# EFM32 Zero Gecko STK


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## Revision History

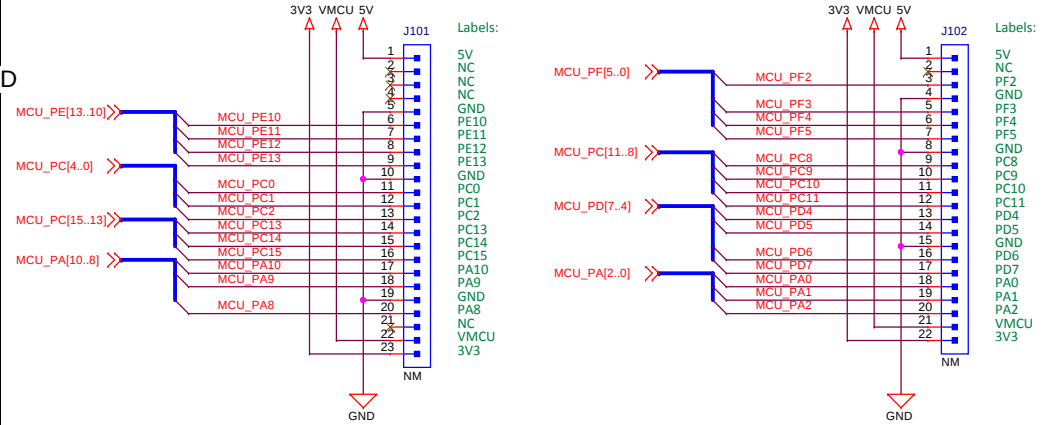
| Rev. | Description |
|---|---|
| B00 | Initial release for production. |

STK

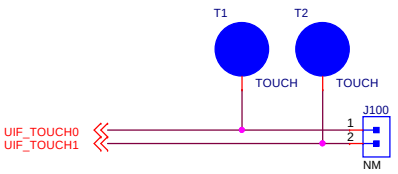
SILICON LABS

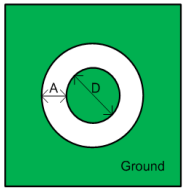
| | | | |
|---|---|---|---|
| Designed: ANB | Approved: JNO | Schematic Title: EFM32 Zero Gecko Starter Kit | |
| Size: A3 | BOM Doc No: | Page Title: Title Page | |
| Design Created Date: Wednesday, December 03, 2008 | | Document number: BRD2010A | Revision: B00 |
| | | Sheet Created Date: Saturday, March 21, 2009 | Sheet Modified Date: Thursday, September 26, 2013 |
| | | | Sheet: 1 of 10 |

## Breakout Connections




## Touch Pads




D = 7-10 mm, bigger is better
A = 2.5 mm
Only top layer shown. No ground on other layers below button or anular ring.

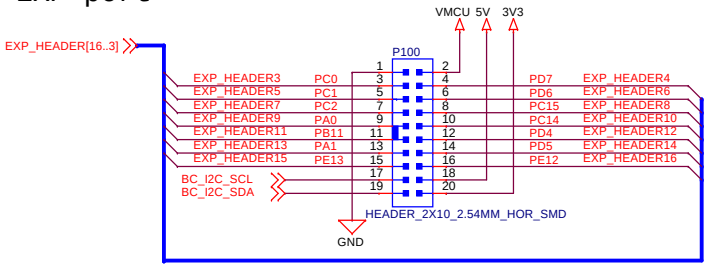
Trace should be taken to bottom layer with via at edge of button, keep tracec short, away from power/noisy traces and route directly to efm32.

Full Ground

No Ground

For mulitple buttons, keep centers at least 20mm apart, enough to allow ground between buttons.

