

GUANGZHOU ALPHA GEO-INFO CO., LTD

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Chapter I MATRIX II Survey System Brief

1.1 Brief

In recent years, the α -GEO company has been committed to making field measurement easier and ea sier. According to the engineering experience accumulated in the past 30 years and the experience in the research and development of Surveying and mapping related instruments, I am familiar with the c urrent situation and development direction of Surveying and mapping products, and can organically i ntroduce other disciplines and technologies into the field of surveying instruments.

MATRIX II is a high-end intelligent GNSS receiver launched by α -GEO, which is a compact new ge neration of smart LASER AR RTK designed for any surveying project using the latest GNSS technol ogy. It adopts multi-satellite and multi-frequency technology, with built-in all constellation motherbo ard, supports beidou No.3 satellite, with advanced IMU technology, and Linux operating system runs more stably and smoothly. The operation mode is simple and flexible, in terms of function, performa nce, speed and power consumption Meet the higher requirements of users

1.2 Product features

Good design, advanced algorithm, smart interaction, and equipped with an efficient Linux platform; The miniaturized zero phase antenna adopts multi-satellite and multi-frequency GNSS main board, s upports multiple satellite system signals of BDS, GPS, GLONASS and Galileo, with good electroma gnetic shielding and stable receiving satellite signals;

When the stakeout points are marked directly on the ground, surveyors can easily find the exact locat ion of the stakeout points. By following the arrows on the real-life map, you can stake out points in o ne go, without having to move the pole back and forth, making the stakeout work more accurate and efficient;

The world's exclusive patented laser coordinate measurement quick calibration technology can easily achieve centimeter-level measurement accuracy, making measurement more accurate and user-friend ly. Besides the camera used in the equipment overcomes the difficulty of aiming under sunlight, maki ng field measurement operations faster and more efficient;

The built-in high-performance 9-axis IMU module eliminates the need for users to perform complica ted calibration. The maximum inclination angle can reach 120 degrees, and the accuracy can be main tained within 2cm. What you reach is what you measure, no more waiting;

Provide rich data link mode, with Wi-Fi and 4G Internet access function to transmit differential data; when using network to transmit differential data, the mobile station receiver of other manufacturers c an connect to the reference station established by the measurement receiver, and the measurement m obile station can also connect to the CORS reference station of other companies;

1.3 Specifications

MEASUREMENTS

- 1408 Tracking Channels
- Satellite signals tracked simultaneously
 - → GPS: L1/L2/L5
 - → GLONASS: L1/L2/
 - \rightarrow SBAS: L1
 - → Galileo: E1/ E5A/ E5B
 - → BDS: B1, B2, B3
 - → QZSS: L1/L2/L5
- Positioning rates
 - \rightarrow 1Hz \sim 20Hz
- Initialization time < 5s
- Initialization reliability >99.99%

POSITIONING

- Code differential GNSS positioning
 - → Horizontal: 0.25 m + 1 ppm RMS
 - → Vertical: 0.50 m + 1 ppm RMS
 - \rightarrow SBAS differential positioning accuracy: typically, <5m 3DRMS
- Static GNSS surveying
 - → Horizontal: 2.5 mm + 0.5 ppm RMS
 - → Vertical: 5mm + 0.5 ppm RMS
 - Real time kinematic surveying
 - Single baseline < 30km
 - → Horizontal: 8 mm + 1 ppm RMS
 - → Vertical: 15mm + 1 ppm RMS

Network RTK

- → Horizontal: 8 mm + 0.5 ppm RMS
- → Vertical: 15m m + 0.5 ppm RMS
- Real time kinematic tilt compensated
 - → Additional Hz pole tip uncertainty typically less than 8 mm + 0.4 mm/° tilt down to 30° tilt
- Laser survey
- → 1 cm + 5 mm/m (Tilt height less than 30°)

HARDWARE

PHYSICAL

- Material: Magnesium alloy
- Dimensions: φ160mm × 53mm (With bottom connector74mm)
- Weight: 1.0kg
- Operating temperature: -40°C to +75°C
- Storage temperature: -55°C to +85°C
- Ingress protection: IP67 dustproof, protected from 30min immersion to depth of 1m

- Shock: Survive a 2m pole drop onto concrete
- Vibration: MIL-STD-810G
- Humidity: 100%, condensing

