# JDC

## User Manual


Version 1.06

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# Table of Contents

# 1. Download & Installation

Please go to the internet and download the JAVAD Data Collector (JDC) apk directly to the Android device. Click on the .apk within the Android OS to initiate the installation. Continue through any pop-ups for installation.

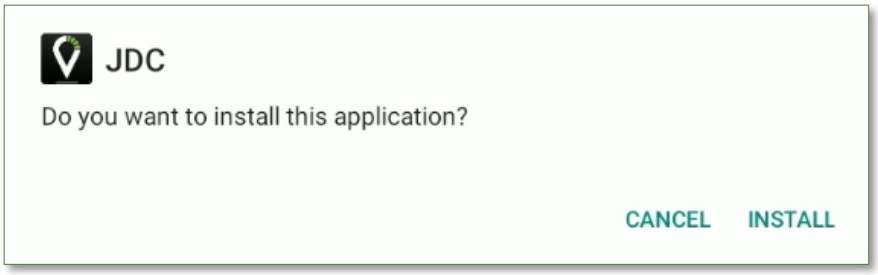


Figure 1: Click "INSTALL" for Installation to Proceed

JDC will proceed with the installation process.


Figure 2: JDC Installing on Android

Once JDC is installed, click on “Open” to open the application or “Done” to end the installation process. Please note that JDC is currently an English only application and requires the Android to be in English. This is done via Settings – Language in the Android operating system.


Figure 3: JDC Successfully Installed

The JDC app will show with the following app icon on the Android and can be launched by clicking on it.

Figure 4: JDC App Icon

# 2. Registration

When first launching JDC, the application will operate in Demo Mode. Demo Mode allows for full functionality of all settings, configurations, and routines and allows for collecting data for 100 points. To unlock JDC for storing more than 100 points, a registration code must be entered. Please contact your local Sales representative to get the process initiated. This is the first screen JDC presents, to allow for entering a valid registration code. Click on “Go to Register JDC” to enter in the Registration code, click “Cancel” to operate in Demo Mode.

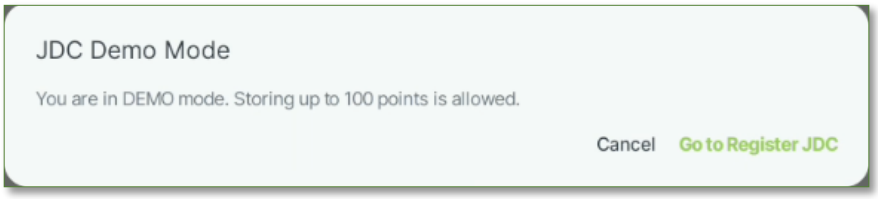


Figure 5: JDC Registration

## 2.1. Online Registration

If the Android device is online, select ‘Online’ in the Registration Type drop-down and enter a valid registration code. Click “Register” to complete the registration process.

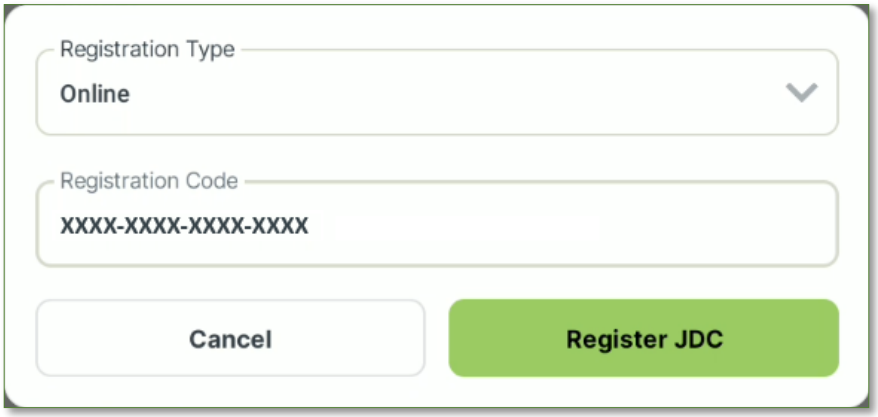


Figure 6: Enter a Valid Registration

Once a valid registration code has been entered a pop-up on the lower portion of the screen will say “Registered Successfully” and the registration process is complete.


Figure 7: Registration Process Complete

## 2.2. Offline Registration

If the Android device is offline, select “Offline”. The Registration Key and the Device ID is provided to JAVAD Support for validation. JAVAD Support will then email a Certificate to be transferred to the Android device.

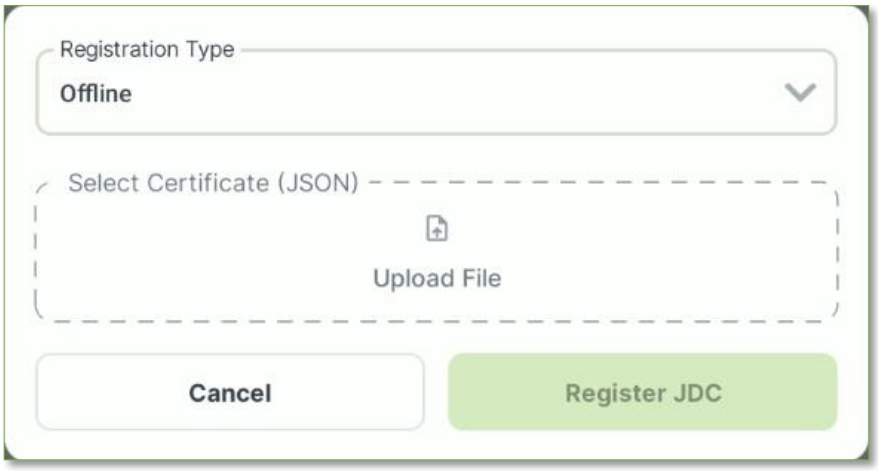


Figure 8: JSON Certificate (From Support) Registration

Once a valid certificate has been entered, click ‘Register JDC’ to complete the process. A pop-up on the lower portion of the screen will say “Registered Successfully” and the registration process is complete.


Figure 9: Registration Process Complete

# 3. JDC Structure

JDC has been designed with simplicity. It has been optimized for an 8” tablet (default settings) to show in a profile view a clear and intuitive layout. There are two main screen types: Configuration and Survey (map screen). The Status bar on top of the screen shows information from any connected JAVAD Smart Antenna with an Information bar below it. The Information bar informs the user of the current screen and any connected JAVAD Smart Antenna. On the bottom are applicable menu items. The “Projects” screen is used as an example (see figure below).

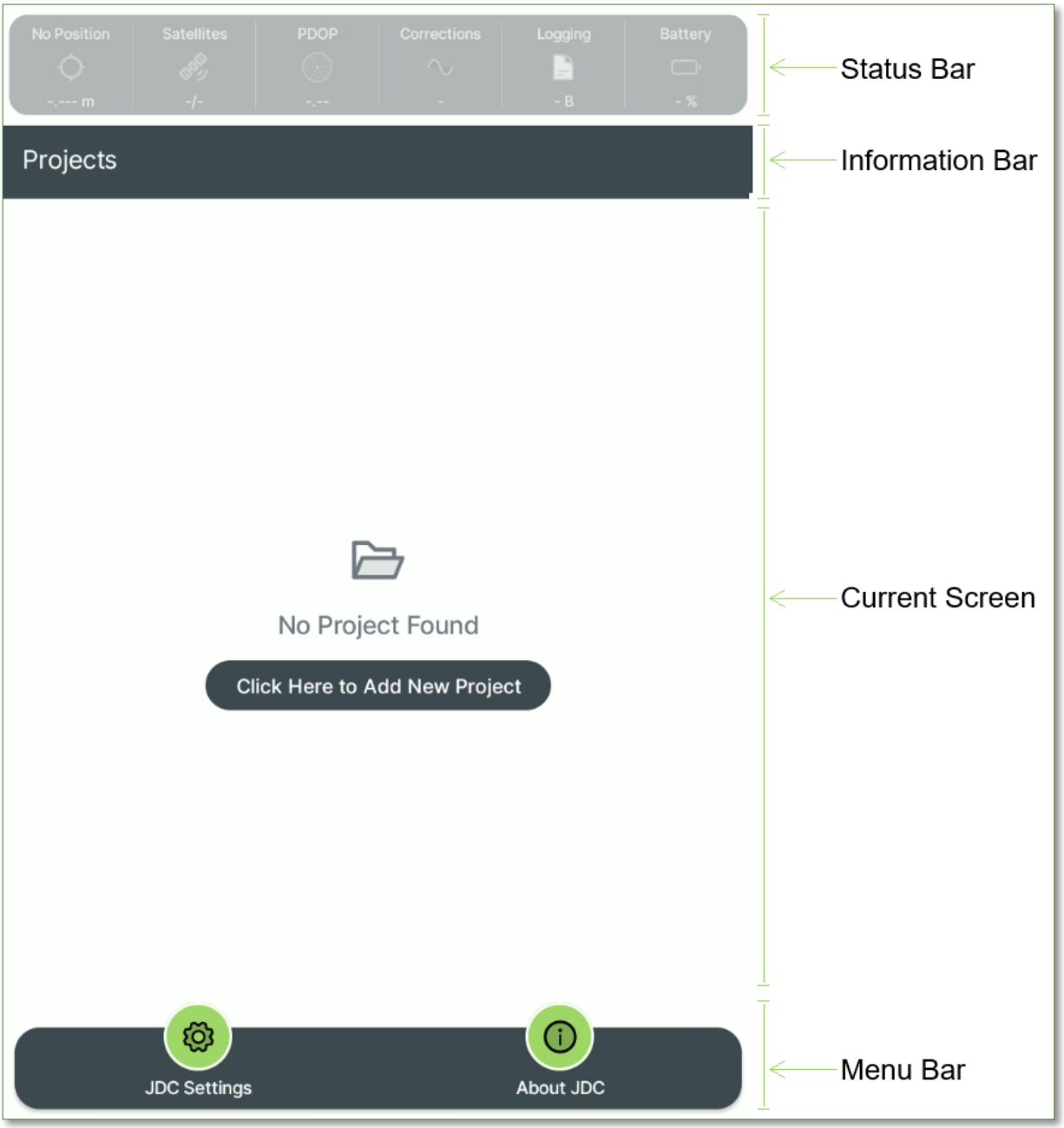


Figure 10: JDC Structure

# 4. JDC Settings

JDC Settings are global options available throughout the application and are accessible by clicking on “JDC Settings” on the bottom menu.


Figure 11: JDC Settings

Options available within App settings are:

- Theme
- Raw Data Logging

## 4.1. Theme

Theme options allow for the application to operate in Light Mode, Dark Mode, or System Default Mode.

## 4.2. Raw Data Logging

Raw Data Logging allows for logging a support file (if applicable).

# 5. About Program

About JDC allows for displaying the app version, device ID, registration status and code.


Figure 12: About JDC

# 6. Projects

The Projects screen is JDC's landing page.  Here, an existing project may be selected, or a new one may be created.

