Ionos D2 – SX1276 UHF LoRa Transceiver Module

CS-P000-TS-07-Rev.B2a

This document comprises of the hardware description and connection information of the Ionos D2 – SX1276 UHF LoRa Transceiver Module.

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1 Purpose

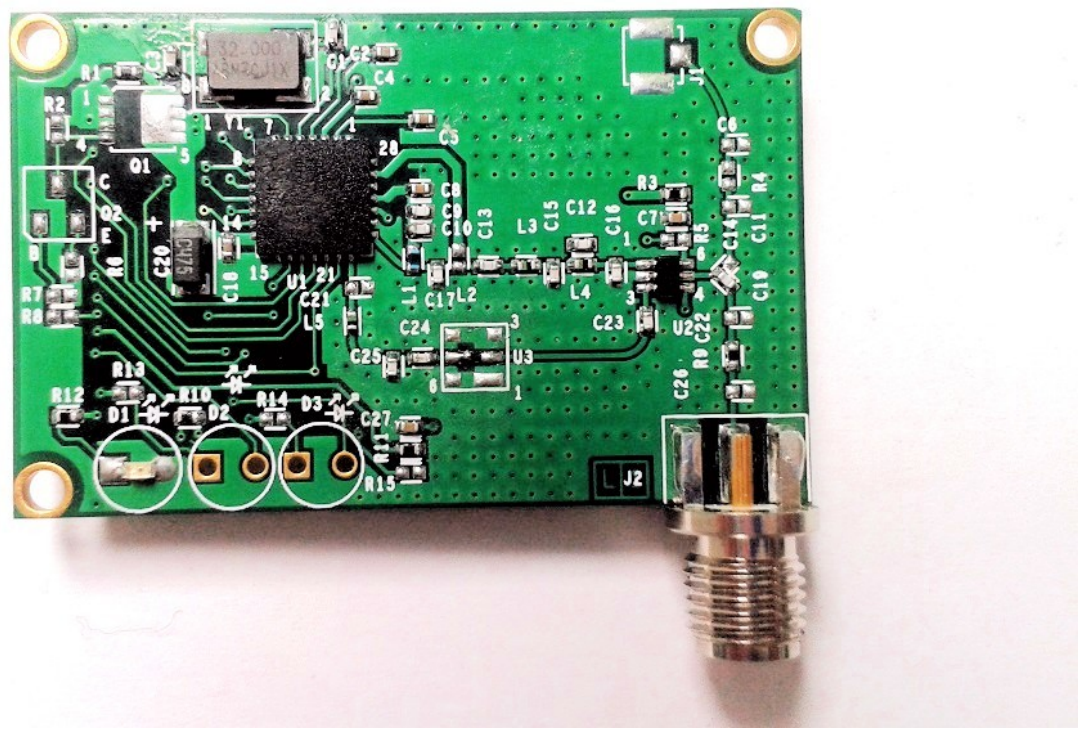
The purpose of this document is to provide the design and technical details of Ionos D2 - SX1276 UHF LoRa Transceiver Module.

1.1 Scope

This document covers the power supply, antenna design and connectors provided on board.

