Compact Comms-On-The-Pause Terminal
I-FM30PM-1
User Manual

Instructions

The Compact Comms-On-The-Pause Terminal (CCOTP) is a full satellite earth station system for communication in Ku-band. The satellite parameters shall be selected only according to the specific user conditions required.

The CCOTP Terminal User Manual provides operational instructions, for the device, which are standard for applications in Ku-band. However, the specific modem and antenna electrical performance parameters need to be taken in account. This manual is intended for technicians responsible for the installing, setting up and operating of the CCOTP Terminal and for system administrators who are responsible for managing the system.

Note

Please read the user manual and watch the video completely first, and then installation and operation according to the steps.

Safety Alert Messages

Safety alert messages call attention to potential safety hazards and tell you how to avoid them. These messages are identified by the signal words DANGER, WARNING, or NOTICE, as illustrated below. To avoid possible property damage, personal injury, or in some cases possible death, read and comply with all safety alert messages.

DANGER: Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE: It is used for advisory messages concerning possible property damage, product damage or malfunction, data loss, or other unwanted results – but not personal injury.

Indicates a safety message that concerns a potentially hazardous situation in which you could fall.

Indicates a safety message that concerns a potential electric shock hazard.

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1 Introducing the CCOTP Terminal I-FM30PM-1

I-FM30PM-1 Compact Comms-On-The-Pause Terminal (CCOTP) has completely changed the form of the standard parabolic antenna that have been used for satellite communication for a long time, and is the real next generation of satellite communication terminal. I-FM30PM-1 CCOTP terminal adopts advanced high gain horn waveguide array antenna and integrates necessary components of satellite communication: Antenna system, RF unit, Servo system, Satellite modem, Wireless router and Power supply system, which makes I-FM30PM-1 completely separated from the traditional Parabolic form, with a simpler appearance and structure, and more convenient for transportation and operation which completely solves the problem that the traditional satellite portable station system is not portable.

The operation interface design of I-FM30PM-1 CCOTP terminal is based on the simple and intuitive user experience. The terminal does not need any assembly, and it is simple, convenient and compact for the satellite pointing. Even the personnel without the professional background of satellite communication or the experience of using the satellite portable station can complete all operations only by checking the operation instructions or simple training.

The traditional parabolic antenna form of the split, semi-finished satellite portable station needs more than one person to cooperate in transportation, temporary assembly, which is easy to cause damage to the components. The integrated design of I-FM30PM-1 CCOTP terminal reduces the failure point to the greatest extent, and has high reliability, which can be transported and used by one person.

I-FM30PM-1 CCOTP terminal can provide high-speed data channels for video, voice and data. It is applicable to the emergency communication scenes of the army, public security, fire protection and government emergency agencies, and widely used in the fields of earthquake relief, emergency repair of grid lines, flood control and drought relief, news gathering, etc. When the terrestrial network communication blind area and the temporary need to establish a special communication network, the network channel can be quickly opened to provide a reliable transmission link for various services.

Figure 1-1 I-FM30PM-1

2 Technical Specification

Antenna		
Model No.		I-FM30PM-1
Antenna Type		Horn waveguide array antenna
Equivalent to parabolic antenna size		0.3m
RF Performance		
Frequency Range	Tx	13.75~14.50 GHz
	Rx	10.70~12.75 GHz
Polarization		Linear Horizontal / Vertical
Rx Gain		≥ 31.2 dBi @12.75 GHz
Tx Gain		≥ 32.5 dBi @14.5 GHz
G/T		10dB/K, 25° Elevation
EIRP		44 dBW (16W BUC)
First Sidelobe		≤ -14dB
Power And RF Performance		
DC Power Supply		DC10~24V ±5% (With AC Adapter) Built in battery 240Wh, External battery 187.2Wh
Typical Satellite Modem		Select small-size Modems according to customer requirements, such as IQ200, UHP210/220, etc.
Typical BUC		8W / 16W
Power Consumption	8W BUC	120W
	16W BUC	150W
Mechanical Performance		
Satellite Acquisition		Manually pointing to satellite, level error<0.2°
Azimuth Range		Unlimited, fine adjustment ±5°
Elevation Range		10°~ 90°continues, fine adjustment ±5°
Polarization		±70°
Terminal Dimensions (Stowing)		L 15.2 × W 13.8 × H 3.3 in. L 385× W 350× H 85 mm
Terminal Weight		6.5 kg 14.3 lbs.
Environmental Performance		
Operational Wind		17m/s (61.2km/h)
Operational Temperature		-25°C to +50°C
Ingress Protection		IP66
Humidity		0 ~ 95%
Interfaces		
Power		DC Power waterproof aviation connector
LAN		1× RJ45 10/100/1000
Other Function		

Wireless Router	IEEE 802.11b/g/n at 2.4GHz Access number: 30 Coverage (Unobstructed):50~100m
Bluetooth Device	V4.2
GNSS Device Supports	GPS/GLONASS/BeiDou-2/Galileo

3 Packing List

(1) External Packing of Terminal as Follows:

- I-FM30PM-1 Terminal
- 24V DC Power, include safety adapter (The safety adapter is configured according to the user's product usage location)
- Network Cable, and Upgrade Cable (Optional)
- Other customized accessories
- User Manual
- Warranty Card

(2) Internal Packing of Terminal as Follows:

- Waveguide array antenna (Equivalent aperture 0.30 m, including LNB and BUC modules)
- Modem module (When the Modem is built in)
- GPS module
- Display module
- ACU module
- Power module
- Battery module

The basic configuration can be designed according to user requirements.

3.1 Unpacking and Inspection

When you receive the system containers, unpack and inspect the components and hardware to ensure that all parts have been received in good condition.

3.2 Freight Damage

If any parts appear to have been damaged in transit, immediately contact the freight carrier.

3.3 Material-Missing or Damaged

If any parts appear to be missing or damaged, but not as a result of handling in transit, contact your dealer or distributor.

3.4 Basic External Configuration of CCOTP Terminal

Item	Photo	Part Name	Quantity	Remarks
01		I-FM30PM-1 CCOTP Terminal	1	Standard
02		Network Cable – 5m	1	Standard
03		Power Cable -5m	1	Standard
04		Power Adapter	1	Standard
05		Backpack	1	Standard
06		Carton	1	Standard

4 Description of CCOTP Terminal

4.1 Terminal Structure Diagram

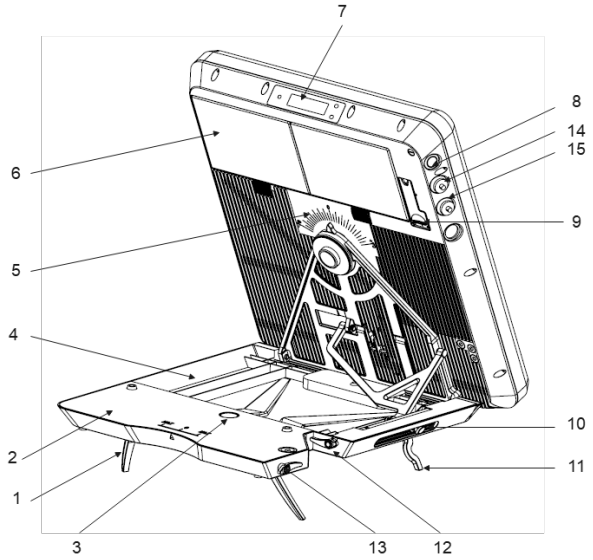


Figure 4-1 Component Description

1-Rear Support Leg Components, 2-Dust Cover, 3-Compass, 4-Base Frame, 5- Polarization Scale, 6-Battery, 7-OLED Display, 8-POWER ON/OFF Button, 9-Lock, 10- Elevation Roughly Adjustment Button, 11-Front Support Leg Components, 12-Elevation Fine-Tune Adjustment Knob, 13- Azimuth Fine-Tune Adjustment Knob, 14-Power Plug, 15-Network Cable Interface

4.2 Terminal Dimensions

The dimension drawing of the CCOTP Terminal (Unit: mm), as shown in Figure 4-2.

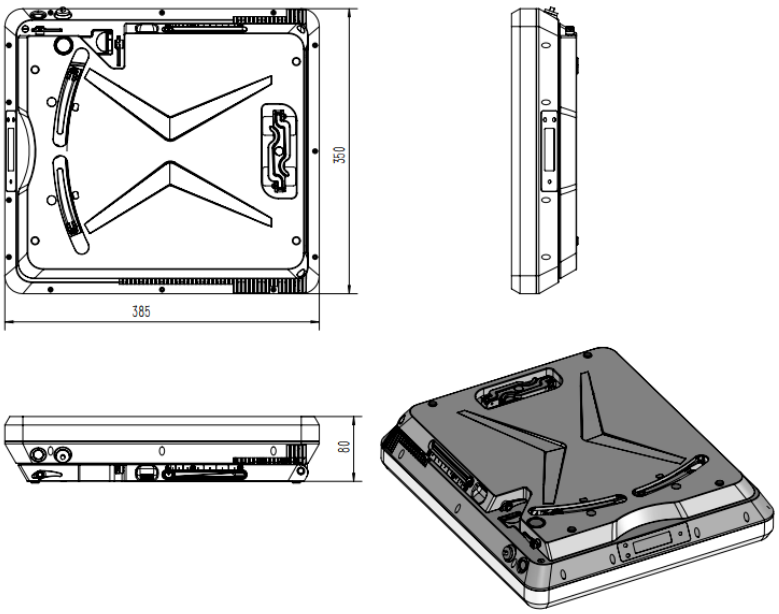


Figure 4-2 Overall Dimension

4.3 Terminal Wireless Access Details

- **Terminal Serial No (S/N):**

  PMXXXXXXXXX (XXXX is the number of the following device)

- **MODEM:IQ200 (Take the IQ200 as example)**

  IP:192.168.0.1
  User: admin
  Password: iDirect

- **Wi-Fi Router:**

  SSID: HILINK-XXX
  Default IP Address: 192.168.0.254
  User Name: admin Password: admin

- **Bluetooth:**

  Device Name: CCOTP-22-XX

4.4 Matters Needing Attention

1. The CCOTP terminal is a valuable instrument - treat it with care.
2. Dry out the CCOTP terminal, before stowing, after using it in rain or snow.
3. Store the CCOTP terminal in a dry environment.

5 Terminal Installation, Initialization and Alignment

5.1 Terminal Installation and Initialization

1. Take the Terminal out of the backpack and open four support legs, as shown in Figure 5-1.

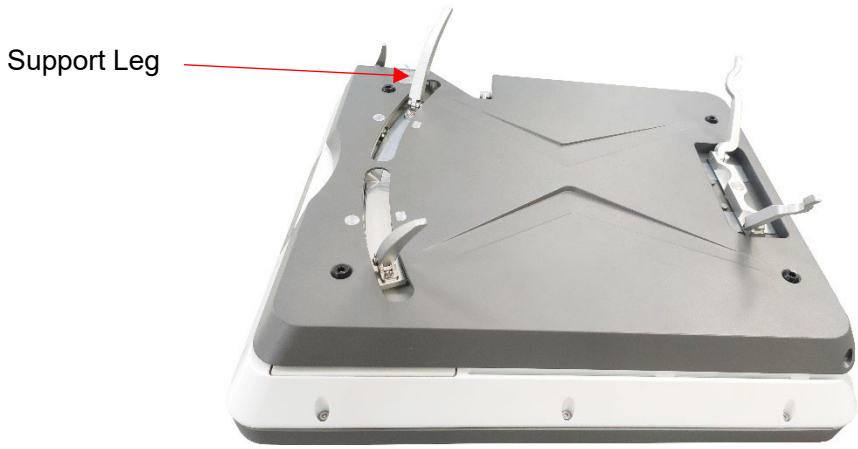


Figure 5-1 Open the Support Leg

2. Place the Terminal safely on the ground in a horizontal position, as shown in Figure 5-2.

Figure 5-2 Place the Terminal on Horizontal

3. Take the power cable and connect it to the Terminal's power socket (POWER, also used for charging), as shown in Figure 5-3.

