



BGM13S32 System in Package Wireless Starter Kit Radio Board

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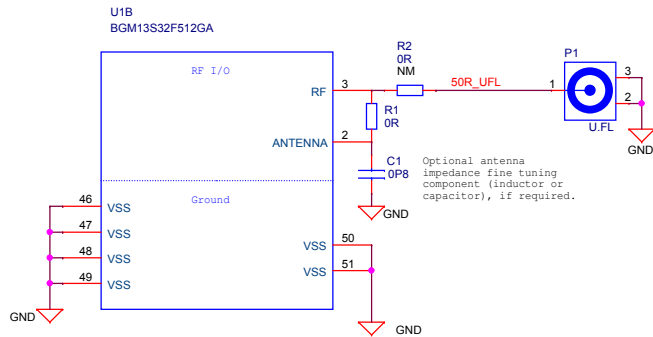


Revision History

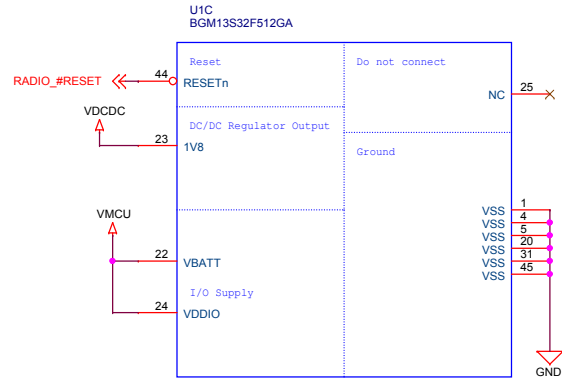
Rev.	Description
A00	Initial revision.
A01	Updated module revision and footprint. Pin 1v8 to WSTK pad conn. option.
A02	Updated module PCB footprint and antenna clearance dimensions.
A03	Updated board rev. for parts with module specific devinfo.
A04	Upd. U1 P/N. Fixed x2 P/N. Added antenna tuning comp.

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Designed: TAB		Approved: JSH	
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Antenna & Radio Interface

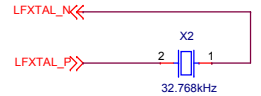


Power Supplies



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)

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Pin Assignments

The diagram illustrates the pin assignments for the EFR32 microcontroller, organized into five main sections: RADIO_PA, RADIO_PB, RADIO_PC, RADIO_PD, and RADIO_PF. Each section shows the connection from the EFR32 pin to the EFR32 peripheral, the EXP header connection, the WSTK breakout pin, the WSTK peripheral connection, and the target peripheral (TP) connection.

RADIO_PA[5..0]

- EFR32 Pin: RADIO_PA0, RADIO_PA1, RADIO_PA2, RADIO_PA3, RADIO_PA4, RADIO_PA5
- EFR32 Peripheral: US0_TX#0, US0_RX#0, US0_CLK#0, US0_CS#0, US1_CS#1
- EXP Header Connection: EXP_HEADER12, EXP_HEADER14, EXP_HEADER3, EXP_HEADER5
- WSTK Breakout Pin: WSTK_P9, WSTK_P11, WSTK_P0, WSTK_P2, WSTK_P16
- WSTK Peripheral Connection: WSTK_P9, WSTK_P11, WSTK_P0, WSTK_P2, WSTK_P16
- WSTK Peripheral: VCOM_TX, VCOM_RX, VCOM_CTS, VCOM_RTS, VCOM_ENABLE
- WSTK Pin: WSTK_F6, WSTK_F7, WSTK_F8, WSTK_F9, WSTK_F5
- TP: TP_VCOM_TX, TP_VCOM_RX, TP_VCOM_CTS, TP_VCOM_RTS

RADIO_PB[15..11]

- EFR32 Pin: RADIO_PB11, RADIO_PB12, RADIO_PB13, RADIO_PB14, RADIO_PB15
- EFR32 Peripheral: FRC_DCLK#6, FRC_DOUT#6, FRC_DFAME#6, LFXXTAL_P, LFXXTAL_N
- EXP Header Connection: EXP_HEADER6, EXP_HEADER8, EXP_HEADER4
- WSTK Breakout Pin: WSTK_P18, WSTK_P20, WSTK_P22
- WSTK Peripheral Connection: WSTK_P18, WSTK_P20, WSTK_P22
- WSTK Peripheral: PTI_CLK, PTI_DATA, PTI_SYNC
- WSTK Pin: WSTK_F21, WSTK_F20, WSTK_F19

RADIO_PC[11..6]

- EFR32 Pin: RADIO_PC6, RADIO_PC7, RADIO_PC8, RADIO_PC9, RADIO_PC10, RADIO_PC11
- EFR32 Peripheral: US1_TX#11, US1_RX#11, US1_CLK#11, US1_CS#11, I2C0_SDA#15, I2C0_SCL#15
- EXP Header Connection: EXP_HEADER6, EXP_HEADER8, EXP_HEADER4, EXP_HEADER10, EXP_HEADER15, EXP_HEADER16
- WSTK Breakout Pin: WSTK_P3, WSTK_P5, WSTK_P1, WSTK_P7, WSTK_P12, WSTK_P13
- WSTK Peripheral Connection: WSTK_P5, WSTK_P1
- WSTK Peripheral: DISP_SCL, DISP_SI
- WSTK Pin: WSTK_F15, WSTK_F16

