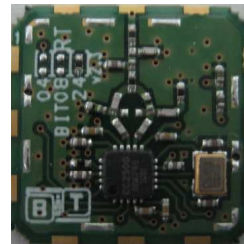




## RF Transceiver Module

### Applications

- Ultra low power wireless Transceiver
- 433/868/915 and 2400 Mhz ISM/SRD band systems
- Consumer Electronics
- Wireless audio
- Alarm and security systems
- Home and building automation
- Wireless sensor networks
- Industrial monitoring and control
- Low power Telemetry



### Product Description

The **BITxxRT** is a very low cost transceiver module designed for very low power wireless applications.

This module is intended for ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency band at 433, 868/915 and 2400 Mhz., but can easily be programmed for operation at other frequencies:

**BIT04RT** 400 – 464 Mhz

**BIT08RT** 800 – 928 Mhz

**BIT24RT** 2400 – 2483 Mhz

The Transceiver module supports various modulation formats and has a configurable data rate up to 500 kbps. The communication range can be increased by enabling a Forward Error Correction option, which is integrated in the module.

### Key Features

- Small size (20 x 20 mm package, 12 pins).
- Frequency bands:

**BITxxRT** provides extensive hardware support for packet handling, data buffering, burst transmissions, clear channel assessment, link quality indication and wake-on-radio.

The main operating parameters and the 64-byte transmit/receive FIFOs of **BITxxRT** can be controlled via an SPI interface. In a typical system, the **BITxxRT** will be used together with a microcontroller.

**BITxxRT** has a very small package only 20 x 20 mm ready for both PTH and SMT assembly.

**BITxxRT** is based on the well-proven [CC1101](#) (BIT04RT and BIT08RT), [CC2500](#) (BIT24RT) Chipcon Products from Texas Instruments.

1. BIT04RT 400 – 464 MHz
2. BIT08RT 800 – 928 MHz
3. BIT24RT 2400 – 2483.5 MHz.



## Features (continued from front page)

- High sensitivity (-110 dbm at 1.2 kbps, 1% PER at 433 and 868 Mhz and -106 dbm at 2.4 kbps, 1% PER at 2,4 Ghz).
- Programmable output power up to + 10 dBm for BIT04RT/BIT08RT and +1 dBm for BIT24RT.
- Low current consumption (15,4 mA in RX, 1,2 kbps, 433 Mhz and 13,3 mA in RX, 250 kbps, input 30 dB above sensitivity limit)
- Excellent receiver selectivity and blocking performance.
- Programmable baseband modem.
- Ideal for multi-channel operation.
- Configurable packet handling hardware.
- Suitable for frequency hopping systems due to a fast settling frequency synthesizer.
- Optional Forward Error Correction with interleaving.
- Separate 64-byte RX and TX data FIFOs
- Efficient SPI interface: All registers can be programmed with one "burst" transfer.
- Digital RSSI output.
- Programmable data rate up to 500 kbps
- BIT04RT/BIT08RT suited for system compliant with EN 300 220 (Europe) and FCC CFR Part 15 (US).
- BIT24RT suited for system compliant with EN 300 328 and EN 300 440 class 2 (Europe), CFR47 Part 15 (US) and ARIB STD-T66 (Japan).
- Integrated analog temperature sensor.
- Lead-free "green package."
- OOK/ASK, FSK, GFSK e MSK supported.
- Wake-on-radio functionality for automatic low-power RX polling.
- Flexible support for packet oriented systems: On chip support for sync word detection, address check, flexible packet length and automatic CRC handling.
- Programmable channel filter bandwidth.
- Automatic Frequency Compensation can be used to align the frequency synthesizer to the received centre frequency.
- Many powerful digital features allow a high-performance RF system to be made using an inexpensive microcontroller.
- Optional automatic whitening and dewatering of data.
- Support for asynchronous transparent receive/transmit mode for backwards compatibility with existing radio communication protocols
- Programmable Carrier Sense indicator
- Programmable Preamble Quality Indicator for detecting preambles and improved protection against sync word detection in random noise.
- Support for automatic Clear Channel Assessment (CCA) before transmitting (for listen-before-talk systems).
- Support for per-package Link Quality Indication



## 1. Absolute Maximum Ratings

Under no circumstances must the absolute maximum ratings given in Table 1 be violated. Stress exceeding one or more of the limiting values may cause permanent damage to the device.

