SingularXYZ SingularXYZ-E1 Lite-1+1

SingularXYZ E1 Lite GNSS RTK Surveying Equipment User Manual

Model: SingularXYZ-E1 Lite-1+1 | Brand: SingularXYZ

1. Introduction

This user manual provides comprehensive instructions for the setup, operation, and maintenance of your SingularXYZ E1 Lite GNSS RTK Surveying Equipment. Designed for high-precision satellite positioning, this system offers centimeter-level accuracy for various surveying applications. Please read this manual thoroughly before using the equipment to ensure optimal performance and safety.

2. What's Included

Upon opening the transport case, verify that all components are present:

- E1 Lite GNSS Receiver (x2)
- Transport Case (x2)
- USB-Type C Cable (x2)
- Super Charger (x2)
- SingularPad Software (x1)
- SC200 Data Collector (x1)
- USB cable (x1)
- Super Charger (x1)
- Bracket (x1)
- Quick Start Guide (x1)
- Quick Start Card (x1)
- Whip Antenna (x2)
- Tape Measure (x1)
- 20 cm extension rod plugged on tribrach (x1)

Figure 2.1: E1 Lite GNSS RTK Surveying Equipment components.

Figure 2.2: Product packaging and contents.

Special Note: Poles, tripods, and tribrachs are not included with this product and must be acquired separately if needed for your surveying tasks.

3. Setup and Initial Connection

3.1 Charging the Devices

The E1 Lite RTK handheld GPS provides over 20 hours of continuous operation on a single charge. Use the provided Type-C chargers to fully charge both the E1 Lite GNSS Receivers and the SC200 Data Collector before initial use. Fast charging is supported.

3.2 Device Overview and Interfaces

Familiarize yourself with the device's front panel indicators and various connection interfaces:

Figure 3.1: Front Panel and Interfaces of the E1 Lite GNSS Receiver.

Front Panel: Satellite Tracking Indicator, Static & Network Indicator, Power Indicator, Function Button.

Interfaces: NFC (Touch connection), Bluetooth, USB Type-C (for charging and data download), WiFi, TNC Connector (for UHF Antenna), RS232 Serial Port.

3.3 Connecting Devices via SingularPad Software

The SingularPad software is essential for controlling and configuring your E1 Lite GNSS RTK equipment. Follow these steps to connect your devices:

Your browser does not support the video tag.

Video 3.1: Singular Software Tutorial - Device Connection. This video demonstrates how to connect your GNSS device to the SingularPad software via Bluetooth, including steps for SingularXYZ RTK Receivers, other brand NMEA devices, and SingularXYZ GNSS Tablets.

General Connection Steps:

1. Turn on your GNSS device.
2. On the SC200 Data Collector, open the SingularPad software.
3. Navigate to **Device >> Communication** to connect your device.
4. For SingularXYZ RTK Receivers (e.g., Y1 GNSS receiver): Select**SingularXYZ >> RTK >> Bluetooth**. Search for your device's Serial Number (SN) and connect.
5. For GNSS NMEA Devices (other brands): Select**Other >> RTK(NMEA0183) >> Bluetooth**. Search and connect the device.
6. For SingularXYZ GNSS Tablets (e.g., T8 Pro GNSS tablet): Select**Other >> Internal GPS >> Internal GPS** and connect the device.
7. After successful connection, you can go to **Device >> Device Information** to view current device information.

