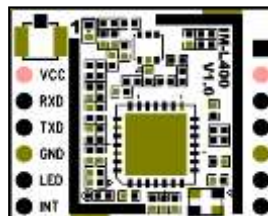


SKT LoRaWAN Module

IM-L210



IM-L400



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Revision

Version	Date	Note
V0.1	2016-06	Release 1 st version

1. Description

- IM-L210, IM-L400은 Semtech사의 장거리 트랜시버 SX1276을 내장한 통신 모듈로써, 원격검침, 센서 네트워크, 스마트그리드등의 M2M 응용에 적용할 수 있는 솔루션을 제공합니다.
- MCU는 ST사의 Cortex-M3 ARM core를 내장하였고, SKT LoRaWAN망에 연동 가능한 프로토콜 규격을 만족하고, UART 및 GPIO 인터페이스를 제공합니다.
- IM-L210, IM-L400은 전류 소비를 최소화하면서 매우 긴 확장 스펙트럼 통신 및 높은 전자파 내성을 제공하는 LoRa™ 장거리 모뎀을 특징으로 하며, -148dBm 이상의 감도와 +14dBm 전력의 출력을 제공합니다.

2. Features

- Size:
 - IM-L210: 45mm X 20mm
 - IM-L400: 20mm X 16mm
- 탁부착 용이한 DIP type 2.0mm pitch header 커넥트
- Power saving mode 제공
- Interface
 - UART 통신 인터페이스 제공
 - 컨트롤 및 상태 확인을 위한 GPIO 제공
- RF Transceiver
 - Ultra-Low-Power
 - KC 무선 설비 규격 준수
 - Frequency Band: 917-923.5MHz
 - 대역폭: 125KHz
 - Data Rate: SF7 기준 5.4Kbps, SF12 기준 293bps
- Microcontroller
 - Ultra-Low-Power, High performance
 - ARM Cortex-M3 32-bit CPU
 - 256KB In-System-programmable, 32KB RAM

