Datasheet

V1.0

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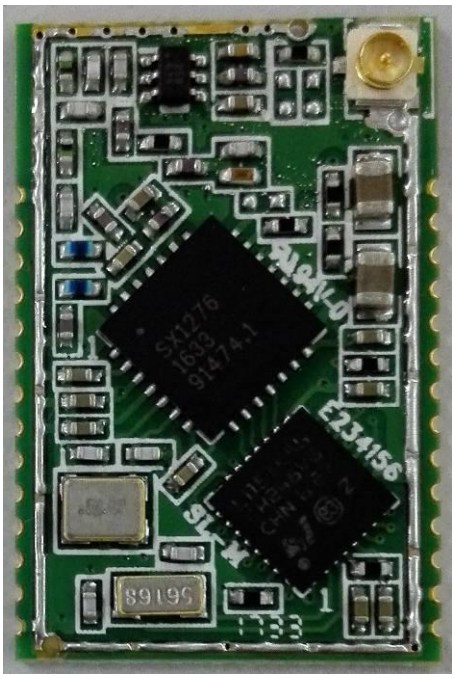
History

Version	Date	Note
Preliminary	2017-8-29	Initial Release
V1.0	2018-06-13	Increase module layout size and Layout Recommendations

Notes:

Hardware version 0.1
61R100H6801 V0.1

Product Description



The Lora RF module R100H offered by NETVOX is low power consumption transceiver based on the SX1276 chip LoRa™ solution.

The R100H is designed to be SMD-mounted onto a host PCB. SMD-mounting provides the best RF performance at the lowest cost. Additionally the R100H is designed to occupy minimal board space on the host PCB, which already includes plentiful interfacing ports and power management circuits. So it can be easily integrated into other device without the need for RF experience and expertise.

The R100H operates in the 862-1020MHz band.

Applications

- Automated Meter Reading
- Home and Building Automation
- Wireless Alarm and Security Systems
- Industrial Monitoring and Control
- Long range Irrigation Systems

Key Features

- High performance and low power 32-bit ARM Cortex-M0 microprocessor
- Up to 20dBm power output
- Wide supply voltage range (1.8V – 3.6V DC)
- Powerful and flexible development tools available

Electric Specifications

Performance

Antenna Type:	FPC antenna
Antenna Gain	1.65dBi
RF Data rate	1.2～300kbps
Frequency Band	902MHZ ~ 928MHz
Mode of emission	LoRa/FSK
Receiver Sensitivity	-121dBm (Frequency deviation=5kHz,Bit Rate=1.2kb/s)

DC Characteristics

Support Voltage	1.8 to 3.6 V DC
RX Current	11mA (MAX)
TX Current	120mA (MAX)
Normal Current (no Radio)	2mA
Deep Sleep (including	8uA

internal RC oscillator)	

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply voltage	-0.5	3.6	V
Voltage on any pin	-0.3	VCC+0.3	V
Frequency stability			ppm
RF Input Power		10	dBm
Storage temperature	-55	115	℃
Operating temperature	-20	85	℃

Caution !
ESD sensitive device.
Precaution should be used when handling the device in order to prevent permanent damage.