## EXP port

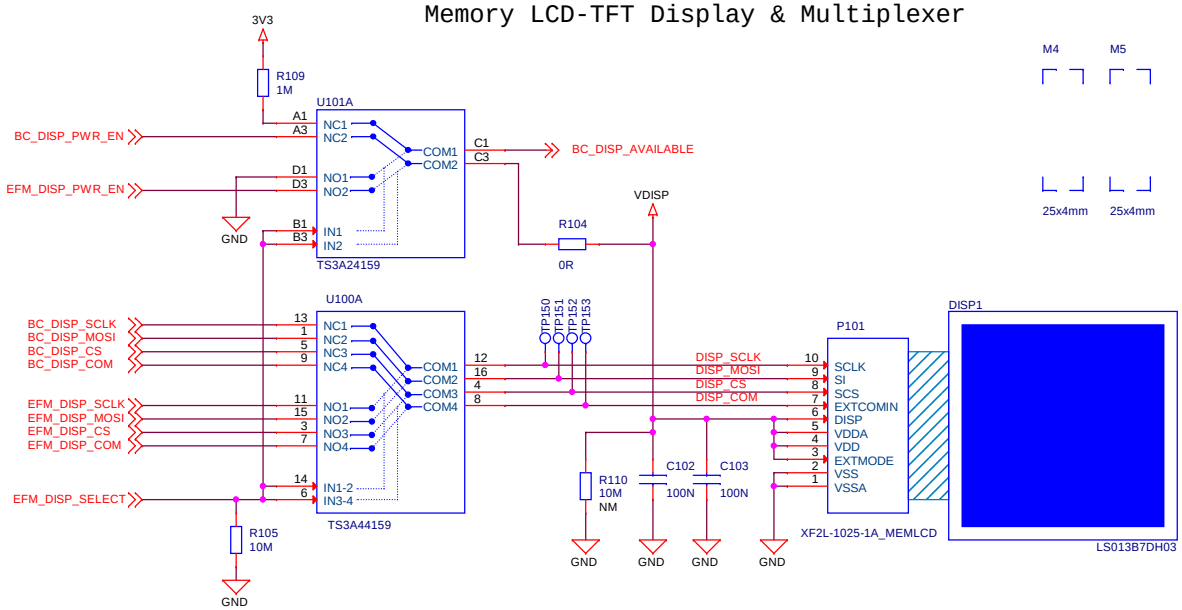



### EXP-Header Functionality

| | | | |
|---|---|---|---|
| 1 | GND | | |
| 3 | PC0 | | ACMP0_CH0 |
| 5 | PC1 | | ACMP0_CH1 |
| 7 | PC2 | | ACMP0_CH2 |
| 9 | PA0 | | |
| 11 | PB11 | | IDAC0_OUT |
| 13 | PA1 | | |
| 15 | PE13 | I2C0_SCL | |
| 17 | Reserved for EXP Board Identification | | |
| 19 | Reserved for EXP Board Identification | | |

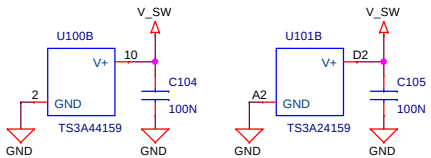
| | | | |
|---|---|---|---|
| 2 | VMCU | | |
| 4 | PD7 | US1_TX | ADC0_CH7 |
| 6 | PD6 | US1_RX | ADC0_CH6 |
| 8 | PC15 | US1_CLK | |
| 10 | PC14 | US1_CS | |
| 12 | PD4 | LEU0_TX | ADC0_CH4 |
| 14 | PD5 | LEU0_RX | ADC0_CH5 |
| 16 | PE12 | I2C0_SDA | |
| 18 | 5V | | |
| 20 | 3V3 | | |

## Memory LCD-TFT Display & Multiplexer

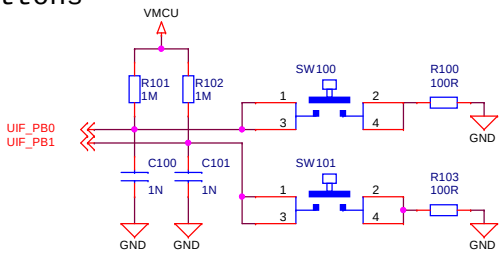



| EFM_DISP_SELECT | DISP_CTRL | VDISP | BC_DISP_AVAILABLE |
|---|---|---|---|
| 1 | EFM | EFM_DISP_PWR_EN | 0 |
| 0 | BC | BC_DISP_PWR_EN | 1 |

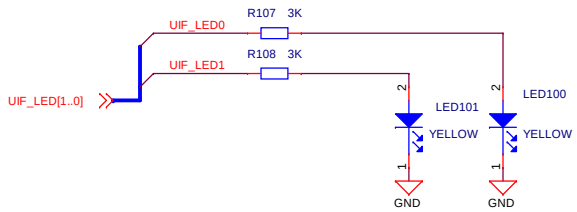
The EFM32 always controls ownership of the display using the EFM_DISP_SELECT signal.




## User pushbuttons




## User LEDs




STK

SILICON LABS

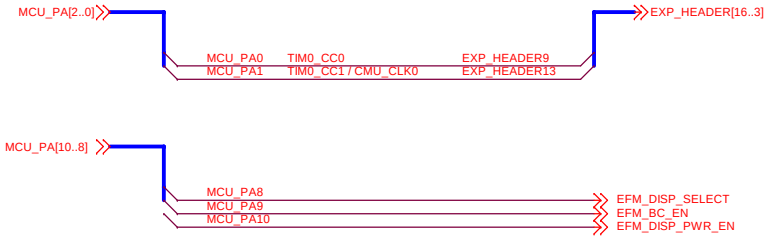
| | |
|---|---|
| Designed: ANB | Approved: JNO |
| Size: A3 | BOM Doc No: |
| Design Created Date: Wednesday, December 03, 2008 | |

Schematic Title: **EFM32 Zero Gecko Starter Kit**

Page Title: **User Interfaces**

| | | |
|---|---|---|
| Document number: BRD2010A | Revision: B00 | |
| Sheet Created Date: Saturday, March 21, 2009 | Sheet Modified Date: Thursday, August 01, 2013 | Sheet 2 of 10 |

## PA Connections

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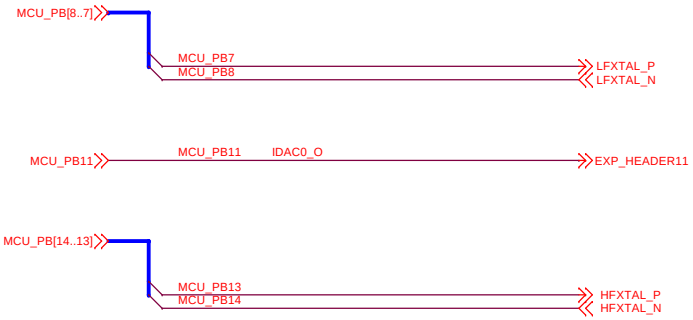
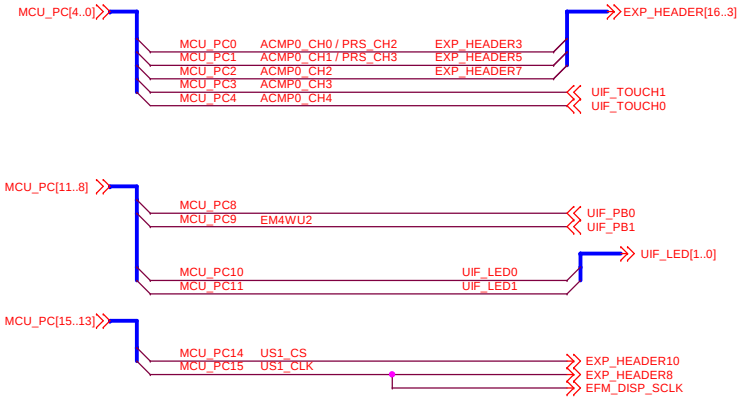
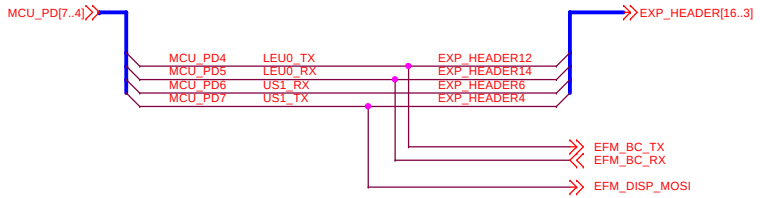


