



[WM-Z2200] High Power RF module

Installation manual

Sumitomo Precision Products

Components

The components of hardware when the product will be delivered.

□ [WM-Z2200] RF module



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1. Product Overview

■Features / Overview

This product is a 2.4GHz wireless module for data communication used by the transmit power up to 10mW . The following features.

1. PLL synthesizer scheme, a total of 15 channels can be set at 5MHz step 2405MHz to 2475MHz.
2. As a power supply is a supply connector I / F or external AC adapter.
3. The various sensors and external devices connect to the I/O interface.
Get the sensor data or it is possible to control the external device.
4. Up to 250kbps data communication is possible.
5. RoHS compliant.

2. General rated value

Table2-1. General rated value

Item		SPEC	Remark
Radio Characteristic			
1	Transmission	Half-duplex	
2	Modulation	Offset-QPSK	
3	Data Rate	250 Kbps	
4	Frequency Range	2405 MHz~2475 MHz	5MHz step, 15ch
5	Sensitivity (PER =1%)	< -95 dBm	
MPU Characteristic			
1	MCU	ATMEL AVR 8bit RISK Core	
2	Clock Frequency	8 MHz	
3	Memory	(FLASH) 128KB	
		(SRAM) 4KB	
		(EEPROM) 4KB	
4	A/D converter	10bit, 7ch	
5	Analog Comparator	1ch	
6	SPI	1ch	
7	USART (UART)	2ch	
8	I2C	1ch	
9	DIO	16ch	
10	PWM	2ch	
Power Supply			
1	Input Voltage	DC 2.7V to 3.3V	
2	Transmit Current	< 100 mA @DC 3.0 V	
3	Receiver Current	< 80 mA @DC 3.0 V	
4	Sleep Current	< 1 mA	
Environmental Specifications			
1	Operating Temperature	-10 deg.C to +70 deg.C	
2	Humidity	0 to 90 % R.H.	
External Interface			
1	Antenna Connector	20279-001E-01 (I-PEX Coaxial)	50 ohm
2	I/O Connector	AXK5F50547YG (Panasonic)	
3	PS Connector	S2B-ZR-SM4A-TF (JST)	
Outline information			
1	Dimensions	W: 50 × D: 25 × H: 7.5 (mm)	
2	Weight	< 15 g	

3. Absolute Maximum Ratings

Table 3-1. Absolute Maximum Ratings

Item		Units	Min.	Max.	Remark
1	Power Supply	V	0	3.6	
2	Storage Temperature	°C	-20	80	

4. Recommended Operating Conditions

Table4-1. Recommended Operating Conditions

Item		Units	Min.	Max.	Remark
1	Operating Voltage	V	2.85	3.15	
2	Ripple Input Level	mV _{p-p}	—	10	
3	Operating Temp. Range	°C	-10	70	

5. Electrical Characteristic

Table5-1. RF Characteristic

Item		SPEC	Remark
Transmit Characteristic			
1	Output Power	+10dBm max.	
2	Frequency Tolerance	< ± 50 ppm	
3	ACLR	< -25dB	
4	OBW	< 5MHz (99%OBW)	
Receiver Characteristic			
1	Sensitivity (PER =1%)	< -95dBm	
2	Spurious Response	> 25dB	
3	Adjacent Channel Selectivity	> 20dB (± 5 MHz)	
4	Co-Channel Selectivity	> -6dB	
5	Carrier Sense (RSSI)	Detectable Level : -77dBm \pm 5dB Link Budget : >90dB	

Table5-2. I/O DC Characteristic

Item		Units	Min.	Max.	Remark
1	Digital I/O Voltage Level				
	Input Low Voltage (V_{IL})	V	0	$0.2 \times V_{CC}$	
	Input High Voltage (V_{IH})	V	$0.6 \times V_{CC}$	V_{CC}	
	Output Low Voltage (V_{OL})	V	—	0.5	$I_{OL}=10\text{mA}$, $V_{CC}=3\text{V}$
	Output High Voltage (V_{OH})	V	2.2	—	$I_{OL}=-10\text{mA}$, $V_{CC}=3\text{V}$
2	Two-wire Serial Interface Characteristics				
	Input Low Voltage (V_{IL})	V	0	$0.3 \times V_{CC}$	
	Input High Voltage (V_{IH})	V	$0.7 \times V_{CC}$	V_{CC}	
	Output Low Voltage (V_{OL})	V	0	0.4	$I_{OL}=3\text{mA}$

Notes 1. Detailed specifications are the property of microcontroller(ATmega128L) data sheet.

