



PG23 Pro Kit

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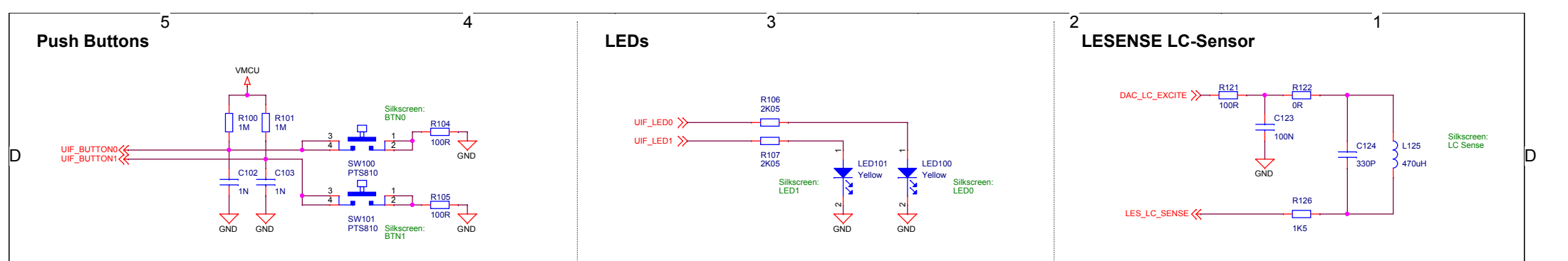
Revision History

Rev.	Description
A00	Initial version.
A01	Bump U1 revision.
A02	Not mount clamping diodes for ADC input.

 SILICON LABS		Board Name	
		EFM32PG23 Pro Kit	
Designed MAH		Approved RGU	
Page Title	Board Number		Revision
Title Page	BRD2504A		A02
Size A3	Sheet Modified Date Friday, June 11, 2021	Sheet 1 of 13	
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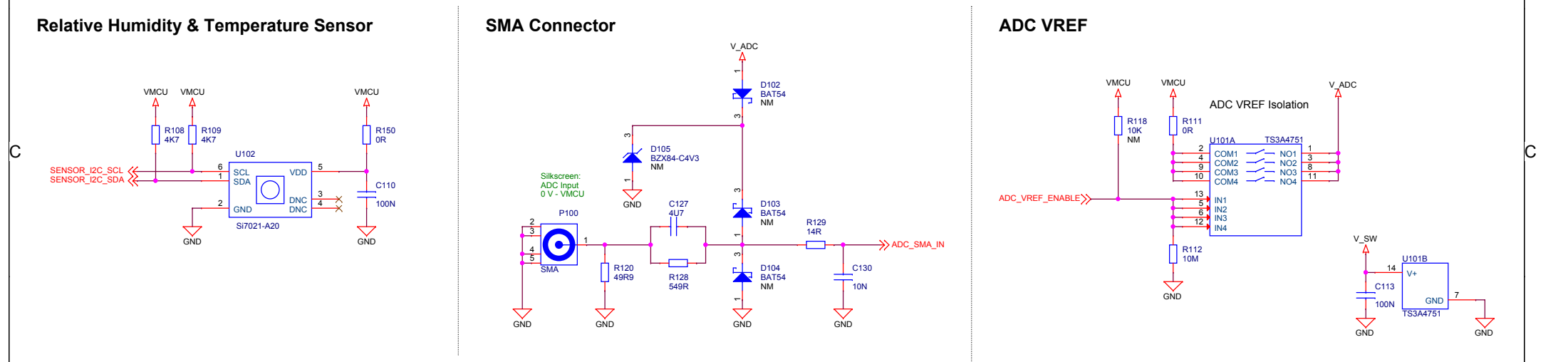
The image displays three circuit diagrams for the VMCU board, each with a title and a component count in the top right corner.

- Push Buttons** (5 components): This diagram shows two push buttons, SW100 and SW101, both labeled as PTS810. They are connected to the VMCU through resistors R100 (1M) and R101 (1M). The buttons are also connected to ground through capacitors C102 (1N) and C103 (1N). The buttons are labeled with silkscreen as BTN0 and BTN1. The input signals are labeled UIF_BUTTON0 and UIF_BUTTON1.
- LEDs** (3 components): This diagram shows two LEDs, LED100 and LED101, both labeled as Yellow. They are connected to the VMCU through resistors R106 (2K05) and R107 (2K05). The LEDs are connected to ground through capacitors C123 (100N) and C124 (330P). The LEDs are labeled with silkscreen as LED1 and LED0. The input signals are labeled UIF_LED0 and UIF_LED1.
- LESENSE LC-Sensor** (1 component): This diagram shows the LESENSE LC-Sensor circuit. It includes a DAC_LC_EXCITE input, a resistor R121 (100R), a capacitor C123 (100N), a resistor R122 (0R), a capacitor C124 (330P), an inductor L125 (470uH), and a resistor R126 (1K5). The output is labeled LES_LC_SENSE. The sensor is labeled with silkscreen as LC Sense.



The image displays three circuit diagrams for the VMCU board, each with a title and a component count in the top right corner.

- Push Buttons** (5 components): This diagram shows two push buttons, SW100 and SW101, both labeled as PTS810. They are connected to the VMCU through resistors R100 (1M) and R101 (1M). The buttons are also connected to ground through capacitors C102 (1N) and C103 (1N). The buttons are labeled with silkscreen as BTN0 and BTN1. The input signals are labeled UIF_BUTTON0 and UIF_BUTTON1.
- LEDs** (3 components): This diagram shows two LEDs, LED100 and LED101, both labeled as Yellow. They are connected to the VMCU through resistors R106 (2K05) and R107 (2K05). The LEDs are connected to ground through capacitors C123 (100N) and C124 (330P). The LEDs are labeled with silkscreen as LED1 and LED0. The input signals are labeled UIF_LED0 and UIF_LED1.
- LESENSE LC-Sensor** (1 component): This diagram shows the LESENSE LC-Sensor circuit. It includes a DAC_LC_EXCITE input, a resistor R121 (100R), a capacitor C123 (100N), a resistor R122 (0R), a capacitor C124 (330P), an inductor L125 (470uH), and a resistor R126 (1K5). The output is labeled LES_LC_SENSE. The sensor is labeled with silkscreen as LC Sense.