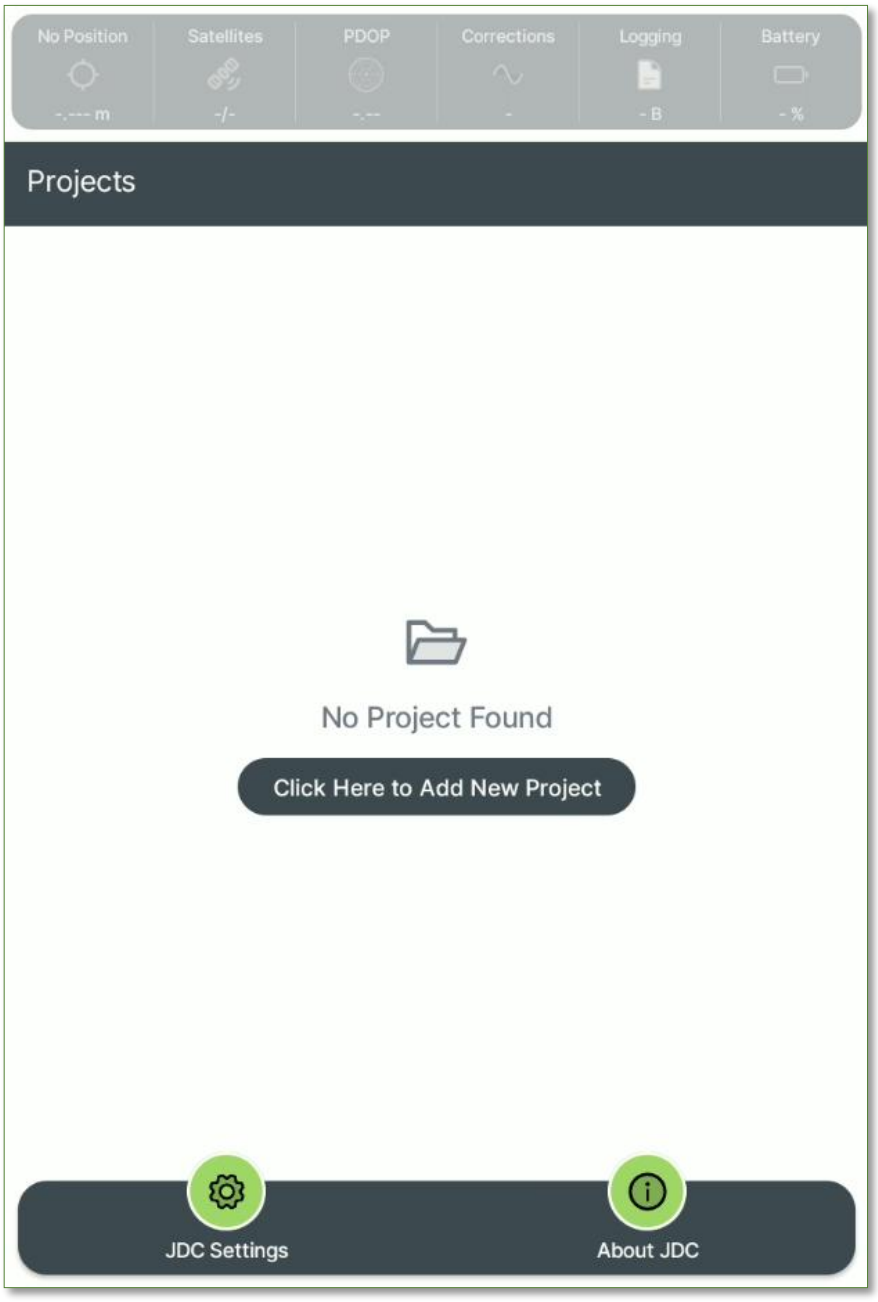


Figure 13: Projects Screen

## 6.1. New Project

A new project may be created by initially selecting “Click here to Add a New Project” or by the  button shown. In the New Project screen, the user may enter values for:

- Project Name
- Surveyor
- Organization
- Comments
- Coordinate System
- Measurement System
- Display Unit
- Pictures

Each item is further described below.

### 6.1.1. Project Name

The Project Name field (required) allows for the Project Name to be entered.

### 6.1.2. Surveyor

The Surveyor field (optional) allows for the Surveyor’s name to be entered.

### 6.1.3. Organization

The Organization field (optional) allows for the Organization name to be entered.

### 6.1.4. Comments

The Comments field (optional) allows for entering in any pertinent comments to be entered.

### 6.1.5. Coordinate System

The Coordinate System field (required) allows the user to select the preferred coordinate system for the job. The search bar can be used to find the coordinate system for use. The search results are scrollable. Click on that coordinate system to select it for the project.

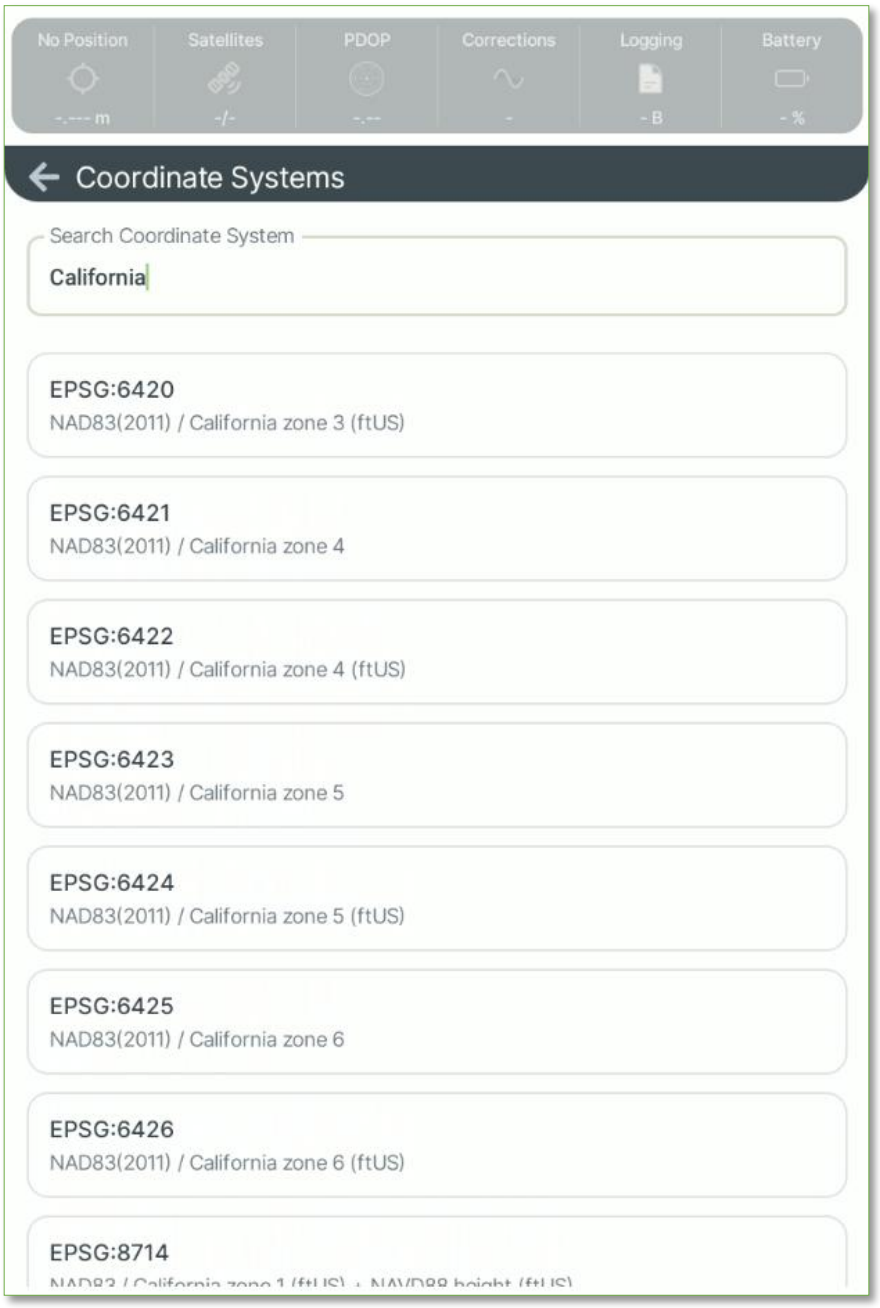


Figure 14: Coordinate System Selection

### 6.1.6. Geoids

The Geoid field allows the user to select the preferred vertical system for the job. The search bar can be used to find the Geoid for use. The search results are scrollable. Click on the Geoid to select it for the project.

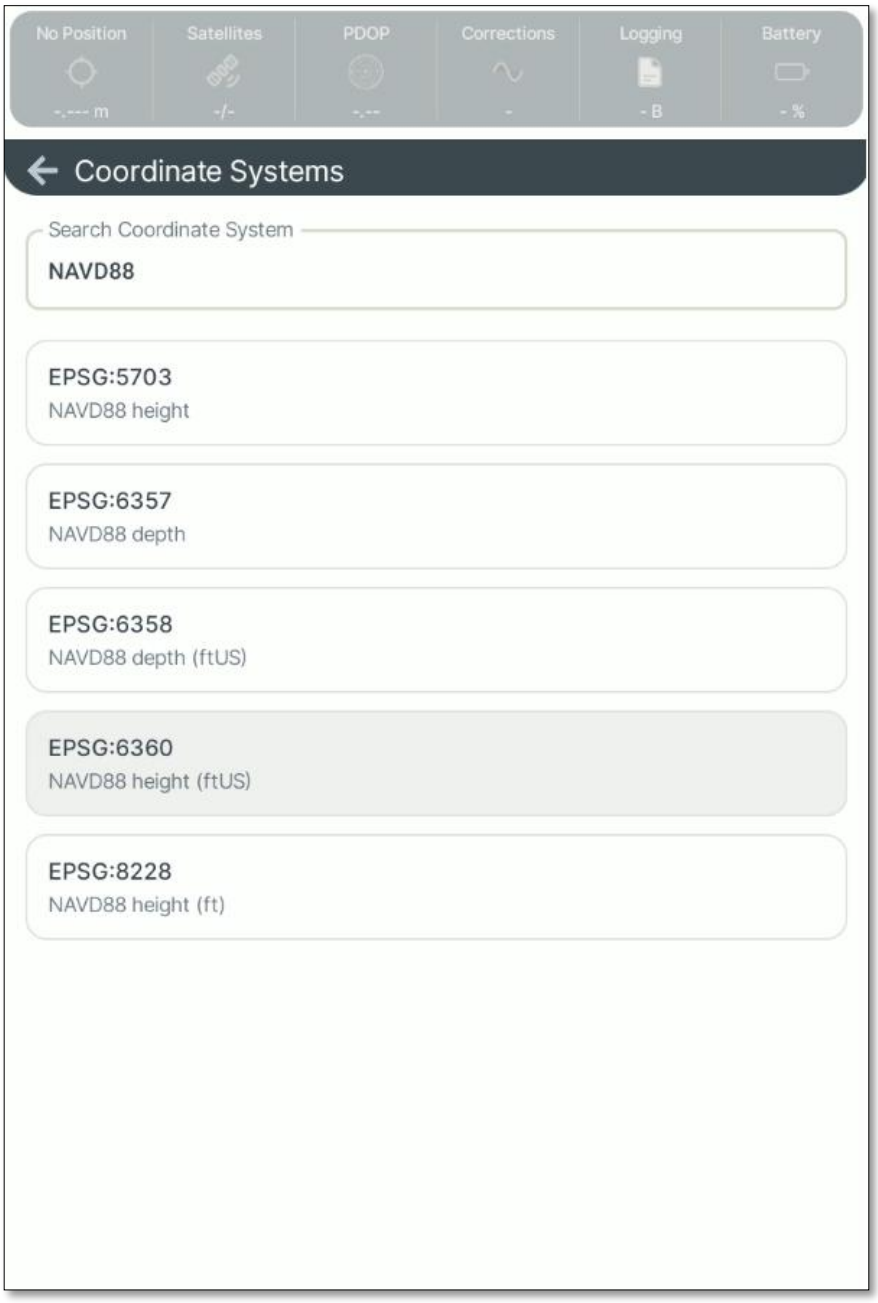


Figure 15: Geoid Selection

### 6.1.7. Measurement System

The Measurement System for the project can be selected, Meters or International Feet.

