User manual of Meter Module

Product Model: MJN53.R410

Document Edit History

No	Date	Author	Version	Content
1	2020-10-27	fengxu	0.1	Create this document
2	2021-01-29	WH	0.2	Add pin define picture.

1. Overview

The MJN53.R410 is a low power and high performance wireless communication module based on Atmel AT86RF215, which can be widely used in many short distance IoT wireless communication field. The MJN53.R410 not only features with small size, low power consumption, long transmission distance and strong anti-interference ability, but also meets the IEEE802.15.4g/e、Wi-SUN、Wireless M-Bus、6LoWPAN standards, therefore it is very suitable for IO network and sensor applications where powerful computing capability is needed.

2. Features

•Working band

-902.2~927.8MHz(50 kbps), 902.4~927.6(150 kbps)

•Radio Frequency

- Sensitivity up to: -109dBm@50kbps_h1_GFSK - Tx output power: 29dBm(typical)

•Mechanical Size

- 109mm*46mm

•Protocol & Standard

IEEE802.15.4g/e、Wi-SUN

3. Application

AMI(Advanced Metering Infrastructure)

IOT(Internet of Things)

-Smart Home System

-Sensor network

- Industrial automation

-Industrial HEMS

- Electronic station signs, intelligent traffic scheduling

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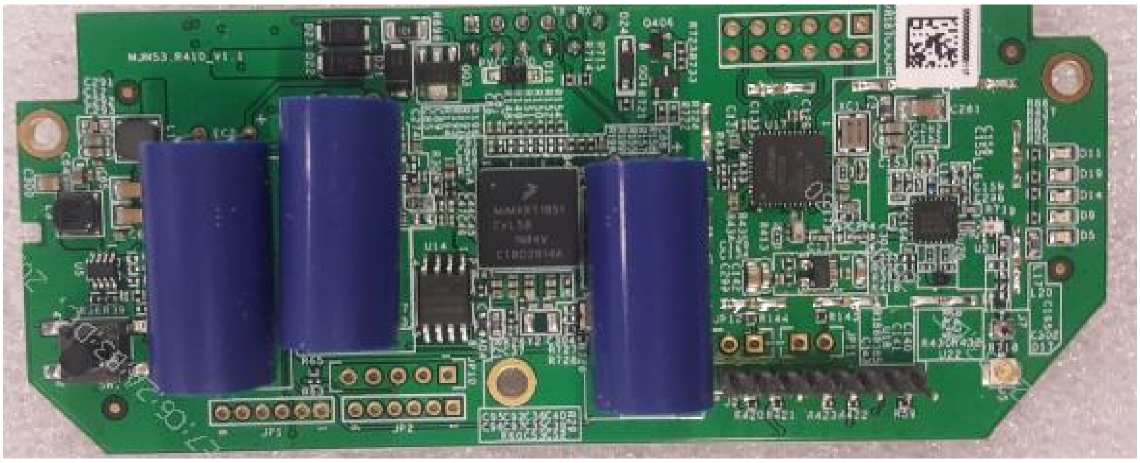
5. Specification

Item	Value			Note
	Min	Typical	Max	
Voltage（V）		8		
Working band(Mhz)	902	915	928	
Temperature（℃）	-40	+25	+85	
Output Power(dBm)	28.56			conducted
Receive Sensitivity(dBm)		-109		PER10%/50kbps/h=1/GFSK
Data Rate	50kbps/150kbps			
Channel spacing	200kHz/400kHz			
Frequency hopping channels	129 (50kbps) 64(150kbps)			
Interface Type	Header connector			
Communication Interface	UART			
Size(mm)	109*46mm			
Supported Standards	IEEE802.15.4g/e、Wi-SUN			

