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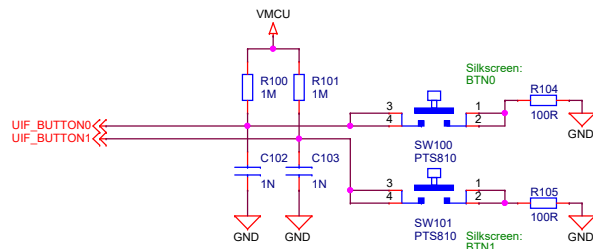
Revision History	
Rev.	Description
A01	Initial version.
A02	U703 changed to LTC6102CDD#PBF. C501 changed to 4.7uF. R5 is NM,R6 is mounted(DC-DC of U1 enabled).
A03	R118 removed R5,R6 removed DC-DC of U1 powering DVDD pins (22,55) C1,C2 added

		Board Name	
		EFM32PG28 Pro Kit	
Designed DDC		Approved RGU	
Size A3	Sheet Modified Date Monday, March 13, 2023	Board Number BRD2506A	
		Revision A03	Sheet 1 of 13



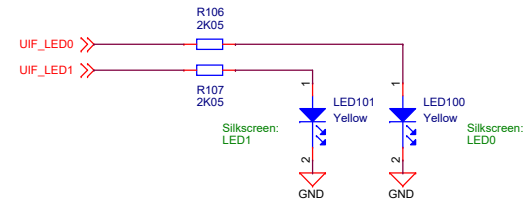
## Push Buttons

The diagram illustrates the electrical connection for two push buttons, SW100 and SW101, which are labeled with silkscreen text as SW100 PTS810 and SW101 PTS810. Each button is connected to a VMCU pin through a pull-up resistor (R100 and R101, both 1MΩ) and to ground through a pull-down capacitor (C102 and C103, both 1N). The buttons are also connected to ground through a 100R resistor (R104 and R105). The buttons are labeled with silkscreen text: SW100 PTS810, SW101 PTS810, and their respective buttons (BTN0 and BTN1).



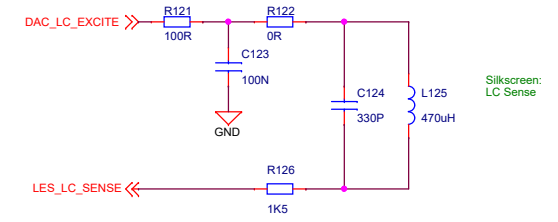
### 3 LEDs

The diagram shows three LEDs connected to a microcontroller. Each LED is connected to a microcontroller pin (UIF\_LED0, UIF\_LED1, UIF\_LED2) through a 2K05 resistor (R106, R107, R108). The LEDs are labeled LED101, LED100, and LED102 respectively, and are noted as 'Silkscreen: LED1', 'Silkscreen: LED0', and 'Silkscreen: LED2'. The cathodes of all LEDs are connected to GND.



## LESENSE LC-Sensor

The diagram illustrates the LESENSE LC-Sensor circuit. It features a DAC output labeled `DAC_LC_EXCITE` connected to a resistor `R121` (100R). The signal then passes through a capacitor `C123` (100N) to ground. The output of this stage is connected to a parallel combination of a capacitor `C124` (330P) and an inductor `L125` (470uH). The output of the resonator is connected to a resistor `R126` (1K5) and then to the `LES_LC_SENSE` input. A green label `Silkscreen: LC Sense` is present next to the resonator components.



# Breakout Pads

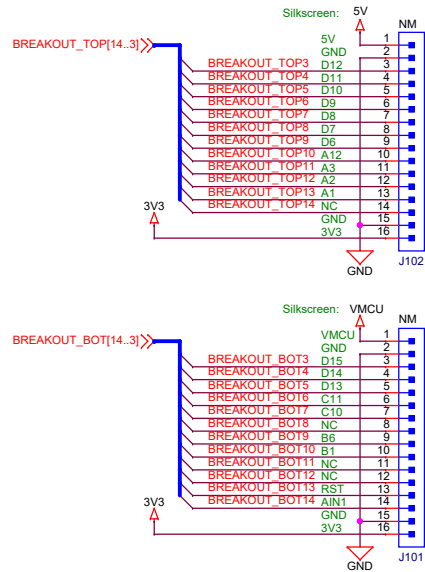
The diagrams illustrate the breakout pad connections for two microcontroller packages, J102 and J101. Each package has a set of breakout pads labeled BREAKOUT\_TOP and BREAKOUT\_BOT. The connections are as follows:

**J102 Connections:**

- 5V:** Connected to BREAKOUT\_TOP3, BREAKOUT\_TOP4, BREAKOUT\_TOP5, BREAKOUT\_TOP6, BREAKOUT\_TOP7, BREAKOUT\_TOP8, BREAKOUT\_TOP9, BREAKOUT\_TOP10, BREAKOUT\_TOP11, BREAKOUT\_TOP12, BREAKOUT\_TOP13, and BREAKOUT\_TOP14.
- GND:** Connected to BREAKOUT\_TOP1, BREAKOUT\_TOP2, BREAKOUT\_TOP15, and BREAKOUT\_TOP16.
- 3V3:** Connected to BREAKOUT\_TOP14.

**J101 Connections:**

- VMCU:** Connected to BREAKOUT\_BOT3, BREAKOUT\_BOT4, BREAKOUT\_BOT5, BREAKOUT\_BOT6, BREAKOUT\_BOT7, BREAKOUT\_BOT8, BREAKOUT\_BOT9, BREAKOUT\_BOT10, BREAKOUT\_BOT11, BREAKOUT\_BOT12, BREAKOUT\_BOT13, and BREAKOUT\_BOT14.
- GND:** Connected to BREAKOUT\_BOT1, BREAKOUT\_BOT2, BREAKOUT\_BOT15, and BREAKOUT\_BOT16.
- 3V3:** Connected to BREAKOUT\_BOT14.