Figure 5-3 Power On

4. Connect the Power cable to the Power Source. Upon connection, the display will show the power logo, as shown in Figure 5-4 and 5-5.

Figure 5-4 Connect the power Cable (Aim at the red dot)

Figure 5-5 LOGO

DANGER

(1) The power supply requirement is 85-264VAC 50 / 60Hz

(2) If you work on a roof, tower or other high structure or use a ladder or scaffold to access the work site, follow these precautions to prevent personal injury or death:

- **Walk only on sound roof structures.**
- **Ensure that the antenna assembly and installation surface are structurally sound so that they can support all loads (equipment weight, ice, and wind).**
- **Use safety equipment (for example, a lifeline) appropriate for the work location.**
- **Follow all manufacturer safety precautions for all safety and other equipment used.**
- **Perform as many procedures as possible on the ground.**

(3) Do not work in high wind or rain; or if a storm, lightning, or other adverse weather conditions are either present or approaching.

(4) Do not connect the other side of the power cable to the power source until the terminal installation completion.

5. Deploy the Terminal, move the locking tab downward firstly, and the button will automatically move downward, then the Terminal is deployed. As shown in Figure 5-6 and Figure 5-7.

Figure 5-6 Deploy the Terminal

Figure 5-7 Deploy Status

6. When the Terminal is powered on, the Terminal will display with indicator and abbreviated text. The display icon description of system initialization is shown in Table 5-1. The first three items are main power supply detection, general power supply, LNB power supply and BUC power supply. when the

self-test passes, it will be displayed as shown in Figure 5-8.

Table 5-1 System Initialization Icon Description

Indication					
Indicator Flashes	General Power Supply is in process of detection	LNB Power Supply is in process of detection	BUC Power Supply is in process of detection	GNSS signal is in process of detection	Attitude is in process of detection
Indication					
Indicator Lights Continuously	General Power Supply is detected	LNB Power Supply is detected	BUC Power Supply is detected	GNSS signal is acquired	Attitude is detected

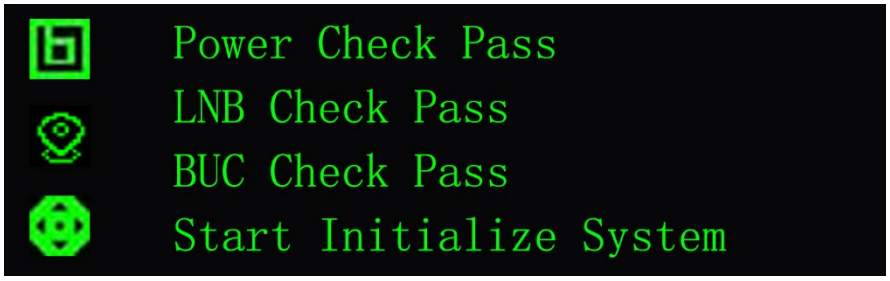


Figure 5-8 Detection Process

7. The GNSS signals acquisition process is displayed as shown in Figure 5-9 and 5-10 (**Lng** is abbreviation of Longitude, **Lat** is abbreviation of Latitude).

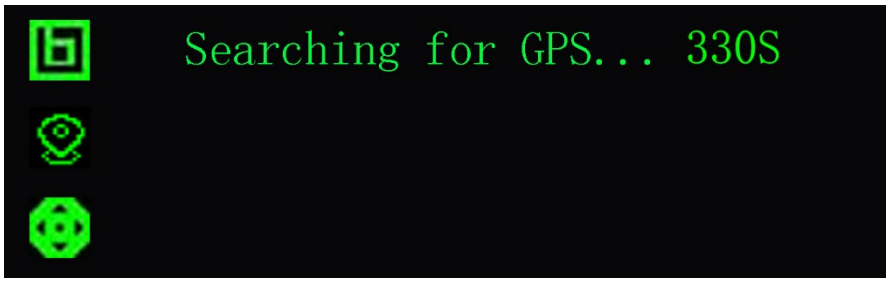


Figure 5-9 GNSS signals acquisition

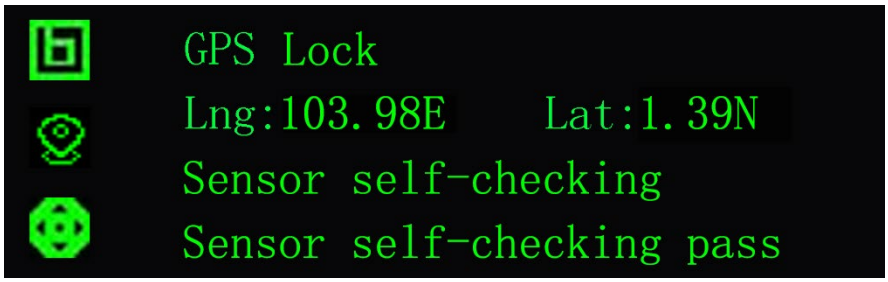


Figure 5-10 GNSS signals acquisition Successfully

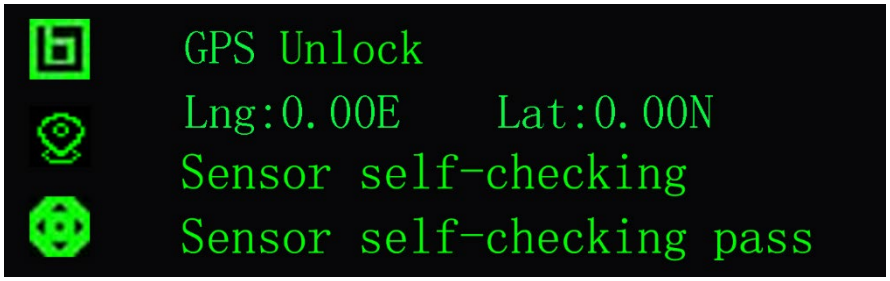


Figure 5-11 GNSS Signal Acquisition Failed

NOTICE

(1) When the Terminal is used for the initial time, the 'App' for Terminal Control should be used first, to set up the satellite related parameters. If the Terminal has the polarization switch function, please use the App to switch the polarization mode. Please see the operational instructions in section 7.

(2) The 'App' for Terminal Control should also be used if it is necessary to select a different satellite. Please see the operational instructions in section 7.

8. When the Terminal is ready to align with the satellite, as shown in Figure 5-12.

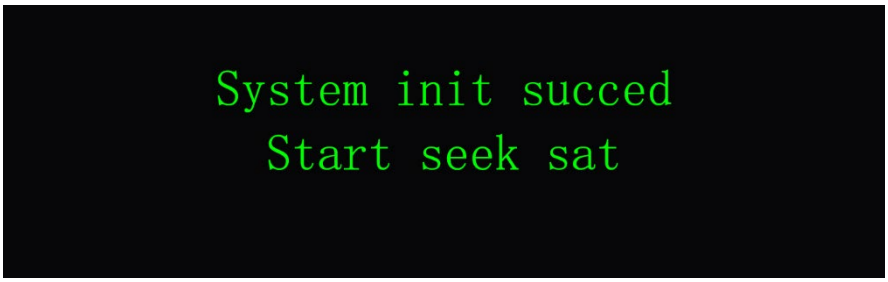


Figure 5-12 The Prompt of Alignment

5.2 Terminal Alignment

NOTICE

Rotate the adjustment knobs slowly during the antenna pointing.

1. According to the satellite direction, adjust the antenna elevation, polarization and azimuth to align the satellite. In the adjustment process, you can refer to the prompt information shown in Figure 5-13 and 5-14.

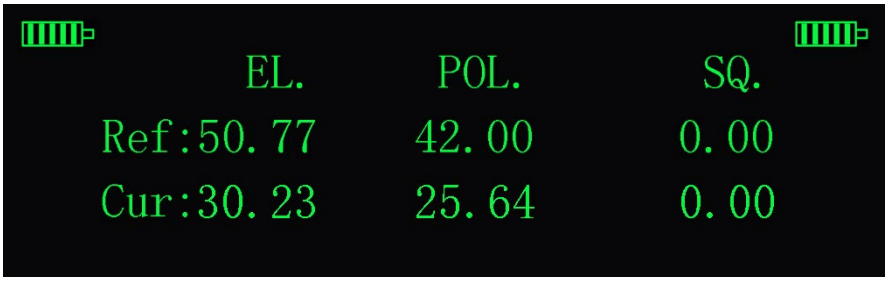


Figure 5-13 The Prompt of Alignment

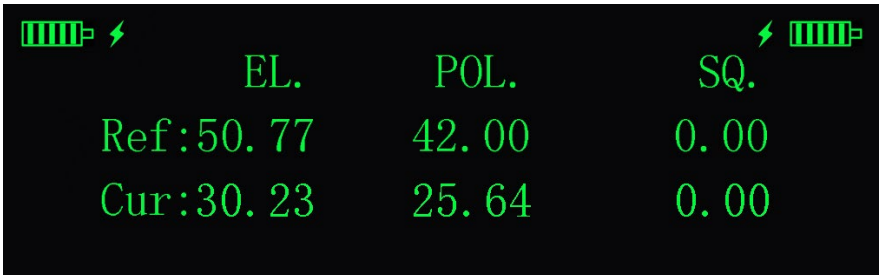


Figure 5-14 The Prompt of Alignment

(The lightning symbol next to the battery is the charging prompt information)

2. Elevation coarse adjustment: Press the elevation coarse adjustment button with the right middle finger, press the handle with the index finger, and lift the panel upward with the left hand, that is, release the fixed lock between the Terminal panel and the base frame, and adjust the elevation adjustment mechanism to make the current elevation angle consistent with the reference elevation angle, as shown in Figure 5-15 and 5-16.

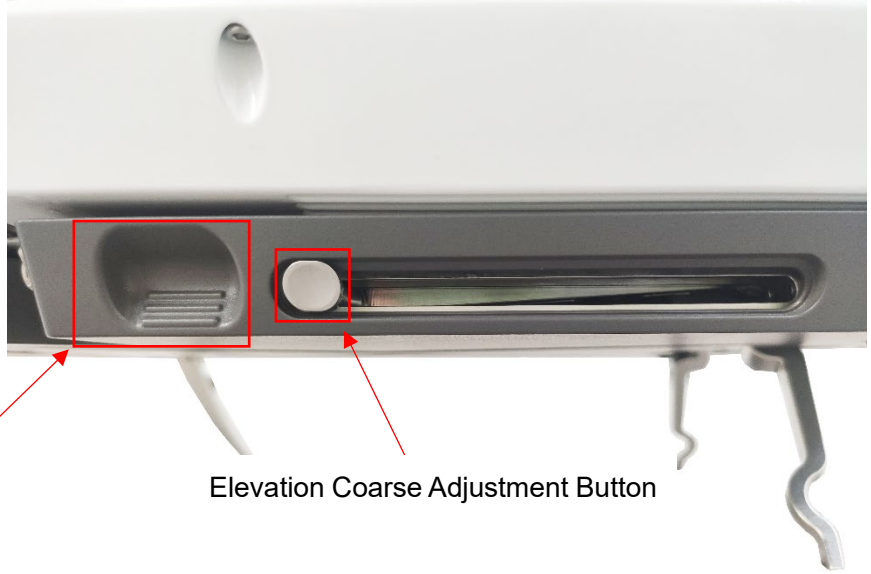


Figure 5-15 Handle, El coarse adjustment button

Figure 5-16 Elevation Coarse Adjustment Status

3. Polarization adjustment: The user rotates the Terminal panel according to the demand to make the current polarization angle consistent with the reference polarization angle. As shown in Figure 5-17.

