



## Double Frequency RF Transmitter

### Applications

- 433/868 MHz ISM band systems
- Consumer Electronics
- Wireless audio
- Alarm and security systems
- Home and building automation
- Wireless sensor networks
- Industrial monitoring and control



### Product Description

**BIT48TX/PA** is a very low cost RF transmitter module designed for short and medium range wireless applications.

This module is intended for ISM (Industrial, Scientific and Medical) frequency band @ 433, 868/915 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.

**BIT48TX/PA** provides extensive hardware support for packet handling, data buffering, burst transmissions.

The main operating parameters and the 64-byte transmit FIFO of **BIT48TX/PA** can be controlled via an SPI interface. In a typical system, the **BIT48TX/PA** will be used together with a microcontroller.

**BIT48TX/PA** has a very small package: only 13 x 23 mm ready for SMT assembly.

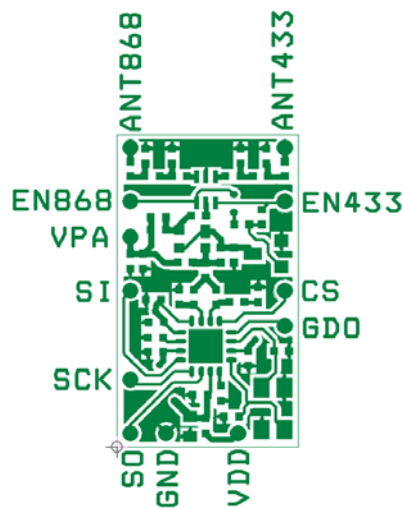
**BIT48TX/PA** is based on the well-proven [CC1150](#) Chipcon Products from Texas Instruments.

### Key Features

- Small size (13 x 23 mm package, 12 pins).
- Frequency bands:
  1. 400 – 464 MHz
  2. 800 – 928 MHz
- High output power (up to 18 dBm).
- Ideal for multi-channel operation.
- Programmable output power up to + 18 dBm @ VPA = 12V.
- Ideal for multi-channel operation.
- Suitable for frequency hopping systems due to a fast settling frequency synthesizer.
- Optional Forward Error Correction with interleaving.

**Features (continued from front page)**

- 64-byte TX data FIFO
- Efficient SPI interface: All registers can be programmed with one “burst” transfer.
- Programmable data rate up to 500 kbps
- OOK/ASK, FSK, GFSK e MSK modulation format supported.
- Pb-free (RoHS compliant) package.

**1. Pin-Out**


| Pin #      | Pin Name        | Pin Type       | Descrizione  |
|------------|-----------------|----------------|--|
| <b>P1</b>  | EN868           | Digital Input  | Transmit 868 enable signal   |
| <b>P2</b>  | V <sub>PA</sub> | Power          | 2.2V – 12V power amplifier supply connection   |
| <b>P3</b>  | SI              | Digital Input  | Serial configuration interface, data input   |
| <b>P4</b>  | SCK             | Digital Input  | Serial configuration interface, clock input  |
| <b>P5</b>  | SO              | Digital Output | Serial configuration interface, data output  |
| <b>P6</b>  | GND             | Ground         | Ground Connection  |
| <b>P7</b>  | V <sub>DD</sub> | Power          | 1.8V – 3.6V frequency sintethyzer supply connection  |
| <b>P8</b>  | GDO             | 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>▪ Clock output, down-divided from XOSC</li> <li>▪ Serial input TX data</li> </ul> |
| <b>P9</b>  | CS              | Digital Input  | Serial configuration interface, chip select  |
| <b>P10</b> | EN433           | Digital Input  | Transmit 433 enable signal   |
| <b>P11</b> | ANT433          | RF Out         | 433 MHz Antenna Connection   |
| <b>P12</b> | ANT868          | RF Out         | 868 MHz Antenna Connection   |