■ RF Overview

● RF Band Description, Channels

The module has adopted the 2.4GHz band compliant with IEEE802.15.4.

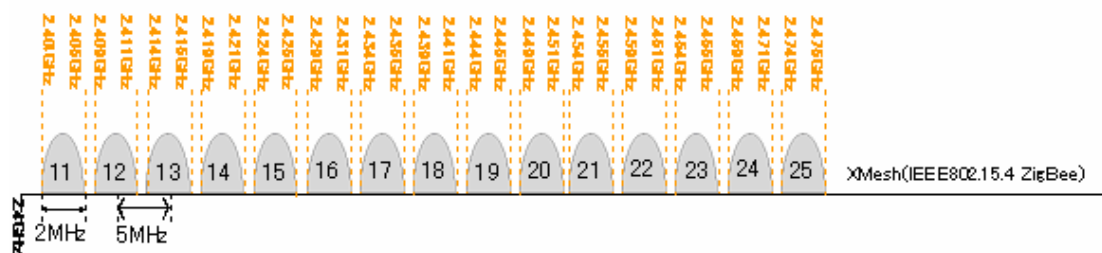


Fig5-1. IEEE802.15.4(ZigBee) Channels and Frequency

Table5-3 IEEE802.15.4 Channel vs Frequency

(MHz.)

CH	Lower Freq.	Center Freq.	Upper Freq.
11	2404	2405	2406
12	2409	2410	2411
13	2414	2415	2416
14	2419	2420	2421
15	2424	2425	2426
16	2429	2430	2431
17	2434	2435	2436
18	2439	2440	2441
19	2444	2445	2446
20	2449	2450	2451
21	2454	2455	2456
22	2459	2460	2461
23	2464	2465	2466
24	2469	2470	2471
25	2474	2475	2476

6. Electrical Design Information

6.1 Recommended Power Supply Circuit

This module is not equipped with a voltage regulator, when the external circuit design, please be sure to configure the voltage regulator.

Reference circuit : XC6210 series by TOREX

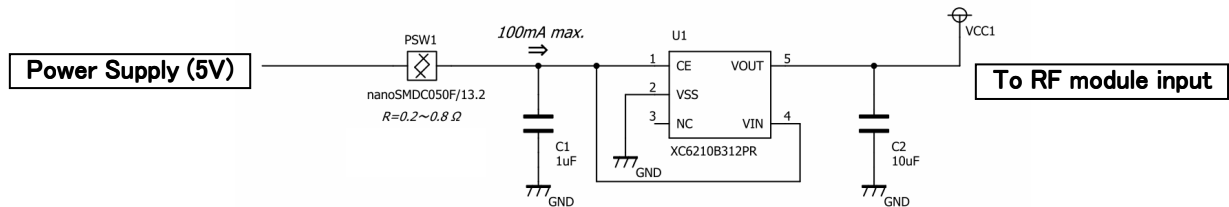


Fig6-1 Reference circuit

6.2 Power on status (Reset)

The module will begin operating from 100msec after being turned on.

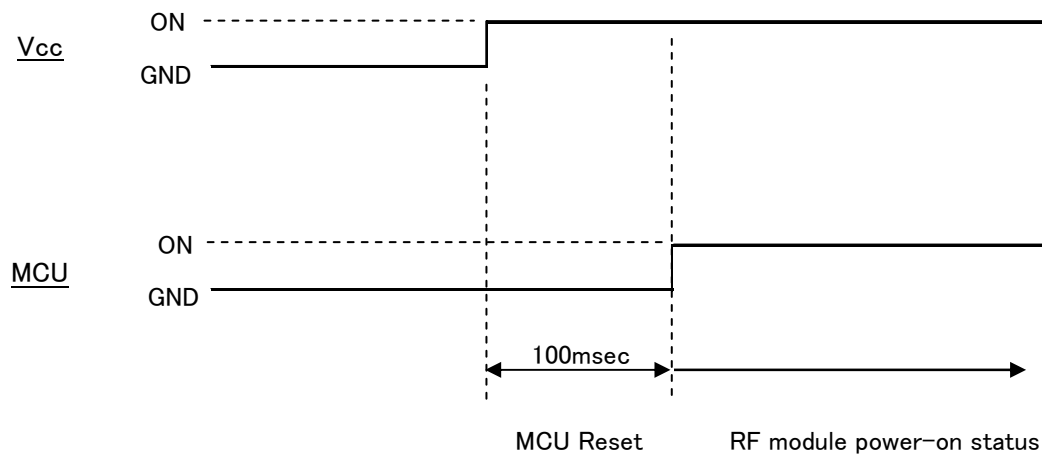


Fig6-2. RF module at power-on sequence

6.3 I/O Ports

All ports are output from the MCU was set as soon as the module power-on.