### 6.1.8. Display Units

The Display Units field allows units to be selected from the following list:

- Imperial
  - Decimal International Feet
  - Inches
  - Statute Miles
  - Nautical Miles
  - Yards
  - Chains
  - Links
- Metric
  - Decimal Meters
  - Kilometers
  - Decimeters
  - Centimeters
  - Millimeters

*Please note that US Survey has been discontinued and therefore it is not available for selection.*

### 6.1.9. Pictures

The Pictures field can utilize the Android's built-in camera or the gallery to add any pictures relating to the project.

### 6.1.10. Project Creation

The Project Name, Coordinate System, Measurement System and Display Unit selections are required, others may be left blank if preferred. Click "Create Project" when all values have been entered to complete creating a new project.


Figure 16: Create Project

Upon Project creation, the user will see a pop-up to verify the selected coordinate system. Once a coordinate system is created within a project, it cannot be changed.

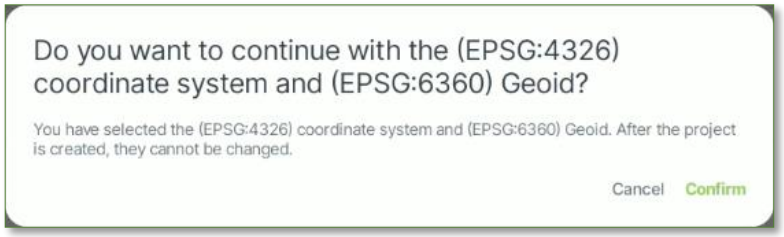


Figure 17: Coordinate System Verification

Click on "Confirm" to continue. If the need for a transformation grid download (for the selected Coordinate System and Geoid), a "Download Required" pop-up will show. With a new project created, the user will be asked to either "Continue with This Project" or "Back to Project List", select a preferred option.

## 6.2. Existing Project

Selecting an Existing Project will open the Project Detail screen. This screen allows for manipulation of Images, Files, Points and Notes. Each is further described below.

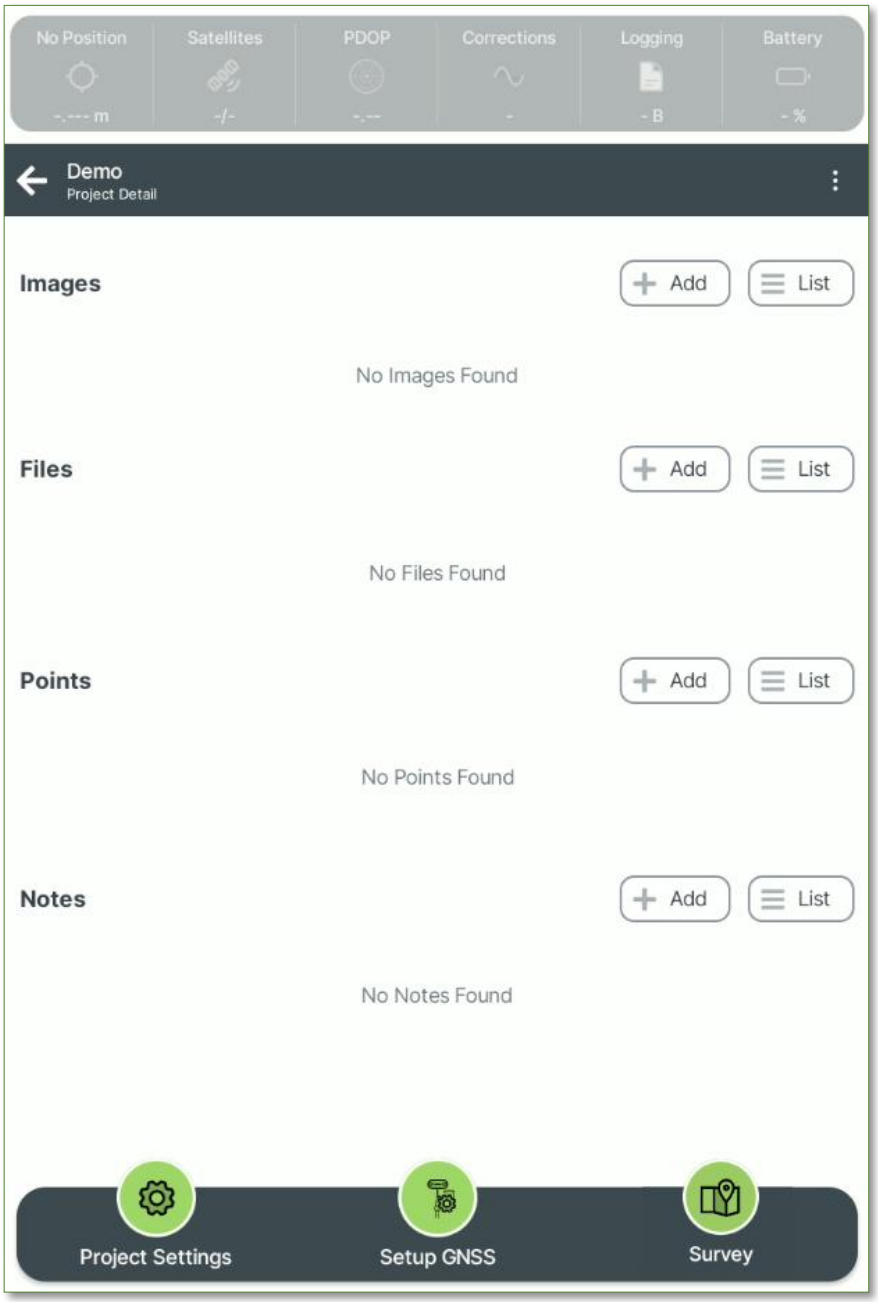


Figure 18: Project Detail

| Project Detail Item | Description |
|---|---|
| Images | Any pictures to be taken from the Android Data Collector camera or gallery to be included within the project. Any added images can be deleted from the List menu. |
| Files | Any files can be imported or exported from a given project. Any added files can be deleted from the List menu. |
| Points | The current point list within the project can be edited / imported / exported from the Project Details screen. Any added points can be deleted from the List menu. |
| Notes | Note within the project can be edited / imported / exported from the Project Details screen. Any added notes can be deleted from the List menu. |
| Edit Project | The three vertical dots, located in the Information Bar,  will allow the current selected project to be edited. |
| Delete Project | The three vertical dots, located in the Information Bar,  will allow the current selected project to be deleted. |

# 7. Project Settings

The Project Settings menu can be accessed by clicking on the Project Settings icon located on the menu bar at the bottom of the screen.

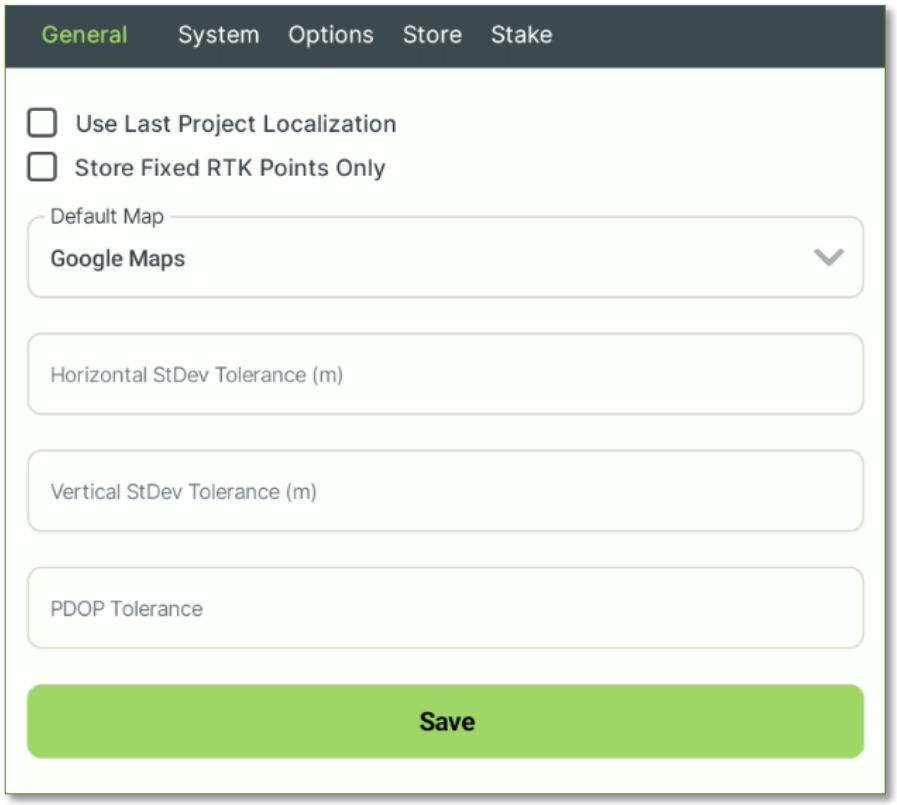


Figure 19: Project Settings

Project Settings are broken into headings, namely:

- General (landing page)
- System
- Options
- Store
- Stake

Each of these is further described below.

## 7.1. General

This tab has general settings for the selected project.