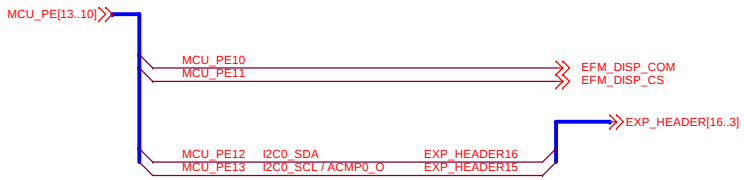

## PC Connections



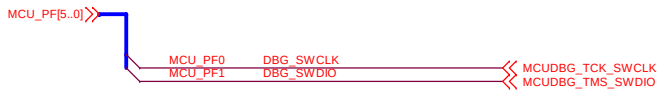

## PD Connections




## PE Connections



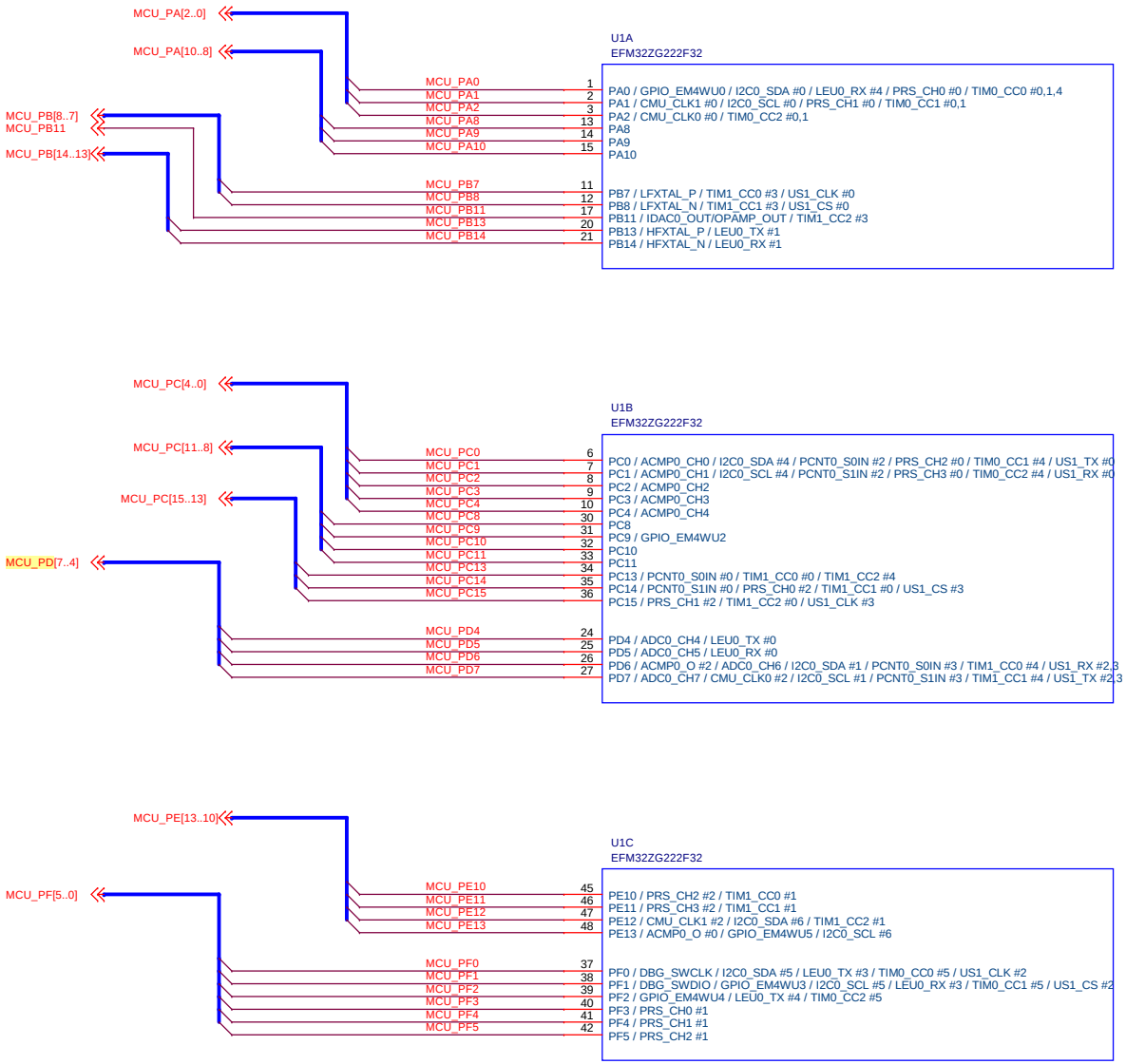

## PF Connections




STK

SILICON LABS

| | | | |
|---|---|---|---|
| Designed: ANB | Approved: JNO | Schematic Title: **EFM32 Zero Gecko Starter Kit** | |
| Size: A3 | BOM Doc No: <Cage Code> | Page Title: **Signal Assignments** | |
| Design Created Date: Wednesday, December 03, 2008 | | Document number: **BRD2010A** | Revision: B00 |
| | | Sheet Created Date: Friday, January 15, 2010 | Sheet Modified Date: Wednesday, July 31, 2013 |
| | | | Sheet: 3 of 10 |




