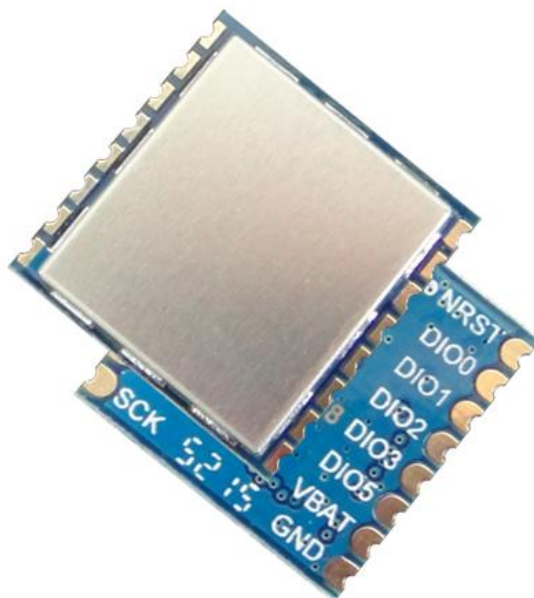


1. General

RF1276F is a type of low cost RF front-end transceiver module based on SX1276 from Semtech Corporation. It keeps the advantages of RFIC SX1276 but simplifies the circuit design. The high sensitivity (-148dBm) in LoRa modulation and 20dBm high power output make the module suitable for low range and low data rate applications.

RF1276F module consists of RFIC SX1276, thin SMD crystal and antenna matching circuit. The antenna port is well matched to standard 50 Ohm impedance. Users don't need to spend time in RF circuit design and choose suitable antennas for different applications. RF1276F operates at 1.8~3.6V with extra low standby current which makes it suitable for battery powered-up applications. Because RF1276F is purely hardware module and it adopts ± 10 ppm crystal which the resolution of it places a important role in calculating spreading factor, bandwidth, etc. Users need to read the datasheet of SX1276 carefully in order to use the module in the best performance.



2. Features

- Frequency Band: 169MHz,433MHz,868MHz
- Modulation: FSK/GFSK/MSK/LoRa
- SPI Data Interface
- Sensitivity: -148dBm
- Output Power: +20dBm
- Data Rate: <300 kbps
- 127dB dynamic Range RSSI
- Excellent blocking immunity
- Preamble detection
- Automatic RF sense and CAD monitor
- Built-in bit synchronizer for clock recovery
- Packet engine up to 256 bytes with CRC
- Working Temperature: -40°C ~+80°C
- Build-in temperature sensor
- Standby current: $\leq 1\mu\text{A}$
- Supply voltage: 1.8~3.6V

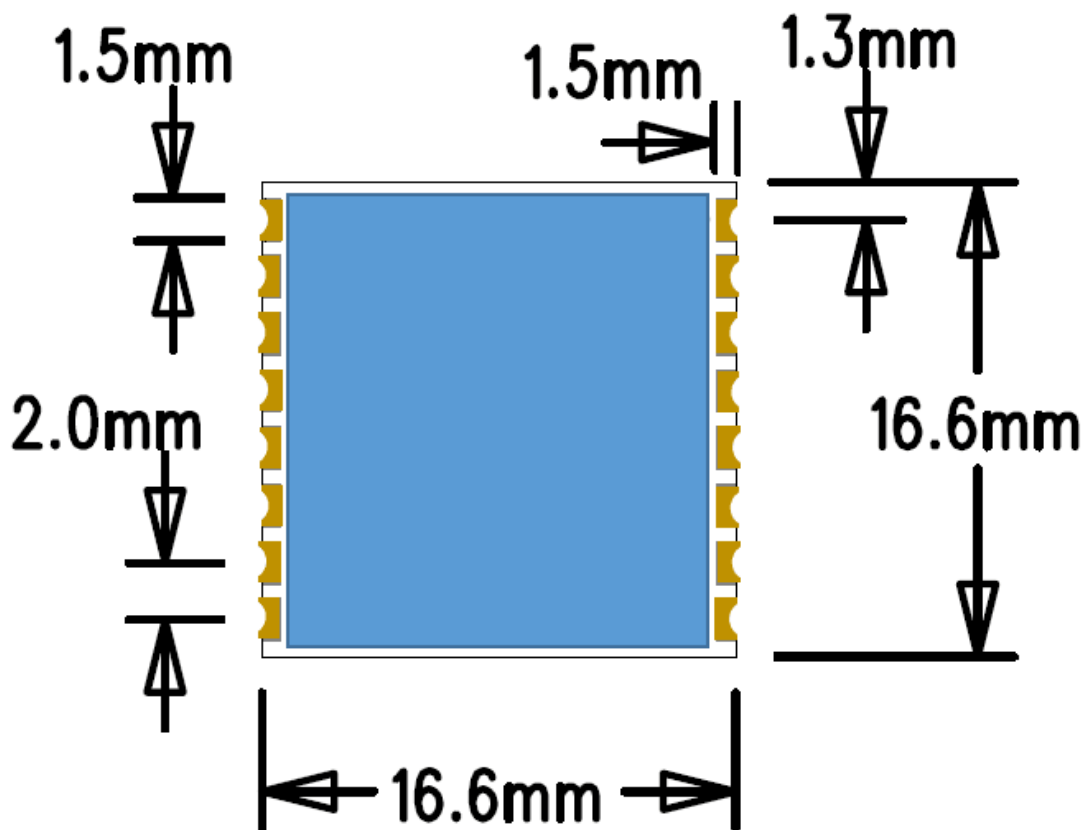
3. Application:

- Automated Meter Reading (AMR)
- Remote control, remote measurement system
- Access control
- Data collection
- Identification system
- IT household appliance
- Baby monitoring system

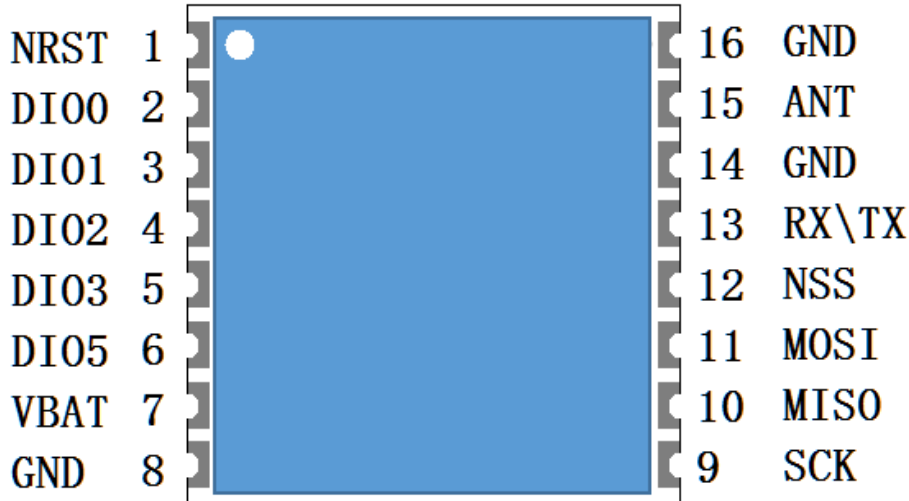
4. Maximum specification

Symbol	Parameter	Min	Max	Units
VCC	Supply Voltage	2.1	3.6	V
VI	Input voltage		VCC+0.3	V
VO	Output voltage		VCC+0.3	V
TOT	Operation Temperature	-30	85	°C
HOH	Operation Humidity	10%	90%	
T _{ST}	Storage Temperature	-55	125	°C

5. Dimension:



6. Pin out:



PIN	Name	Function	Description
1	NRST	Reset	Reset trigger input
2	DIO0	Input/Output	Software configured
3	DIO1	Input/Output	Software configured
4	DIO2	Input/Output	Software configured
5	DIO3	Input/Output	Software configured
6	DIO5	Input/Output	Software configured
7	VBAT	Power input	1.8V-3.6V
8	GND	Ground	Ground pin, 0V
9	SCK	SPI	SPI clock input
10	MISO	SPI	SPI data output
11	MOSI	SPI	SPI data input
12	NSS	SPI	SPI chip select input
13	RX/TX	RX/TX control	Switch TX and RX mode(transmit Low, Sleep Low,Receiving High)
14	GND	Power Ground	Ground pin, 0V
15	ANT	ANT port	Radio output
16	GND	Power Ground	Ground pin, 0V