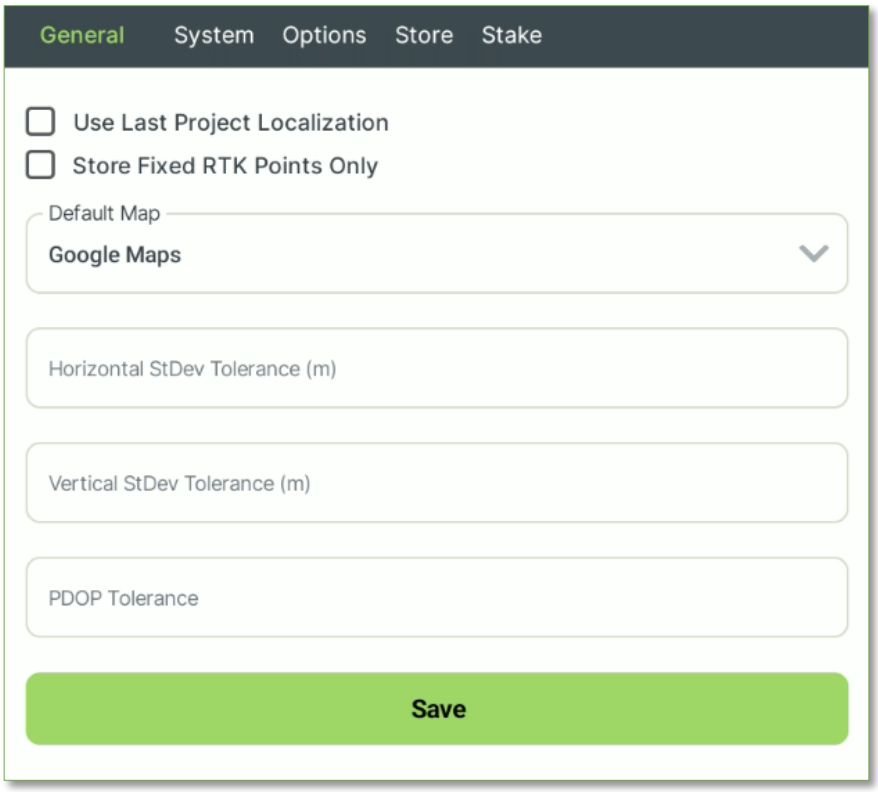


Figure 20: Project Settings: General

| Project Settings: General Item | Description |
|---|---|
| User Last Project Localization | This option will use the localization used in the most recently opened project. |
| Store Fixed RTK Points Only | This option will require Fixed RTK receiver mode status for any points to be recorded. |
| Default Map | This option is to use either Google Maps or Open Street Maps as the map background. |
| Horizontal Standard Deviation Tolerance | Horizonal standard deviation Tolerance sets a maximum value for HRMS for a point to be stored or edited. |
| Vertical Standard Deviation Tolerance | Vertical standard deviation tolerance sets a maximum value for VRSM for a point to be stored or edited. |
| PDOP Tolerance | PDOP tolerance sets a maximum value for PDOP for a point to be stored. |

## 7.2. System

This tab has system settings for the selected project.

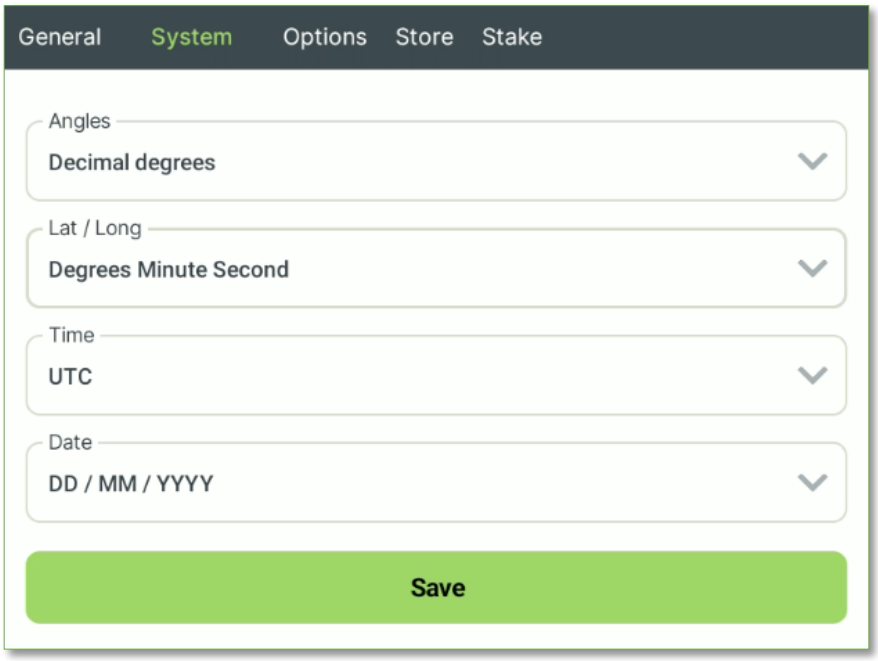


Figure 21: Project Settings – System

| Project Settings: System Item | Description |
|---|---|
| Angles | This allows for decimal degrees or DMS. |
| Lat / Log | This allows for decimal degrees or DMS. |
| Time | For time, the user has the choice of UTC or local time. |
| Date | Several formats for Date can be selected for ease of use. |

## 7.3. Options

This tab allows for options to be selected.

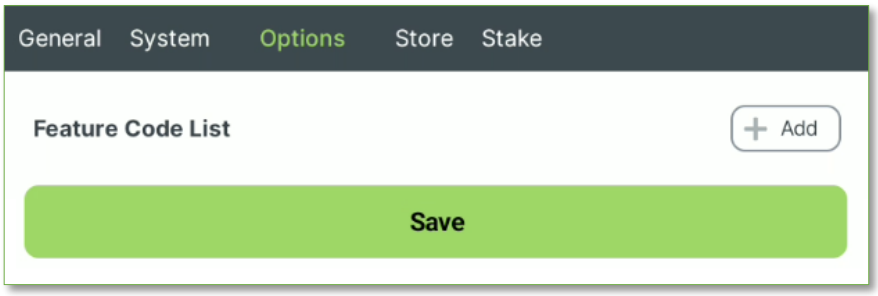


Figure 22: Project Settings – Options

| Project Settings: Options Item | Description |
|---|---|
| Feature Code List | This is a list of shortcuts for the user to use when adding a description to a stored point. |

## 7.4. Store

This tab shows options when storing a point.

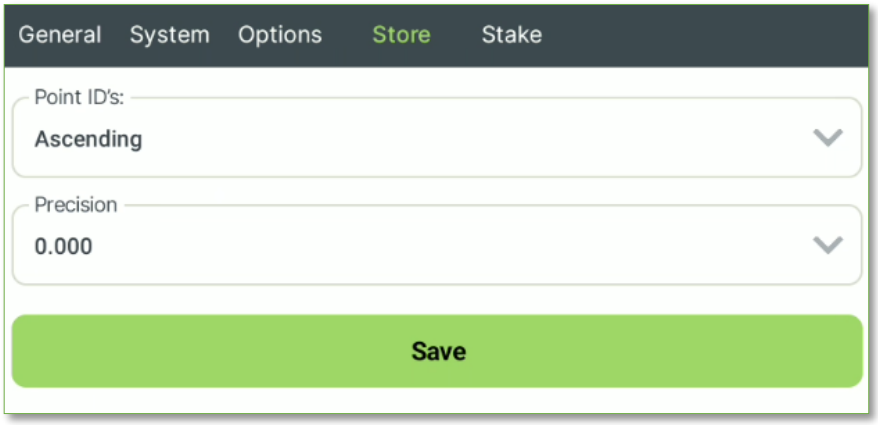


Figure 23: Project Settings – Store

| Project Settings: Store Item | Description |
|---|---|
| Point ID's | Point ID's can be incremented ascending (+1) or descending (-1). |
| Precision | Precision can be selected for ease of use while storing points. |

## 7.5. Stake

This tab shows options when using any staking routine (stake point / line / line offset / arc / arc offset).

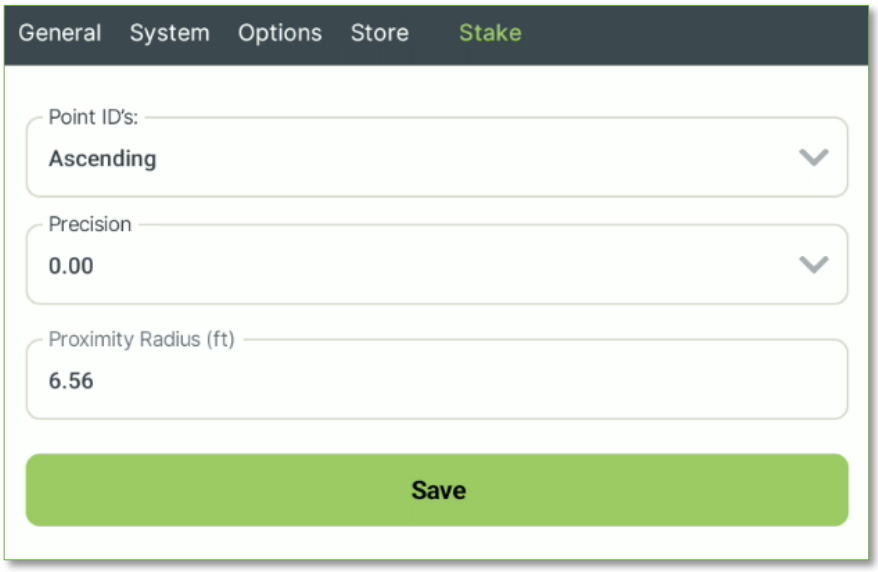


Figure 24: Project Settings – Stake

| Project Settings: Stake Item | Description |
|---|---|
| Point ID's | Point ID's can be incremented ascending (+1) or descending (-1). |
| Precision | Precision can be selected for ease of use while storing points. |
| Proximity Radius | Proximity Radius represents the proximity to a point where the Proximity screen will show for the user. It is a bullseye screen that allows for easier movement to the stake point. This also is the value at which JDC will recognize the point on a line is reached. If the proximity radius is 2 feet, and the user is staking to a point on a line beyond 2 feet, the point is not reached yet. If the user is within 2 feet, JDC will consider that point reached and allow for the user to then stake along that line. |

# 8. Setup GNSS

Selecting Setup GNSS from the Menu Bar will open the Connection / Setup screen defaulting in the Connection tab.