RADIO_PD[15..9]

- EFR32 Pin: RADIO_PD9, RADIO_PD10, RADIO_PD11, RADIO_PD12, RADIO_PD13, RADIO_PD14, RADIO_PD15
- EFR32 Peripheral: US1_CS#19
- EXP Header Connection: EXP_HEADER7, EXP_HEADER9, EXP_HEADER11
- WSTK Breakout Pin: WSTK_P37, WSTK_P4, WSTK_P6, WSTK_P8, WSTK_P31, WSTK_P33, WSTK_P35
- WSTK Peripheral Connection: WSTK_P31, WSTK_P33, WSTK_P35
- WSTK Peripheral: DISP_EXTCOMIN, DISP_SCS, DISP_ENABLE
- WSTK Pin: WSTK_F18, WSTK_F17, WSTK_F14

RADIO_PF[7..0]

- EFR32 Pin: RADIO_PF0, RADIO_PF1, RADIO_PF2, RADIO_PF3, RADIO_PF4, RADIO_PF5, RADIO_PF6, RADIO_PF7
- EFR32 Peripheral: DBG_SWCLK#0, DBG_SWDIO#0, DBG_SWDIO#0, DBG_SWDIO#0, DBG_TDO#0, DBG_TDO#0, DBG_TDO#0, DBG_TDO#0
- EXP Header Connection: EXP_HEADER13
- WSTK Breakout Pin: WSTK_P24, WSTK_P26, WSTK_P28, WSTK_P10, WSTK_P30, WSTK_P32, WSTK_P34, WSTK_P36
- WSTK Peripheral Connection: WSTK_P24, WSTK_P26, WSTK_P28, WSTK_P10, WSTK_P30, WSTK_P32, WSTK_P34, WSTK_P36
- WSTK Peripheral: DBG_TCK_SWCLK, DBG_TMS_SWCLK, DBG_TDO_SWO, DBG_TDI, UIF_LED0, UIF_BUTTON0, UIF_BUTTON1
- WSTK Pin: WSTK_F1, WSTK_F0, WSTK_F2, WSTK_F3, WSTK_F10, WSTK_F11, WSTK_F12, WSTK_F13
- TP: TP_TCK_SWCLK, TP_TMS_SWCLK, TP_TDO_SWO, TP_TDI

Other Connections:

- FLASH_SCS: Connected to RADIO_PA5
- FLASH_MOSI: Connected to RADIO_PC8
- FLASH_SCLK: Connected to RADIO_PC8
- RP200: Connected to RADIO_PC8
- 100R: Connected to RADIO_PC8
- VDCCDC: Connected to WSTK_P27
- R202 OR NM: Connected to WSTK_P27
- DEBUG_RESET: Connected to RADIO_RESET
- C207: Connected to WSTK_F4
- 100N: Connected to WSTK_F4
- GND: Connected to WSTK_F4

Digital Connections

The diagram illustrates the digital connections for the U1A BGM13S32F512GA component. It shows five groups of radio pins (RADIO_PA, RADIO_PB, RADIO_PC, RADIO_PD, RADIO_PF) connected to specific pins on the component. Each group is represented by a blue double arrow pointing to a set of pins. The pins are labeled with their names and numbers. The connections are as follows:

- RADIO_PA[5..0]** connects to PA0 (13), PA1 (14), PA2 (15), PA3 (16), PA4 (17), and PA5 (18).
- RADIO_PB[15..11]** connects to PB11 (38), PB12 (37), PB13 (36), PB14 (21), and PB15 (19).
- RADIO_PC[11..6]** connects to PC6 (26), PC7 (27), PC8 (28), PC9 (30), PC10 (32), and PC11 (33).
- RADIO_PD[15..9]** connects to PD9 (6), PD10 (7), PD11 (8), PD12 (9), PD13 (10), PD14 (11), and PD15 (12).
- RADIO_PF[7..0]** connects to PF0 (34), PF1 (35), PF2 (29), PF3 (39), PF4 (40), PF5 (41), PF6 (42), and PF7 (43).