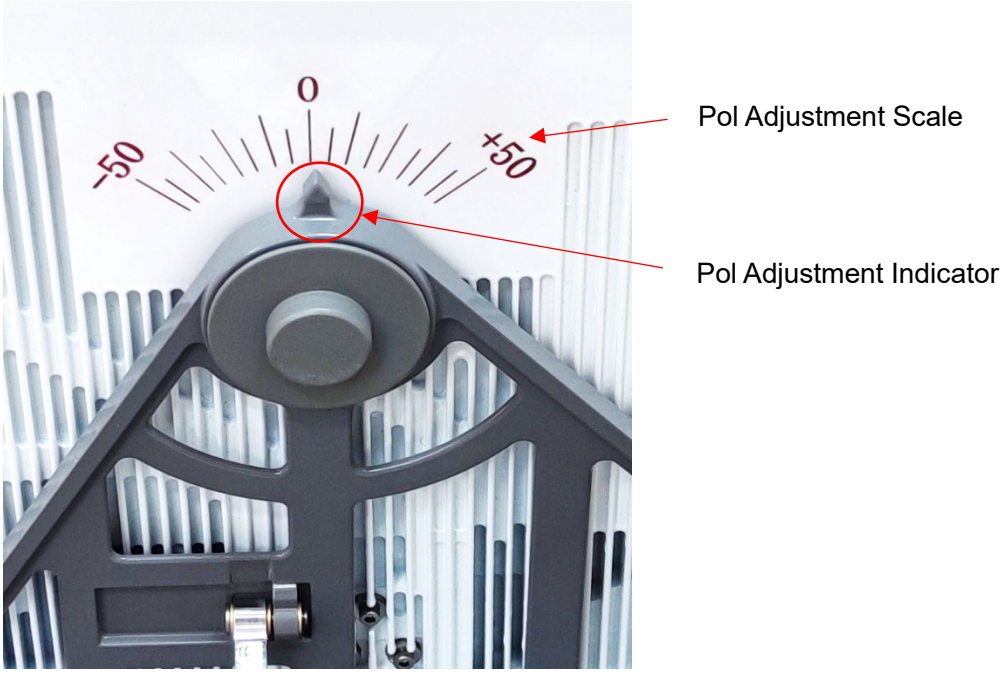


Figure 5-17 Polarization Adjustment Scale and Indicator

4. Coarse adjustment of azimuth: The whole Terminal is directly rotated during the coarse adjustment of azimuth to ensure that the elevation angle remains unchanged as far as possible until the signal quality appears, that is to say, to find the approximate position of the satellite.

5. The screen appears as shown in Figure 5-18. According to the signal quality shown on the display, the elevation, azimuth and polarization can be adjusted manually to find a better signal value.

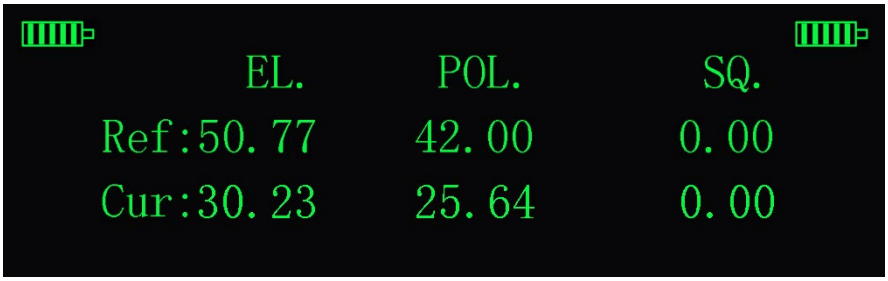


Figure 5-18 Signal Quality

6. Elevation fine tune: According to the satellite signal quality, rotate the elevation fine tune knob, as shown in Figure 5-19.

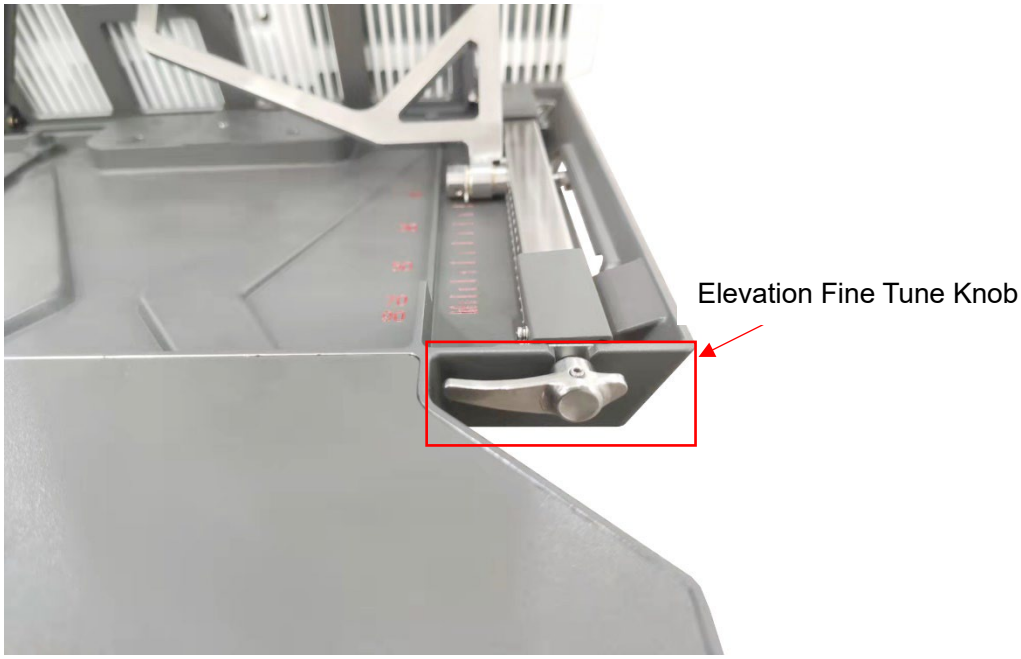


Figure 5-19 Elevation Fine Tune Knob

7. Azimuth fine tune: According to the satellite signal quality, rotate the azimuth fine tune knob, as shown in Figure 5-20.

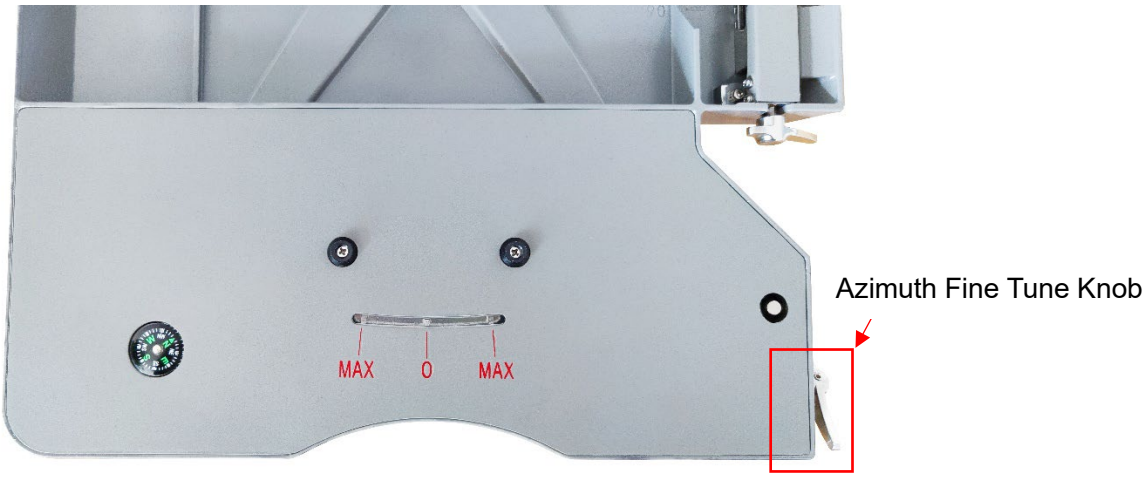


Figure 5-20 Azimuth Fine Tune Knob

NOTICE

Rotate the adjustment knobs slowly during the antenna pointing.

8. After satellite alignment is completed, BUC is enabled automatically, as shown in Figure 5-21. After successful network access, the network can be used, as shown in Figure 5-22.

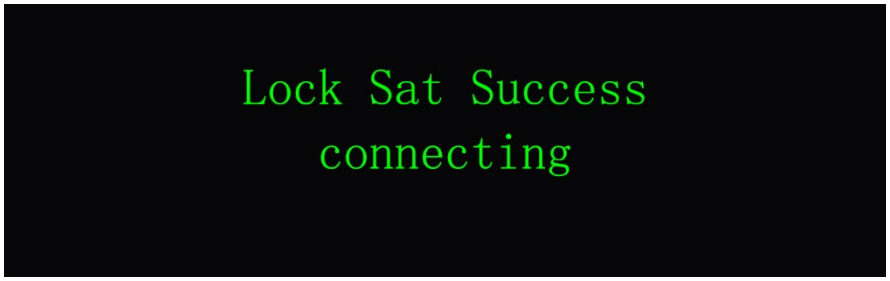


Figure 5-21 Prompt for Satellite Completion

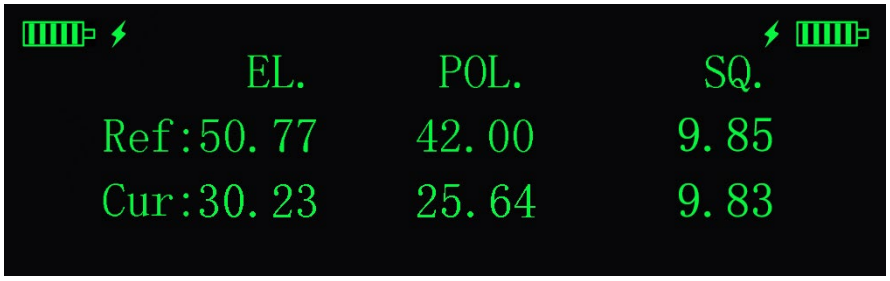


Figure 5-22 Signal Quality Display

Other Function:

(1) Beam Switch

Press and hold the sub key to enter the sub interface. If it is not in the beam switching interface, continue to press the sub key to switch to the beam switching interface. At the same time, press and hold the main and sub keys to send the beam switching command, as shown in Figure 5-23 and Figure 5-24.

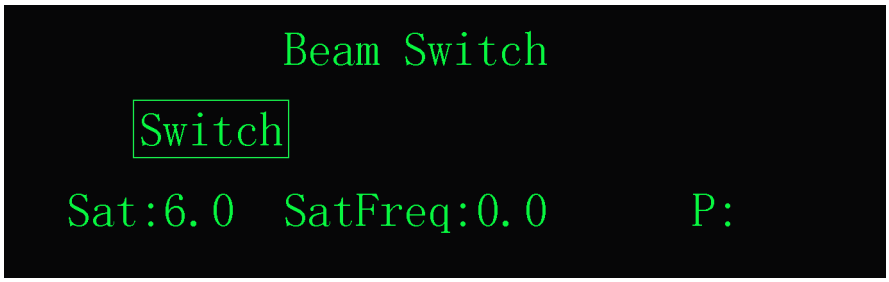


Figure 5-23 Beam Switch Start

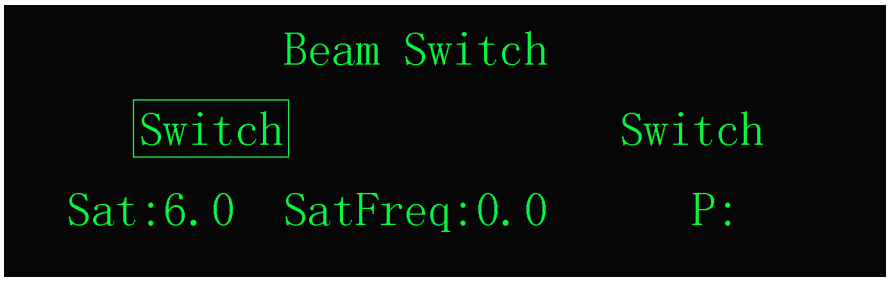


Figure 5-24 Beam Switch Success

(2) BUC Control:

a. There are two infrared keys on the right side of OLED screen, which are arranged vertically. The upper key is the main key to control the main interface, and the lower key is the sub key to control the sub interface.

b. The switch between the main and sub interfaces is realized by press and hold the corresponding key, that is, press and hold the main key can switch from the sub interface to the main interface, or switch in each sub interface of the main interface, and press and hold the sub key can switch from the main interface to the sub interface, or switch in each sub interface of the sub interface.

c. The function of sub interface (such as BUC on/off) is realized by pressing the main and sub keys at the same time.