### EXP Header

Bottom Row	
1	GND
3	AIN1
5	B0 NC
7	B7 NC
9	B1 GPIO
11	NC
13	C11 GPIO
15	D10 I2C_SCL
17	Reserved for EXP Board Identification
19	Reserved for EXP Board Identification

### EXP Header Functionality

Top Row	
2	VMCU
4	D11 SPI_MOSI
6	D12 SPI_MISO
8	D13 SPI_CLK
10	D14 SPI_CS
12	D7 UART_TX
14	D8 UART_RX
16	D9 I2C_SDA
18	5V
20	3V3

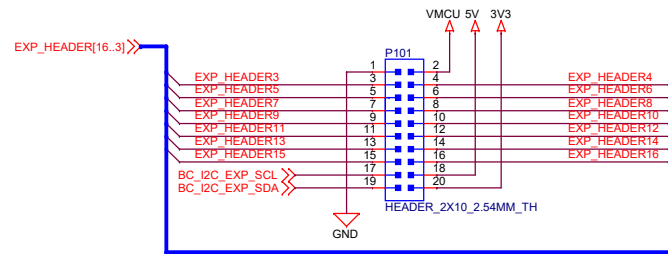
The diagram illustrates the connection between the EXP Header and the P101 header. The EXP Header pins are connected to the P101 header pins as follows:

- EXP\_HEADER3 to P101 pin 3
- EXP\_HEADERS to P101 pin 5
- EXP\_HEADERS to P101 pin 7
- EXP\_HEADERS to P101 pin 9
- EXP\_HEADERS to P101 pin 11
- EXP\_HEADERS to P101 pin 13
- EXP\_HEADERS to P101 pin 15
- BC\_I2C\_EXP\_SCL to P101 pin 19
- BC\_I2C\_EXP\_SDA to P101 pin 19

The P101 header pins 1, 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20 are connected to VMCU 5V, 3V3, and GND. The P101 header pins 3, 5, 7, 9, 11, 13, 15, 17, and 19 are connected to GND. The P101 header pins 1, 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20 are connected to the EXP Header pins 3, 5, 7, 9, 11, 13, 15, 17, and 19 respectively.

1	GND	
3	AIN1	
5	B0	NC
7	B7	NC
9	B1	GPIO
11	NC	
13	C11	GPIO
15	D10	I2C_SCL
17	Reserved for EXP Board Identification	
19	Reserved for EXP Board Identification	

2	VMCU	
4	D11	SPI_MOSI
6	D12	SPI_MISO
8	D13	SPI_CLK
10	D14	SPI_CS
12	D7	UART_TX
14	D8	UART_RX
16	D9	I2C_SDA
18	5V	
20	3V3	



# ADC VREF

V<sub>ADC</sub>

R114  
16K2

C115  
1U

GND

D101  
ADR1581

GND

R116  
205R

C117  
10U

GND

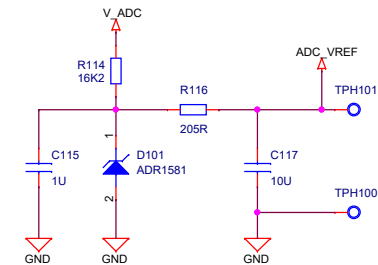
ADC\_VREF

TPH101

TPH100

## SMA Connector

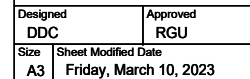
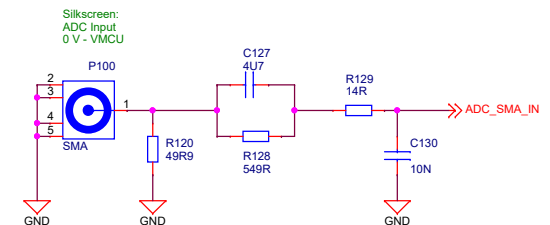
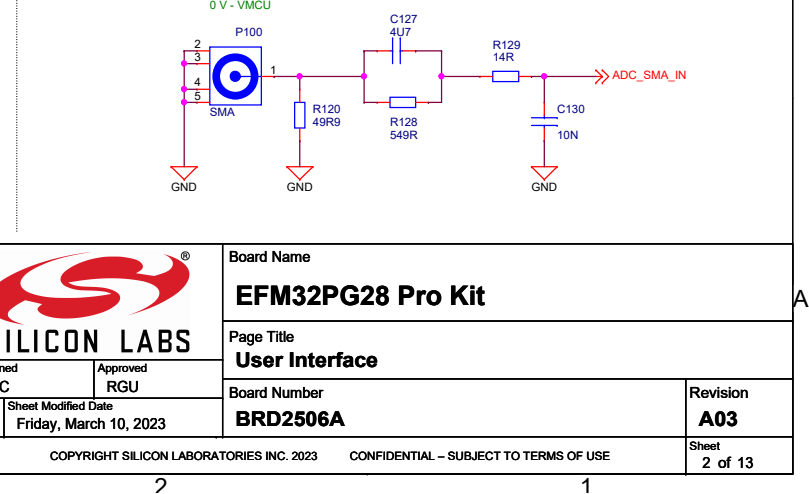
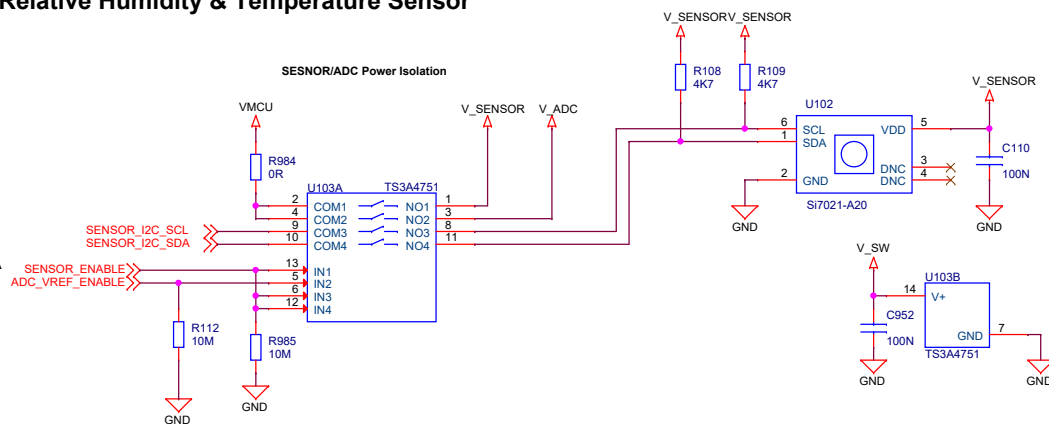
Silkscreen:



## Relative Humidity & Temperature Sensor

The schematic diagram illustrates the electrical connections for a Relative Humidity & Temperature Sensor. The circuit is divided into three main sections: 5, 4, and 3.

