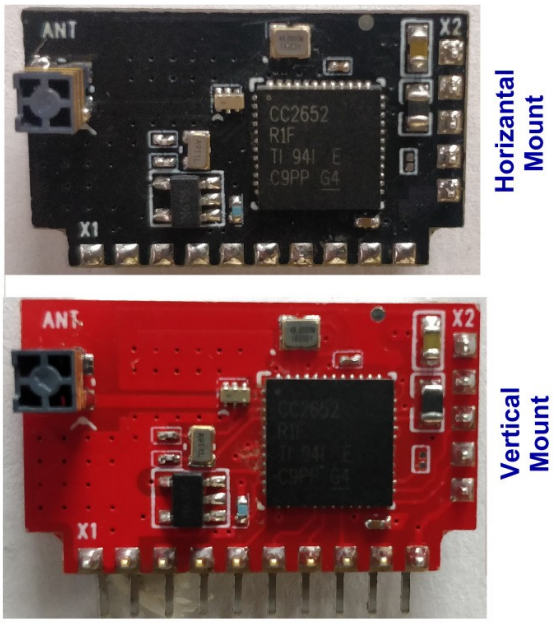
Angelic RF

Multi Protocol Wireless Module

Bluetooth 5 Low Energy - ZigBee 3.0 - IEEE 802.15.4g - 6LoWPAN

QH2652R Data Sheet



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1 Introduction

The QH2652R is an advanced, highly flexible, ultra-low power multi protocol module that enables ZigBee 3.0 Bluetooth 5 (BLE) and IEEE 802.15.4 connectivity for portable, extremely low power embedded systems. With an ARM® Cortex™-M4F CPU, integrated 2.4GHz transceiver, and an integrated antenna, the QH2652R provides a complete RF solution allowing faster time to market with reduced development costs. Providing the use of the ***ti*** CC2652R capabilities and peripherals, the QH2652R can power the most demanding applications, all while simplifying designs and reducing BOM costs. The QH2652R is an ideal solution for designs that require the latest ZigBee 3.0, Bluetooth 5 features or 802.15.4 based networking for Thread.

2 Features

- Based on the ***ti*** CC2652R SoC with Powerful Arm® Cortex® -M4F Processor
- Reduced pin count and wider pitch (2mm), helps for low cost application PCB design
- Module supporting 6 GPIOs, any pin can be configured as UART, SPI, I2C and I2S.
- The module can be mounted in any orientation (horizontal, vertical or castellated)
- Complete RF solution with integrated antenna
- Integrated DC-DC converter
- Provided external 4KB Data EEPROM and external watch dog IC on module
- No external additional components required

3 Applications

- Remote Controls and Access Control
- Smart Grid, Smart Energy and Lighting Products
- Wireless Sensor Networks
- Home, Building Automation and Home Appliances
- Internet of Things
- Factory Automation, Asset Tracking and Management
- Wireless Healthcare Applications

