Datasheet – CharIoT2.1

DSPWorks' India band low power LoRa radio module

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DSPWORKS

Contents

Introduction

This document provides detailed information on DSPWorks' India band LoRa module named **CharIoT2.1**, offering lower power consumption and cost efficient LoRa module.

Features

- ➢ LoRa and FSK technology supported
- ➢ Class A and Class C LoRa mode operations
- ➢ LoRaWAN Protocol Stack available
- ➢ >21.5 dBm Transmit Power
- ➢ -120 dBm Receiver sensitivity
- ➢ Peak Transmit current consumption: 120mA
- ➢ Low Receiver current consumption: <20mA
- ➢ Sleep mode current consumption: 2.4uA
- ➢ Available for India free band, 865MHz to 867 MHz
- ➢ On board powerful CortexM0+, STM32L0
- ➢ Available ports: **USART, I2C, SPI, ADC, DAC & GPIOs** (configurable)
- ➢ AT commands available providing immediate deployment and quick prototyping

Description

DSPWorks' CharIoT2.1 uses Semtech's SX1262 chip and is powered by STM Cortex M0+ controller (STM32L0xx). The CharIoT2.1 can also be used in FSK mode. The module is LoRaWAN compliant with Class A and Class C mode of operations supported.

CharIoT2.1 is suitable for LoRaWAN sensor applications and can be customized for majority of IoT products. The CharIoT2.1 can communicate with LoRaWAN gateway and can also be configured for peer to peer Communications using LoRa.

Designed in an optimum 40mm x 20mm size, this fits all your IoT applications and its low sleep current enables battery operated device to operate up to few years (1 to 10 years) based on the duty cycle and battery characteristics.
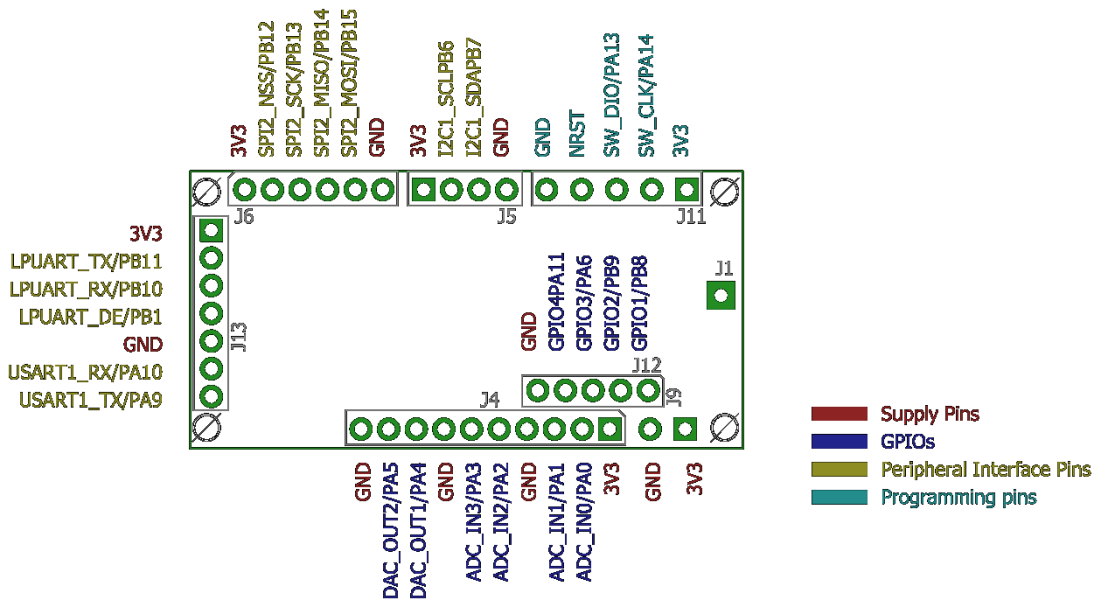
Applications
Temperature and Humidity Sensor
GPS Tracker
Serial Modem
Door Sensor
AMR (Automated Meter Reader)
Home and Building Automation
Industrial Monitoring and Automation
Security and Alarming
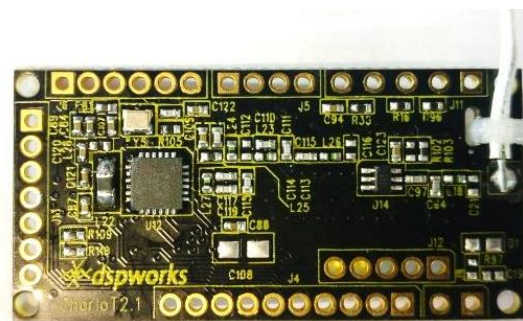
Block Diagram
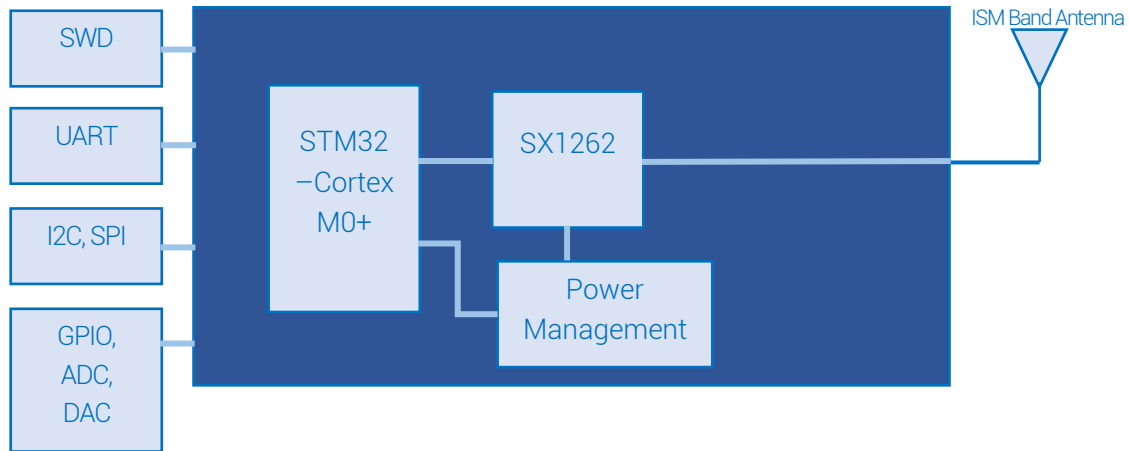
Pinout

