SND1 500mW Data Link Mesh Radio

-- Supports up to 735kbps wireless link rate
-- Supports Point-to-Point, Point-to-Multipoint, Multipoint-to-Point and Mesh topologies
-- Supports maximum 1024 nodes mesh network
-- High sensitivity: -114dBm@125kHz
-- Supports frequency hopping(FHSS)
-- Wide temperature specification (-40°C to +85°C)

SND1 self-organizing network(Mesh) data link radio realizes the centerless long-distance communication between large-scale nodes, all nodes can communicate with each other independently without interfering, supports large-scale dense node access to wireless transmission, dynamic networking and flexible reorganization, supports full-multiplexing communication, the node sends data at the same time it can also receive the data of all other nodes without interfering with each other, and in the absence of the center, it can realize the interoperability of any node and all other nodes in the network. Without interfering with each other, it can realize the interconnection between any node in the network and all other nodes in the case of no center.

SND1 data link mesh radio supports large-scale node access, multi-hop self-organizing network, 500mW transmit power, -114dBm sensitivity, maximum 735kbps effective data transmission rate, 2ms ultra-low latency, which can be used for swarming drones, Internet of Things, data chain, remote control, data collection, artificial intelligence, military equipment and other application scenarios.

SND1 data link mesh radio has a variety of models to choose from, the appearance and functional characteristics of each model is the same, only the working frequency band and networking scale is different.

SND1 500mW data link mesh radio models

model	RF power	Network scale	frequency bands
SND1-H460-500mW	500mW	Max. 1024 nodes, up to 16 hops	453～470MHz
SND1-H495-500mW			490～500MHz
SND1-H800-500mW			820~854MHz
SND1-H900-500mW			900~940MHz

SND1-F460-500mW	500mW	Max. 256 nodes, up to 3 hops	453~470MHz
SND1-F495-500mW			490～500MHz
SND1-F800-500mW			820~854MHz
SND1-F900-500mW			900~940MHz

Features

- Frequency: different models support different frequency bands, see models table;
- Bandwidth: 1MHz/500kHz/250kHz/125kHz selectable;
- Number of nodes and hops: Maximum 1024 nodes up to 16 hops or 256 nodes up to 3 hops, see models table;
- Frequency hopping speed:
  More than 1800 times per second @ 1MHz
  More than 900 times per second @ 500kHz
  More than 450 times per second @ 250kHz
  More than 225 times per second @ 125kHz
- Effective data rate: Maximum 735kbps@1MHz, 370kbps@500kHz, 185kbps@250kHz, 92kbps@125kHz
- Full-multiplexing communication: support
- Air-to-ground LOS(light of sight) distance: ≥30km
- Centerless self-organized network: support centerless self-organized network, any node of the network is destroyed without affecting the communication;
- Network construction time: within 1 second
- Wireless transmission delay: minimum 2ms
- Dynamic topology: support dynamic topology, support node joining and leaving, network topology change and deformation can be normal communication;
- RF power: 500mW(27dBm)
- Sensitivity: -114dBm@125kHz, -111dBm@250kHz, -108dBm@500kHz, -105dBm@1MHz
- Frequency stability: ≤1ppm
- QPSK modulation LDPC coding
- Encryption: 128-bit encryption
- Movement Speed: supports no less than 1250km/h
- Low power consumption: less than 1W when receiving, less than 4W when transmitting, average working power consumption less than 2.5W;
- Operating voltage: 7V～36V
- Operating temperature: -40～+85℃
- Dimensions: 50*50*17.3mm
- Weight: 56g

Specification

I/O	Description
J30JZ-9PIN connector	Power-input, uart, M0 control signals
M1 Dipswitch	M1 control signal

SMA female	Antenna port, the required antenna impedance is 50Ω

J30JZ-9PIN connector

J30JZ-9PIN connector PIN signal (when assembled as TTL3.3Vor RS232 uart port)

