

User Manual

This document provides for the outline specification of the low power radio module EXN-RF24-01N. This equipment is the radio modem to communicate the data by the command control from external device. Radio 2.4GHz for data communicating with low power.

Federal Communication Commission Interference 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.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

RF Warning Statement

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna

and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna. As long as two conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed. To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.

The module is limited to OEM installation ONLY. The module is limited to installation in mobile or fixed application. We hereby acknowledge our responsibility to provide guidance to the host manufacturer in the event that they require assistance for ensuring compliance with the Part 15 Subpart B requirements.

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: Z3D00EXN024W001A". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

The following FCC part 15.19 statement has to also be available on the label:

This device complies with Part 15 of 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.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

In the user manual of the end product, the end user has to be informed that the equipment complies with FCC radio-frequency exposure guidelines set forth for an uncontrolled environment.

The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

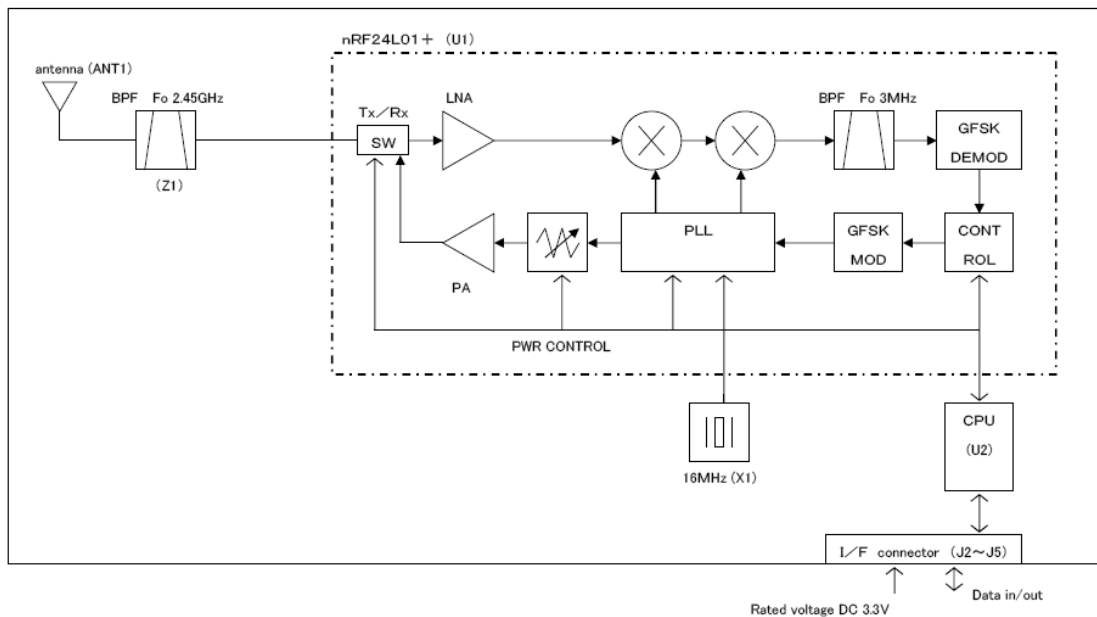
The end user manual shall include all required regulatory information/warning as show in this manual.

The maximum operating ambient temperature of the equipment declared by the manufacturer is: -20~+60°C

Specification

Frequency Band		2402~2480MHz
		1MHz Step/79ch
Channel Bandwidth		<2MHz
Transmission band rate		<2Mbps
Modulation Mode		GFSK
Transmitting Power (EIRP)		-1.54dBm
Frequency Tolerance		±75kHz
Power Voltage		DC3.3V
Rated Current		20mA
Range of Operating Temperature		-20~+60°C (20~90%RH) (must be NO condensation)
Outside Dimension		19×9×2mm (L×W×H / excluding protrusion)
Antenna 0	Antenna Type	1/4 Wire Antenna
	Antenna Gain	2 dBi
Hardware Version:		EXN-RF24-01N-P1-1
Software Version:		FW002