ELECTRICAL

- Power 9-24 V DC external power input on 5 pin LEMO port
- Support Type-C fast charging
- Internal 6800mA Lithium-ion battery
- Battery life
 - \rightarrow Rover mode: 12 hours
 - \rightarrow Base mode: 7h hours
 - \rightarrow Static mode: 15 hours

COMMUNICATIONS & DATA STORAGE

- I/O Interface
 - → 1 LEMO port (5pin): Supports power input, serial port control, and external radio communic ation
 - → 1 Type-C USB port: Data download
 - \rightarrow 1 sim card slot: Supports Nano-SIM
 - \rightarrow 1 antenna port: UHF antenna interface
- Radio modem
 - \rightarrow Transmit power: 1w/2w switchable, the work range is greater than 4km
 - \rightarrow Frequency band: 410MHz-470MHz; supports to freely set the frequency
 - \rightarrow Supports to retransmit correction from CORS; Compatible with other brands
- Cellular
 - → Integrated full frequency band 4G modem, supports WCDMA/CDMA2000/TDD-LTE/FDD -LTE
- Wi-Fi
 - → 802.11 b/g standard, access point and client mode, supports to access to hotspot to transfer c orrections
- Bluetooth
 - → Fully integrated Bluetooth V4.0, range $\leq 50m$
- Data format
 - → RTCM3.2, RTCM 3.x input and output
 - \rightarrow Dat, Rinex, NMEA outputs
- Storage
 - → 64GB internal memory optional, supports cyclic storage; over five-year raw observations ba sed on 5 seconds interval

OTHERS

CAMERA

- AR:5M high-definition camera with large viewing angle and support for live scene stake out
- Laser assisted: 5M high-definition camera, large viewing angle, auxiliary laser measurement and aiming

PRACTICAL

- OS system: Intelligent LINUX operating system
- Tilt compensation: Calibration free

- Supported controllers: All Android devices with supported software DESIGN
- Button: 1 power key
- Indicator: 1 power indicator, 1 data link indicator, 1 satellite indicator
- Voice: Intelligent voice prompts
- WEB UI: Support WEB UI configuration

1.4 Precautions

MATRIX II receiver is a precision instrument. Although it is designed to resist chemical corrosion an d earthquake, it should be used and maintained carefully in actual use.

1. Packing and transportation: please make sure that the receiver and all accessories are placed in the instrument box in the correct position to prevent the instrument from being damaged by impact and v ibration during transportation. Please dry the instrument surface with a cloth when it is wet by rain, a nd then pack it after it is dried. The receiver and data collector are equipped with built-in lithium batt ery. Please ensure to comply with the national laws and regulations during express transportation.

2. Storage: when using and storing the receiver, please make sure it is within the specified temperatur e range. Before storage, take out the lithium battery from the host and turn off the manual. After usin g the instrument at ordinary times, it shall be packed in time to prevent the loss of accessories.

3. Please do not disassemble the instrument when using the GNSS receiver. In case of failure, please contact the supplier;

4. Please use the original battery charger. When using an external power supply, you must ensure that the nominal voltage is correct.

5. Do not use receiver and pole in thunderstorm days to prevent accidental injury caused by lightning stroke.

6. In order to ensure the quality of the satellite observation signal, the sky over the station should be a s wide as possible, and there should be no obstacles above the altitude angle of 15 degrees. High volt age line, microwave station, TV Tower and other strong electromagnetic interference equipment shall be avoided within 200m around the station. In order to reduce the influence of multipath effect on th e observation, the station should be far away from large water areas, glass curtain walls of high-rise b uildings and other areas with strong electromagnetic wave reflection.

Chapter II Introduction

2.1 Housing & Indicators



2.1.1 Indicators

Table 2-1	Descri	ntions
14010.2-1	DUSCH	puons

୮୧୭୮	Green	Satellite	es locked
Dell	Off	No trac	king satellites
	Daga	Blink	Transmitting data
11	Dase	Off	No transmitting
<u>*1</u>	Douor	Blink	Receiving data
	Kovel	Off	No data received
		Green	The receiver battery is fully charged
•	Plug in	Red	Receiver is charging
•	No plug in	Green	Battery power is full
	no piug in	Red	Battery power is low

2.1.2 Bottom



AR Camera: For live scene stake out.

Laser: For laser measurement.