2 Introduction

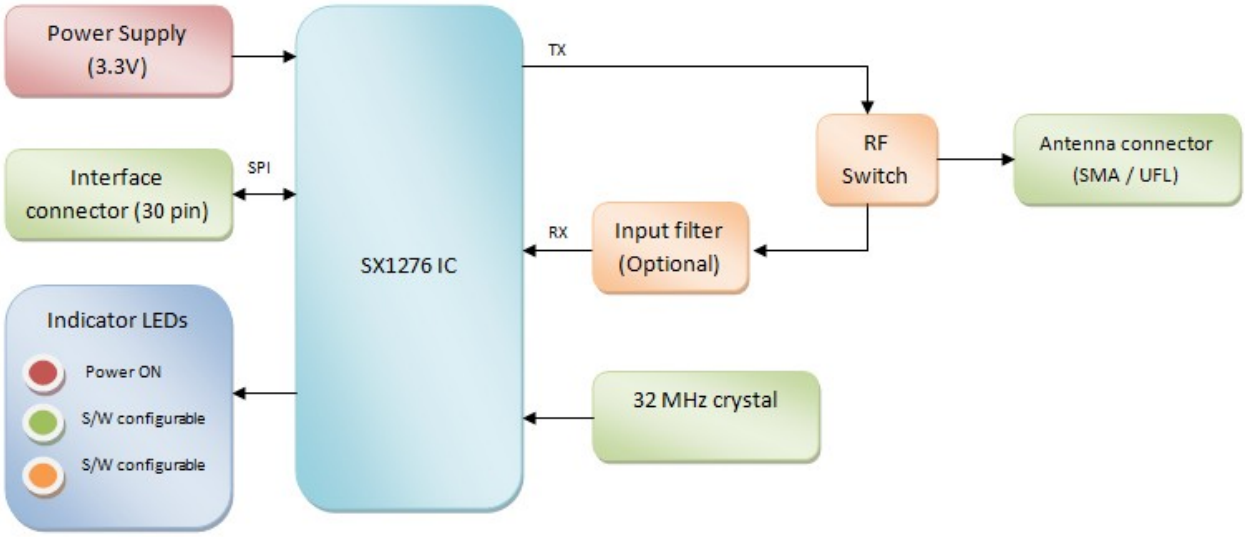
Ionos D2 - SX1276 UHF LoRa Transceiver Module is a long range, low power RF transceiver module which operates in the Sub-GHz frequency band.
The module has high advantages for implementing in smart metering applications where transmission distance and low power consumption are must.
The module is flexible to adjust bandwidth, spreading factor and error correction rate as required.
The LoRa modulation technique used is compatible with standards like W-Mbus and IEEE 802.15.4g. An added advantage of LoRa modulation is its improved immunity to interference.



2.1 Application

- Automated meter reading
- Remote monitoring and control
- Home automation
- Irrigation monitoring
- Energy and water monitoring
- Smart home
- Smart city

3 Block level architecture



4 Specification

Parameters	Specifications
LoRa	SX1276
Current consumption	• Sleep mode : 1uA • Standby mode : 1.8mA • Receive mode : 12mA • Transmit mode : Maximum 240mA
Frequency band	525 to 1020 MHz
Transmit power	Up to 20 dBm
Bandwidth	7.8 – 500 kHz (configurable)
Spreading factor	6 – 12 (configurable)
Data rate	Up to 37.5 kbps
Sensitivity	Up to -148 dBm
Distance covered	1.2 km
Protocol	LoRaWAN1.0

5 Description

5.1 Power supply

The RF transceiver module is powered through 3.3V supplied through the 30 pin connector J3.

J1 pin no	Function	Min.	Typ.	Max.
3	Input Voltage (V)	2.8	3.3	3.6
2,4	Gnd	-	-	-

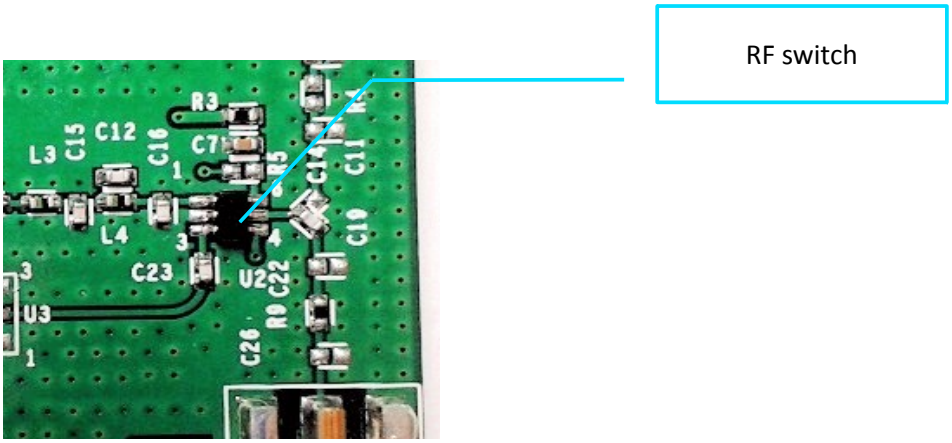
5.2 RF section

The communication signals and GPIO levels shall not be greater than VDD. The mode of communication between the SX1276 IC and the external controller is SPI. The RF transceiver also consists of DIO pins providing different status and indications.

The DIO pin functions shall be acquired from the device datasheet of SX1276.