• Block diagram



Basic packet structure

Preamble 1byte	Address 5byte	Control 9byte	Payload 0-16byte	CRC 2byte
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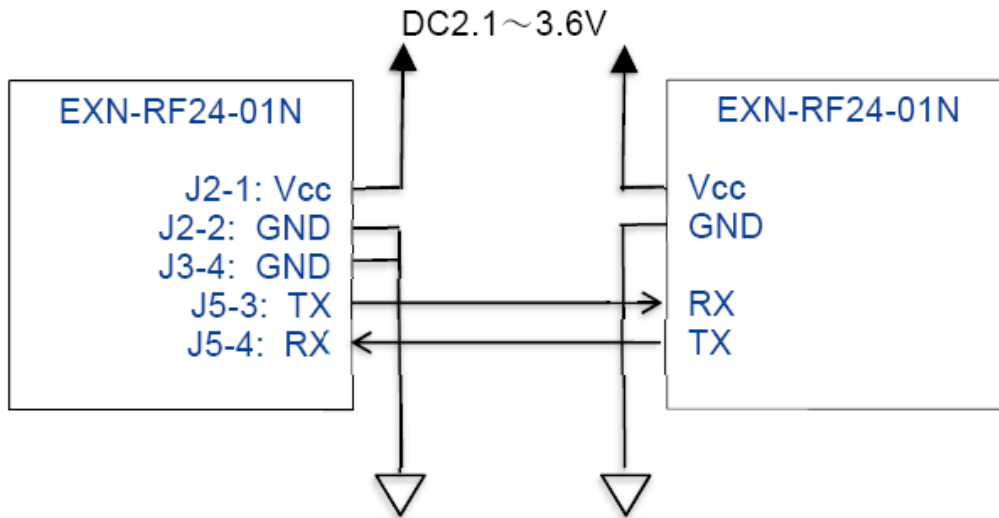
Preamble + Address + Control-Field + Payload + CRC

- Preamble field: 1byte, alternating bits "10101010" .
- Address field : 5byte, An address ensures that the packet is detected and received by the correct receiver, preventing accidental cross talk between multiple nRF24L01+ systems.
- Control Field : 9byte, The packet control field contains a 6 byte payload length field, a 2 byte PID (Packet Identity) field and a 1 byte NO_ACK flag.
- Payload field : 0-16byte, variable length from 0 to 16 byte.
- CRC field : 2byte, It is calculated over the address, Packet Control Field and Payload.

• Connection

Conector	No	name	description
J2	1	Vcc	Supply input
	2	GND	Ground
	3	C2CK	GPIO1
	4	C2D	GPIO2
J3	1	P1.6	GPIO3
	2	P1.5	GPIO4
	3	P1.4	GPIO5
	4	GND	Ground
J4	1	MOSI	GPIO6
	2	MISO	GPIO7
	3	SCK	GPIO8
	4	P0.6	Not conect
J5	1	P0.2	GPIO9
	2	P0.3	GPIO10
	3	P0.4	UART TX
	4	P0.5	UART RX

- Data in/out put



Recommended circuit

- UART setting

1	Baud rate	57600bps
2	data	8
3	parity	non
4	Stop bit	1bit
5	Flow control	non

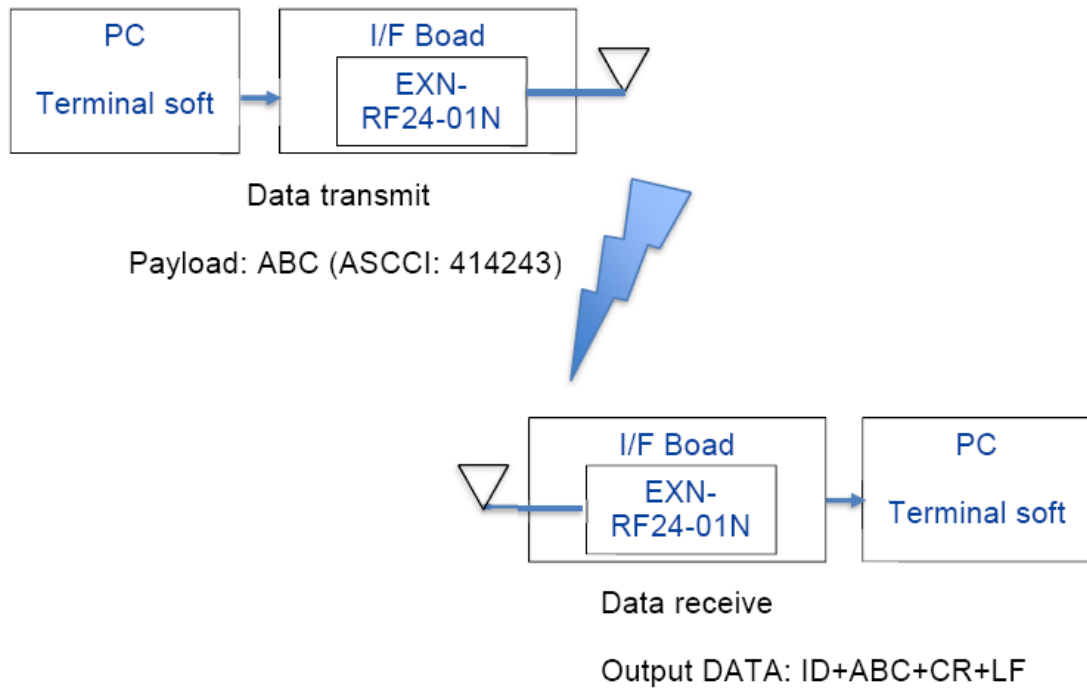
- UART packet format Transmit packet

Transmit On: 1 Off: 0	Modulation On: 1 Off: 0	PN On: 1 Off: 0	Freq ch 01~79	payload	CR+LF (0D0A)
1byte	1byte	1byte	2byte	16byte	2byte