All I/O pins have protection diodes to both VCC and Ground as indicated in Fig.6-3.

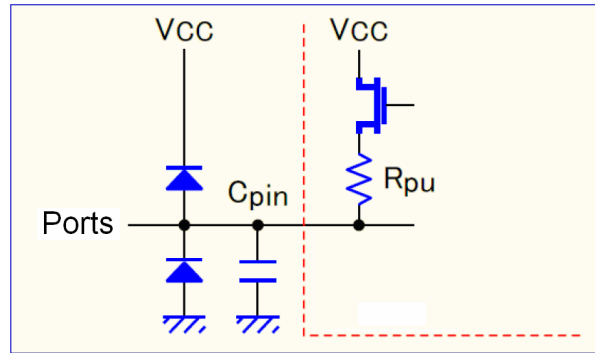


Fig6-3. I/O Pin Equivalent Schematic

6.4 External Reset

An External Reset is generated by a low level on the RESET pin. Reset pulses longer than the minimum pulse width (see Table6-1) will generate a reset, even if the clock is not running.

Shorter pulses are not guaranteed to generate a reset. When the applied signal reaches the Reset Threshold Voltage – V_{RST} on its positive edge, the delay counter starts the MCU after the Time-out period t_{TOUT} has expired.

(/RESET pin to avoid malfunction, and adding an internal RC circuit.)

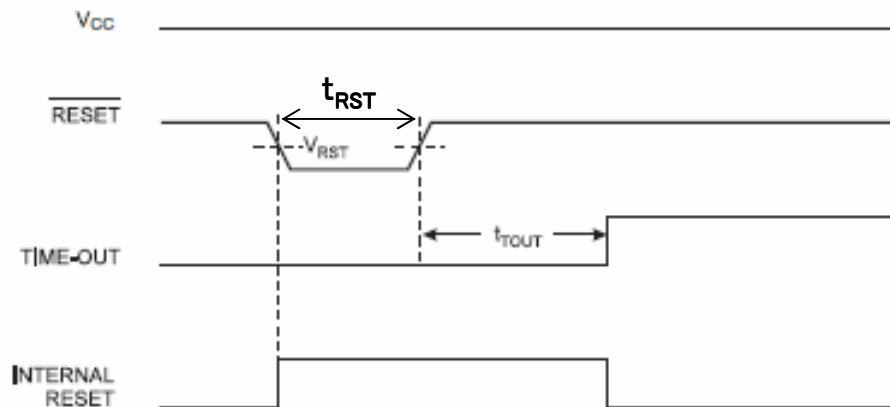


Fig6-4. External Reset During Operation

Table6-1. Reset Characteristics

Item	Symbol	Units	Min	Max
/RESET pin threshold	V_{RST}	V	$0.2 \times V_{CC}$	$0.85 \times V_{CC}$
Min. RESET pulse width	t_{RST}	μs	1.5	—
Delay timer timing	t_{TOUT}	mS	70	—

