MINI-DUAL User manual (dual-band)

SwiftLink series: 600MHz & 1.4GHz
Version： 20240826V1.0

Version history

Date	Version	Modification description
20240826	V1.0	Initial release

Catalogue

1.Product overview

MINI-DUAL is a self-developed TDD bidirectional dual-band graph and digital integrated wireless transmission equipment. The product has the functions of real-time interference detection, adaptive frequency selection, adaptive stream, automatic retransmission and automatic power control, which greatly improves the ability of antimultipath and anti-interference, and has the characteristics of high reliability, good stability and low delay.

This product is suitable for firefighting, inspection, monitoring and other scenarios, the transmission distance of 30KM+ when the environment is good。

2.Product characteristics

- Supports dual-band transmission： It supports symmetric or asymmetric frequency transmission in both upstream and downstream frequency bands.
- Support long-distance transmission： 4M code flow can be transmitted up to 30km+.
- Supports large bandwidth transmission： Up to 23.9Mbps@20MHz.
- Supports automatic relay transmission： Supports automatic repeater addition.
- Supports automatic frequency selection：Automatic detection of interference signals, real-time selection of the optimal frequency point.
- Supports automatic retransmission： Automatic retransmission of burst error data improves data reliability.
- Supports adaptive stream：The channel modulation mode is automatically adjusted according to the signal quality in real time.

- Supports automatic power control：Close range automatic adjustment of transmission power, reduce power consumption.
- Supports automatic antenna selection：According to the occlusion situation, the optimal antenna transmission is selected in real time.
- Supports upstream and downstream dynamic allocation：Master-slave uplink and downlink bandwidth ratio can automatically allocate bandwidth according to the actual data volume.
- Supports the coexistence of multiple sets：A maximum of six devices can be used at the same fixed frequency.
- Supports the frequency matching function：You can use software to configure frequency alignment and hardware key alignment.

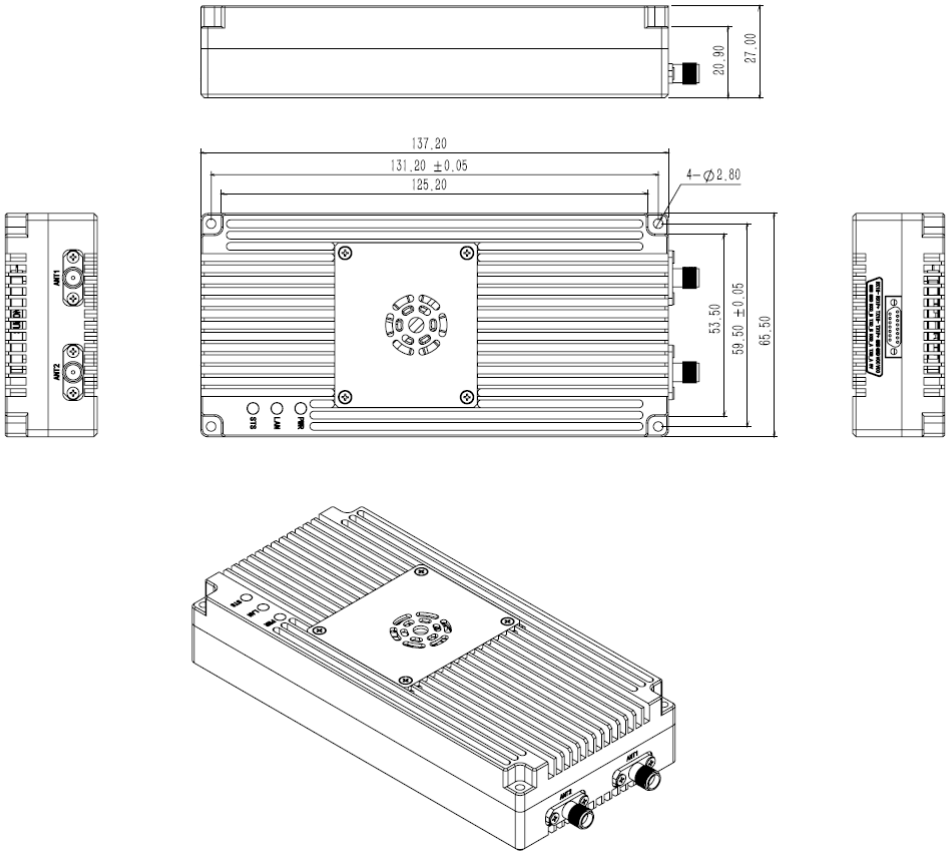
3.Product specifications

System parameter	Technical index
Equipment type	P33-MINI-DUAL
Working frequency	566-678MHz&&1350-1470MHz (customizable)
RF channel	2T2R
Transmission power	33dBm (2W)
Transmission distance	Air to ground 30KM+(LOS)
Channel bandwidth	10MHz/20MHz
Modulation mode	QPSK/16QAM
Transmission rate	See Table 2
Maximum rate	23.9Mbps@20M
AES	AES256
Transmission delay	≤10ms
RF interface	SMA *2
Device interface	Ethernet *1
	TTL/RS232 *1
	TTL*1/RS232*1/SBUS*2
Power consumption	≤ 25W @4Mbps (Air)
	≤ 10W@1Mbps (Ground)
Dimension	148mm*65mm*27mm
Weight	280g
Working voltage	DC 9~26V, Typical value : +12V@3A
Working temperature	-40~+65℃

