

ComNav Technology

User Guide

M900 GNSS Receiver



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1. Introduction

Thank you for choosing the M900 GNSS receiver.

This Getting Started Guide will provide useful information about M900. It will also guide you through your first step of using M900 GNSS receiver.

1.1 Safety information

Before using the receiver, please make sure that you have read and understood this Getting Started Guide, as well as the safety requirements.

- Install the M900 receiver in a location that minimizes vibration and moisture
- Avoid falling to ground, or colliding with other item
- Do not rotate 7-pin Lemo port
- Do not cover the radio, keep a sound ventilation environment
- To reduce radiation, please keep above 2 meters away from the radio station
- Take lightning protection measures when installing antennas

1.2 Warning and cautions

An absence of specific alerts does not mean that there are no safety risks involved. A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

WARNING-A Warning alerts you to a potential misused or wrong setting of the equipment.

CAUTION- A Caution alerts you to a possible risk of serious injury to your person and/or damage to the equipment.

1.3 Use and care

The M900 is designed to withstand the rough environment that typically occurs in the field. However, the M900 is high-precision electronic equipment and should be treated with reasonable care.

1.4 Technical assistance

If you have any question and can't find the answer that you need in this manual, please contact your local dealer from which you purchased the M900. Alternatively, please request technical support using the ComNav Website at: www.comnavtech.com or technical support email: support@comnavtech.com.

1.5 Your comments

Your feedback about this Getting Started Guide will help us to improve it with future revisions. Please email your comments to: support@comnavtech.com.

2. Overview

This chapter will introduce the main features, technical specifications and basic kit of M900 receiver.

2.1 Receiver features

The M900 is designed as a multi-purpose GNSS receiver for a wide range of applications. Integrating with a high performance GNSS OEM Board inside, M900 GNSS receiver can provide centimeter - level positioning and high accuracy heading. With dual antenna connectors in one compact box, it is an economical choice for challenging guidance and positioning applications including fleet management, marine, UGV and related unmanned control systems. A standard SinoGNSS M900 GNSS receiver provides the following features:

- 1226 GNSS tracking channels
- Working with all the running constellations
- Advanced QUANTUM™ technology
- Support INS+GNSS navigation
- Dual Antennas Design for Positioning and Heading
- LED status indicator
- Compact and rugged housing with flexible interfaces for external devices
- Integrated Ethernet and 4G modem guarantee the stability internet communication
- LAN and WIFI support Webpage Configuration

2.2 Technical specifications

Signal Tracking

- 1226 channels with simultaneously tracked Satellite Signals
- GPS: L1 C/A, L2C, L2P
- BeiDou: B1, B2
- BeiDou Global Signal: B1C, B2b
- GLONASS: L1, L2
- Galileo: E1, E5b
- L- Band
- SBAS: WAAS, EGNOS, MSAS, GAGAN
- Low noise carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- High precision multiple correlates for GNSS pseudorange measurements
- Signal Noise Ratios reported in dB-Hz

Positioning Specifications

- Post Processing Static
- Horizontal: 2.5 mm + 1 ppm RMS
- Vertical: 5 mm +1 ppm RMS
- Single Baseline RTK(<30KM)
- Horizontal: 8 mm + 1 ppm RMS
- Vertical: 15 mm + 1 ppm RMS
- DGPS: 0.5 m 3D RMS
- SBAS: 1 m 3D RMS
- Standalone: 1.5 m 3D RMS
- Heading: (0.2/R)°
- Pitch and Roll: (0.4/R)°

Communications

- 2 × 7-pin Lemo ports, contains 2 RS232, 1 CAN BUS, 1 USB
- 3 TNC connectors
- 1 UHF connector
- 2 external GNSS antenna connectors
- 1 SMA connector

Data Format

- Correction data I/O:
 - RTCM 2.x, 3.x, RTCM3.2, MSM4-7, CMR (GPS only), CMR+ (GPS only)
- Positioning data outputs:
 - ASCII: NMEA-0183 GSV, RMC, HDT, VHD, GGA, GSA, ZDA, VTG, GST, PJK, PTNL
 - Extended NMEA-0183 BDGGA, GPNTR, GPCDT, GPHPR
- Observations
ComNav binary, RINEX, RTCM3.X

Data logging

- Loop recording data function supports long time record
- Data logging frequency, maximum 50Hz
- Storage capacity
 - 8 GB internal memory
 - Rinex 3.X or 2.X or ComNav binary format
- File log session
 - Days or hours can be set by user

Physical

- Size (L x W x H): 183mm x 171mm x 56mm (With connectors)
- Weight: 1kg

Environmental

- Operating temperature: -40°C to +75°C
- Storage temperature: -55°C to +85°C
- Humidity: 100% no condensation
- Water proof and dust proof: IP68
- Shock: rugged aluminum case plus plastic ring seal, designed to survive a 1m drop onto concrete

- 4G antenna connector • 1 RJ45 LAN Ethernet port (10/100M Bit) - supports HTTP, TCP/IP, NTRIP • UHF modem - 410MHz - 470 MHz • Bluetooth® - BT4.0, Compatible with Android™ and Windows™ mobile OS • WIFI - 802.11 a/b/g/n/ac • 4G modem - TCP/IP, HTTP, Ntrip protocols	Electrical • Power consumption: <3W • External power input: 5-27VDC Antenna • AT340 GNSS Geodetic Antenna • AT190 GNSS Helix Antenna
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2.3 M900 basic kit

The table below provides an overview of items included in the M900 Basic Kit.

Items	Picture
M900 GNSS Receiver	
2*AT340 antenna	

A/C adapter	 Power Adapter
Lemo to RS232 cable	
Network Cable	
GNSS Antenna Cable/ Special cable can be provided if you require	
Lemo to USB cable	
1*Car UHF Antenna with magnetic fix bar	
1*Car GPRS Antenna with magnetic fix bar	

3. Installing the receiver

This chapter describes how to install the antenna, M900 receiver and cable connections.