Display	No screen	1.1" HD color screen	No screen	No screen
IMU Initialization Time	5 sec	5 sec	40 sec	5 sec
IMU Accuracy	Centimeter-Level	Centimeter-Level	Centimeter-Level	Centimeter-Level
Satellite Tracking	GPS: L1C/A, L1C, L2C, L2P(Y), L5 BDS: B1I, B1C, B2a, B2I, B3I GLONASS: G1, G2, G3 Galileo: E1, E5a, E5b, E6 QZSS: L1C/A, L1C, L2C, L5 NavIC: L5 SBAS: WAAS, EGNOS, SDCM, BDSBAS, GAGAN	Same as E1	Same as E1	GPS: L1C/A, L1C, L2C, L2P(Y), L5 BDS: B1I, B2I, B3I, B1C, B2a, B2b GLONASS: G1, G2, G3 Galileo: E1, E5a, E5b, E6 QZSS: L1C/A, L1C, L2C, L5 NavIC: L5 SBAS: WAAS, EGNOS, SDCM, BDSBAS, GAGAN
Radio	LoRa (RX compatible) or Normal	Same as E1	Same as E1	No radio
Drone Base Station	Yes	Yes	Not supported	Not supported
Working Modes	Base, Rover, PPK, Static	Same as E1	Base, Rover, Static	Rover (NTRIP) only
Storage	8 GB	8 GB	8 GB	No internal storage
Web UI	Full access	Full access	Limited (firmware upgrade, static data download only)	Not supported
Battery Life	Up to 20 hours	Up to 20 hours	Up to 20 hours	Up to 16 hours
GNSS Antenna	Geodetic antenna	Geodetic antenna	Geodetic antenna	Helix antenna
Price Level	Mid-range	High-end	Budget model	Entry-level

Figure 3.2: Setting up Rover and Base units in SingularPad.

Setting up Rover and Base (for Base + Rover mode):

1. Ensure you have two E1 Lite GNSS receivers. Designate one as the base and the other as the rover.
2. Connect both to your PDA device via Bluetooth.
3. Place both your E1 Lite base and rover in an open view of the sky.
4. Connect the whip antenna to both E1 Lite base and rover.
5. **Setting up the Base:** Connect E1 Lite base to your PDA, go to **Device >> Base**. For **Base Startup Mode**, you can input known point coordinates or select **Single Point** mode for automatic setup. Set **Datalink** as Internal Radio, and customize radio channels, frequency, and protocol. Save settings and Start Base.
6. **Setting up the Rover:** Disconnect E1 Lite base and connect to the rover in the software. Go to **Device >> Rover**, set **Data Link** as Internal Radio. Match and set the same protocol and frequency as the base setting. Click **Collection** to save settings and click **Apply**.

4. Operating Instructions

4.1 Working Modes

The E1 Lite GNSS RTK system supports two primary working modes:

- **Base + Rover Mode:** Provides millimeter-level positioning. Compatible with base stations of other brands. Not subject to network and regional restrictions.
- **Rover + CORS Mode:** Provides centimeter-level positioning. Requires a network signal. CORS account is not included and must be purchased from your local CORS provider.