5-pin LEMO interface: support external power supply; serial cable connection control; external radi o data transmission.

Antenna interface: Built-in radio antenna interface, the antenna must be inserted to use the built-in r adio.

Nano SIM card slot: Used to install a nano SIM card for data link communication.

Type-C interface: To charge the device and download the data.

Reset Button: For reset the device when some unexpected issue happens.

2.2 Configuration Brief

2.2.1 Carry Case

If there is water on the surface of the instrument or inside the box, please do not directly pack the box, and then cover it tightly after drying. If the inside of the box is wet and the field is eager to transport it, it should be opened and dried in time when returning to the room.



2.2.2 5-PIN cable & USB cable

1. 5-Pin interface



Note: The 5-pin interface are all arranged in a counterclockwise direction when lookin g at the front (that is, facing the front side of the notch of the 5-pin interface of the rece i v e r) .

(1) Three uses of the 5-pin interface:

1. When the interface is connected to the computer, it is used to connect the PC control software of the test;

2. When the interface is connected to the external radio, the data cable used for the rec eiver and the external radio;

3. When the interface is connected to the adapter, it can supply power to the receiver.(2) Signal description

5-Pin l	LEMO
1	Power(12V)
2	Signal (Ground)
3	RXD
4	TXD
5	Power (Ground)

Note: When connecting the 5-pin interface, make sure that the red mark of the 5-pin he ad is aligned with the red point on the small 5-pin interface, and then it can be inserted gently. If it is not aligned, it cannot be inserted to protect the 5-pin interface.

2.2.3 TYPE-C Cable

The USB interface is located on the side of the receiver. Open the rubber plug on the si de of the receiver to see the interface. The Micro USB interface of the receiver is used as follows:

(1) Connect the charger via the TYPE-C USB cable and charge the device;



TYPE-C USB cable

For TYPE-C USB cable, one end is a standard USB interface, and the other end is a TYPE-C USB in terface, which is mainly used for data transmission between computers and receivers and charging.

2.2.4 Internal UHF antenna

The receiver is equipped with a UHF built-in radio antenna, the specific use is as follows:

(1) In any case where the built-in radio is used as a data link, whether it is a dual-transmission mode or a radio repeater mode, the UHF built-in radio antenna must be inserted.

(2) The receiver integrates a 4G built-in antenna, and users do not need to plug in a 4G antenna.



Internal UHF antenna

When using the built-in radio as the data link, the radio communication protocol and radio frequency can be set on the data collector.

2.2.5 SIM Card Installation

When using the built-in network communication, a mobile phone card needs to be inserted, and the r eceiver supports Nano-SIM card. SIM card installation method: Open the battery cover, as shown in Figure 2.3.5-1, insert the SIM card notch into the card slot with the chip facing down. When removin g, just press the SIM card to automatically eject part of it, then pull out the card

Tip: The receiver has a built-in 4G antenna, and no external antenna is required when using the builtin network communication



Fig 2.3.4-1

α-geo

Chapter III WEB UI Introduction

3.1 Connecting to the WEB UI

MATRIX II can be fully configured and monitored by using the WEB UI. Any Wi-Fi device can con nect to MATRIX II via the WEB UI. The steps how to connect to Wi-Fi is as below.

- 1. Wait till MATRIX II has fully booted after switching on (about 10 seconds).
- 2. The wireless access point name will be shown up which is same as the serial number as shown in Figure 3-1. The password is **12345678**.
- 3. Open a browser and type the IP **192.168.10.1** in the address bar, type ID: **admin** Password: **admi n** to log in. The browser will open the 'Overview' page of the Web Interface shown in Figure 3-2.



Figure 3-1: Access point name

	Device		Position	r.	Status		English ~
1 mm	SN : T18R3B116963066		Longitude : 113.405232	28800	HDOP: 0.8	a Remain 58877.55M	📿 Age
	Firmware : V2_0_7-D-2023	1124	Latitude : 23.19033861	57	Working Mode : Rover Mode	Phone Internet	 28 10:54:20
	Web Ver : 20230921_v1		Height : 65.1287		Expiry : 20800101		
	Status Work M	lode 🗸	GNSS Information $^{\vee}$	NetWork Setting	Data Communication	System Setting	
Network Info		- Server - Port 8 Mount	IP: 1.14.194.9 006 I Point: T03V32000204583	Devic OEM: IMEI: ICCID IMSI; MOD	# Info UM980 866308065655862 +CME ERROR: 3 EL: EC25		
		Userna	ame: tx	SIGN, REG: SIM: I SOFT	AL: 19 2 Vot inserted WARE: EC2X-V1_0_0-20230930		
power Info				disk S	ize		
_		Ren	nain100%Electric		used used 144.91 0% Remain 587:	M 32.64 M	