3.1 Front panel

All connectors are located on the front panel, you can connect other external devices through these connectors.



① Setting button

Change the settings.

② OLED screen

Check receiver status, includes satellites number, position information IP address, Firmware information and more.

③ Com1 Port of Main Board (RS232 port and USB)

Control the mainboard and request data from this port

④ Com2 Port of Main Board (RS232 port and CAN)

Control the mainboard and request data from this port

⑤ LAN port

⑥ SIM Slot

Install the SIM card

⑦ Page down button

Click to page down

⑧ Radio port

Connect to radio antenna

⑨ GNSS Antenna Connector 1

Connect to the master GNSS antenna

⑩ GNSS Antenna Connector 2

Connect to the slave GNSS antenna

⑪ GPRS antenna connector

Connect to 4G GPRS antenna

3.2 Guidelines

Please follow these guidelines when setting up your receiver.

3.2.1 Environmental requirements

To keep the receiver with a reliable performance, it is better to use the receiver in safe environmental conditions.

- Operating temperature: -40°C to +75°C
- Out of corrosive fluids and gases

3.2.2 Power Supply

The M900 GNSS receiver has no built-in battery, which only can work with an extra power supply. The proper voltage range is from 5VDC to 27VDC. Power supply is connected through 7-pin Lemo to RS232 Cable (as the picture below):



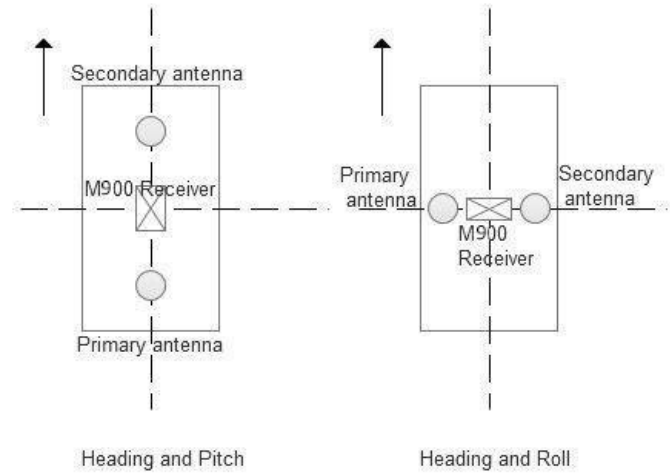
3.2.3 Mounting the antenna

Choosing the optimal location for the GNSS antenna is critical to the performance quality of your M900 receiver. It is necessary to mount the antenna to the optimal position in a proper way. Follow these guidelines to select the antenna location:

- If the application is mobile / kinematic, place the antenna on a flat surface along the centerline of the vehicle.
- Choose an area with open view to the sky and far from metallic objects.
- Avoid areas with high vibration, excessive heat, electrical interference or strong magnetic fields.
- Away from other radio frequency and electronic devices

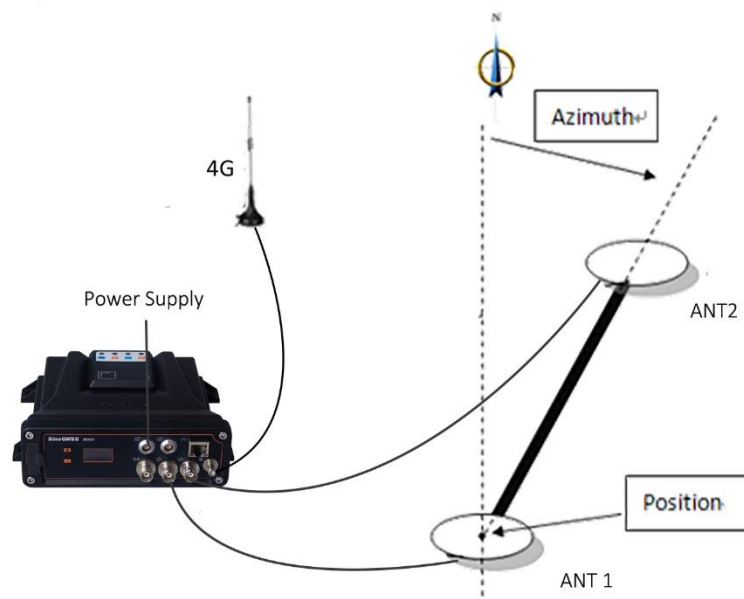
The M900 receiver is linked with two antennas, primary antenna is connected to Master, and secondary antenna is connected to the Slave. AT340 antenna is recommended, if use other kinds of antenna please check the specifications with the ComNav support team. Please install antennas in the proper position based on your requirement.

To mount the stable antennas, there are various mounting types you can choose, including magnetic mount, pole mount and rail mount.



3.2.4 M900 connection view

M900 is mainly used for challenging guidance and positioning applications including fleet management, marine, UGV and related unmanned control systems. The GNSS antennas are fixed on top of machine. The below figure explains the connection of each equipment.