[illegible][illegible]

Breakout Pads

B

Silkscreen:

BREAKOUT_TOP[14..3]

3V3

5V
GND
NC
NC
NC
NC
NC
A8
A7
A5
A3
A2
A1
NC
GND
3V3

J102

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

NM

GND

A

Silkscreen:

BREAKOUT_BOT[14..3]

3V3

VMCU
GND
C8
C9
B6
B5
B4
NC
B2
B1
NC
NC
RST
ADC1
GND
3V3

J101

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

NM

GND

5

Breakout Pads

Top Row (J102):

- 1: 5V
- 2: GND
- 3: NC
- 4: NC
- 5: NC
- 6: NC
- 7: NC
- 8: A8
- 9: A7
- 10: A5
- 11: A3
- 12: A2
- 13: A1
- 14: NC
- 15: GND
- 16: 3V3

Bottom Row (J101):

- 1: VMCU
- 2: GND
- 3: C8
- 4: C9
- 5: B8
- 6: B5
- 7: B4
- 8: NC
- 9: B2
- 10: B1
- 11: NC
- 12: NC
- 13: RST
- 14: ADC1
- 15: GND
- 16: 3V3

EXP Header

EXP Header Functionality

Pin	Signal	Function
2	VMCU	
4	NC	
6	NC	
8	NC	
10	NC	
12	B5	UART_TX
14	B6	UART_RX
16	A7	I2C_SDA
18	5V	
20	3V3	

Pin	Signal	Function
1	GND	
3	ADC1	
5	NC	
7	NC	
9	A5	GPIO
11	B4	GPIO
13	C9	GPIO
15	A8	I2C_SCL
17	Reserved for EXP Board Identification	
19	Reserved for EXP Board Identification	

Breakout Pads

Top Row (J102):

- 1: 5V
- 2: GND
- 3: NC
- 4: NC
- 5: NC
- 6: NC
- 7: NC
- 8: A8
- 9: A7
- 10: A5
- 11: A3
- 12: A2
- 13: A1
- 14: NC
- 15: GND
- 16: 3V3

Bottom Row (J101):

- 1: VMCU
- 2: GND
- 3: C8
- 4: C9
- 5: B8
- 6: B5
- 7: B4
- 8: NC
- 9: B2
- 10: B1
- 11: NC
- 12: NC
- 13: RST
- 14: ADC1
- 15: GND
- 16: 3V3

EXP Header

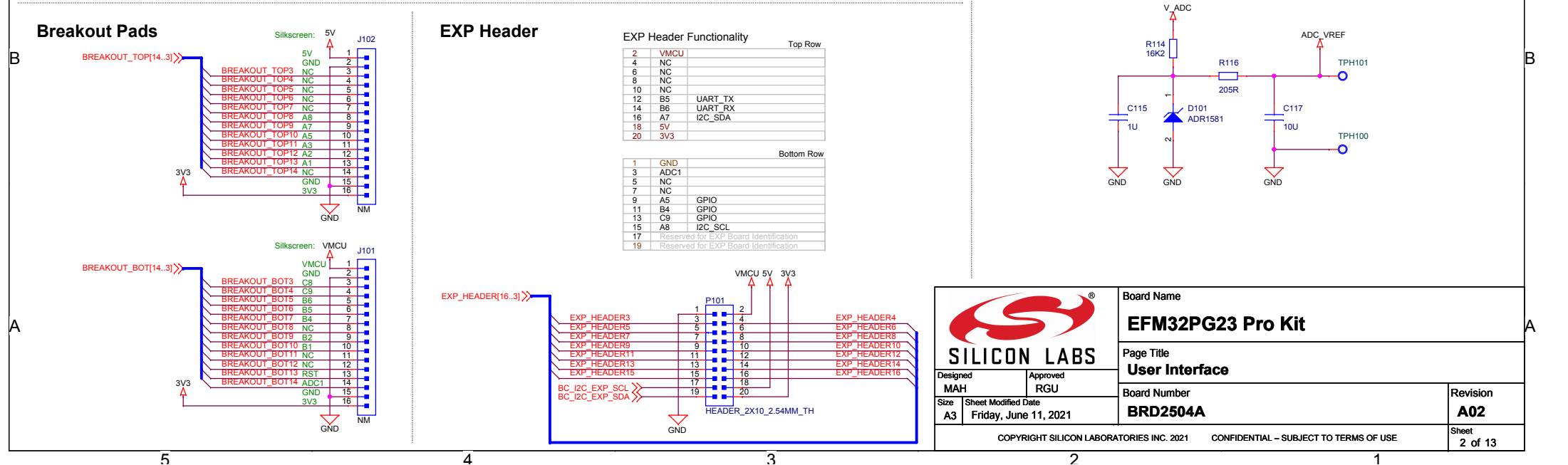
EXP Header Functionality

Pin	Signal	Function
2	VMCU	
4	NC	
6	NC	
8	NC	
10	NC	
12	B5	UART_TX
14	B6	UART_RX
16	A7	I2C_SDA
18	5V	
20	3V3	

Pin	Signal	Function
1	GND	
3	ADC1	
5	NC	
7	NC	
9	A5	GPIO
11	B4	GPIO
13	C9	GPIO
15	A8	I2C_SCL
17	Reserved for EXP Board Identification	
19	Reserved for EXP Board Identification	