Figure 3-2: Web UI overview

3.2 Configuring the device as a Base

The MATRIX II is available to be set as **Base**, and can be started as internal UHF/Network/Ntrip C aster. Check the Base in work mode field as shown in Figure 3-2-1.

-	E	Device	Position	Status		English
	SN : T18R3B116	6963066	Longilude : 113.4052347003	HDOP:0.8	Asmain 58877.55M	C Age
	Firmware : V2_0	_7-D-20231124	Latitude : 23.1903382198	Working Mode : Rover Mode	Phone Internet	28 (P) 10:55:22
	Web Ver : 20230)921_v1	Height : 64.5370	Expiry : 20800101		0
	Status	Work Mode	GNSS Information > Net\	Work Setting × Data Communication ×	System Setting	
		Base				
		Rover	B	85C		
		Static	on X annas			
			Figure	3 7 1		

Figure 3-2-1

3.2.1 Transmitting via Internal UHF

- 1. Insert the UHF antenna to the MATRIX II for transmitting the signal.
- 2. Select the **Base** work mode field, set the coordinate, antenna height, the differential message typ e, PDOP and mask angle as shown in Figure 3-2-1-1.
- 3. Select the Built-in Radio in Datalink field, set the required radio protocol, channel, frequency an d power level as shown in Figure 3-2-1-2.

Record Ra	aw Data Disable 🗸
StartU	ip Mode Single Point Auto Start 💎
Message	Format RTCM32 V
Mas	sk Angle 10
Transmitting	Interval 1 ~
PDC	2P Limit 3.0000
	Set Base Figure 3-2-1-1
DataLink Set Internal Radio	Set Base Figure 3-2-1-1
DataLink Set Internal Radio	Figure 3-2-1-1
DataLink Set Internal Radio 🗸 Radio Protocol T Radio Baudrate 9	Set Base Figure 3-2-1-1
DataLink Set Internal Radio V Radio Protocol T Radio Baudrate 9 Radio Channel C	Set Base Figure 3-2-1-1 RIMTALK 600 channel2
DataLink Set Internal Radio 🗸 Radio Protocol T Radio Baudrate 99 Radio Channel C Radio Frequency Cl	Set Base Figure 3-2-1-1 RMTALK 600 channel2 channel1 450.125 Channel2 mmmel1
DataLink Set Internal Radio 🗸 Radio Protocol T Radio Baudrate 9 Radio Channel C Radio Frequency Cl	Set Base Figure 3-2-1-1 RIMTALK 600 channel2 channel1 450.125 Channel2 Expand All Channels

Figure 3-2-1-2

3.2.2 Transmitting via Network

- 1. Insert a sim card into the device and configure the APN parameters in Network Setting field **Mo bile Config** to activate it as shown in Figure 3-2-2-1.
- 2. Select the Built-in Network in Datalink field, and enter the Ntrip Server parameters in the corres ponding filed. You will need provide a name of the mountpoint in Access Point filed as shown in Figure 3-2-2-2.

	Mobile Config
Parameter Setting	
APN Name	CMNET
APN User	
APN Password	
	Set
	Figure 3-2-2-1
DataLink Set Built-in Network	

Tip : Please go to <Ntrip Caster> and <Ntrip Server> under menu <Data Communication> to set data link

Status	Enable	
Server IP	1.14.194.9	
Port	8006	
Username	alphageo	
Password	1234	
Mount Point	lest	

Figure 3-2-2-2

3.2.3 NTRIP Caster

The **NTRIP Caster** is a HTTP server which receives streaming RTCM data from one or more NTRI P Servers and in turn streams the RTCM data to one or more NTRIP Clients via the internet. MATRI X II is equipped with Wi-Fi module, so it can be a server and perform as Ntrip Caster to transmit the RTCM data, which is a very good feature for drone's application.