Figure 5-25 Infrared Key

Infrared Keys	Name	Sub Interface 1	Sub Interface 2
Upper Key	Main Key/Main Interface	Alignment Interface	Information Interface
Lower Key	Sub Key/Sub Interface	BUC Control Interface	Beam Switch Interface

Table 5-2 Key Function

S status analysis:

The first bit has no meaning;

The second bit indicates emission enable, 0: not enable, 1: enable;

The third bit indicates the transmitted local oscillator, 0:12800mhz, 1:13050mhz;

The fourth bit indicates receive enable, 0: not enabled 1: enabled;

The fifth bit indicates receiving Lo, 0: 9750 1:10600 2:11300;

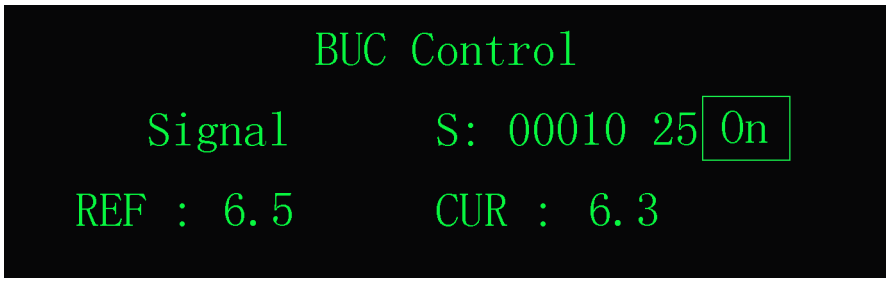


Figure 5-26 BUC Control Switch On

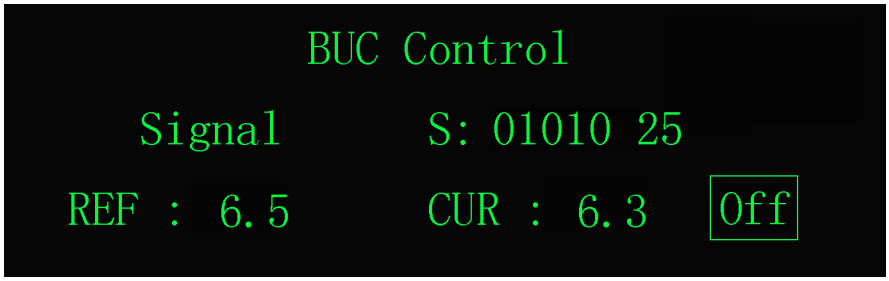


Figure 5-27 BUC Control Switch Off

(3) LED state:

- OLED normal display, the LED flashing frequency is 1 second, two flashes at one time;
- OLED Hibernation mode, the LED flashing frequency is 3 second, two flashes at one time;
- Press the touch any key, LED flash fast, when the OLED enter the Hibernation mode, can make the screen light up.

(4) Information Interface

Press and hold the sub key to enter the sub interface. If it is not in the information interface, continue to long press the main key to switch to the information interface. The version information Figure 5-28, IP and Port information Figure 5-29, currently selected working mode Figure 5-30, satellite parameter Figure 5-31 and signal quality prompt Figure 5-32.

Figure 5-28 Version Information

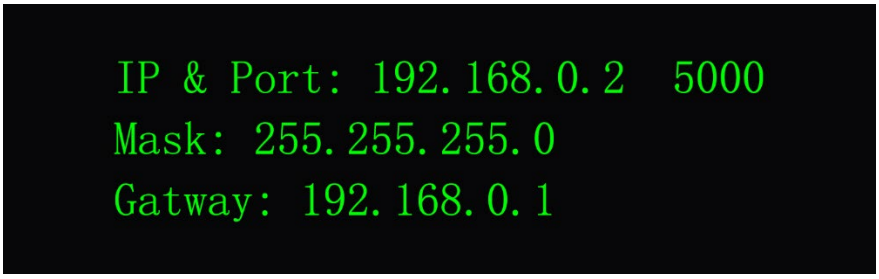


Figure 5-29 IP & Port Information

Figure 5-30 Current Working Mode

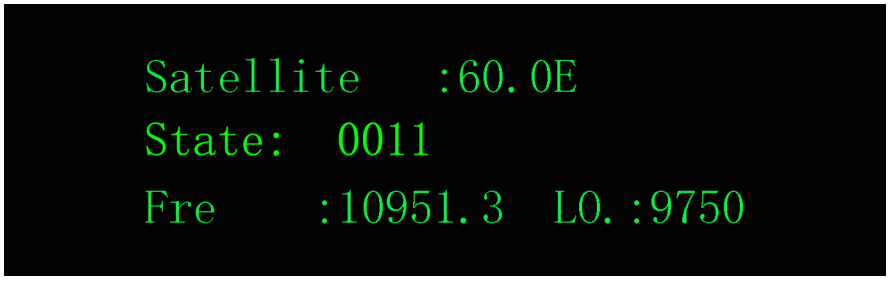


Figure 5-31 Satellite Parameter

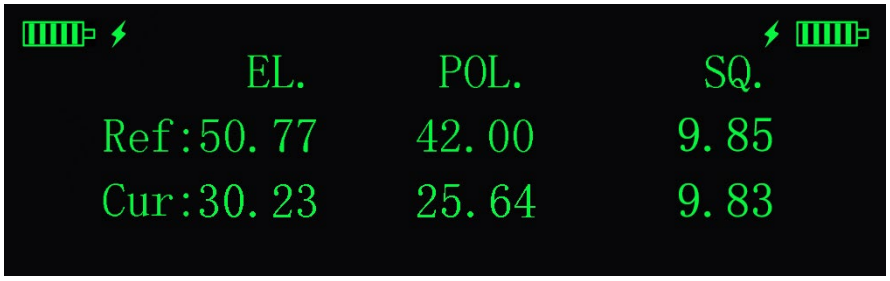


Figure 5-32 Signal Quality Prompt

6 Modem Status Indication

Note: Take the IQ200 Modem As example:

6.1 Modem Status Indication

1. The Modem status indication is shown in Figure 6-1.

POWER	STATUS	TX	RX	NET
Ready:				Not Ready

Figure 6-1 Modem Status Indicator Icon

2. The Modem status indication is shown in Table 6-1 and Figure 6-2.

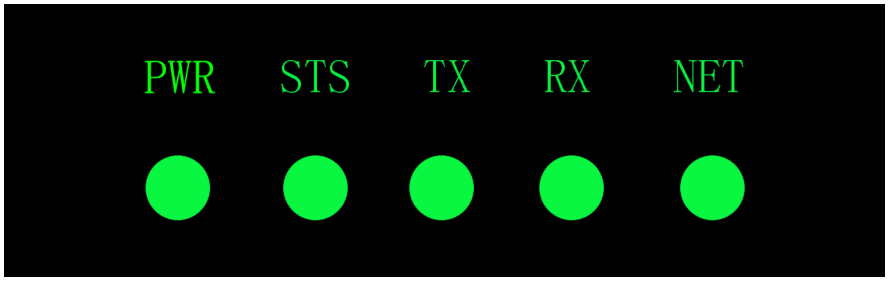


Figure 6-2 Modem Status

Indication	PWS	Tx	Rx	STA	NET
Indicator flashes	The modem Powering Status is NOT COMPLETED	The modem TX Status is OFF	The modem RX Status is NOT LOCKED	The modem LINK Status is CONNECTING	The modem NET Status is CONNECTING
Indicator lights continuously	The modem Powering Status is COMPLETED	The modem TX Status is ON	The modem RX Status is LOCKED	The modem LINK Status is CONNECTED	The modem NET Status is CONNECTED

Table 6-1 Modem Status

6.2 Modem Configuration

1. I-FM30PM-1 is connected to the network cable for modem network access debugging, computer web page address input: IP: **192.168.0.1**; Main interface user name: **admin,** main interface password: **iDirect**. Click the "Log In" button on the main interface,

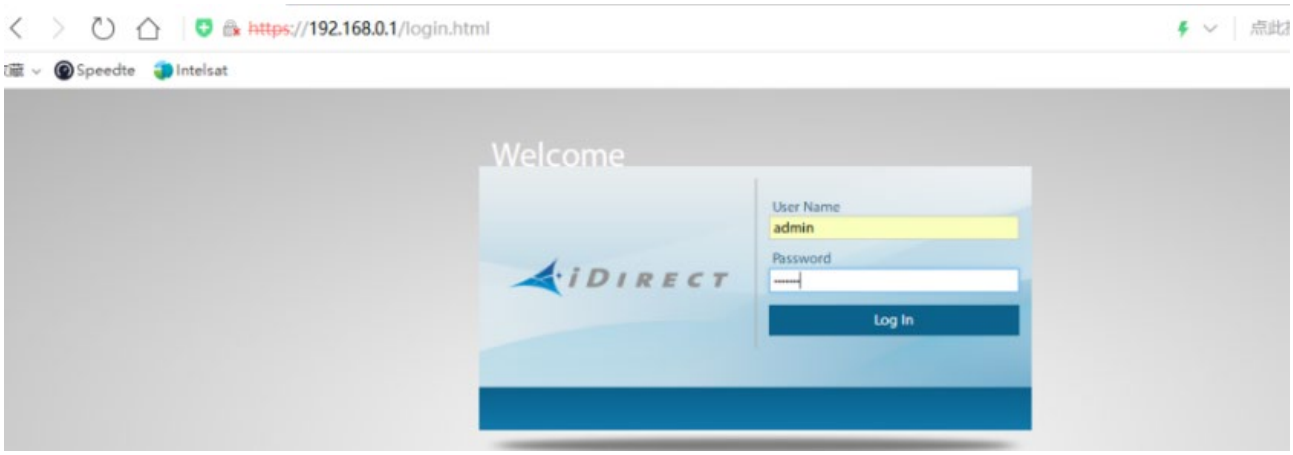


Figure 6-3 Modem Web UI

2. Click "Continue" - "Continue with Wizard" to enter the modem interface, and directly click the lower right corner to enter the next step. Directly click the middle button "Enter Commissioning Mode", where you can import the configuration file of the modem, as shown in Figure 6-4;

