



BGM13S22 System in Package Wireless Starter Kit Radio Board

Board Function	Page
Title Page	1
RF, Antenna & Power	2
EFR32 Signal Assignments	3
WSTK Connectors & Board ID	4

LEGAL NOTICE:
SILICON LABORATORIES INC. ("SILICON LABS") AND/OR ITS LICENSORS DO NOT WARRANT THE ACCURACY OR COMPLETENESS OF THIS SCHEMATIC OR ANY INFORMATION CONTAINED WITHIN THIS SCHEMATIC. IT IS PROVIDED "AS-IS" FOR REFERENCE ONLY. SILICON LABS DOES NOT WARRANT THAT THIS DESIGN WILL MEET THE SPECIFICATIONS, BE SUITABLE FOR YOUR APPLICATION OR FIT FOR ANY PARTICULAR PURPOSE, OR WILL OPERATE IN YOUR IMPLEMENTATION. SILICON LABS AND ITS LICENSORS DO NOT WARRANT THAT THE DESIGN IMPLIED IN THIS SCHEMATIC IS PRODUCTION-WORTHY. YOU SHOULD COMPLETELY VALIDATE AND TEST YOUR DESIGN IMPLEMENTATION TO CONFIRM SYSTEM FUNCTIONALITY FOR YOUR APPLICATION.

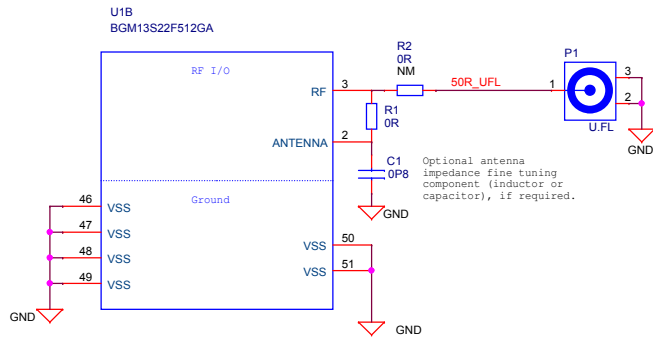


Revision History

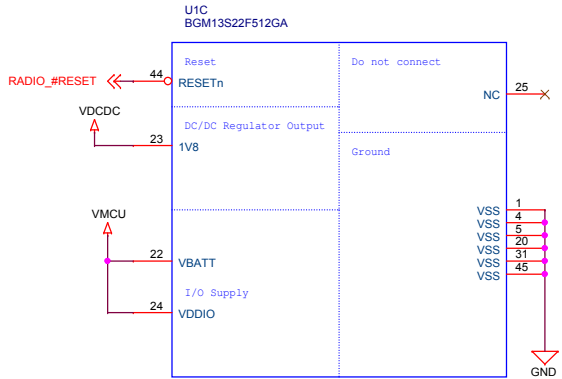
Rev.	Description
A00	Initial revision.
A01	Updated module revision and footprint. Pin 1v8 to WSTK pad conn. option.
A02	Updated module PCB footprint and antenna clearance dimensions.
A03	Updating board rev. for parts with module specific devinfo.
A04	Upd. U1 P/N. Fixed x2 P/N. Internal rev. for module solderability test.
A05	Added antenna tuning comp.

 SILICON LABS		Schematic Title BGM13S22 Blue Gecko Radio Board	
Designed: TAB		Approved: JSH	
Size A3	BOM Doc No: <Cage Code>	Document number BRD4305C	Revision A05
Design Created Date: Friday, November 03, 2017		Sheet Created Date Friday, November 03, 2017	Sheet Modified Date Monday, November 25, 2019
		Sheet 1 of 4	

Antenna & Radio Interface

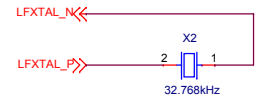


Power Supplies



The xGM13S has integrated filter caps on its supply lines therefore additional external filtering is not required (unless specific application requires).

Low Frequency Crystal



(Optional for lower current consumption)

 SILICON LABS		Schematic Title	
		BGM13S22 Blue Gecko Radio Board	
Designed: TAB		Page Title	
Approved: JSH		RF, Antenna and Power	
Size A3	BOM Doc No: <Cage Code>	Document number	Revision
Design Created Date: Friday, November 03, 2017		BRD4305C	A05
	Sheet Created Date: Friday, November 03, 2017	Sheet Modified Date: Monday, November 25, 2019	Sheet 2 of 4

Pin Assignments

RADIO_PA[5..0] << EFR32 Pin EFR32 Peripheral EXP Header Connection WSTK Breakout Pin >>WSTK_P[45..0] WSTK Peripheral Connection >>WSTK_F[21..0]