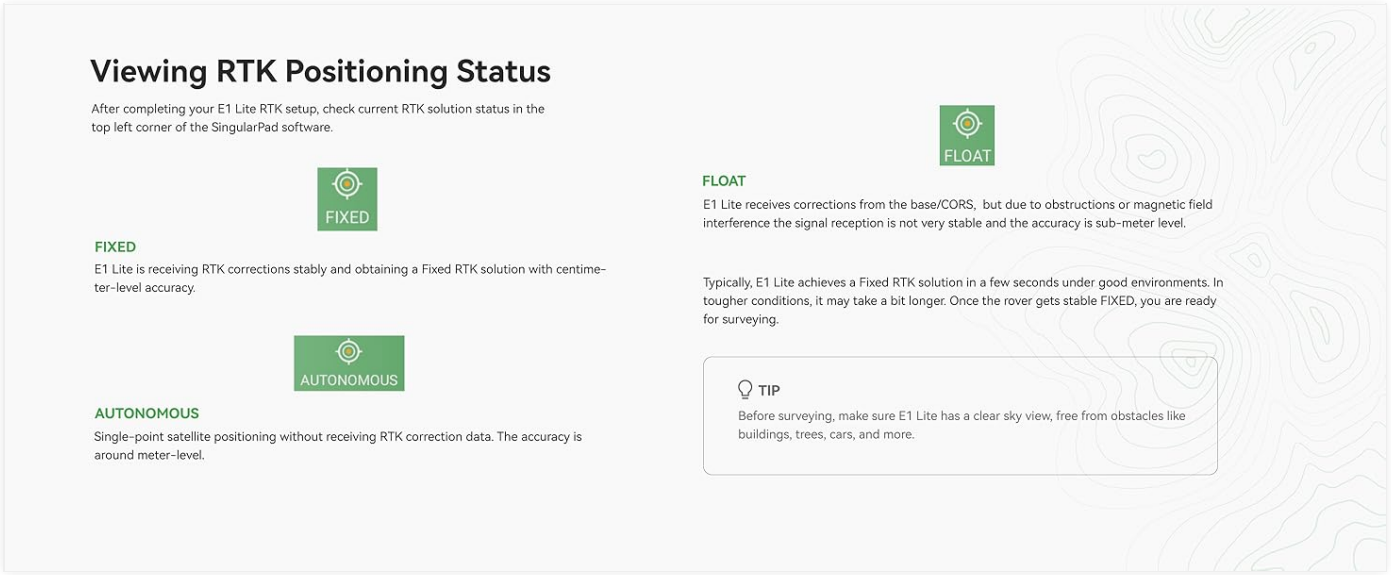


Figure 4.1: E1 Lite Working Modes.

4.2 Working with CORS/RTK Correction Service

To utilize the CORS/RTK correction service, ensure you have purchased a CORS/RTK Correction Service account in your local area. Your PDA device (phone/tablet/data collector) must have network access and support Bluetooth connection. Place your E1 Lite GNSS receiver in an open view of the sky.

1. Open SingularPad software.
2. Click **"Communication"** and connect to your E1 Lite receiver's SN via Bluetooth.
3. Click **Get** to obtain Mount-Point list and select appropriate one. Click **Start** and **Apply**.
4. Click **"Rover"**. Set **Data Link** as Phone Internet. Then go to **Connect Mode** and fill in your CORS/RTK Correction Service account details.

Figure 4.2: Connecting to CORS/RTK Correction Service.

4.3 Viewing RTK Positioning Status

After completing your E1 Lite RTK setup, check the current RTK solution status in the upper left corner of the SingularPad software:

- **FIXED:** E1 Lite is receiving corrections stably and obtaining a Fixed RTK solution with centimeter-level accuracy. Typically, E1 Lite achieves a Fixed RTK solution in a few seconds under good environments.

- **FLOAT:** E1 Lite receives corrections from the base/CORS, but due to obstructions or magnetic field interference, the signal reception is not very stable and the accuracy is sub-meter level. In tougher conditions, it may take a bit longer to achieve FIXED status.
- **AUTONOMOUS:** Single-point satellite positioning without receiving RTK correction data. The accuracy is around meter-level.

Figure 4.3: RTK Positioning Status Indicators.

Tip: Before surveying, make sure E1 Lite has a clear sky, free from obstacles like buildings, trees, cars, and more.

4.4 Advanced Features

- **60° Tilt Surveying:** The E1 Lite GNSS Surveying System with IMU initializes in 5 seconds and supports tilt measurements up to 60°, compatible with regular 5/8" thread poles. This allows for surveying in challenging locations without needing perfect vertical alignment.
- **5 Kilometers UHF Range:** The radio range between the rover and the base can reach 5 kilometers (3.1 miles). The E1 Lite is compatible with base stations of other brands in both Radio and CORS mode and supports RTCM v3/CMR correction data transmission.
- **Robust Signal Tracking:** Supports Full-Constellation Tracking (GPS/GLONASS/Galileo/BDS/QZSS/IRNSS/SBAS etc.), allowing for fixed RTK solutions in seconds even in challenging environments like multipath, trees, and city canyons.
- **Easy Data Download via Web UI:** Access E1's WiFi to conduct static data download, firmware upgrade, and configuration via its web page.