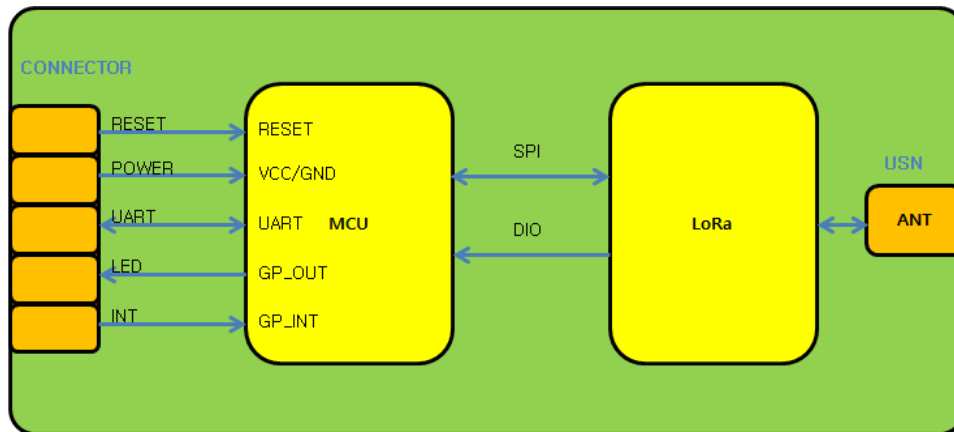
3. HARDWARE SPECIFICATIONS

3.1 Module Specification

Feature	Specification
System Specification	
MCU	ARM 32-Bit Cortex-M3 Core, 32MHz
Memory	
Flash Memory	256KB
RAM	32KB
Interface Support	
Interface	<ul style="list-style-type: none"> • UART*2 • GPIO
Antenna	<ul style="list-style-type: none"> • UFL Connector, External Antenna, 917MHz ~ 923MHz
LED	<ul style="list-style-type: none"> • IM-L210 Only
Button	<ul style="list-style-type: none"> • IM-L210 Only (Reset / Test)
Physical Characteristics	
Operating range	<ul style="list-style-type: none"> • Temperature: -20 ~ +60 °C • Humidity: 5 ~ 90%RH
Storage Conditions	<ul style="list-style-type: none"> • Temperature: -40 ~ +70 °C • Humidity: 5 ~ 90%RH
Power specifications	<ul style="list-style-type: none"> • IM-L210: +3.0-3.6VDC(3.3V typical) • IM-L400: +2.2-3.6VDC(3.3V typical)
Power Consumption	Max 10uA @ Sleep Max 25mA @ Receive mode Max 40mA @ Transmit mode
Physical Dimensions (W x H)	<ul style="list-style-type: none"> • IM-L210: 45mm X 20mm • IM-L400: 20mm X 16mm

3.2 Function Block Diagram

IM-L210/L400 Module 은 LoRa RF Transceiver 와 RF Transciever 를 제어하는 MCU, 그리고 외부 시스템을 연결하는 External Interface 로 구성됩니다.

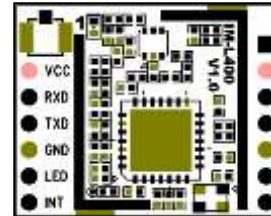


4. PIN Map

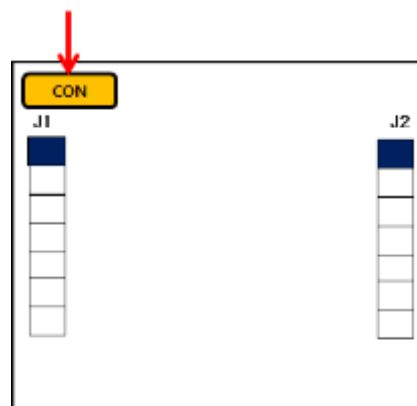
IM-L210



IM-400



ANTENNA



J1(MAIN)

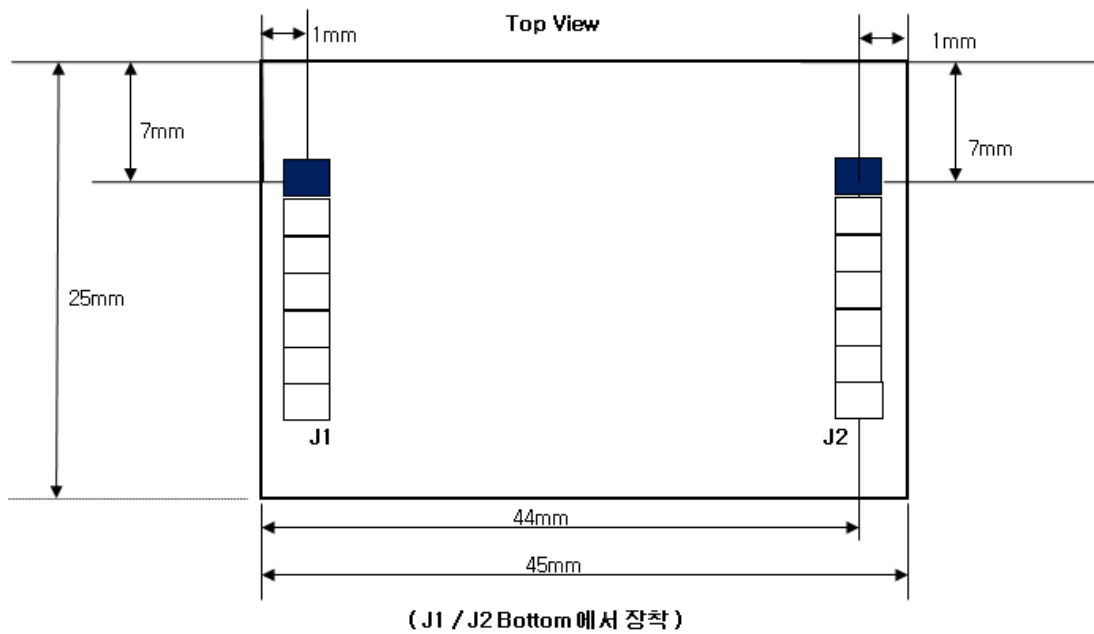
PIN	NAME	TYPE
1	N.C	Not Connected
2	VCC	3.0VDC
3	RXD	IN(UART)
4	TXD	OUT(UART)
5	GND	Ground
6	LED	OUT(State)
7	WAKE	IN(Interrupt)