SILICON LABS

| | |
|---|---|
| Designed: ANB | Approved: JNO |
| Size: A3 | BOM Doc No: <Cage Code> |
| Design Created Date: Wednesday, December 03, 2008 | |

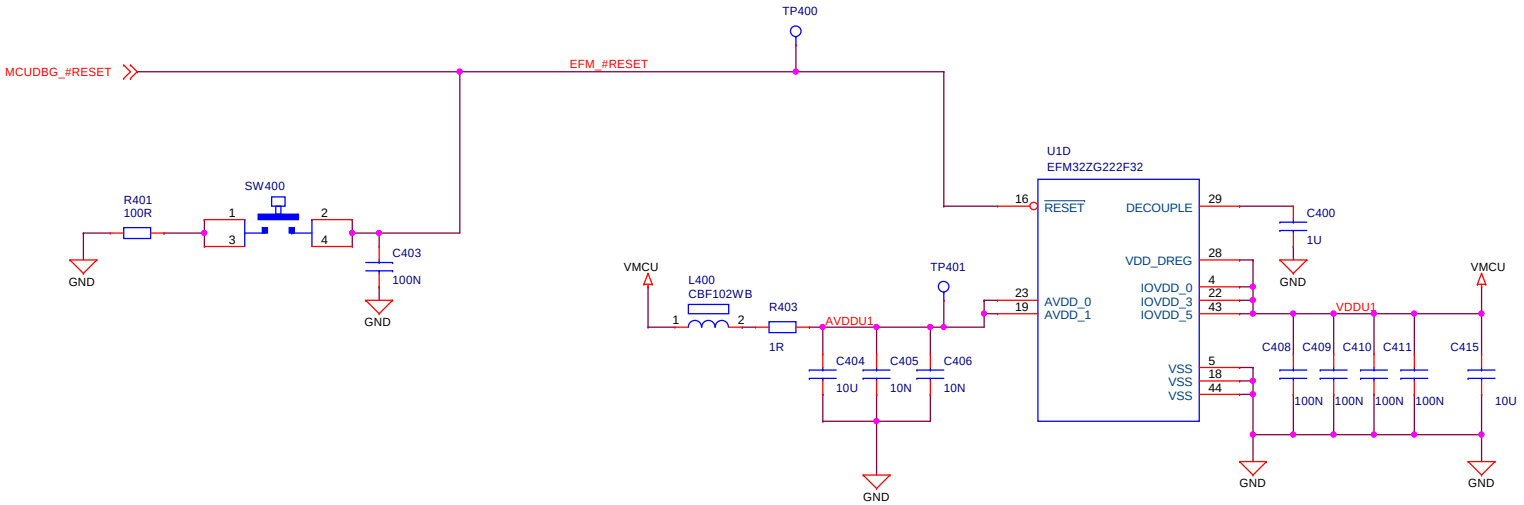
Schematic Title

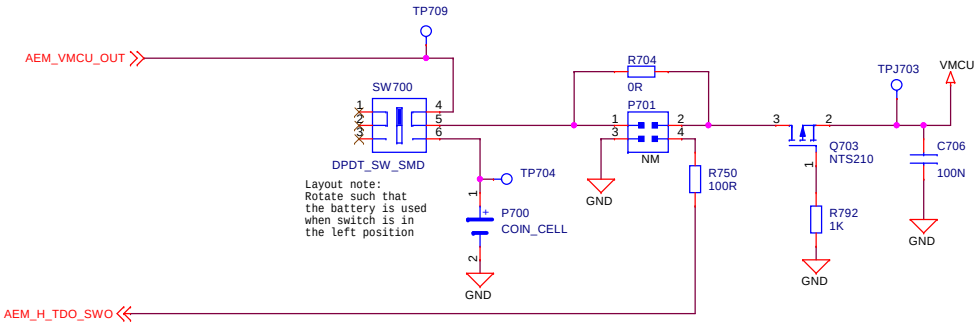
**EFM32 Zero Gecko Starter Kit**

Page Title

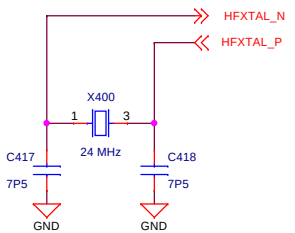
**EFM32 I/O**

| | | |
|---|---|---|
| Document number: **BRD2010A** | | Revision: B00 |
| Sheet Created Date: Tuesday, January 12, 2010 | Sheet Modified Date: Monday, July 15, 2013 | Sheet: 4 of 10 |