- Section 5: Sensor Selection and Power Isolation**
  - U103A (TS3A4751):** A multiplexer used for sensor selection. Its COM1, COM2, COM3, and COM4 pins are connected to the sensor's I2C lines (SENSOR\_I2C\_SCL, SENSOR\_I2C\_SDA) and the VMCU line. Its NO1, NO2, NO3, and NO4 pins are connected to the V\_SENSOR and V\_ADC lines.
  - U103B (TS3A4751):** A multiplexer used for voltage selection. Its V+ pin is connected to the V\_SW line, and its GND pin is connected to ground.
  - Resistors:** R984 (0R) is connected between VMCU and the sensor's I2C lines. R112 (10M) and R985 (10M) are connected between the sensor's I2C lines and ground.
  - Capacitors:** C952 (100nF) is connected between V\_SW and ground. C110 (100nF) is connected between V\_SENSOR and ground.
- Section 4: Sensor and ADC Interface**
  - U102 (Si7021-A20):** An I2C-to-ADC converter. Its SCL, SDA, and GND pins are connected to the sensor's I2C lines and ground. Its VDD and DNC pins are connected to the V\_SENSOR and V\_ADC lines.
  - Resistors:** R108 (4K7) and R109 (4K7) are connected between the V\_SENSOR and V\_ADC lines and ground.
- Section 3: Sensor and ADC Interface**
  - U103B (TS3A4751):** A multiplexer used for voltage selection. Its V+ pin is connected to the V\_SW line, and its GND pin is connected to ground.

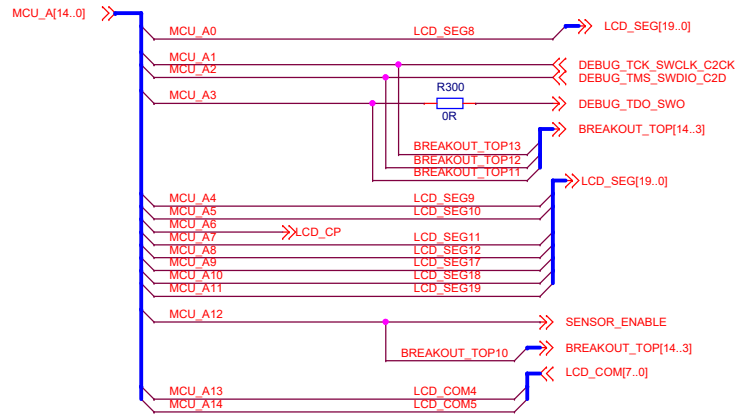


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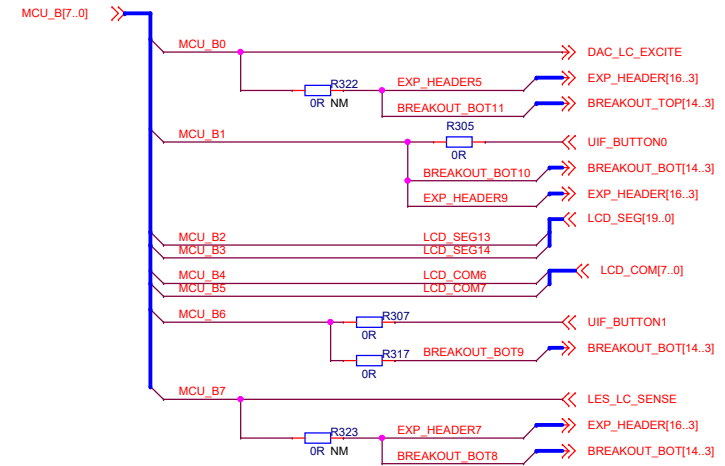
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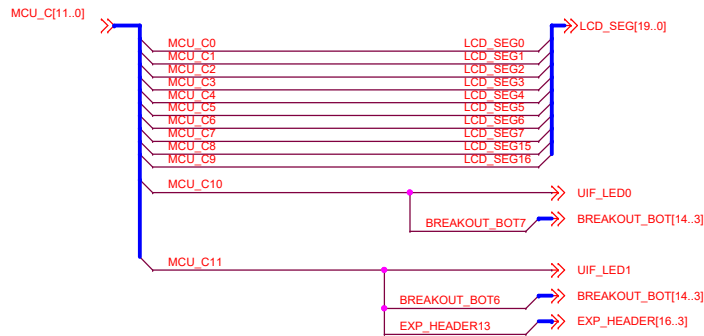
## PA Connections