4 Block Diagram

The below block diagram depicts the module block diagram

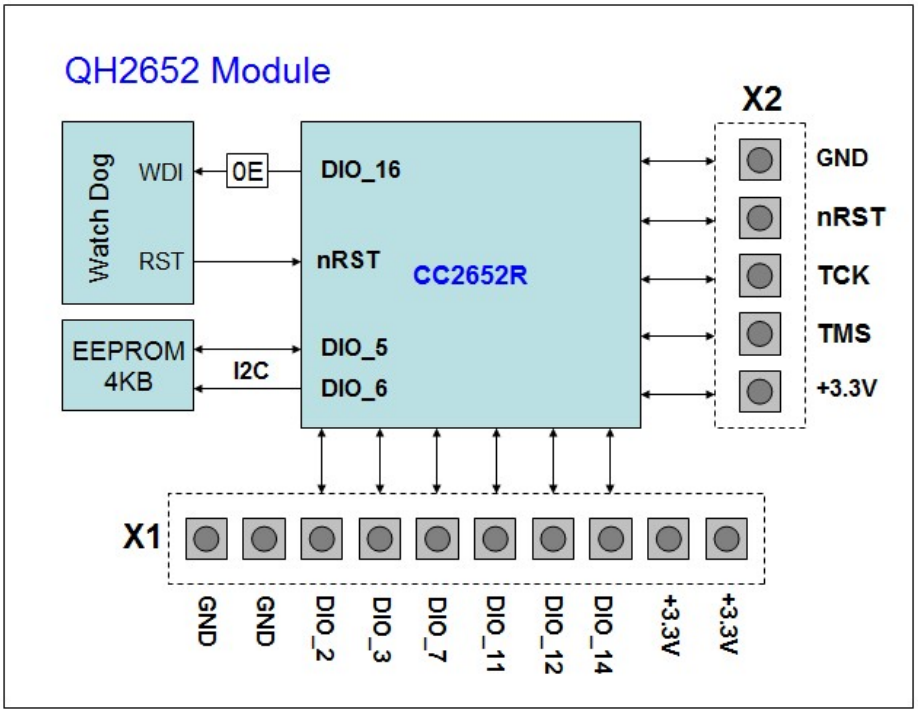


Figure 1 : Module Block Diagram

5 SoC Features

CC2652R from Texas Instruments is used on the module. Listed below features, please refer CC2652R at manufacturer website for more details.

- Powerful Arm® Cortex® -M4F Processor, Clock Speed Up to 48 MHz
- 352KB of In-System Programmable Flash, 256KB of ROM for Protocols and Firmware
- 8KB of Cache SRAM, 80KB of Ultra-Low Leakage SRAM with parity
- Interfaces supported : 2× UART, 2× SSI (SPI, MICROWIRE, TI), I2C, I2S, RTC
- Supports Over-the-Air Upgrade (OTA)

6 Specifications

Hardware		
Soc Part Number	CC2652R from Texas Instruments	
Power supply	+3.3V (Single Supply to module)	
Interfaces	2× UART 2× SSI (SPI, MICROWIRE, TI) I2C, I2S, RTC	GPIO x 6 Temperature Monitor External + Internal Watch Dog
Antenna Part Used	Part Number : 479480001 from Molex	
EEPROM Part Used	24LC32AT-I/OT from Microchip ; 32KBIT 400KHZ	
Temperature Range	-40°C to +85°C (Operating)	
External Watch Dog IC	Part Number : TPS3828-33QDBVRQ1 Reset Pulse : 200 ms, Watch Dog Timeout : 0.9s Contact Factory for custom time values	
Radio		
2.4-GHz RF Transceiver Compatible With BLE 5.0, ZigBee3.0, IEEE 802.15.4 PHY and MAC		
Output Power	Up to +5 dBm with temperature compensation	
Receiver Sensitivity	-100 dBm for 802.15.4 (2.4 GHz)	
	-105 dBm for Bluetooth 125-kbps (LE Coded PHY)	
Certifications		
Suitable for Systems Targeting Compliance With Worldwide Radio Frequency Regulations		
Europe	EN 300 328, EN 300 440 Class 2	
US	FCC CFR47 Part 15	
Japan	ARIB STD-T66	
Current Consumption		
Active-Mode RX	6.9 mA	
Active-Mode TX 0 dBm	7.4 mA	
Active-Mode TX 5 dBm	9.7 mA	
Active-Mode MCU 48 MHz	3.3 mA (69 µA/MHz)	
Standby	0.95 µA (RTC on, 80KB RAM and CPU Retention)	
Shutdown	125 nA (Wakeup on External Events)	