SILICON LABS

Designed MAH		Approved RGU		Board Name EFM32PG23 Pro Kit	
Size A3		Sheet Modified Date Friday, June 11, 2021		Page Title User Interface	
Board Number BRD2504A				Revision A02	
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Designed MAH		Approved RGU	
Size A3		Sheet Modified Date Friday, June 11, 2021	
		Board Number BRD2504A	
		Revision A02	
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		Board Number BRD2504A	Revision A02
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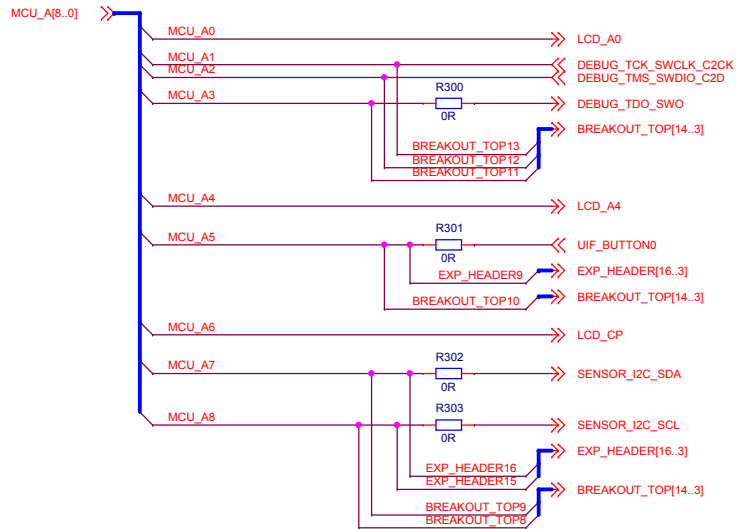
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Designed MAH		Approved RGU	
Size A3	Sheet Modified Date Friday, June 11, 2021	Page Title User Interface	
		Board Number BRD2504A	Revision A02
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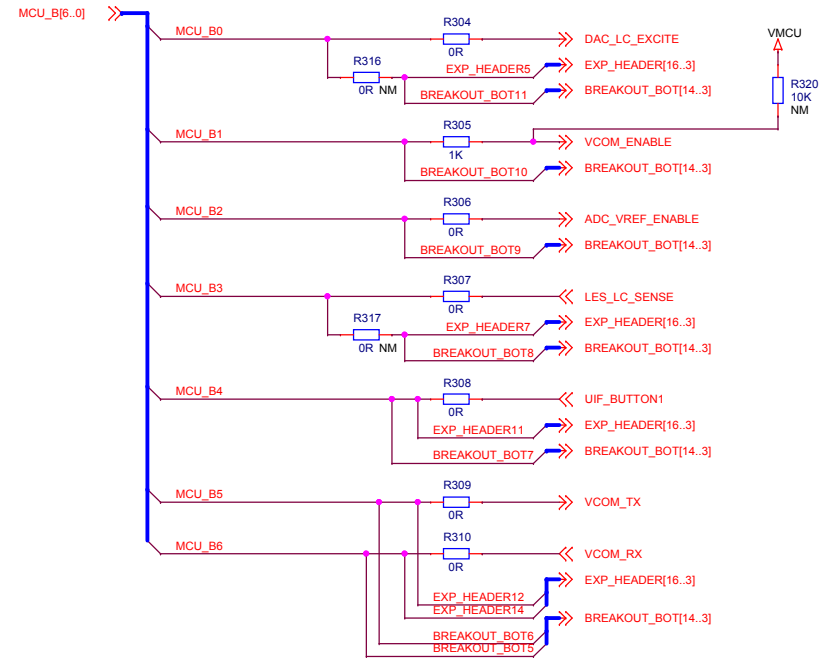
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Designed MAH		Approved RGU	
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		Board Number BRD2504A	Revision A02
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		Board Number BRD2504A	Revision A02
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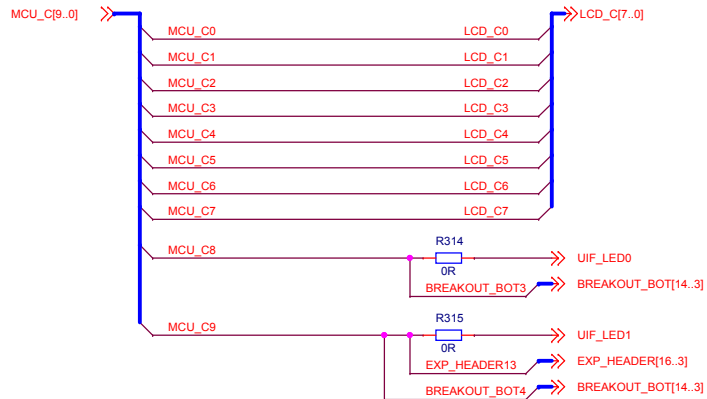
PA Connections