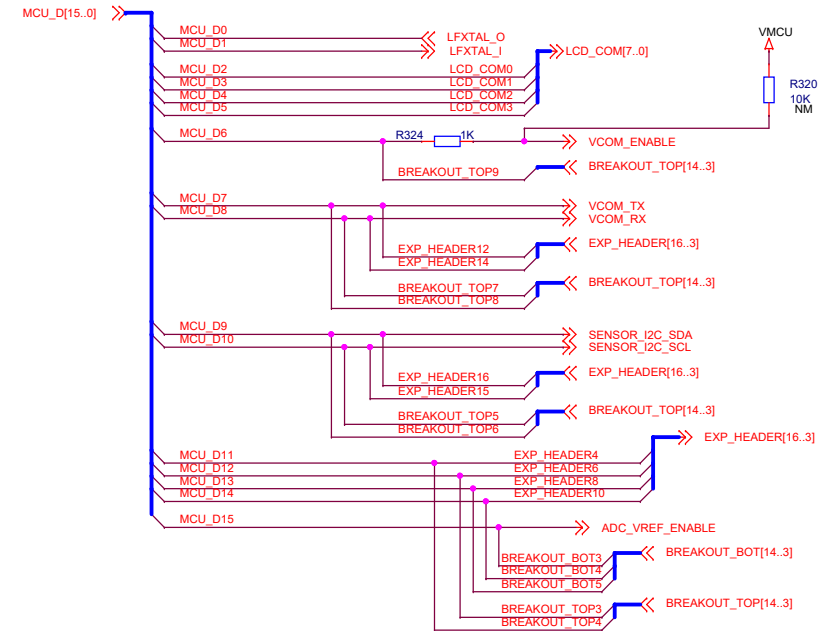
## PB Connections



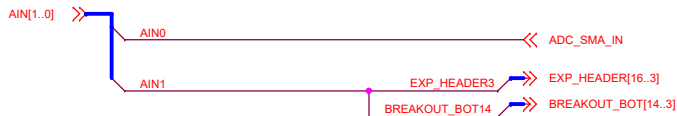
## PC Connections




## PD Connections



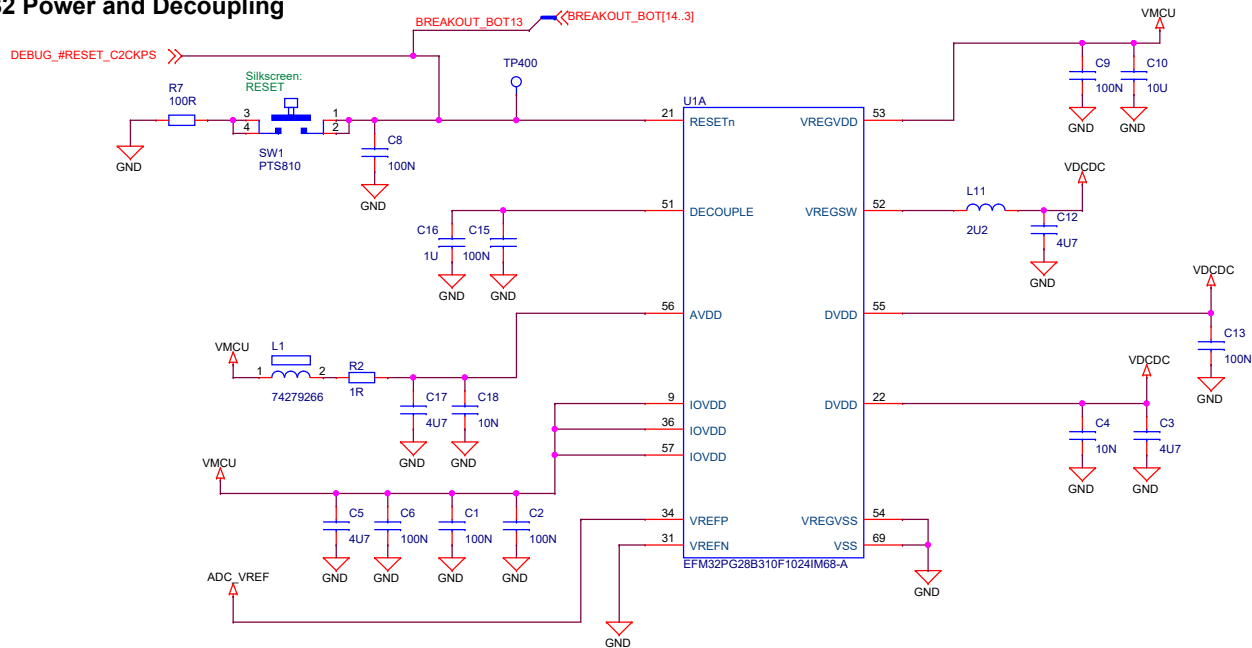
## ADC Connections



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		EFM32PG28 Pro Kit	
Designed DDC		Page Title	
Approved RGU		Signal Assignments	
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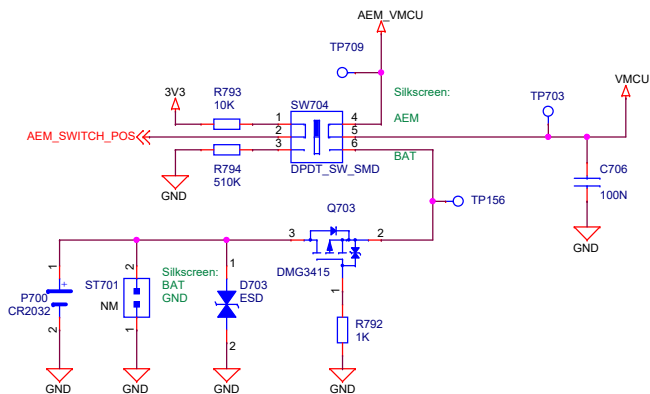


## EFM32 Power and Decoupling



## Power Select Switch: AEM/BAT

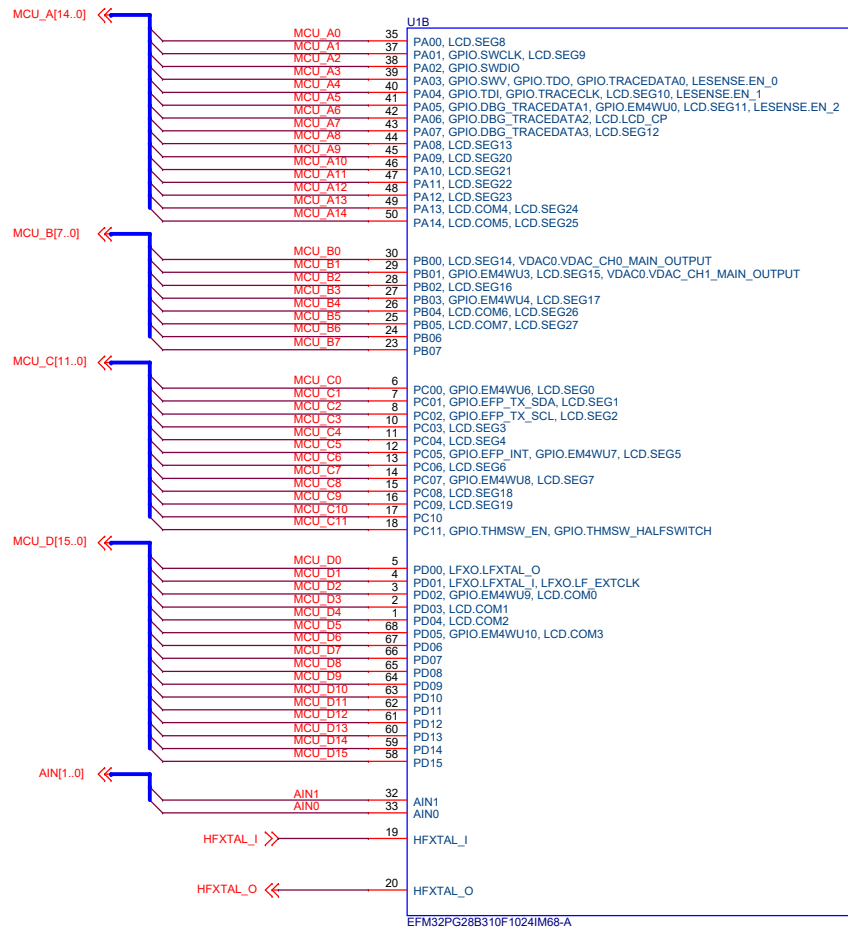
SWITCH POS	MODE DESCRIPTION
AEM	AEM Enabled, VMCU sourced from external 3.3V LDO powered by BC USB 5V supply
BAT	AEM Disabled, VMCU sourced from coin-cell battery or external power supply



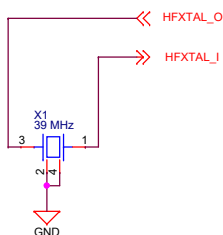
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		EFM32PG28 Pro Kit	
Designed DDC		Page Title	
A3		EFM32 Power	
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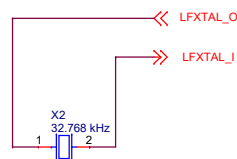
# EFM32 MCU