Parameter	Min	Max	Unit	Condition
Supply voltage	-0.3	3.6	V	All supply pins must have the same voltage
Voltage on any digital pin	-0.3	VDD+0.3, max 3.6	V	
Voltage ramp-up rate		120	kV/ $\mu$ s	
Input RF level		+10	dBm	
Storage temperature range	-40	85	°C	
ESD		750	V	According to JEDEC STD 22, method A114, Human Body Model (HBM)
ESD		400	V	According to JEDEC STD 22, C101C, Charged Device Model (CDM)

**Table 1: Absolute Maximum Ratings**

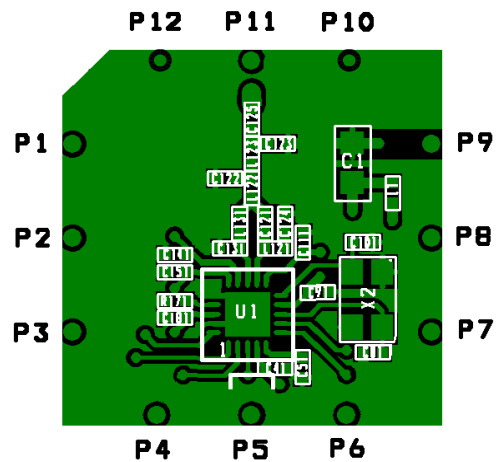
## 2. Operating Conditions

The operating conditions for BITxxRT are listed Table 2 in below.

Parameter	Min	Max	Units	Condition
Operating temperature	-30	85	°C	
Operating supply voltage	1.8	3.6	V	All supply pins must have the same voltage