No.	PIN	Description	Input or Output
1	M0	M0 control signal	I
2	TX	Uart transmission pin	O
3	RX	Uart receiving pin	I
4	GND	GND of uart port	O
5	NULL	Null	IO
6	VDD	Power input VDD	I
7	VDD	Power input VDD	I
8	GND	Power input GND	I
9	GND	Power input GND	I

J30JZ-9PIN connector PIN signal (when assembled as RS422 uart port)

No.	PIN	Description	Input or Output
1	M0	M0 control signal	I
2	422_TX+	RS422 port transmission positive pin	O
3	422_TX-	RS422 port transmission negative pin	O
4	422_RX+	RS422 port receiving positive pin	I
5	422_RX-	RS422 port receiving negative pin	I
6	VDD	Power input VDD	I
7	VDD	Power input VDD	I
8	GND	Power input GND	I
9	GND	Power input GND	I

Power input

The supply voltage range of SND1 is 7V~36V, and the normal working supply current is less than 0.5A@12V, we suggest the power supply current 1A@12V above.

Uart port

Before shipment, the uart port can be assembled as TTL uart port, or RS232 uart port, or RS422 uart port according to customer's requirement. The TTL/RS232 uart port data bit is 8-bit, the stop bit is 1-bit, and there is no parity check bit. When the radio operates in configuration mode, the baud rate is fixed at 9600. When operating in data transparent mode, the baud rate can be configured as 9600 / 19200 / 38400 / 57600 / 115200 / 230400 / 460800 / 921600. Suggest selecting a baud rate of 921600 when the RF bandwidth is 1MHz; When the RF bandwidth is 500kHz, select a baud rate of 460800; When the RF bandwidth is 250kHz, select a baud rate of 230400; When the RF bandwidth is 125kHz, select 115200 baud rate, so that the uart port baud rate matches the wireless throughput to avoid packet loss during uart port data transmission and reception. uart ports are mainly used for radio parameter configuration and data transmission.

M1 Dipswitch

M1 and M0 (M0 PIN of J30JZ-9PIN connector) signal is used for control the radio operating mode.

The radio supports two operating mode: data transparent transmission mode and configuration mode. Users can configure the M0 level and the M1 status to put the system in the corresponding mode. When the voltage levels of M0 and M1 are not consistent, the system operates in configuration mode; When the voltage levels of M0 and M1 are the same, the system operates in transparent mode. The M0 and M1 pin systems have been pulled up to a high level internally and are in transparent mode. When M0 is suspended, the M1 dip switch is turned to the "C" side, and the system enters configuration mode. The M1 dip switch is turned to the "D" side, and the system enters transparent transmission mode. The configuration mode and transparent transmission mode are switched in real-time without restarting the system.

When the radio is in configuration mode, it only responds to configuration commands and does not transmit received serial data to the wireless port. It also does not output data to the serial port when receiving signals from the wireless port. In configuration mode, the uart port baud rate is fixed at 9600, with 8 data bits, 1 stop bit, and no parity check bits.

When the radio is in transparent transmission mode, if the received serial data is a configuration packet, the radio will perform parameter configuration; If the received serial data is not a configuration packet, it will be transmitted to the wireless port, and the signal received from the wireless port will be forward to the serial port.