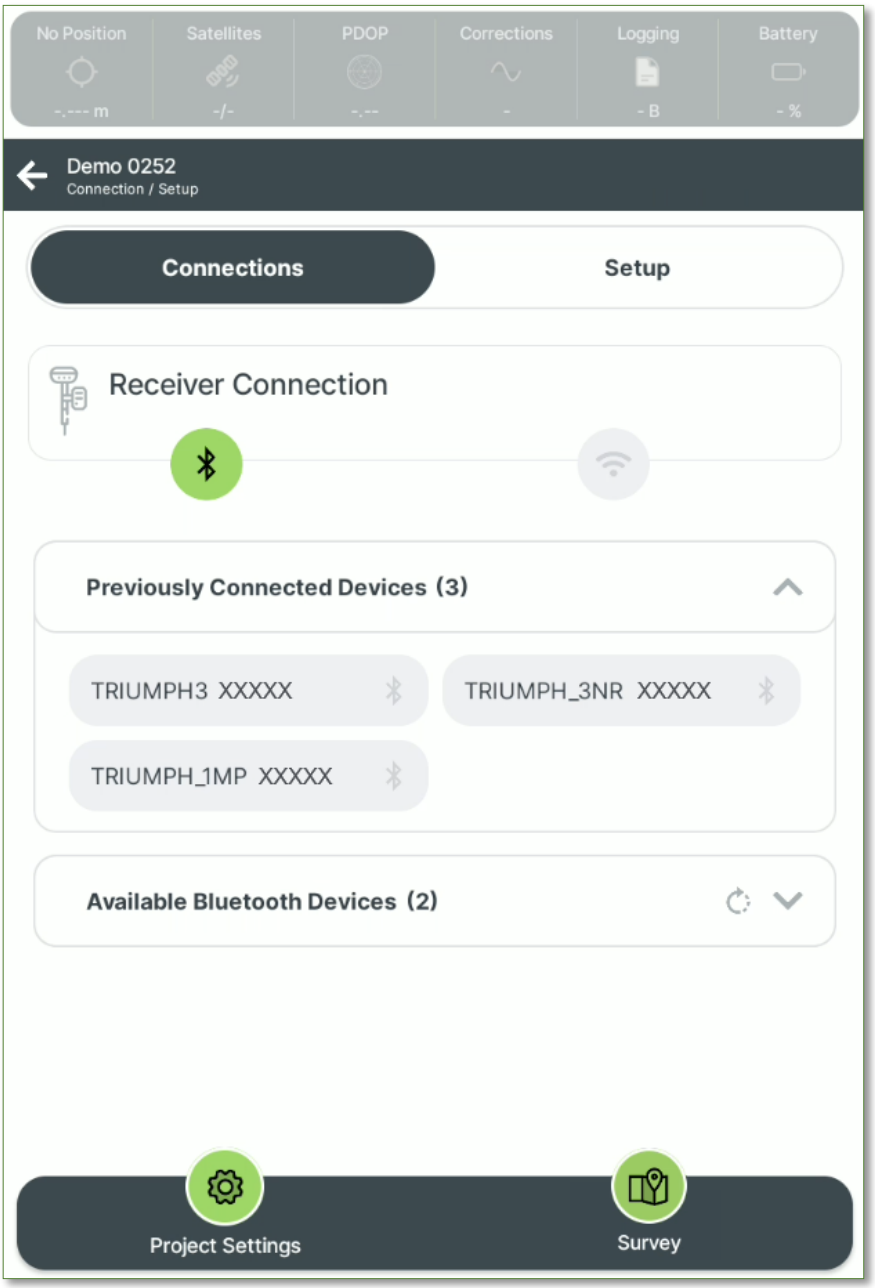


Figure 25: Connection / Setup Screen

## 8.1. Connections

The Connection tab allows JAVAD Smart Antenna connection via Bluetooth or WIFI. By default, the Bluetooth connection will be active (denoted by green fill of the Bluetooth button, shown above); to select WIFI, simply click on the WIFI icon to the right of the Bluetooth icon.

### 8.1.1. Bluetooth Connection

If JDC has connected to a device previously, they will be shown in the Previously Connected Devices card. The Available Bluetooth Devices card will populate and can be expanded. Only one card can be expanded at a time. Select the preferred device to make a Bluetooth connection. Once connected, the status will say “Connected” and the Status Bar on the top of the screen will become active, showing the status of the connected receiver.

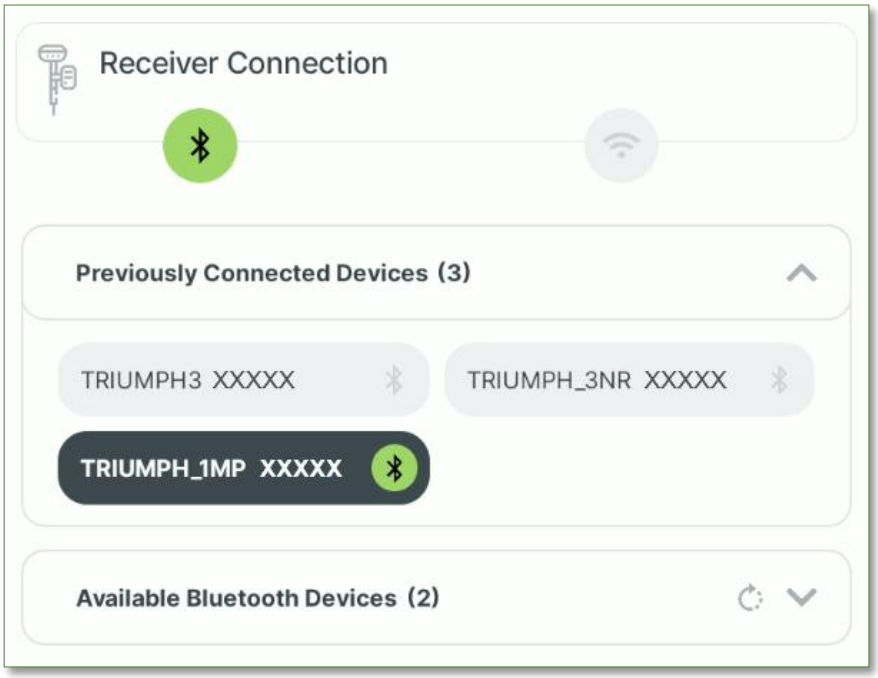


Figure 26: Receiver Connected Via Bluetooth

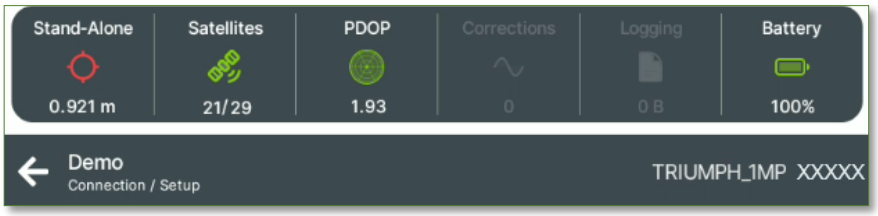


Figure 27: Connected Status Bar

### 8.1.2. Bluetooth Disconnection

To disconnect the Bluetooth connection, click on the connected receiver.

### 8.1.3. WIFI Connection

A WIFI connection can be initiated by clicking on the WIFI icon, this will open WIFI connection screen. Two cards will show. The upper card, titled “Receivers Connected to [SSID]”, where [SSID] represents the WIFI network the Android is currently connected to. The receiver list in this card will populate. The lower card, titled “Program (via Bluetooth) for [SSID]” will populate with the Bluetooth device list.

Any available device shown in the Bluetooth list can be programmed to connect to same network the Android is connected to. This will program the JAVAD Smart Antenna to automatically connect to this network and reboot it. Upon reboot, the receiver will connect to this network. This is further described in the following section.

A WIFI connection can be made by clicking on the preferred device in the upper card and entering in the Login and Password. By default, the Login is blank and the Password is “1234.” Once connected, the status will say “Connected” and the Status Bar on the top of the screen will be come active, showing the status of the connected receiver.

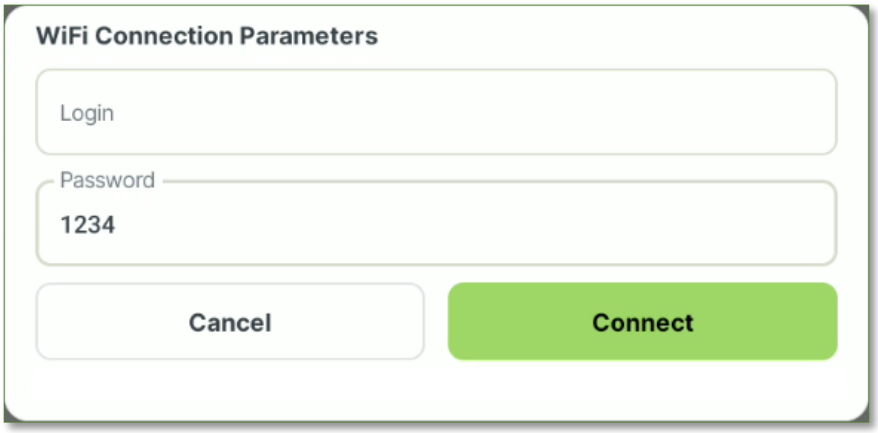


Figure 28: Default WIFI Connection Parameters

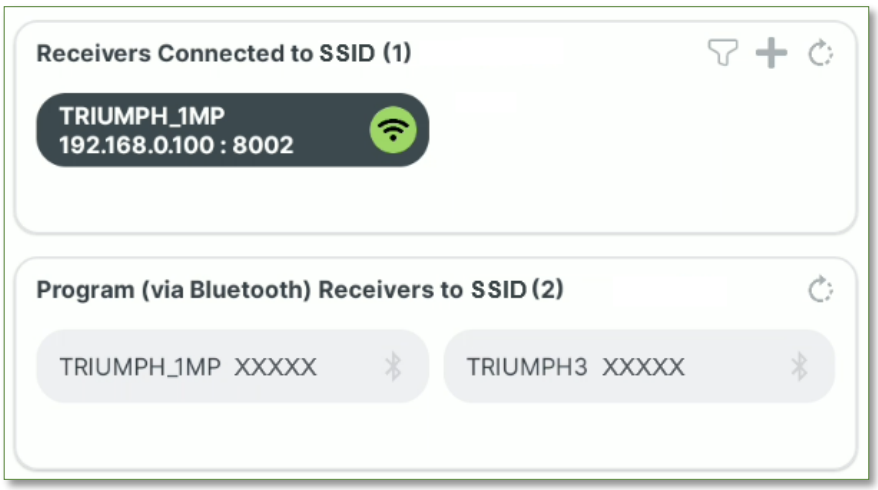


Figure 29: Receiver Connected via WIFI

#### 8.1.3.1. Program JAVAD Smart Antennas to Connect to a WIFI Network.

The lower card in the WIFI connection screen, titled “Program (via Bluetooth) Receivers for [SSID], where [SSID] is the network the Android is currently connected to, will program any available receiver to connect to the same network as the Android. To do this, click on the preferred receiver and type in the password for the network. Note that the SSID field will be auto filled with the network the Android is currently connected to.

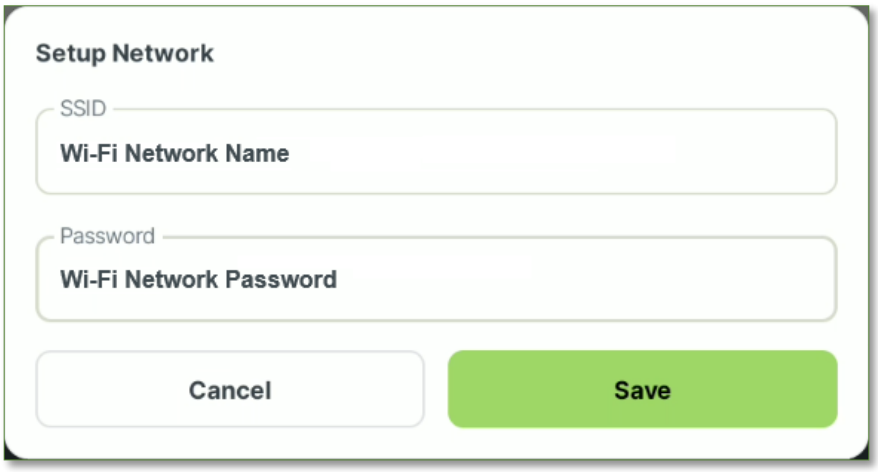


Figure 30: Program Receiver's WIFI

Click “Save” to program this into the selected receiver. The receiver will then reboot and automatically connect to this network. After a few minutes, the receiver will now show in the upper card as connected to the network.

### 8.1.4. WIFI Disconnection

To disconnect the WIFI connection, click on the connected receiver.

### 8.1.5. Connected Receiver Options

Once connected to a receiver, the receiver's name and serial number will show in the Information Bar (shown below).


Figure 31: Connected Receiver's Name and Serial Number

There are several options available for any connected receiver. Click on the receiver's name to show a drop-down menu of these options (shown below). Each option is further described below.