Base Configuration

- 1. Set the **Base** start parameters as usual, and select the external radio as datalink method.
- 2. Select the NTRIP Caster in Data Communication field as shown in Figure 3-2-3-1.
- 3. Set the port number and the mountpoint name as shown in Figure 3-2-3-2.

Data Communication 🔿
File
TCP/IP
Ntrip Client
Ntrip Server
Ntrip Caster
NMEA Config
System Log
WebSocket

Figure 3-2-3-1

Status	Enable V
Port	8000
Mount Point	T10R2A116000000

Figure 3-2-3-2

Rover Configuration

- 1. Connect data collector or Drone's controller to MATRIX II's Wi-Fi hotspot without entering any password as shown in Figure 3-2-3-3.
- Open the controller software and go to the Ntrip Configuration menu, enter the IP 192.168.10.1 and port (e.g., 8001) as set in Figure 3-2-3-2. The mountpoint (e.g., RTCM32_RTK) will be sh own in the list as below Figure 3-2-3-4.



Figure 3-2-3-3

Cut-off Angle:5 Enable PPK Data link Settings Data Link Phone Inter Connect Mode:NTRIP IP:192.168.10.1 Server Port:8001 User:h Password:****** MountPoint Settings	ernet
Datalink Settings Data Link Connect Mode:NTRIP IP:192.168.10.1 User:h Password:****** MountPoint Settings MountPoint RTCM32	ernet
Data Link Phone Internet Mode:NTRIP IP:192.168.10.1 Server Port:8001 User:h Password:****** MountPoint Settings	ernet
Connect Mode:NTRIP IP:192.168.10.1 Server Port:8001 User:h Password:****** IountPoint Settings	
IP:192.168.10.1 Server Port:8001 User:h Password:****** IountPoint Settings	
User:h Password:****** AountPoint Settings MountPoint RTCM32	
IountPoint Settings	
MountPoint RTCM32	Get
	_RTK
eceive data	
2137B Start	

Figure 3-2-3-4

3.3 Configuring the device as a Rover

3.3.1 Standard Rover settings

For the MATRIX II to operate as a rover and accept differential correction data from a Base station, check that **Rover** is selected in the 'Work Mode' field as shown in Figure 3-3-1-1. This is the default operating mode of the MATRIX II.

Status Work Mode M GNSS I	nformation × NetWork Setting ×	Data Communication \vee	System Setting
	Rover		
Record Raw Data	Disable		
Mask Angle	10		
	Set Rover		

Figure 3-3-1-1

Note: When the 'record raw data' is checked, the receiver will record raw data in Rover mode.

3.3.2 Data link in Rover mode

Built-in Radio

Configure the radio parameters as same as Base as shown in Figure 3-3-2-1. And the radio antenna m ust be inserted when using internal radio.

Radio Protocol	TRIMTALK	(¥				
Radio Baudrate	9600						
Radio Channel	Channel2		~				
Radio Frequency	Channel1	450,125	Channel2	451.125	Channel3	452.125	
		Ехра	nd All Channe	els ~			in manipa

Figure 3-3-2-1

Built-in Network

When built-in network is selected, a NANO SIM card must be inserted to the MATRIX II to get the 4 G signal. At the same time the APN parameters would be set in 'Network Settings' field Cellular men u. After that, the CORS details will be set as Figure 3-3-2-2.

Status Enable Ntrip Mode Ntrip IP 1.14.194.9 Port 8006 alphageo I234 Mount Point T03V32000204583 Get		
Ntrip Mode Ntrip IP 1.14.194.9 Port 8006 8006 alphageo Username alphageo Password 1234 Mount Point T03V32000204583 APN Name CMNET	Status	s Enable ~
IP 1.14.194.9 Port 8005 Username alphageo Password 1234 Mount Point T03V32000204583 Get APN Name CMNET	Ntrip Mode	e Ntrip ~
Port 8006 Username alphageo Password 1234 Mount Point T03V32000204583 APN Name CMNET	IP	P 1.14.194.9
Username alphageo Password 1234 Mount Point T03V32000204583 Get APN Name CMNET	Port	t 8006
Password 1234 Mount Point T03V32000204583 Get APN Name CMNET	Username	e alphageo
Mount Point T03V32000204583 Cet	Password	d 1234
APN Name CMNET	Mount Point	t T03V32000204583 ~ Get
	APN Name	e CMNET
APN Username	APN Username	e
APN Password	APN Password	