*Based on nominal voltage 8V, temperature 25℃, relative humidity 20%

6. Photos and Pin definition

6.1 Photos



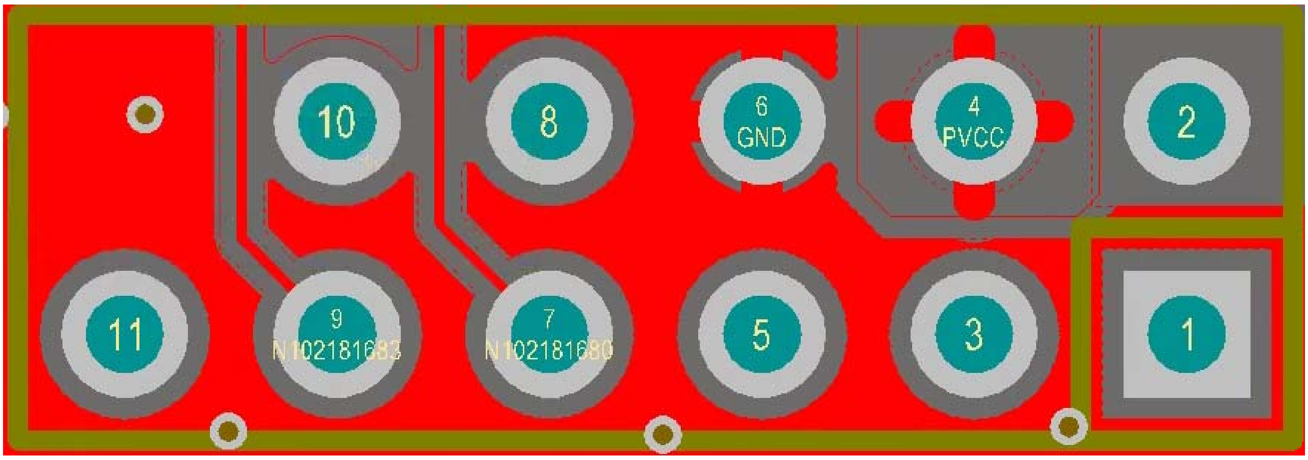
Top layer

Bottom layer

6.2 Pin Definition

Pin Designator	Pin Name	Note
4	PVCC	POWER
6	GND	GND
7	UART_TXD	COM UART between meter and module
9	UART_RXD	COM UART between meter and module
1,2,3,5,8,10,11	NC	NC

Bottom J6 Pin define:



7.Installation:

Attention:Installation should be performed by a qualified professional.
Ensure all the parts are included in your kit.
MJN53.R410 Modules are used for gateways and meters and concentrators.
Take installing it on an electricity meter.

7.1 Assemble MJN53.R410 into NIC.

Follow the steps below to assemble the NIC.

7.2 The NIC is connected to antenna through the adapter, and then tighten it.

7.3 The NIC is connected to the meter via a serial port,plug and play.

7.4 Install the meter

A) Installation tools

Cross screwdriver	
Electric drill	
Wire stripper	
Lead sealing pliers	
Hairsprings	
Screw	

B) Preparation before installation

- The meter should be installed in ventilated and dry place to ensure the meter's safety and reliability. In the dirty or risky area, the meter should be installed in a protection box.
- Meter should be fixed on a firm, fire-resistant and stable support.
- Before installation, please check if the meter has been damaged during the

transportation(damage of meter cover, hanger, seal, and LCD display, etc)

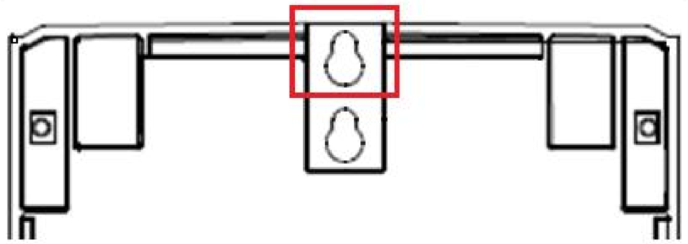
- As the internal part of the electrical meter is composed by the delicate electronic components, the meter should be carefully protected during the installation in order to avoid any damage.

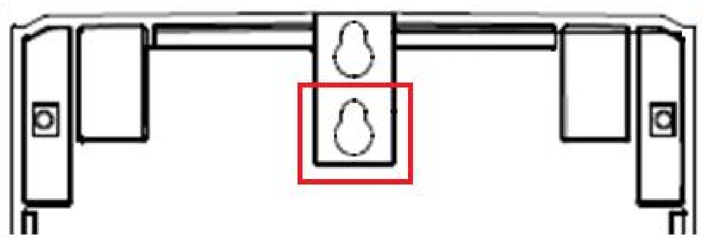
WARNING Make sure that the power is cut off before the meter installation, otherwise it will cause a threat to life. The fuse should be disconnected and put it in a safe place to avoid the accidental power-on.

C) Installation procedure

1、 Select the proper position according to the meter dimensions, and indicate fixing points of the meter on the installation panel.

2、 Drill down holes on previously marked positions. (make sure that there's no cable behind before punching, avoid ruining the cable and threatening personal safety)





3、 Open the meter terminal cover, and adjust the height of hanger.

4、 Using the vertical installation method, the meter is hanging on the hanger screw, and fixed on the bottom by two screws. Need to ensure that the 3 screws are completely banned, and the meter is installed firmly, without shaking.

NOTE To ensure the installation stability, the diameter of hanger screw must be greater than 11mm, and the diameter of bottom fixed screws must be greater than 7mm.

