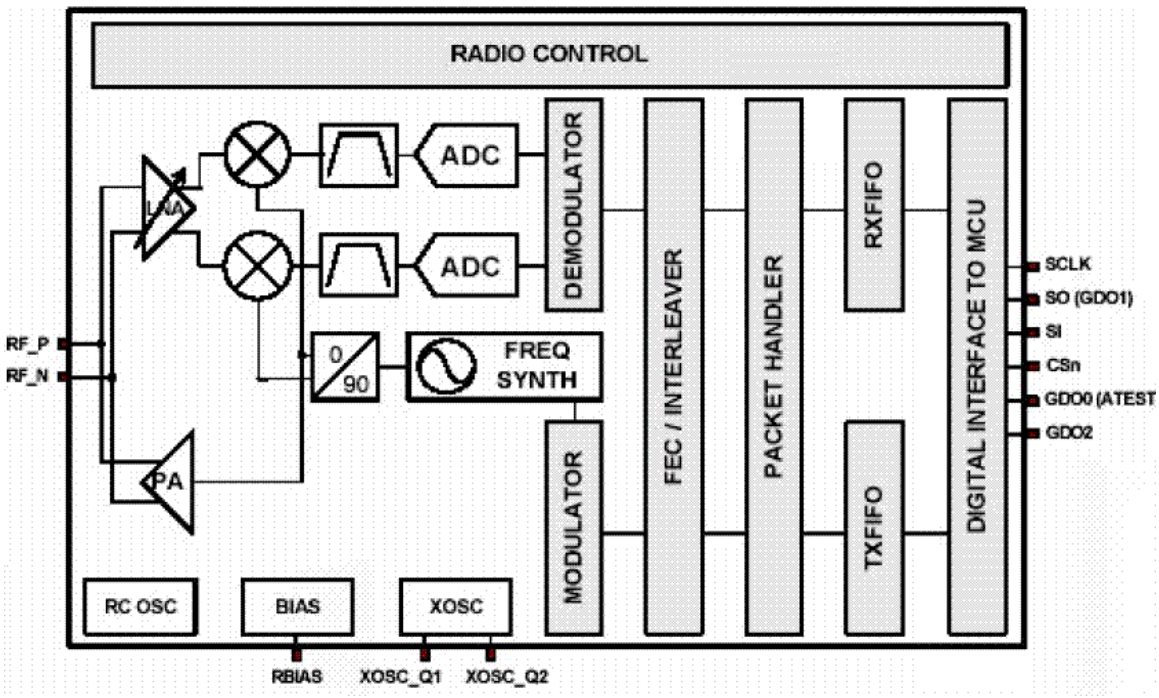
1、Overview

MD-01 is a low-cost,low-power single-chip RF transceiver module operatingin the 2.4GHz ISM band. MD-01 is designed for a small amount of data designed wireless controller.

2、Features

- Frequency between the 2400MHz ~ 2483.5MHz;
- Rate up to 250kbps, and high datathroughput;
- Has high sensitivity (the rate at 10Kbps under-98dbm, 1% packet error rate)
- Current consumption is very small, in the receive mode current is15.6mA;
- Design of the output power up to +1 dbm;
- Built-in CRC error detection hardware circuits and protocols
- Support for asynchronous transparent receive and transmit mode,and is compatible with existing wireless communication protocol

3、Principles and external chip module block diagram



4、Description

1）RF receive mode

MD-01(MC-01) at VDD = 3.0V, Tc = 25 ° condition, the receiversensitivity is -88dBm at the rate of 250Kbps , 10kbps rate when-98dBm, the digital channel filter bandwidth between the 58~650KHz bandwidth limit should be crystal proportional to the frequency.

2）RF transmit mode

MD-01's output power between-30dBm ~ +1 dBm, and spuriousradiation in the frequency of 25MHz ~ 1GHz ,is -36dBm, at 47 ~ 74,87.5 ~ 118,174 ~ 230,470 ~ 862MHz is -54dBm, the 1800MHz ~ 1900MHz (restricted band in Europe) is as-47dBm, and in 2 * RF 3 * RF (U.S. restrictions on the band) when -41dBm, the other is -30dBm when the frequencies above 1GHz.

3）4-wire configuration interface

When the MD-01 in a subordinate position, it's SI, SO,

SCLK,CSn four port is configured as a simple 4-wire synchronous parallel ports, which are also used as a buffer to read and writedata.