7 Pin Description

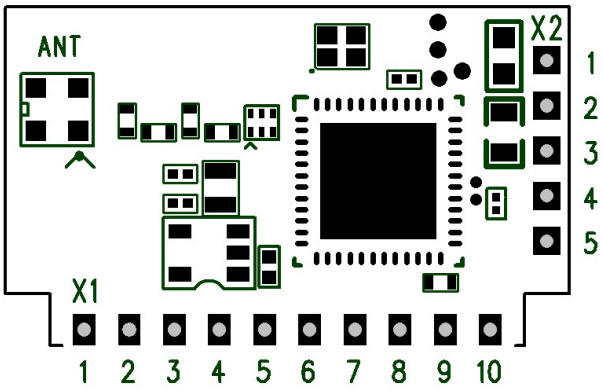


Figure 2 : Module Pin Description

7.1 Connector X1

X1 Pin Number	Signal Name	Description
Pin 1	GND	GROUND
Pin 2	GND	GROUND
Pin 3	DIO_2	IC Pin 7, GPIO
Pin 4	DIO_3	IC Pin 8, GPIO
Pin 5	DIO_7	IC Pin 12, GPIO
Pin 6	DIO_11	IC Pin 17, GPIO
Pin 7	DIO_12	IC Pin 18, GPIO
Pin 8	DIO_14	IC Pin 20, GPIO
Pin 9	+3.3V	Power Supply
Pin 10	+3.3V	Power Supply

7.2 Connector X2 (cJTAG Programming Connector)

X2 Pin Number	Signal Name	Description
Pin 1	GND	GROUND
Pin 2	nRST	IC Pin 35, Reset
Pin 3	TCK	IC Pin 25, JTAG
Pin 4	TMS	IC Pin 24, JTAG
Pin 5	+3.3V	Power Supply