Block diagram

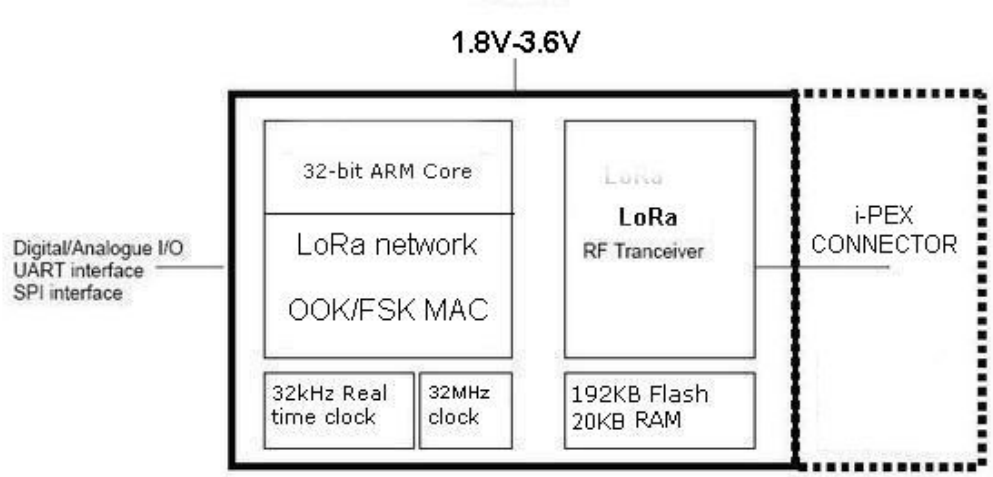


Figure 2 Block diagram

Pin Assignment

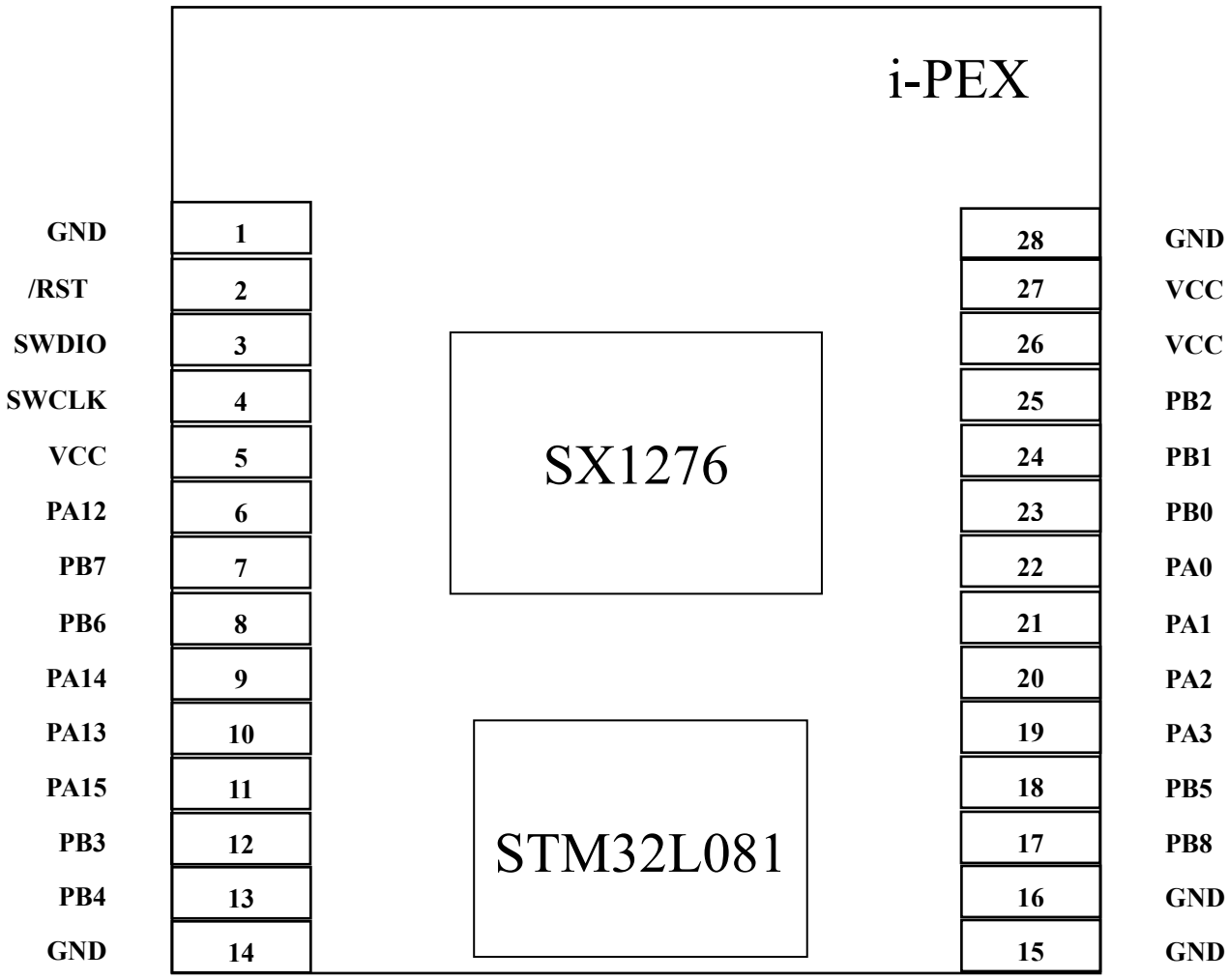


Figure 3 Pin assignment

Pin Description

Pin NO.	Pin name	Pin type	Description
1	GND	Ground	GND
2	/RST	I	Active low chip reset
3	SWDIO	I/O	Programming and debug interface
4	SWCLK	I/O	Programming and debug interface
5	VCC	Power	1.8V-3.6V DC power supply
6	PA12	Digital I/O	GPIO
7	PB7	Digital I/O	GPIO / MI / RXD
8	PB6	Digital I/O	GPIO / MO / TXD
9	PA14	Digital I/O	GPIO / CLK
10	PA13	Digital I/O	GPIO / SS
11	PA15	Digital I/O	GPIO
12	PB3	Digital I/O	GPIO
13	PB4	Digital I/O	GPIO
14	GND	Ground	GND
15	GND	Ground	GND
16	GND	Ground	GND
17	PB8	Digital I/O	GPIO
18	PB5	Digital I/O	GPIO
19	PA3	Digital I/O	GPIO
20	PA2	Digital I/O	GPIO
21	PA1	Digital I/O	GPIO
22	PA0	Digital I/O	GPIO
23	PB0	Digital I/O	GPIO
24	PB1	Digital I/O	GPIO
25	PB2	Digital I/O	GPIO
26	VCC	Power	1.8V-3.6V DC power supply
27	VCC	Power	1.8V-3.6V DC power supply
28	GND	Ground	GND

Debugging interface

Pin2~4 of the module are arranged for burning and debugging interface.

Mechanical Drawing and Dimensions

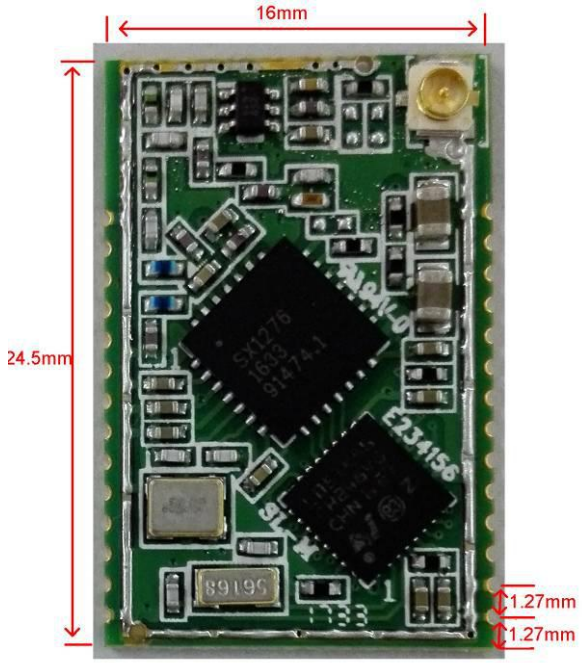


Figure 4 Mechanical Drawing and Dimensions

The module size is 16.0*24.5*3.0mm

Antenna and Range Considerations

The R100H module is delivered with an integrated antenna. This is highly recommended for most applications, as this gives a very compact solution containing all the critical RF parts within the module.

The radiation pattern from the antenna is similar to the donut-shaped obtained from a quarter wave antenna. That is, the maximum radiation is in the plane perpendicular to the length axis of the antenna. For best achievable radiation the module should be oriented so that the antenna is vertical.

The antenna should be kept more than 10 millimeters away from metallic or other conductive and dielectric materials. Any metallic enclosures would shield the antenna and reduce the communication range drastically. In applications where the module must be placed in a metallic enclosure, an external antenna would give best signal strength. The external antenna is attachable from the i-PEX connector . The RF input/output is matched to 50 Ohm.

PCB Layout Recommendations

The figure 5 shows the proper layout footprint for the module. The footprint shown by figure 6 is also fit for the PA module offered by NETVOX. The area underneath the module should be covered with a solid ground plane.

And for greater flexibility and compatibility, the footprint shown by Figure 6 is strongly recommended to use.