**Table 2: Operating Conditions**

### 3. Pin-Out

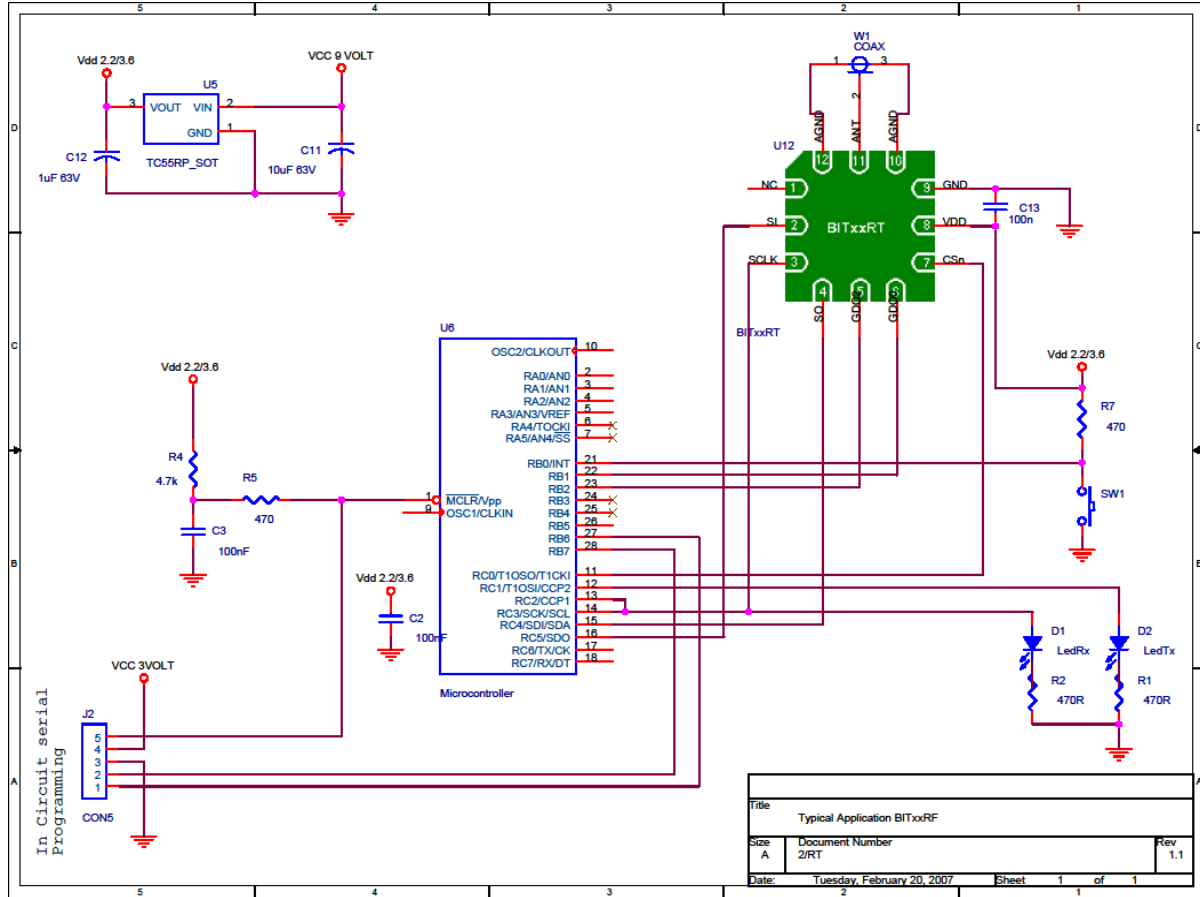


Pin #	Pin Name	Pin Type	Descrizione
P1	NC	NC	
P2	SI	Digital Input	Serial configuration interface, data input
P3	SCLK	Digital Input	Serial configuration interface, clock input
P4	SO GDO1	Digital Output	Serial configuration interface, data output Optional general output pin when CSn in High
P5	GDO2	Digital Output	Digital Output pin for general use: <ul style="list-style-type: none"> <li>• Test signal</li> <li>• FIFO status signals</li> <li>• Clear Channel Indicator</li> <li>• Clock output, down-divided from XOSC</li> <li>• Serial output RX data</li> </ul>
P6	GDO0	Digital I/O	Digital Output pin for general use: <ul style="list-style-type: none"> <li>• Test signal</li> <li>• FIFO status signals</li> <li>• Clear Channel Indicator</li> <li>• Clock output, down-divided from XOSC</li> <li>• Serial output RX data</li> <li>• Serial input TX data</li> </ul> Also used as analog test I/O for prototype/production testing
P7	CSn	Digital Input	Serial configuration interface, chip select
P8	VDD	Power	1.8V – 3.6V analog power supply connection
P9	GND	Ground	Ground Connection
P10	AGND	Ground	Ground Connection for Antenna
P11	RF	RF I/O	RF input/output to Antenna
P12	AGND	Antenna Ground	Ground connection for Antenna

**Table3: Pin-Out**



### 4. Typical application



source code is available on the web for this typical application.