## High Frequency Clock

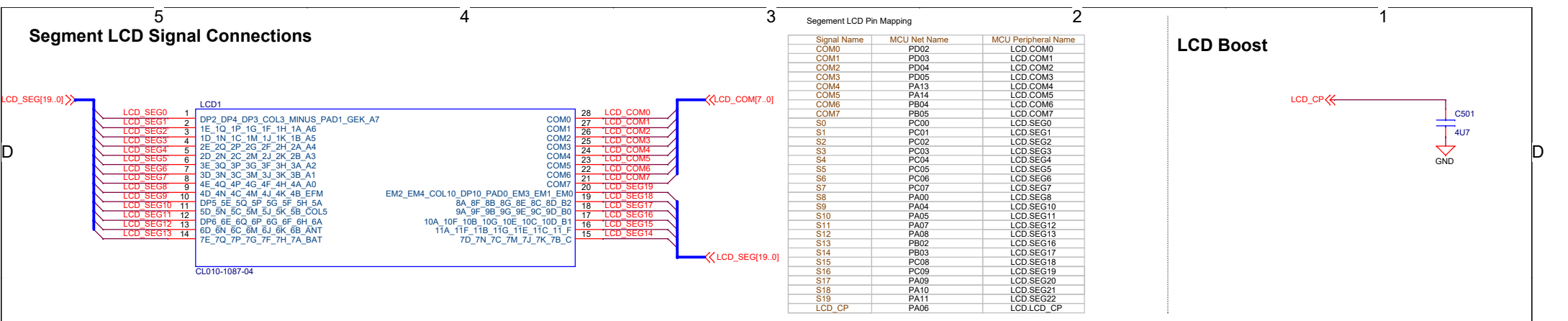


## Low Frequency Clock



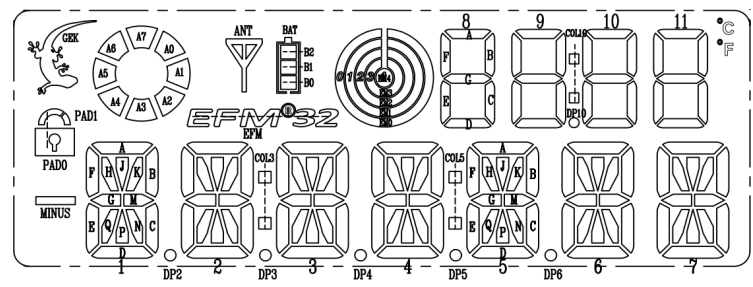
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		EFM32PG28 Pro Kit	
Designed DDC		Page Title	
Size A3		EFM32 I/O	
Sheet Modified Date Friday, March 10, 2023		Board Number	Revision
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PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
COM0	DP2	1 E	1 D	2 E	2 D	3 E	3 D	4 E	4 D	DP5	5 D	DP6	6 D	7 E
COM1	DP4	1 Q	1 N	2 Q	2 N	3 Q	3 N	4 Q	4 N	5 E	5 N	6 E	6 N	7 Q
COM2	DP3	1 P	1 C	2 P	2 C	3 P	3 C	4 P	4 C	5 Q	5 C	6 Q	6 C	7 P
COM3	COL3	1 G	1 M	2 G	2 M	3 G	3 M	4 G	4 M	5 P	5 M	6 P	6 M	7 G
COM4	MINUS	1 F	1 J	2 F	2 J	3 F	3 J	4 F	4 J	5 G	5 J	6 G	6 J	7 F
COM5	PAD1	1 H	1 K	2 H	2 K	3 H	3 K	4 H	4 K	5 F	5 K	6 F	6 K	7 H
COM6	GEK	1 A	1 B	2 A	2 B	3 A	3 B	4 A	4 B	5 H	5 B	6 H	6 B	7 A
COM7	A7	A6	A5	A4	A3	A2	A1	A0	EFM	5 A	COL5	6 A	ANT	BAT

PIN	15	16	17	18	19	20	21	22	23	24	25	26	27	28
---	S14	S15	S16	S17	S18	S19	COM7	COM6	COM5	COM4	COM3	COM2	COM1	COM0
COM0	7 D	11 A	10 A	9 A	8 A	EM2								COM0
COM1	7 N	11 F	10 F	9 F	8 F	EM4							COM1	
COM2	7 C	11 B	10 B	9 B	8 B	COL10						COM2		
COM3	7 M	11 G	10 G	9 G	8 G	DP10					COM3			
COM4	7 J	11 E	10 E	9 E	8 E	PAD0				COM4				
COM5	7 K	11 C	10 C	9 C	8 C	EM3			COM5					
COM6	7 B	11 D	10 D	9 D	8 D	EM1		COM6						
COM7	°C	°F	B1	B0	B2	EM0	COM7							



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SILICON LABS

4

Board Name

EFM32PG28 Pro Kit

3

Page Title

Segment LCD

2

Board Number

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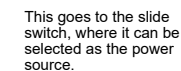
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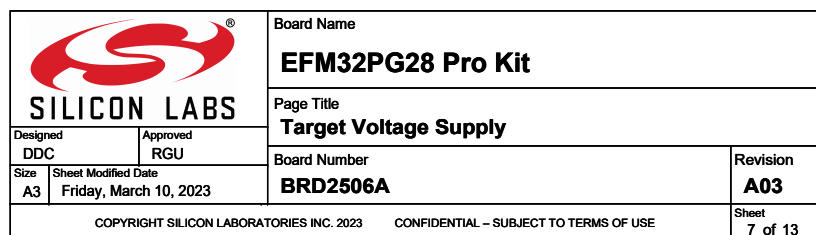
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## A



CALIBRATE	Calibration Current
0x1	3.30 uA
0x2	132.5 uA
0x4	323.5 uA
0x6	456.1 uA
0x8	12.36 mA