All the parallel port data transfer begins with the first byte, includinga read/write signal, the pulse signal and a 6-byte address.

During the address and data transmission, CSn pin (chip select,active low) must be kept low. If the transfer to take to CSn high, the transmission will be terminated.

When CSn is set low, the microcontroller must wait for theMD-01's low SO pin is set to begin after the first byte transfer, indicating that the voltage regulator has stabilized, crystal work,unless the transfer is completed or the chip in sleep state, CSn pin is set low after the SO pin will be set low.

4）Modulation

MD-01 supports amplitude modulation, frequency shift keying and phase shift keying mode

a) Amplitude modulation

MD-01 supports two different forms of amplitude modulationmode: off keying and amplitude shift keying. Off keyingmodulation, respectively, through simply set to "1" or "0" to turn onor turn off power make a big function, and amplitude shift keyingcan be programmed to adjust to a more sophisticated range ofsizes.

b) Frequency Shift Keying

FSK symbol coding as follows:

Format	Symbol	Coding
2FSK	'0'	– Deviation
	'1'	+ Deviation

c) Phase shift keying

Phase shift keying is in transit to maintain a certain Period to transmit data.

5）Wireless Control

a) Running order

When the power is turned on, the system mustbe reset. In one of two ways must be executed: automatic restart or manual restart

From time to time re-configuration is as follows:

- SCLK set to "1" while SI is set to "0" to avoid pin control modemay arise.
- Strobe CSn set high
- At least 40us CSn is high
- CSn low and wait for SO to be set low, then there is data to send or receive
- The synchronous reset signal gating
- When the SO once again set low, the reset is complete and thechip is idle

b) Mode

MD-01 has two operating modes: receive and send. These patterns through the micro-controller SRX or STX strobecommands to directly activate, or wake up automatically by thewireless.

c) Wireless wake-up (WOR) functionality

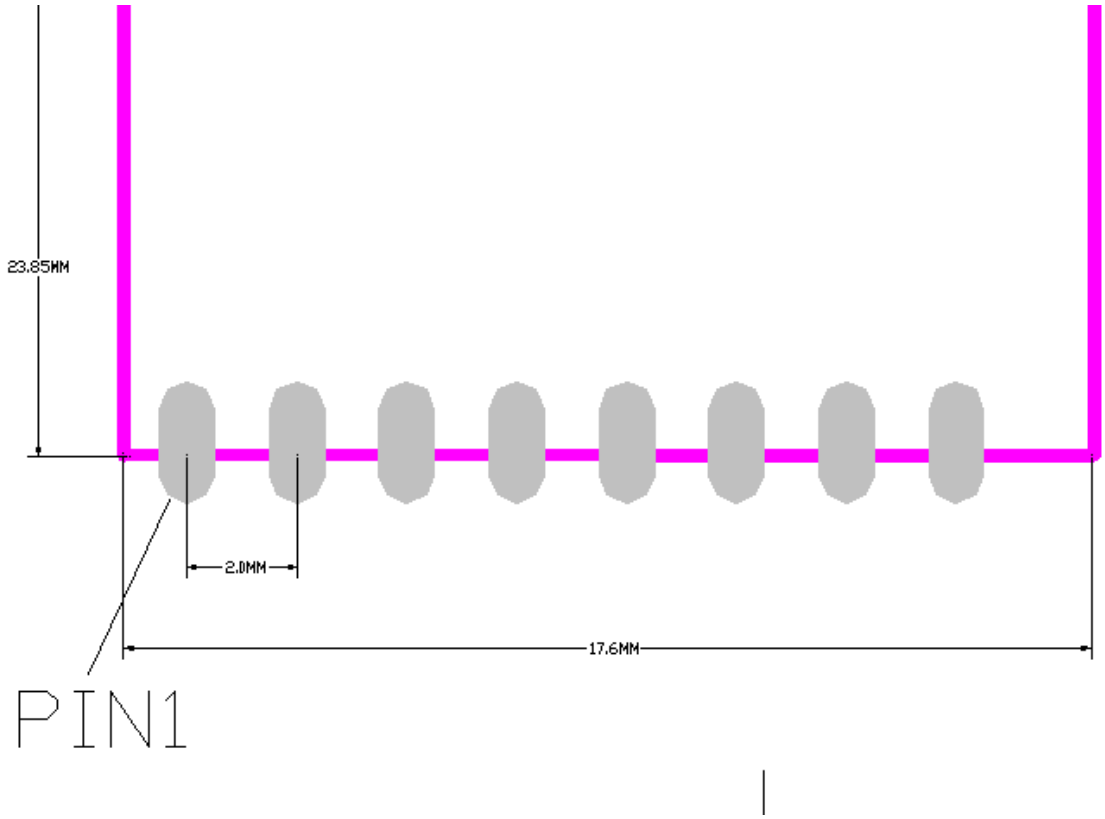
This optional wireless wake-up function can make the MD-01periodically wake up from a deep sleep. This function WOR has twocontrol modes choose to rely on PKTCTRL1.AUTOSYNCbits. When this bit is set to "0", the module will be wireless wake up in the Event0 point in time, and enters the RX State Event1point, which will ensure access to RX state at the exact time.