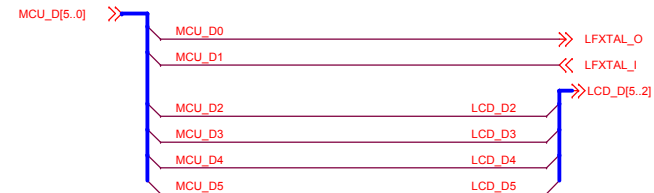
PB Connections



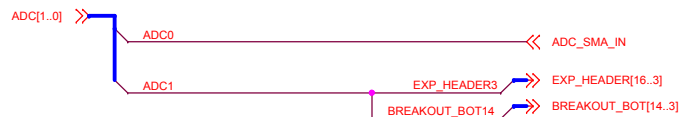
PC Connections




PD Connections

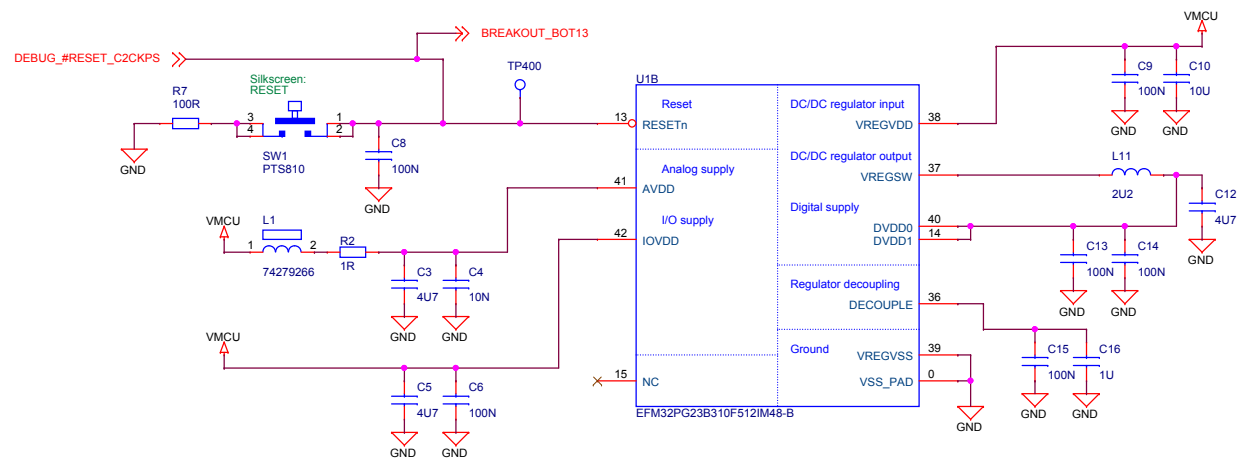


ADC Connections



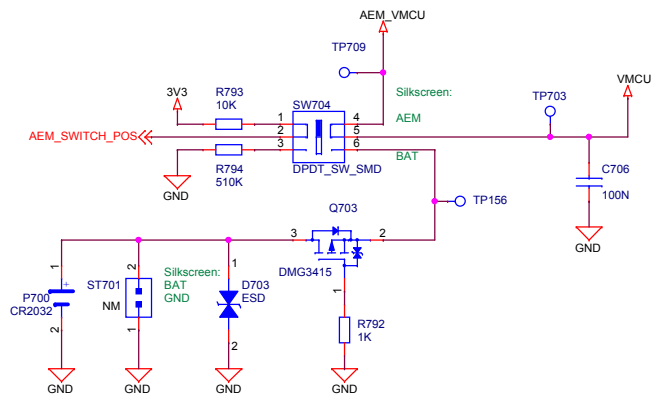
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		EFM32PG23 Pro Kit	
Designed MAH		Page Title	
Approved RGU		Signal Assignments	
Size A3	Sheet Modified Date Friday, June 11, 2021	Board Number BRD2504A	Revision A02
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EFM32 Power and Decoupling

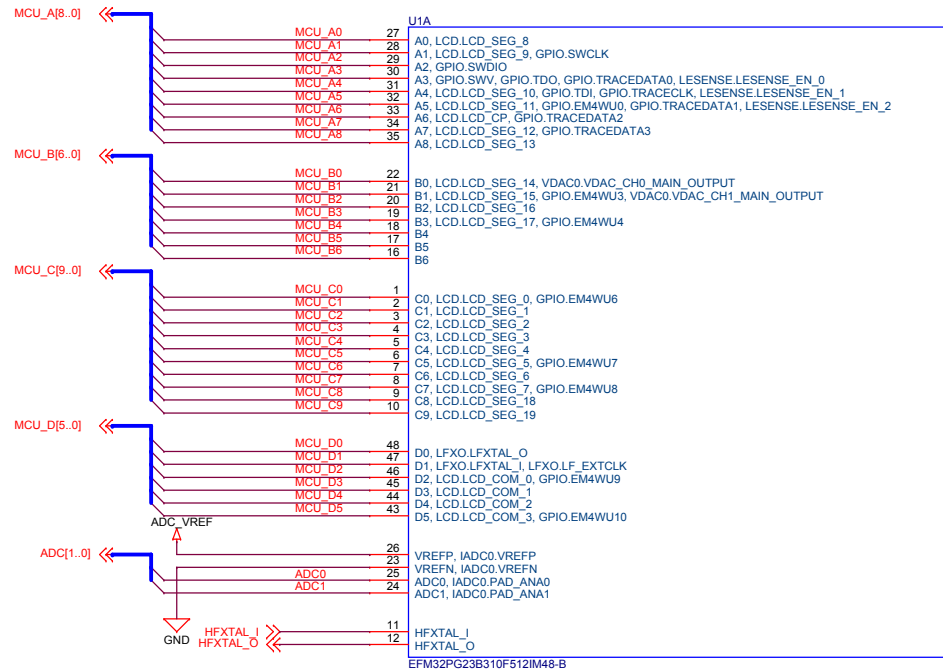


Power Select Switch: AEM/BAT

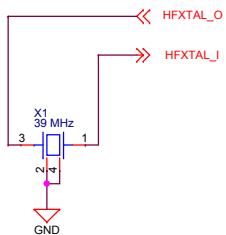
SWITCH POS	MODE DESCRIPTION
AEM	AEM Enabled, VMCU sourced from external 3.3V LDO powered by BC USB 5V supply
BAT	AEM Disabled, VMCU sourced from coin-cell battery or external power supply



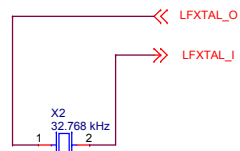
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		Page Title EFM32 Power	
Designed MAH	Approved RGU	Board Number BRD2504A	Revision A02
Size A3	Sheet Modified Date Friday, June 11, 2021	COPYRIGHT SILICON LABORATORIES INC. 2021 CONFIDENTIAL – SUBJECT TO TERMS OF USE Sheet 4 of 13	



High Frequency Clock

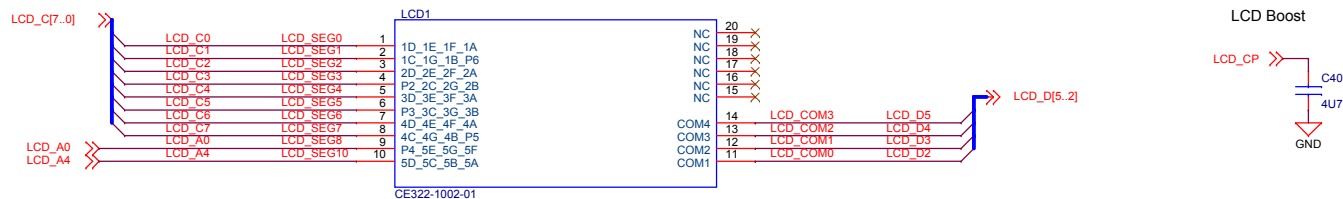


Low Frequency Clock



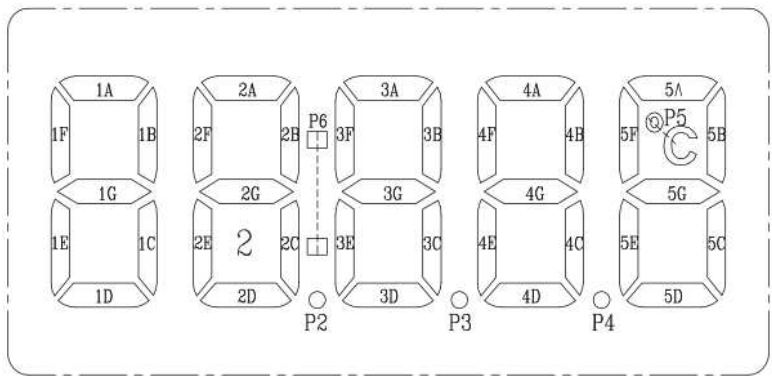
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		EFM32PG23 Pro Kit	
Designed MAH		Page Title	
Size A3		EFM32 I/O	
Sheet Modified Date Friday, June 11, 2021		Board Number	Revision
		BRD2504A	A02
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Segment LCD Signal Connections