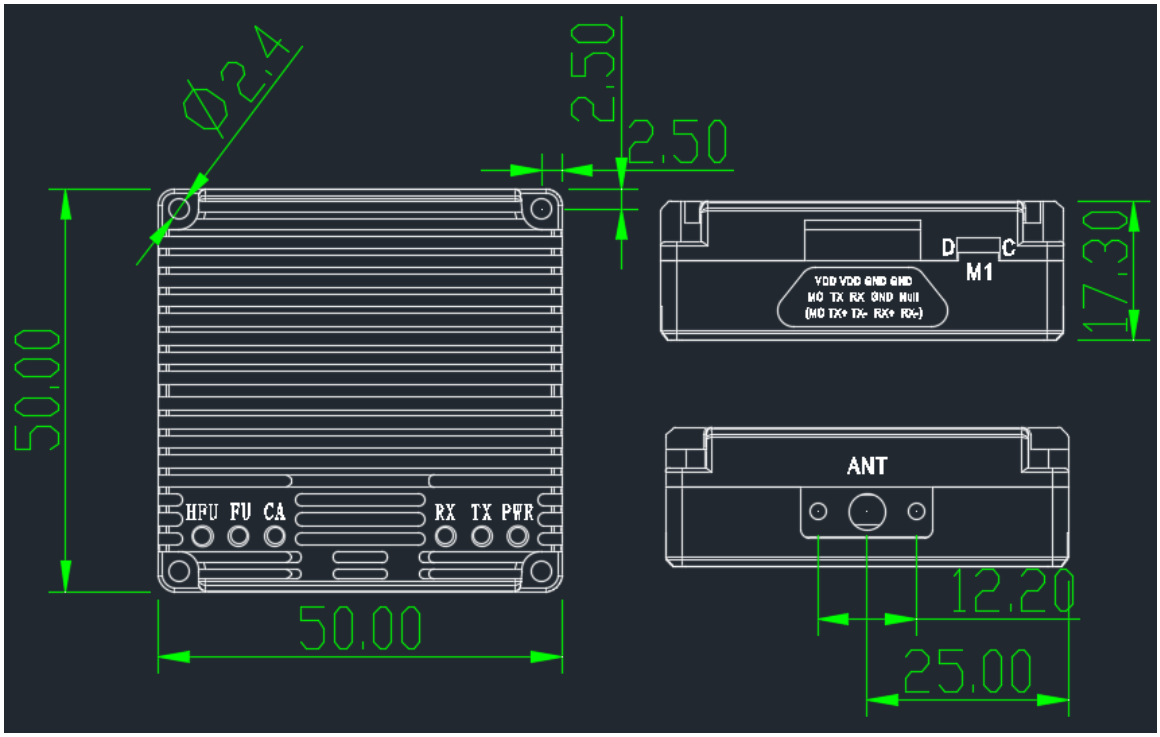
In configuration mode, only local configuration parameters are supported, while in transparent transmission mode, both local and remote parameter configurations are supported.

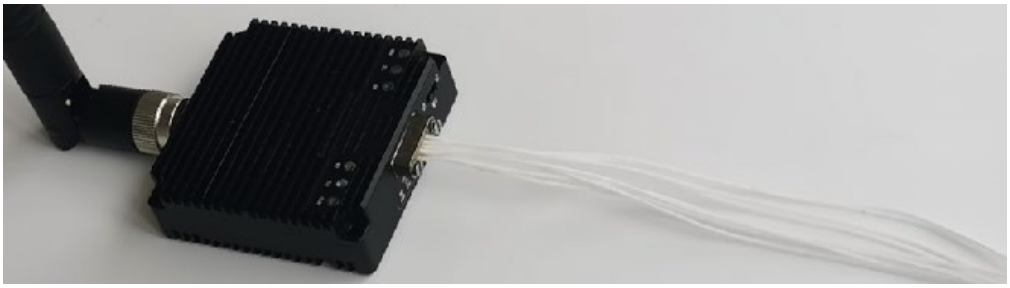
Indicator LEDs

LED	Description
PWR	Power led, Red light on normal powered.
TX	Green, data transmission led, briefly light during power on self-test, light when data is transmitting.
RX	Green, data receiving led, briefly light during power on self-test, light when receiving data.
CA	Blue, interference led, briefly light during power on self-test, light in configuration mode. In transparent transmission mode: When it light on, it means exist interference and the brighter the light, the stronger the interference signal.
FU	Blue，data cache indicator led, briefly light during power on self-test, light when data cache is full.
HFU	Blue，data cache indicator led, briefly light during power on self-test, light when data cache is half full.

In order to ensure communication quality, there is a data buffer memory inside the system, and the buffer size can be set. The larger the buffer, the less likely it is to lose data, but it may increase latency. The cache status can be obtained through the system FU and HFU indicator leds. In general, it is recommended that when the HFU indicator led is light on, the upper computer should pause sending data to avoid data cache being full and causing data loss.

SND1 device size(mm)






RX
TX
PWR