5、Limit rating

Parameter	Min	Max	Unit	Remarks
Input voltage	1.8	3.6	V	All power supply pin have the same voltage input
Max output power		1	dbm	
Max data transfer rate		250	Kbps	
Operating Temperature	－40	85	° C	
Storage Temperature	－50	150	° C	

6、Module size and pin description

Module size



FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
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 device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.
(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: 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.

Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.
The firmware setting is not accessible by the end user.
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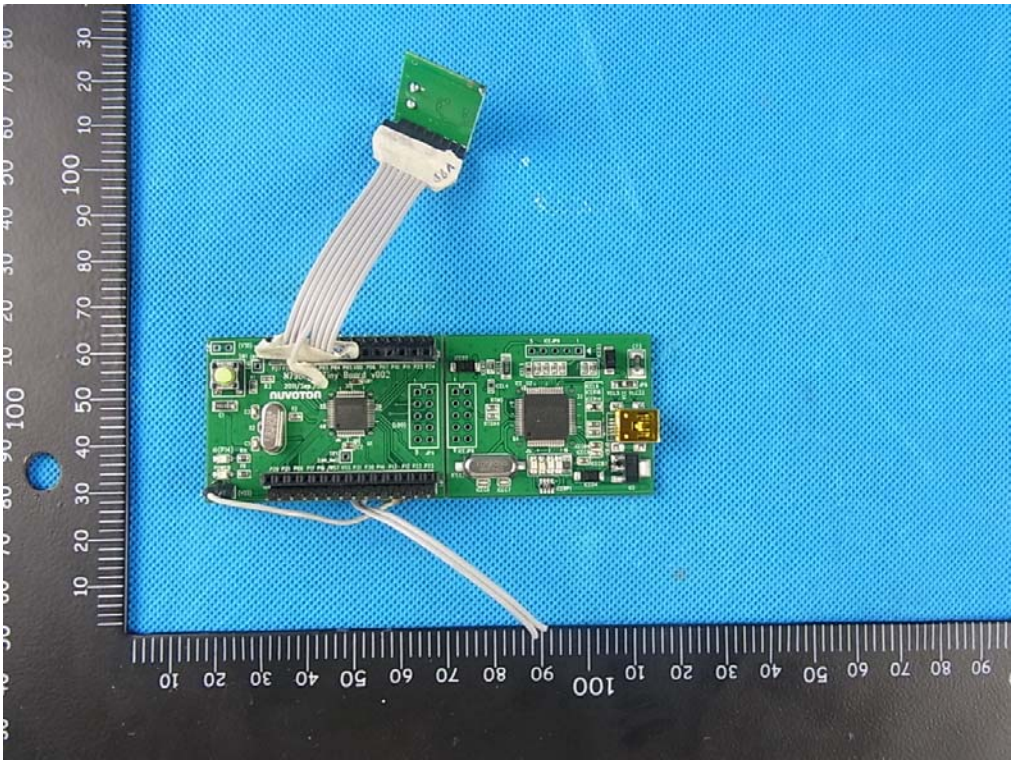
The final end product must be labelled in a visible area with the following:“Contains Transmitter Module FCC ID: TRIMD-01”

MD-01 pin description

Pin	Name	Pin Function	Description
1	VCC	Power supply	Positive power supply
2	SI	Digital input	Configuration mode input
3	SCLK	Digital input	Configuration mode, the clock input
4	SO	Digital input	Configuration mode output
5	GDO2	Digital input	Configuration mode to read data
6	GND	Ground	Ground
7	GDO0	Digital input / output	As a general purpose digital output
8	CSn	Digital input	Chip select Configuration mode

Control PCB + MD-01



Control PCB