



EFM8LB1 Laser Bee STK	
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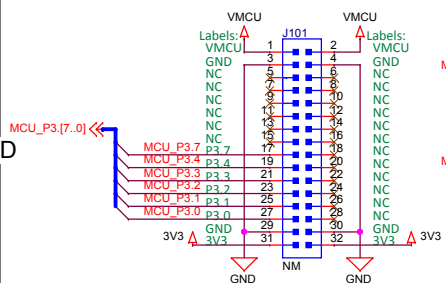
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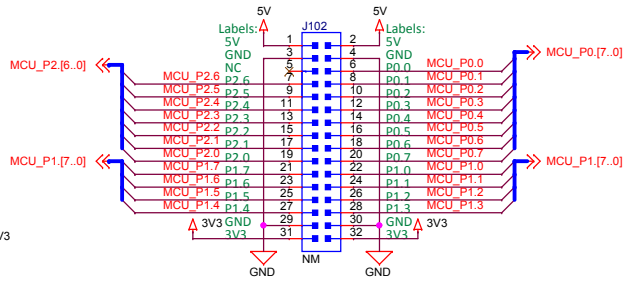
Revision History	
Rev.	Description
A00	Initial release.
A01	Changed to surface mounted joystick and smaller reset switch.
A02	Cleaned up sine generator circuit. Updated silk print.
A03	Updated EFM8LB1 revision. Moved reset switch. Fixed EXP pinout description.
A04	Un-mounted D801.

/ STK		Schematic Title	
SILICON LABS		EFM8LB1 Laser Bee STK	
Designed: MRW		Page Title	
Approved: JNO		Title Page	
Size: A3	BOM Doc No:	Document number	Revision
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5 Breakout Connections

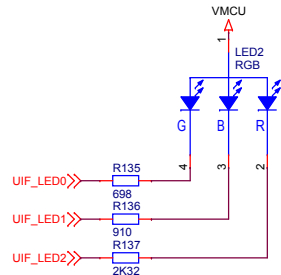


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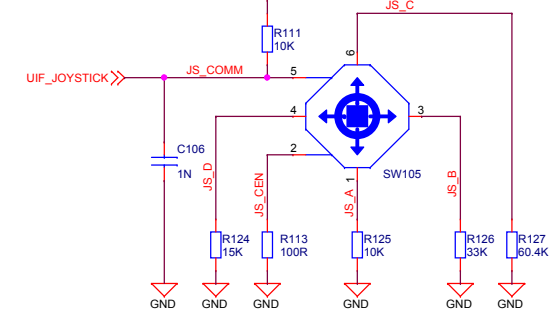
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RGB LED

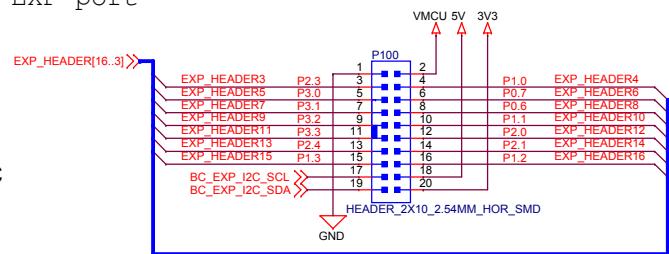


2

Analog Joystick



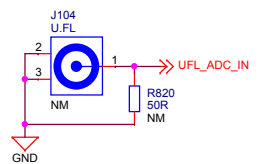
EXP port



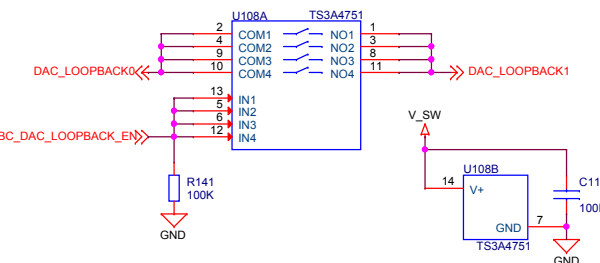
EXP-Header Functionality

1	GND		CMP1.5/ADC0.16
3	P2.3		DAC0
5	P3.0		DAC1
7	P3.1		DAC2
9	P3.2		DAC3
11	P3.3		CMP1.6/ADC0.17
13	P2.4		ADC0.9
15	P1.3		I2C0_SCL
17			Reserved for EXP Board Identification
19			Reserved for EXP Board Identification
2	VMCU		
4	P1.0	SPI0_MOSI	CMP1.1/ADC0.6
6	P0.7	SPI0_MISO	CMP0.5/ADC0.5
8	P0.6	SPI0_SCK	CMP0.4/ADC0.5
10	P1.1	SPI0_NSS	CMP0.7/ADC0.7
12	P2.0	UART1_TX	CMP1.3/ADC0.14
14	P2.1	UART1_RX	CMP1.4/ADC0.15
16	P1.2	I2C0_SDA	CMP0.8/ADC0.8
18	5V		
20	3V3		

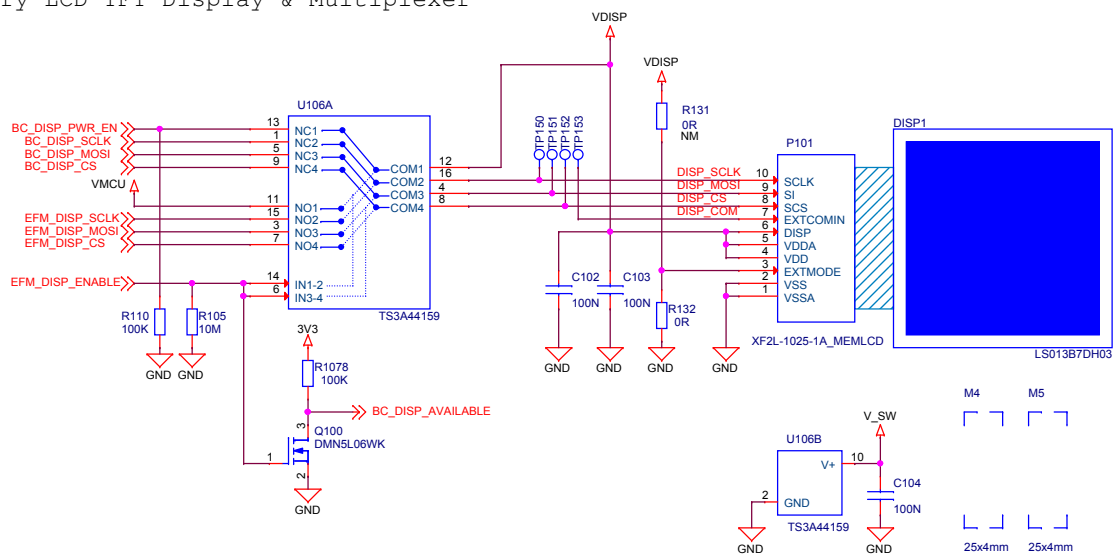
U.FL ADC Connection



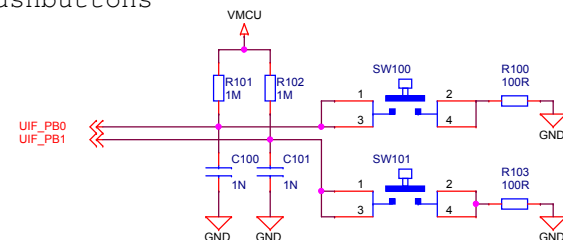
DAC Loopback Analog Switch



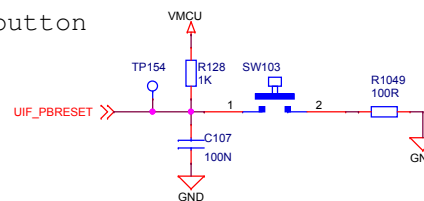
Memory LCD-TFT Display & Multiplexer



User pushbuttons



RESET Pushbutton



The EFM8 always controls ownership of the display using the EFM_DISP_ENABLE signal.