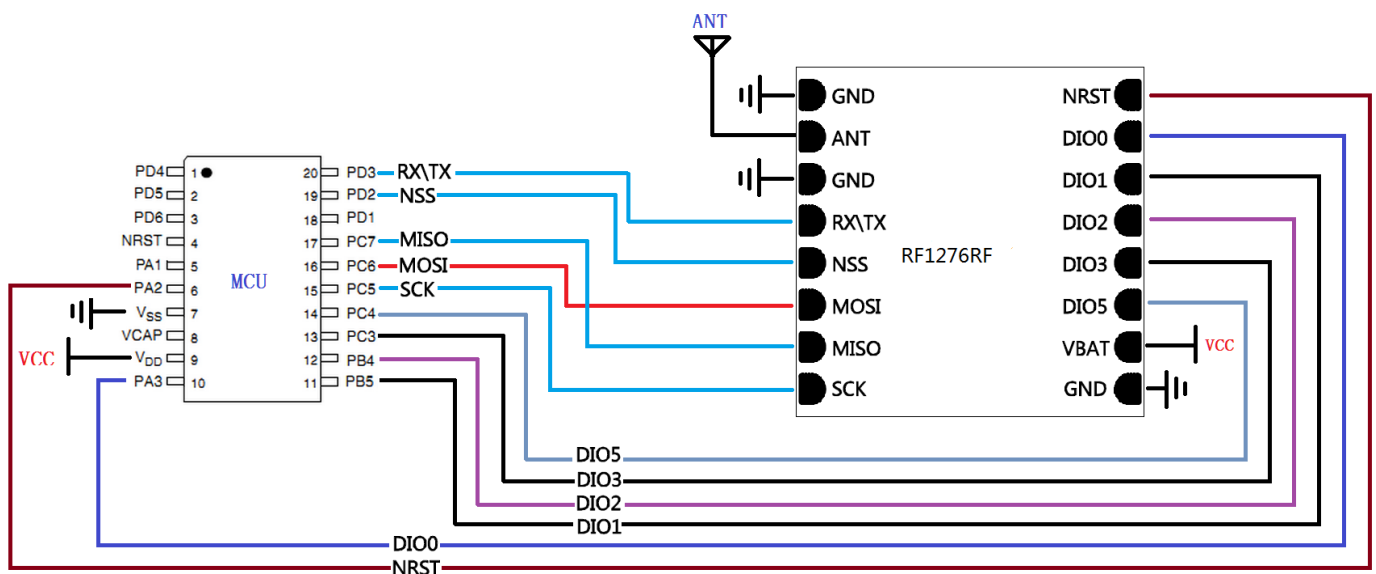
Table 1: Pin definition

7. Electrical Specification

RF1276F Long Range LoRa Front-end module V2.0

Symbol	Parameter(condition)	Min	Typ.	Max.	Units
VCC	Supply Voltage	2.1	3.3	3.6	V
Temp	Operating temperature range	-40	25	80	°C
Freq	Frequency Range	410	433	460	MHz
IDD_R	Current in receive mode		12		mA
IDD_T	Current in transmit mode		120	125	mA
IDD_S	Current in sleep mode.			1	uA
Pout	Max. output power		20		dBm
Sen	Receiver sensitivity @LoRa 300bps			-148	dBm
ZANT	Antenna Impedance		50		Ohm

8. Application Schematic



9. Technical instruction

TX and RX pins are used for controlling receiving and transmitting mode:

Transmit	TX pin	RX pin	Receiving	TX pin	RX pin
	High level	Low level		Low level	High level

REST pin is used for reset RF1276F module. Low level is effective. High level is in the working status.

Keep REST pin in High level after reset successfully.

RF1276F Long Range LoRa Front-end module V2.0

There are 5 GPIO pins in RF1276 module. These 5 pins are used as controlling register for function definition.

Address	bit	Pin	Address	bit	Pin
0X40	7~6	GPIO0	0X41	Reserved	
	5~4	GPIO1		5~4	GPIO5
	3~2	GPIO2		Reserved	
	1~0	GPIO3		Reserved	

Relationship of GPIO pins and register

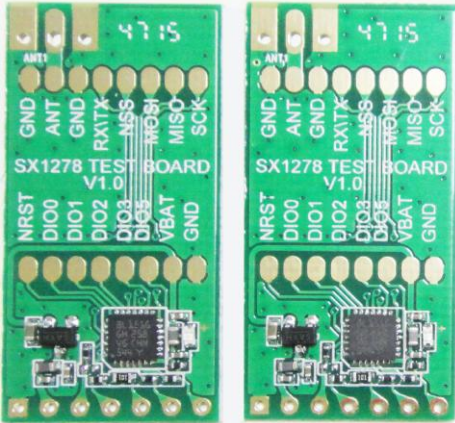
Register value	GPIO0	GPIO1	GPIO2	GPIO3	GPIO5
00 (bit)	RxDone	RxTimeout	FhssChangeChannel	CadDone	ModeReady
01 (bit)	TxDone	FhssChangeChannel	FhssChangeChannel	ValidHeader	ClkOut
10 (bit)	CadDone	CadDetected	FhssChangeChannel	PayloadCrcError	ClkOut
11 (bit)	Reserved	Reserved	Reserved	Reserved	Reserved