## 2. Electrical Specification

| Parameter                  | Test conditions  | Units  | Min          | Typ  | Max      |   |
|----------------------------|--|--|--------------|------|----------|---|
| $V_{DD}$                   |  | V  | 1.8          | -    | 3.6      |   |
| $V_{PA}$                   |  | V  | 1.8          | -    | 12       |   |
| $V_{IL}$                   | SI, SCK, SO, CS and GDO pin  | V  | 0            | -    | 0.7      |   |
|                            | EN868 and EN433 pin  | V  | 0            | -    | 0.2      |   |
| $V_{IH}$                   | SI, SCK, SO, CS and GDO pin  | V  | $V_{DD}-0.7$ | -    | $V_{DD}$ |   |
|                            | EN868 and EN433 pin  | V  | 2.3          | -    | 7.5      |   |
| $V_{OL}$                   | SI, SCK, SO, CS and GDO pin<br>Up to 4mA output current  | V  | 0            | -    | 0.5      |   |
| $V_{OH}$                   | SI, SCK, SO, CS and GDO pin<br>Up to 4mA output current  | V  | $V_{DD}-0.3$ | -    | $V_{DD}$ |   |
| $P_{OUT}$                  | CC1150 configured @ -1dBm output power<br>433 or 868 TX mode   |  |              |      |          |   |
|                            | $V_{PA} = 1.8V$  | dBm  | -            | 10   | -        |   |
|                            | $V_{PA} = 3V$  | dBm  | -            | 13.5 | -        |   |
|                            | $V_{PA} = 5V$  | dBm  | -            | 15   | -        |   |
|                            | $V_{PA} = 7.2V$  | dBm  | -            | 17   | -        |   |
| $V_{PA} = 12V$             | dBm  | -  | 18           | -    |          |   |
| <b>Current consumption</b> |  |  |              |      |          |   |
|                            | ▪ Stand-by mode  | EN433 = EN868 = 0V CC1150 in stand-by  | nA           | -    | 300      | - |
|                            | ▪ $I_{VPA} + I_{VDD}$  | EN433 = 3V ; EN868 = 0V; VPA = 3V<br>CC1150 configured @ -1dBm output power<br>433 MHz TX mode @ 13.5 dBm ANT433<br>output power . | mA           | -    | 49       | - |
| ▪ $I_{VPA} + I_{VDD}$      | EN433 = 0V ; EN868 = 3V; VPA = 3V<br>CC1150 configured @ -1dBm output power<br>868 MHz TX mode @ 13.5 dBm ANT868<br>output power . | mA   | -            | 49   | -        |   |

### 3. Development Tools

Configuration of main operating parameters are easily achieved using the SmartRF® Studio software described below.

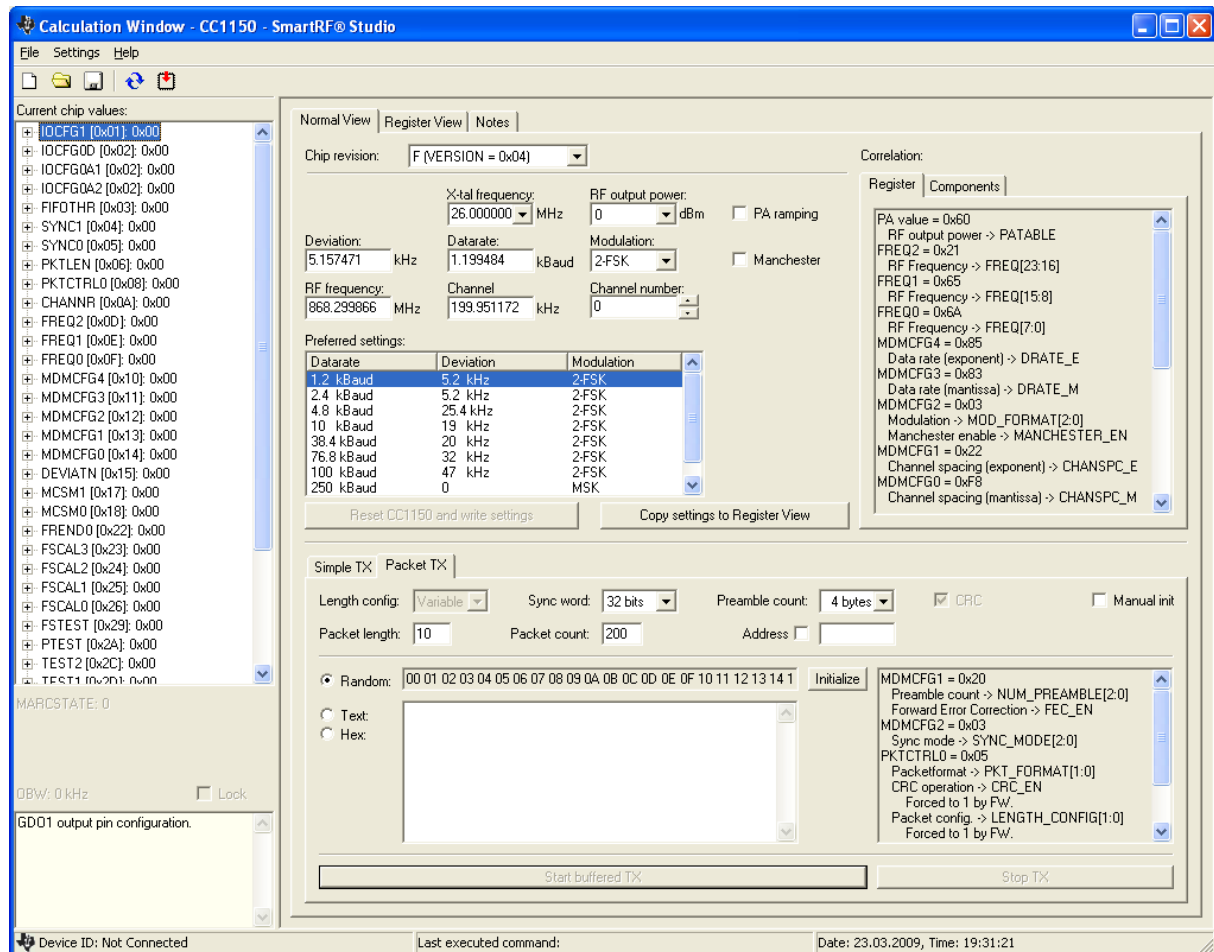
*It is strongly recommended not to use CC1150 output power configuration below -1dBm in order to achieve better performance in terms of spurious emission.*