Figure 4.4: Advanced IMU Tilt Measurement in action.

Figure 4.5: Superior Performance in Challenging Environments.

Working with CORS/RTK Correction Service

NOTE Please confirm the following conditions before configuration.

- Purchase a CORS/RTK Correction Service account in your local area.
- Make sure your PDA device (phone/tablet/data collector) can access net work and support Bluetooth connection.
- Place your E1 Lite GNSS receiver in an open view of the sky.

Step 1: Open **SingularPad** software.

Step 2: Click **"Communication"** and connect to your E1 Lite receiver's SN via Bluetooth.

Step 3: Click **"Rover"**. Set **Data Link** as **Phone Internet**, then go to **Connect Mode** and fill in your CORS/RTK Correction Service account.

Step 2: Click **Get** to obtain **Mount-Point** list and select appropriate one. Click **Start** and **Apply.**

NOTE

Find the appropriate mount point via the website of your local CORS/RTK Correction Service provider. Ensure the baseline is within 50km.

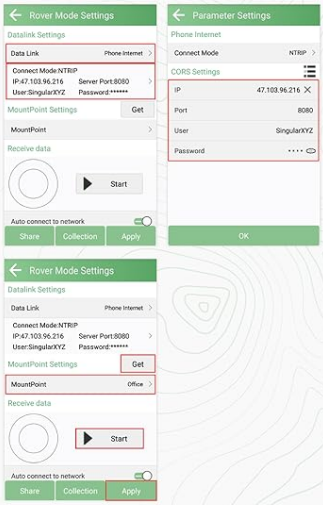


Figure 4.6: Easy Data Download via Web UI.

5. Maintenance

The E1 Lite GNSS RTK equipment is designed for durability and reliability in harsh environments. It features an**IP68 rating**, making it waterproof, dustproof, and shock-resistant.

- Regularly clean the device with a soft, damp cloth. Avoid abrasive cleaners.
- Ensure all ports (Type-C, TNC) are free from debris and properly sealed when not in use.
- Store the equipment in its transport case when not in use to protect it from physical damage and environmental factors.
- Periodically check cables and connectors for wear and tear. Replace if damaged.

Figure 5.1: E1 Lite's Rugged Design and Battery Life.

6. Troubleshooting

If you encounter issues with your E1 Lite GNSS RTK Surveying Equipment, consider the following common points:

- **Connection Issues:** Ensure Bluetooth is enabled on both the data collector and the receiver. Verify that the correct device type and manufacturer are selected in the SingularPad software. Try restarting both devices.
- **Poor Accuracy/No Fixed Solution:**
    - Ensure the receiver has a clear view of the sky, free from obstructions like buildings, dense trees, or large metal objects.
    - Check the status indicator on the device and in the SingularPad software (refer to Section 4.3).
    - Verify that the base station (if in Base+Rover mode) or CORS service (if in Rover+CORS mode) is active and providing corrections.
    - Confirm that the radio frequency and protocol settings match between the base and rover units.
- **Battery Life:** Ensure devices are fully charged before use. Check the battery indicator in the SingularPad software.
- **Software Issues:** Ensure your SingularPad software is up to date. Refer to the software's help section or online tutorials for specific software-related problems.

For persistent issues or problems not covered here, please contact SingularXYZ customer support for assistance. Refer to the "Support" section for contact details.