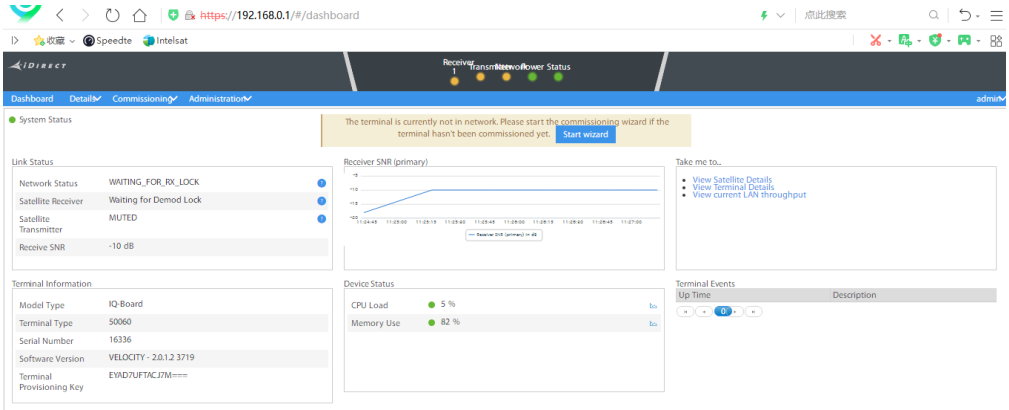


Figure 6-4 Modem Web UI

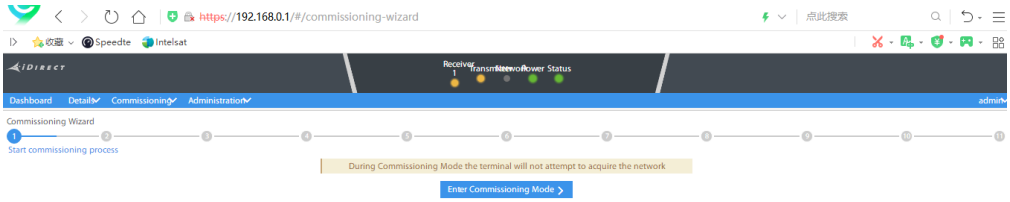


Figure 6-5 Modem Web UI

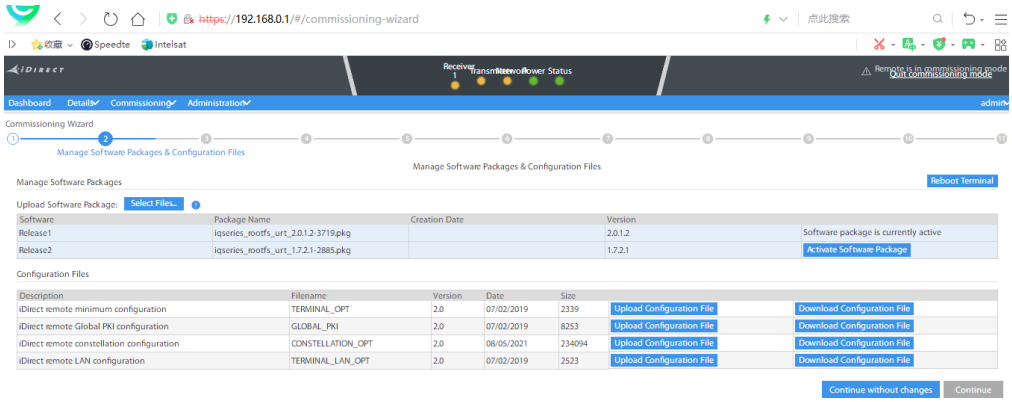


Figure 6-6 Modem Web UI

3. Click the "Continue without changes" button, as shown in Figure 6-6. In this interface, you can set the terminal location and satellite location, such as satellite location settings: enter the satellite longitude 134 in the "Satellite Longitude" in the lower right corner, and then click the "Save remote location and continue" button, as shown in Figure 6-7;

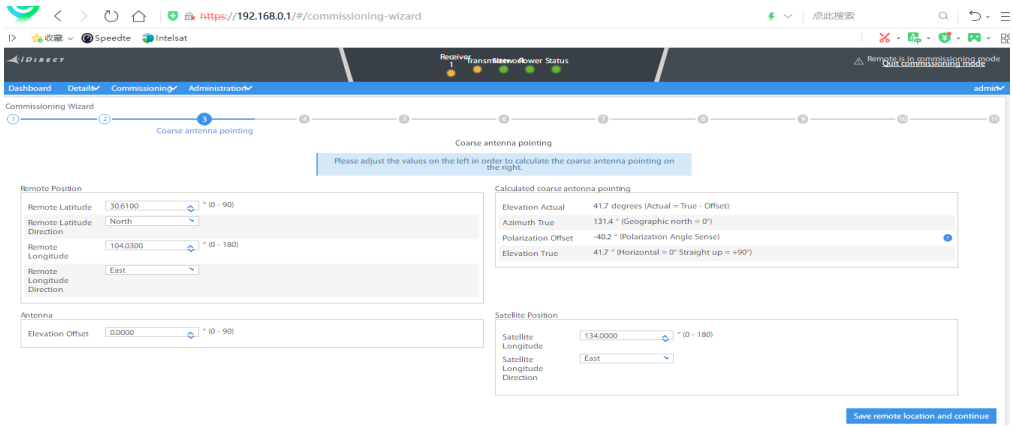


Figure 6-7 Modem Web UI

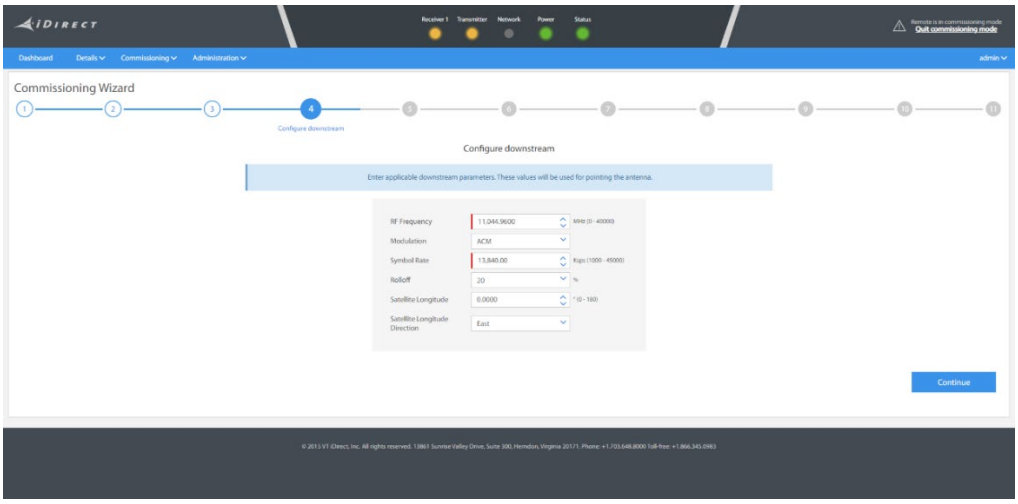


Figure 6-8 Modem Web UI

4. On this page, you can set parameters such as RF frequency, symbol rate, modulation method, attenuation, and satellite longitude. After setting the parameters, click the "Continue" button, as shown in Figure 6-8. Click the "Start Antenna Pointing" button to start satellite alignment, as shown in Figure 6-9.

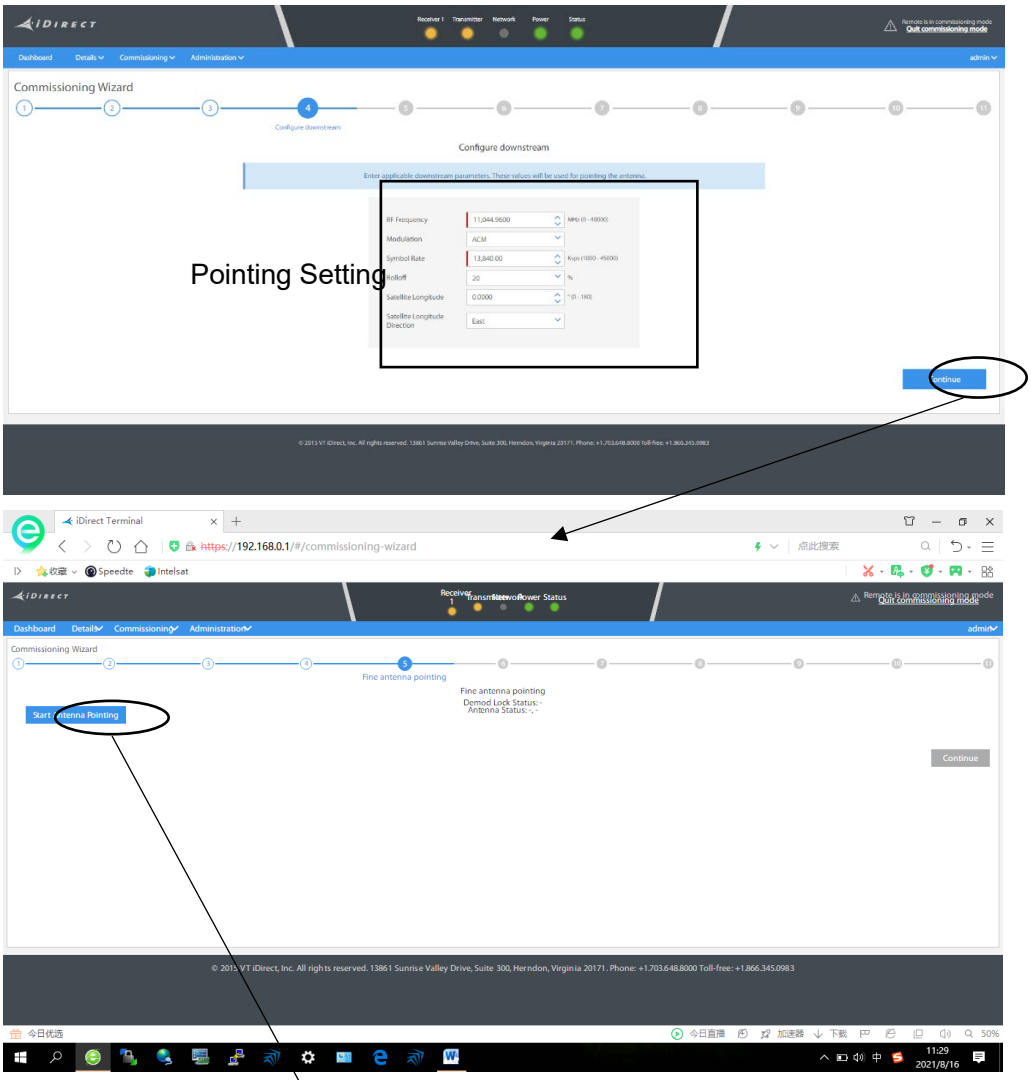


Figure 6-9 Modem Web UI

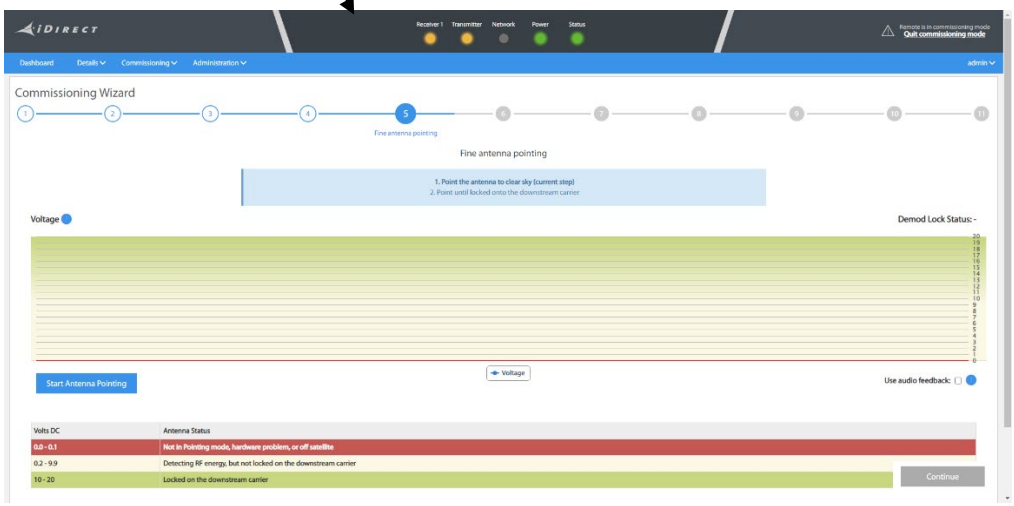


Figure 6-10 Start satellite alignment

NOTICE

If necessary, perform additional alignment to get better signal quality values.

7 Application (‘App’) for Terminal Control

The User name and password of iOS is same with Android platform
User: admin **Password: admin**

Searches "***FlexMove***" in Apple store and Google Paly for download

When APP prompts you to get location permissions, give APP location permission.

1. Select the language to use according to the APP prompt (when first using) or the language selection button on the login interface, as shown in Figure 7-1 and Figure 7-2.