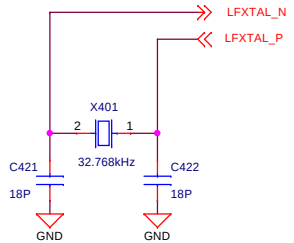



High Frequency Clock



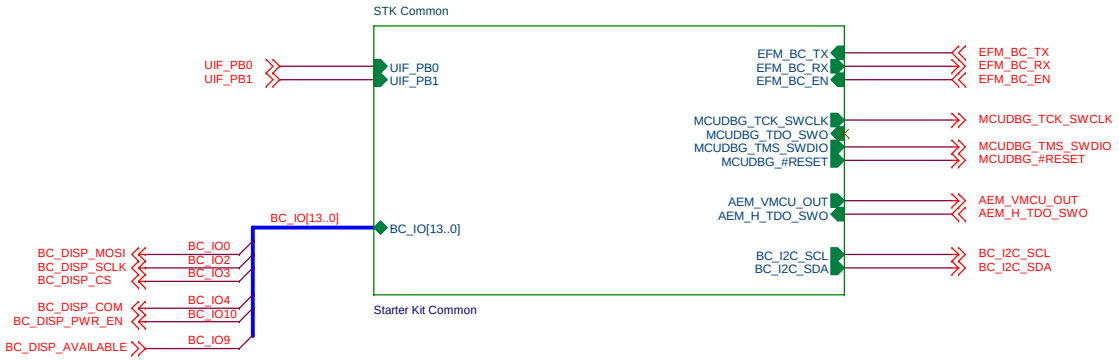

Low Frequency Clock




STK

SILICON LABS

| | |
|---|---|
| Schematic Title | **EFM32 Zero Gecko Starter Kit** |
| Page Title | **EFM32 Power & USB** |
| Designed: ANB / Approved: JNO | |
| Size: A3 / BOM Doc No: <Cage Code> | Document number: **BRD2010A** / Revision: **B00** |
| Design Created Date: Wednesday, December 03, 2008 | Sheet Created Date: Thursday, April 11, 2013 / Sheet Modified Date: Monday, July 15, 2013 / Sheet: 5 of 10 |

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STK

SILICON LABS

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|---|---|
| Designed: ANB | Approved: JNO |
| Size: A3 | BOM Doc No: <Cage Code> |
| Design Created Date: Wednesday, December 03, 2008 | |

Schematic Title

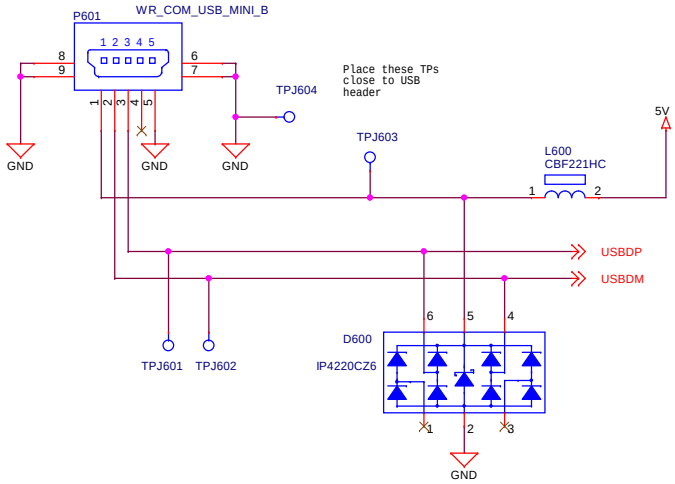
**EFM32 Zero Gecko Starter Kit**

Page Title

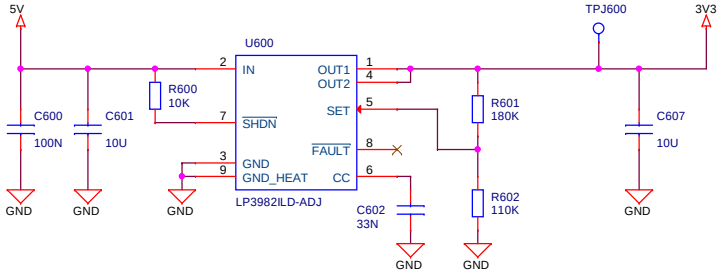
**STK Common Interface**

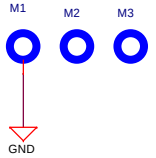
| | | |
|---|---|---|
| Document number: **BRD2010A** | | Revision: B00 |
| Sheet Created Date: Wednesday, June 19, 2013 | Sheet Modified Date: Thursday, August 01, 2013 | Sheet: 6 of 10 |