4. Receiver configuration through a web browser

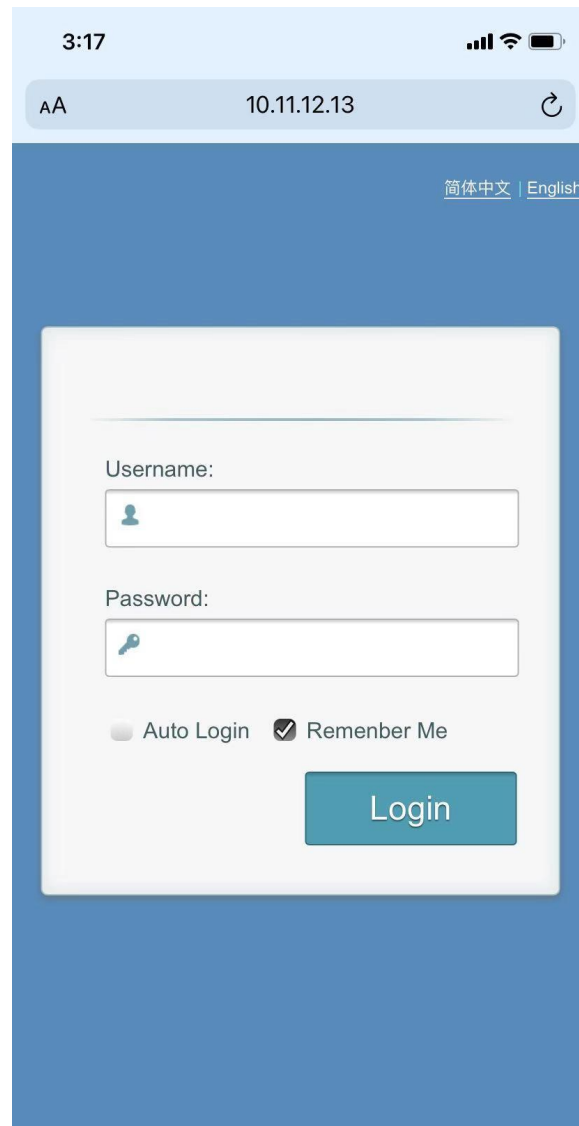
M900 has the advanced built-in web server, you can access the web setting page and do configurations by LAN or WIFI. This section describes how to change receiver

settings through a web server.

4.1 Login the configuration page of M900

4.1.1 Login the webpage by WIFI

You can get the WIFI name and WIFI IP address in OLED screen, the default password is 12345678. After connecting the WIFI by computer or phone, input ip address in browser, then you will get webpage of M900. The default username and password are *admin*, it allows user to change it in webpage.



4.1.2 Login the webpage by LAN

1. Firstly, make sure that the M900 and your computer are within the same Local Area Network (LAN). You can get M900 IP address in screen. Then change your

receiver's IP address by wifi webpage based on your office computer. For example, IP address in your computer:

```
Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix . : 
Link-local IPv6 Address . . . . . : fe80::45d1:8f50:7c4e:f827%12
IPv4 Address. . . . . : 192.168.1.58
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.1.1
```

IP address of M900:

Ethernet Config

IP Setting: Static IP

IP Address:

Subnet Mask:

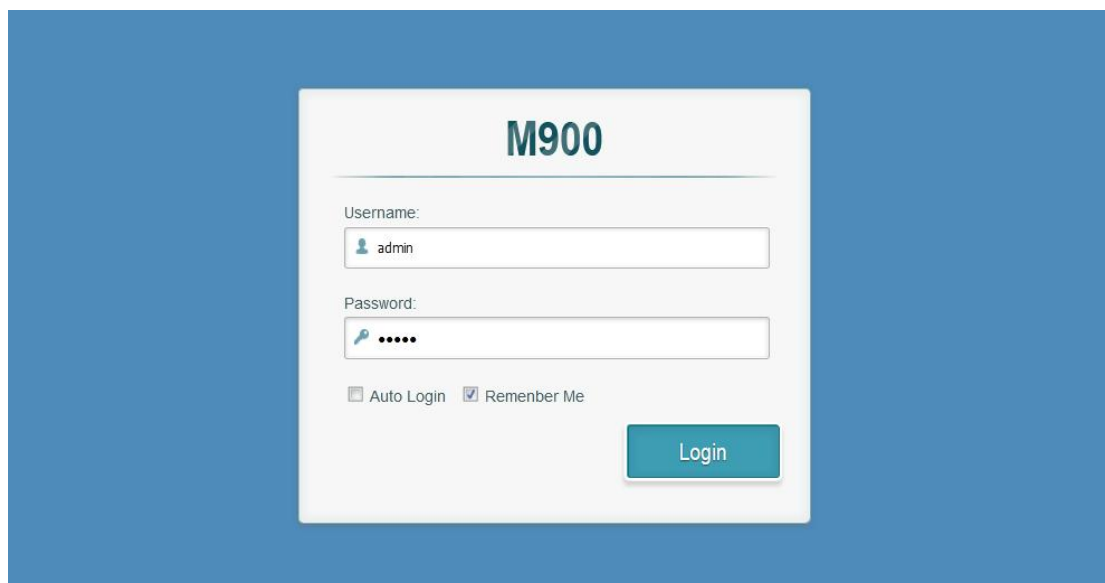
Default Gateway:

DNS:

2. Enter the IP address and HTTP port of the receiver into the address bar, you will access the configuration page of M900. The default setting for the HTTP port is 80, which is the standard port for web servers. However, HTTP port need to be changed in some cases.

For example, using default port 80. <http://192.168.1.205>

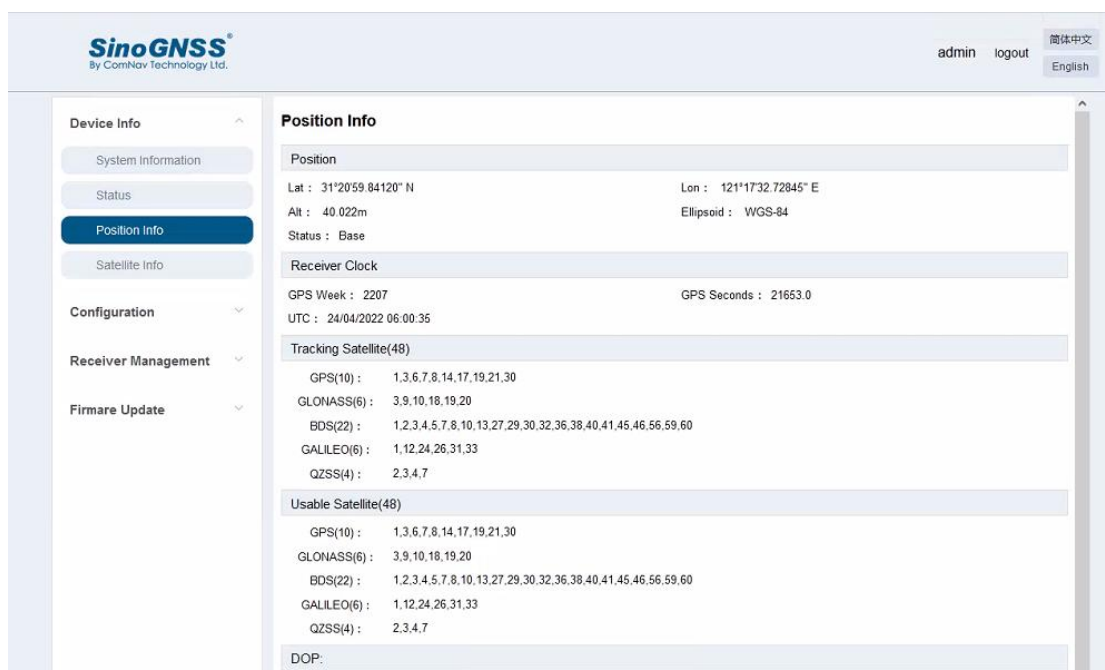
If your receiver has a port other than 80, you must enter the IP address followed by port number. As example shown below: <http://192.168.1.205:8000>