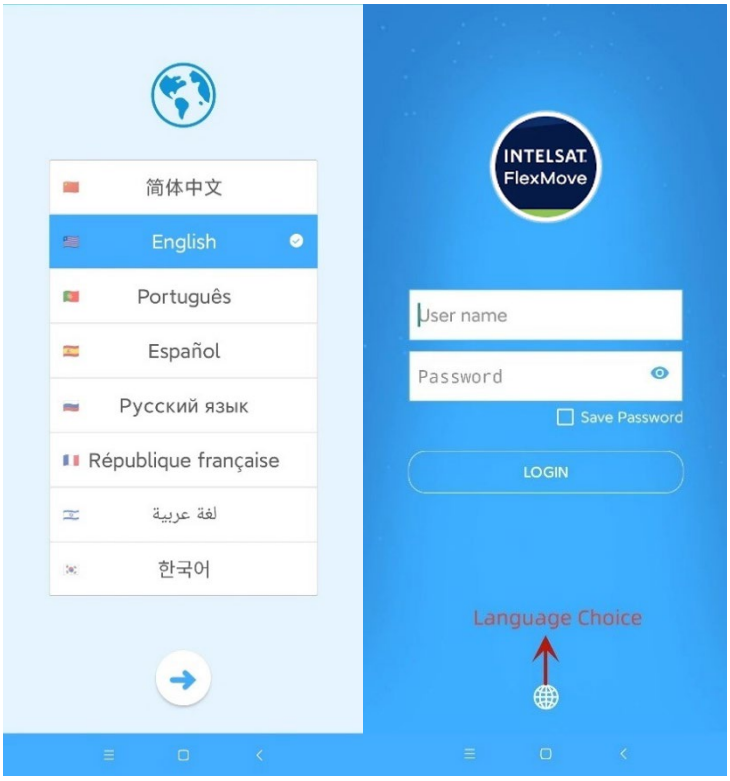
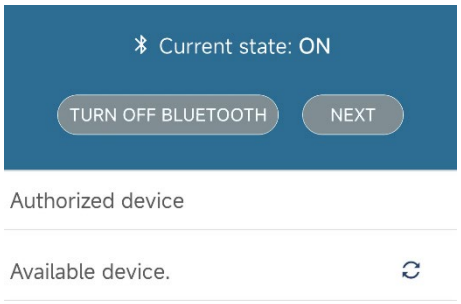


Figure 7-1 **Figure 7-2**

2. Open the FlexMove App and enter the login interface, as shown in Figure 7-3. Enter the username: admin, password: admin, click the "Login" button (select whether to check the "Save Password" button as needed) to enter the connection pairing interface.

Figure 7-3

3. When entering the connection pairing interface, the APP will prompt whether to enable Bluetooth. Click "Allow" to allow the use of Bluetooth, as shown in Figure 7-4.



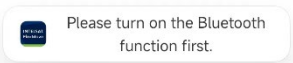
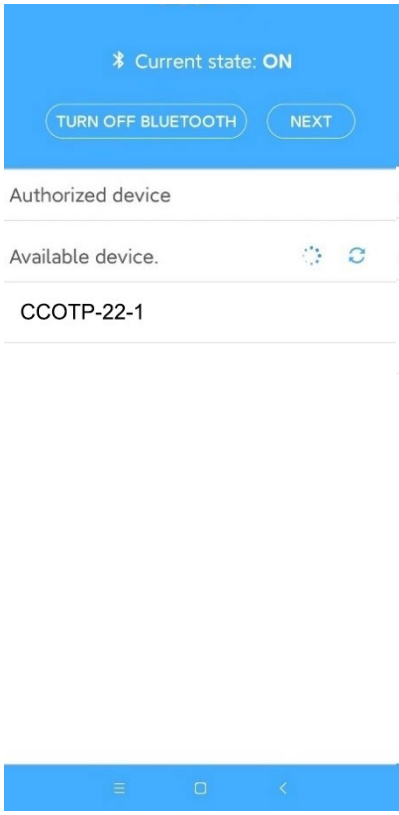


Figure 7-4

4. After allowing Bluetooth to be used, the interface enters the device search interface. After searching for available devices, click on the corresponding Bluetooth name of the device below the available device bar, and wait for the prompt of authentication succeeded, as shown in Figure 7-5 and Figure 7-6.



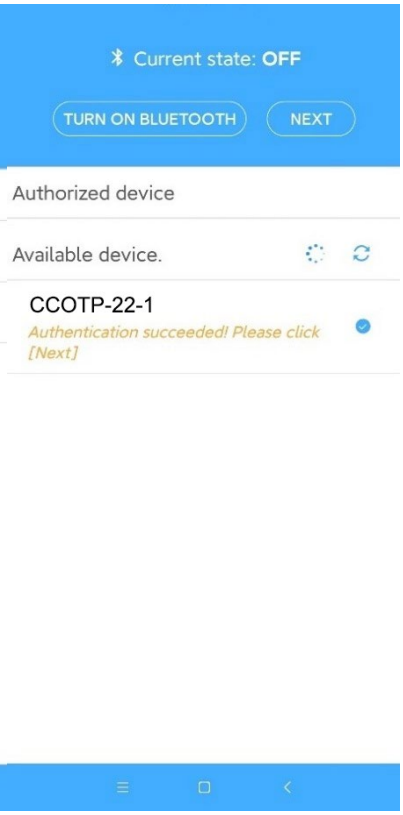


Figure 7-5 **Figure 7-6**

5. Click the "Next" button to enter the work mode selection interface, as shown in Figure 7-7.

Figure 7-7

6. After selecting DVB mode, click "Next" to enter the Home screen, as shown in Figure 7-8 and Figure 7-9.

Figure 7-8

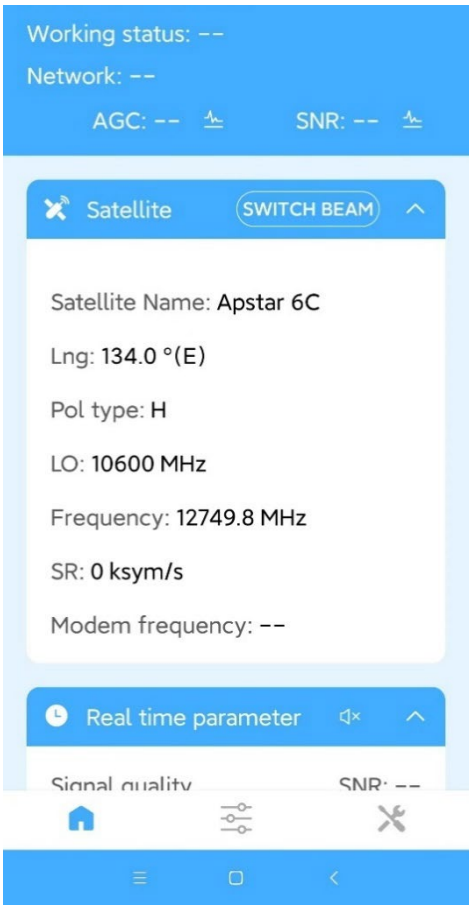


Figure 7-9

7. In the Home screen, click the navigation bar icon below to enter the parameter setting interface, as shown in Figure 7-10.

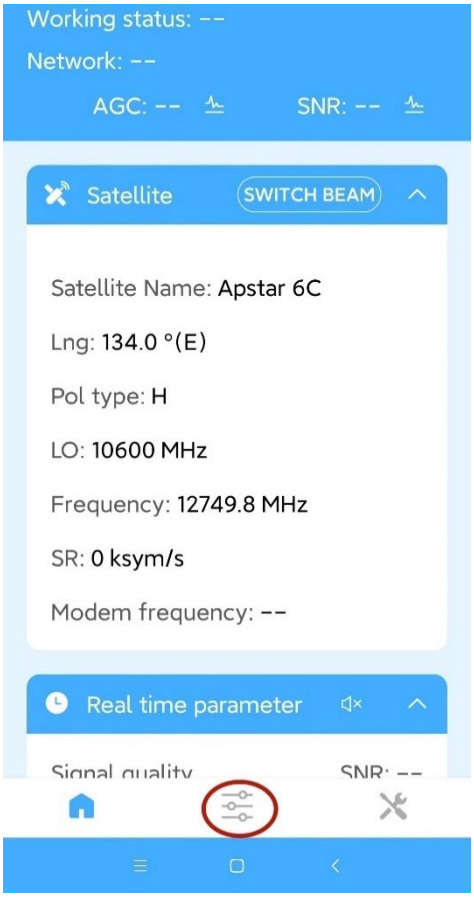


Figure 7-10

8. Taking 33E as an example to configure parameters: Click on the search setting satellite column, select "Intelsat 33E" in the pop-up dropdown box, click on the search setting LO column, select "9750" in the pop-up dropdown box, click on the search settings Pol type column, select "V" in the pop-up dropdown box, enter the frequency in the frequency input box and the symbol rate in the symbol rate input box,then click the button in the upper right corner of the search settings column, and send the parameters, as shown in Figure 7-11,Figure 7-12, Figure 7-13 and Figure 7-14.

Figure 7-11

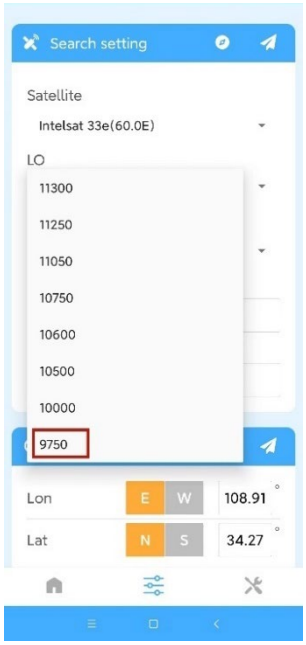


Figure 7-12

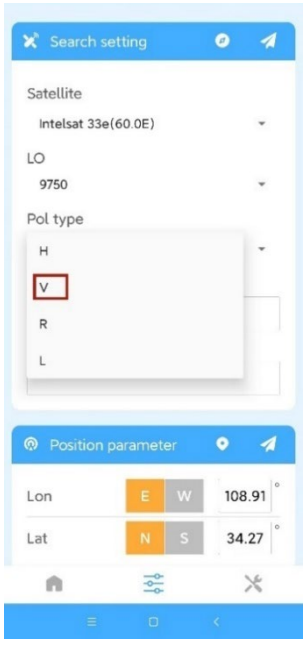


Figure 7-13

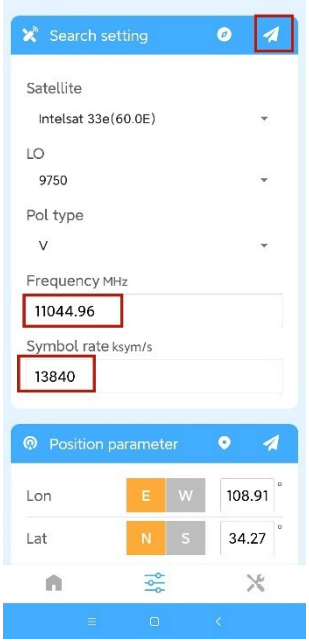


Figure 7-14

Note: Please ensure that all parameters are configured correctly before sending them to the Terminal.

9. After receiving these parameters, the terminal will restart and start searching and aligning satellites with new parameters. When the user sees the logo again on the terminal's display screen, it indicates successful operation.

10. If you need to disconnect, in the home screen, click the icon in the lower navigation bar to enter the management center interface, as shown in Figure 7-15, and select "Disconnect Device".

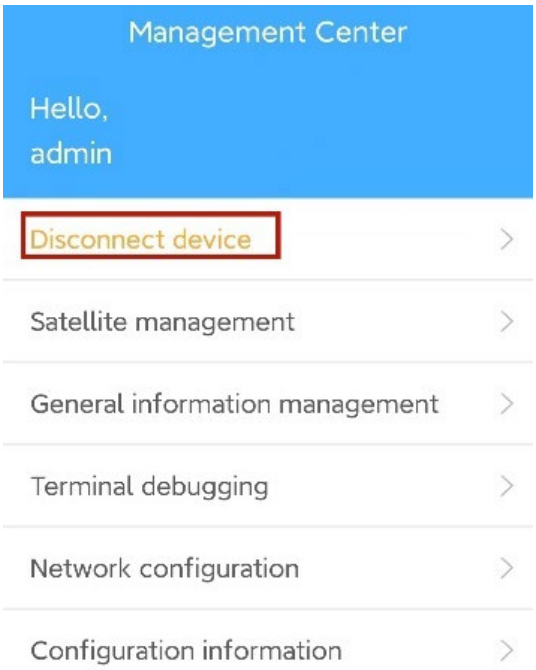
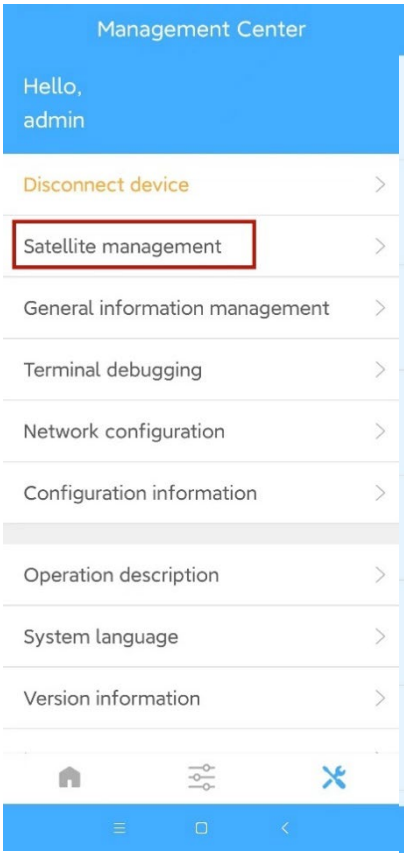


Figure 7-15

11. **Adding Satellite:** On the home screen, click the navigation bar icon below to enter the management center interface, select "Satellite Management", as shown in Figure 7-16. The application has built-in commonly used satellites. If there are target satellites, just select the circle in front of the corresponding satellite, as shown in Figure 7-17.