## Power input

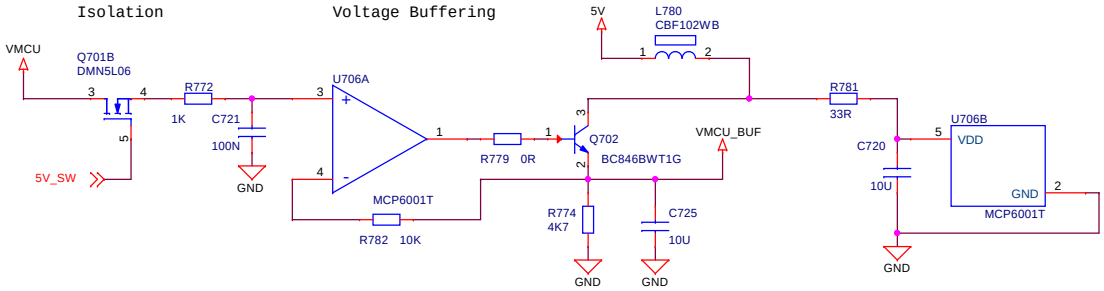



## 3V3 Regulator



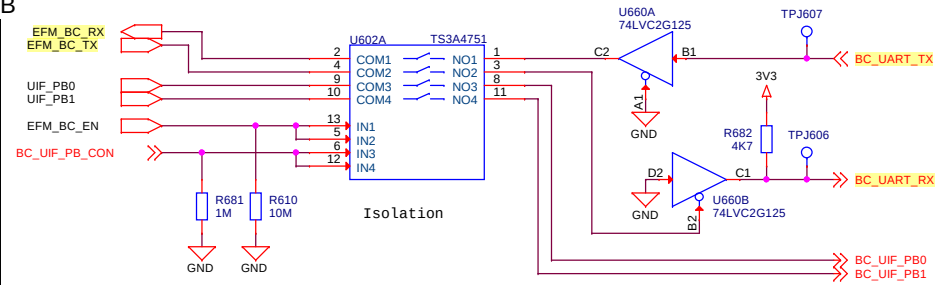



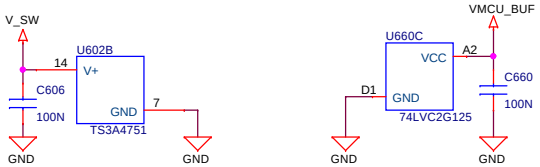

## VMCU_DBG power




## Board Controller Communication

## User input to board controller

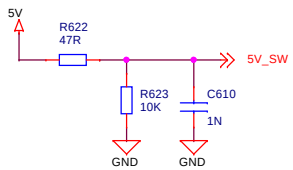


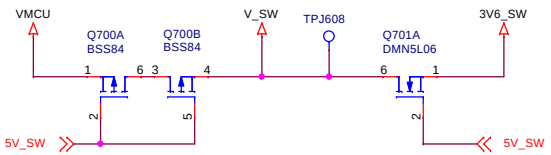



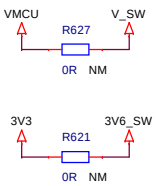

## Power Supply for Analog Switches

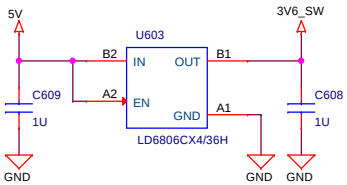
The USB VBUS voltage is used to bias these transistors, turning the P-Channel MOSFETs (Q700) off, and the N-Channel MOSFETs (Q701) on.

