ZXIMCU sMesh100 Broadband Mesh Manpack System Manual
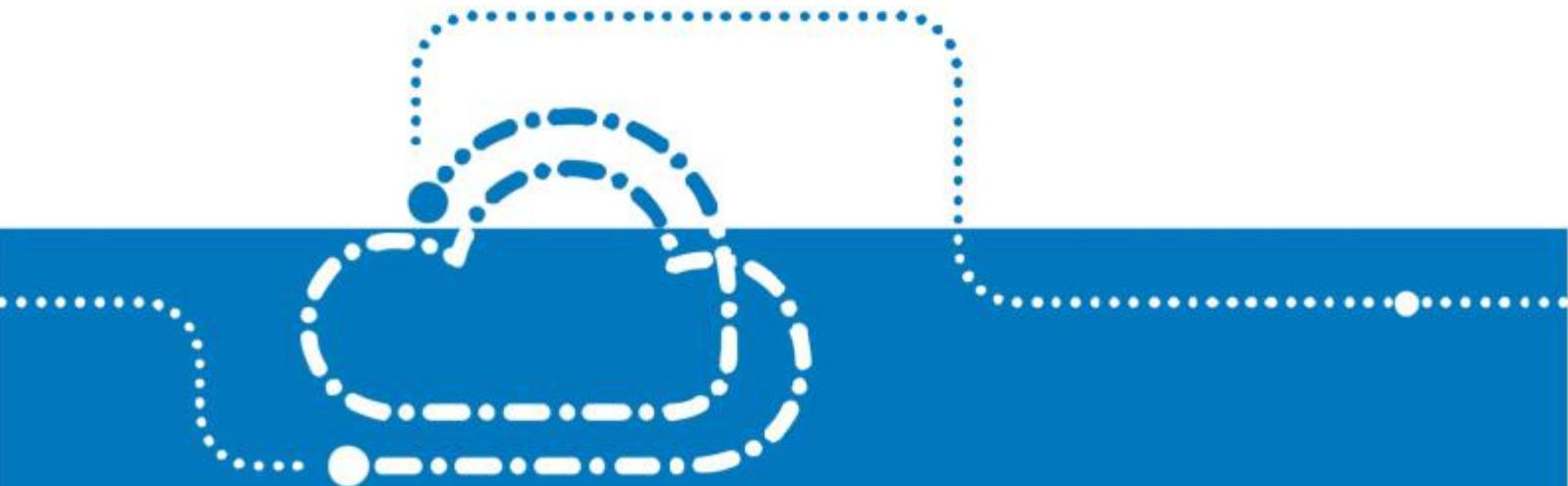
Revision record

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1　Overview

1.1　System Overview

The sMesh ("s" standing for "smart") broadband Mesh Manpack system adopts center-less co-frequency Mesh network technology and distributed network architecture. The system supports any network topology and multi-hop relay, such as point-to-point, point-to-multi-point, chain relay, mesh network and hybrid network topology, etc. When the sMesh equipment moves quickly, the system topology can be rapidly updated to adapt to the new network topology and ensure system transmission.

The system is easy to deploy, flexible to use, simple to operate, and easy to maintain. It provides customers with reliable, timely, efficient, and secured all-IP-based clear voice, broadband data and other multimedia integrated services under non-line-of-sight and fast-moving conditions.

The system is widely adopted in industries such as public safety, firefighting, power supply, oil & gas, transportation, water conservancy, forestry, medical etc., to completely meet user requirements for wireless broadband emergency communication

Figure 1- 1 The sMesh broadband Mesh Manpack system functions

1.2   System Features

Figure 1- 2 The sMesh broadband Mesh Manpack system

Quick Startup

● The system does not require any configuration, starts up after pressing power button, establishes network in "seconds".

One system, Multi-purpose

● The system can be flexibly deployed as required, such as man pack, on-board (vehicle or vessel) or fixed at some place. It can meet the requirements of communication for users on land or on board, and realize wireless networking coverage at different scenarios.

Abundant Services

● The system supports rich services such as voice, video, location, data, and support VPN channel. It supports interconnection with different systems, such as, satellite, public network, and LTE wireless network.

Flexible Networking

● The system adopts centerless and co-frequency Mesh network, and the carrier bandwidth can be flexibly configured. It supports point-to-multi-point, chain relay, star network, and hybrid network, as well as multi-hop relay and relay forwarding.

Disaster Recovery

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- When a node of the network fails or disconnects, the system calculates and selects the optimal path for transmission automatically, to realize network self-healing and improve disaster recovery capability.

