



F900D

DATASHEET

V 1.2.0

CONFIDENTIAL INFORMATION

■ History

Ver.	Date	Description	Author
1.2.0	2023. 10. 20	- UART RX Line operation add - Chapter 5 Appendix add	Enoch
1.1.1	2022. 04. 13	- Application schematic update - Factory reset operating guide change	Enoch
1.1.0	2021. 11. 09	- Classification by type	Enoch
1.0.1	2021. 11. 09	- Document template & Company Logo change - Antenna Selection option delete - Pre-define GPIO update	Enoch
1.0.2	2021. 10. 28	-F900D series GPIO8&9 pin assign change - Application schematic update for F900D pin assign	Enoch

List of Contents

1. General	4
1.1 Overview	4
1.2 Block Diagram	4
1.2.1 F900D Block Diagram	4
1.3 Features	5
1.4 Application	5
1.5 Pin Configuration & Description	6
1.5.1 F900D Pin Configuration	6
1.5.2 F900D Pin Description	7
1.6 Dimension	8
1.6.1 F900D Dimensions	8
2. Characteristics	9
2.1 Electrical Characteristics	9
2.1.1 Absolute Maximum Ratings	9
2.1.2 Recommended Operating Conditions	9
2.1.2 Power Consumption	9
2.1.3 GPIO DC Characteristics	10
2.1.4 ADC Characteristics	10
2.2 RF Characteristics	10
3. Terminal Description	11
3.1 UART Setting	11
4. Application Schematic	12
5. Appendix	13
5.1 책임의 한계 및 법적 고지	13

1. General

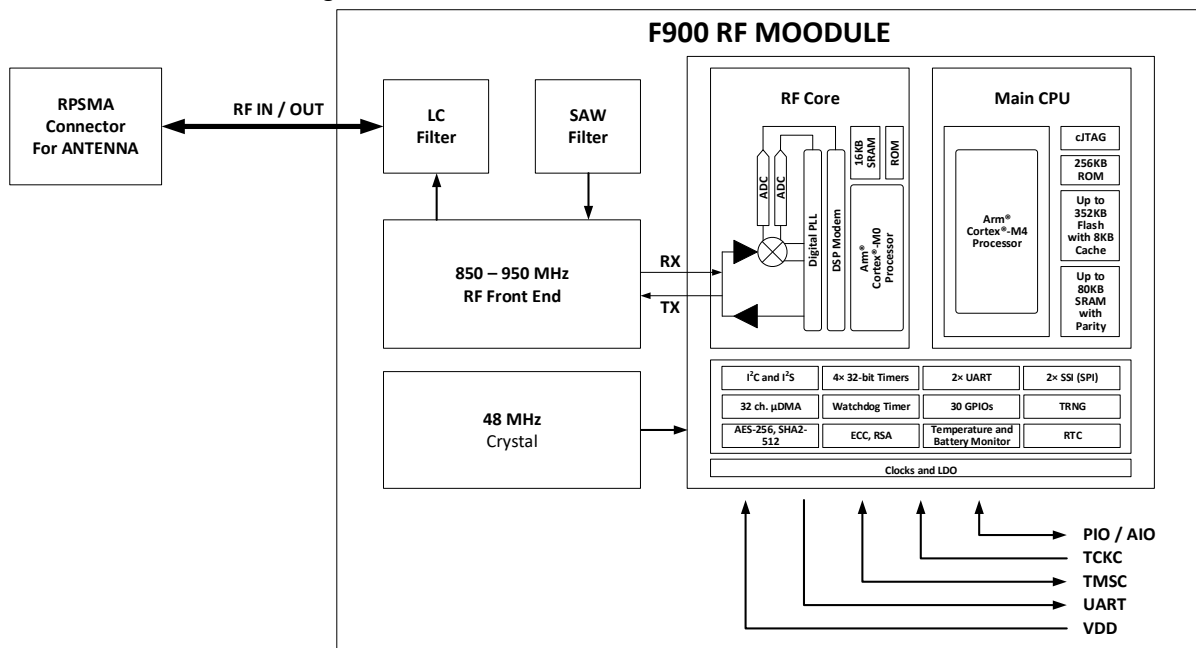
1.1 Overview

F900D Long Range Sub-1GHz Technology Transceiver module, provides an easy to use, small size for long range wireless data transmission.