EFM_DISP_ENABLE	DISP_CTRL	VDISP
0	BC	BC_DISP_PWR_EN
1	EFM	VMCU

STK

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		User Interface	
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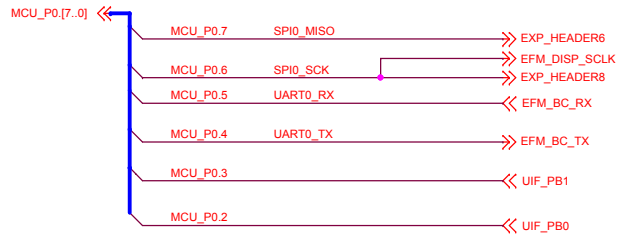
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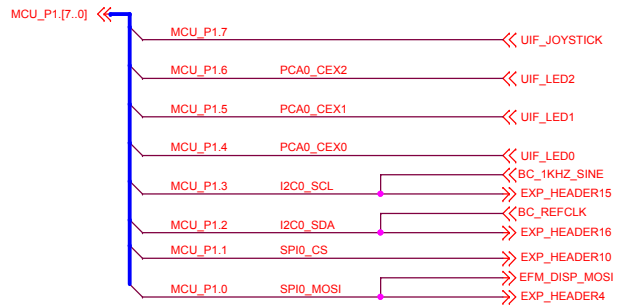
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1

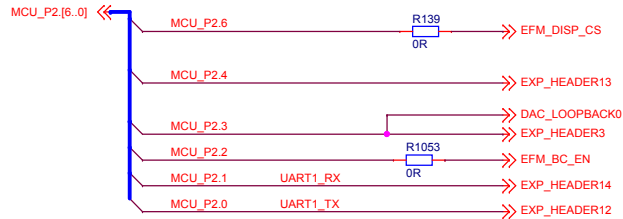
P0 Connections



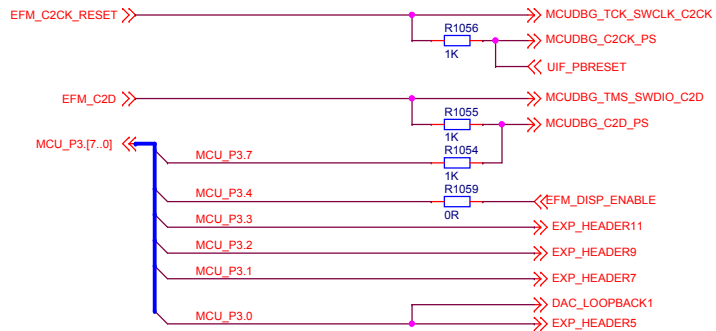
P1 Connections



P2 Connections



P3 & DEBUG Connections

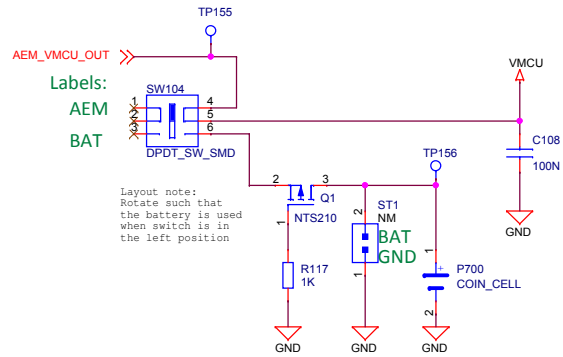


/
STK

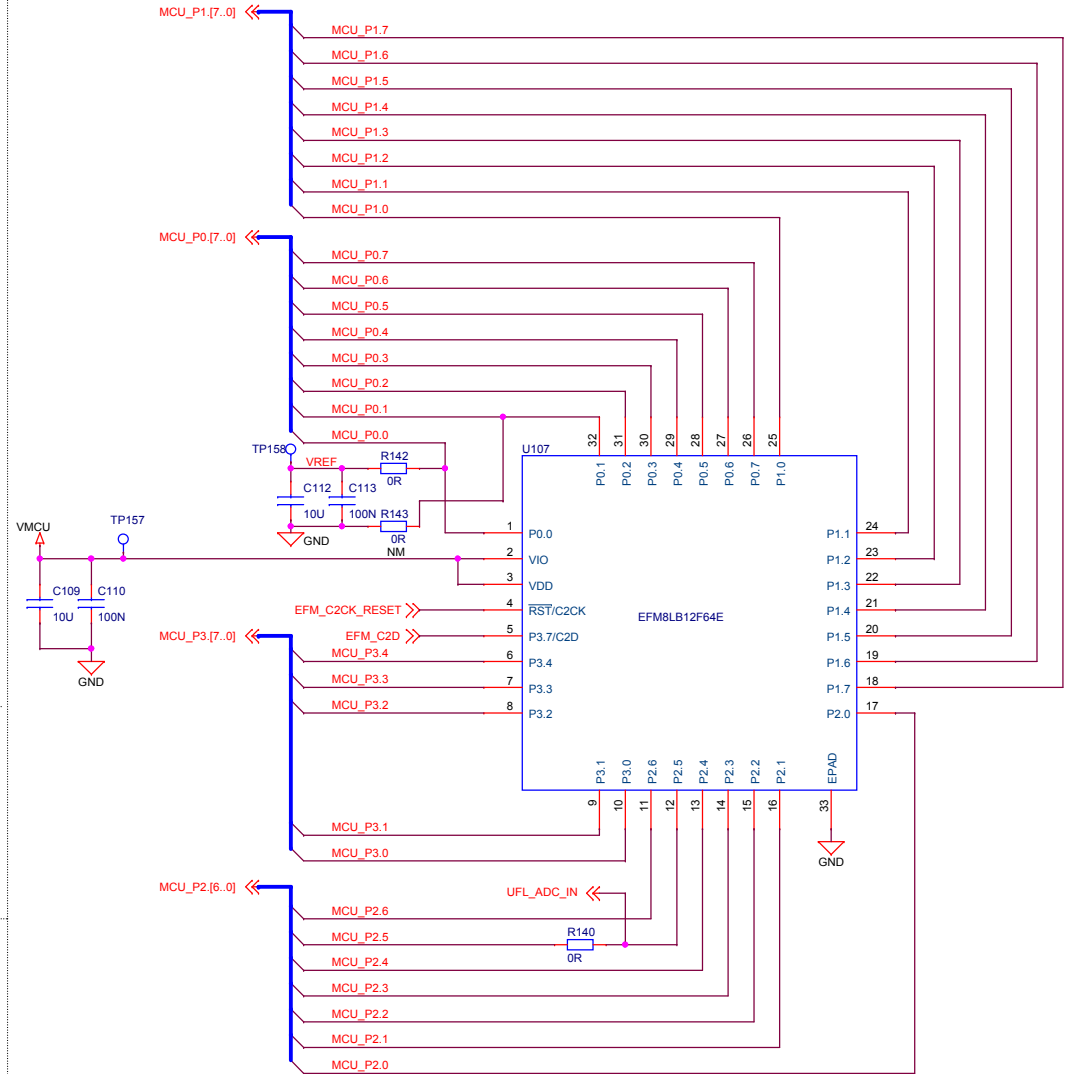
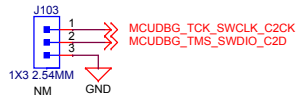
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Designed: MRW		Page Title	
		Signal Assignments	
Approved: JNO		Document number	
Size: A3		BRD5300A	
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Power Switch

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 external coin-cell battery or external power supply