Frequency Scanning

- The system can scan frequency in real-time to check environmental interference.

Easy to Manage

- The system can monitor the working status of each node and wireless link quality, as well as GIS location information.

High Reliability

- With IP67 ingress protection grade, high anti-vibration performance, and operating temperature range from–40°C to + 60°C, the system is comprehensively applicable to harsh environment.

1.3   System networking

The ZXIMCU sMesh100 broadband Mesh Manpack system supports multiple networking method, such as chain networking, star networking, mesh networking, and hybrid networking, etc.

Figure 1- 3 System networking

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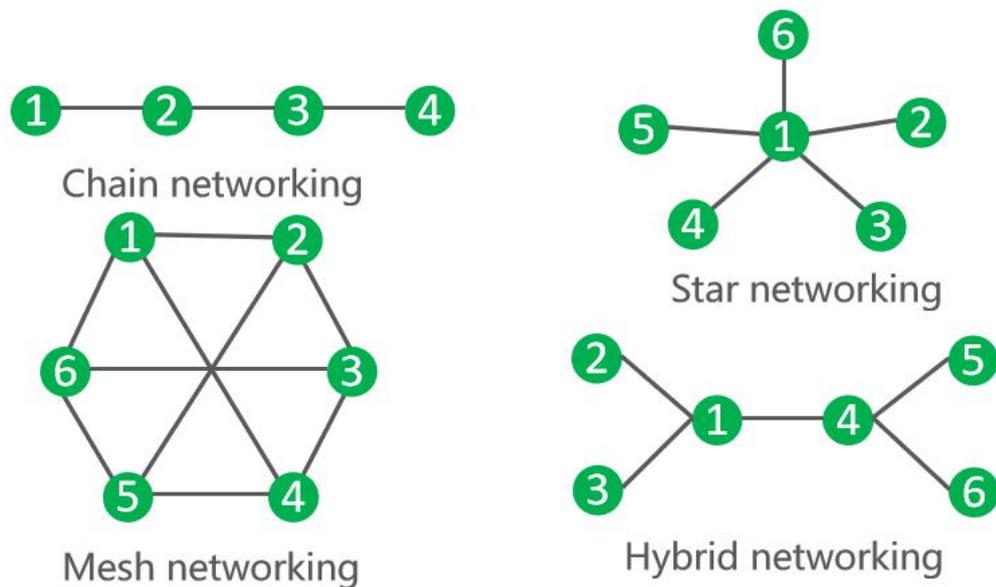
1.4　　　Product Specification

Table 1- 1 ZXIMCU sMesh100 broadband Mesh Manpack system product specification

No.	Item		Detailed description
1	General	Working Frequency	566~626M
			Other frequencies can be customized
		Working Mode	TDD
		Technical Standard	COFDM
		Working bandwidth	Flexibly configured as 2.5 MHz, 5 MHz,10 MHz or 20 MHz
		Transmit Power	2 * 2W
		Rx Sensitivity	≤ -105dBm;
		Number of channels	2 channels, 2T2R
		Rate	Peak data rate > 50 Mbps
		Networking Mode	Centerless, co-frequency mesh
		Networking Scale	32 nodes
		Number of Hops Supported	Unlimited, recommend less than 8 hops
		Encryption Mode	DES / AES128 / AES256
2	Environmental	Operating Temperature	-40℃～+60℃.
		Storage Temperature	-50℃～+70℃.
		Air Pressure Range	70～106 kPa
		IP Grade	IP67
		Shock Resistance	Above class 7M2 under GBT 4798.7-2007 Environmental conditions existing in the application of electric and electronic products - Part 7: Portable and nonstationary use
3	Physical	Dimensions	270mm × 210mm × 65mm(with handle)
		Weight	4 kg (with battery)
		External Ports	Network Port: data transmission and network management Wi-Fi Port (SMA): Connect to Wi-Fi antenna Audio Port: connected to an external earphone RF Port (N): connected to RF antenna GPS (SMA): location Power Port: connected to an external power supply

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4	Electrical	Power supply	Adaptor: AC 110V/220V 50/60Hz.
			DC input: DC 33.6V.
			Modular lithium battery for easy assembly and disassembly
		Working hours	Work continuously for 12 hours with lithium battery

2 Equipment Description

2.1 Equipment Composition

ZXIMCU sMesh100 consists of host, battery, adaptor, wifi antenna, headset, GPS antenna, network cable, and so on:

Figure 2- 1 Equipment Composition

| Host | Battery | Adaptor | Rf antenna | WiFi antenna |
| Headset | Network cable | GPS antenna | Backpack | Flight case |

Host: sMesh100 core part, realizes all services of sMesh device;

Battery: Detachable, provides backup power support for the host, 12 hours backup;

Adaptor: Charge the host or battery. When the battery is low, the adaptor connect the host to power the host and charge the battery;

Rf antenna: Transmit and receive radio frequency signal;

WiFi antenna: Transmit and receive WiFi frequency signal;

Headset: Connect to the host to realize voice communication under the networking of multiple devices;

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Network cable: Connect to the host and other network equipment to provide IP data transmission for other network equipment;

GPS antenna: Connect to the host for positioning;

Backpack: Used for backpack scenario;

Flight case: Used to place the host and accessories to provide equipment transportation and carrying protection.

Note: The above equipment is not all included in the standard configuration. For details, please refer to the equipment specification or consult relevant salesman.

2.2   Host Description

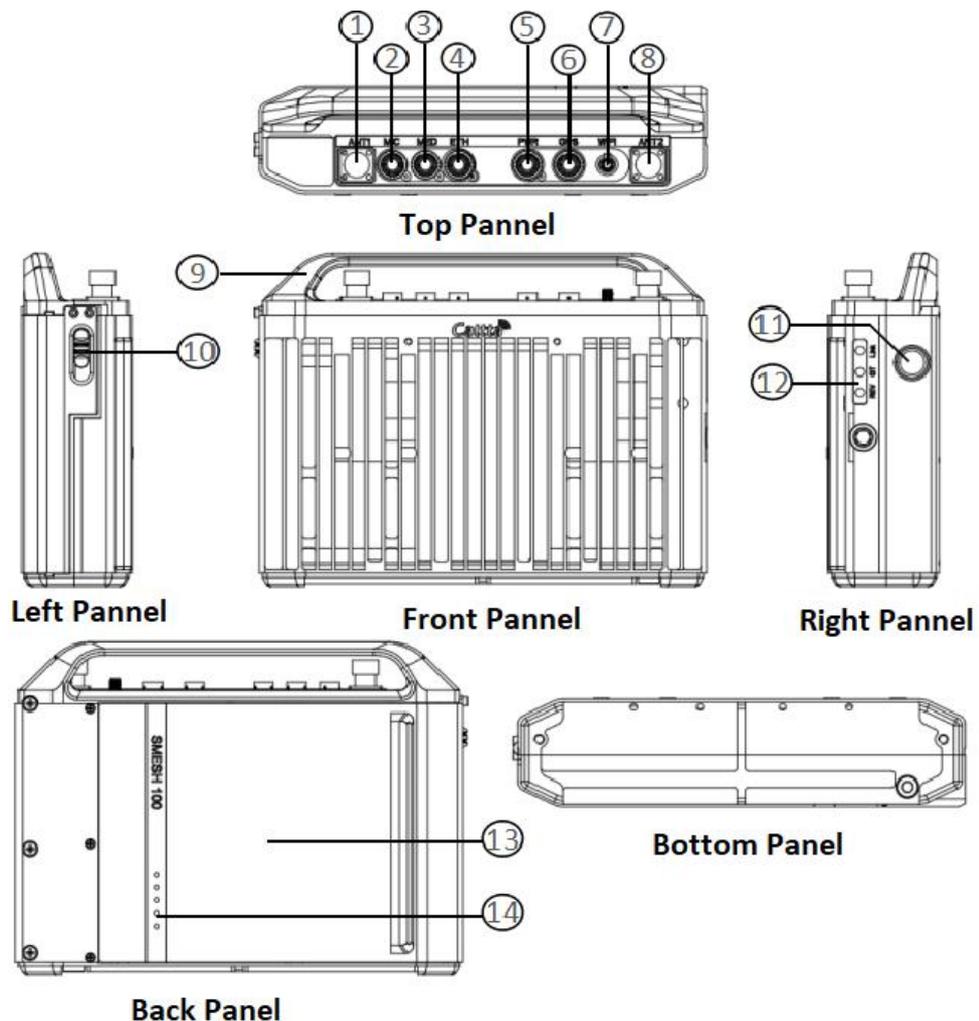sMesh100 host is shown as follows:

Figure 2- 2 sMesh100 host

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Table 2- 1 Host description

No.	Part Name	Description
1	RF antenna port 1（ANT1）	Connect with RF antenna to provide signal transmit and receive
2	Headset port（MIC）	Connect with sMesh headset to provide voice communication among different equipment
3	Multimedia port（MED）	Connect with the multimedia expansion module (optional) to provide external video source input.
4	Network port（ETH）	Connect with network cable to provide IP data transmission service by connecting different network equipment.
5	Power port（PWR）	Connect with the adaptor to provide power supply to the host and charge the battery.
6	GPS port（GPS）	Connect with GPS antenna to realize positioning.
7	WiFi port（WIFI）	Connect with WiFi antenna to provide WiFi connection.
8	RF antenna port 2（ANT2）	Connect with RF antenna to provide signal transmit and receive
9	Handle	Equipment handle
10	Battery buckle	Fix or release the battery
11	Power switch	Power on or power off the equipment
12	Work indicator	Link status indicator (Link), link quality indicator (QT), reserved (REV)
13	Battery	Detachable battery to power the host
14	Battery indicator	Battery level indicator, each indicator indicates 20% power

3   Equipment Installation

1. Battery installation

Take out the sMesh100 host and battery, align the battery charging port side with the host, and align the battery guide pin with the host guide slot, push the battery in until the battery is inserted tightly, and then lock the battery buckle, as shown in the figure below.

Figure 3- 1 sMesh100 battery installation
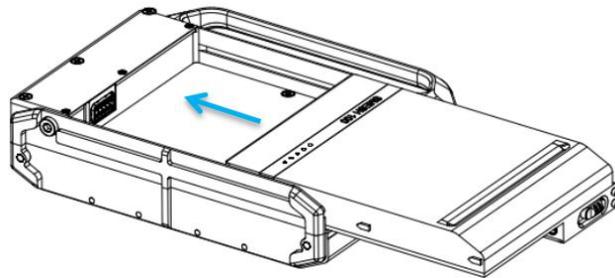
2. RF antenna installation

The interface between the RF antenna and the host is a standard N-type connector. Insert the threaded end of antenna into the RF antenna port on the top panel of the host and tighten it clockwise.

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Note: sMesh100 can be configured with multiple antenna types according to different scenarios, such as piggyback antenna. FRP long antenna. When FRP long antenna is configured, the equipment and antenna are connected by feeder.

Figure 3- 2 sMesh100 piggyback antenna installation
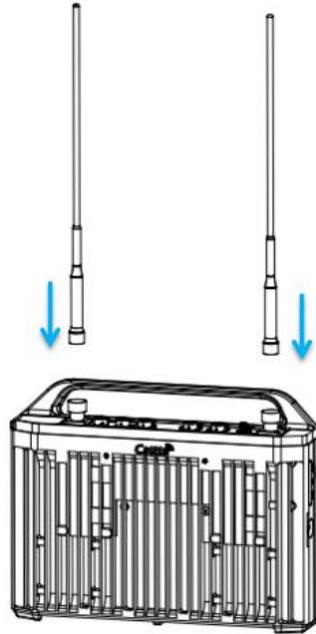
3. Equipment power on

After the installation is complete, press the power switch on the right panel of the host to power on the host. By observing the status of the LED indicators on the right panel of the host, check whether the device is working normally; and monitor the status of the communication link between the devices (The connection can be established with at least 2 hosts power on).

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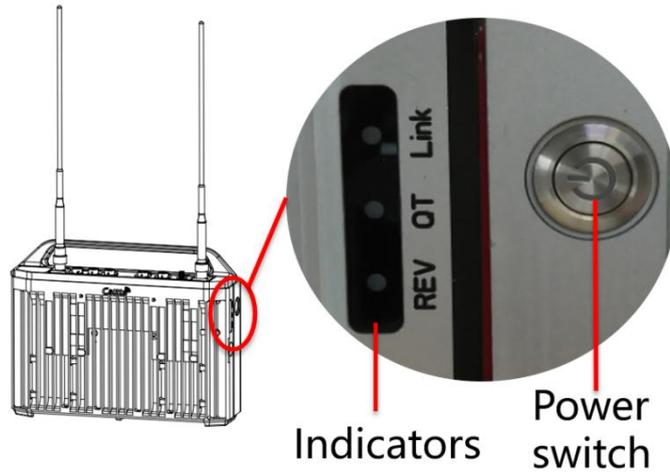
Figure 3- 3 sMesh100 equipment power on