8 Dimension

8.1 Module Dimension

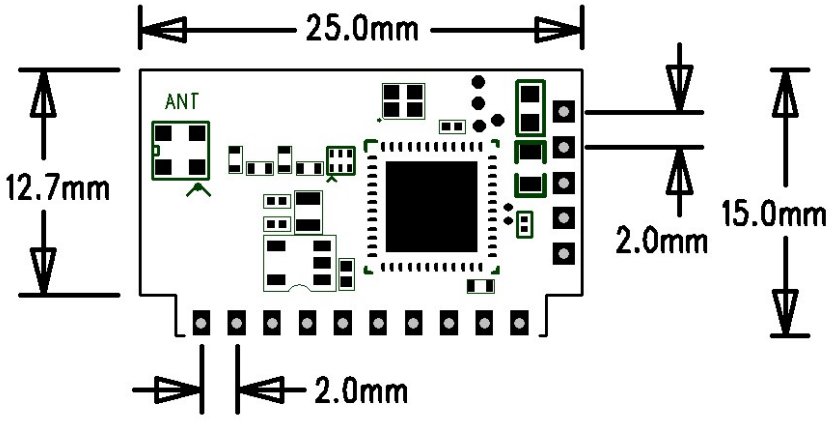


Figure 3 : Module Dimension

9 Recommended Footprint

9.1 Horizontal Connector Mount with cJTAG Connection to carrier board

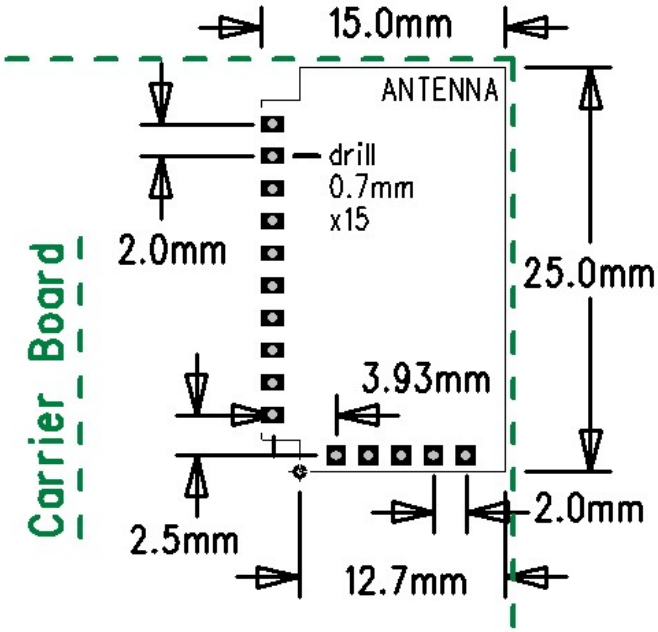


Figure 4 : Horizontal Connector Mount

9.2 Vertical Connector Mount without cJTAG Connection to carrier board

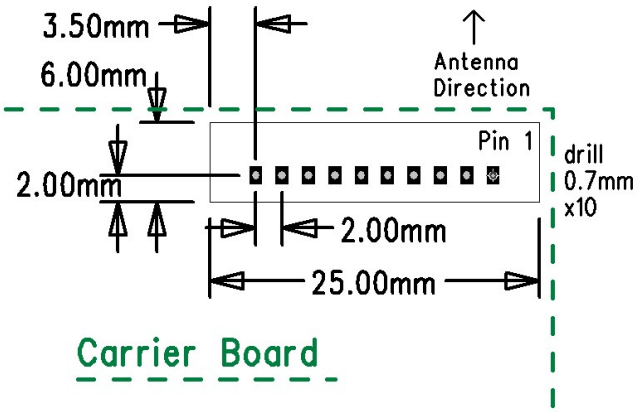


Figure 5 : Vertical Connector Mount

9.3 Vertical Slot Mount without cJTAG Connection to carrier board

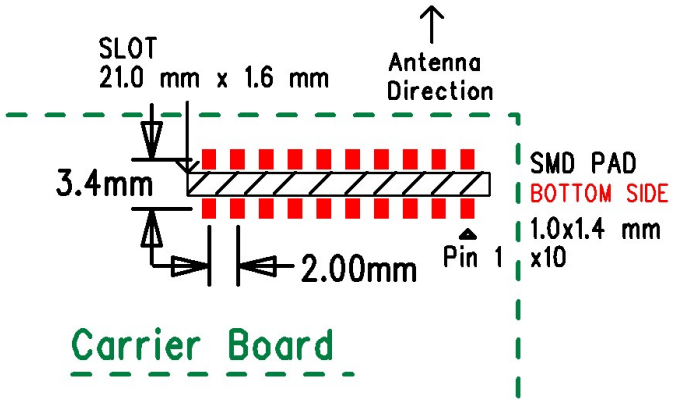


Figure 6 : Vertical Slot Mount

9.4 Eval Kit

Demo board available to test the module which can be programmed using external JTAG programmer (**XDS110** from ***ti*** or similar) and the schematic reference as below