#### 3.1. Technical Documents:

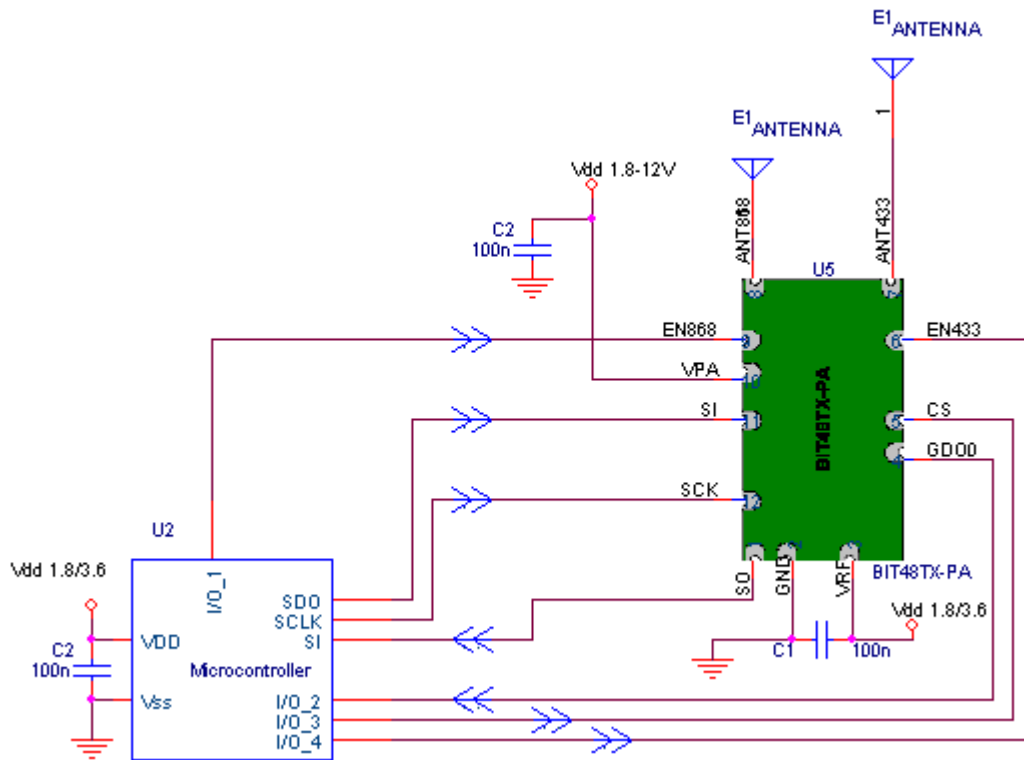
Data sheet CC1150 available for download from:  
<http://focus.ti.com/docs/prod/folders/print/cc1150.html>