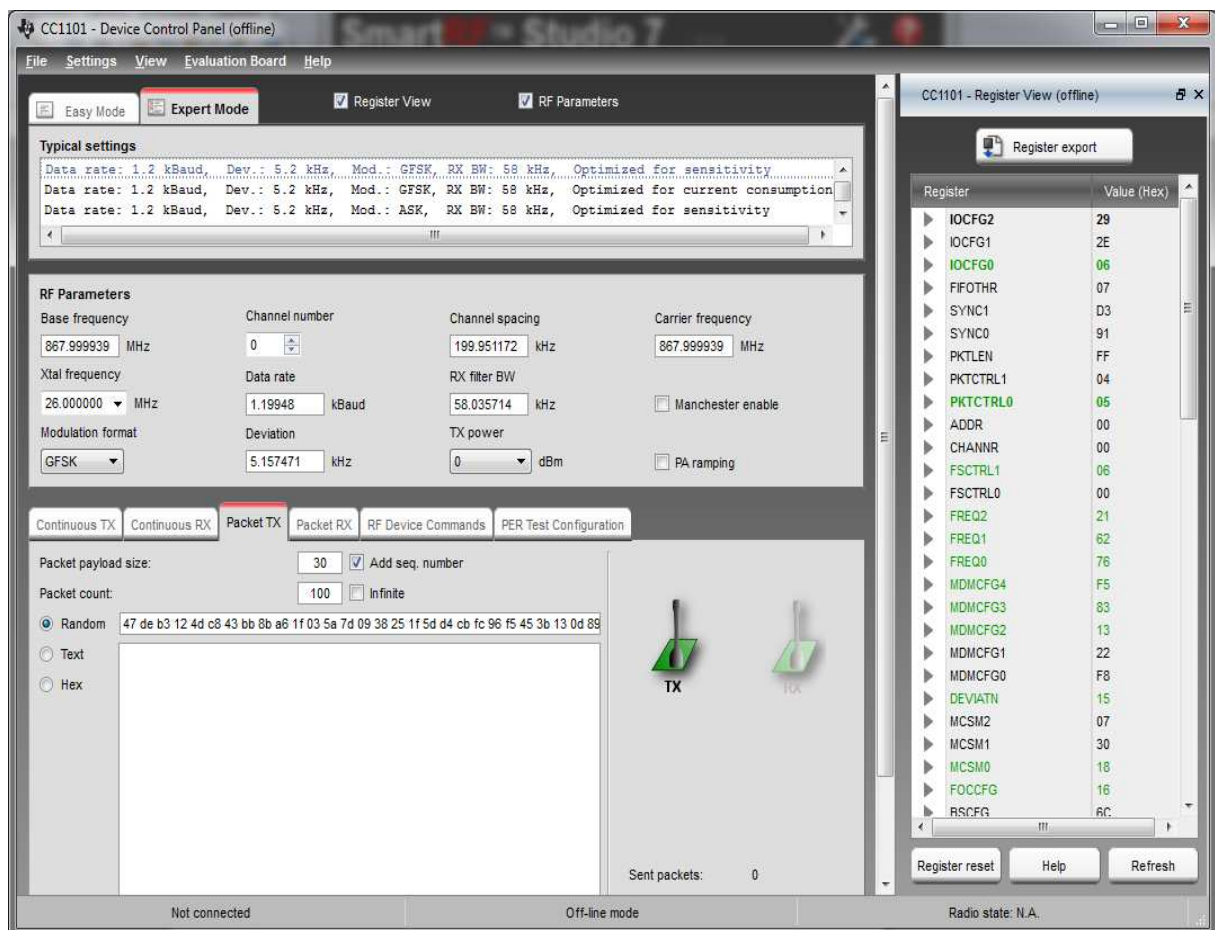
## 5. Development Tools

### 5.1. Technical Documents:

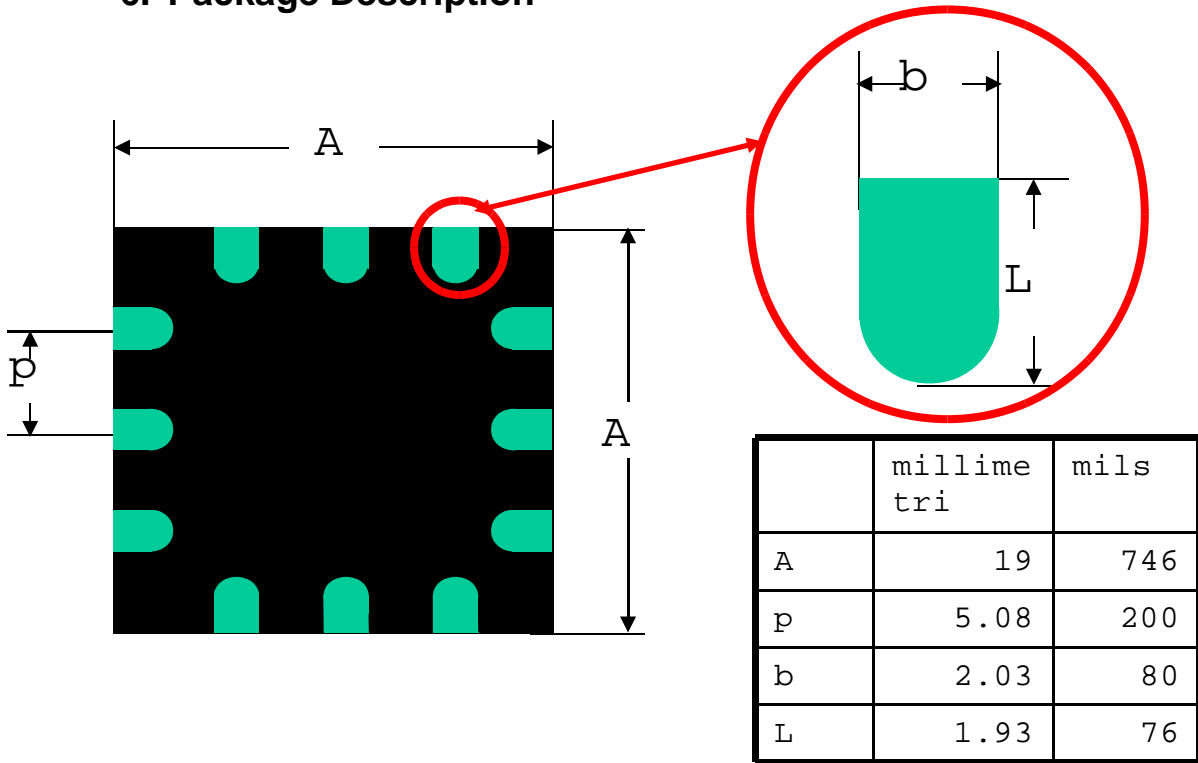
Data sheet CC1101 or CC2500 available for download from <http://www.chipcon.com> or <http://www.ti.com/lpw>