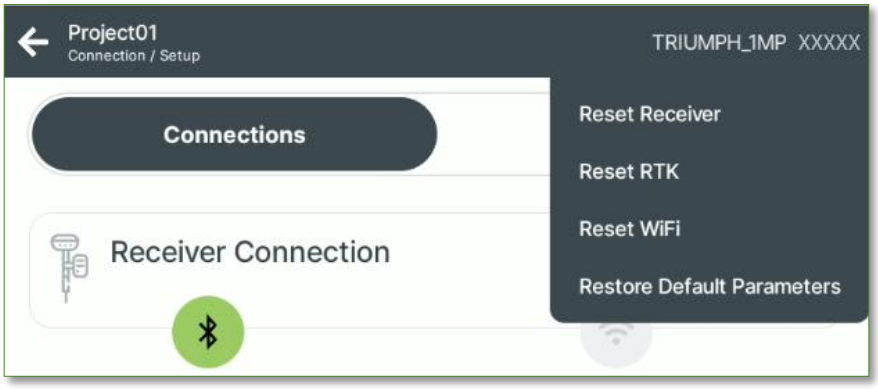


Figure 32: Connected Receiver Options

#### 8.1.5.1. Reset Receiver

Reset Receiver will send the reset receiver command. This is a soft reboot of the receiver and will cause the connection to the receiver to be lost. Reconnect the receiver after reboot when using this command.

#### 8.1.5.2. Reset RTK

Reset RTK will send the reset RTK command. This will erase the current RTK solution and re-calculate.

#### 8.1.5.3. Reset WIFI

Reset Parameters will send the reset WIFI parameters command. This will erase all parameters in the receiver and set it to a factory default state.

#### 8.1.5.4. Restore Default Parameters

Restore Default Parameters will set all valid JDC parameters to default values.

## 8.2. Status Bar

The Status Bar shown on the top of each screen will show the status of the connected receiver. The position mode, satellites used and tracked, position dilution of precision, corrections, logging, and battery of the connected receiver will be shown. Each of these items are further described below.

### 8.2.1. Position Mode

The position mode icon of the connected receiver will be in one of several states. These states are Fixed RTK, Float RTK, Differential, and Stand-Alone and are shown above the position icon along with the HRMS of the current position solution below.

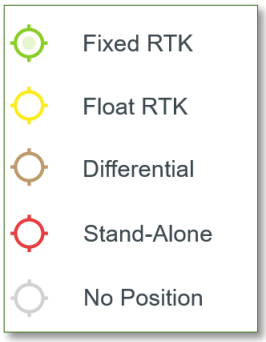


Figure 33: Status Bar - Position Mode Icons

### 8.2.2. Satellites

The Satellite icon of the connected receiver will be in one of several states. These states are 5 or more satellites used, between 1 and 4 satellites used, 0 satellites used in the receiver's position solution, and no receiver connection. The number of satellites used / tracked are shown below the satellite icon.

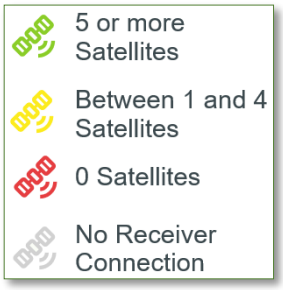


Figure 34: Status Bar - Satellite Icons

### 8.2.3. PDOP

The position dilution of precision icon of the connected receiver will be in one of several states. These states are between 0 and 4, between 4.1 and 6, greater than 6, and no receiver connection. The calculated PDOP value is shown below the PDOP icon.

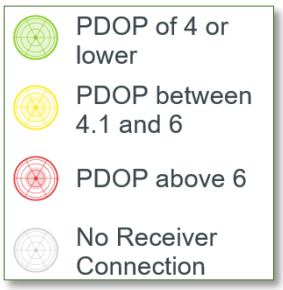


Figure 35: Status Bar - PDOP Icons

### 8.2.4. Corrections

The corrections icon will show if corrections are being sent or received along with the correction source (if Base) or latency (if Rover) below the corrections icon.

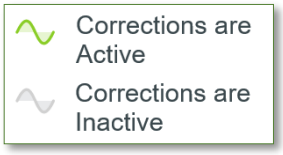


Figure 36: Status Bar - Corrections Icons

### 8.2.5. Logging

The logging icon will show if logging is active or inactive along with the logged file size shown below.

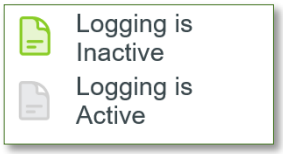


Figure 37: Status Bar - Logging Icons

### 8.2.6. Battery

The battery icon will show the charge status of the connected receiver's battery. There are several states shown. These states are above 50%, between 30% and 49%, below 30%, battery charging, and no receiver connection. The battery charge percentage is shown below the battery icon.

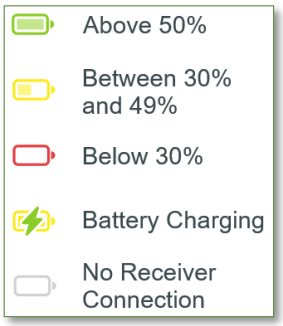


Figure 38: Status - Battery Icons

## 8.3. Extended Status Bar

Clicking on the Status Bar will open the Extended Status Bar. The Extended Status Bar contains more details about the connected receiver. There are cards for receiver, position, satellites, dilution of precision, corrections, data logging and battery. The Extended Status Bar can be close by selecting the “X” shown at the bottom. Each card is further described below.

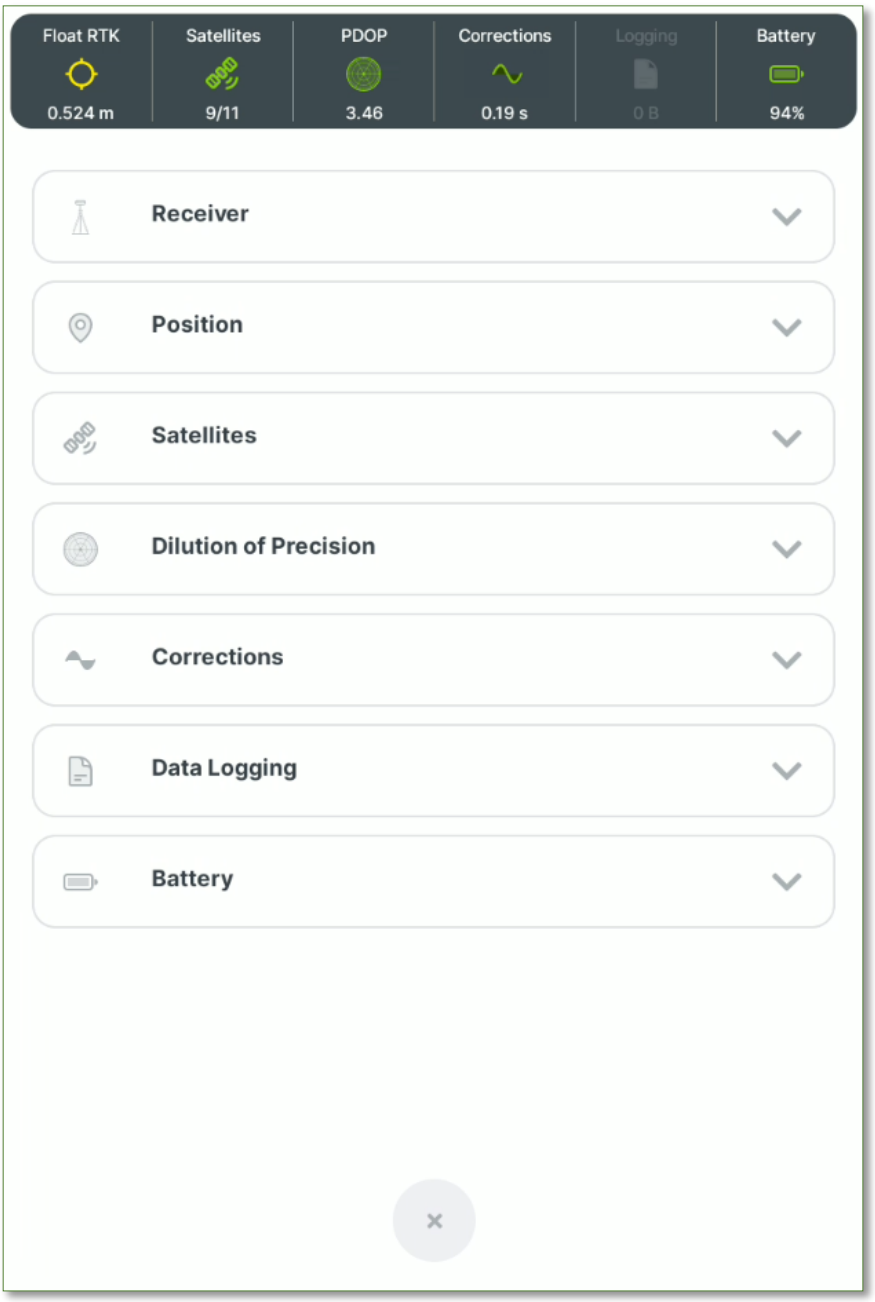


Figure 39: Extended Status Bar

### 8.3.1. Receiver

The receiver card will show further information regarding the position solution.


Figure 40: Extended Status Bar – Receiver

| Extended Status Bar – Receiver Card Item | Description |
|---|---|
| Receiver Mode | This is the current receiver mode of the receiver (Fixed RTK, Float RTK, etc.). |
| Horizontal RMS (HRMS) | The calculated horizontal root mean square solution of the calculated position. |
| Vertical RMS (VRMS) | The calculated vertical root mean square solution of the calculated position. |
| 3D RMS (Horizontal and Vertical) | The calculated horizonal and vertical, or 3D root mean square solution of the calculated position. |

### 8.3.2. Position

The position card will show further information regarding the receiver's position.

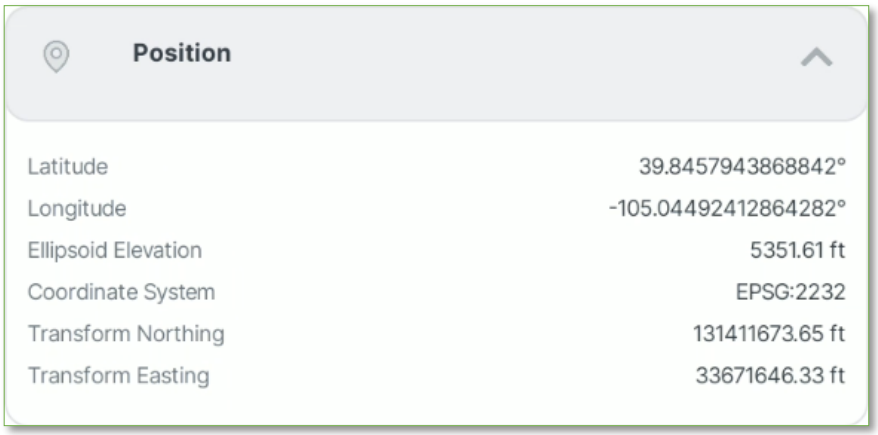


Figure 41: Extended Status Bar – Position

| Extended Status Bar – Position Card Item | Description |
|---|---|
| Latitude | This is the connected receiver's latitude portion of the calculated position (WGS84). |
| Longitude | This is the connected receiver's longitude portion of the calculated position (WGS84). |
| Ellipsoid Elevation | This is the connected receiver's ellipsoid elevation portion of the calculated position (WGS84). |
| Orthometric Elevation | This is the connected receiver's Orthometric elevation portion of the calculate position. |
| Coordinate System | This is the selected coordinate system for the current JDC project. |
| Transform Northing | This is the northing value in the selected coordinate system of the current JDC project. |
| Transform Easting | This is the easting value in the selected coordinate system of the current JDC project. |

### 8.3.3. Satellites

The satellites card will show further information regarding the status of satellite signal reception.