Segment Names

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
COM1	1D	1C	2D	P2	3D	P3	4D	4C	P4	5D	COM1	--	--	--	--	--	--	--	--	--
COM2	1E	1G	2E	2C	3E	3C	4E	4G	5E	5C	--	COM2	--	--	--	--	--	--	--	--
COM3	1F	1B	2F	2G	3F	3G	4F	4B	5G	5B	--	--	COM3	--	--	--	--	--	--	--
COM4	1A	P6	2A	2B	3A	3B	4A	P5	5F	5A	--	--	--	COM4	--	--	--	--	--	--



 SILICON LABS		Board Name	
		EFM32PG23 Pro Kit	
Designed MAH		Approved RGU	
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MCU Power Regulator

The schematic diagram illustrates the MCU Power Regulator circuit. It includes a 5V input, a 3V6 SW input, and various components like resistors (R700, R701, R702, R703, R705, R706, R707, R708), capacitors (C701, C702, C703, C705, C706, C707, C708), and integrated circuits (U701, U702A, U700, Q705A, Q705B). It features an isolation switch (U700) and an AEM Calibration section with a table of calibration currents.


AEM Calibration

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.

AEM Bypass Control

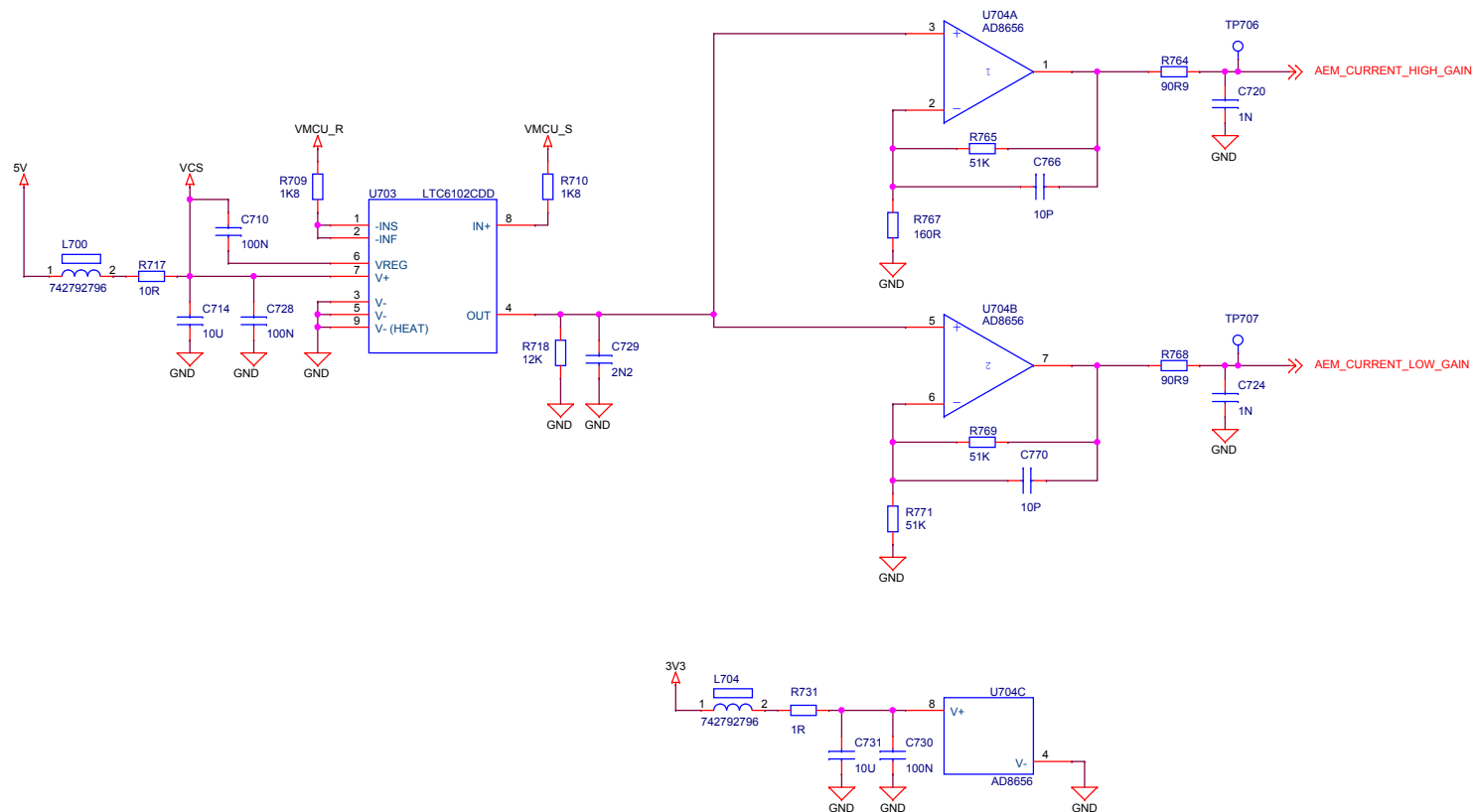
Default state:
AEM_BYPASS_EN = 1 (AEM bypass not enabled)
AEM_SENSE_EN = 0 (AEM sense enabled)

 SILICON LABS		Board Name	
		EFM32PG23 Pro Kit	
Designed MAH		Approved RGU	
Size A3		Page Title Target Voltage Supply	
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MCU Current Sense