Radio Pin Group	Radio Pin Name	Radio Pin Number	Component Pin Name	Component Pin Number
RADIO_PA[5..0]	RADIO_PA0	13	PA0	
	RADIO_PA1	14	PA1	
	RADIO_PA2	15	PA2	
	RADIO_PA3	16	PA3	
	RADIO_PA4	17	PA4	
	RADIO_PA5	18	PA5	
RADIO_PB[15..11]	RADIO_PB11	38	PB11	
	RADIO_PB12	37	PB12	
	RADIO_PB13	36	PB13	
	RADIO_PB14	21	PB14	
	RADIO_PB15	19	PB15	
RADIO_PC[11..6]	RADIO_PC6	26	PC6	
	RADIO_PC7	27	PC7	
	RADIO_PC8	28	PC8	
	RADIO_PC9	30	PC9	
	RADIO_PC10	32	PC10	
	RADIO_PC11	33	PC11	
RADIO_PD[15..9]	RADIO_PD9	6	PD9	
	RADIO_PD10	7	PD10	
	RADIO_PD11	8	PD11	
	RADIO_PD12	9	PD12	
	RADIO_PD13	10	PD13	
	RADIO_PD14	11	PD14	
	RADIO_PD15	12	PD15	
RADIO_PF[7..0]	RADIO_PF0	34	PF0	
	RADIO_PF1	35	PF1	
	RADIO_PF2	29	PF2	
	RADIO_PF3	39	PF3	
	RADIO_PF4	40	PF4	
	RADIO_PF5	41	PF5	
	RADIO_PF6	42	PF6	
	RADIO_PF7	43	PF7	

Serial Flash

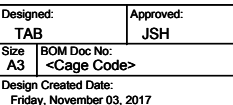
The diagram illustrates the connection of two MX25R8035F serial flash chips (U100A and U100B) to a VMCU and other control signals.

U100A (MX25R8035F) Connections:

- VMCU:** Connected to D2, E1, A3, E3, and CT pins.
- FLASH_MOSI:** Connected to D2 pin.
- FLASH_SCLK:** Connected to E1 pin.
- FLASH_MISO:** Connected to C3 pin.
- FLASH_SCS:** Connected to A3 pin.
- Chip Selects:** CS# is connected to E3 pin. WP# / SIO2 and RESET# / SIO3 are connected to CT pin.
- IO Pins:** SI / SIO0 and SO / SIO1 are present but not connected.

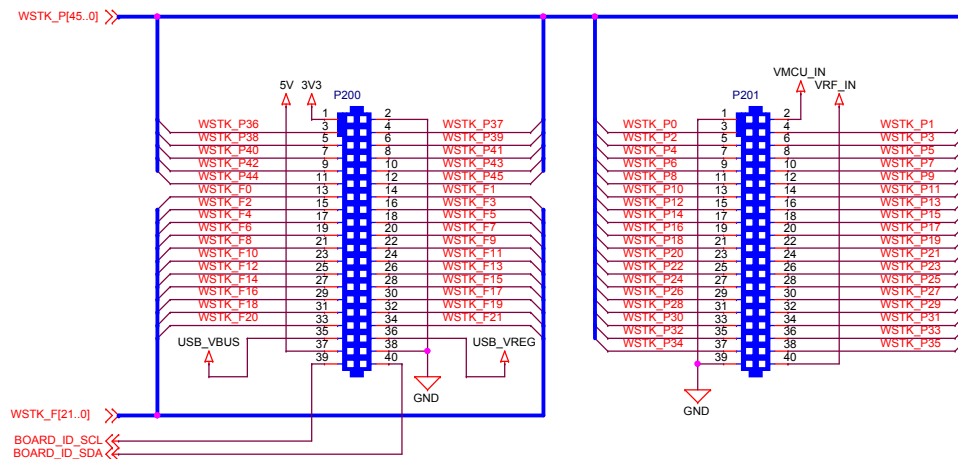
U100B (MX25R8035F) Connections:

- VMCU:** Connected to VCC and A1 pins.
- Capacitor:** A 100nF capacitor (C124) is connected between VCC and GND.
- Chip Select:** B2 pin is connected to GND.

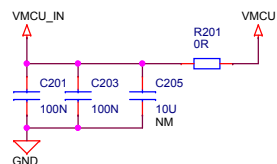


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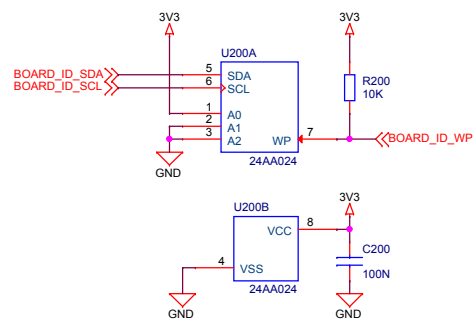
WSTK Connectors



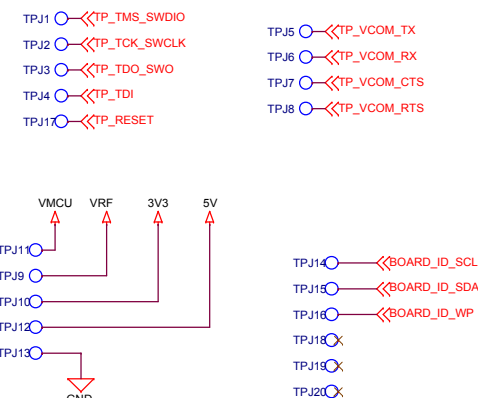
WSTK Power Decoupling



Board Identification



Test Points



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