7. Module Exterior Description

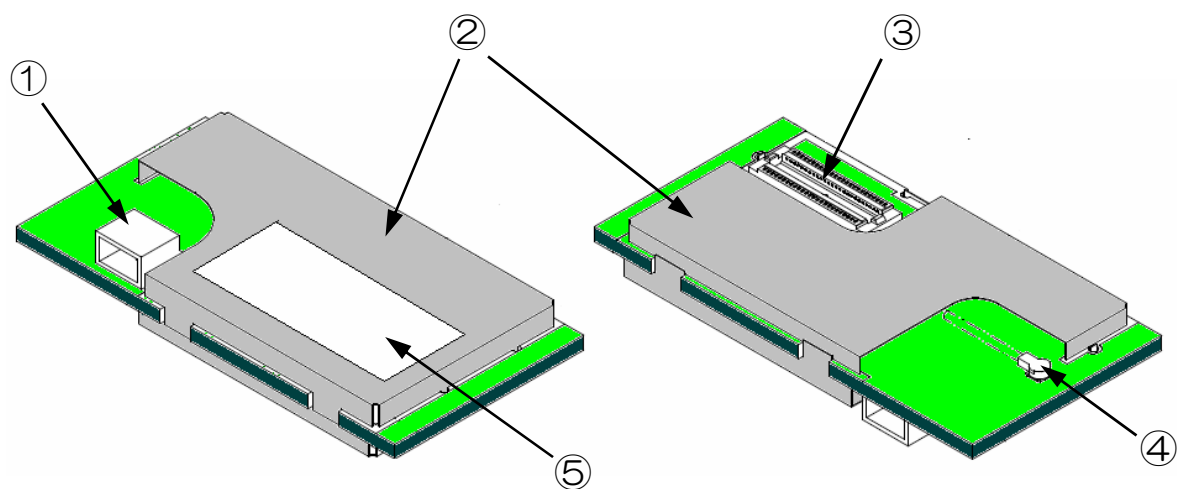


Fig7-1. RF Module Exterior

Table7-1. Part names and functions

Item		Description
①	PS Connector	DC Power supply input connector
②	Shield Cover	Metallic shield cover is soldered on the board.
③	I/O Connector	Used to connect external devices.
④	Coaxial Connector	Connect the antenna using a coaxial cable.
⑤	Name Plate	Indicates the part number and authorization number and manufacturing information.

8. Block Diagram

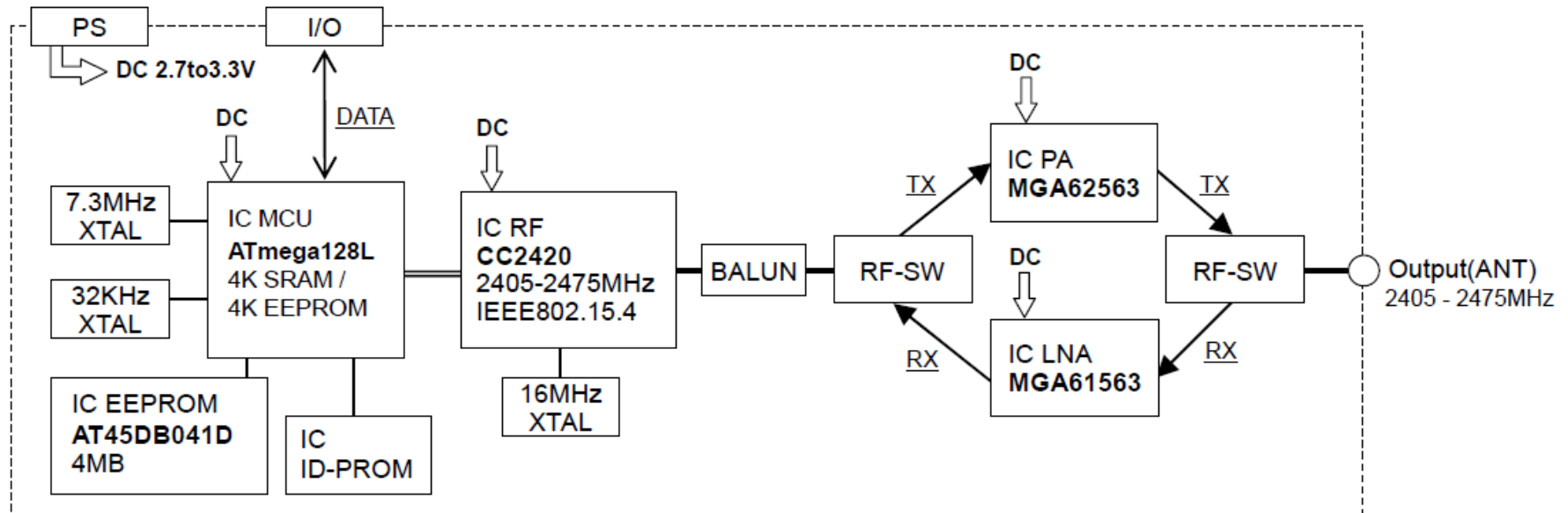
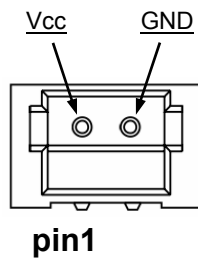
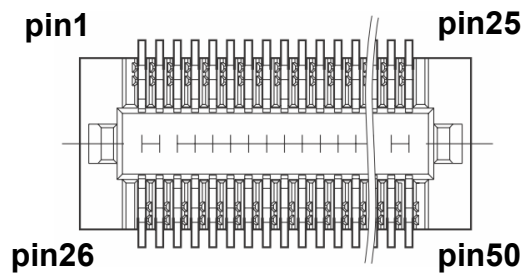