Sub-1GHz radio supporting industry standard 900MHz frequency band to meet industry requirements. The F900D module provides the user with serial AT Commands through UART interface.

1.2 Block Diagram

1.2.1 F900D Block Diagram



1.3 Features

- Frequency Range : 922.1 ~ 923.3 MHz (26 ~ 32 CH.)
- Powerful 48 MHz ARM® Cortex®-M4F 32-bit processor with FPU
- Memory: 352 kB Flash / 80 kB RAM
- RF Output Power: MAX +14 dBm
- RF Receive Sensitivity:
 - 50 kbps 2-GFSK : -111 dBm
 - SimpleLink LRM 5 kbps : -121 dBm
- Fully automatic LDO and DC/DC regulator system (Used LDO by Default)
- Temperature Sensor
- UART (CTS/RTS) with SPI, and I2C data interfaces.
- 12-Bit 200 ksps ADC with - 8 channels
- Size:
 - 23 X 50.4 X 9.3 (Included 2.0mm Pitch Header)
- Operating Voltage: 3.0V to 3.6V
- Operating Temperature: -40 to +85°C
- RoHS compliant

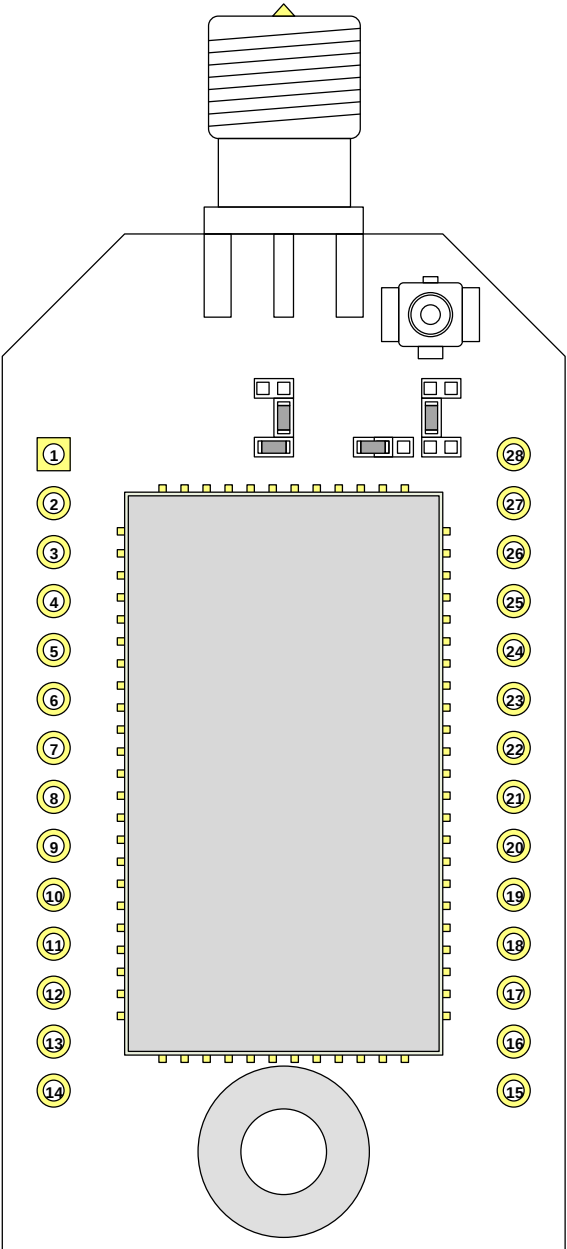
1.4 Application

- Building automation
 - Building security systems
 - Motion Detector
 - Electronic Smart Lock
- Grid Infrastructure
 - Water Meter
 - Gas Meter
- Factory Automation
- Personal electronics
 - Connected Peripherals
 - Home Theater & Entertainment
 - Gaming
- Elevators and escalators