3. Enter the default login settings to access the main page:

- Username: admin
- Password: admin

After accessing the main page, configuration menus are listed on the left, and receiver's settings on the right. Each configuration menu will be demonstrated in the following sections.



4.2 Checking the receiver status

Click **Device Info**→**System Information**, **Status**, **Position info** or **Satellite info** you can check the corresponding receiver status, including:

- System information: SN, Firmware Version, Web Version, etc.
- Status: Datalink, Disk Capacity, WIFI status, etc.
- Position Info: GNSS constellation system tracked, etc.
- Satellite Info: SV, type, elevation, etc.

System Information

Receiver Type : M900
Serial Number : S0102154
Hardware Version : Pluto001
Firmware Version : eg25_v1.9.6
Board Firmware : 601AC-21AT6-1
Radio Firmware : 1.0.4
Display Firmware : v9.0
Web Version : V-4.0

Status

Device Status

Work Mode : Base
Data Link :
Capacity : 7440.0MB
Free Storage : 7440.0MB
BT Status : Started
Wifi Status : Stoped
4G Status : Stoped

Radio Information

Get radio information

Data Link Status

SV	Type	Elev.	Azim.	L1.	L2.	L5.
3	GPS	15	261	39	42	0
4	GPS	36	312	44	48	0
16	GPS	62	281	47	42	0
18	GPS	7	93	37	40	0
22	GPS	10	240	39	22	0
26	GPS	63	12	47	52	0
27	GPS	35	187	44	47	0
29	GPS	14	39	40	41	0
31	GPS	47	79	47	48	0
32	GPS	14	155	39	45	0
1	BDS	46	140	46	47	0
2	BDS	35	235	40	46	0
3	BDS	50	199	43	46	0
4	BDS	34	123	42	45	0
5	BDS	14	254	36	40	0

Sky View >>>
Tracking-Graph >>>

4.3 Receiver configuration

Use **configuration** menu to do basic configurations of your receiver.

4.3.1 Satellite tracking

Select smooth pseudorange, setup the mask angle and select the satellite systems of the tracking signal based on surveying requirements.

Satellite Tracking Setup

Smooth Pseudorange : ☒ ON ☐ OFF

Elevation Mask : degree

System	Status
GPS	☒ ON ☐ OFF
GLONASS	☒ ON ☐ OFF
BDS	☒ ON ☐ OFF
GALILEO	☒ ON ☐ OFF

Enter
Cancel

4.3.2 Work mode

There are 2 work modes you can choose:

- Base: configure the receiver as a Base station and its settings. However, you can change the base setup only when you stop the base mode.

Work Mode

Mode Setting

☐ Rover ☒ Base

Station ID : Setup

Coordinate :

Lon : ☒ E ☐ W

Lat : ☒ N ☐ S

Alt : m

Status : Started

Start Stop

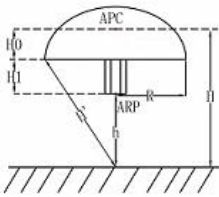
- Rover: setting the receiver as a rover.

4.3.3 Antenna setup

Enter the proper values of marker name and antenna height (height limited 0 to 6.5535m), select the antenna type and measurement method.

Antenna Setup

Antenna Setup



Antenna Height : m (0-6.5535)

measure method : ☒ Slant height ☐ vertical height ☐ Phase center

Antenna Type :

4.3.4 4G network

In this section, you can set up 4G function in M900. When you use a SIM card, you must enable this feature. It is best to insert the SIM card before turning on the power, and connect the 4G antenna.

Input your SIM card APN, username and password, then click Start button. If it starts successfully, you will get signal intensity and SIM ID.

4G Network

Module Type : EG25

Signal Intensity : 7

SIM Card State : ERROR

SIM ID :

Net Status : Disconnect

PPP dialing : Stoped

APN : cmnet

Username : zynq

Password : ****

Start

OFF

4.3.5 WIFI and bluetooth

Click Start to active WIFI or Bluetooth function. It allows you to customize the name, you can check the name and status in the screen.

Wifi

Wifi Name : WIFI_50499

Wifi Password :

IP : 10.11.12.13

Mac Address : F5:C8:7d:41:01:79

Status : Started

Start

off

Bluetooth

Name : BT-50499

Mac Address : 00:00:00:00:00:00

Status : Stoped

Start

off

4.3.6 Ethernet config

Use the *Ethernet Config* menu to set IP address, subnet mask, default gateway and DNS of M900. After changing those settings, you need to change your computer's IP address and re-login configuration webpage based on the new IP address.