Figure 3-3-2-2

3.4 NTRIP and TCP/IP configuration

3.4.1 NTRIP Server

An **NTRIP server** is a broadcast Internet server that manages authentication and password control fo r differential correction sources such as VRS networks, and relays corrections from the source that yo u select. NTRIP is the acronym for Networked Transport of RTCM via Internet Protocol which is full y supported by the MATRIX II receiver as shown in Figure 3-4-1-1. The settings are as below:

- 1. Make sure you have a cellular connection as described in the previous section.
- Select the corresponding NTRIP version and fill the NTRIP Sever details in the corresponding b ox. The user name and password can be any letters, and the mount point name needs to be set in 'Access point' field.

Status Work Mode 🕤 GNSS I	nformation \sim NetWork Setting \sim	Data Communication 🗠	System Setting
		File	
	Ntrip Server	тср/ір	
		Ntrip Client	
Status	Enable	Ntrip Server	
Server IP	1 14 194.9	Ntrip Caster	
Port	8006	NMEA Config	
		System Log	
Usemame	alphageo	WebSocket	
Password	1234		
Mount Point	T03V32000204583		
	Set		

Figure 3-4-1-1: NTRIP Server

3.4.2 NTRIP Client

An NTRIP Client is the software element used by the rover (the GNSS devices out in the field) used t o connect to an NTRIP Caster such as SurPro6.0 to gain access to the data stream with the positional corrections it needs. There are also two methods to get the correction data, one is via internal networ k of receiver and the other is via data collector internet. But there is only internal network available when configuring it in WEB UI. You can find the related settings in 'Data Communication' field NT RIP Client as shown in Figure 3-4-2-2.

- 1. Make sure you have a cellular connection as described in the previous section.
- 2. Input the CORS details in the corresponding box. The user name and password must be correct, a nd the mount point list can be updated in 'Access point' field.

		File	
	Ntrip Client	TCP/IP	
		Ntrip Client	
Status	Enable	Ntrip Server	
Server IP	1 14 194.9	Ntrip Caster	
Port	8006	NMEA Config	
		System Log	
Usemame	alphageo	WebSocket	
Password	1234]
Mount Point	T03V32000204583 Ge	t	

Figure 3-4-2-2: NTRIP Client

3.4.3 TCP/IP

The MATRIX II can be set as a reference station to broadcast the raw data/differential data to the spe cified server. There are 5 channels supported which allows to send data to 5 servers at the same with different data format as shown in below Figure 3-4-3-3. When the server is connected to MATRIX II, the 'Status' button will become green and that means it is connected successfully.

	Status	Work Mode 🗸	GNSS Information	 NetWork Setting 	Data Communication	System Setting	
				TCP/IP			
Status on	Data	Raw Data	Server IP	123.25.3.279	Server Port	2101	Set
Status on O	Data	Diff Data V	Server IP	123.25.3.279	Server Port	6010	Set
Status 🕥	Data	Select	Server IP		Server Port		Set
Status 🕕	Data	Select ~	Server IP		Server Port		Set
Status	Data	Bidirectional	Server IP		Server Port		Set

3.4.4 Data Stream

3.4.4.1 NMEA output

Select the NMEA Config in 'Data Communication' field, here allows to define the NMEA message o utputs as shown in Figure 3-4-4-1-1.

		Status	Work Mode 🗵	GNSS Information	NetWork	Setting 🕚	Data (Communication	System Settin	ıg	
					NMEA Con	fig	File				
GGA	1 Hz		RMC	OFF	~	VTG	O Ntrip C	lient	ZDA	1 Hz	8
GSA	1 Hz	5	GST	1 Hz	~	G5V	5 Ntrip Se	erver	STA	Select	~
							Ntrip C	aster			
					Set		NMEA	Config			
						J.	System	Log			



3.4.4.2 Debug

This windows provides a debug function which you can send the commands to check the receiver's working status. And the NMEA data stream can be shown here as the Figure 3-4-4-2-1.