1.5 Pin Configuration & Description

1.5.1 F900D Pin Configuration

NO	Pin Configuration
1	GND
2	NC
3	GPIO_1
4	GPIO_2 / STATUS LED
5	GPIO_0
6	FACTORY_RESET
7	GPIO_3 /ADC_0
8	GPIO_4 /ADC_1
9	H/W RESET
10	GPIO_5 /ADC_2
11	GPIO_6 /ADC_3
12	VCC
13	NC
14	GND



NO	Pin Configuration
28	GND
27	NC
26	CONFIG_MODE
25	NC
24	GPIO_7
23	GPIO_9 /RTS
22	GPIO_8 /CTS
21	UART_TXD
20	UART_RXD
19	GPIO_10
18	GPIO_11
17	GPIO_12
16	GND
15	GND

< TOP VIEW >

1.5.2 F900D Pin Description

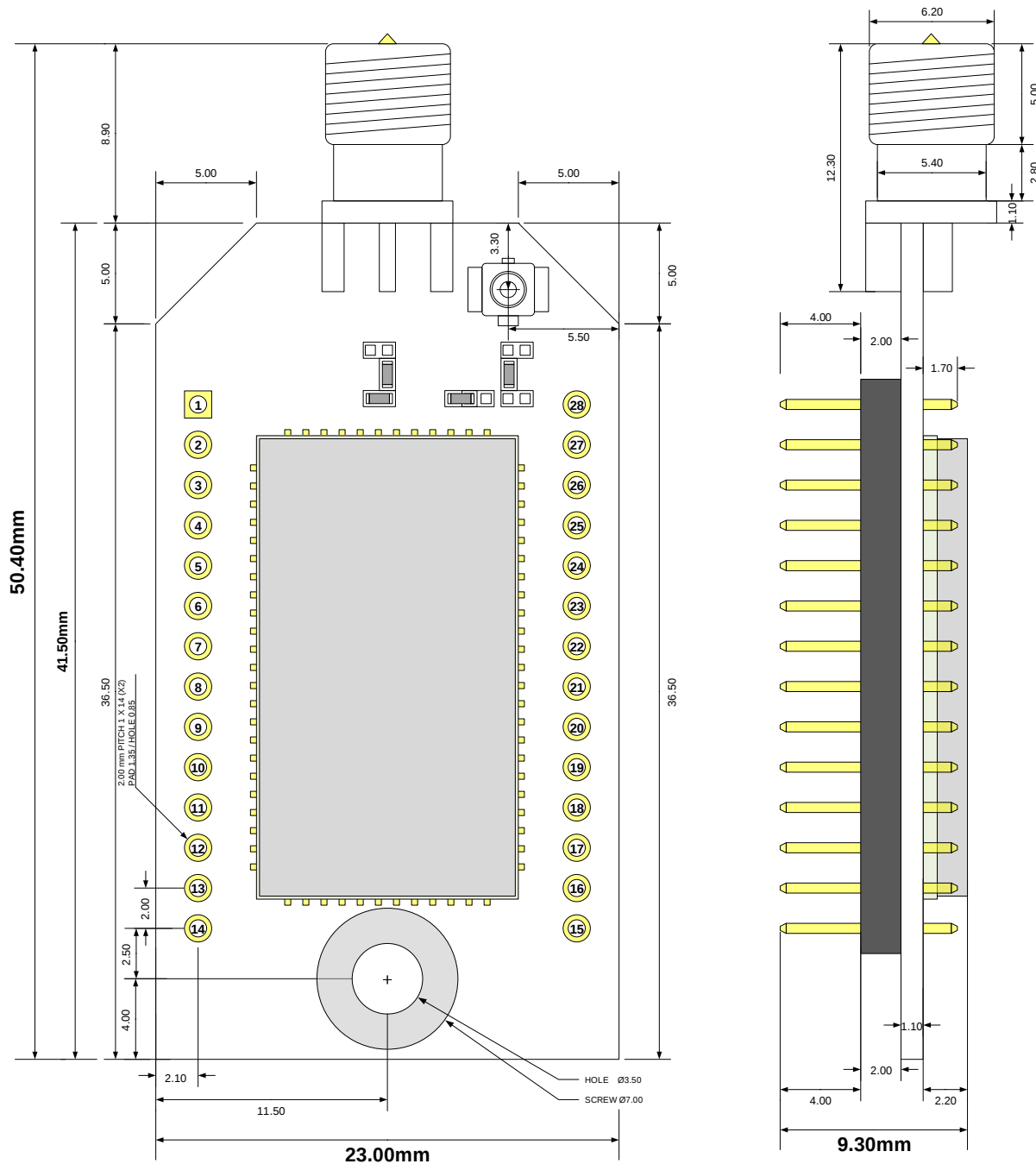
Pin No.	Pin Name	Default Function	IN/OUT	Description	Note
1	GND	-	-	Ground	
2	NC	-	-	No connect	
3	GPIO_1	DIO_1	IN/OUT	GPIO	
4	GPIO_2 / STATUS LED	DIO_2	IN/OUT	GPIO, Status LED	Refer to AT Command Manual
5	GPIO_0	DIO_0	IN/OUT	GPIO	
6	FACTORY_RESET ⁽¹⁾	FACTORY_RESET	IN	FACTORY_RESET ⁽¹⁾	Active Low (internal pull-up)
7	GPIO_3 /ADC_0	DIO_3	IN/OUT	GPIO, ADC_0	Refer to AT Command Manual
8	GPIO_4 /ADC_1	DIO_4	IN/OUT	GPIO, ADC_1	Refer to AT Command Manual
9	H/W RESET	H/W RESET	IN	Main Chipset HW Reset	Active low, > 5ms to cause a reset
10	GPIO_5 /ADC_2	DIO_5	IN/OUT	GPIO, ADC_2	Refer to AT Command Manual
11	GPIO_6 /ADC_3	DIO_6	IN/OUT	GPIO, ADC_3	Refer to AT Command Manual
12	VCC	-	IN	Power supply for system, 3.3V	
13	NC	-	-	No connect	
14	GND	-	-	Ground	
15	GND	-	-	Ground	