Ethernet Config

IP Setting:

IP Address:

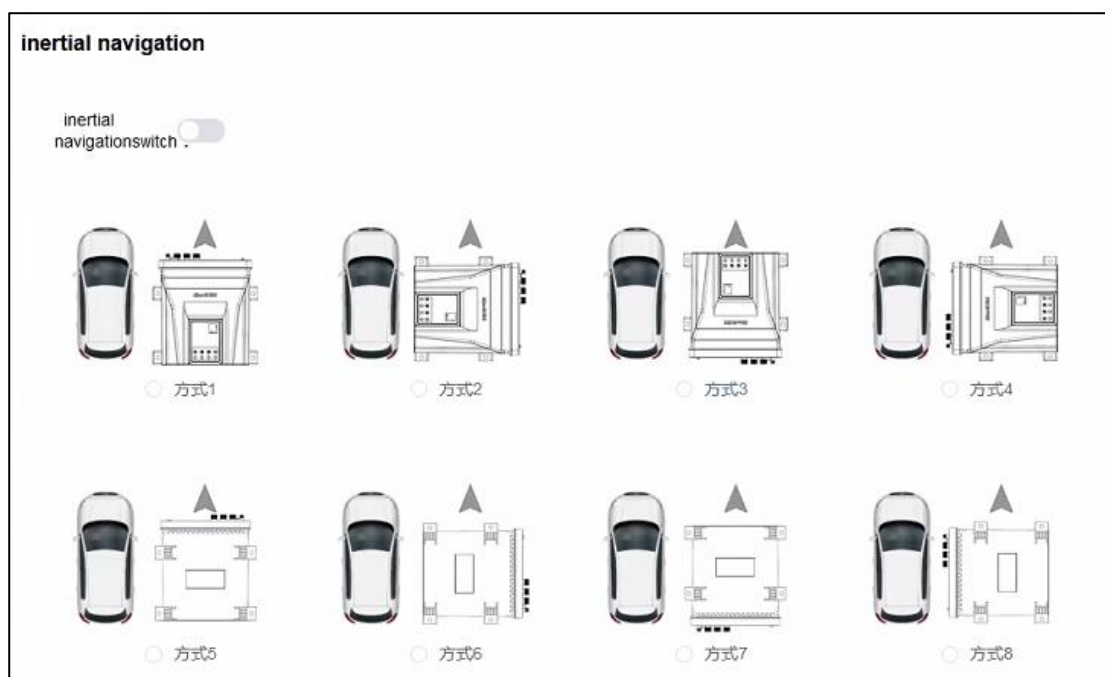
Subnet Mask:

Default Gateway:

DNS:

4.3.7 Inertial navigation

The inertial navigation system is a kind of independent system that doesn't need external information. This function is used when M900 is used in a rover station. It provides 8 installation methods to choose from.

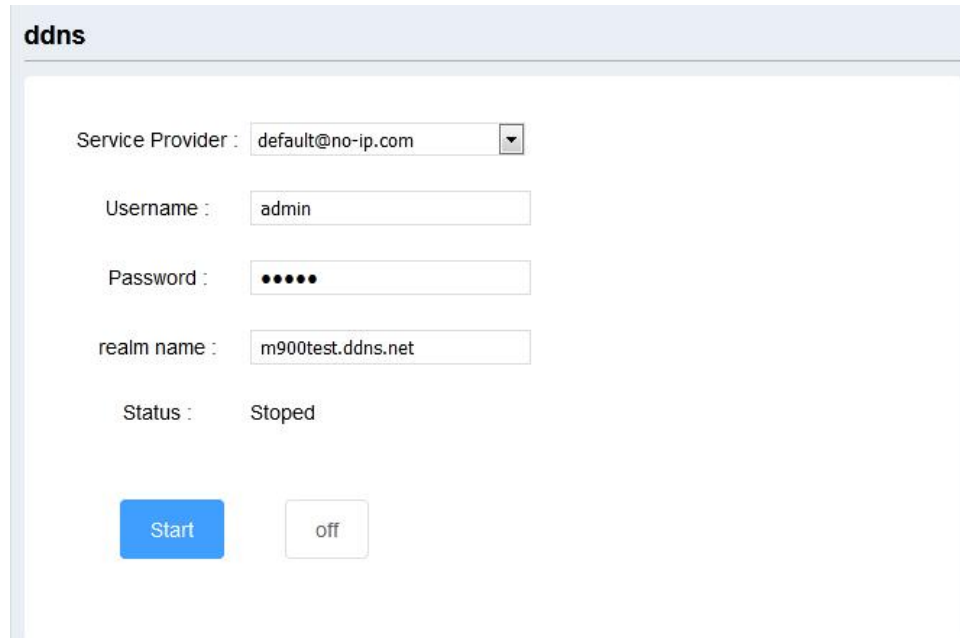


4.3.8 DDNS

Dynamic DNS (DDNS) is a method of automatically updating a name server in the Domain Name System (DNS). M900 has built-in Dynamic DNS capabilities, which

means that it is capable of sending an update to your DDNS account when your IP address changes. M900 supports no-ip, dyndns and freedns.

- Choose your DDNS provider
- Input your username, password and realm name.
- Click start to active DDNS feature.



The screenshot shows a web interface titled "ddns" with a light blue header. Below the header, there are several input fields and a status indicator. The "Service Provider" is set to "default@no-ip.com" with a dropdown arrow. The "Username" is "admin". The "Password" is masked with five dots. The "realm name" is "m900test.ddns.net". The "Status" is "Stoped". At the bottom, there are two buttons: a blue "Start" button and a grey "off" button.