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



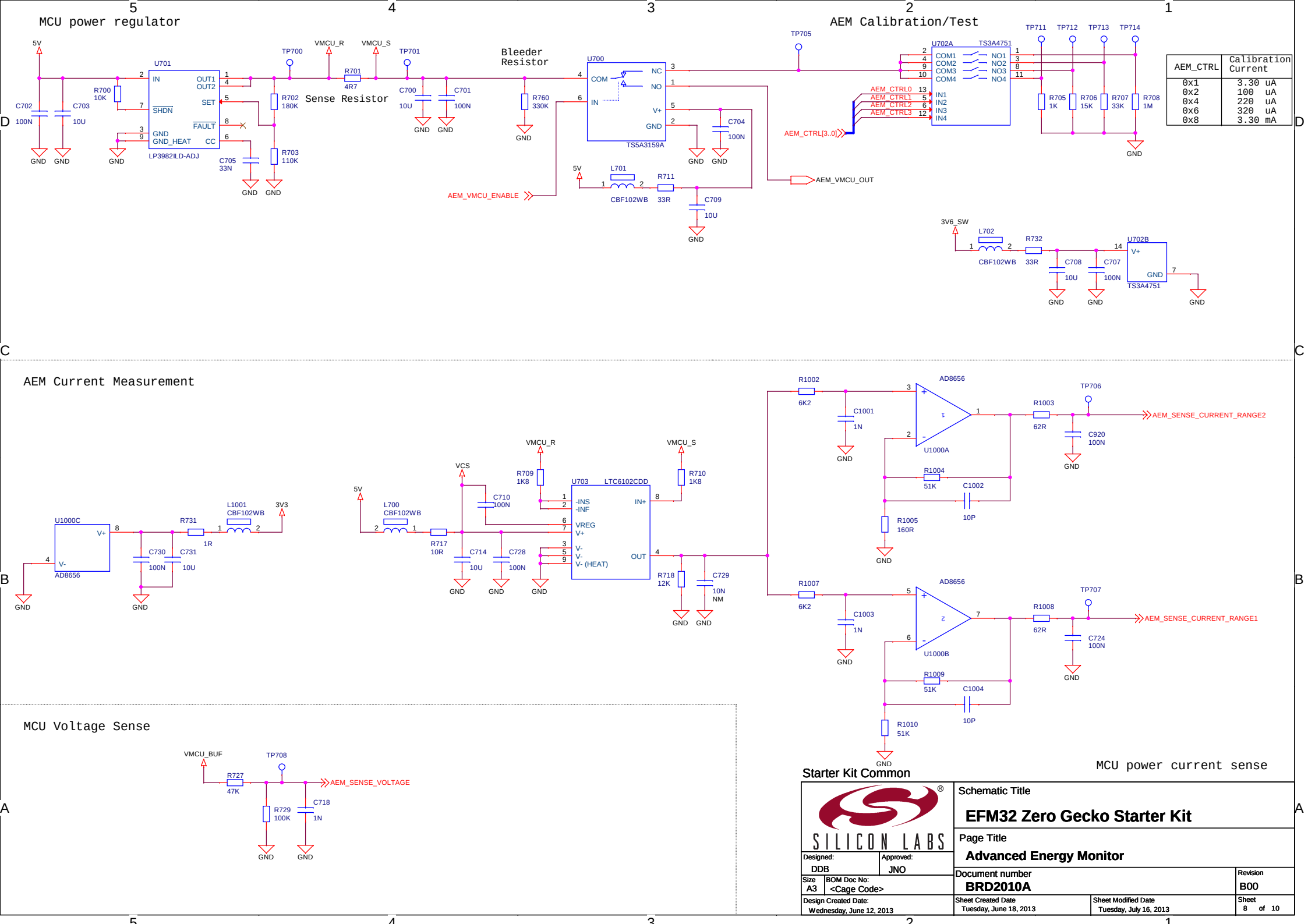



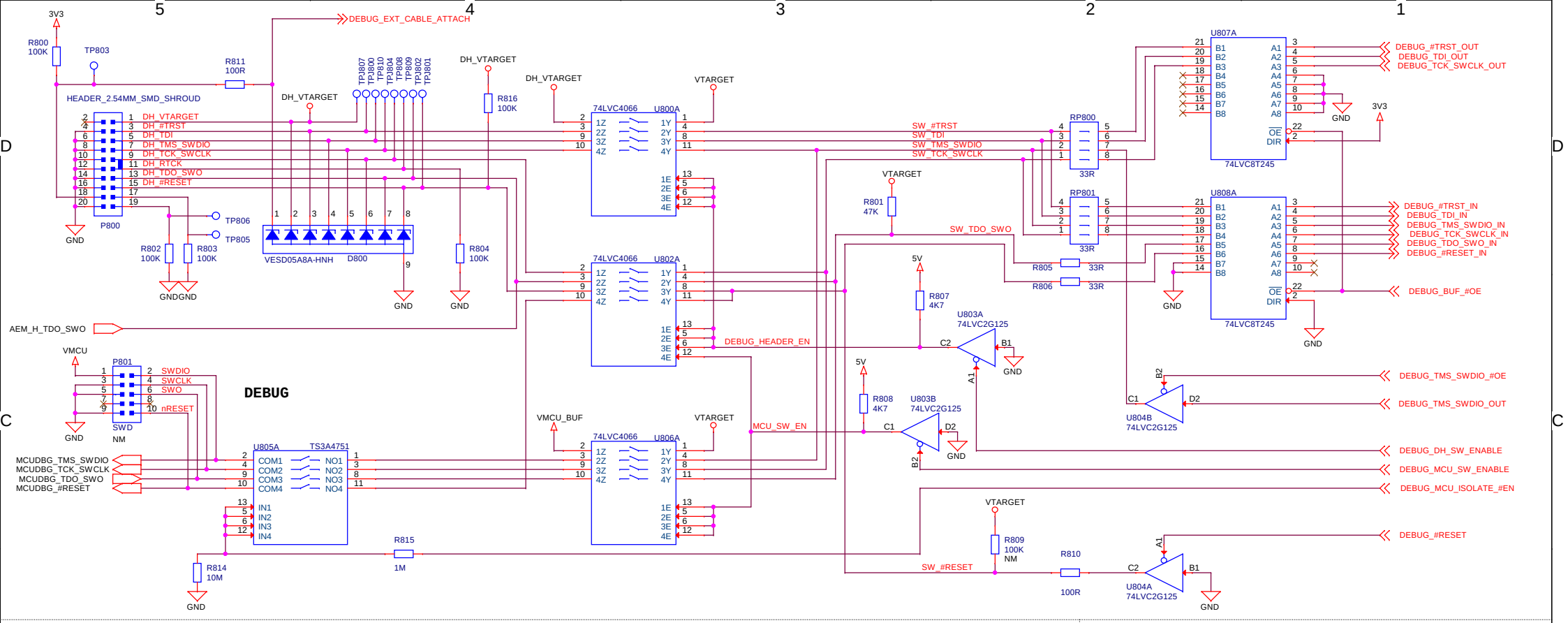




Starter Kit Common

SILICON LABS

| | |
|---|---|
| Schematic Title | EFM32 Zero Gecko Starter Kit |
| Page Title | Power & Misc |
| Designed: DDB / Approved: JNO | |
| Size: A3 / BOM Doc No: <Cage Code> | |
| Document number: BRD2010A | Revision: B00 |
| Design Created Date: Wednesday, June 12, 2013 | |
| Sheet Created Date: Tuesday, June 18, 2013 | Sheet Modified Date: Monday, July 29, 2013 |
| | Sheet: 7 of 10 |


MCU power regulator
AEM Calibration/Test
AEM Current Measurement
MCU Voltage Sense
MCU power current sense
Bleeder Resistor
Sense Resistor
U701
LP3982ILD-ADJ
U700
TS5A3159A
U702A
TS3A4751
U702B
U703
LTC6102CDD
U1000A
U1000B
U1000C
AD8656
L700
L701
L702
CBF102WB
TP700
TP701
TP705
TP706
TP707
TP708
TP711
TP712
TP713
TP714
AEM_VMCU_ENABLE
AEM_VMCU_OUT
AEM_CTRL[3..0]
AEM_SENSE_CURRENT_RANGE2
AEM_SENSE_CURRENT_RANGE1
AEM_SENSE_VOLTAGE
VMCU_R
VMCU_S
VMCU_BUF
VCS
3V6_SW
5V
3V3
GND
AEM_CTRL
Calibration Current
0x1 3.30 uA
0x2 100 uA
0x4 220 uA
0x6 320 uA
0x8 3.30 mA
Starter Kit Common
SILICON LABS
Schematic Title
EFM32 Zero Gecko Starter Kit
Page Title
Advanced Energy Monitor
Designed: DDB
Approved: JNO
Size A3
BOM Doc No: <Cage Code>
Document number BRD2010A
Revision B00
Design Created Date: Wednesday, June 12, 2013
Sheet Created Date Tuesday, June 18, 2013
Sheet Modified Date Tuesday, July 16, 2013
Sheet 8 of 10