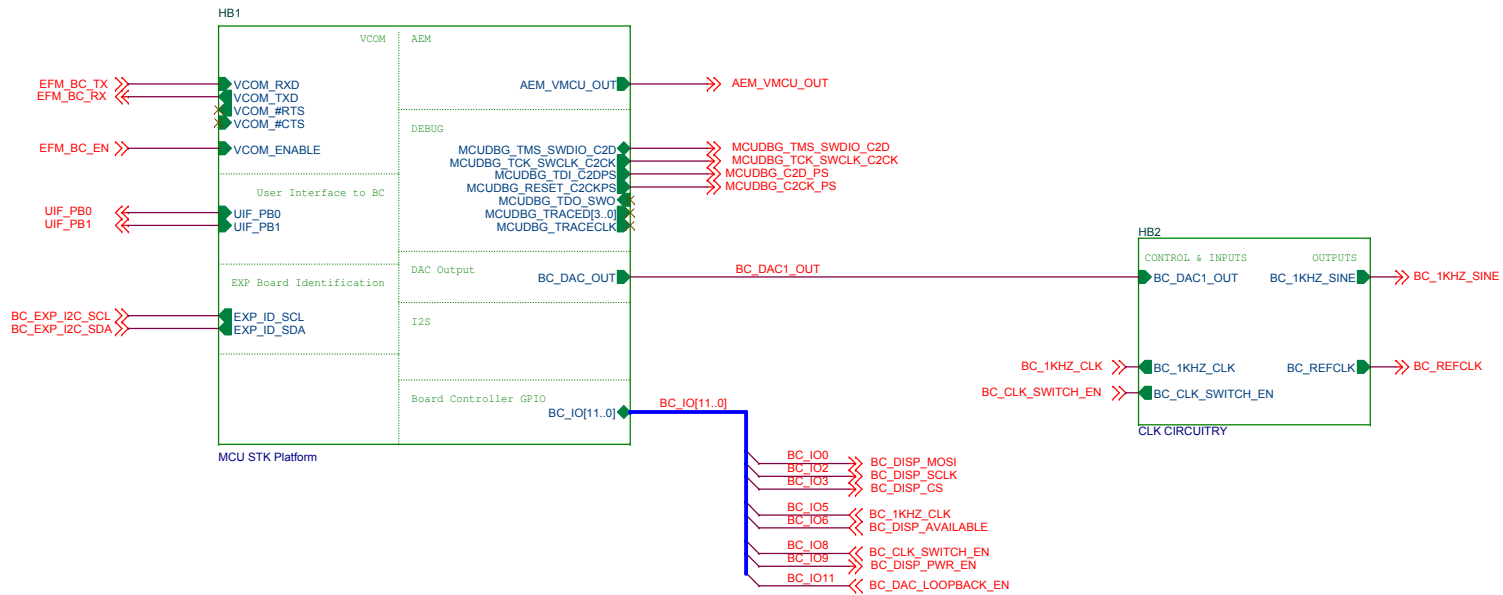


C2 Debug Header



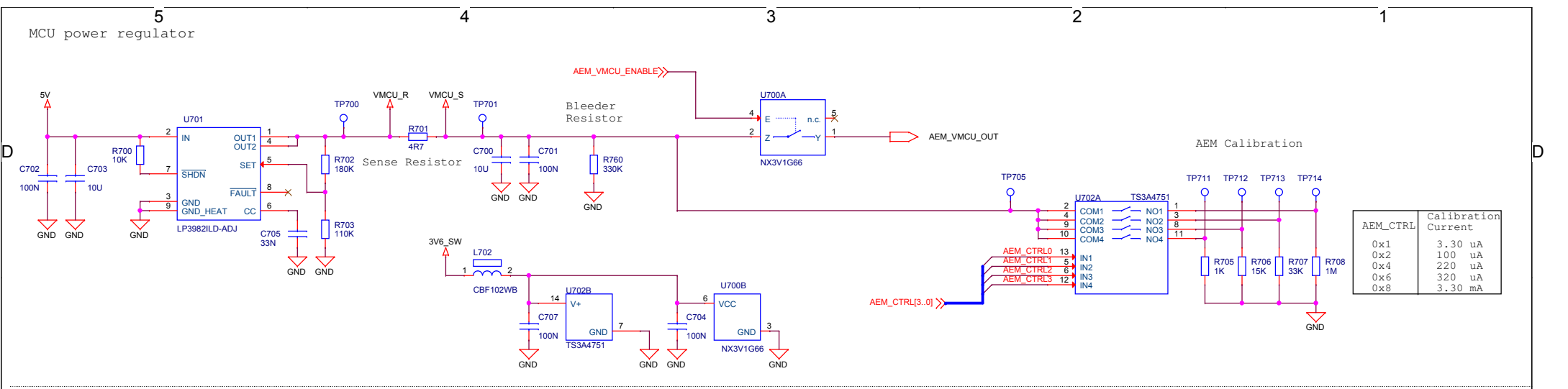
STK

		Schematic Title	
		EFM8LB1 Laser Bee STK	
Designed: MRW Size: A3 BOM Doc No:		Page Title	
		EFM8 I/O & Power	
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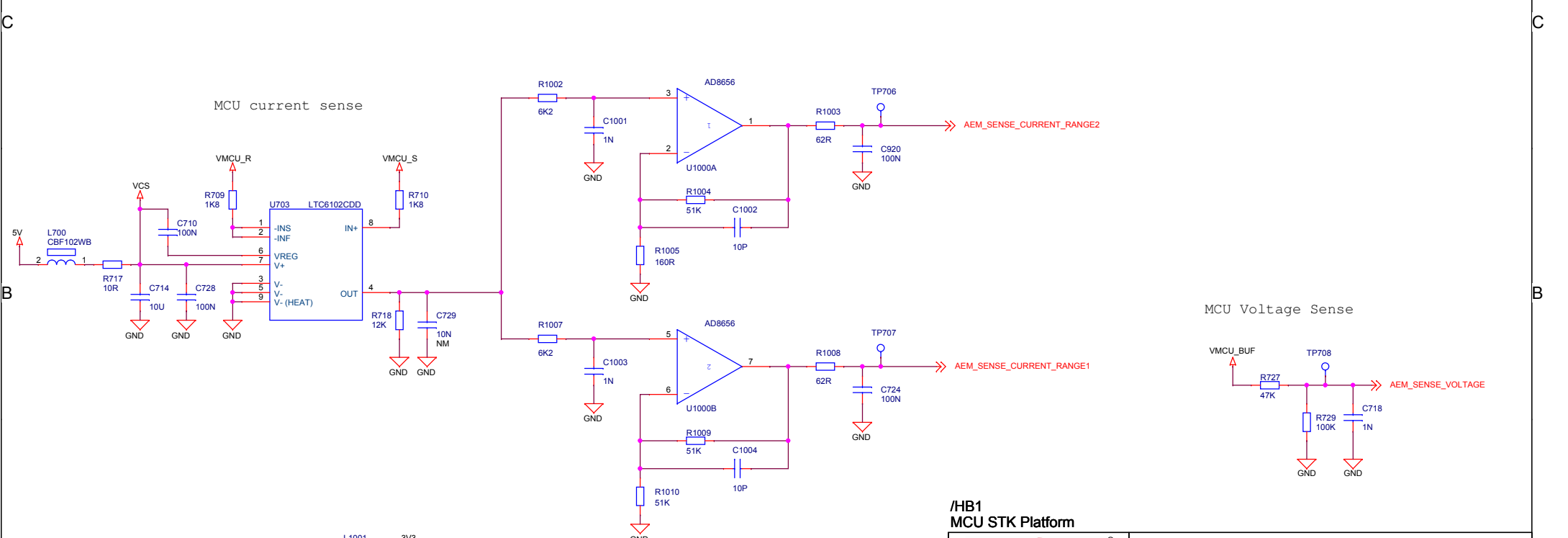