		Device	Positio	on	Status		English
	SN : T18R3B11	6963066	Longitude 113,4052	492325	HDOP:0.8	A Remain 58877.55M	🔾 Age
	Firmware : V2_0	0_7-D-20231124	Latitude : 23,1903341	308	Working Mode : Rover Mode	Autonomous	28 (A) 111541
	Web Ver : 2023	0921_v1	Height : 59.7606		Expiry : 20800101	o Hone menee	O mari
	Status	Work Mode 🕑	GNSS Information \sim	NetWork Setting	Data Communication	System Setting	
				WebSocket	File		
					TCP/IP		
WebSocket					Ntrip Client		
			N. 8292		Ntrin Soner		
\$GNG5A,M,3,02,03	,05,06,07,08,09,10,1	3,16,23,32,1.4,0.8,1.2	4*36		Nulp Server		
\$GNGSA,M,3,37,38 \$GNGST 031639.00	1 9 3 3 4 1,00 mm 1.4,0.8, 1 1 9 3 3 4 1 8 2 8 3 8	41.2,4°30 044.0 614.1 108.3 711	*7F		Ntrip Caster		
\$GNGGA.031640.0	0.2311.42004032.N.	11324.31495531.E.1.	28.0.8.59.7768.M.0.0000.M	1.,*78	NMEA Config		
\$GNZDA,031640.00	0,07,12,2023,,*7F				System Log		
\$GNGSA,M,3,10,23	,28,31,32,,,,,,,1.4,0.8,	,1.2,1*3A			Web Constant		
\$GNGSA,M,3,68,79	1.4,0.8,1.2,2*3	0			websocket		
\$GNGSA,M,3,07,08	,13,30,,,,,,1.4,0.8,1.3	2,3*3F					
\$GNGSA,M,3,02.03	.05,06,07,08,09,10,1	3,16,23,32,1.4,0.8,1.2	4*36				
SGNGSA,M,3,37,38	, 39,41,60,,,,,,,,1.4,0.8,	,1.2,4*50 750 0 635 1 117 3 703	970				
SGNGGA 031641.00	0,2.10,5.50,1.65,64.0 0.2311 42004785 N	11324 31495395 F 1	28.0.8.59.7606 M.0.0000 M	1 *73			
\$GNZDA.031641.00	0.07.12.2023.*7E	.)	20,0.0,33,7000,10,0.0000,10	6 / J			
\$GNGSA,M,3,10,23	,28,31,32,,1.4,0.8,	,1.2,1*3A					
\$GNGSA,M,3,68.79		0					
\$GNGSA,M,3,07,08	,13,30,,1.4,0.8,1.2	2,3*3F					
\$GNGSA,M,3,02,03	,05,06,07,08,09,10,1	3,16,23,32,1.4,0.8,1.2,	4*36				
\$GNGSA,M,3,37,38	39,41,60,,,,,1.4,0.8,	,1.2,4*30					
\$GNGST,031641.00),2.04,3.32,1.83,83.5	769,0.617,1.103,3.734	1*70				

Figure 3-4-4-2-1

3.4.4.3 File Manage

MATRIX II allows to download the static data via WEB UI which is very convenient to share the dat a in the field.

WEB UI

When the static data is stored, the data list will be shown in this page as Figure 3-4-4-1. Users can download the data by clicking it.

	Status	Work Mode 💛	GNSS Information $^{\!$	NetWork Setting 🗠	Data Communication	System Setting	
				File	File		
					TCP/IP		
Curren	t Path:/sdcard/20231206/				Ntrip Client		
	B.Former's				Ntrip Server	Time	(December)
	Name				Ntrip Caster	11111e	Operation
	••• Return to the previous level				NMEA Config		
	T18R3B116963066-2023120	6-142827.txt			System Log	Dec 6 14:28	Download Delete
Dele	le				WebSocket		

Figure 3-4-4-1

3.4.4.4 System Setting

MATRIX II provides some system settings, such as factory reset, restart, OEM reset, update and regi ster as shown in Figure 3-4-4-5-1. If there is system error, the factory reset may fix the problem. For registration, we provide two different ways, to register in WEB UI or in field software. You can c

hoose the most convenient way to register the code.

Status Work I	Mode \sim GNSS Information \sim	NetWork Setting $~\sim~$	Data Communication 👻	System Setting
		SystemSetting		
	Shutdown	Register	Time Zone	
		Cutom lagrada		
	Lineardo Elemento	Upgrade GEM		
	upgraue rinnware	Opgrade CEM		
		Power		
	Auto Boot Disable			
		Set		



Firmware upgrading can be completed on WEB UI as above figure shows. It takes some minutes to complete the procedure, and it will auto restart once it is done. As well as the OEM board upgrading, choose the 'Upgrade OEM' and it will take around 3minutes to complete. Once it is done, the receiv er will automatically restart.