 SILICON LABS		Board Name	
		EFM32PG23 Pro Kit	
Designed		Page Title	
MAH		AEM	
Size		Board Number	
A3		BRD2504A	
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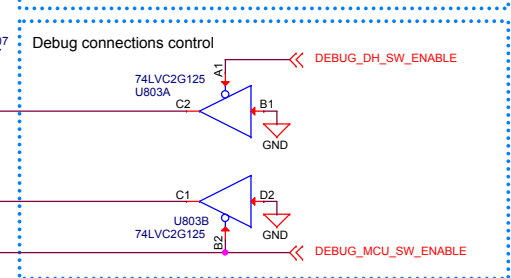
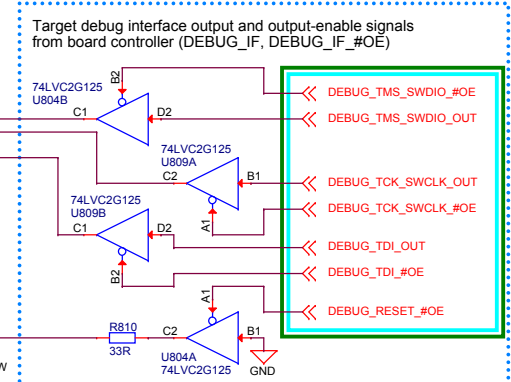
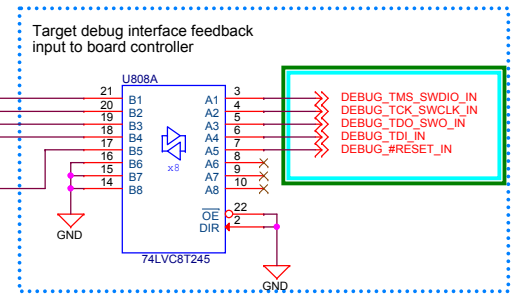
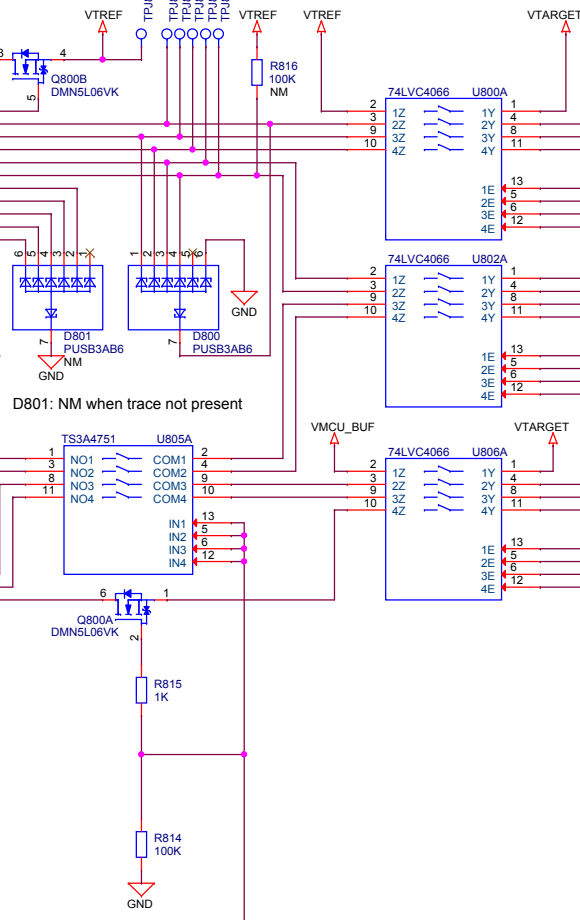
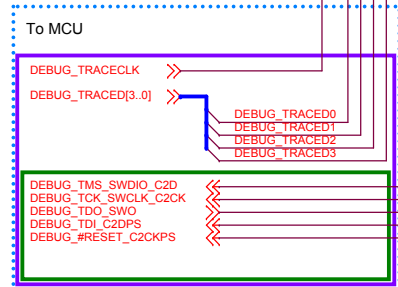
ARM Coresight 20-pin
Debug + ETM header

P800

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

DH TMS SWDIO
DH TCK SWCLK
DH TDO SWO
DH TDI
DH #RESET

GND



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



EFM32PG23 Pro Kit

Page Title	Debug Interface
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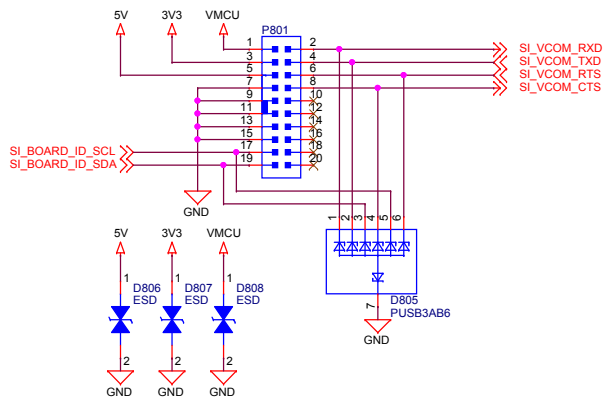
Board Number	BRD2504A
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A02

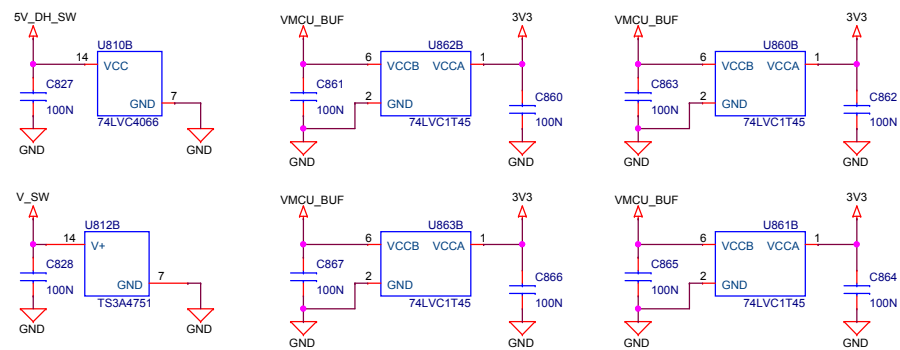
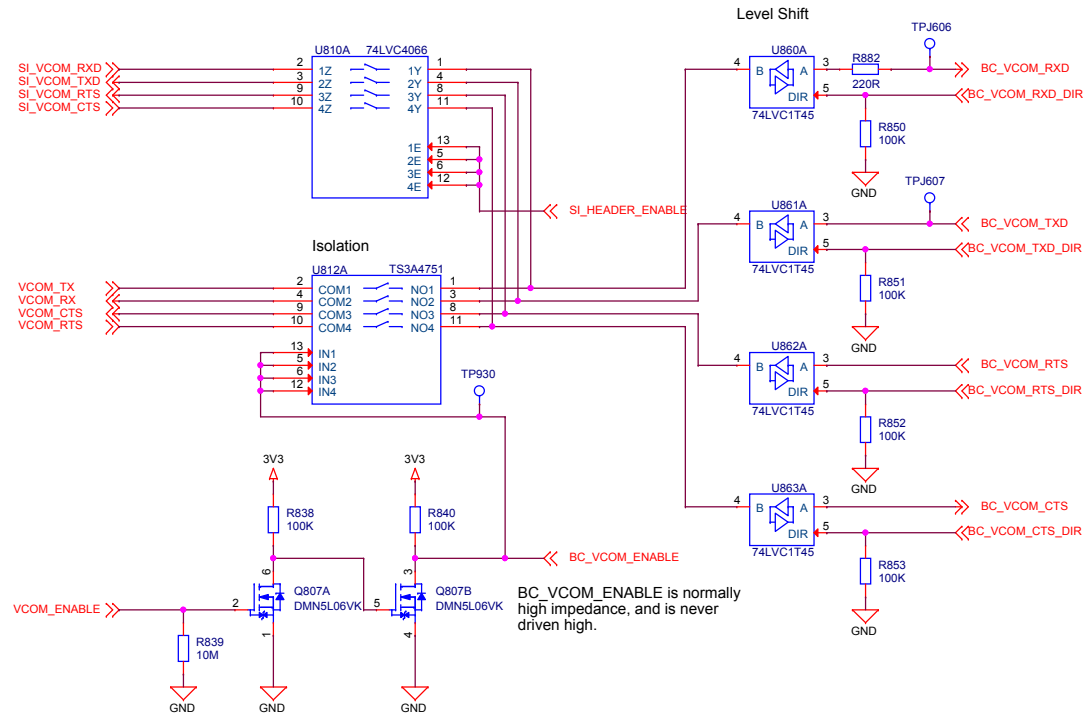
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Simplicity Connector