7. Specifications

Feature	Specification
Item Weight	1.91 pounds
Product Dimensions	2.64 x 5.26 x 5.26 inches
Item Model Number	SingularXYZ-E1 Lite-1+1
Batteries	3 Lithium Ion batteries required (included)
Battery Life	20 Hours
Display Size (SC200 Data Collector)	5.5 inches (SC200) / 1 inch (E1 Lite receiver display)
Tilt Survey Accuracy	±2.5cm at 60° tilt
Channels	1408 Channels
UHF Radio Range	Up to 5 kilometers (3.1 miles)
Constellation Tracking	GPS/GLONASS/Galileo/BDS/QZSS/IRNSS/SBAS etc.
Connectivity	NFC, Bluetooth, USB Type-C, WiFi, TNC Connector, RS232 Serial Port
Ingress Protection (IP) Rating	IP68 (Waterproof, Dustproof, Shock-resistant)
Country of Origin	China

E1 Lite RTK

Professional Accuracy, Budget-Friendly

Centimeter-Level Precision

±2cm accuracy, even in urban canyons & forests

IMU Tilt Measurement

60° tilt, ±2.5cm accuracy, no leveling needed

Full GNSS Support

GPS, GLONASS, Galileo, BeiDou, QZSS, SBAS

Lightweight & Compact

Just 870g, Φ133.5mm × 67mm

Rugged & Reliable

IP68 waterproof, dustproof & shock-resistant

20+ Hours Battery

3-hour fast charging

Figure 7.1: E1 Lite RTK Key Specifications.

Figure 7.2: Lightweight and Portable Design.

8. Warranty

The SingularXYZ E1 Lite GNSS RTK Surveying Equipment comes with a**one-year warranty** from the date of purchase. This warranty covers manufacturing defects and ensures the product meets its specified performance standards. Please retain your proof of purchase for warranty claims.

9. Support and Resources

SingularXYZ is committed to providing excellent customer support. For any inquiries, technical assistance, or service requests, please utilize the following resources:

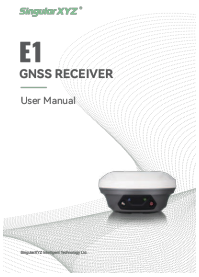
- **1-On-1 Support Service:** Direct technical support is available to assist you with any operational or technical challenges.
- **User Manual (PDF):** A comprehensive PDF version of the user manual is available for download.Download PDF

User Manual

- **Video Tutorials:** Access a library of video tutorials to help you get started and master various functions of your equipment.
- **Software Upgrades:** Enjoy permanent free software upgrades and update services for the SingularPad and Post-processing Software.
- **FCC Radio License Note:** U.S. users must apply for an FCC radio license for commercial use (e.g., surveying, construction) with the UHF function (450–470 MHz). The device is FCC certified, and supporting information can be provided if needed.

For direct contact, please visit the official SingularXYZ website or refer to the contact information provided with your product documentation.

Related Documents - SingularXYZ-E1 Lite-1+1

	SingularXYZ L1 Laser GNSS Receiver Quick Start Guide Comprehensive quick start guide for the SingularXYZ L1 Laser GNSS Receiver, detailing package contents, product features, software integration, RTK and static surveying methods, and warranty information for surveyors.
	SingularXYZ E1 GNSS Receiver User Manual Comprehensive user manual for the SingularXYZ E1 GNSS Receiver, detailing setup, RTK and static survey workflows, data collection, calibration, and export features for professional surveying applications.
	SingularXYZ E1-Series GNSS Receiver: Quick Start Guide A concise guide to setting up and using the SingularXYZ E1-Series GNSS Receiver, covering package contents, product features, workflow, and warranty information for high-precision surveying tasks.

	[SingularPad Surveying Software User Guide] A comprehensive user guide for SingularPad, a professional Android-based surveying software developed by SingularXYZ Intelligent Technology Ltd. This guide covers installation, user interface, RTK workflow, total station operations, and frequently asked functions.
	[JAVAD JDC Data Collector User Manual] Comprehensive user manual for the JAVAD JDC Data Collector, detailing installation, registration, GNSS setup (Base, Rover, Static), and survey functionalities like Store, Stake, and COGO.
	[ORION ONE GNSS Receiver User Manual] User manual for the SingularXYZ ORION ONE GNSS Receiver, detailing its features, setup, RTK workflow, surveying, and stakeout procedures using SingularPad software.