RADIO_PA0 US0_TX#0 EXP_HEADER12 WSTK_P9 WSTK_P9 VCOM_TX WSTK_F6 WSTK_F6 <<TP_VCOM_TX

RADIO_PA1 US0_RX#0 EXP_HEADER14 WSTK_P11 WSTK_P11 VCOM_RX WSTK_F7 WSTK_F7 <<TP_VCOM_RX

RADIO_PA2 US0_CLK#0 EXP_HEADER3 WSTK_P0 WSTK_P0 VCOM_CTS WSTK_F8 WSTK_F8 <<TP_VCOM_CTS

RADIO_PA3 US0_CS#0 WSTK_P2 WSTK_P2 VCOM_RTS WSTK_F9 WSTK_F9 <<TP_VCOM_RTS

RADIO_PA4 US1_CS#1 WSTK_P14 WSTK_P16 VCOM_ENABLE WSTK_F5

RADIO_PA5 <>> FLASH_SCS

RADIO_PB[15..11] << RADIO_PB11 FRC_DCLK#6 WSTK_P18 WSTK_P18 PTI_CLK WSTK_F21

RADIO_PB12 FRC_DOUT#6 WSTK_P20 WSTK_P20 PTI_DATA WSTK_F20

RADIO_PB13 FRC_DFAME#6 WSTK_P22 WSTK_P22 PTI_SYNC WSTK_F19

RADIO_PB14 <>> LFXXTAL_P

RADIO_PB15 <>> LFXXTAL_N

RADIO_PC[11..6] << RADIO_PC6 US1_TX#11 <>> FLASH_MOSI

RADIO_PC7 US1_RX#11 <>> FLASH_MISO

RADIO_PC8 US1_CLK#11 <>> FLASH_SCLK

RP200 1 8 EXP_HEADER6 WSTK_P3

2 7 EXP_HEADER8 WSTK_P5

3 6 EXP_HEADER4 WSTK_P1

4 5 EXP_HEADER10 WSTK_P7

RADIO_PC9 US1_CS#11 EXP_HEADER15 WSTK_P12

RADIO_PC10 I2C0_SDA#15 EXP_HEADER16 WSTK_P13

RADIO_PC11 I2C0_SCL#15

Serial resistors on SPI interface to mitigate any signal integrity issues that might arise when an unknown load is connected to the expansion header.

RADIO_PD[15..9] << RADIO_PD9 <>> SENSOR_ENABLE WSTK_P37

RADIO_PD10 EXP_HEADER7 WSTK_P4

RADIO_PD11 EXP_HEADER9 WSTK_P6

RADIO_PD12 EXP_HEADER11 WSTK_P8

RADIO_PD13 WSTK_P31 WSTK_P31 DISP_EXTCOMIN WSTK_F18

RADIO_PD14 US1_CS#19 WSTK_P33 WSTK_P33 DISP_SCS WSTK_F17

RADIO_PD15 WSTK_P35 WSTK_P35 DISP_ENABLE WSTK_F14

RADIO_PF[7..0] << RADIO_PF0 DBG_SWCLK#0 WSTK_P24 WSTK_P24 DBG_TCK_SWCLK WSTK_F1 WSTK_F1 <<TP_TCK_SWCLK

RADIO_PF1 DBG_SWDIO#0 WSTK_P26 WSTK_P26 DBG_TMS_SWCLK WSTK_F0 WSTK_F0 <<TP_TMS_SWCLK

RADIO_PF2 DBG_SWO#0/DBG_TDO#0 EXP_HEADER13 WSTK_P28 WSTK_P28 DBG_TDO_SWO WSTK_F2 WSTK_F2 <<TP_TDO_SWO

RADIO_PF3 DBG_TDI#0 WSTK_P10 WSTK_P10 DBG_TDI WSTK_F3 WSTK_F3 <<TP_TDI

RADIO_PF4 WSTK_P30 WSTK_P30 UIF_LED0 WSTK_F10

RADIO_PF5 WSTK_P32 WSTK_P32 UIF_LED1 WSTK_F11

RADIO_PF6 WSTK_P34 WSTK_P34 UIF_BUTTON0 WSTK_F12

RADIO_PF7 WSTK_P36 WSTK_P36 UIF_BUTTON1 WSTK_F13

VDCDC R202 OR NM WSTK_P27

RADIO_#RESET << DEBUG_RESET WSTK_F4 WSTK_F4 <<TP_RESET

C207 100N GND

Digital Connections

The diagram illustrates the digital connections for the U1A BGM13S22F512GA component. It shows five groups of pins, each connected to a specific radio interface. The connections are as follows:

- RADIO_PA[5..0]** is connected to pins PA0 through PA5.
- RADIO_PB[15..11]** is connected to pins PB11 through PB15.
- RADIO_PC[11..6]** is connected to pins PC6 through PC11.
- RADIO_PD[15..9]** is connected to pins PD9 through PD15.
- RADIO_PF[7..0]** is connected to pins PF0 through PF7.

The component is labeled U1A BGM13S22F512GA.

Serial Flash

The diagram illustrates the connection of two MX25R8035F Serial Flash memory chips, U100A and U100B, to a VMCU and other components.