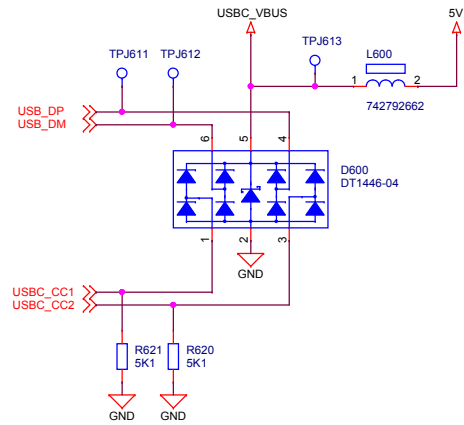
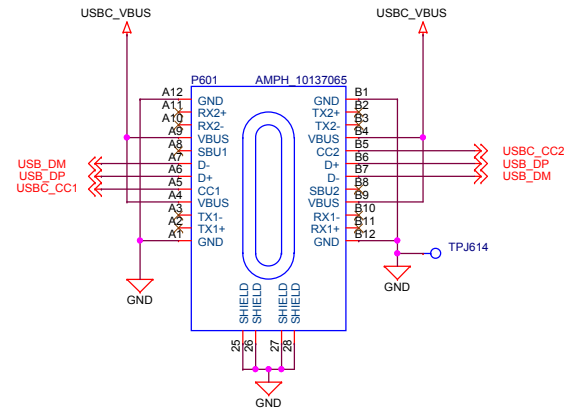


VCOM Interface

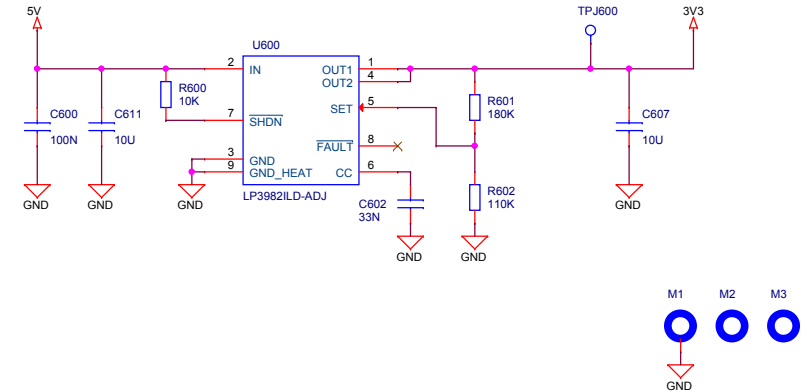


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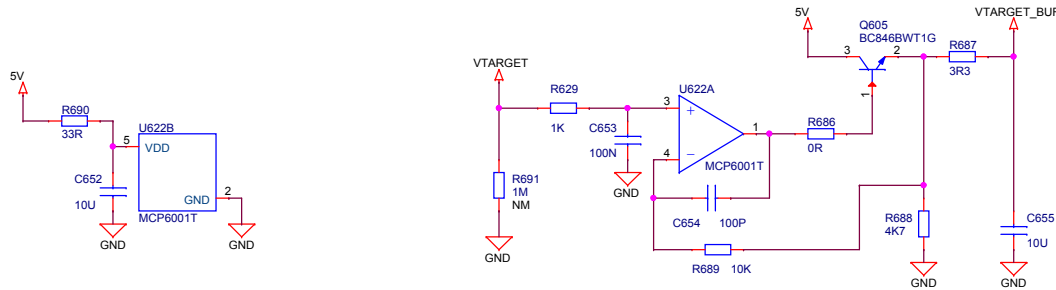
J-Link USB Port



3V3 Regulator



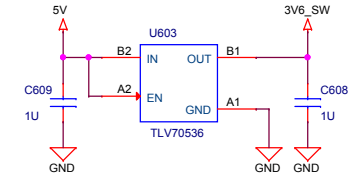
VTarget Voltage Mirror



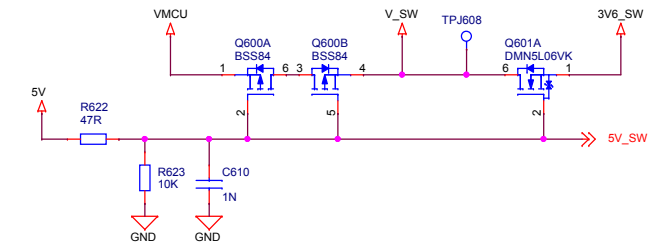
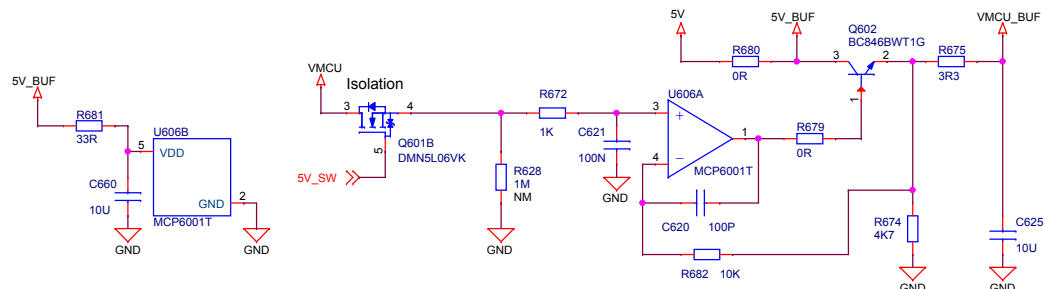
Power Supply for Analog Switches