/
STK

 SILICON LABS		Schematic Title	
		EFM8LB1 Laser Bee STK	
Designed: MRW Size: A3		Page Title	
		STK Common Platform	
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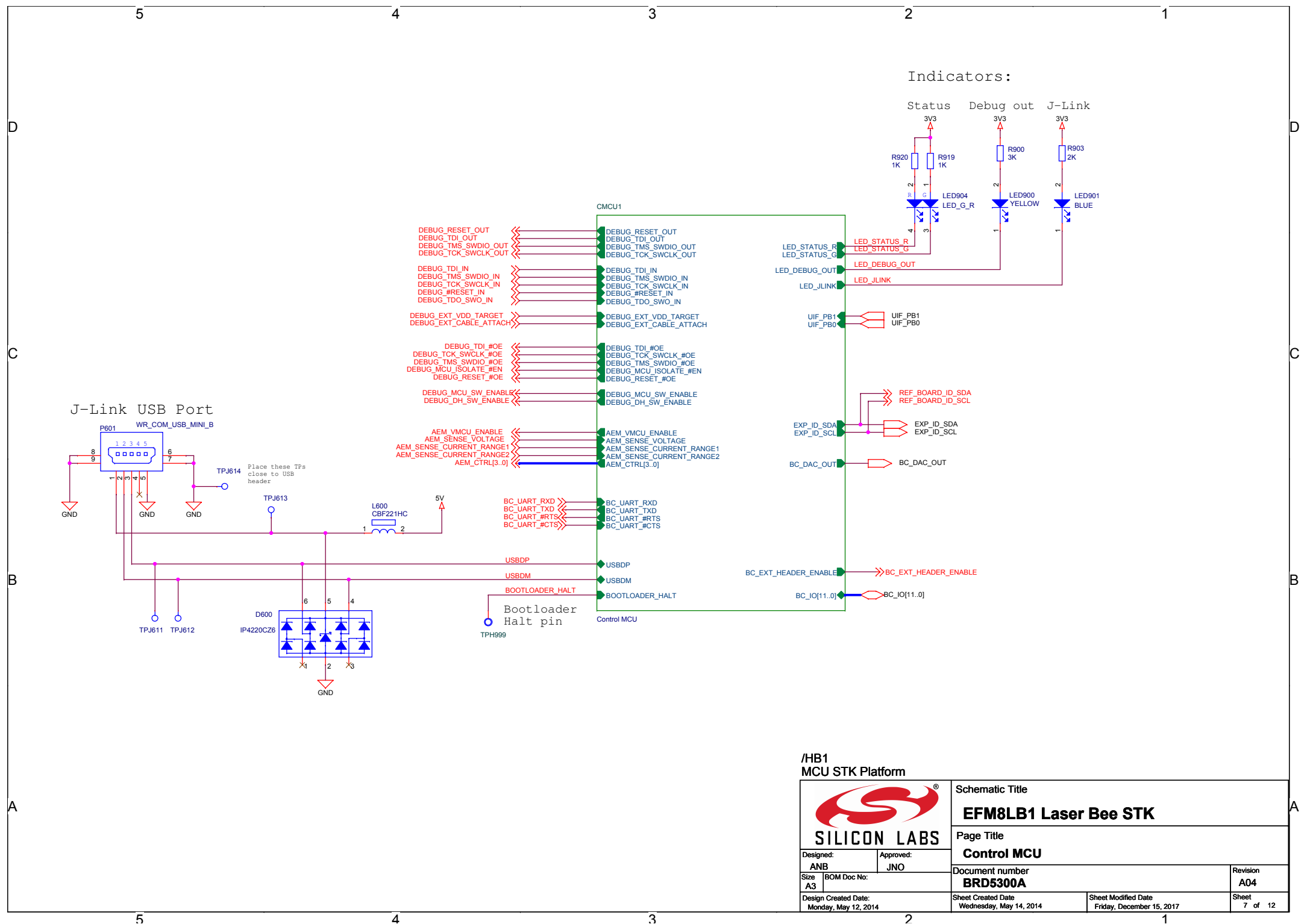


AEM_CTRL	Calibration Current
0x1	3.30 uA
0x2	100 uA
0x4	220 uA
0x6	320 uA
0x8	3.30 mA

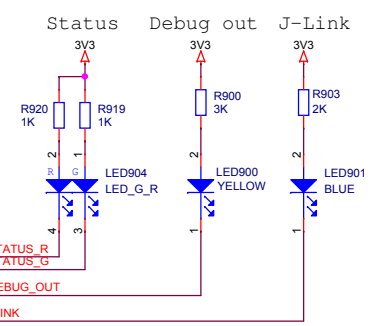


/HB1
MCU STK Platform

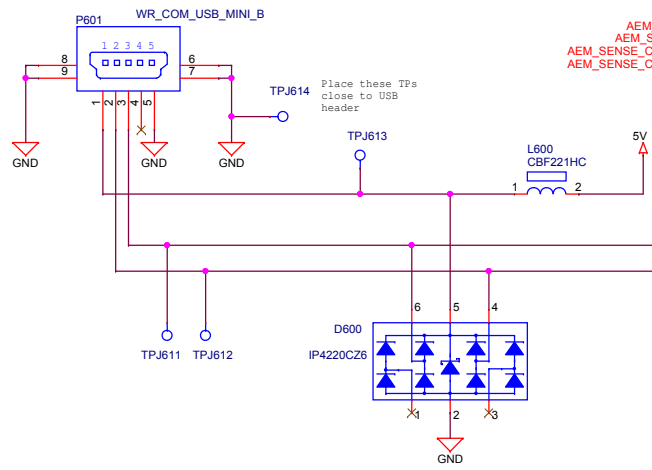
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		EFM8LB1 Laser Bee STK	
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		Advanced Energy Monitor	
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Indicators:




