

Bluetooth Low Energy Range Extender Module

USER GUIDE

TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
BLE RANGE EXTENDER MODULE USE AND PIN DEFINITIONS	3
PIN DESCRIPTION	3
ELECTRICAL SPECIFICATIONS	5
BLOCK DIAGRAM.....	6
FCC STATEMENTS.....	7
IC STATEMENTS.....	8
RF EXPOSURE INFORMATION.....	9
OEM LABELLING REQUIREMENTS	10

BLE RANGE EXTENDER MODULE USE AND PIN DEFINITIONS

The BLE Range Extender module is a Bluetooth low energy module that uses the Texas Instrument’s cc2540 System-on-a-Chip along with their cc2592 Power Amplifier.

The device can be powered directly using 3.3V supplied to the 3V3_OUT signal listed in Table 1. Alternatively, USB cable can be used and the 5V from USB will be regulated down to 3.3V using the on board voltage regulator. Enabling of the regulator is controlled using the SHDN# signal (see Table 1). Setting the signal high will enable the regulator.

In order to use the BLE Range Extender module, it is important to use the module pins in your application as they are designated in the table below.

To design, develop, and program the device you will need the IAR Embedded Workbench development environment.

For detailed information regarding cc2540, please visit the Texas Instrument website and navigate to the cc2540 product page.

PIN DESCRIPTION

Table 1 BLE Range Extender Pinout (Top View)

PIN	NAME	FUNCTION	DESCRIPTION
1	GND	Ground	Ground connection
2	P0_5	GPIO	General purpose input output
3	PWRGND	GPIO	Output signal from voltage regulator indicating stability
4	P0_3_TX	GPIO	General purpose input output
5	P0_2_RX	GPIO	General purpose input output
6	nRESET	RESET	Reset signal for cc2540
7	P0_1	GPIO	General purpose input output
8	P0_0	GPIO	General purpose input output
9	GND	Ground	Ground connection
10	SHDN#	RESET	Reset signal for linear voltage regulator
11-26	GND	Ground	Ground connection
27	3V3_OUT	VCC	Positive voltage supply for module

28	3V3_OUT	VCC	Positive voltage supply for module
29	GND	Ground	Ground connection
30	GND	Ground	Ground connection
31	GND	Ground	Ground connection
32	GND	Ground	Ground connection
33	DEBUG_CLK	CLOCK	Programming clock signal
34	DEBUG_DATA	DATA	Programming data signal
35	P2_0	GPIO	General purpose input output
36	P1_7	GPIO	General purpose input output
37	P1_6	GPIO	General purpose input output
38	GND	Ground	Ground connection
39	GND	Ground	Ground connection
40	GND	Ground	Ground connection
41	USB_P	GPIO	USB P
42	USB_N	GPIO	USB N
43	5V_USB_EXT	USB 5V	USB positive supply voltage
44	P1_5	GPIO	General purpose input output
45	P1_4	GPIO	General purpose input output

All digital I/O signals use logic based on the supply voltage. If the external digital circuitry does not support this logic level, then level shifters **MUST** be used.

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Table 2 Absolute Maximum Ratings

Parameter	Min	Max	Unit
Power supply voltage (3V3_OUT)	-0.3	3.6	V
Operating voltage	+2.0	+3.6	V
Voltage on any GPIO	-0.5	3V3_OUT + 0.3	V
Operating temperature	-40	+85	°C
Storage temperature	-40	+125	°C