- Receive packet

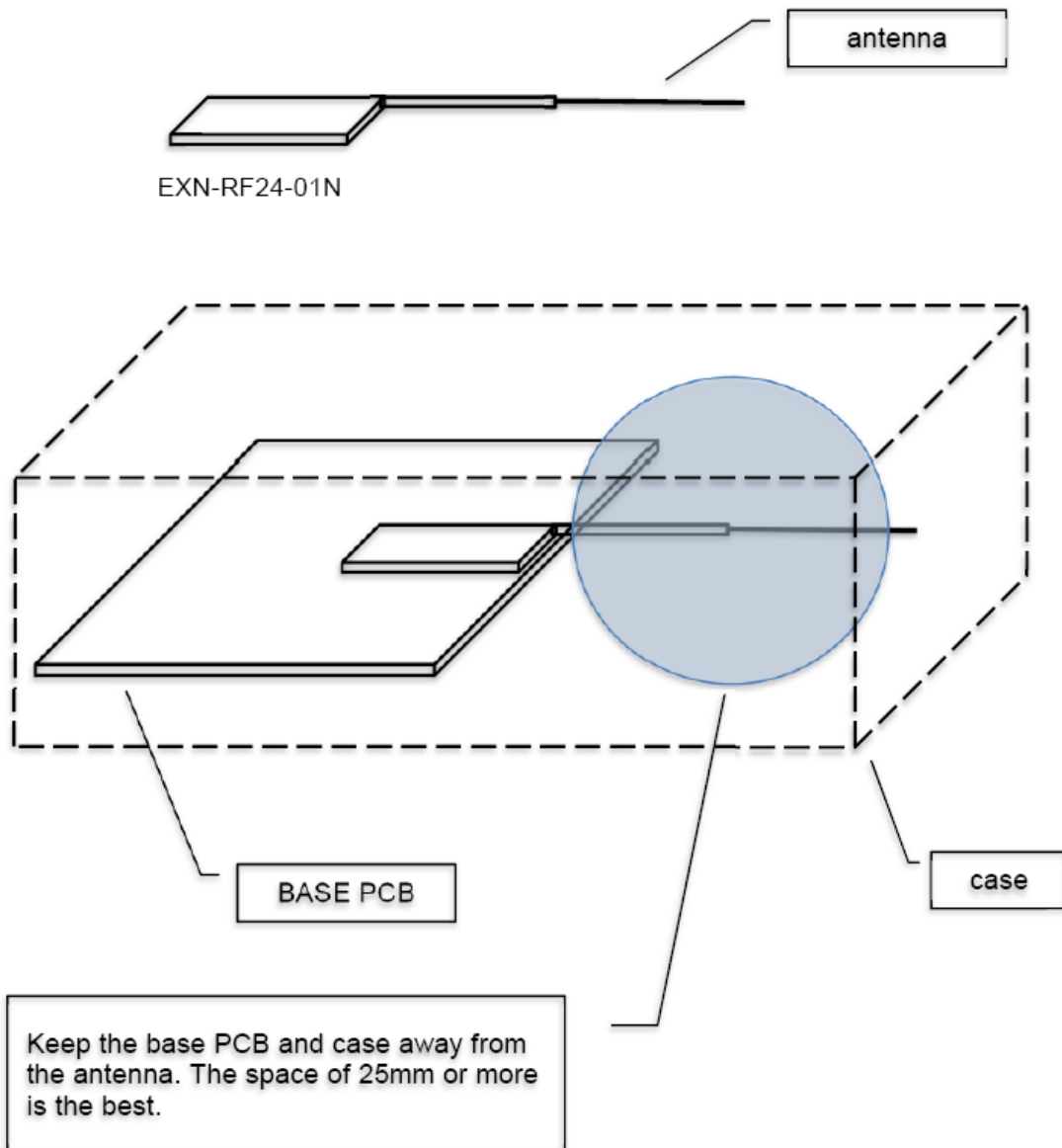
ID	payload	CR+LF
2byte	16byte	2byte

• Communication example



▪ **Antenna trace design rule**

- Use the antenna of EXN-RF24-01N as straight as possible.
- Secure the space as wide as possible around the antenna.
- Do not put in a metal case.



RF Exposure information:

Max output power is less than 20mW, only need RF Exposure assessment,
Meet the requirement EN 62479 :2010

EU Regulatory Conformance

Hereby, Easy-Measure Co.,Ltd. declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

For the declaration of conformity, visit the Web
site www.easy-measure.co.jp/certification.

**Scope of application**

This product can be used across EU member states

Manufacturer Information

Manufacturer	Easy-Measure Co.,Ltd.
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