### 5.2. Configuration Software

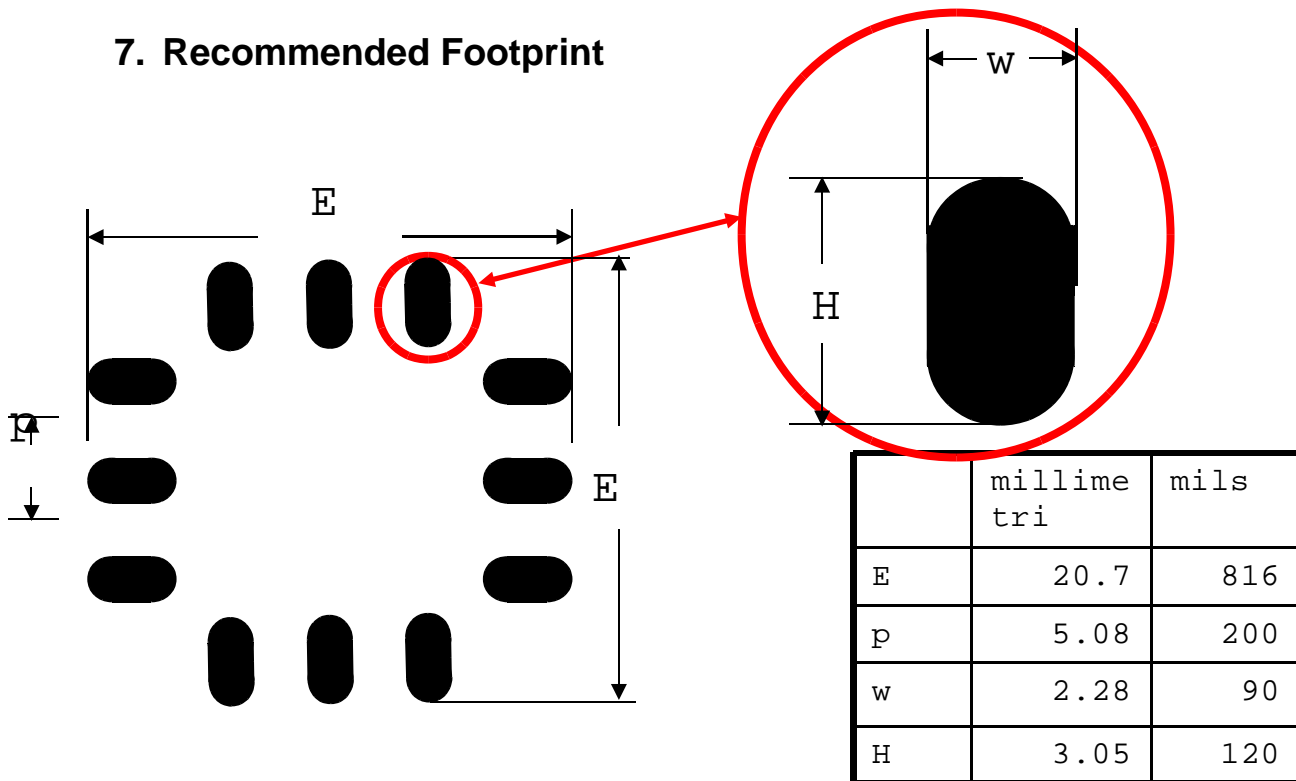
BITxxRT can be configured using the SmartRF® Studio software, available for download from <http://www.chipcon.com> or <http://www.ti.com/lpw> The SmartRF® Studio software is highly recommended for obtaining optimum register settings, and for evaluating performance and functionality. A screenshot of the SmartRF® Studio user interface for CC1101 is shown in Figure



## 6. Package Description



## 7. Recommended Footprint



The area underneath the module should be covered with solder resist in order to prevent short circuiting the test pads on the back side of the module. A solid ground plane is preferred.



## 8. PACKAGING INFORMATION

Orderable device	Status	Package Type	Pins	Package Qty	Eco Plan	MSL Peak Temp
BIT04RT	ACTIVE	MLF	12	84	Green (RoHS & no Sb/Br)	Level-2-260C-1 YEAR
BIT08RT	ACTIVE	MLF	12	84	Green (RoHS & no Sb/Br)	Level-2-260C-1 YEAR
BIT24RT	ACTIVE	MLF	12	84	Green (RoHS & no Sb/Br)	Level-2-260C-1 YEAR

## 9. General Information

### 9.1. Disclaimer

B.I.T. srl believes the information contained herein is correct and accurate at the time of this printing. However, B.I.T. srl reserves the right to make changes to this product without notice. B.I.T. srl does not assume any responsibility for the use of the described product; neither does it convey any license under its patent rights, or the rights of others. The latest updates are available at the BIT website or by contacting BIT directly.

As far as possible, major changes of product specifications and functionality, will be stated in product specific Errata Notes published at the BIT website. Customers are encouraged to sign up to the Developers Newsletter for the most recent updates on products and support tools.

Compliance with regulations is dependent on complete system performance. It is the customer's responsibility to ensure that the system complies with regulations.

### 9.2. Life Support Policy

This BIT product is not designed for use in life support appliances, devices, or other systems where malfunction can reasonably be expected to result in significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. B.I.T. srl customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify B.I.T. srl for any damages resulting from any improper use or sale.



è una società del gruppo



Bit is Italian Technology S.r.l.  
Viale delle Industrie, 20 – 20020 Arese (MI)  
Tel.: (+39) 02 30465311, fax: (+39) 0230465396  
<http://www.bit.it/> [info@bit.it](mailto:info@bit.it)

<http://www.kevin.it/>

[info@kevin.it](mailto:info@kevin.it)