J-Link USB Port

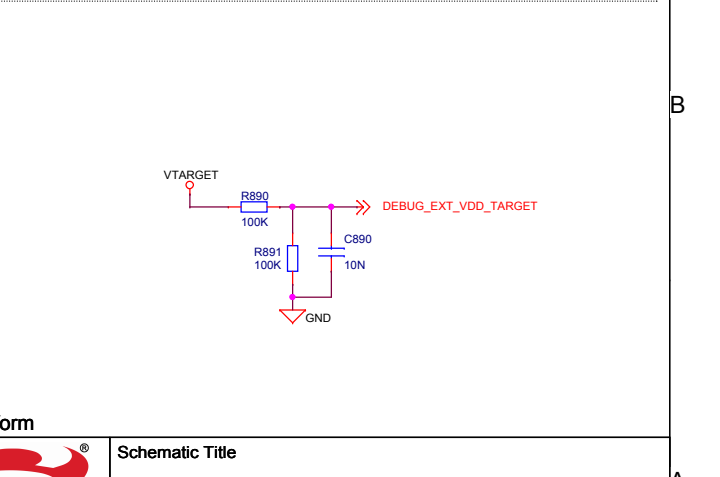
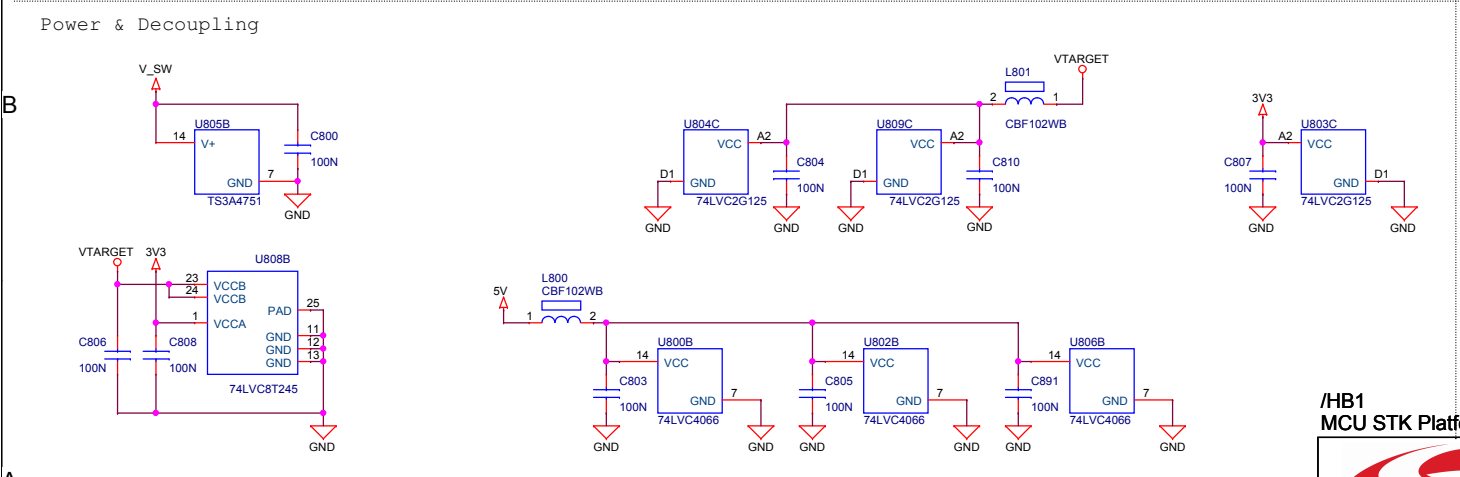
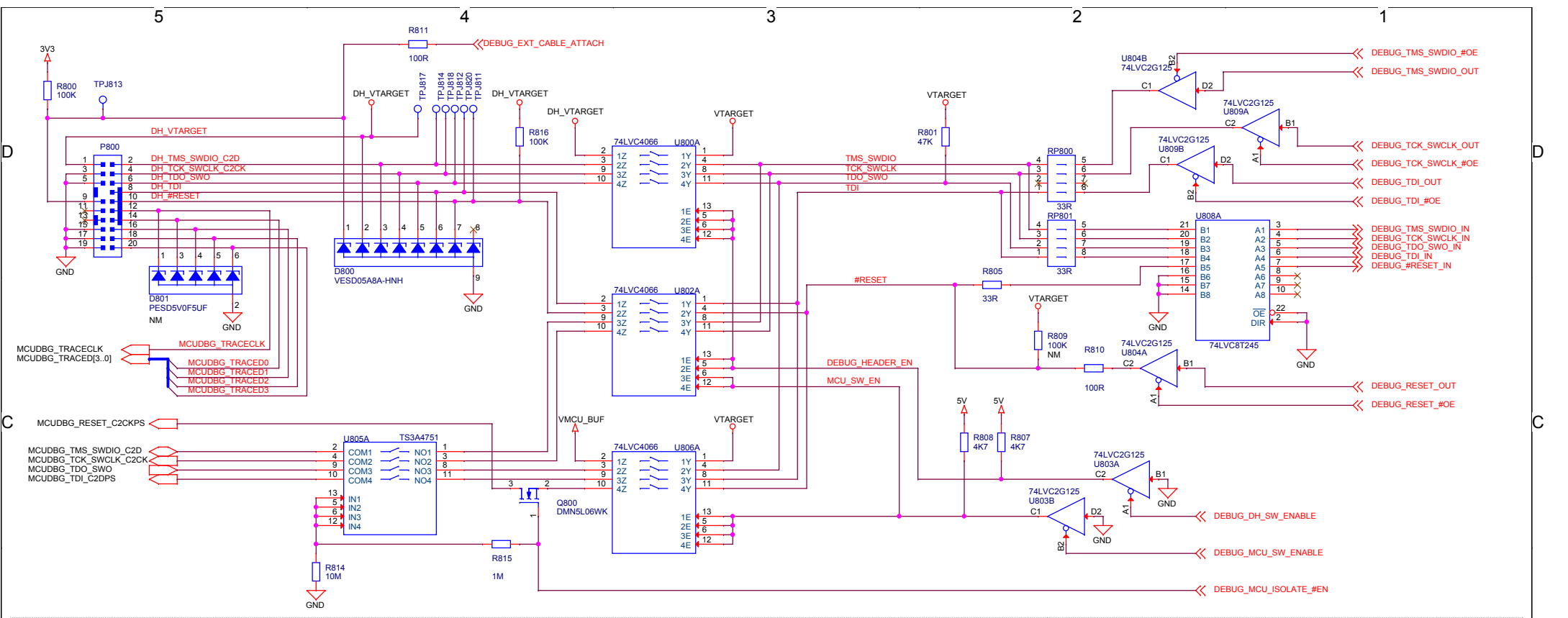


- DEBUG_RESET_OUT <<> DEBUG_RESET_OUT
- DEBUG_TDI_OUT <<> DEBUG_TDI_OUT
- DEBUG_TMS_SWCLK_OUT <<> DEBUG_TMS_SWCLK_OUT
- DEBUG_TCK_SWCLK_OUT <<> DEBUG_TCK_SWCLK_OUT
- DEBUG_TDI_IN <>> DEBUG_TDI_IN
- DEBUG_TMS_SWCLK_IN <>> DEBUG_TMS_SWCLK_IN
- DEBUG_TCK_SWCLK_IN <>> DEBUG_TCK_SWCLK_IN
- DEBUG_#RESET_IN <>> DEBUG_#RESET_IN
- DEBUG_TDO_SWO_IN <>> DEBUG_TDO_SWO_IN
- DEBUG_EXT_VDD_TARGET <>> DEBUG_EXT_VDD_TARGET
- DEBUG_EXT_CABLE_ATTACH <>> DEBUG_EXT_CABLE_ATTACH
- DEBUG_TDI_#OE <<> DEBUG_TDI_#OE
- DEBUG_TCK_SWCLK_#OE <<> DEBUG_TCK_SWCLK_#OE
- DEBUG_TMS_SWCLK_#OE <<> DEBUG_TMS_SWCLK_#OE
- DEBUG_MCU_ISOLATE_#EN <<> DEBUG_MCU_ISOLATE_#EN
- DEBUG_RESET_#OE <<> DEBUG_RESET_#OE
- DEBUG_MCU_SW_ENABLE <<> DEBUG_MCU_SW_ENABLE
- DEBUG_DH_SW_ENABLE <<> DEBUG_DH_SW_ENABLE
- AEM_VMCU_ENABLE <<> AEM_VMCU_ENABLE
- AEM_SENSE_VOLTAGE <<> AEM_SENSE_VOLTAGE
- AEM_SENSE_CURRENT_RANGE1 <<> AEM_SENSE_CURRENT_RANGE1
- AEM_SENSE_CURRENT_RANGE2 <<> AEM_SENSE_CURRENT_RANGE2
- AEM_CTRL[3..0] <<> AEM_CTRL[3..0]
- BC_UART_RXD <>> BC_UART_RXD
- BC_UART_TXD <>> BC_UART_TXD
- BC_UART_#RTS <>> BC_UART_#RTS
- BC_UART_#CTS <>> BC_UART_#CTS
- USBDP <>> USBDP
- USBDM <>> USBDM
- BOOTLOADER_HALT <>> BOOTLOADER_HALT
- Bootloader Halt pin <>> Bootloader Halt pin

- LED_STATUS_R <>> LED_STATUS_R
- LED_STATUS_G <>> LED_STATUS_G
- LED_DEBUG_OUT <>> LED_DEBUG_OUT
- LED_JLINK <>> LED_JLINK
- UIF_PB1 <>> UIF_PB1
- UIF_PB0 <>> UIF_PB0
- REF_BOARD_ID_SDA <>> REF_BOARD_ID_SDA
- REF_BOARD_ID_SCL <>> REF_BOARD_ID_SCL
- EXP_ID_SDA <>> EXP_ID_SDA
- EXP_ID_SCL <>> EXP_ID_SCL
- BC_DAC_OUT <>> BC_DAC_OUT
- BC_EXT_HEADER_ENABLE <>> BC_EXT_HEADER_ENABLE
- BC_IO[11..0] <>> BC_IO[11..0]