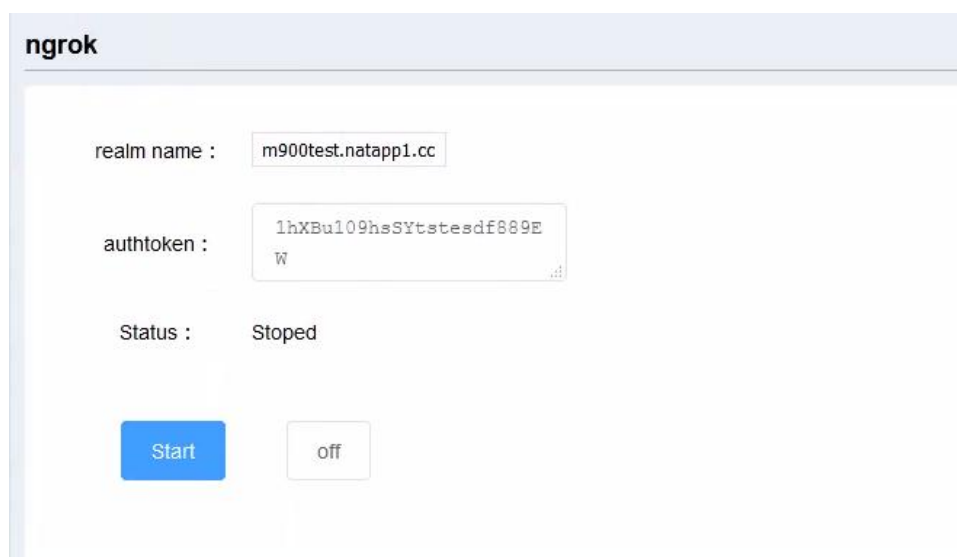
Field	Value
Service Provider	default@no-ip.com
Username	admin
Password	•••••
realm name	m900test.ddns.net
Status	Stoped

Buttons: Start, off

4.3.9 Natapp and ngrok

Network Address Translation (NAT) is the process where a network device, usually a firewall, assigns a public address to a computer (or group of computers) inside a private network. Ngrok exposes local servers behind NATs and firewalls to the public internet over secure tunnels. After registering the Ngrok or natapp account, you can set it up in M900.

- Input realm name
- Input authtoken.
- Click start to active Natapp/ ngrok service.

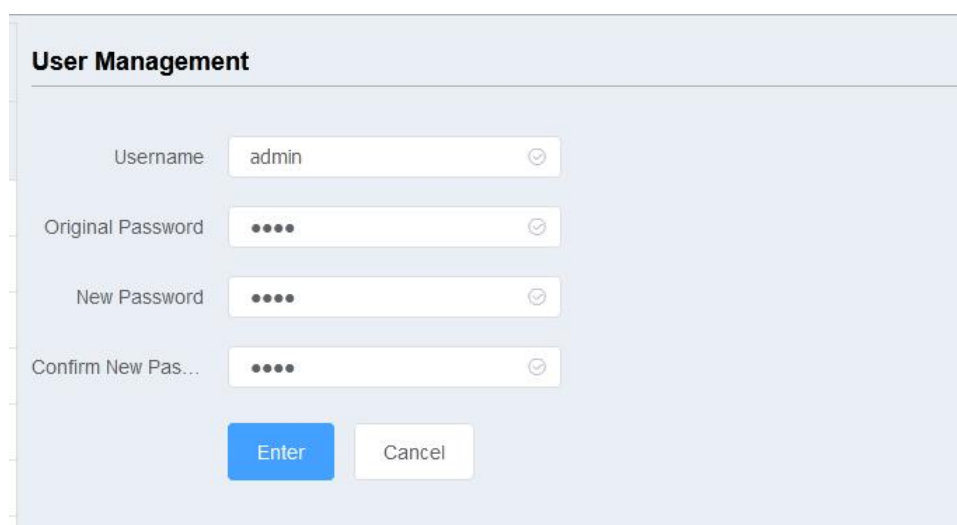


The image shows a web interface for ngrok. At the top, there is a header with the text "ngrok". Below the header, there are three input fields: "realm name :" with the value "m900test.natapp1.cc", "authtoken :" with the value "1hXBu109hsSYtstesdf889E", and "Status :" with the value "Stoped". Below these fields, there are two buttons: a blue "Start" button and a grey "off" button.

4.3.10 User management

Use *user management menu* to change the password of account.

Enter the username and original password, then input the new password and confirm it again, then click enter to change the password of account.



The image shows a web interface for "User Management". It has a header with the text "User Management". Below the header, there are four input fields: "Username" with the value "admin", "Original Password" with four dots, "New Password" with four dots, and "Confirm New Pas..." with four dots. Below these fields, there are two buttons: a blue "Enter" button and a grey "Cancel" button.

4.4 Receiver management

4.4.1 Data transfer

There are two ways to transfer raw data from the M900 receiver to your office computer--internet or serial ports. Serial ports support RS232 (com1 and com2, Lemo port) protocol; the internet support TCP and Ntrip protocol.

Data Transfer			
Port Summary			
Type	Port	Data Stream	Setup
COM	COM1	RTCM3.2	<button>Setup</button>
COM	COM3	Custom data	<button>Setup</button>
TCP/IP	4455	RTCM3.2	<button>Setup</button>
TCP/IP	8001	Navigation Data	<button>Setup</button>
NTRIP Server	8888	RTCM3.2	<button>Setup</button>
NTRIP Client	25001		<button>Setup</button>
Radio	-	RTCM3.2	<button>Setup</button>

4.4.1.1 Serial Port config

The data will output from the Lemo port of the receiver when you complete the com port settings. Select proper baud rate and data flow, and click **Enter**, the corresponding serial port will output data. The format of Data flow includes:

- Raw observation data: ComNav binary format raw data
- Navigation data: Some standard NMEA messages and custom messages
- RTCM2.3, RTCM3.0, RTCM3.2
- Custom data: ComNav custom data

Port Configuration
×

COM1

☐ Use

Baud Rate : 115200

Odd/Even : ODD

data stream: Navigation Data

GPGLL off

GPRMC 1Hz

GPZDA 1Hz

GPGGA 1Hz

GPTRA off

GPHDT off

GPYBM off

PTNLA VR off

PTNLPJK off

HEADING off

KSXT off

Enter

Cancel

4.4.1.2 TCP/IP config

Dataflow can be transferred via the internet by using TCP Server or TCP clients.