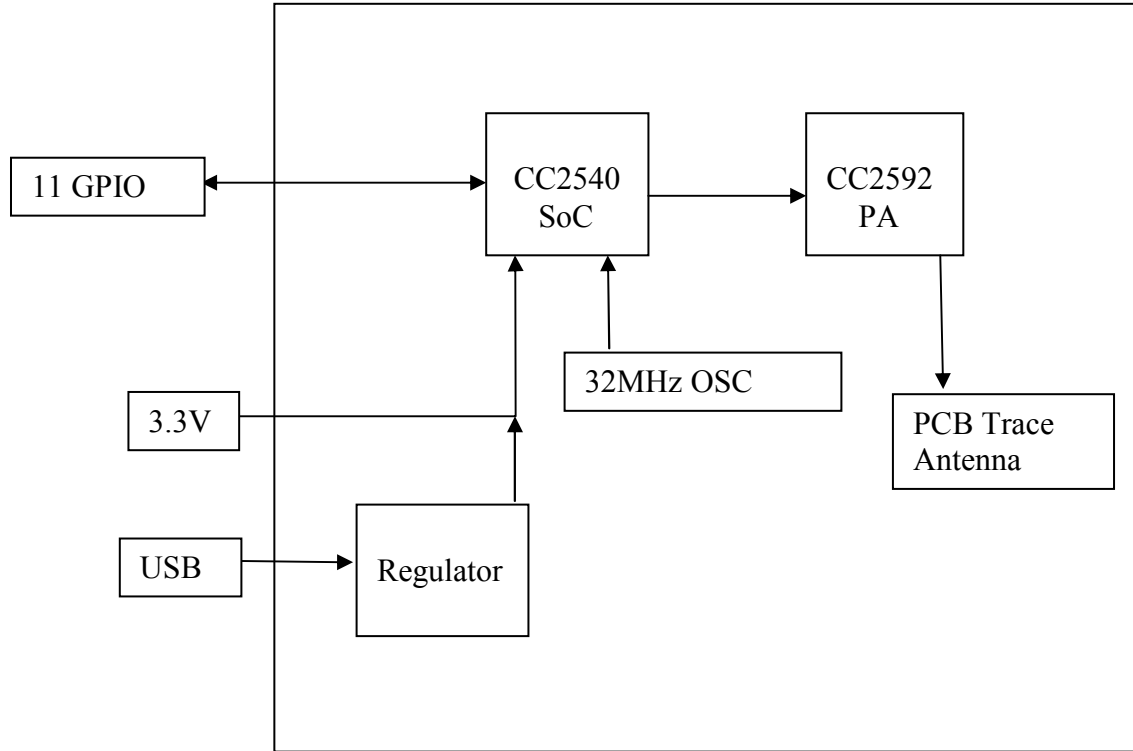
General Characteristics

Table 3 General Characteristics

Parameter	Min	Typ	Max	Unit
BT RF Frequency Range	2402		2480	MHz

BLOCK DIAGRAM

Figure 1 Block Diagram



FCC STATEMENTS

FCC ID: 2AFYY-BLERANGEX

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.*
- Increase the separation between the equipment and receiver.*
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- Consult the dealer or an experienced radio/TV technician for help.*

Changes or modifications made to this equipment not expressly approved by Embedded Sense Inc. could void the user's authority to operate the equipment.

IC STATEMENTS

IC: 20641-BLERANGEX

This device complies with Industry Canada's licence-exempt RSS. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and*
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.*

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) l'appareil ne doit pas produire de brouillage;*
- 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

RF EXPOSURE INFORMATION

The device has been evaluated to meet general RF exposure requirements. The device can be used in portable applications as long as there is 20mm of separation between the antenna and the user.

For mobile general population/uncontrolled co-location exposure, the maximum calculated MPE ratio for the module with 0 dBi PCB Trace Antenna is 0.01045 (based on more stringent RSS-102 limit), this configuration can be co-located with other antennas provided the sum of the MPE ratios for all the other simultaneous transmitting antennas incorporated in a host device is $< 1.0 - 0.01045 < 0.98955$.

IMPORTANT: OEMs must include RF Exposure Information in their supplied user manuals.

OEM LABELLING REQUIREMENTS

WARNING: The Original Equipment Manufacturer (OEM) must ensure that FCC/IC labelling requirements are met. This includes a clearly visible label on the outside of the final product enclosure that displays the contents shown in the figure below.

Required FCC/IC Label for OEM products containing the BLE Range Extender Module

Contains FCC ID: 2AFYY-BLERANGEX & IC: 20641-BLERANGEX

This device complies with Part 15 of the FCC Rules and ICES-003. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interferences that may cause undesired operation

IMPORTANT: OEMs must test final product to comply with unintentional radiators (FCC section 15.107 & 15.109, ICES-003) before declaring compliance of their final product to Part 15 of FCC Rules and ICES-003.

FAILURE TO MEET INTEGRATION CONDITIONS WILL REQUIRE OEM INTEGRATORS TO SEEK NEW CERTIFICATION FOR THEIR PRODUCT