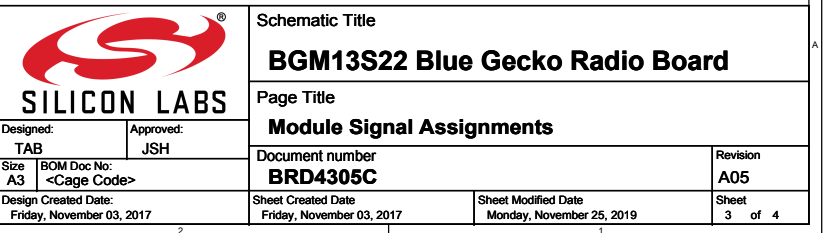
U100A Connections:

- VMCU:** Connected to pins D2, E1, A3, E3, and C1.
- FLASH_MOSI:** Connected to pin SI / SIO0.
- FLASH_SCLK:** Connected to pin SCLK.
- FLASH_SCSS:** Connected to pin CS#.
- FLASH_MISO:** Connected to pin SO / SIO1 via trace C3.
- WP# / SIO2:** Connected to pin WP# / SIO2.
- RESET# / SIO3:** Connected to pin RESET# / SIO3.

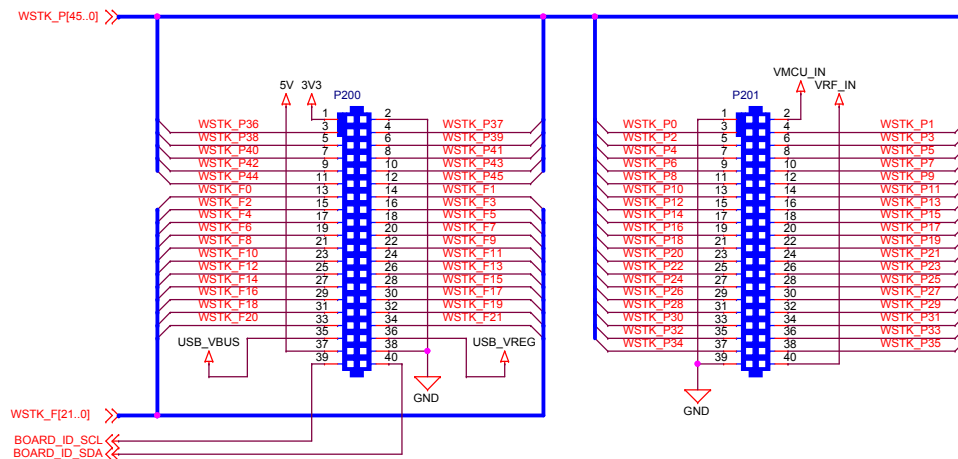
U100B Connections:

- VMCU:** Connected to pin VCC.
- VCC:** Connected to pin VCC.
- GND:** Connected to pin GND.
- Capacitor C124:** A 100nF capacitor connected between VCC and GND.

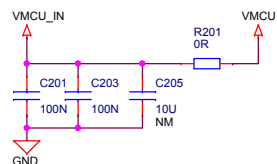
Resistor R103: A 330K resistor connected between VMCU and FLASH_SCSS.



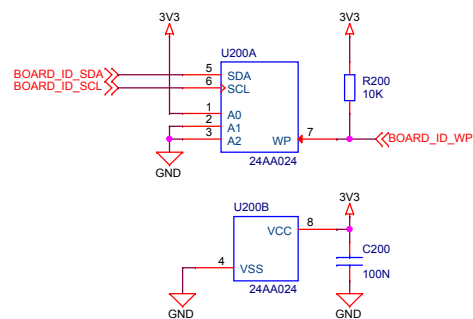
WSTK Connectors



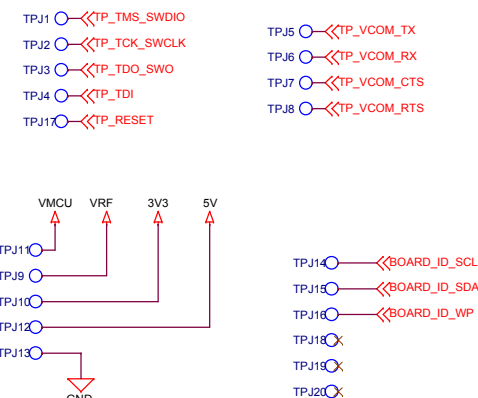
WSTK Power Decoupling



Board Identification



Test Points



 SILICON LABS		Schematic Title	
		BGM13S22 Blue Gecko Radio Board	
Designed: TAB		Page Title	
Size A3		WSTK Connectors & Board ID	
BOM Doc No: <Cage Code>		Document number	Revision
Design Created Date: Friday, November 03, 2017		BRD4305C	A05
Sheet Created Date: Friday, November 03, 2017		Sheet Modified Date: Monday, November 25, 2019	Sheet 4 of 4