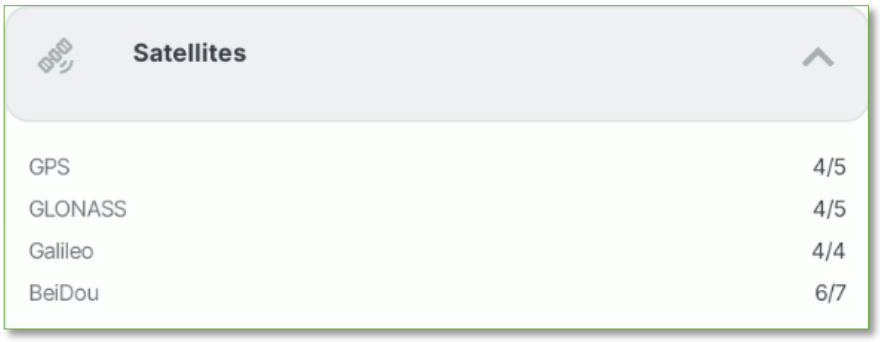


Figure 42: Extended Status Bar – Satellites

| Extended Status Bar – Satellites Card Item | Description |
|---|---|
| GPS | This shows the GPS satellite signals used / tracked in the current position solution. |
| GLONASS | This shows the GLONASS satellite signals used / tracked in the current position solution. |
| Galileo | This shows the Galileo satellite signals used / tracked in the current position solution. |
| BeiDou | This shows the BeiDou satellite signals used / tracked in the current position solution. |

### 8.3.4. Dilution of Precision

The dilution of precision card will show further DOP details of the current position solution.


Figure 43: Extended Status Bar - Dilution of Precision

| Extended Status Bar – Satellites Card Item | Description |
|---|---|
| Horizontal Dilution of Precision (HDOP) | This is the calculated horizontal dilution of precision of the current position solution. |
| Position Dilution of Precision (PDOP) | This is the calculated position dilution of precision of the current position solution. |
| Geometric Dilution of Precision (GDOP) | This is the calculated general dilution of precision of the current position solution. |
| Vertical Dilution of Precision (VDOP) | This is the calculated vertical dilution of precision of the current position solution. |
| Time Dilution of Precision (TDOP) | This is the calculated time dilution of precision of the current position solution. |

### 8.3.5. Corrections

The corrections card will show further details of the corrections stream


Figure 44: Extended Status Bar – Corrections

| Extended Status Bar – Corrections Card Item | Description |
|---|---|
| Device | The device used for transmitting or receiving corrections. |
| Message Type | The message type of the corrections. |
| Station ID | The station ID of the base or network sending corrections. |
| Latency | The latency of the correction stream. |
| Received Messages | The number of received messages from the correction stream. |
| Corrupt Messages | The number of corrupt messages from the correction stream. |
| UHF Radio Parameters – Message Transmitted | The transmitted message from the UHF. |
| UHF Radio Parameters – Output Power | The output power (watts) from the UHF. |
| UHF Radio Parameters – Received Signal Strength Indicator | The signal strength from the base UHF:<br>• <-147 = “No Data” – No signal received.<br>• -147 - -95 = “Poor” – The signal is poor.<br>• -95 - -85 = “Fair” – The signal is fair.<br>• -85 - -65 = “Good” – The signal is good.<br>• -65 - -10 = “Excellent” – The signal is excellent.<br>• -10 – 0 = “Very Strong” – The signal is very strong.<br>• >0 = “Transmitter very close” – The transmitter is very close. |
| UHF Radio Parameters – Bit Error Rate | The error rate from the base UHF. |

### 8.3.6. Data Logging

The data logging card will show further information of the data logging status.


Figure 45: Extended Status Bar - Data Logging

| Extended Status Bar – Logging Card Item | Description |
|---|---|
| Logging Status | This is the logging status (on or off). |
| Data Amount | This is the size of the logged data file. |
| Free Space Available | This is the available memory space within the connected receiver. |

#### 8.3.6.1. File Manager

This will open the file manager of the connected receiver and show the receiver files saved within the connected receiver.

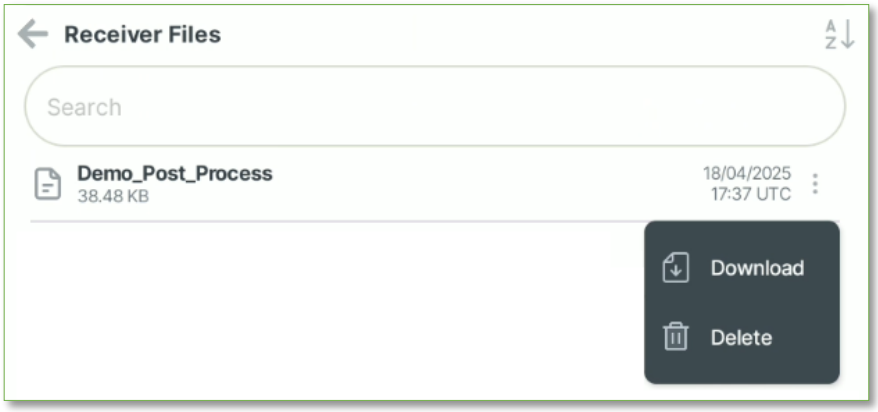


Figure 46: File Manager - File Context Menu

| File Manager – File Context Item | Description |
|---|---|
| Download | This will download the file from the connected JAVAD Smart Antenna to the Android. |
| Delete | This will delete the file from the connected JAVAD Smart Antenna. |

### 8.3.7. Battery

The battery card will show further details of the state of charge within the connected receiver.

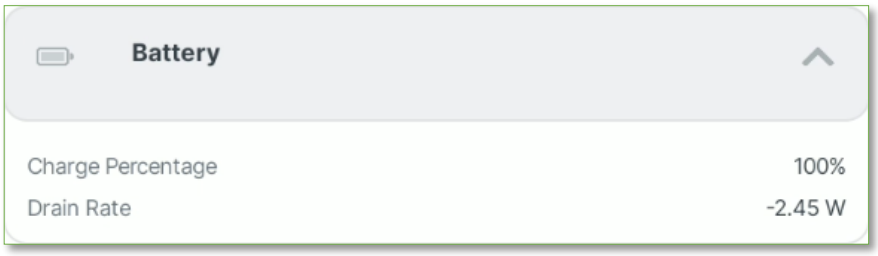


Figure 47: Extended Status Bar – Battery

| Extended Status Bar – Battery Card Item | Description |
|---|---|
| Charge Percentage | This is the current charge percentage of the battery within the connected receiver. |
| Drain Rate | This is the rate of discharge of the battery within the connected receiver. |

## 8.4. Setup

The setup of the connected receiver is initiated by sliding the toggle from “Connections” to “Setup”, or by tapping “Setup”. All JAVAD Smart Antenna configurations can be made from here. These setups are using the internal UHF radio, internal Cell modem, WIFI, or Bluetooth. Each of these setups are further described below.

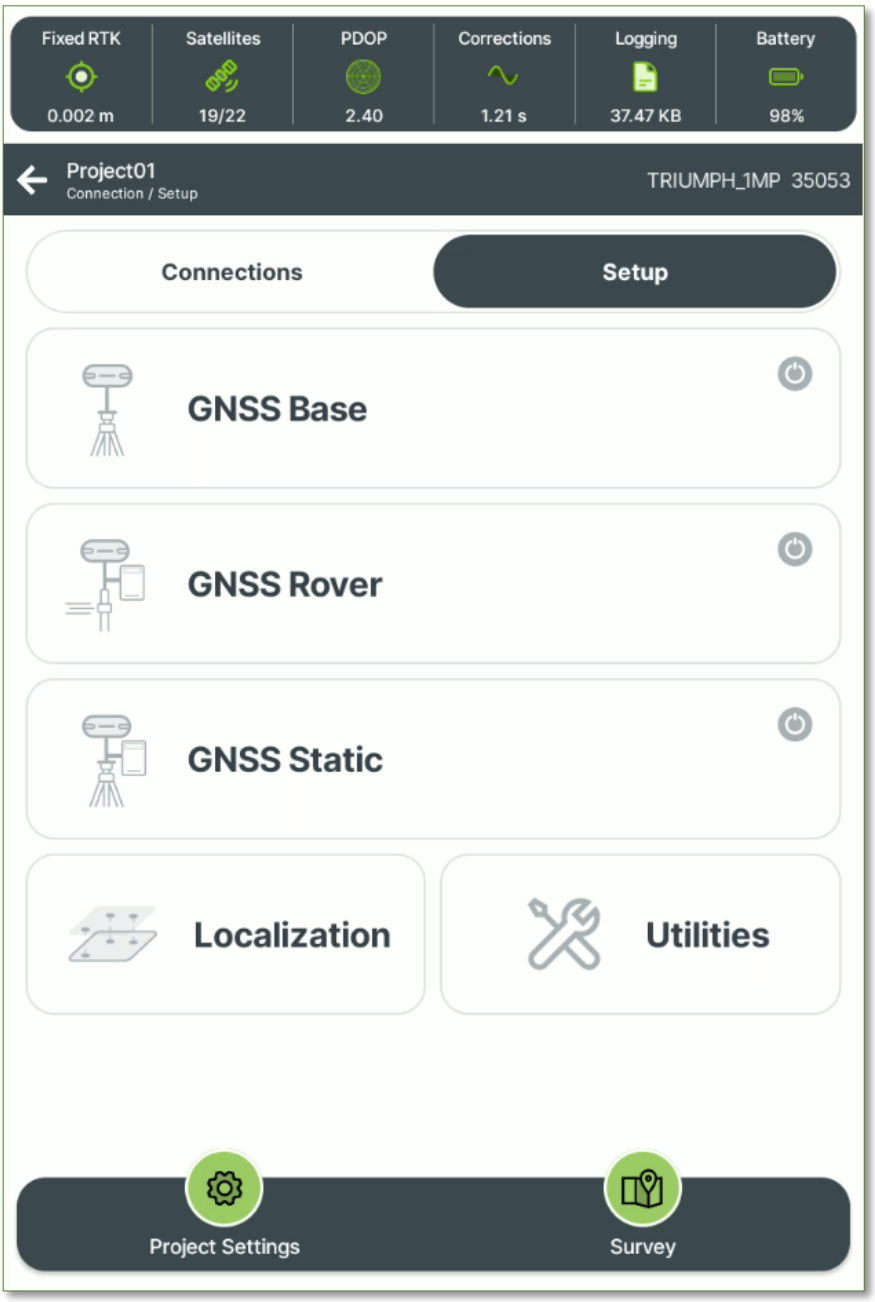


Figure 48: Connected Receiver Setup

## 8.5. GNSS Base

If a Base setup is preferred, click on the “GNSS Base” card. This will open the GNSS Base screen and allow for easily configuring the base parameters. These parameters include base station, antenna, corrections, base position and data logging. Each of these are further discussed below.