Fig8-1. Module Block diagram

9. Interface Connector Description



J1 : Power supply connector
[S2B-ZR-SM4A-TF]



J2 : I/O connector
[AXK5F50547YG]

Table9-1. Pin definitions “J2”

Pin.	Name	I/O	Description	Pin	Name	I/O	Description
1	GND		Ground	26	PE3	I/O	GPIO
2	DVDD		Power Supply	27	USART0_RXD	I	USART0 Receive
3	INT7	I/O	GPIO	28	USART0_TXD	O	USART0 Transmit
4	NC		Not Connected	29	PC0	I/O	GPIO
5	INT5	I/O	GPIO	30	PC1	I/O	GPIO
6	INT4	I/O	GPIO	31	PC2	I/O	GPIO
7	NC		Not Connected	32	PC3	I/O	GPIO
8	LED3	O	LED (Yellow)	33	PC4	I/O	GPIO
9	LED2	O	LED (Green)	34	PC5	I/O	GPIO
10	LED1	O	LED (Red)	35	PC6	I/O	GPIO
11	PG1	I/O	GPIO	36	NC		Not Connected
12	PG0	I/O	GPIO	37	ADC6	I	ADC Channel 6
13	PG2	I/O	GPIO	38	ADC5	I	ADC Channel 5
14	PC7	I/O	GPIO	39	ADC4	I	ADC Channel 4
15	NC		Not Connected	40	ADC3	I	ADC Channel 3
16	PDI	I	Programming Data Input	41	ADC2	I	ADC Channel 2
17	PDO	O	Programming Data Out	42	ADC1	I	ADC Channel 1
18	SCK	I	SPI Serial Clock	43	ADC0	I	ADC Channel 0
19	NC		Not Connected	44	NC		Not Connected
20	NC		Not Connected	45	NC		Not Connected
21	I2C_CLK	O	I2C Bus clock	46	NC		Not Connected
22	I2C_DATA	O	I2C Bus data	47	/RSTN	I	Reset
23	PB4	I/O	GPIO	48	PB6	I/O	GPIO
24	PB5	I/O	GPIO	49	DVDD		Power Supply
25	PE2	I/O	GPIO	50	GND		Ground