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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[illegible][illegible]

Board ID & Button Isolation

3V3 3V3

BOARD_ID_SDA BOARD_ID_SCL

R907 4K7 R908 4K7

U901A SDA SCL WP

M24C02

3V3

R909 10K

BOARD_ID_WP

3V3 3V3

BC_UIF_BUTTON0 BC_UIF_BUTTON1

R951 100K NM R952 100K NM

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

TS3A4751

IN1 IN2 IN3 IN4

3V3

C950 10N

U950B V+ GND

TS3A4751

7

3V3

C951 100N

U901B VCC VSS

M24C02

8

4

BC Serial Flash

3V3 3V3

BC_SPI_COP1 BC_SPI_SCLK

R906 10K

U902A SI / SIO0 SO / SIO1 SCLK CS# WP# / SIO2 RESET# / SIO3

MX25R8035F

C3

3V3

C914 100N

U902B VCC GND

MX25R8035F

B2

GND


Board Version

3V3

BOARD_V0 BOARD_V01

R931 1K R930 1K

GND GND



SILICON LABS

Designed
MAH

Size
A3

Approved
RGU

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Board Name

EFM32PG23 Pro Kit

Page Title

Board Controller

Board Number

BRD2504A

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Revision

A02

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BC Serial Flash

BC_SPI_COP1
BC_SPI_SCLK
BC_SPI_CS
BC_SPI_CPO

3V3
3V3

R906
10K

U902A
SI / SIO0
SCLK
CS#
WP# / SIO2
RESET# / SIO3
MX25R8035F

C3

3V3

C914
100N

U902B
VCC
GND
MX25R8035F

BOARD_VER0
BOARD_VER1

R931
1K

R930
1K

GND
GND

BC Serial Flash

BC_SPI_COP1
BC_SPI_SCLK
BC_SPI_CS
BC_SPI_CPO

3V3
3V3
3V3

R906 10K
C914 100N
GND
GND
GND

U902A
D2
E1
A3
C1
SI / SIO0
SCLK
CS#
WP# / SIO2
RESET# / SIO3
SO / SIO1
C3
MX25R8035F

U902B
VCC
GND
B2
MX25R8035F

BOARD_VER0
BOARD_VER1

R931 1K
R930 1K
GND
GND

Board Version




Board Name		A
EFM32PG23 Pro Kit		
Page Title		
Board Controller		
Board Number		Revision
BRD2504A		A02
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EFM32PG23 Pro Kit		
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EFM32PG23 Pro Kit		
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Board Controller		
Board Number		Revision
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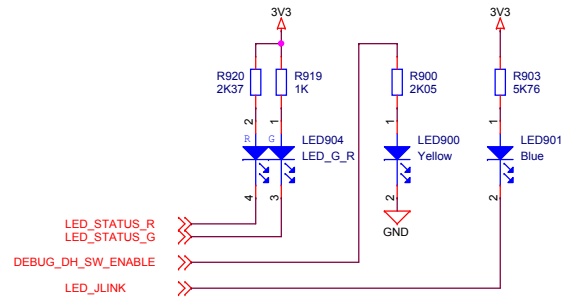
Board Name		A
EFM32PG23 Pro Kit		
Page Title		
Board Controller		
Board Number		Revision
BRD2504A		A02
LABORATORIES INC. 2021		Sheet
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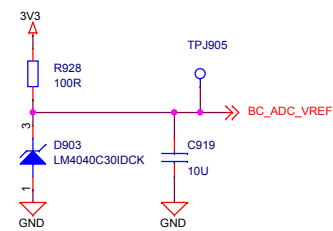
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	Page Title Board Controller		
	Approved RGU	Board Number BRD2504A	Revision A02
Last Modified Date Friday, June 11, 2021	COPYRIGHT SILICON LABORATORIES INC. 2021 CONFIDENTIAL – SUBJECT TO TERMS OF USE		

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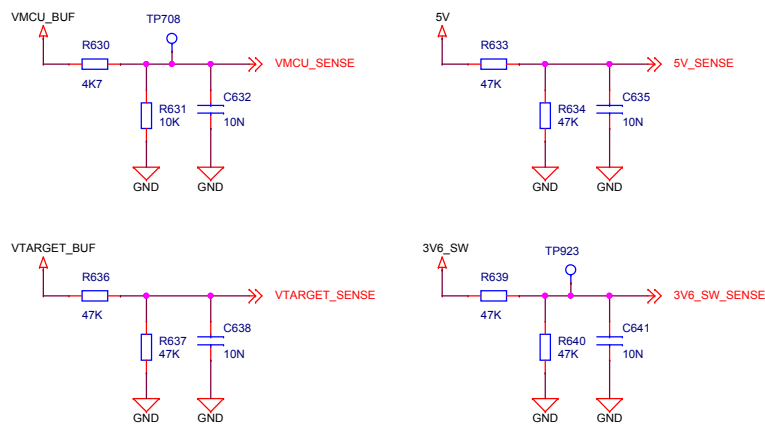
Indicator LEDs



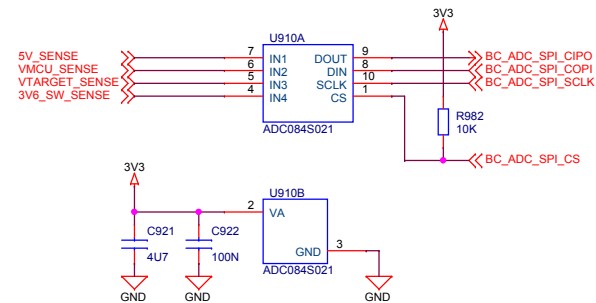
BC ADC Reference



BC Voltage Sense



BC Voltage Sense ADC



		Board Name	
		EFM32PG23 Pro Kit	
Designed MAH		Page Title	
Size A3		Board Controller Misc	
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