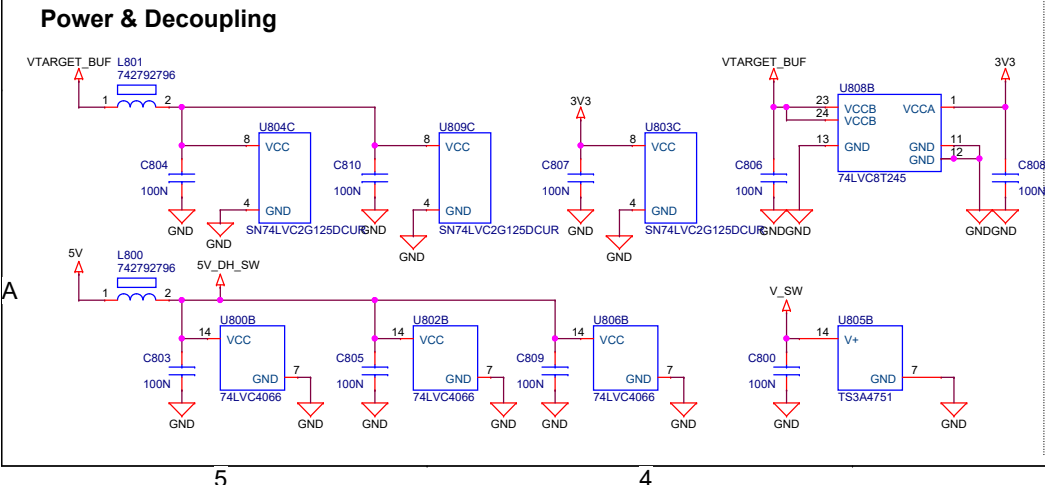
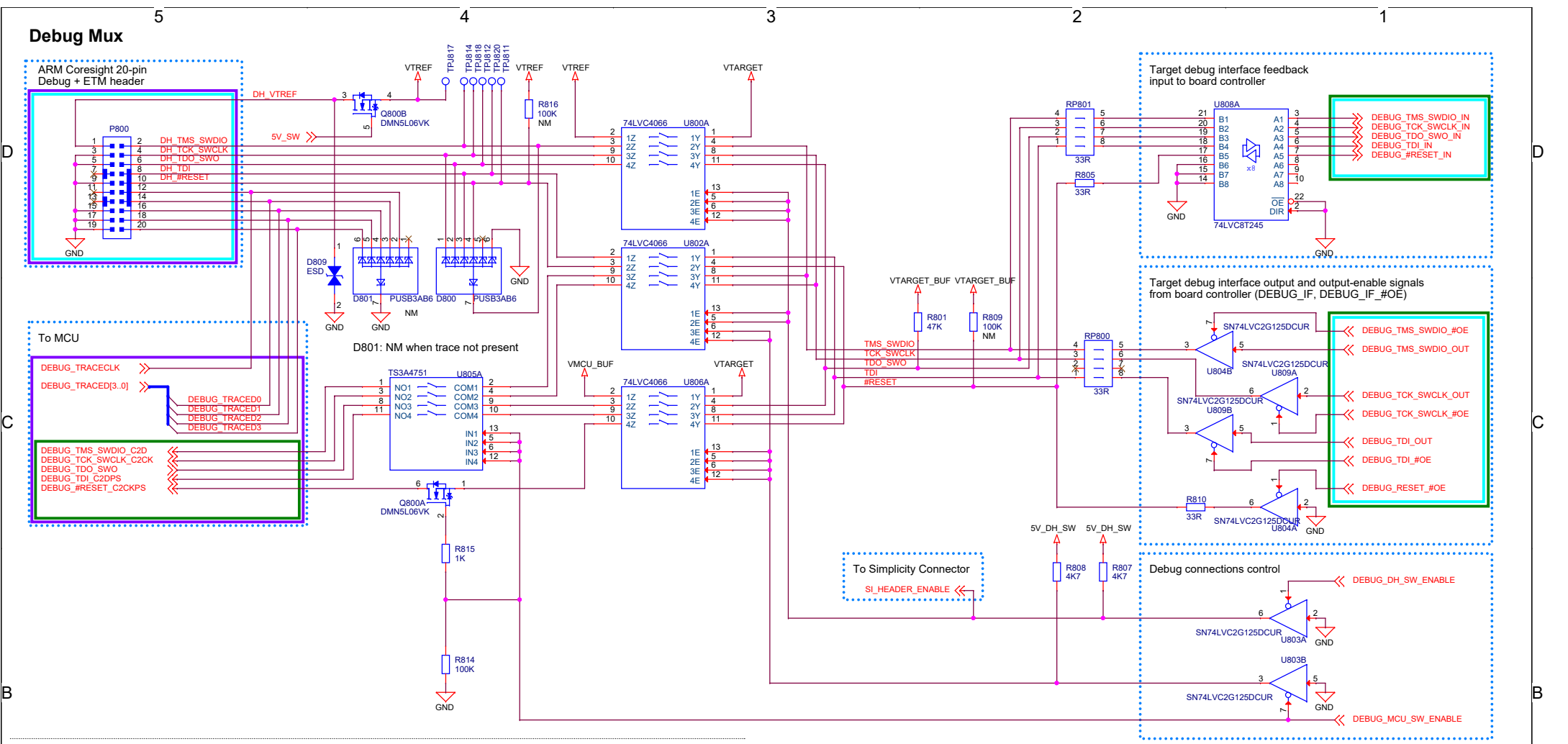




## A








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	-	-

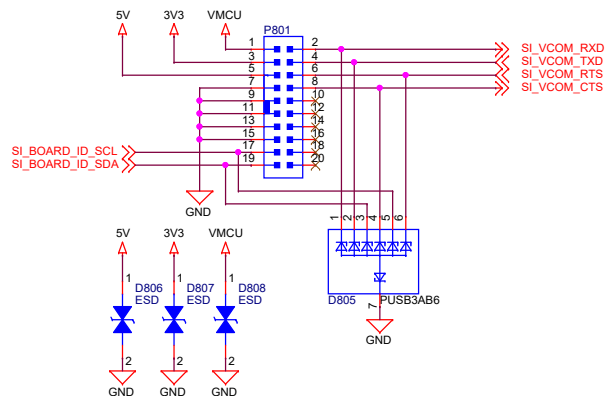
Color coded frames indicates which groups of signal nodes that are active in a given debug mode