16	GND	-	-	Ground	
17	GPIO_12	DIO_12	IN/OUT	GPIO	
18	GPIO_11	DIO_11	IN/OUT	GPIO	
19	GPIO_10	DIO_10	IN/OUT	GPIO	
20	UART_RXD ⁽²⁾	UART_RXD	IN	UART_RXD	Software Internal pull-up after v1.5.0 ⁽²⁾
21	UART_TXD	UART_TXD	OUT	UART_TXD	
22	GPIO_8 /CTS	DIO_8	IN/OUT	GPIO, UART_CTS	Refer to AT Command Manual
23	GPIO_9 /RTS	DIO_9	IN/OUT	GPIO, UART_RTS	Refer to AT Command Manual
24	GPIO_7	DIO_7	IN/OUT	GPIO	
25	NC	-	-	No connect	
26	CONFIG_MODE	CONFIG_MODE	IN	AT Command & PIO Setting Mode	High is Config Mode active Low is normal operate
27	NC	-	-	No connect	
28	GND	-	-	Ground	

(1) When reset pin detect high edge after hold low more 5 sec, device will be reset to factory settings.

(2) If no external MCU or do not support UART RX pull-up, apply external pull-up resistor to the UART RX line Ref Chapter 4.
Support software pull-up setting after Firmware ver1.5.0

1.6 Dimension

1.6.1 F900D Dimensions



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2. Characteristics

2.1 Electrical Characteristics

2.1.1 Absolute Maximum Ratings

Symbol	Parameter	Min.	Max.	Units
VCC	Supply voltage	-0.3	3.8	V
V _{I/O}	Voltage on any digital pin	-0.3	VCC+0.3, MAX3.8	V
V _{IN}	Voltage on ADC input	-0.3	1.49	V
RF	Input level, RF pins	-	10	dBm
T _{stg}	Storage temperature	-40	150	°C