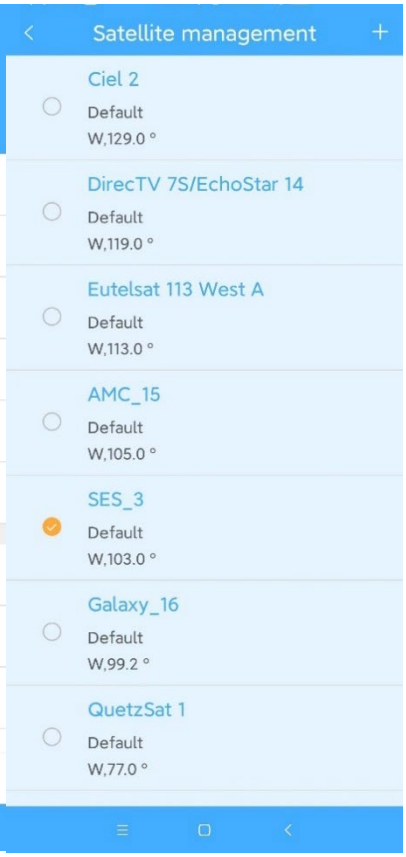
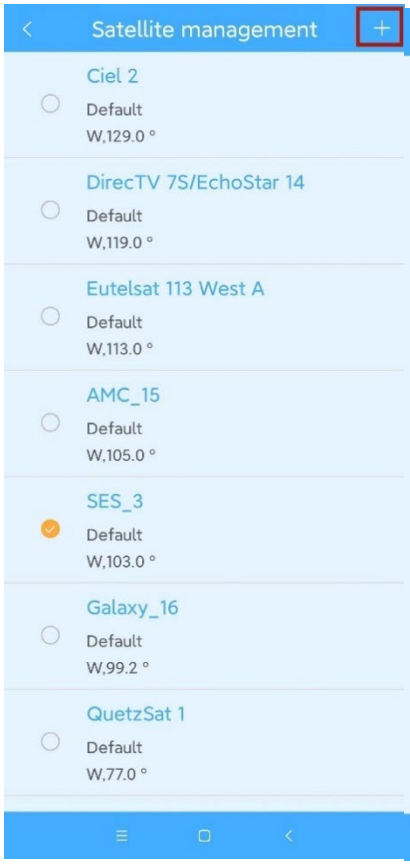


Figure 7-16 **Figure 7-17**

12. If not, click on the "+" in the upper right corner to enter the satellite addition interface, as shown in Figure 7-18. Enter the satellite name and longitude, click "Save" to complete the addition, as shown in Figure 7-19. Then return and check the newly added satellite to appear in the satellite selection list, as shown in Figure 7-20.



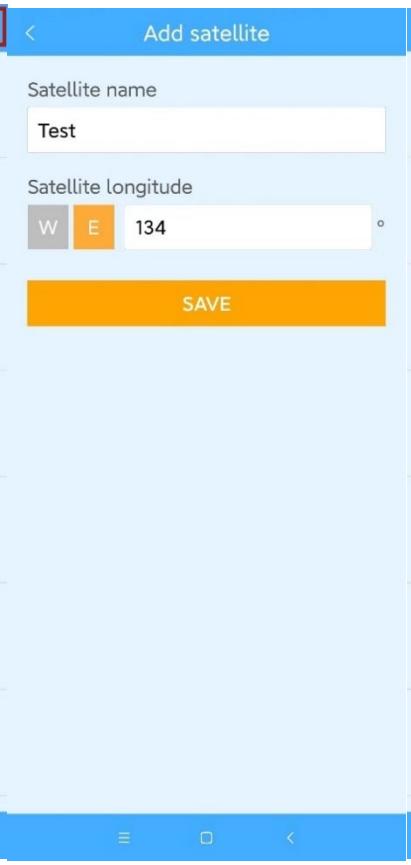
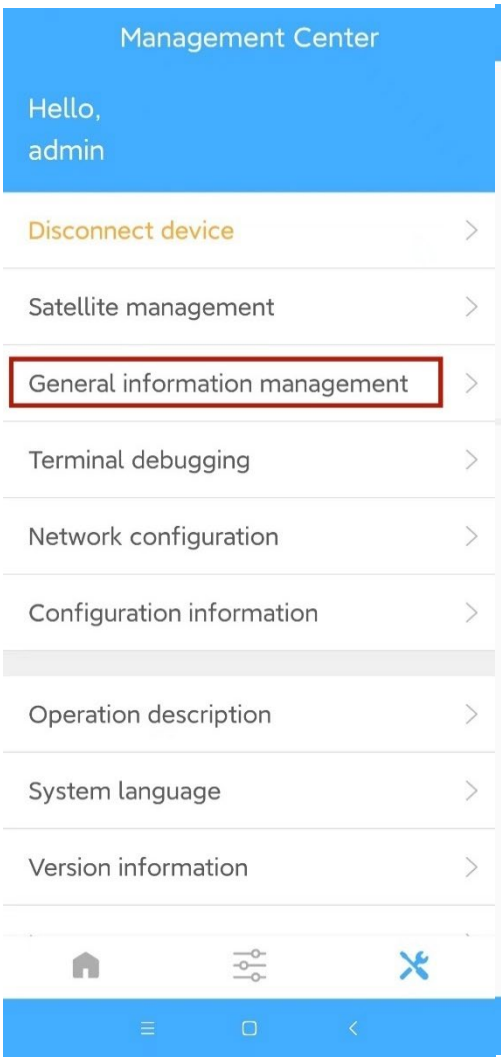


Figure 7-18 **Figure 7-19** **Figure 7-20**

13. General information management interface: On the Home screen, click the icon in the lower navigation bar to enter the management center interface, select "General information management", as shown in Figure 7-21. WiFi can be turned on or off, Bluetooth can be turned off, LO can be set, BUC can be switched on, BUC attenuation adjustment can be performed on this interface, as shown in Figure 7-22.

For example, local oscillator switching and BUC switch operation: In the editable item 1 edit box, enter "12800" and click the send button to switch the BUC to 12800MHz local oscillator. Enter "13050" and click the send button to switch the BUC to 13050MHz local oscillator; Enter "BUCO" in edit box 1 and click the send button to open BUC; In edit box 1, enter "BUCF" and click the send button to close BUC.

For example, BUC attenuation adjustment operation: modify BUC attenuation in edit box 2, with a modification range of 0-32. The modified status can be viewed through the terminal display BUC control interface.



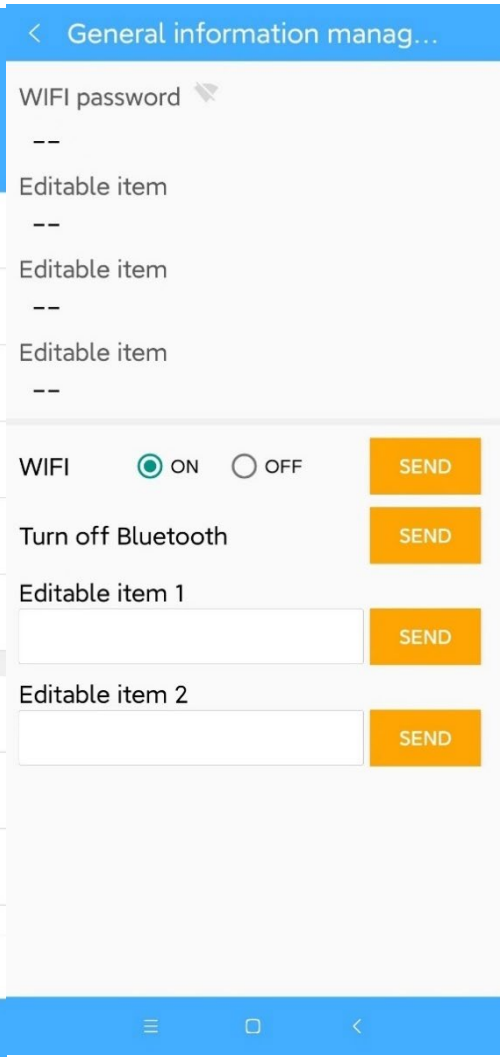


Figure 7-21 **Figure 7-22**

8 Terminal Stowing

1. Press the power switch button as shown in Figure 8-1 to disconnect the Terminal power supply, and the screen display is shown in Figure 8-2.

Figure 8-1 Power Socket

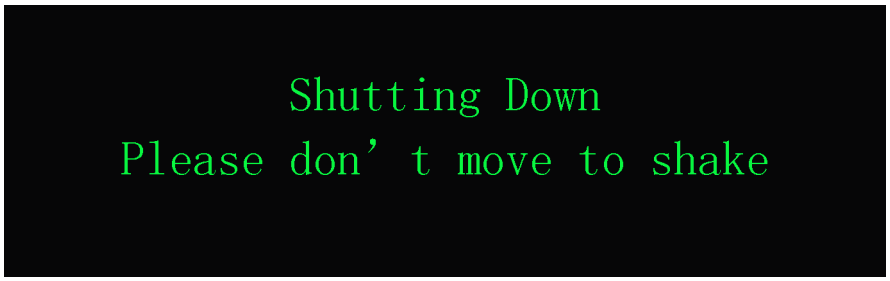


Figure 8-2 Shutting Down Prompts

2. Disconnect the power cable from power supply.
3. Disconnect the power cable from terminal power socket (POWER).
4. According to the scale on the panel, indicate the Terminal panel to the 0 position, even if it returns to the zero position, the reference azimuth scale is shown in Figure 8-3.

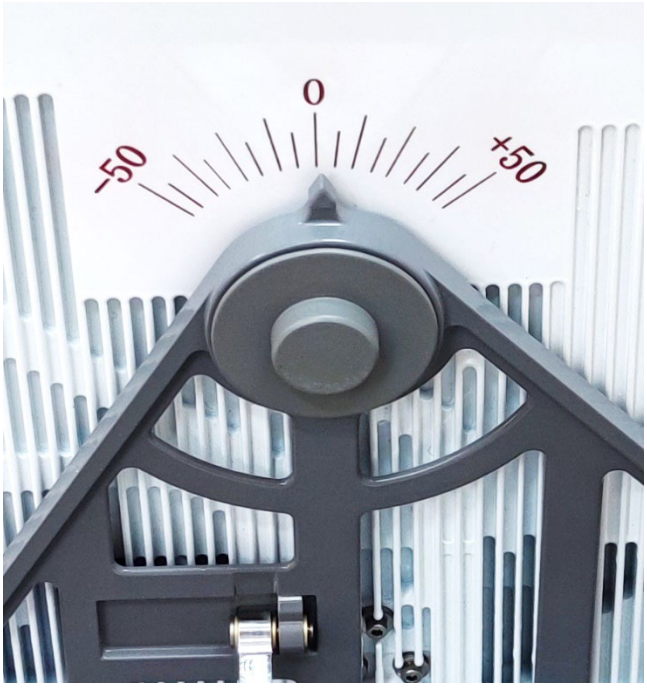


Figure 8-3 Polarization Adjustment Scale and Indicator

5. Azimuth fine tune reset: Rotate the azimuth fine tune knob to the 0 position, that is, the azimuth reset is completed, as shown in Figure 8-4.