 <b>SILICON LABS</b>		Board Name <b>EFM32PG28 Pro Kit</b>	
		Page Title <b>Debug Interface</b>	
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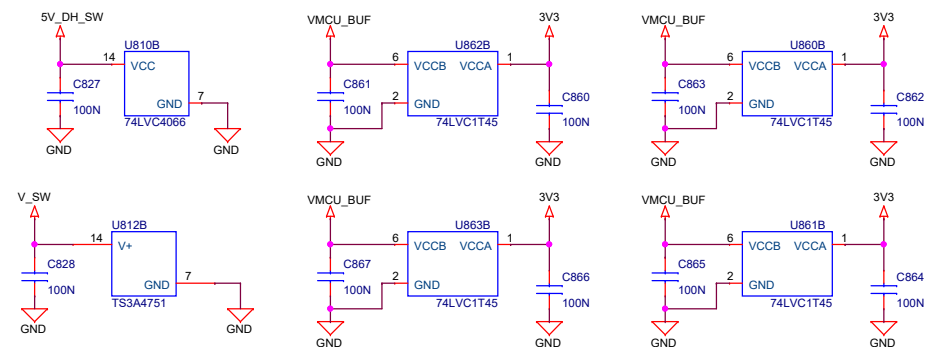
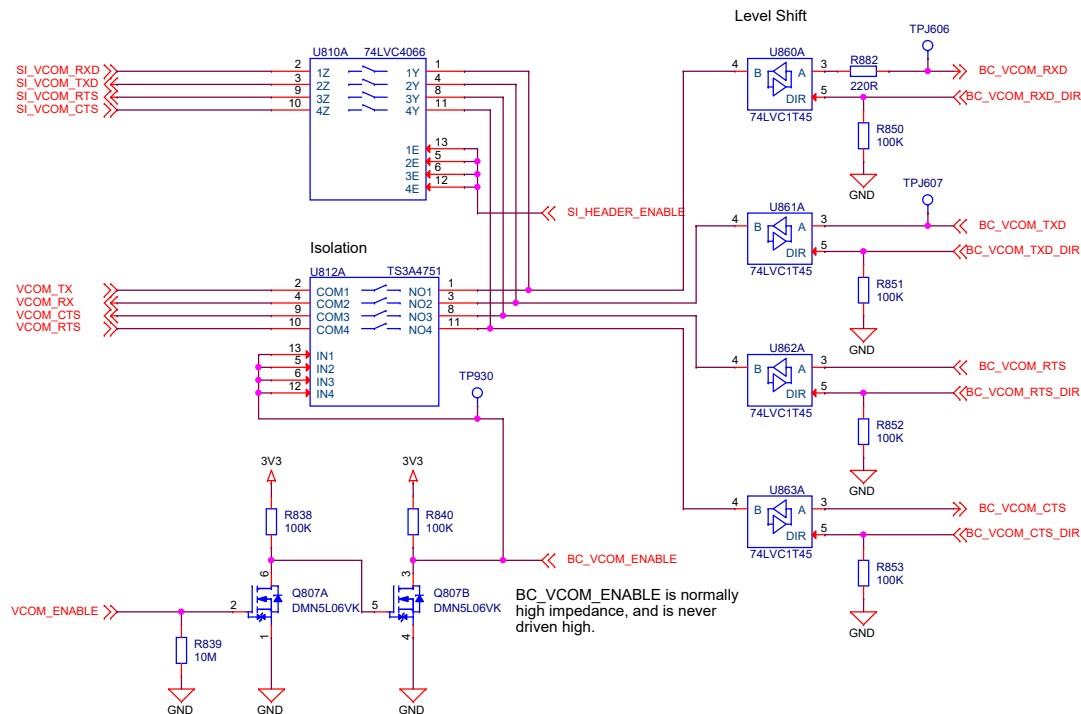
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# Simplicity Connector



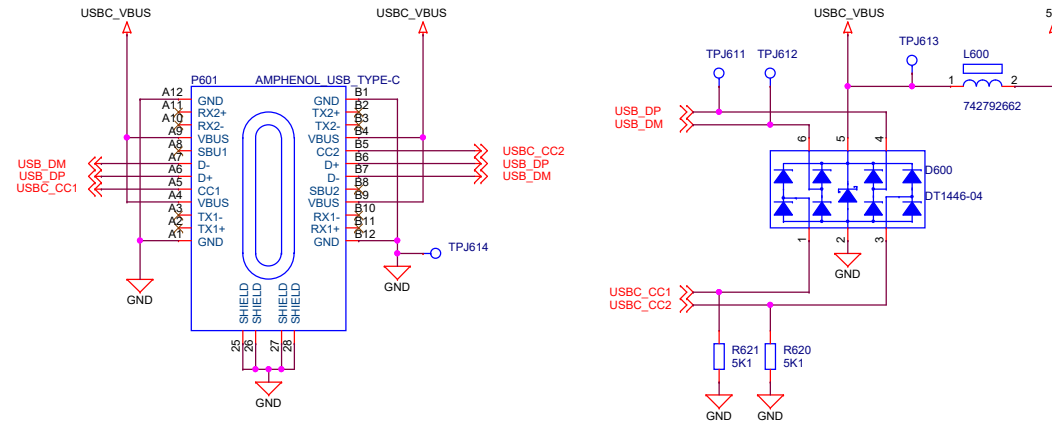
# VCOM Interface



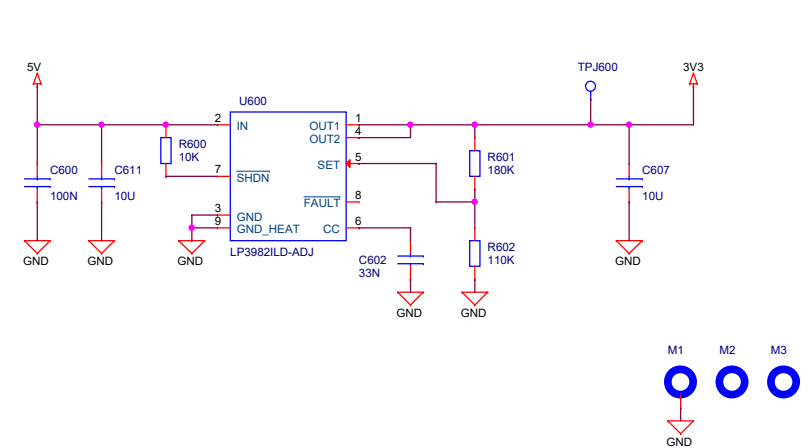
		Board Name	
		EFM32PG28 Pro Kit	
Designed DDC		Page Title	
Size A3		Simplicity & VCOM	
Sheet Modified Date		Board Number	
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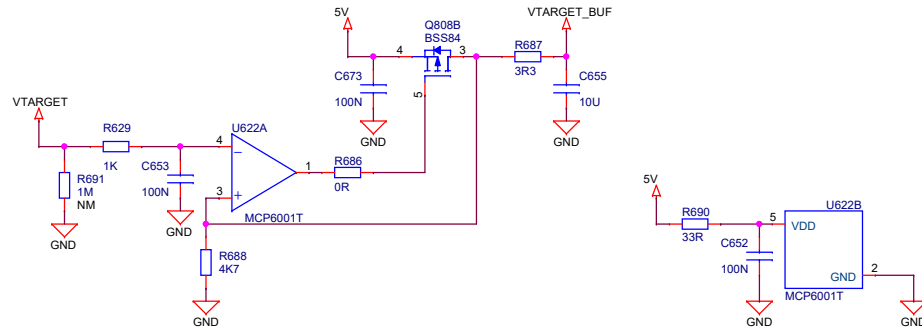
## J-Link USB Port