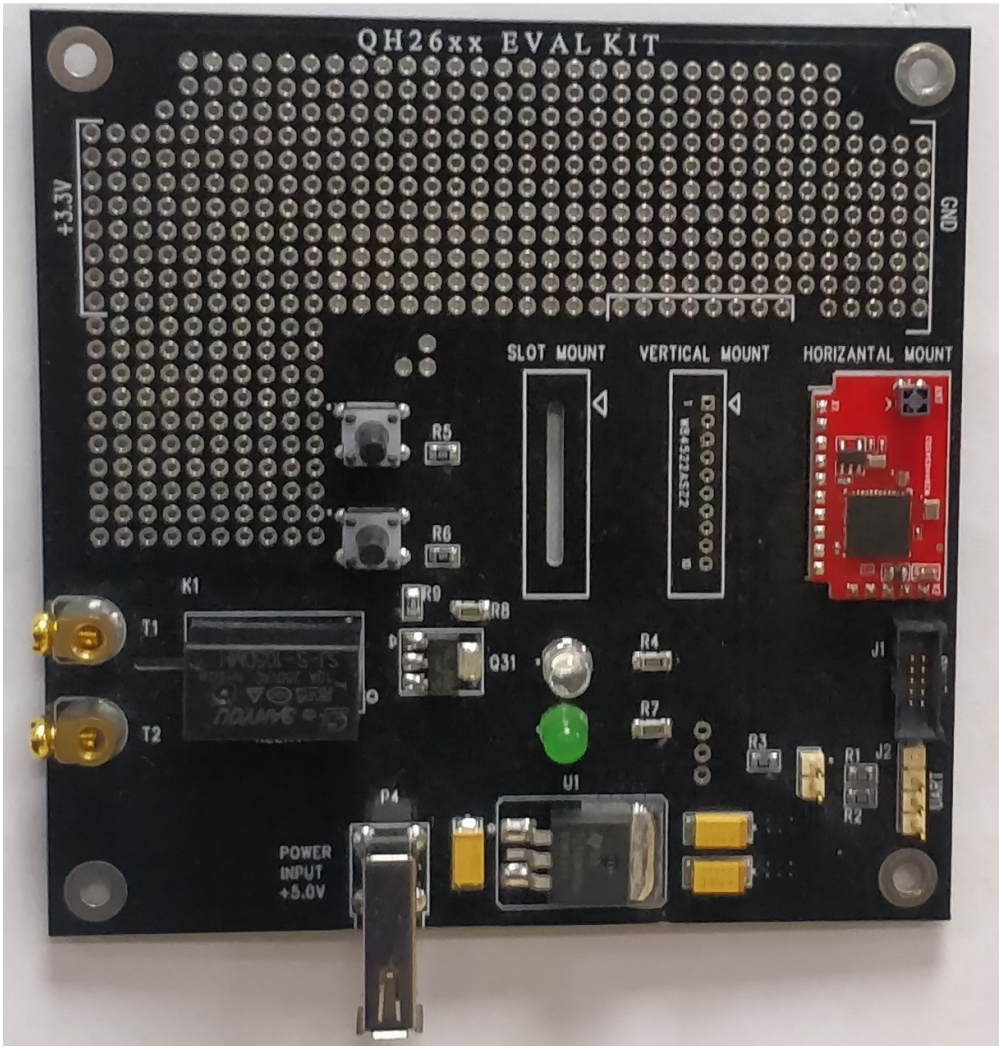
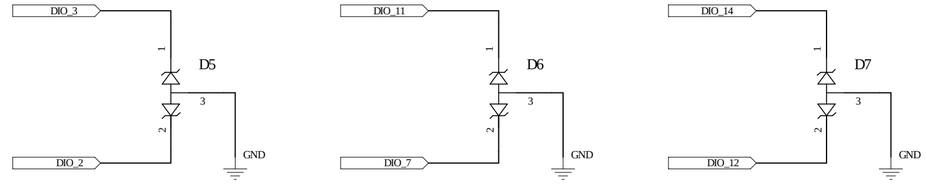


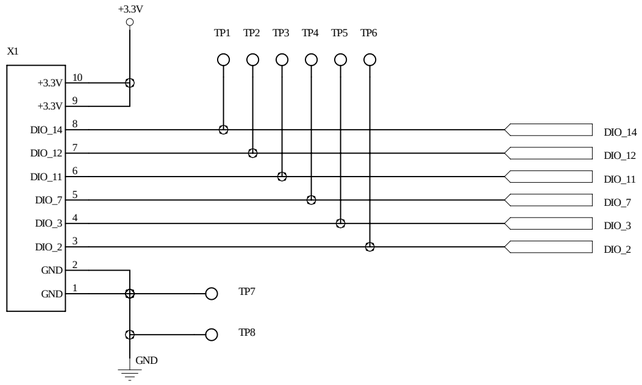
Figure 7 : Eval Kit (Demo Board)