/HB1
MCU STK Platform

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		EFM8LB1 Laser Bee STK	
Designed: ANB Approved: JNO		Page Title	
		Control MCU	
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Mode	DEBUG_MCU_SW_ENABLE	DEBUG_DH_SW_ENABLE	DEBUG_BUF_#OE	ISOLATE_#EN	DH_VTARGET	VTARGET
Debug Out	0	1	0	0	External voltage	External voltage
MCU Debug	1	0	0	1	Disconnected	VMCU
Debug In	1	1	1	1	VMCU	VMCU
Debug Off	1	1	1	0	-	-

**/HB1
MCU STK Platform**

Schematic Title
EFM8LB1 Laser Bee STK

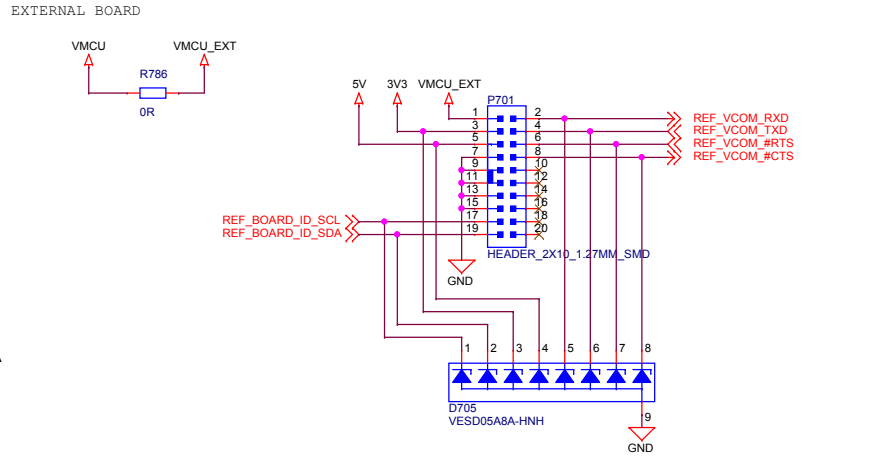
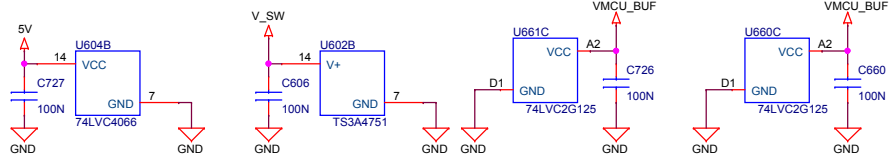
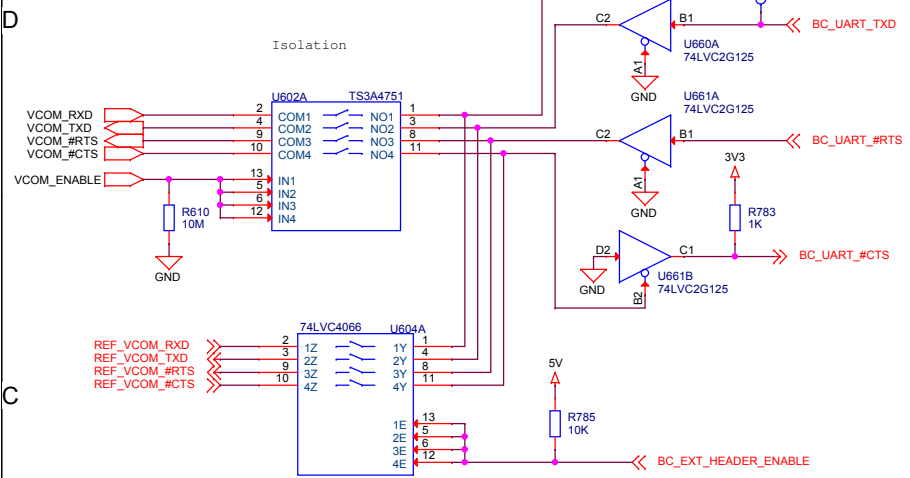
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Debug Interface

Designed: DDB Approved: JNO

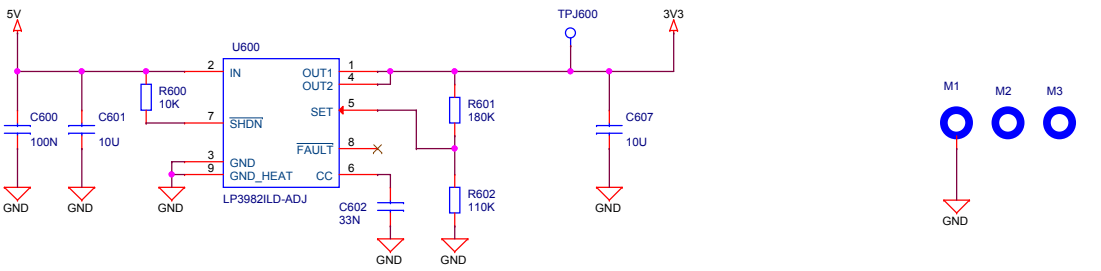
Size: A3 BOM Doc No: Document number: **BRD5300A** Revision: **A04**

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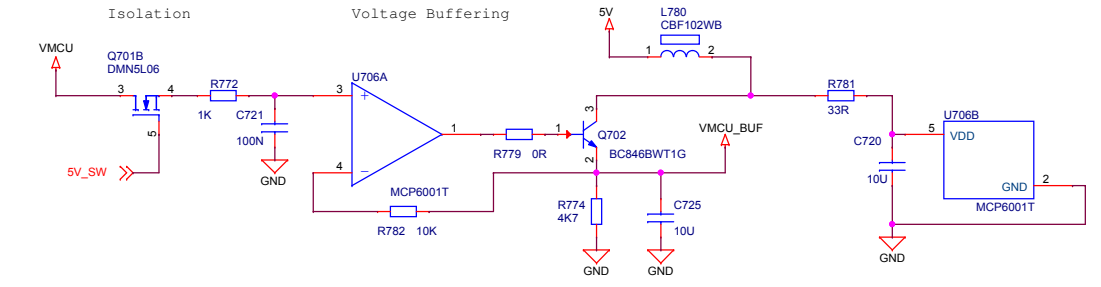
Virtual COM Port Interface



3V3 Regulator



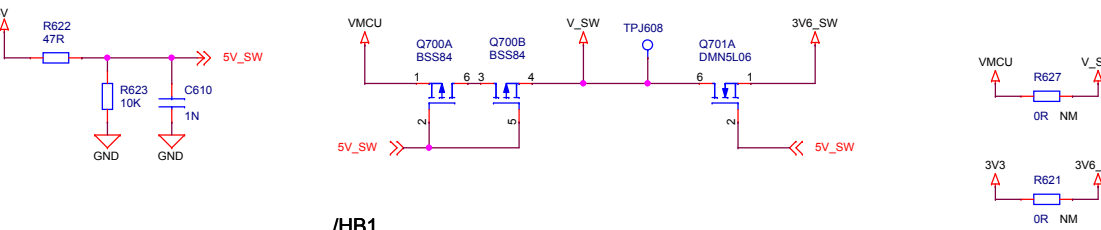
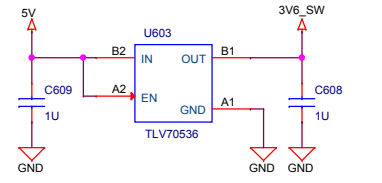
VMCU Voltage Mirror