| 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 | - | - |

Starter Kit Common

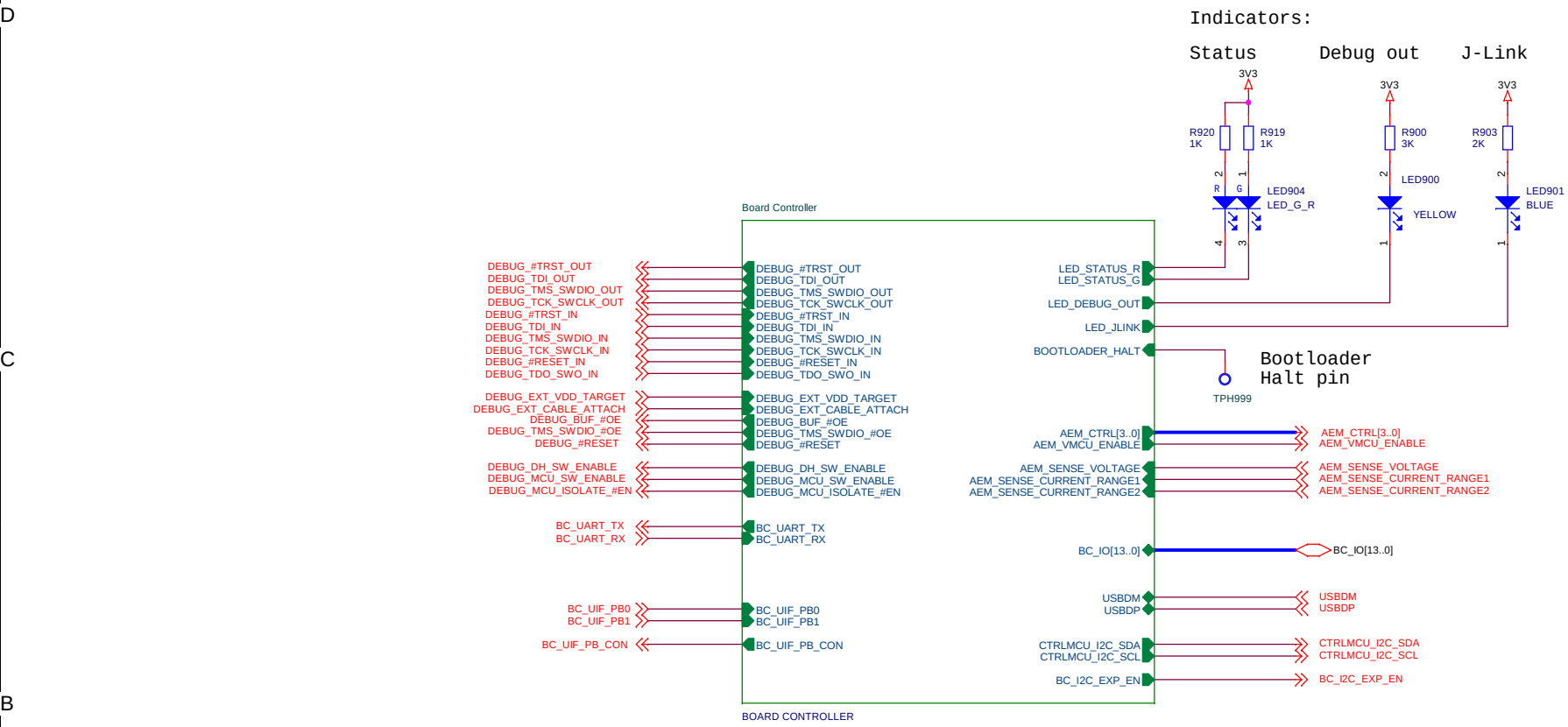
SILICON LABS

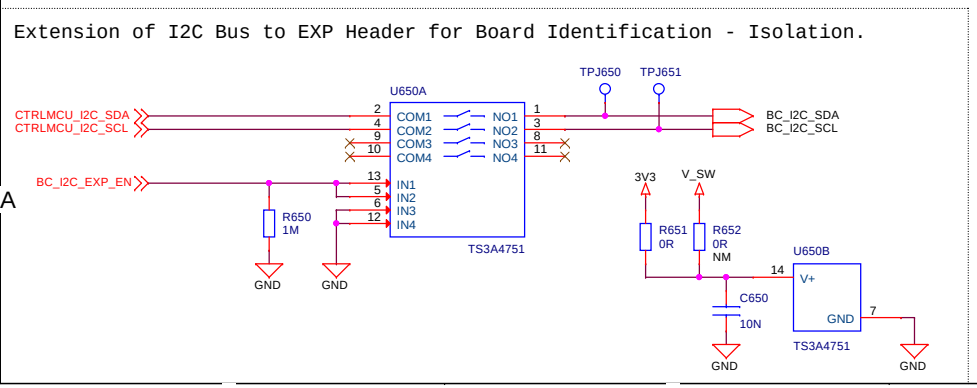
| | |
|---|---|
| Designed: DDB | Approved: JNO |
| Size: A3 | BOM Doc No: <Cage Code> |
| Design Created Date: Wednesday, June 12, 2013 | |

Schematic Title: **EFM32 Zero Gecko Starter Kit**

Page Title: **Debug Interface**

| | | |
|---|---|---|
| Document number: BRD2010A | Revision: B00 | |
| Sheet Created Date: Tuesday, June 18, 2013 | Sheet Modified Date: Wednesday, July 10, 2013 | Sheet: 9 of 10 |




Starter Kit Common

SILICON LABS

| | |
|---|---|
| Designed: DDB | Approved: JNO |
| Size: A3 | BOM Doc No: <Cage Code> |
| Design Created Date: Wednesday, June 12, 2013 | |

Schematic Title: **EFM32 Zero Gecko Starter Kit**

Page Title: **Board Controller**

| | | |
|---|---|---|
| Document number: **BRD2010A** | | Revision: **B00** |
| Sheet Created Date: Tuesday, June 18, 2013 | Sheet Modified Date: Thursday, August 01, 2013 | Sheet: 10 of 10 |