3.4.5 Laser Survey

WIFI connection

1. Open the data collector WIFI to search for the device serial number, enter the password: 12345678, and click 'connect'. (Note: After the WIFI is connected to the data collector, a SIM card must be ins erted into the receiver or handheld device to provide the network).

2. A window pops up, prompting that 'this network has no Internet access'. Do you want to keep the connection? Click "Yes". As shown in the below picture:

÷	Wi-Fi	۹	T18	R3B	1169	9632	272							Use Wi-Fi	
	Use Wi-Fi	0	Pass	word										T18R3B116963272	3
•	ChinaNet-KbqD	⋳										-	r	Nomenen	
۲	ChinaNet-KbqD-5G	⋳	08	Show	pass	word								T18R3B116963272 This network has no Internet access.	
•	Gzboye	⋳						CAN	EL	CO	NNE	ст		Don't ask again for this network	1
•	HUAWEI-LP	٢										æ	Ľ.		
•	T18R3B116963272	⋳	1 :	2 3	4	. (5	6	7	8	9	0	Ľ.	NO YES	
•	TP-LINK_CB07	⋳	qv	N	1		t	у	u	i	0	р	•	alphageo	1
•	alphageo	₿	а	s	d	f	g	h	j	k		I		16tx888888	I
Ŷ	16tx16tx	⋳	ŵ	z	x	с	v	b	n	m		×	-	ChinaNet-KbqD-5G	1
0		0			T	,				-					

Laser and camera calibration

1. Turn on 'laser aiming correction'.

2. Fix the instrument in a position, find the laser point, adjust it with the up, down, left and right butt ons, adjust the camera's centerline to the laser position, and click Apply.

er unning v	Joneotion	
_		
		1

Measure points with laser

1. Enter into "Point Survey", find the settings menu and enable the floating icon(camera).

2. Turn on the camera and laser button, aim at the point to be measured, and click the measurement b utton. (Note: IMU must be available)



3.4.6 AR Stakeout

- 1. Open "Point Stakeout", click on the stakeout point, and find the AR icon
- 2. Find the required stakeout point based on the position provided by AR. As shown as below picture:

FIXED 20 20 ← 📕 To South 🔶 To West forwards:0.5544 Target azimuth:212°13'55.3124' 🚹 Fill to Right:0.9604 Slope(%):0.3068 0.2359m 0.0010m 0.9503m 📕 To South To West 1 Fill 0.0034m 0.9381m 0.5915m 8 0.9791m 1 S Ready 0 ↑ ្រោ ↑ \downarrow Name Pt4 X Code Input t1:0.9791m P Ant. H:1.8+0.093... > Target:Pt1

Chapter IV Warranty and Safety Notices

4.1 Warranty and Limited Liability

- a. The warranty period of our products is 12 months from purchase. If a defective is found due to qualified problems of the products, we perform two commitments: repair and replace.
- b. During the warranty period, if the instrument is damaged due to human factors, it will not be covered by the warranty.
- c. In the event that claims are made against the customer due to product liability, the supplier is obliged to indemnify the customer from such claims if and to the extent that the damage was caused by a defect in the contractual item delivered by the supplier. In cases of fault-based liability, however, this only applies if the supplier is at fault. If the cause of the damage is the responsibility of the supplier, the supplier bears the burden of proof.

4.2 Safety Notices

- a. Compliance is required with respect to voltage, frequency, and current requirements indicated on the manufacturer's label. Connection to a different power source than those specified may result in improper operation, damage to the equipment or pose a fire hazard if the limitations are not followed.
- b. Do not leave your device for charging more than one week. Doing so runs the risk of overchargin g the battery and shortening its total life span.

CE Marking

CE marking on this product represents the product is in compliance with all directives that are applicable to it.

RoHS Compliance Statement

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/ or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that th is product should be disposed of separately from regular household waste streams. It is your responsi bility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent p otential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal servic e, or the shop where you purchased the product.

4.3 Recycling

1. Do not place the product as household waste.

- 2. According to local regulations for proper disposal of discarded electronic products.
- 3. We actively encourage you to participate in electronics recycling program.