Power Supply for Analog Switches

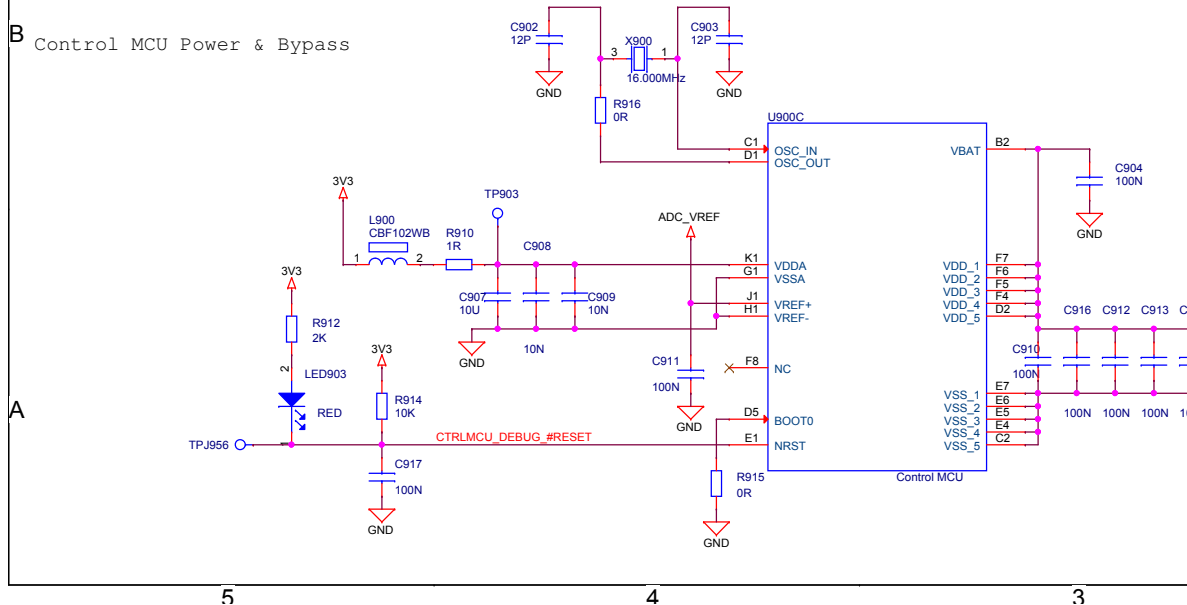
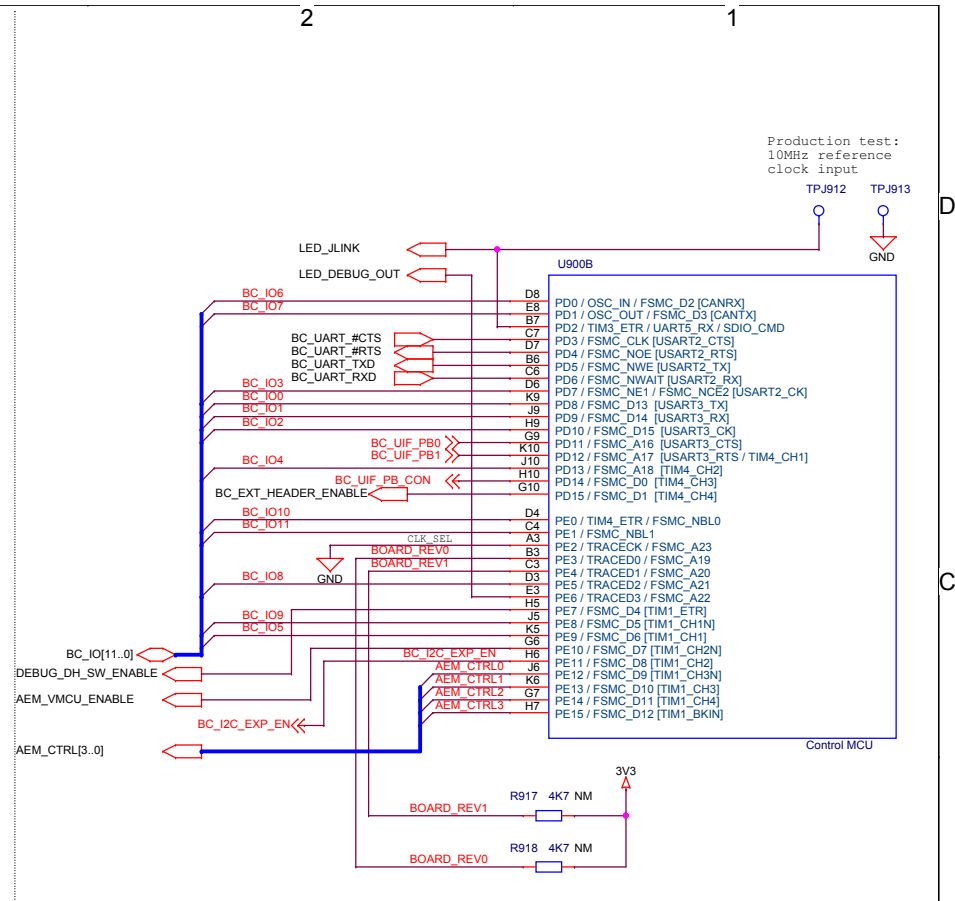
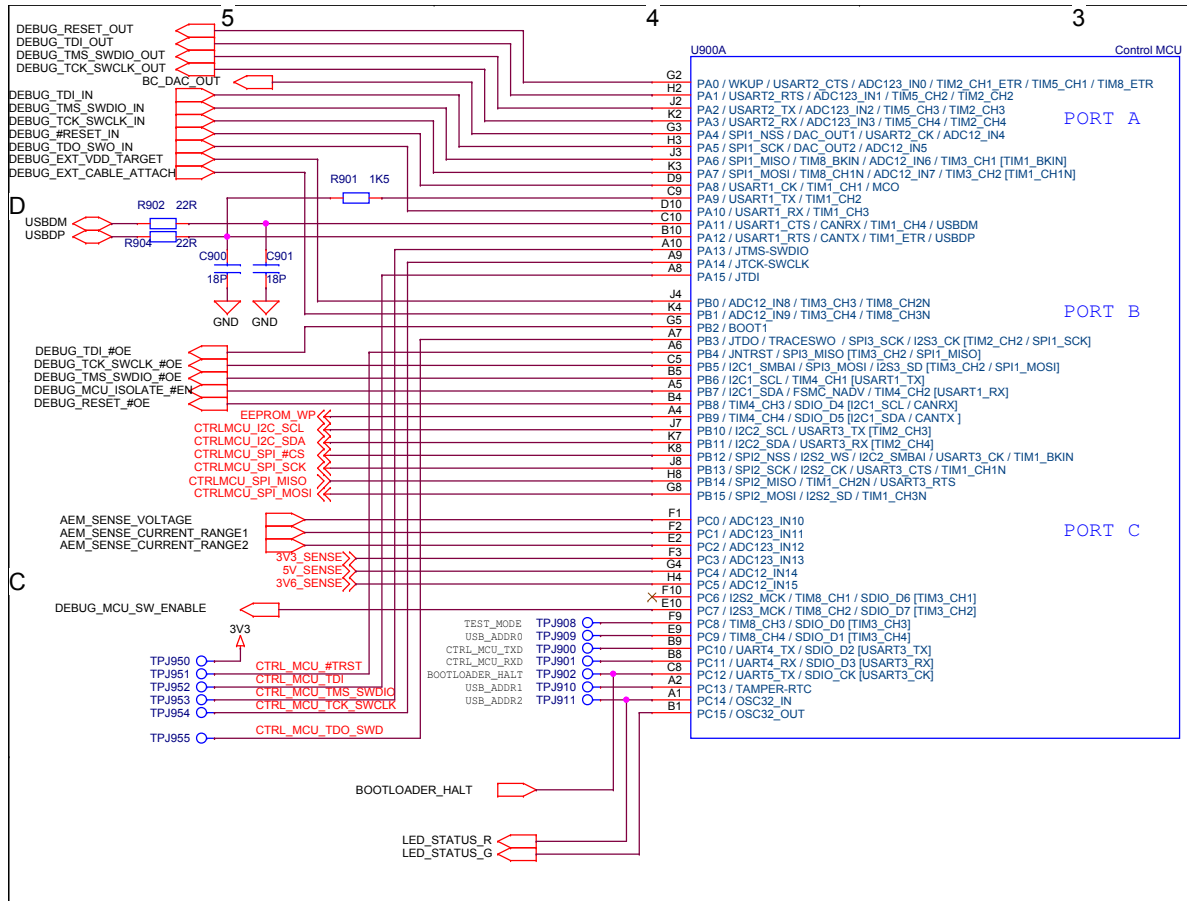
The USB VBUS voltage is used to bias these transistors, turning the P-Channel MOSFETs (Q700) off, and the N-Channel MOSFETs (Q701) on.