J2(SUB)

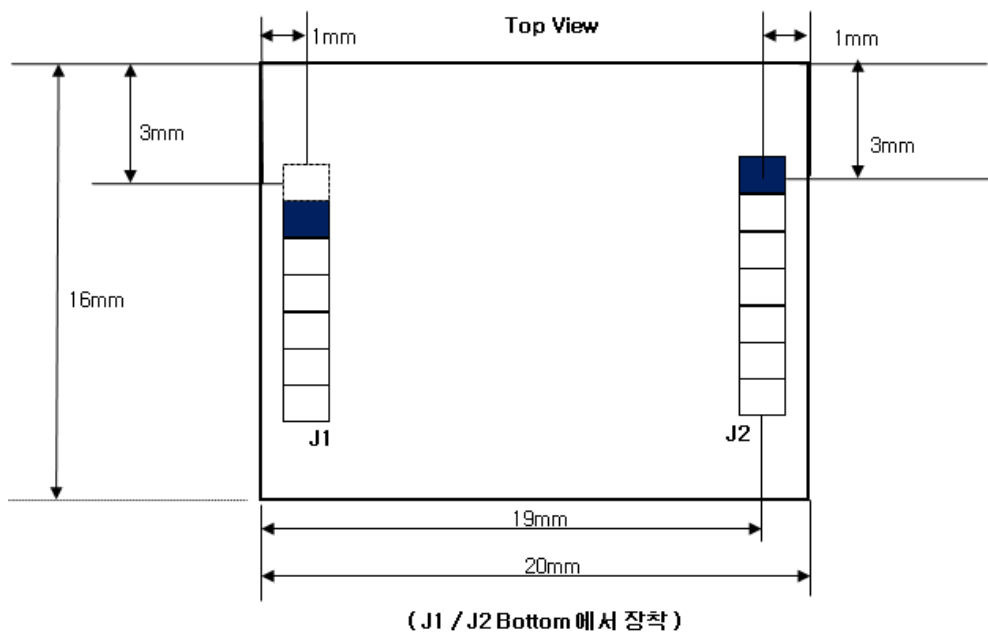
PIN	NAME	TYPE
1	BOOT	IN(Active High)
2	VCC	3.0VDC
3	RXD	DEBUG
4	TXD	DEBUG
5	GND	Ground
6	RESET	IN(Active Low)
7	TEST	IN(Active Low)

