Instruction Manual for BN4 Network Base Station

1. Overview

The BN4 network base station is a highly stable GNSS network base station device specifically designed for long-term continuous operation environments such as indoor data centers and equipment rooms. The product is developed based on the BP4 platform with a redesigned circuit board and is suitable for 7×24-hour continuous power supply operation. After the device is powered on, it will automatically complete satellite positioning, automatically log in to the ICECORS backend, and continuously upload RTCM differential data at a frequency of 1Hz.

BN4 supports multiple network modes including Ethernet, WiFi, and 4G, has high-precision GNSS receiving capabilities across the entire system, and can be applied to CORS networks, data center fixed stations, high-precision monitoring, multi-industry equipment integration, etc.

2. Hardware Configuration

1. RTK board

- **Standard Configuration:** Feiman P23M
- **Optional:** UM980 supports GNSS positioning across all systems and frequency bands.

2. Wireless Communication Module

- WiFi + Bluetooth: Standard Quectel **FCS945R**
  Supports WiFi AP/STA modes and BLE communication.

3. Ethernet Interface

- Standard RJ45 Gigabit Ethernet interface is the default highest priority network for the device.

4. 4G Communication (Mini PCI-E)

- Domestic Standard Configuration:**Quectel EG800 CAT1**,**Meige CAT4**
- Overseas, it can be replaced according to the local frequency band with:**EC20 CAT4**
  for differential data upload and backend communication.

5. Data Transmission Module (Optional)

- Supports optional configuration of **M5 Data Transmission Module** for industry-customized wireless links.

6. Power and Serial Interface (5-pin Aviation Connector)

- 2-pin: 12V DC input
- 3-pin: RS232 serial port (115200 bps), used for connecting external high-power radio stations

7. External Interface Configuration

- **TNC × 3:** Main Antenna / Sub Antenna / Data Transmission Antenna
- **SMA × 3:** 4G/WiFi/Bluetooth Antenna
- **RJ45 × 1:** Gigabit Network Interface
- **5-pin aviation connector × 1:** Power supply + RS232
- **USB-C:** Current version default (with reserved expansion space in the enclosure)

8. Display and Buttons

It uses the display and button layout of BP4 for status viewing and local common operations.

9. Product image (to be updated later)





3. Software Features

1. Automatic Network Base Station Function

BN4 automatically after power-on:

1. Initialize Hardware
2. Complete satellite positioning
3. Connect to available networks according to network priority
4. Automatically log in to the ICECORS backend
5. Upload RTCM data at **1Hz**.

It achieves Plug and Play without customer engagement.

2. Base Station Coordinate Setting

- Supports autonomous positioning to obtain coordinates
- Supports writing fixed coordinates via measurement APP / USB virtual serial port, suitable for requirements such as CORS fixed stations and monitoring stations.

3. Network Priority Policy (Automatic Switching)

Priority from high to low:

6. **Ethernet (RJ45)**
7. **WiFi**
8. **4G**

The system automatically selects the optimal link and switches to the second-best network when the network is disconnected.

4. Workflow

1. Starting Phase

Device self-check, GNSS initialization, and network module startup.

2. Log in to the backend

Automatically log in to the ICECORS backend after GNSS positioning is completed and the network connection is stable.

The system will automatically select to log in to the domestic or non-China backend based on the region where the device is located.

3. Upload RTCM Data

Stably output and upload differential data at a frequency of **1Hz**.

4. Local RTCM File Storage

When the user enables this feature:

- Automatically create a new RTCM file every time the power is turned on according to **year, month, day, hour, minute, and second**
- When the remaining capacity of the flash memory is <100MB:
  - Stop Writing
  - No longer create new files
  - Network functionality remains unaffected

Suitable for scenarios that require local archiving.

5. External Interface Description

Interface Type	Quantity	Function Description
TNC × 3	Main Antenna / Sub Antenna / Data Transmission Antenna	
SMA × 3	4G / WiFi / Bluetooth Antenna	
RJ45 × 1	Gigabit Ethernet	
5-Pin aviation plug × 1	12V Power Supply + RS232	
USB-C	Temporarily unavailable (reserved for future upgrades)	

6. Scalable Features

The following features are potential requirements:

1. User-switchable Communication Protocol

- ICECORS NTRIP
- ICECORS MQTT
- Standard NTRIP
- Standard MQTT

2. Extended RTCM Data Management

More data management methods (such as remote download, scheduled cleanup, etc.).

3. Measurement Station Mode

Working mode for use with the measurement APP.

4. Dual Antenna Azimuth Angle Calculation

Targeting capabilities can be enabled according to project requirements.