TCP Server: Any user can receive the data through TCP Clients protocol

TCP Clients: Send data to the specified IP address and port

For data flow:

- Raw observation data: ComNav binary format raw data
- Navigation data: Some standard NMEA messages and custom messages
- RTCM2.3, RTCM3.0, RTCM3.2
- Differential mode: Correction data

Port Configuration

TCP/IP 8080

☒ Use

Work Mode : Server

Port: 8080

data stream: Raw Observation Data

140 on 41 on 71 on 412 on

712 on 723 on 792 on 1122 on

1133 on

Enter Cancel

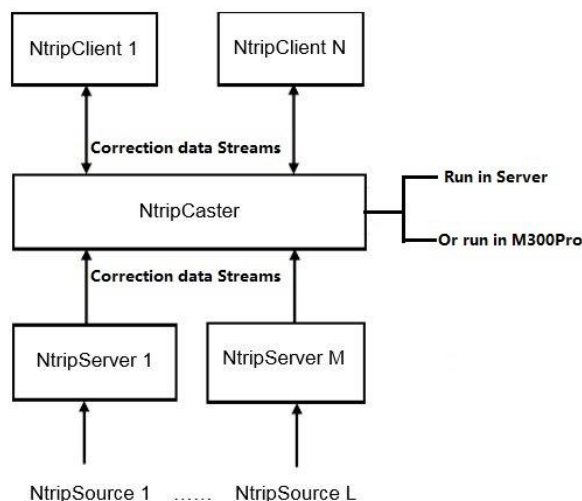
4.4.1.3 Ntrip server

Before setting the Ntrip Server, you should configure the receiver as *Base mode*, also select correction data format as RTCM3.2 (recommended). Then start Ntrip Server configuration:

- Enable **Use** button
- Enter the server IP address as Ntrip Caster address and Ntrip Caster port. As the example showed above, our company's server is under running: 211.144.120.104: 8888
- Set custom username and password (Username and password of our server can be anything you choose).
- Mount point: Ntrip caster mount point
- Data stream: format and the corresponding message
- Click **Enter** button, you will transmit the correction data to server.

4.4.1.4 Ntrip client

The M900 support Ntrip Client. It allows you to acquire correction data from CORS through Ntrip Client protocol.



*Tips: You need to uncheck **Use** and click **Enter** button to disconnect them before you configure this interface.*

Here will show you how to set up Ntrip Client.

- Enable **Use** button
- Enter IP address, Port, User name and Password of CORS
- Click Get List to acquire the Mount Point list
- Choose one of mount points and click **Enter** button, you will receive correction

data from CORS.

Port Configuration

NTRIP Client

Status: disconnect

Use: ☐

Ntrip version: NTRIP v1.0

CasterAddress : 140.207.166.210 25001

Username: 50499

Password:

mountpoints: K803_FG_RTCM32 Get List

Enter Cancel

Click **position Info** in **Device Info** to check the rover's status, and position status should be Fixed.

Position Info

Position

Lat : 31°20'59.97509" N Lon : 121°17'32.86977" E

Alt : 36.830M Ellipsoid : WGS-84

Status: Fixed

Receiver Clock

GPS Week : 2134 GPS Seconds : 134433.0

UTC : 30/11/2020 13:20:15

Tracking Satellite(32)

GPS(9) : 3,4,16,22,26,27,29,31,32

GLONASS(8) : 4,5,14,15,16,17,23,24

BDS(11) : 1,2,3,4,5,6,7,9,10,11,16

GALILEO(4) : 4,5,9,24

Usable Satellite(32)

GPS(9) : 3,4,16,22,26,27,29,31,32

GLONASS(8) : 4,5,14,15,16,17,23,24

BDS(11) : 1,2,3,4,5,6,7,9,10,11,16

GALILEO(4) : 4,5,9,24

4.4.1.5 Radio

M900 has internal radio model, the frequency range is 410-470Mhz and spacing is 12.5Khz, users can configure the radio settings in radio of Data Transfer.

- Enable **Use** button
- Enter frequency, like 454.050, 454.1125, 455.000 and so on.
- Choose Protocol, m900 supports Transparent, south, TT450 and MAC.
- Choose Power of radio and click **Enter** button, you will receive correction data by radio.

The screenshot shows a 'Port Configuration' dialog box with a close button (X) in the top right corner. Inside the dialog, there is a 'Radio' dropdown menu. Below it, the 'Status' is 'disconnect'. The 'Use' checkbox is checked. The 'frequency' field is set to '454.050' with 'MHZ' as the unit. The 'Protocol' dropdown is set to 'Transparent'. The 'power' dropdown is set to '2w'. At the bottom right, there are two buttons: 'Enter' (blue) and 'Cancel' (white with a grey border).

4.4.2 Data record

Use the *data record* menu to set the storage mode for surveying date. Information is shown below:

- Internal Memory: 8GB, could record for 2 months while using 1 Hz sample frequency.
- Show record name, status, data format, record mode and operation in table, click **Setup** button to configure the data record settings.

CAUTION - Please be careful to click the **Format Disk** button. It will empty all your data files in M900.

Data record

record Setting

Position	Capacity	Free Storage	Format Disk
Internal memory	7440M	7428M	Format Disk

number	Name	Record State	data format	record mode	Operation
1	testtesttest	Unrecorded	CNB	Manual Recording	setup
2	record2	Unrecorded	RINEX3.02	Manual Recording	setup

To configure the data recording settings, please make sure that recording mode is on **manual** with **unrecorded status**.

Setting options are shown below:

- Name: Support only number or letter
- Sample Interval: Choose sample frequency, support 0.05\0.1\0.2\0.5\1\2\5\15\30\60s.
- File Split: Choose file split, support every 15 minutes or 1\2\4\24 hours to save a file. If you select 24 as file split, it will create two data files when it occurs to 24 o'clock (UTC Time). One is from start time to 24 o'clock, another is from 0 o'clock to end time.
- Data Format: Support CNB \Rinex3.02\ Rinex2.10(excluding BeiDou)
- Loop: When storage is full, **Yes** means delete earliest data and store continually, **No** means stop recording
- Storage Space: Separate storage space in internal memory
- Record mode: Support manually and automatically recording mode.