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



/HB1 MCU STK Platform

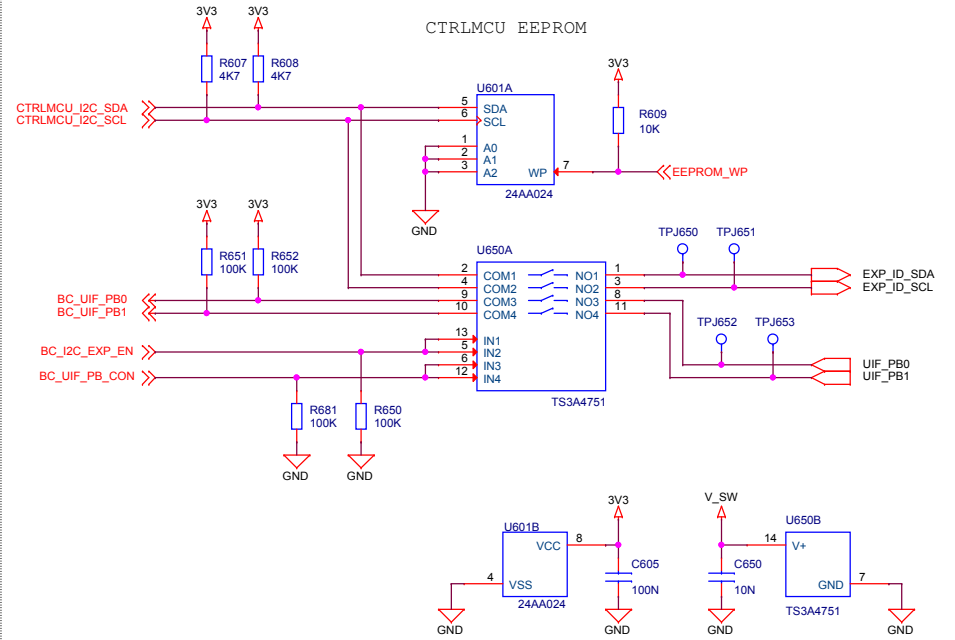
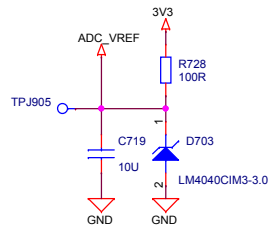
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		Power & Misc.	
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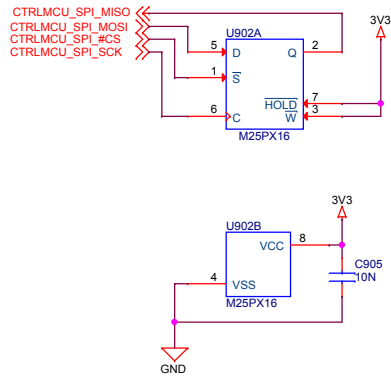
/HB1/CMCU1 Control MCU

		Schematic Title	
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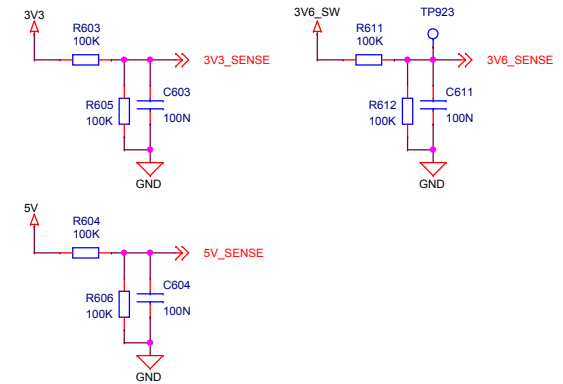
ADC reference voltage




CTRLMCU SERIAL FLASH

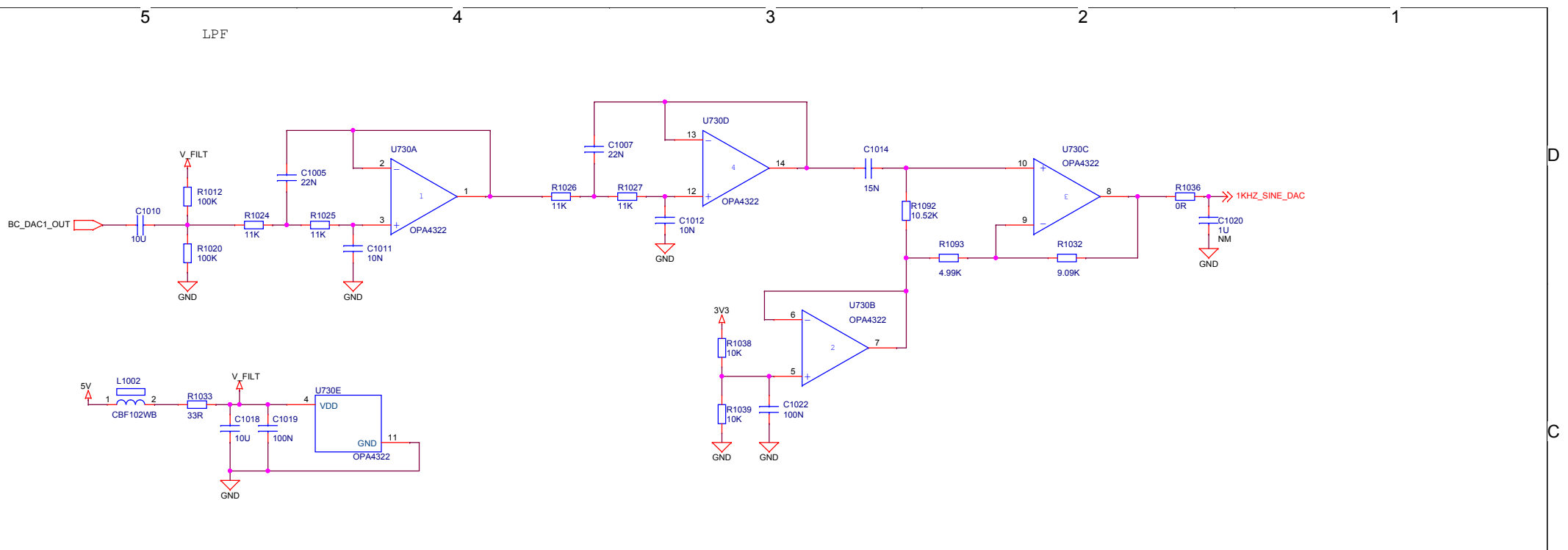


POWER SENSE

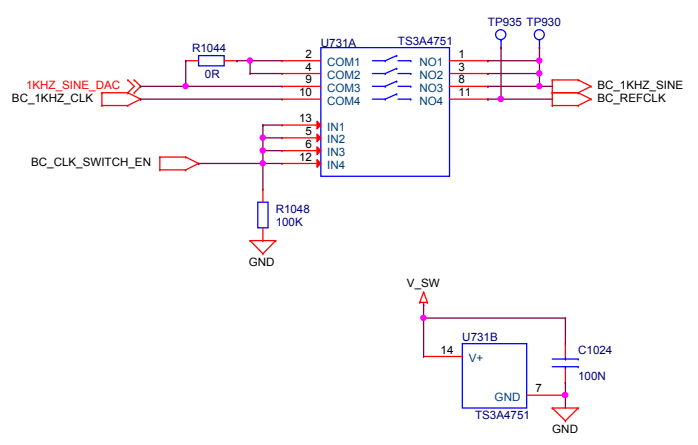


/HB1/CMCU1
Control MCU

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		Control MCU Misc.	
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Analog Switch



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		Clock & Filter	
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