#### 3.2. Configuration Software

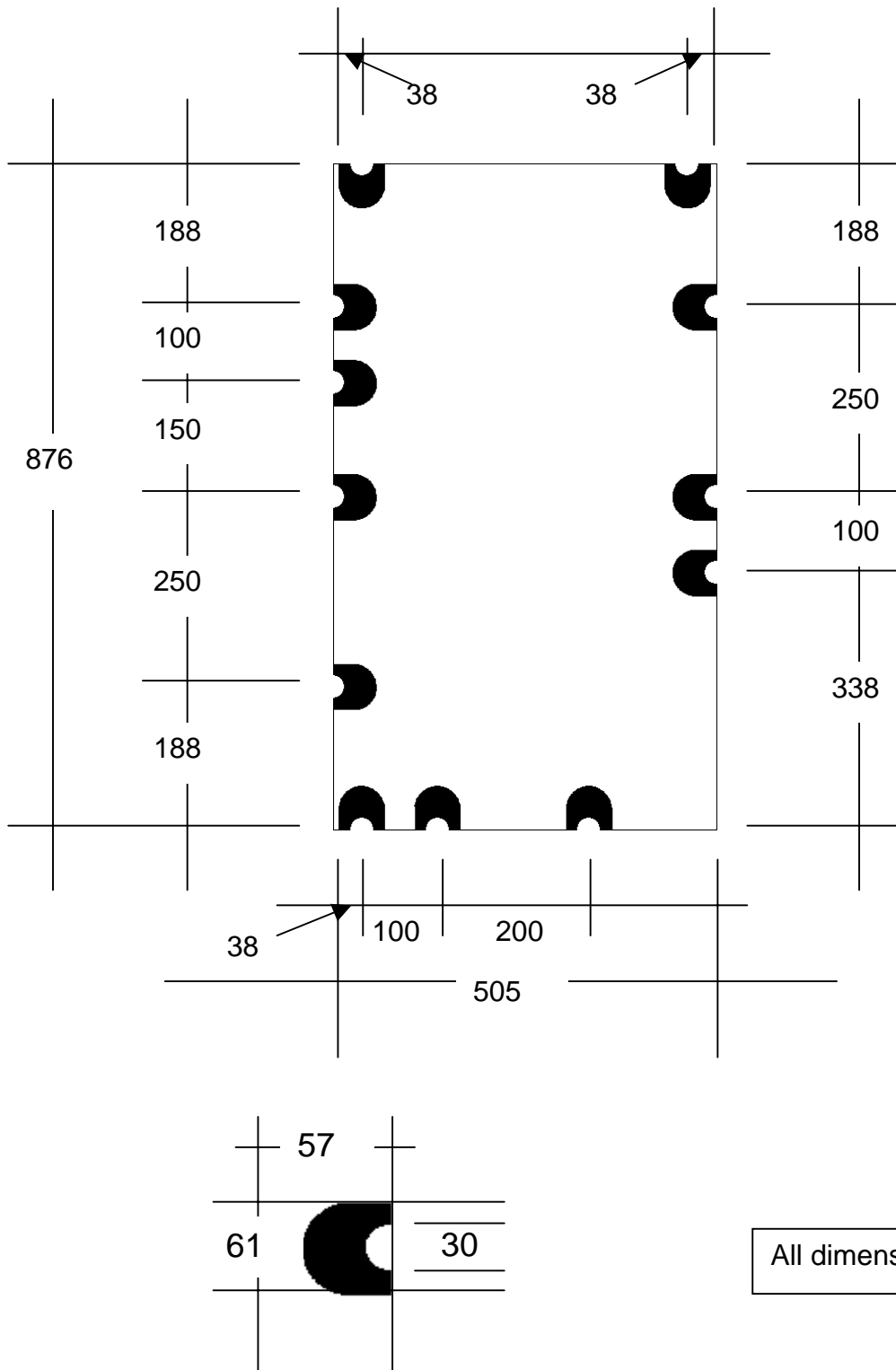
BIT48TX/PA can be configured using the SmartRF® Studio software, available for download from <http://www.chipcon.com> or <http://www.ti.com/lpw> The SmartRF® Studio software is highly recommended for obtaining optimum register settings, and for evaluating performance and functionality. A screenshot of the SmartRF® Studio user interface for CC1150 is shown in Figure.



#### 4. Typical application



### 5. Package Description



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.



## 6. General Information

### a. Disclaimer

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### b. 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.



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