From component to system to enterprise solution,
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GreenQuanta Radio Module
User's Manual

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Introduction

The GreenQuanta is a 2.4 GHz ZigBee radio module that features a Renesas core and a Skyworks front end module (FEM). This powerful combination incorporatesa feature rich processor with a premiere radio section that provides the ideal platform to add wireless connectivity to your product.

Compliance Information

FCC ID: X5C-BARBER2
Industry Canada REL ID: 8815A-BARBER2

EU Disposal Information

Disposal & Recycling – Applicable in the European Union and other countries with separate collection systems.

To prevent possible harm to the environment or human health from uncontrolled waste displasal, please separate the Greeen Quanta Zigbee module and other electronic circuitry from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Please contact your supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial waste for disposal.

Do not dispose of the Green Quanta Zigbee Module and other electronic devices with your household or commercial waste. In some countries/regions, collection systems are set up to handle electrical and electronic waste items. If collection systems are not available in your area, please return unwanted devices to a commercial recycler.

EU Declaration of Conformity

Herby, Envisionnovation Inc. (EIN) declares that the Green Quanta Zigbee is in compliance with the essential requirements and other relevant provisions of Directive 1999/S/EC

EN 300 328 v1.7.1 (2006-10)
EN 301 489-17 v1.3.2 (2008-04)
EN 62311: 2008

The above declaration of compliance does not relieve the original equipment manufacturer (OEM) who incorporates Green Quanta Zigbee module(s) into their product from their own declaration of compliance with any and all relevant EU directives.

EMC Information

Changes or modifications to this product not authorized by Envisionnovation Inc. (EIN) could void the EMC compliance and negate your authority under law to operate this product. This product has demonstrated EMC compliance under conditions that simulate its use on an original equipment manufacturer (OEM) printed circuit board (PCB) which includes voltage regulation and shielding, as directed in this User Manual. It is important that the OEM perform their own EMC compliance tests and other electrical tests to ensure compliance with the end customers' regulatory jurisdictions, and to avoid interference to radios, televisions, and other electronic devices.

FCC Information

FCC ID: X5C-BARBER2. This equipment has been tested and found to comply with the limits for a Class B digital device, and complies with Part 2 and Part 15 of the FCC Rules (Section 47 of the US Code of Federal Regulations), specifically Part 15.247. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and radiates radio frequency energy and, if not integrated, 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 correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into a circuit different than the one with the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

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.

Changes or modifications not expressly approved by Envisionnovation Inc. (EIN) could void the users' authority to operate the equipment.

To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be colocated or operate in conjunction with any other antenna or transmitter, and must remain at least 20cm from humans.

Canadian Compliance Statement

Industry Canada REL ID: 8815A-BARBER2. This device complies with Canadian ICES-003 Class B specifications. Cet appariel numérique de la Classe B est conforme á la norme NMB-003 et RSS 210 du Canada. This device complies with RSS 210 of Industry Canada. This class B device meets all the requirements of the Canadian interference-causing equipment regulations. Cet appariel numérique de la Classe B respecte toutes les exigences de Réglement sur le matériel brouilleur du Canada.

Operation is subject to the following two conditions:

3. This device may not cause harmful interference; and
4. This device must accept any interference, including interference that may cause undesired operation of this device.

Module Features

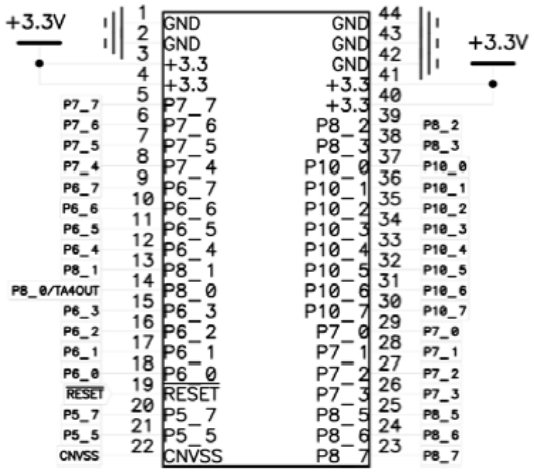
- Based on the Renesas M16C/6B3 single-chip ZigBee processor.
- Skyworks FEM with a power amplifier(PA) and a low noise amplifier (LNA).
- 256 kB of program flash, 20 kB of RAM, and 256 kB of external SPI flash.
- 11 hardware timers, 8 x 10 bit ADC, 3 serial channels and 30 GPIO are available.
- Program security to prevent unauthorized extraction of program data and security keys from the on-board flash.
- Multiple sleep modes and FEM shutdown for reduced power consumption.
- Hardware symmetric encryption engine (128-bit AES)
- Software development and debugging is supported through Renesas HEW and the E8a emulator.
- ZigBee Pro stack is built upon the µItron RTOS for maximum flexibility.
- All registers and peripherals (except radio power control) are easily accessible to the developer to
  facilitate creative solutions.
- Module footprint of 37.5 mm x 20.5 mm.

Radio Features

- Based on the Renesas ZigBee stack for the 2.4 GHz ISM band.
- Fully supports ZigBee Pro as well as 802.15.4
- Output power of 17 dBm (19 dBm in boost mode)
- Received sensitivity of –100 dBm (preliminary) with a packet error rate (PER) of 1%.
- 3 antenna options including a chip antenna, PCB mount 1/4 wave monopole, and a U.FL connector.
- Compliant with FCC, IC and CE requirements with 3 different antennas (pending as of 21/03/2010).
- FEM shutdown available on pin P7_7.
- RX current of 64 mA.
- TX current of 132 mA.

Module Pinout

Module Pinout



All the GPIO from the Reneas M16C/6B3 are available on the module pinout.

RF Characteristics

Tx Power	17 dBm
Rx Sensitivity	-100 dBm (prelim)
Frequency	ISM 2.405—2.480 GHz

Power Requirements

Supply voltage	2.7—3.6 Vdc
Tx/Rx current	132/64 mA
Idle current	6.7 mA
Sleep current	4 µA

Module Outline