## 3V3 Regulator



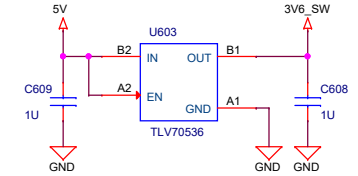
## VTarget Voltage Mirror



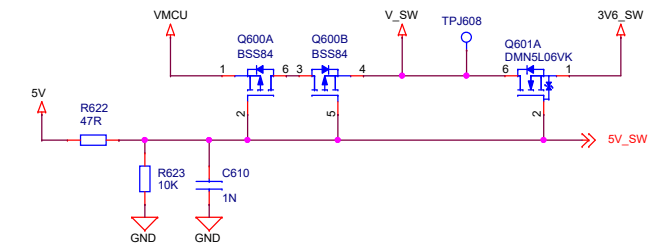
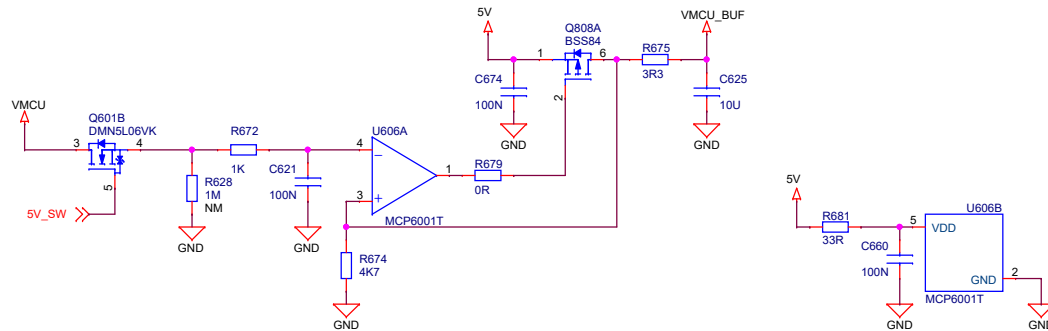
## Power Supply for Analog Switches

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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		EFM32PG28 Pro Kit	
Designed DDC Size A3		Page Title	
		Power	
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The schematic diagram illustrates the Board Controller's internal components and their interconnections. It features three main microcontroller units: U900A, U900B, and U900C. U900A is connected to U900B via a series of pins, including PA0 through PA15 and PB0 through PB15. U900B is connected to U900C via a series of pins, including G11 through G12 and PE0 through PE12. The diagram also shows connections to various peripheral components, including the X900 (48 MHz), TPJ900, TPJ912, TPJ913, and TPJ950. A 3V3 power supply is connected to the TPJ950 pin. The diagram includes labels for various pins and signals, such as DEBUG\_TMS\_SWIDIO\_OUT, BC\_VCOM\_RTS, AEM\_CURRENT\_LOW\_GAIN, and BC\_DISP\_AVAILABLE.

[illegible]

### Board ID & Button Isolation

BOARD ID & Button Isolation

### BC Serial Flash

BC Serial Flash

### Board Version

Board Version

**SILICON LABS**

Designed DDC		Approved RGU	
Size A3	Sheet Modified Date Friday, March 10, 2023		
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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

U902B  
VCC  
GND  
MX25R8035F

C914  
100N

BOARD\_VER0  
BOARD\_VER1

R931  
1K  
GND

R930  
1K  
GND

**Board Version**

NAME

**FM32PG28 Pro Kit**

**Title**

**ard Controller**

**Number**

**D2506A**

**Revision**

**A03**

**Sheet**

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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

U902B  
VCC  
GND  
MX25R8035F

C914  
100N

BOARD\_VER0  
BOARD\_VER1

R931  
1K  
GND

R930  
1K  
GND

**Board Version**

NAME

**FM32PG28 Pro Kit**

**Title**

**ard Controller**

**Number**

**D2506A**

**Revision**

**A03**

**Sheet**

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Board Name		A
<b>EFM32PG28 Pro Kit</b>		
Page Title		
<b>Board Controller</b>		
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Board Name		A
<b>EFM32PG28 Pro Kit</b>		
Page Title		
<b>Board Controller</b>		
Board Number		Revision
<b>BRD2506A</b>		<b>A03</b>
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Board Name		A
<b>EFM32PG28 Pro Kit</b>		
Page Title		
<b>Board Controller</b>		
Board Number		Revision
<b>BRD2506A</b>		<b>A03</b>
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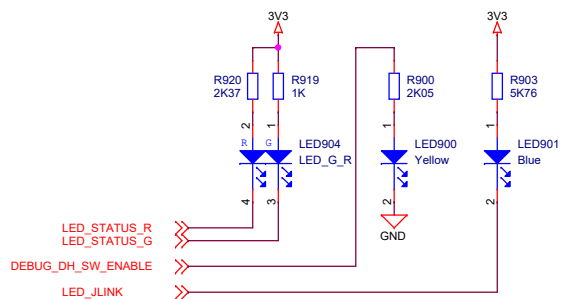
Revision	
<b>A03</b>	
Sheet	
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Revision	
<b>A03</b>	
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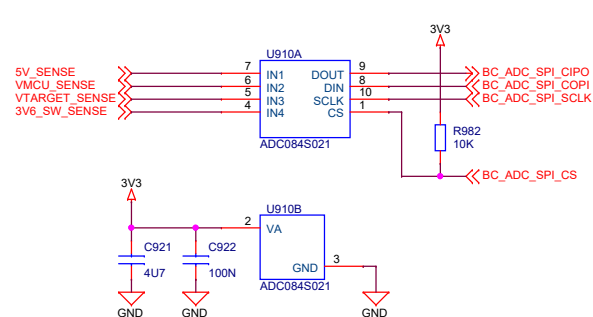
 <b>SILICON LABS</b>		Board Name	EFM32PG28 Pro Kit
		Page Title	Board Controller
Designed DDC	Approved RGU	Board Number	Revision
Size A3	Sheet Modified Date Friday, March 10, 2023	BRD2506A	A03
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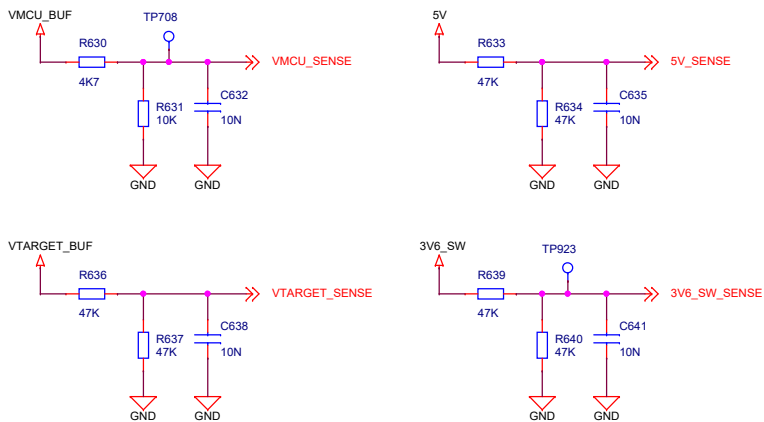
## Indicator LEDs



## BC Voltage Sense ADC



## BC Voltage Sense



 <b>SILICON LABS</b>		Board Name <b>EFM32PG28 Pro Kit</b>	
		Page Title <b>Board Controller Misc</b>	
Designed DDC	Approved RGU	Board Number <b>BRD2506A</b>	Revision <b>A03</b>
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