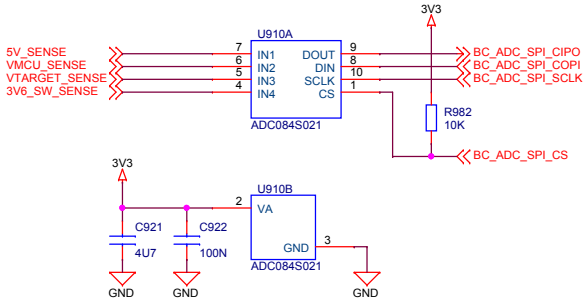

## BC ADC Reference




## BC Voltage Sense




## BC Voltage Sense ADC




| | | |
|---|---|---|
| SILICON LABS | Board Name: **EFM8UB2 Universal Bee STK** | |
| | Page Title: **Board Controller Misc** | |
| Designed: SKV / Approved: RGU | Board Number: **BRD5001B** | Revision: **A00** |
| Size: A3 / Sheet Modified Date: Friday, July 23, 2021 | | Sheet: 11 of 11 |