Table 2 MCS and total throughput (10/20MHz bandwidth)			
No.	MCS	10M Total throughput(Mbps)	20M Total throughput (Mbps)
1	BPSK1/3	Non-support	3.5
2	BPSK1/2	Non-support	4.8
3	BPSK2/3	Non-support	5.9
4	BPSK3/4	Non-support	6.8
5	QPSK1/3	4.0	7.0
6	QPSK1/2	5.8	9.7
7	QPSK2/3	7.1	11.9
8	QPSK3/4	8.1	13.7
9	16QAM1/3	8.0	11.7
10	16QAM1/2	11.6	16.9
11	16QAM2/3	14.2	20.8
12	16QAM3/4	16.4	23.9

4.Product dimension and weight

4.1 Dimensional diagram

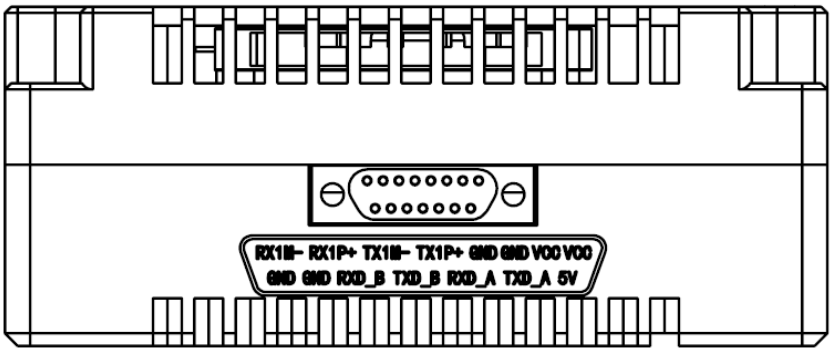


4.2 Dimension and weight

- Dimension : 148mm *65mm *27mm（include SMA 10mm）
- Weight: 280g

5. Product interface definition

5.1 Interface diagram



The MINI-DUAL uses a J30J-15pin interface and has one power supply, one network port, and two serial ports. One serial port is fixed to RS232/TTL, and the other serial port can be changed to RS232/TTL/SBUS.

5.2 Interface definition

Linear order	Pin name	Interface definition	Interface description	Signal direction
1	VCC	Power DC 9~26V	Power positive	I
2	VCC		Power positive	I
3	GND		Power negative	I
4	GND		Power negative	I
5	TX1P+	Ethernet*1	TX+	O
6	TX1M-		TX-	O
7	RX1P+		RX+	I
8	RX1M-		RX-	I
9	5V	5V output	SBUS 5V output	O
10	TXD_A	Serial port 1 RS232/TTL	Serial port 1 TX	O
11	RXD_A		Serial port 1 RX	I
12	SBUS /TXD_B	Serial port 2 SBUS/TTL/RS232 (note 4;5)	SBUS output(air)	IO
13	SBUS /RXD-B		SBUS input(ground)	IO
14	GND		Serial port 2 ground	O
15	GND	ground	Serial port 1 ground	O

Note 1: Signal direction I indicates radio input and direction O indicates radio output.

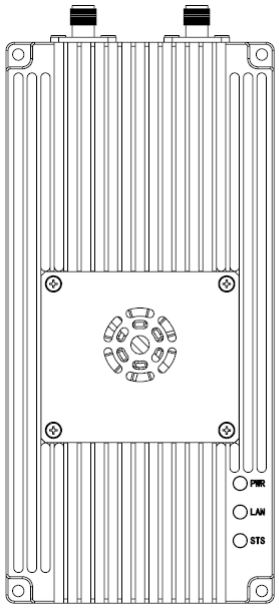
Note 2: Serial port 1 can be used only with RS232/TTL, PIN10,11,15. Delivery is determined by the hardware.

Note 3: Serial port 2 can be used as RS232/TTL/SBUS. The factory is determined by hardware. TTL and SBUS can be switched to software.

Note 4: SBUS12 and 13pin at the ground end are in, and SBUS12 and 13pin at the sky end are out.

Note 5: If dual serial ports are used, set the sky SBUS to Line12->Line12. line13->line13.

6.Product status light meaning



PWR（green）

The device is powered on, and the PWR is long and bright.

LAN（green）

The network port indicator blinks when data is being sent or received.

STS（Four-color light)

Different colored lights indicate the current signal quality.

The STS light represents the SNR size of the received signal	
STS colour	Received signal quality SNR
green（great）	SNR>10dBm
yellow（well）	6dBm<SNR<10dBm
red（good）	SNR<6dBm

Module type	mode	PWR 灯	LAN 灯	STS 灯
master	unsynchronized	The green light is steady on	Data is being transmitted and blinking	The blue light keeps on
master	synchronization	The green light is steady on	Data is being transmitted and blinking	（green/yellow/red） Proportional to the strength of the received signal
slave	unsynchronized	The green light is steady on	Data is being transmitted and blinking	Blue light flashing
slave	synchronization	The green light is steady on	Data is being transmitted and blinking	（ green/yellow/red ） Proportional to the strength of the received signal

When the master and slave devices are not synchronized, the power PWR indicator of the master and slave devices is steady, and the STS blue indicator of the master device is always on. The blue light from the device's STS flashes. When the master and slave are synchronized, the master and slave's STS light becomes a three-color light, and the green light is displayed if the signal quality is good. A yellow light indicates moderate communication quality. A red light indicates poor communication quality. When the network port is sending or receiving data, the LAN indicators of the master and slave devices blink.