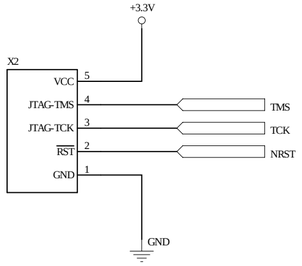
DWG. NO.	SH	REV.
<Drawing Number>	1	<Revision>

EVAL BOARD - QH2652R

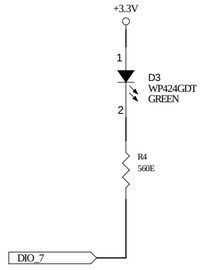
ESD Protection



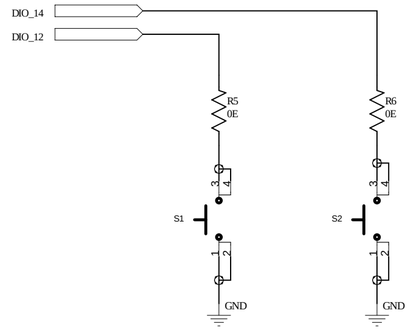


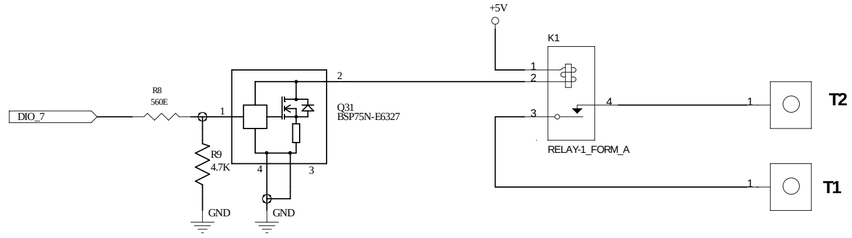


User LED

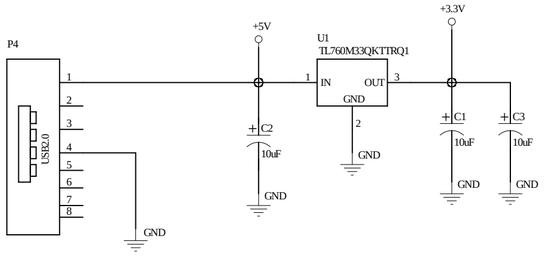


Push Buttons

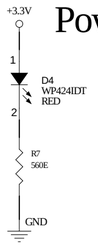




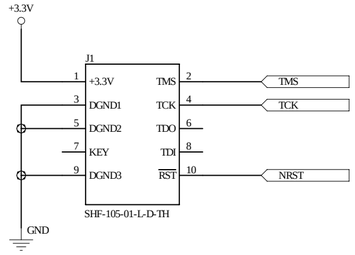
Power Supply



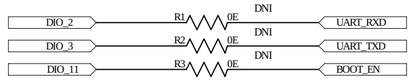
Power LED



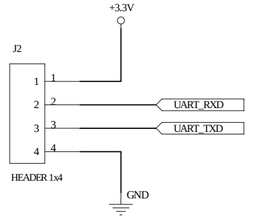
Debug / JTAG interface

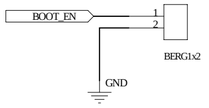


For UART Bootloader Backdoor



UART_RX	PA0	DIO2
UART_TX	PA1	DIO3
Bootloader En	PA3	DIO11





APPROVALS	DATE	EVAL BOARD - QH2652R			
DRAWN	<Drawn Date>	02_MCU_WIRELESS			
CHECKED	<Checked Date>				
ENGINEER		SIZE C	DWG. NO. <Drawing Number>	SHEET 1 of 1	PROD REV. <Revision>
			FILE test.sch	SCALE <Scale>	

10 Document History

Version	Date	Changes
1.0	January 02nd 2020	Initial Version, Technical Details

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