5、 Cut the cable to the required length and use the wire stripper to uncover the cable. The recommended bare metal length after stripping is at least 20mm for this series of products.

WARNING We insist on the recommended length of the stripped wire to ensure that the bare metal part is long enough and can be fixed by two connection screws at the same time. However the bare part should not exceed the

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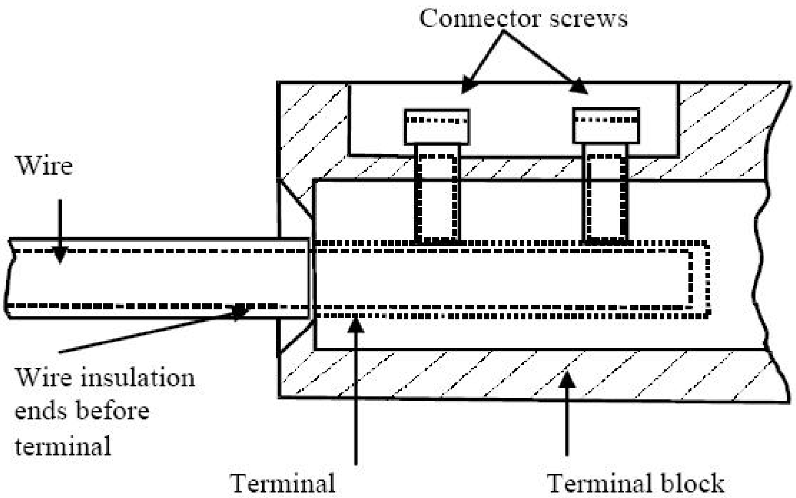
terminal box wiring holes, ensure the safety and insulation effect.

6、 When using a small sectional cable, such as 4mm squared, the cable must be placed in the medium to ensure that the screw is well tightened without deviation.



7、 The cables should be connected correctly according to the wiring diagram and the terminals should be tightened during the installation in order to avoid any damage caused by bad connection.

NOTE	The bad fixing of connection screws will lead to the raise of resistance, which can lead to electrical energy loss and heating of terminals. The heating of component is risky. Besides, 1mΩ contact resistance in a circuit of 80A will result in 6.4 W power losses.

8、 The cables should be connected correctly according to the definition of the auxiliary terminal (such as pulse output, signal input or RS485 communication).

WARNING	Be attention to not be mistakenly connected the auxiliary terminal to the voltage or current line, so as to avoid damage to meter.

9、 Check connecting wire carefully and avoid any error (such as the reverse wiring for the incoming and outgoing lines, the wrong connection of live and neutral, the bad fixing of screws).

NOTE	To ensure the correct wiring, it is recommended to use the appropriate testing tools (such as multi-meters) for input/output test.

10、 Close the terminal cover, and sealed it.

NOTE	Please to ensure that the terminal cover is closed tightly, otherwise it will cause the meter relay cut off due to terminal cover open(If required, can add this relay off through terminal cover open).

8.1 Testing after installation

- Insert the fuse, connect to the grid
- Check the meter display, is there any malfunction indication, phase inverse, cover open, or strong magnetic field, no current indictor.
- Press button to display voltage value, double confirm the voltage.
- Check the relay is on the right position (if the symbol ' ' is shown on the LCD).

8.2 Un-installation

1、 Remove the fuse and power off the meter.

WARNING	Make sure that the power is cut off before the meter un-installation, otherwise it will cause a threat to life. The fuse should be disconnected and put it in a safe place to avoid the accidental power-on.

2、 Cut off the terminal cover seal, and remove the terminal cover.

3、 Use the voltage test equipment (such as multi-meter) to test meter connecting wire and confirm power-off before go to the next operation.

4、 Use the appropriate screwdriver to unscrew the meter auxiliary terminal screws and remove the connecting wires.

5、 Use the appropriate screwdriver to unscrew the current connection screws and remove the connecting wires.

6、 Using the appropriate screwdriver to unscrew the meter fixing screws.

7、 Take off the meter.

CAUTION	The meter un-installation should be done according to the above mentioned order. Be attention to prevent meter from dropping down, which will cause injuries and damage the meter itself.

8、 If necessary, please replace a new meter.

⚠ WARNING	If a new meter cannot be installed for the moment, please envelop the voltage and current connection cables in insulating material and avoid exposing any bare metal part, otherwise it will pose a threat to life.

9.How to use：

Power on the meter, the module will be in the working , when the module receives the user’s command information, the module will return the corresponding information to the user device.

FCC Statement：

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the 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.

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

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.