5.2.1 RF switch

The module consists of an RF switch which switches the antenna line between transmit and receive of the IC. This is done through a GPIO. The GPIO has to be made high during transmission and low during reception.

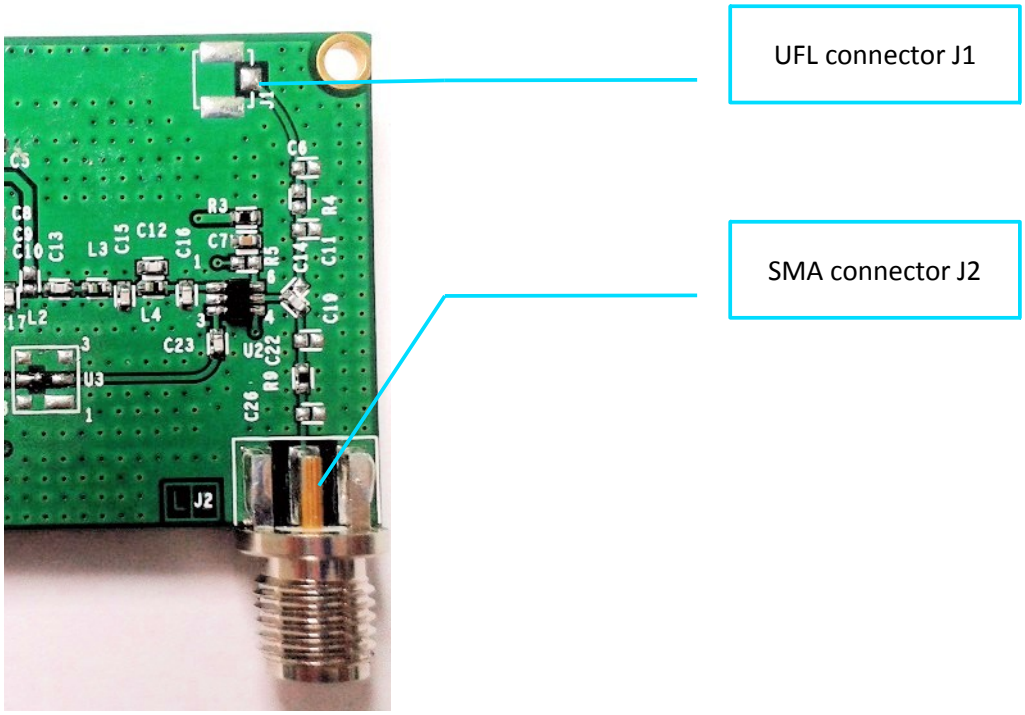


The GPIO control detail is as follows:

Pin name	Connector pin no.	Transmit	Receive
HF_CTRL1	19	High	Low

5.3 Antenna Circuit

The board supports both SMA and UFL antenna. As per the user requirement, the connector shall be chosen.



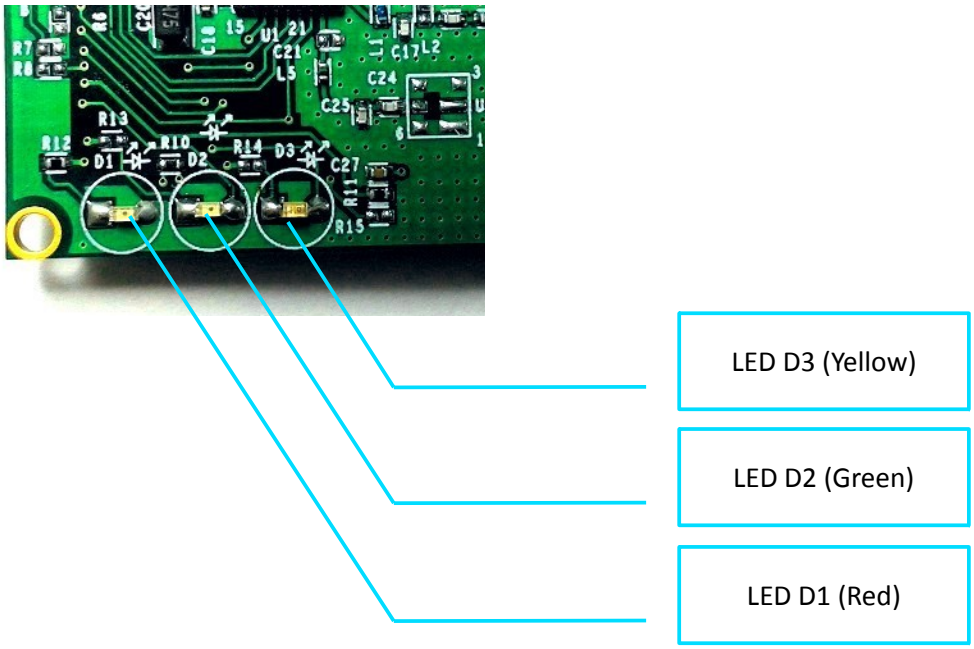
The jumper setting for antenna selection is as follows:

Antenna connector	C14 = 47pF	C19 = 47pF	R4 = 0R	R9 = 0R
SMA (J2)	Open	Close	Open	Close
UFL (J1)	Close	Open	Close	Open

5.4 Indicators

The board contains three LEDs – one for power ON indication and for two software LEDS for user configuration.

The user configurable LED pins are available on the peripheral connector J3. The LEDs D2 and D3 glow when the corresponding pin is made low.



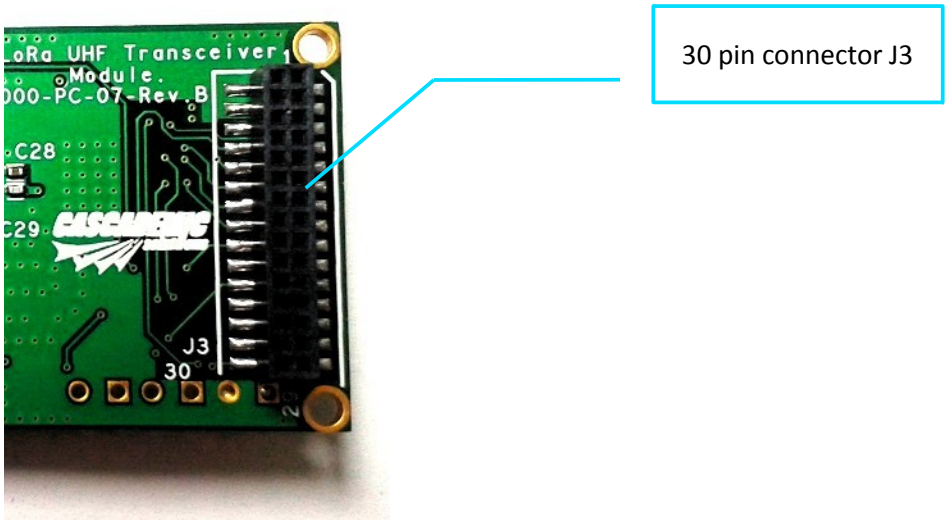
The pin details of the LEDs are as follows:

LED	Purpose	Connector pin no.	Pin name	Function
D1 (Red)	Power ON	-	-	
D2 (Green)	User configurable	J3 pin 21	LED_D2	LED glows when pin goes low
D3 (Yellow)	User configurable	J3 pin 22	LED_D3	LED glows when pin goes low

5.5 Peripheral Connector

5.5.1 30 pin connector J3

The LoRa module contains a dual row 1.27mm pitch receptacle connector which brings out all the pin functions.



The pin details of the connector are as follows:

J1 Pin no.	Function
1	NC
2	GND
3	3.3VDD
4	GND
5	NC
6	NC
7	SPI_PCS
8	SPI_SCK
9	SPI_MOSI
10	SPI_MISO
11	DIO0
12	DIO1
13	DIO2
14	DIO3
15	DIO4
16	DIO5

17	RXTX
18	HF_CTRL0
19	HF_CTRL1
20	NC
21	LED_D2
22	LED_D3
23	NC
24	NC
25	NC
26	NC
27	NC
28	NC
29	NC
30	RESET

5.6 Dimensions

The LoRa module dimensions are as follow:

- L x B : 42.5mm x 26.5mm
- Mounting hole diameter : 2mm

6 Appendix

6.1 Road map

6.1.1 Features

- A module which has an ARM cortex MCU and LoRa IC
- Battery operated device
- GPIO, SPI and other interfaces.