Table 3- 1 Indicator status description

No	Indicator	Light status		Corresponding equipment status
1	Link	Always green	🟢	Connection is normal
		Flashing green	🟢 ⚪	Connection is normal, MIC access
		Always red	🔴	Not connected
		Flashing red	🔴 ⚪	The system is abnormal, you need to wait for the system to restart automatically or you need to restart it manually
2	QT	Always green	🟢	Connection is normal, wireless link quality is excellent
		Always cyan	🔵	Connection is normal, wireless link quality is fine
		Always yellow	🟡	Connection is normal, wireless link quality is moderate
		Always magenta	🟣	Connection is normal, wireless link quality is a little poor
		Always red	🔴	Connection is normal, wireless link quality is weak
		Light off	⚪	Connection is down, no wireless link
3	REV	Reserved		Reserved

4. Other accessories connection

Connect different accessories according to different scenarios, such as network cable (for network transmission) , adaptor (for device charging), headset (for voice communication), WiFi antenna (for WiFi access), etc. Except for WiFi antenna, other interface uses aviation connector and supports foolproof design.

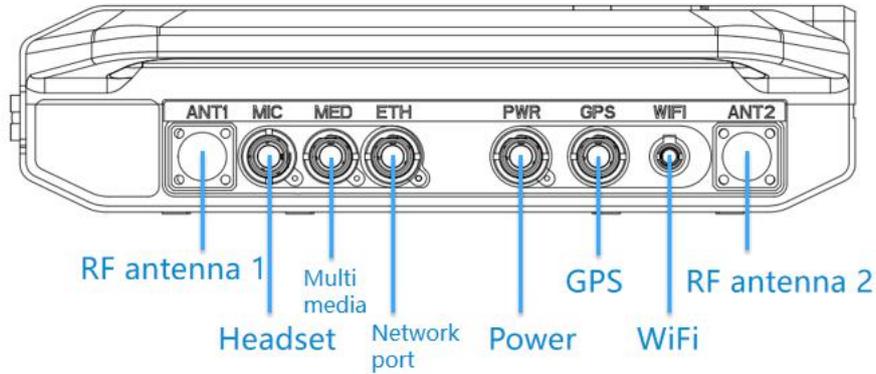Figure 3- 4 sMesh100 top panel accessory connection interface

Figure 3- 5 sMesh100 accessory and host docking alignment mark

4   Precautions for use

1. The antenna should be firmly connected. If the connection is loose, it will easily lead to weak signals and reduce the antenna life;

2. Do not rotate cable connector forcefully. The aviation connectors of cables such as network cable, power cable, are buckle design instead of thread design, please connect the cable to the connector base by aligning the cable connector;

3. Charge the battery regularly to avoid long-term battery loss;

4. During the use of the equipment, please avoid sand and soil entering the connector, and ensure that there is no foreign object in the connector before connecting the cables or antennas;

5. Do not puncture or scratch the device with hard objects;

6. Do not store the equipment in an environment containing corrosive substance.

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5   Troubleshooting

Table 5- 1 sMesh100 troubleshooting

Fault description	Cause analysis	Solution
Can not power on	The battery is not installed correctly or is in poor contact	Check if the battery is installed correctly and firmly
	Battery is low	Replace the battery, or connect an external power source, and then try to power on
Unable to establish connection among sMesh100 equipment	The configured Tx & Rx frequency points and bandwidth are inconsistent with the other equipment	Check if the network parameters such as frequency and bandwidth are consistent with others. If necessary, please ask after-sale expert to reset the equipment.
	The working frequency is interfered by an external strong signal, causing the connection to fail	Find the source of interference. If cannot turn off or stay away from the source of interference, you need to change the working frequency or reduce the working bandwidth of the equipment.
Short communication distance or unstable link	Host antenna connection abnormal	Check the antenna connection status and make sure the antenna connection is firm
	Host RF port is loose	Check the RF connector, tighten the connector, if there is no improvement, you need to replace with a new connector
	The working frequency is interfered by a external strong signal, causing the connection to fail	Find the source of interference. If cannot turn off or stay away from the source of interference, you need to change the working frequency or reduce the working bandwidth of the equipment.
Network connection abnormal	Network cable is damaged	Check the status of the network cable and replace it if necessary
	The distance between equipment exceeds the equipment coverage	Try to place the equipment on a high ground or choose a high spot between the equipment to set up a relay
	The working frequency is interfered by a strong signal, causing the connection to fail	Find the source of interference. If cannot turn off or stay away from the source of interference, you need to change the working frequency or reduce the working bandwidth of the equipment.

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