2.1.2 Recommended Operating Conditions

Parameter	Min.	Typ.	Max.	Units
Operating junction temperature	-30	25	85	°C
Operating supply voltage (VCC)	3.0	3.3	3.6	V
GPIO INPUT	3.0	3.3	3.6	V
ADC INPUT	0	-	1.48	V
Rising supply voltage slew rate	0	-	100	mV/μs
Falling supply voltage slew rate	0	-	20	mV/μs

2.1.2 Power Consumption

Symbol	Parameter	Current	Unit
TX	Trnasmit MAX Power	405	mA
RX	Receive	13	mA
Idle	Not connect, Receiver off	T.B.D	mA

2.1.3 GPIO DC Characteristics

Parameter (VCC = 3.3V, 25°C)	Min.	Typ.	Max.	Units
VIH (Lowest GPIO input voltage reliably interpreted as a High)	0.8 * VCC	3.3	3.6	V
VIL (Highest GPIO input voltage reliably interpreted as a Low)	0		0.2 * VCC	V
VOH (Lowest GPIO output voltage reliably interpreted as a High)		2.88		V
VOL (Highest GPIO output voltage reliably interpreted as a Low)		0.46		V
F900 GPIO Current, DIO[5,6,7,16,17]			8	mA
F900 GPIO Current, DIO[8:15], DIO[28:32]			4	mA
F900D GPIO Current, GPIO[0,1,2]			8	mA
F900D GPIO Current, GPIO[3:12]			4	mA

2.1.4 ADC Characteristics

Parameter (VCC = 3.3V, 25°C)	Min.	Typ.	Max.	Units
Reference voltage (Fixed internal reference)		1.48	1.49	V
Input voltage range	0		1.49	V
Resolution		12		Bits
Sample Rate			200	ksps
Input impedance	200 kSamples/s, voltage scaling enabled. Capacitive input, Input impedance depends on sampling frequency and sampling time		>1	MΩ

2.2 RF Characteristics

Parameter	Min.	Typ.	Max.	Units
Operating frequency	920.9		923.3	MHz
Max output power			18	dBm
Output power variation over temperature		±2		dBm
Harmonics	Second harmonic		< -30	dBm
	Third harmonic		< -30	dBm
Sensitivity	50 kbps 2-GFSK	-111		dBm
	SimpleLink LRM 5 kbps	-121		dBm
Saturation	Maximum input power level for 1% BER	+10		dBm
Selectivity and blocking,	±1 MHz from wanted signal	54		dB
	±2 MHz from wanted signal	59		dB
	±5 MHz from wanted signal	65		dB
	±10 MHz from wanted signal	80		dB