Pin Description

Sr#	Connector Pin	Pin Name	Sr#	Connector Pin	Pin Name
1	J4.1	3V3	21	J9.1	3V3
2	J4.2	ADC_IN0	22	J9.2	GND
3	J4.3	ADC_IN1	23	J11.1	3V3
4	J4.4	GND	24	J11.2	SW_CLK
5	J4.5	ADC_IN2	25	J11.3	SW_DIO
6	J4.6	ADC_IN3	26	J11.4	NRST
7	J4.7	GND	27	J11.5	GND
8	J4.8	DAC_OUT1	28	J12.1	GPIO_1
9	J4.9	DAC_OUT2	29	J12.2	GPIO_2
10	J4.10	GND	30	J12.3	GPIO_3
11	J5.1	3V3	31	J12.4	GPIO_4
12	J5.2	I2C1_SCL	32	J12.5	GND
13	J5.3	I2C1_SDA	33	J13.1	3V3
14	J5.4	GND	34	J13.2	LPUART_TX
15	J6.1	3V3	35	J13.3	LPUART_RX
16	J6.2	SPI2_NSS	36	J13.4	LPUART_DE
17	J6.3	SPI2_SCK	37	J13.5	GND
18	J6.4	SPI2_MISO	38	J13.6	USART1_RX
19	J6.5	SPI2_MOSI	39	J13.7	USART1_TX
20	J6.6	GNS	40	J1	Antenna Connector

Connections: SX1262 – STM32L0xx

Signal	GPIO	Remark
DIO1	PA7	
DIO3	PB2	
DIO4	PA8	
NSS	PB12	
SCK	PB13	
MOSI	PB15	
MISO	PB14	
NRESET	PC13	
EN_RADIO_PWR	PA12	RF switch power control

Connection Diagram – Programming
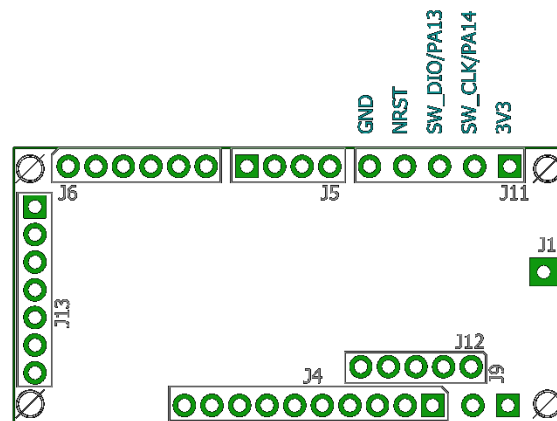
Programming pins