Disk Record Setting

✕

Record State: Unrecorded

Name:

Sample Interval:

File Split:

data format: CNB RINEX2.10 RINEX3.02

Loop: Yes No

Storage Space:

record mode:

Cancel
Start

4.4.3 Data download

You can download internal data files through a web server or USB drive

1. Data download through a web server

Firstly, select data name, file type (CNB \Rinex3.02\Rinex2.10) and date. Then click **Get Data**, you will see data files meet the demand. Click **Download** icon to download the data file you need, or click **Delete** icon to delete this file.

Data Download

record Setting

Name:

File Type: CNB RINEX2.10 RINEX3.02

Select Date:

Get Data

	Item	FileName	Size	operate	
☐	1	shsn3350955.20C	12.00KB	download	delete
☐	2	shsn3350955.20G	4.00KB	download	delete
☐	3	shsn3350955.20L	4.00KB	download	delete
☐	4	shsn3350955.20M	0.00B	download	delete
☐	5	shsn3350955.20N	8.00KB	download	delete
☐	6	shsn3350955.20O	1.82MB	download	delete

select All
delete
First
End
Last
Next
Go to

Total
1
10/page
▼

2. Data download through a USB port

Use Lemo to USB cable to connect M900 with your office computer, internal memory will be identified automatically as a removable disk. Double click to open disk, and copy raw data files out.

4.4.4 Receiver utility

In this section, you can control M900, including:

- Reboot: Restart the receiver
- Factory Default: Recover the receiver to factory default setting

4.5 Firmware update

You can update the system firmware, board firmware, front panel firmware and radio firmware in this menu.

Select system, board or front panel upgrade according to your demand, then click **Browse** to select the latest firmware version. Click **Install**, a progress bar shows 0 to 100% and status will be “Not allowed to do other operations during the upgrade”. When completing firmware update, the receiver will restart automatically.



The screenshot shows a web interface titled "System Upgrade". It contains a "Path :" label followed by a text input field containing "Firmware-..." and a "Browse..." button. Below this is an "Install" button. At the bottom, there is a "Status:" label. The interface is light blue with a white content area.

5. Programmatic interface

This section describes a method of controlling M900 receiver through programmatic commands. It provides a more machine friendly method for users to check and

configure receivers, such as rover, NMEA data output. Please read these tips before sending commands to your M900 receiver.

- Select and send proper commands, all commands are case insensitive: Log version=LOG VERSION
- Press **Enter** button at the end of every command to check receivers' feedback information or input another command
- For More detailed programmatic commands, please refer to [ComNav OEM CARD REFERENCE MANUAL](#)

WARNING-These commands are only suitable for COM1. The COM2 and COM3 are connected to the web interface, please do not change the baud rate and the data output of these two ports.

5.1 Frequently used commands

● Check Version Information

log version // Version information about the board

```
<VERSION COM1 0 60.0 UNKNOWN 1869 200404.500 00000000 0000 1114
< 1< GPSCARD "S32030K708" "02801074" "CRDK-708AA-TTT-0" "2.20R-
2.032-1" "5.000" "2015/Aug/25" "17:27:16"
OK!
Command accepted! Port: COM1.
```

● Check Port Information

log comconfiga // Information of the port.

```
=====
Port| Baud |Parity|Databits|Stopbits|Handshake|Echo|Breaks|RxType|TxType|
Response|
=====
COM1|115200| 0| 8| 1| 0| 0| 1| 1| 1|
1|
COM2|921600| 0| 8| 1| 0| 0| 1| 1| 1|
1|
COM3|115200| 0| 8| 1| 0| 0| 1| 1| 1|
1|
COM4|115200| 0| 8| 1| 0| 0| 1| 1| 1|
1|
OK!
Command accepted! Port: COM1.
```

● Change the serial port baud rate

com com1 9600// Change the baud rate of com1 to 9600

● Check System Information

log sysconfiga //All the configuration of the system can be viewed by this command.

● Check the Output data Information

log loglista//View the output data information about all the ports.

```
<command>
log loglista
</command>
#LOGLISTA,COM1,0,60.0,UNKNOWN,1869,201015.800,00000000,0000,1114;
COM2,RAWEPHEM,BINARY,ONCHANGED,1.000,
COM2,BESTPOS,BINARY,ONTIME,120.000,
COM2,BD2EPHEM,BINARY,ONCHANGED,1.000,
COM2,RANGECMP,BINARY,ONTIME,1.000,
COM2,PSRDOP,BINARY,ONTIME,2.000,
COM2,BD2RAWEPHEM,BINARY,ONCHANGED,1.000,
COM2,GPSEPHM,BINARY,ONCHANGED,1.000,
COM2,GLOEPHEMERIS,BINARY,ONCHANGED,1.000,
COM2,GLORAWEPHEM,BINARY,ONCHANGED,1.000,
COM2,M925,BINARY,ONTIME,10.000,
COM3,GPGGA,ABBASCII,ONTIME,1.000,
COM3,GPGSA,ABBASCII,ONTIME,1.000,
COM3,GPGSV,ABBASCII,ONTIME,1.000,
COM3,GPZDA,ABBASCII,ONTIME,1.000,
```

● Lockout/unlockout satellite system

Command	Description
(un)lockout bd2	(un)lockout Beidou system
(un)lockout gps	(un)lockout GPS system
(un)lockout GLONASS	(un)lockout Glonass system
Unlockoutall	Unlock all GNSS system

● NMEA data output

The serial port is for COM1, you can output any NMEA data through COM1. For example:

log com1 gpgga ontime 1

log com1 gpgsv ontime 1

● Raw data output

Log com1 rawephemb onchanged // Output GPS ephemeris

Log com1 glorawephemb onchanged // Output Glonass ephemeris

Log com1 bd2rawephemb onchanged // Output Beidou ephemeris

Log com1 galephemerisb onchanged // Output Galileo ephemeris

Log com1 rangecmpb ontime 1 // Set com1 output raw data, the frequency is 1Hz.