10. Module Mechanical Drawings

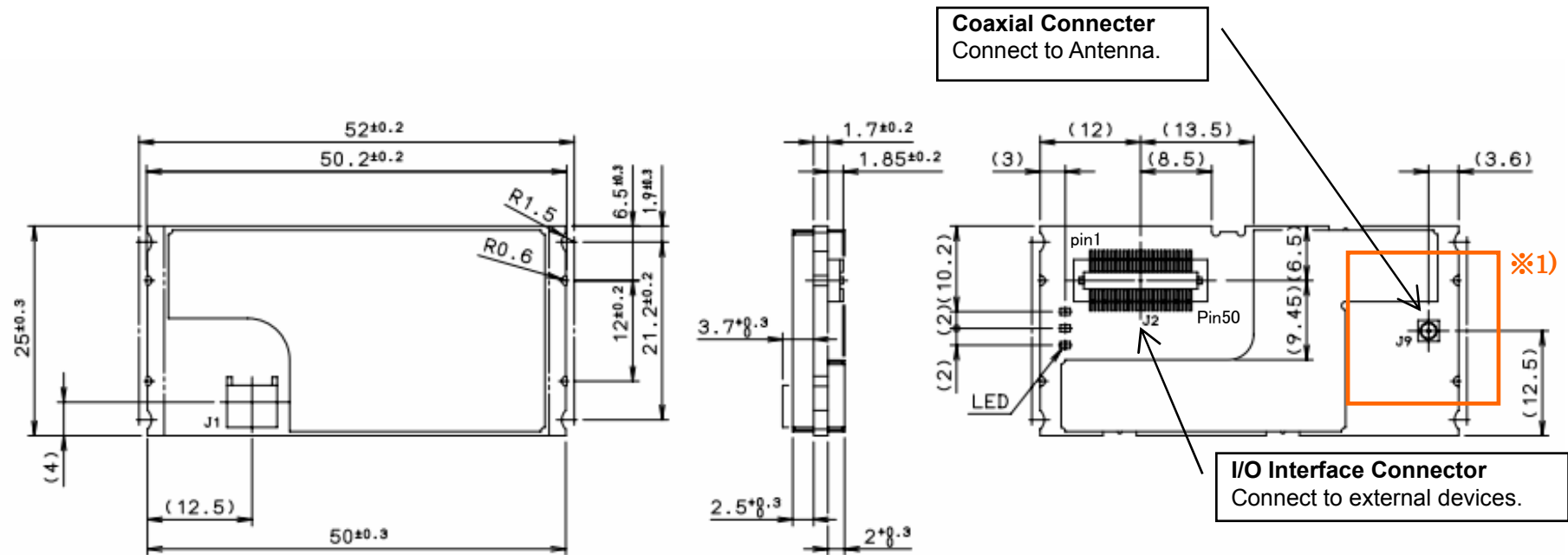


Fig10-1. Module Mechanical Drawings

※1) Areas to avoid connecting the coaxial connector

When connect the antenna cables, connectors, please do not interfere with equipment designed for.

11. Installation Instructions

RF Module connected to the application board, and incorporates into the device.

I/F connector connects the interface board, the module is fixed inside the device.

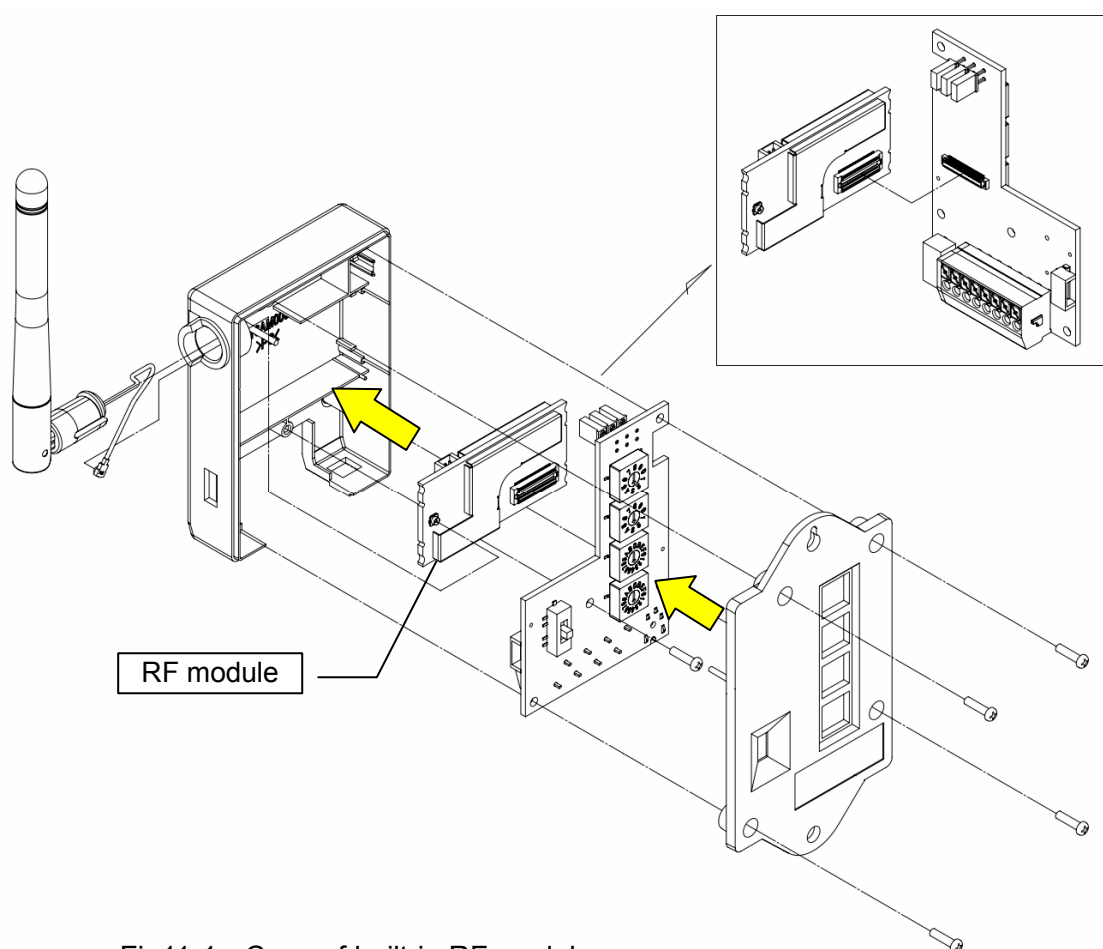


Fig11-1. Case of built-in RF module

12. Production Number Description

Lot number Label



Lot number Label details.

○○ : Year

△△ : Month

□ : Control Number

× × × × × : Production Number