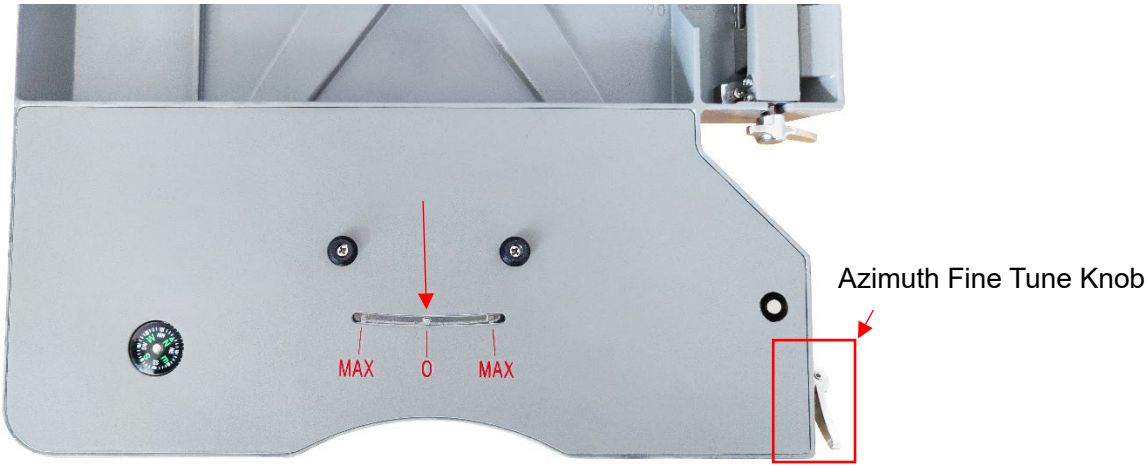


Figure 8-4 Position Knob Reset

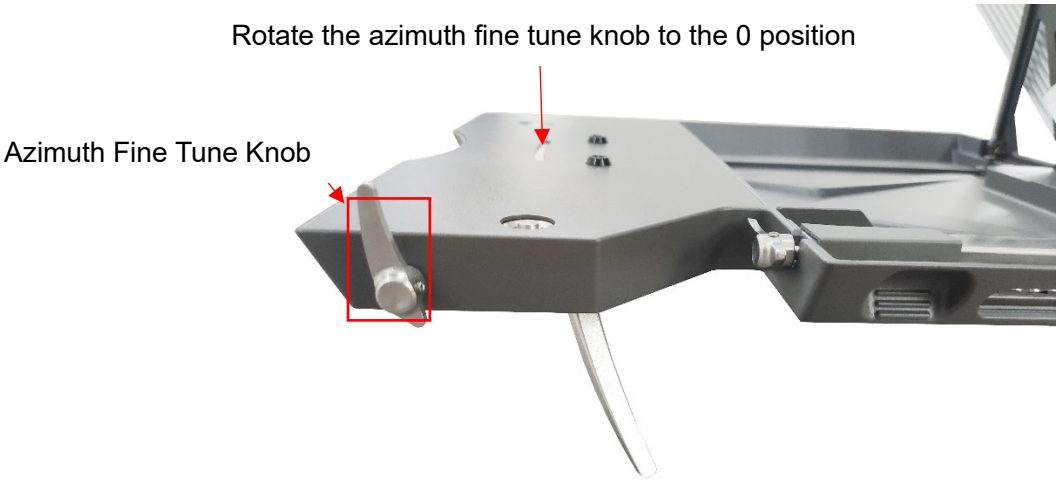


Figure 8-5 Position Knob Reset

6. Elevation roughly adjustment reset: Hold the Terminal panel with the left hand, and press the elevation roughly adjustment button inward with the right hand. When the button slides downward, hold the Terminal panel with the left hand and gently move downward towards the base until the button returns to the 0 position, and the Terminal panel is closely connected with the base, as shown in Figure 8-6.

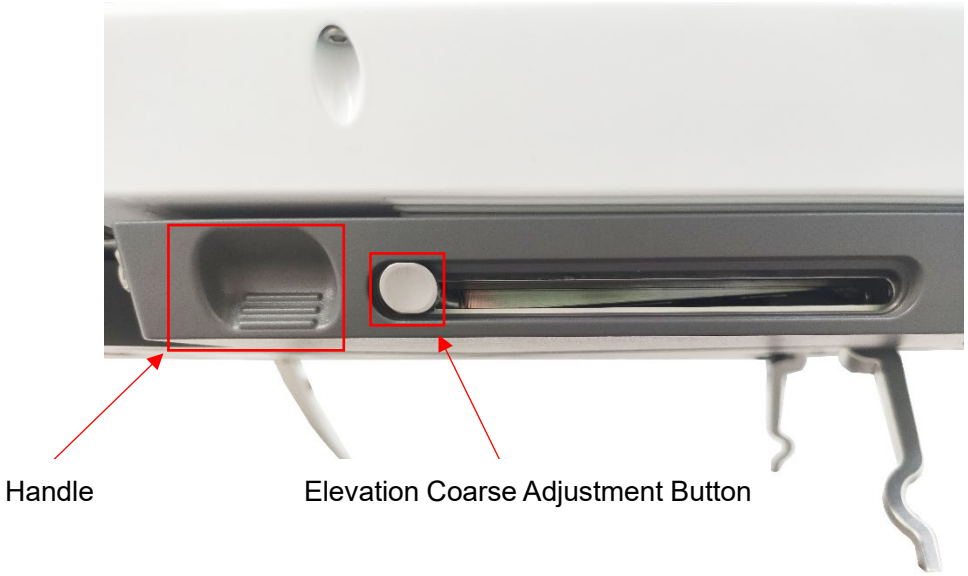


Figure 8-6 Elevation Coarse Adjustment Button

7. Base button: After the Terminal panel is tightly connected with the base, gently press the button at the bottom of the base, and there will be a "click" sound, indicating that the Terminal panel and the base are tightly fastened. As shown in Figure 8-7.

Figure 8-7 Base Button

8. Stow each support leg into the supporting leg groove, as shown in Figure 8-8.

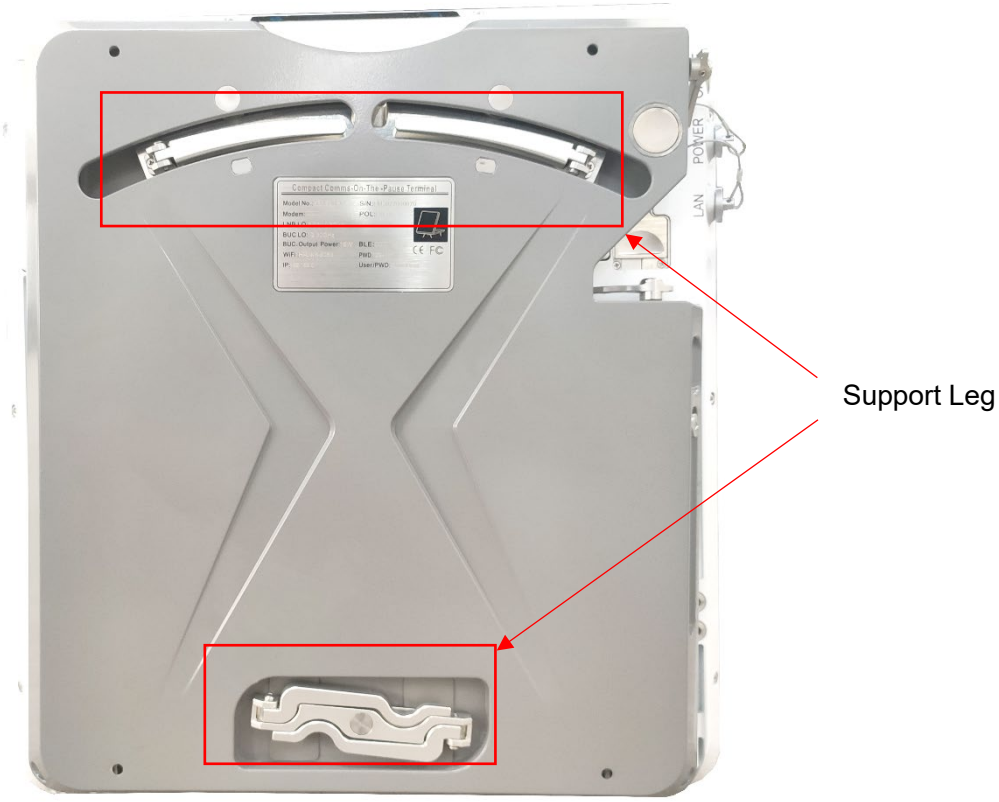


Figure 8-8 Support Leg

9. Put the Terminal into the backpack to complete the stowing.

9 Troubleshooting and Maintenance

9.1 Troubleshooting

Item	Problem and Indication	Corrective Action
01	Display does not work	Verify the power connection
02	Antenna does not work	Press the “POWER ON/OFF” button Or reconnect the power
03	No GNSS signals acquisition	Verify the terminal is under the open sky/has an unobstructed view. Reboot
04	Terminal cannot lock the satellite	Check whether the antenna's approximate orientation is correct, Terminal configuration parameters, and Modem configuration parameters are correct
05	Terminal aligns to another satellite	Verify the satellite data entered via the ‘App’ for Terminal Control
06	Display switches off after the completion of alignment	Press down the “Icon” button (On the screen) for 3 seconds to activate the screen
07	The display indicates the terminal is in normal operational state but there is no data transfer	Verify that LAN or Wi-Fi are properly connected
08	Low signal quality	The elevation and azimuth angle of the antenna body are adjusted by adjusting the elevation and azimuth knobs, and the antenna polarization angle is adjusted by rotating the antenna body in the polarization direction

9.2 Maintenance

The I-FM30PM-1 CCOTP Terminal parameters and performance can remain stable and provide normal operation for at least 10 years under a regular maintenance schedule. The periodical maintenance work includes:

1. Antenna system - it is highly recommended that a comprehensive examination of the entire system is completed, periodically, along with a thorough check of all the adjustment mechanisms.

2. Antenna mechanisms – it is recommended that a daily check is made of the adjustment mechanisms and any necessary lubricant is added, to prevent wear of the worms and gears.

3. Visual verification of terminal protective casing surface damages. If there is a damage, the special spray (NOT included in the standard system configuration) should be applied.

4. Check that all the screw fastenings are tight.

5. Close check of the antenna to look for any damage or cracks.

6. Regular cleaning of the terminal and antenna radome surfaces. Remove all dust, dirt, condensed salt and other contamination that may harm the signal quality and the terminal’s performance.

10 Appendix Battery Installation Method

Pick up the battery, align it with the buckle, and insert the front end of the battery downward, as shown in Figure A-1 and A-2.

Figure A-1

Figure A-2

Then press in the rear end of the battery to ensure that the snap is inserted into the rear end of the battery, as shown in Figure A-3 and A-4.

Figure A-3

Figure A-4

11 FCC Statement

The device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

Danger: FCC Radio Frequency Exposure Information
In order to comply with RF exposure requirements, antennas must be installed to ensure a minimum separation distance of 1702cm (antenna main beam) and 56cm (out range of +/-10 degrees off-axis) and must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with accepted multi-transmitter product procedures.

Safety Considerations
For the following safety considerations, "Instrument" means the 'satellite terminal Flat Terminal' units, components and their cables. It is necessary to read the instructions carefully before using the satellite terminal flat portable terminal. The terminal usage shall be carried out in accordance with the described steps and methods to ensure the safety and accuracy of equipment operation.

Radio
The instrument transmits radio energy during normal operation. To avoid possible harmful exposure, to this energy, do not stand or work for extended periods of time in front of its antenna. The long-term characteristics or the possible physiological effects of Radio Frequency Electromagnetic fields have not been yet fully investigated.

Caution
1. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

2. Before connecting this instrument to a power source, make sure that the voltage of the power source matches the requirements of the instrument.