Each ground pin should be connected directly to the ground plane. In case the ground plane is on an inner layer of the PCB, via should be placed as close as possible to every ground pad of the module to create low impedance grounding. Unconnected pins should be soldered to the pads, and the pads should be left floating.

When using the module with on-board ceramic chip antenna lying on the north-east corner of the module, the area underneath the antenna should be kept open, and if possible extended in east and north direction as far as possible. Best possible placement of the module on your main PCB is in the far north-east corner. Positioning to suit different application please refer to the figure 7.

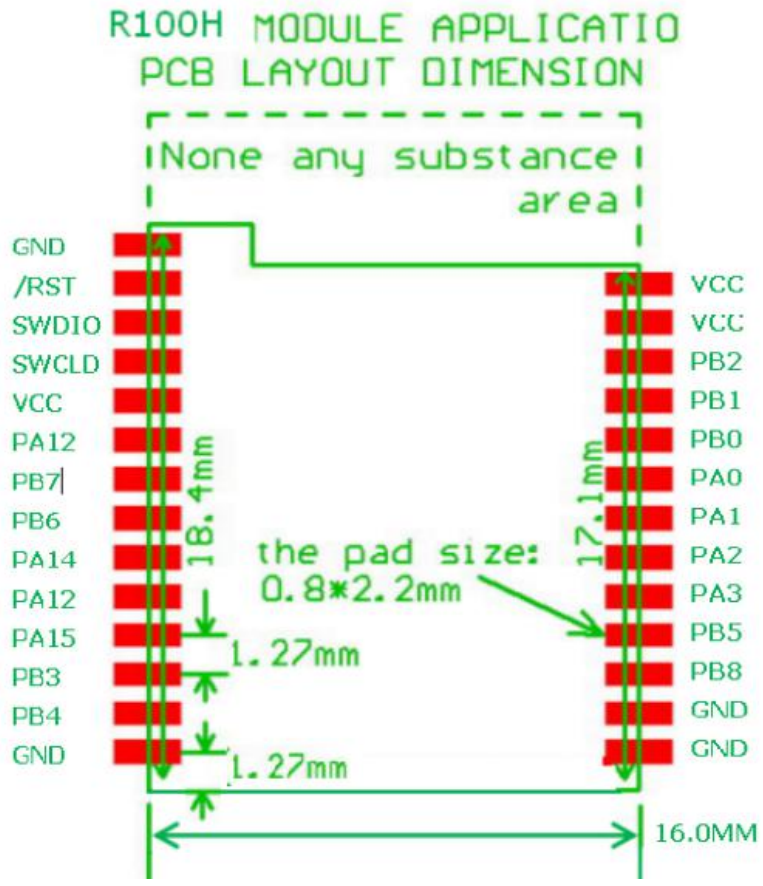


Figure 5 R100H/L PCB Layout dimension

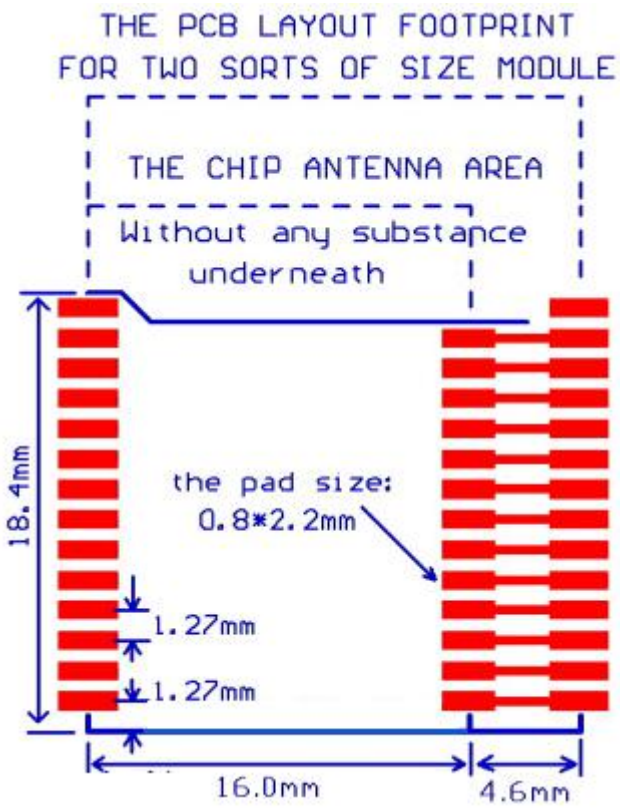


Figure 6 Suggested Module Footprint Layout

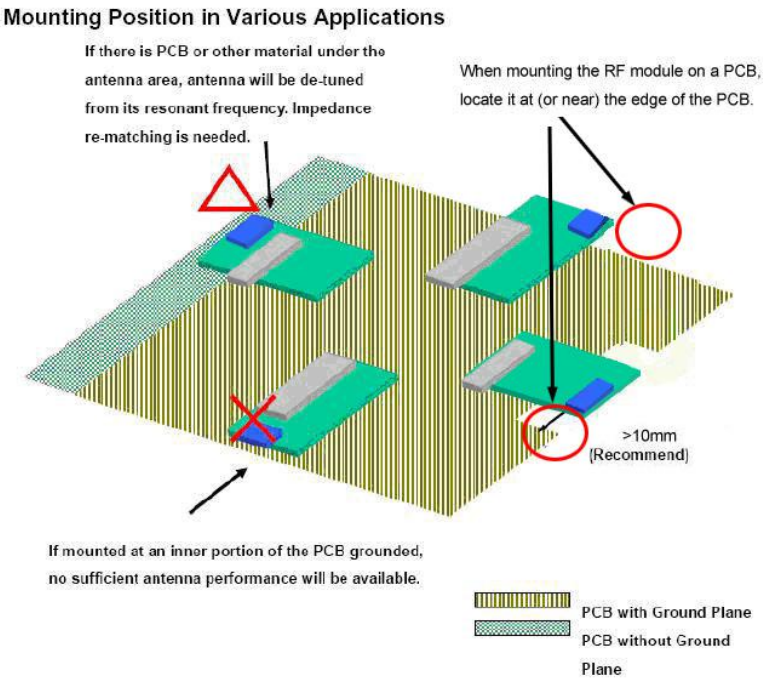
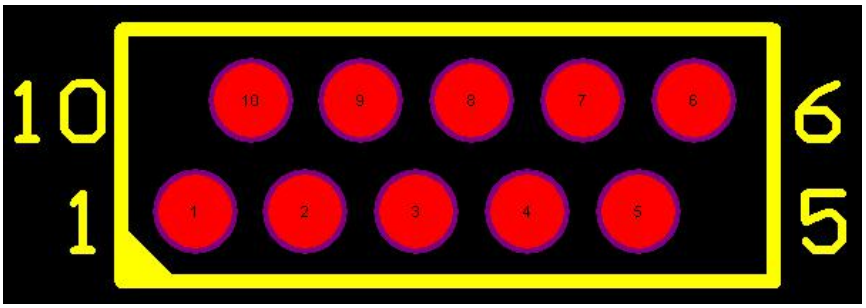


Figure 7 Module mounting position

For in circuit programming and debugging, the 10 pin interface (as following figure) must be reserved in the mainboard PCB.



10 PINdebug interface footprint

The 10 PIN respectively connects the module's PIN. Please see the table below for the detail.

Interface PIN NO.	1	2	3	4	5
Module's PIN			/RST	SWCLK	O
Interface PIN NO.	6	7	8	9	10
Module's PIN			SWDIO		

IC Statement:
This device complies with Industry Canada’ s licence - exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
Le pr é sent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autoris é e aux deux conditions suivantes : (1) l’appareil ne doit pas produire de brouillage, et (2) l’utilisateur de l’appareil doit accepter tout brouillage radio é lectrique subi, m ê me si le brouillage est susceptible d’en compromettre le fonctionnement.

The modules IC number is not visible when installed in the host, or if the host is marketed so that end users do not have straight forward commonly used methods for access to remove the module so that the IC number of the module is visible; then an additional permanent label referring to the enclosed module: Contains Transmitter Module IC number: 8984A-R100H or Contains IC number: 8984A-R100H must be used.
FCC Statement:
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 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.
Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

The modules FCC ID is not visible when installed in the host, or if the host is marketed so that end users do not have straight forward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: Contains Transmitter Module FCC ID: NRH-LR-R100H or Contains FCC ID: NRH-LR-R100H must be used.