5. Package Diagram

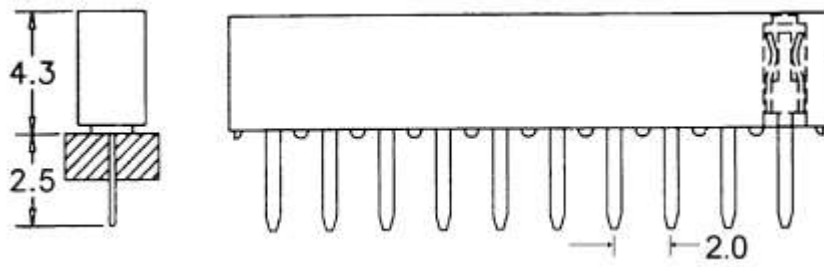
5.1 IM-210 Layout



5.2 IM-400 Layout

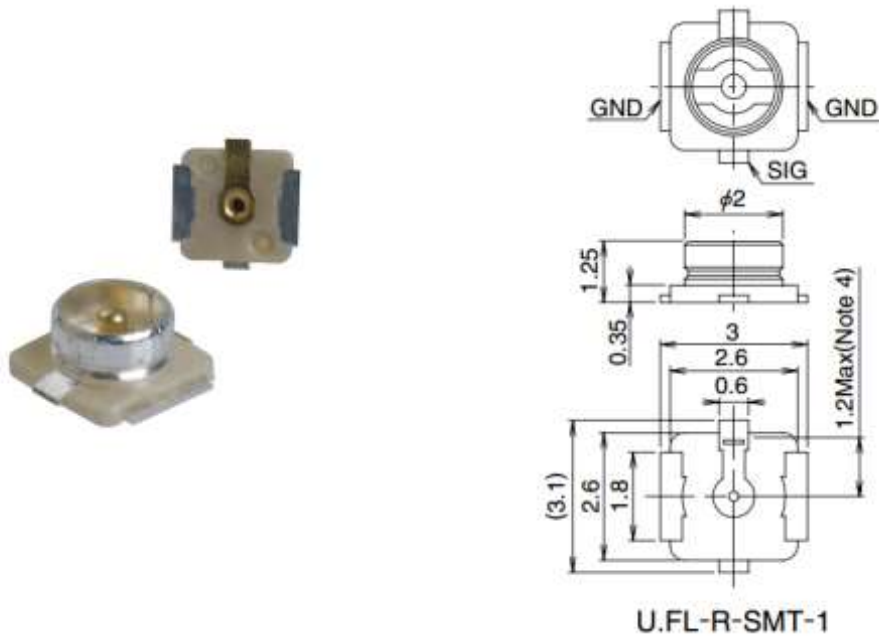


5.3 Header Socket 사양

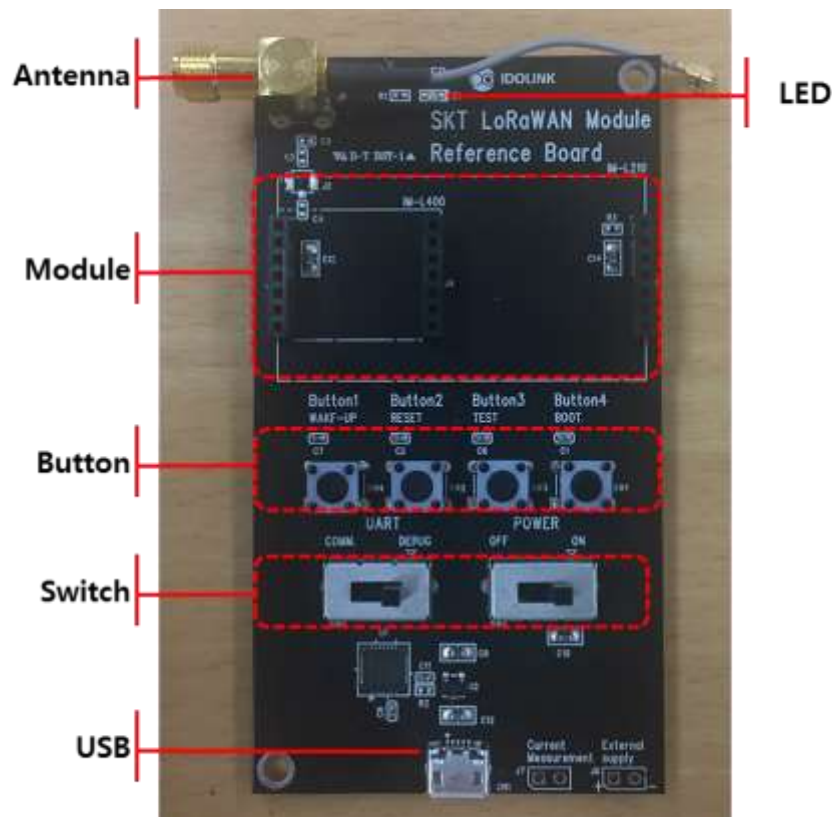


Female header single row
2.0mm pitch
7pin

5.4 Antenna Connector 사양



6. Reference Board



■ Features

- USB: 5V supply, UART 연결
- LED: Status
- SMA: Antenna 커넥터
- Module: IM-L210, IM-L400
- Button: Wake-up, Reset, Test, Boot
- Switch: UART select, Power On/Off

■ EVB KIT 구성품

- EV B'D
- USB Cable (별매)
- Antenna (별매)

7. Application Schematic