Connection Diagram – External Communications
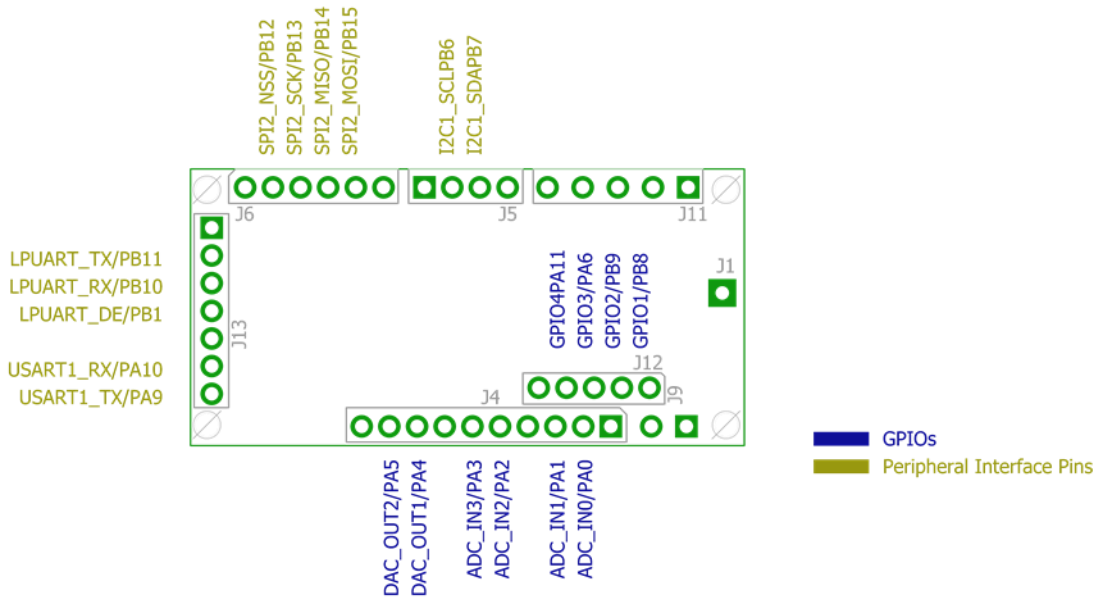
Electrical Specification

Supply Voltage	: 2V – 3.6V
Average TX Current	: 100mA
Peak TX Current	: 120mA
Average RX Current	: 17mA
Peak RX Current	: 20mA
Sleep mode Current	: 2.4uA

Radio Characteristics

Operation Mode	: LoRa and FSK
Operation Frequency range	: 865MHz to 867MHz (India free band)
Supported Bandwidth	: 125kHz, 250kHz, 500kHz
Supported Data rate	: 0.018 – 300kbps
Transmit Power (Total TX Out)	: 21.5 – 21.76dBm
Receiver Sensitivity (LoRa)	: - 120dBm
Link Budget (Typical)	: >140dBm
Recommended antenna gain	: +2dBi to +6dBi
Antenna Connector	: PTH antenna connection hole

Physical Dimension
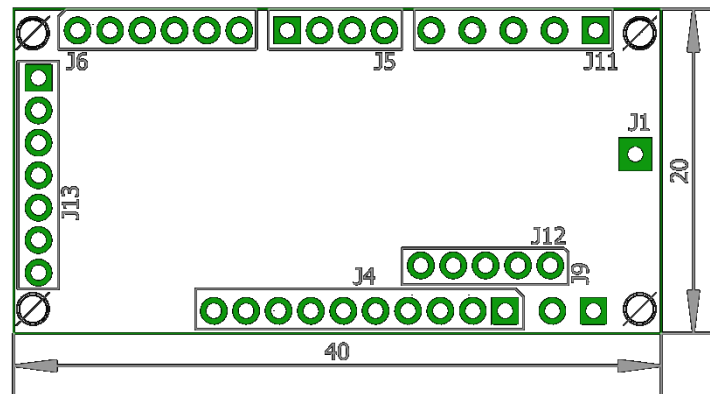
Available Applications

- CharIoT2.1 based Temperature and Humiture Sensor

Humiture Device (HDC1080) connected to CharIoT2.1 module sends Humidity and temperature data to server. Please visit DSPWorks' web shop at dspworks.in/shop for product details and availability.

- CharIoT2.1 based GPS Tracker

A tiny GPS module on CharIoT2.1 acting as a GPS tracker can be used for Asset tracking, inventory tracking and even person tracking. Please visit DSPWorks' web shop at dspworks.in/shop for product details and availability.

- CharIoT2.1 based Serial Modem

A pair of CharIoT2.1s can be used as serial Modem, sending data fed on serial port at one end and receiving same data at other end on serial port for further actions. This application can be used for serial communication, remote monitoring or even controlling devices remotely. Please visit DSPWorks' web shop at dspworks.in/shop for product details and availability.

- CharIoT2.1 based Door Sensor

Reed Switch connected to CharIoT2.1 sends data on door opening and/or closing operations to server. Please visit DSPWorks' web shop at dspworks.in/shop for product details and availability.

Notes

- Ensure there is no polarity swap at input voltage
- Link Budget calculation will depend on mode and configuration

Warnings

- Never power up CharIoT2.1 without antenna connected to it. The RF reflection can damage radio transceiver
- Power supply less than 2.0V can cause performance issues
- Make sure power supply is able to supply a peak current of 120mA to achieve maximum TX Power and maximum range

Version History

Version Number	Dated	Author	Remarks
V1.0	10 January 2020	Fahad Ansari	First Release