3. Terminal Description

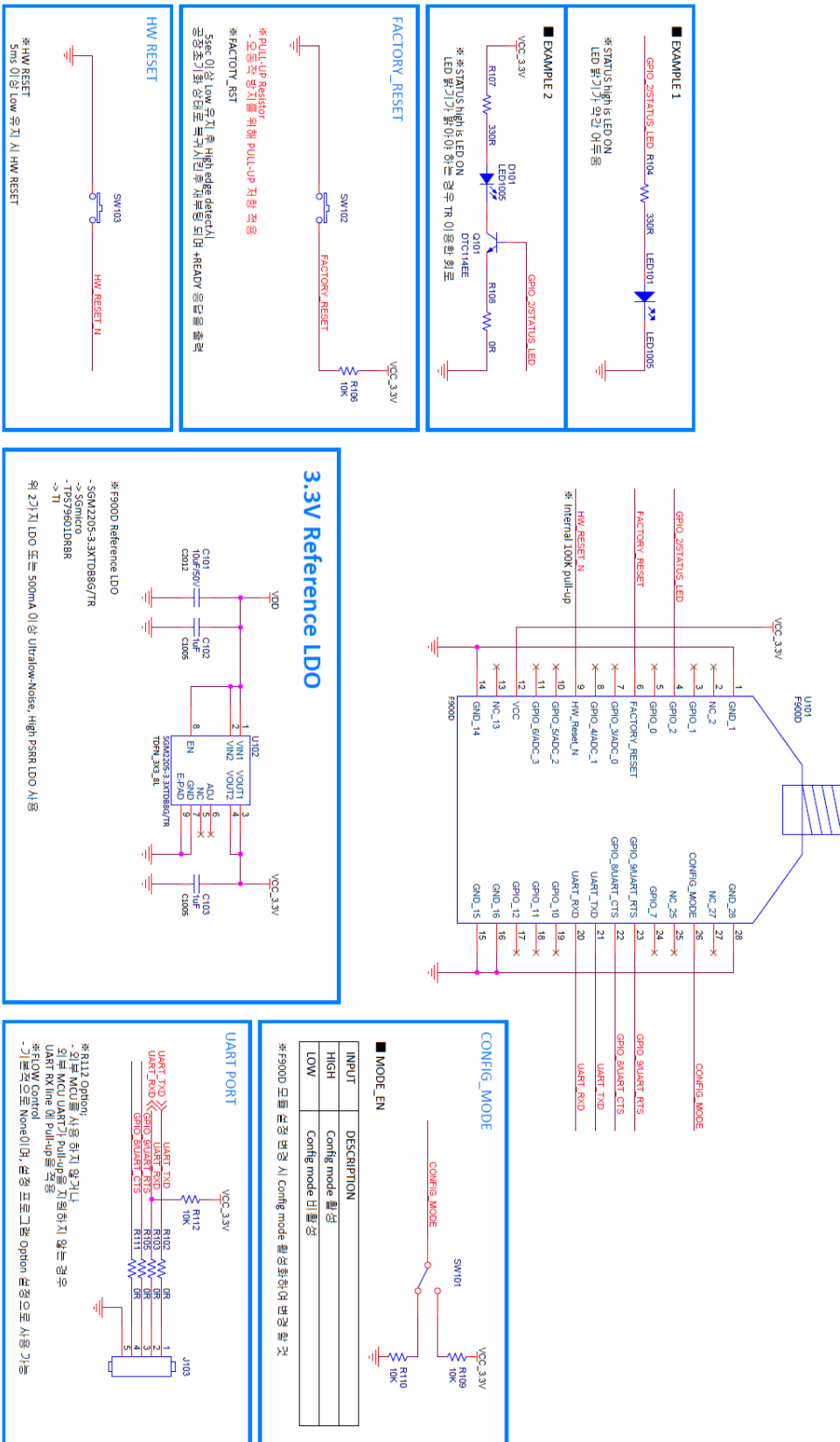
3.1 UART Setting

The UARTs implement universal asynchronous receiver and transmitter functions. They support flexible baud-rate generation up to a maximum of 230400 bps. If no external MCU or do not support UART RX pull-up, apply external pull-up resistor to the UART RX line. Support Software internal pull-up after firmware version 1.5.0

Parameter		Remark
Baud Rate	2400 bps	The UART baud rate has nothing to do with wireless transmission parameters & won't affect the wireless transmit / receive features.
	4800 bps	
	9600 bps (Default)	
	19200 bps	
	38400 bps	
	57600 bps	
	115200 bps	
	230400 bps	
Flow Control	None (Default) or RTS/CTS(Optional)	
Parity	None(Default), Odd or Even	
Number of Stop Bits	1 (Default) or 2	
Bits per Channel	8 (Default)	

4. Application Schematic

■ F900D REF. APPLICATION



5. Appendix

5.1 책임의 한계 및 법적 고지

★이 제품은 사용 중 전파 혼신 가능성이 있으며, 타 기기로부터 유해한 혼신을 받을 수 있습니다. 따라서, 데이터 전송 지연 또는 유실이 발생 할 수 있으며 사용자는 이를 감안하여 충분한 테스트를 거친 후 사용하심을 권장 드립니다. 무선의 특성 상 정확도, 신뢰도, 완성도에 대해 어떠한 보증도 하지 않으며, 어떠한 책임도 지지 않습니다. 어떠한 경우에도 (주)칩센 또는 판매자의 책임 한도는 제품의 지불된 판매 가격을 초과하지 않습니다.

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