Relationship of register value and function

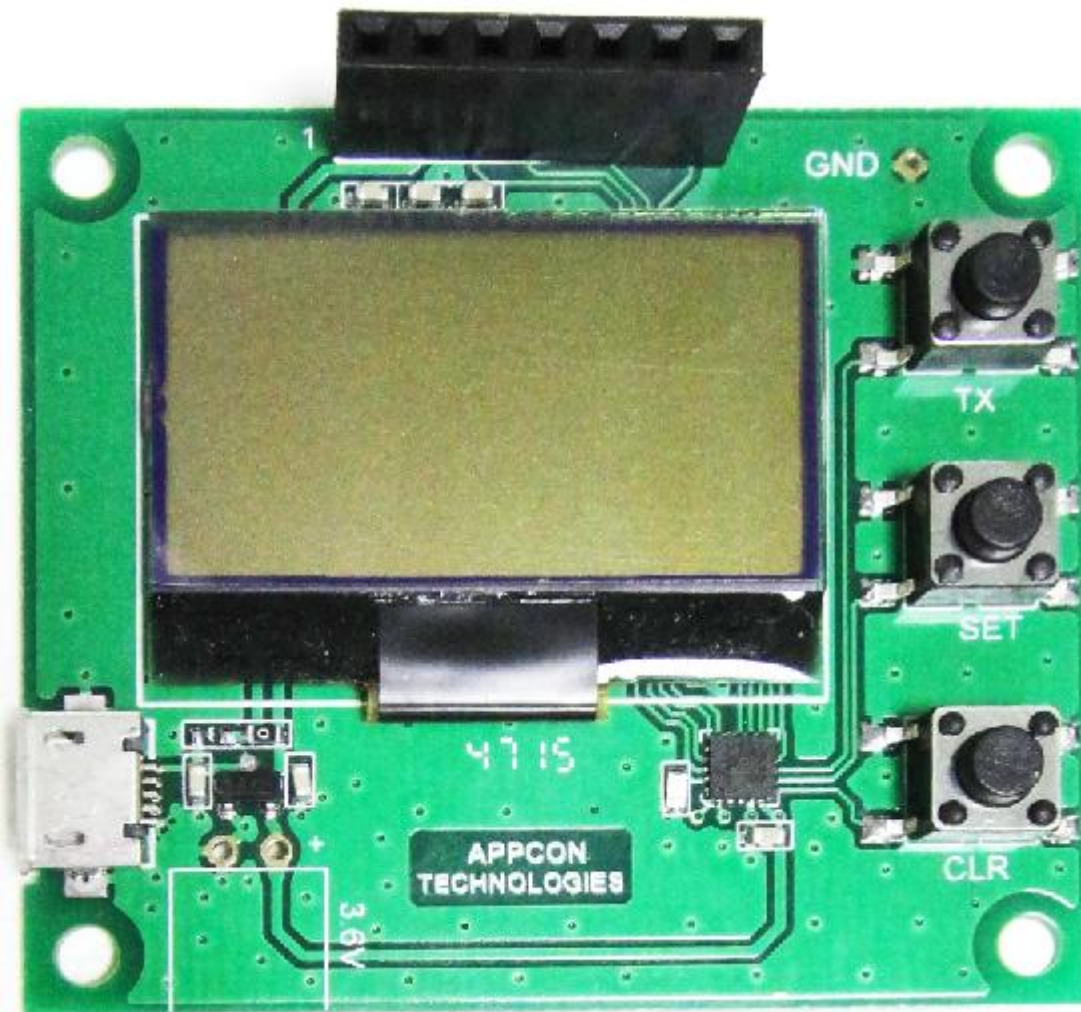
10 Demo board



RF1276F Long Range LoRa Front-end module V2.0



RF1276RF module soldering on the board.



The entire board insert to the board.



RF1276F Long Range LoRa Front-end module V2.0

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