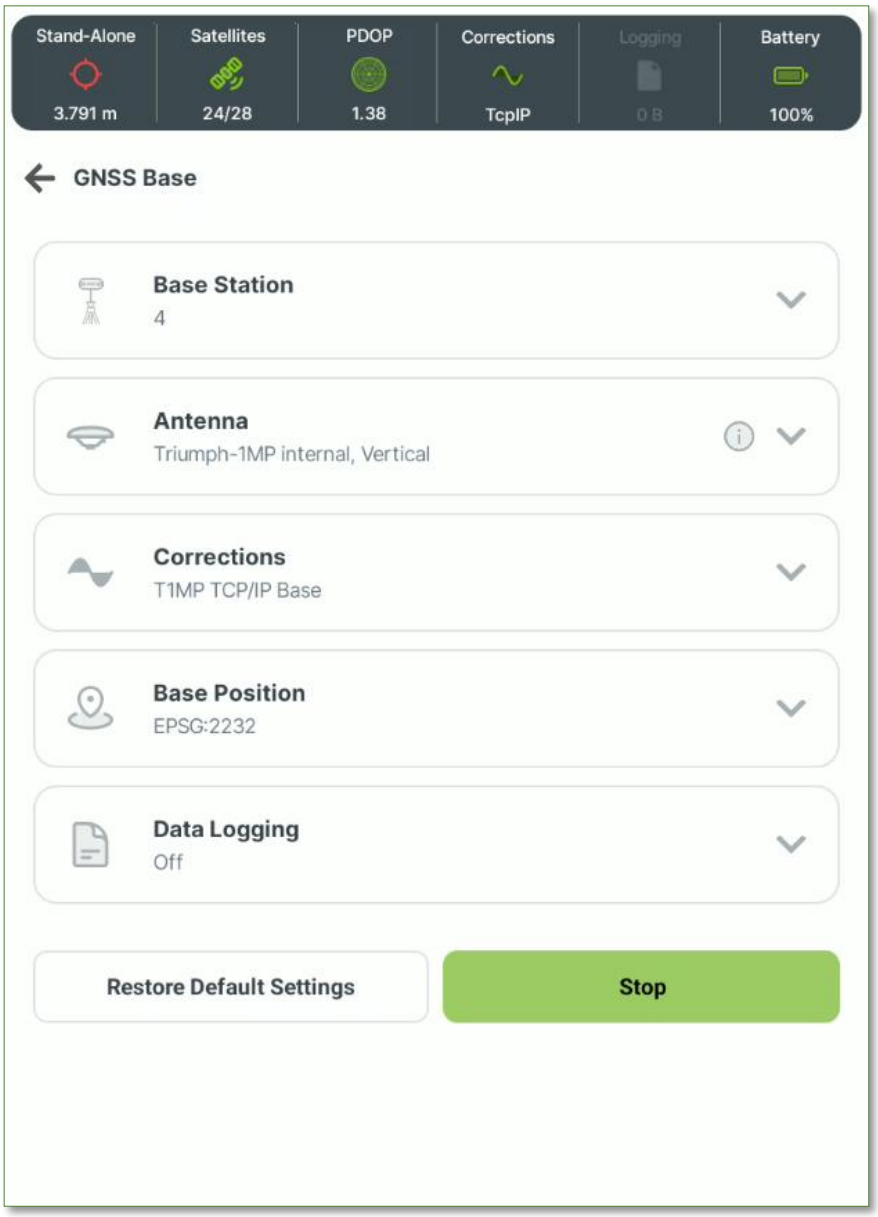


Figure 49: GNSS Base

### 8.5.1. Base Station

The Base Station card inputs to the connected receiver the [Base] Station Name and the Station ID. These parameters are included in the transmitted correction messages.

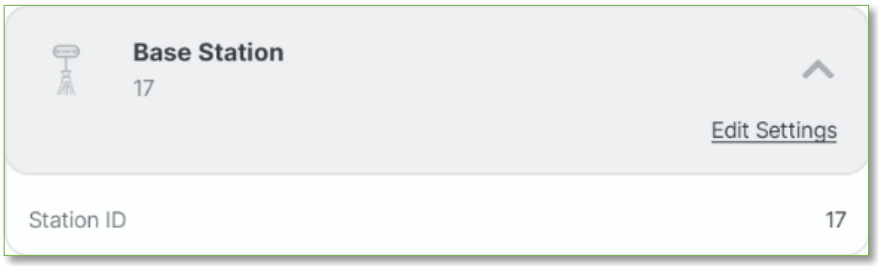


Figure 50: GNSS Base - Base Station

| GNSS Base – Base Station Item | Description |
|---|---|
| Station ID | The Station ID of the Base may be entered here. |

### 8.5.2. Antenna

The Antenna card inputs in the values for the Antenna height, height type, and elevation mask. These items are further described below.

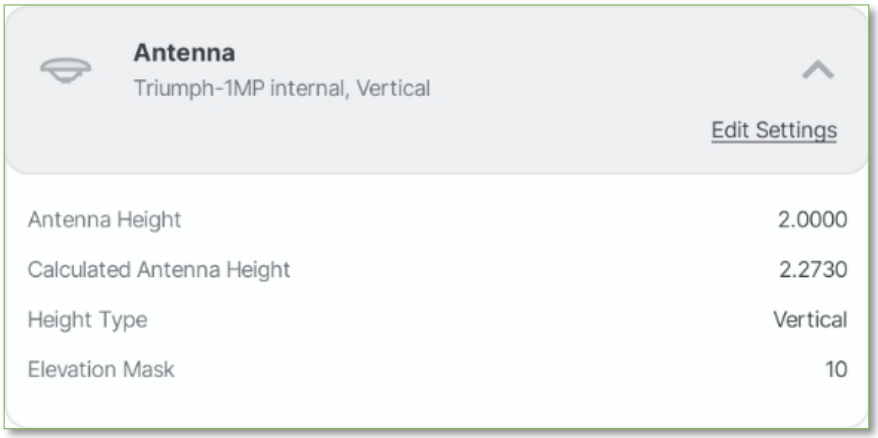


Figure 51: GNSS Base – Antenna

| GNSS Base – Antenna Card Item | Description |
|---|---|
| Antenna Height | JAVAD Smart Antennas have a 5/8” threaded adapter to connect to an industry standard tribrach or rod. The check box “Includes JAVAD Thread Adapter” indicates if this adapter is used and will calculate the antenna height value. |
| Calculated Antenna Height | JDC will calculate the antenna height based on the antenna type (vertical / slant) and if a 5/8” thread adapter is being used. |
| Height Type | Receiver height can be measured as either a slant height or vertical height. Vertical height is defined as the distance from the ground marker to antenna reference point. If a 5/8” adapter is used, this height is the distance from the ground to the 5/8” adapter. Slant height is defined as the distance from the ground marker to the slant height mark on the receiver. This value is used to calculate the vertical height. |
| Elevation Mask | The elevation mask is the degrees up (from the 0-degree horizon) the connected receiver will disregard satellite signals. The default value for this parameter is 10 degrees. |

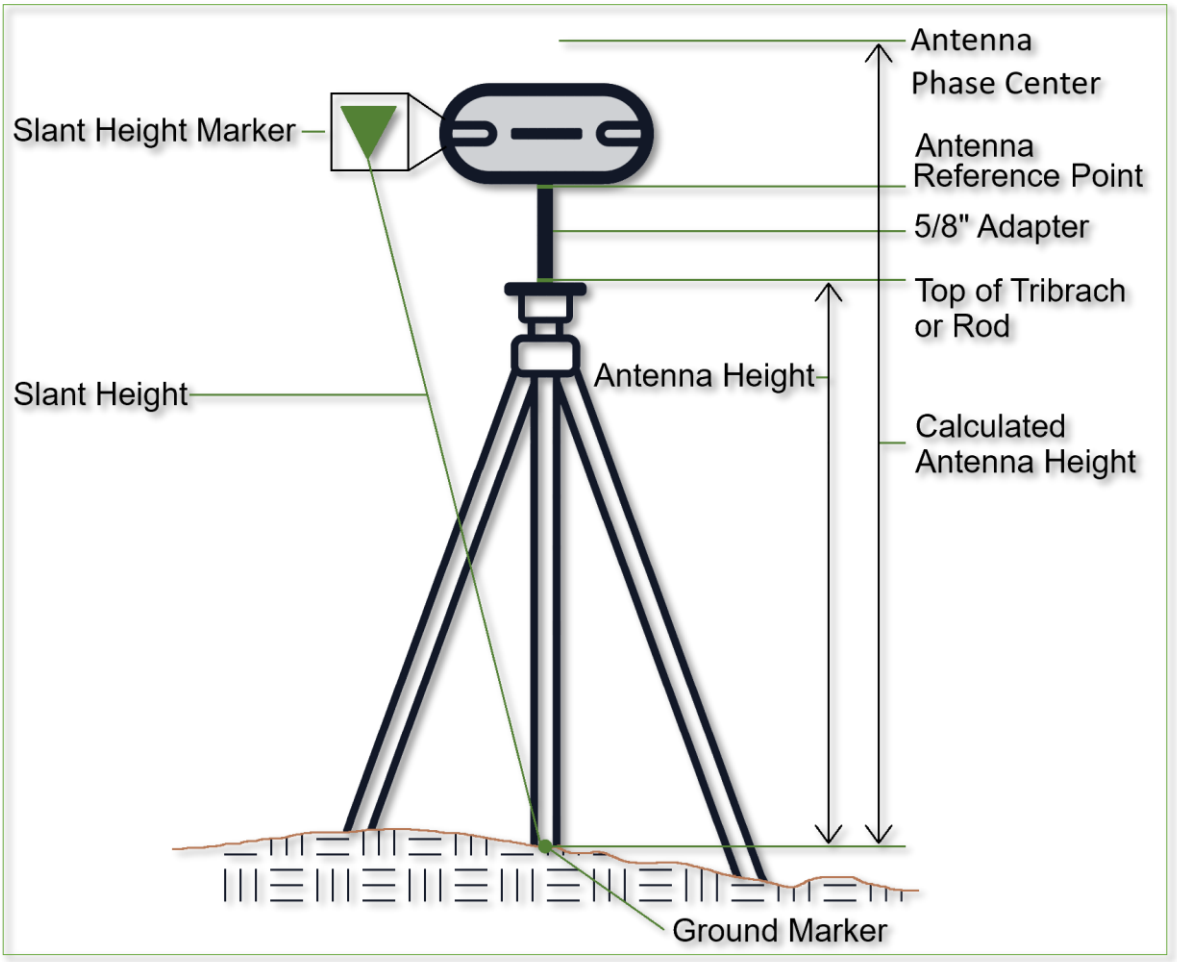


Figure 52: Antenna Diagram

### 8.5.3. Corrections

Configuring the connected receiver as a base requires RTK corrections to be set up. There are many types of corrections setups. JDC will store these correction setups as “Correction Sources” for ease of use. The Correction Sources screen can be accessed by clicking on “Edit Settings” (shown below).

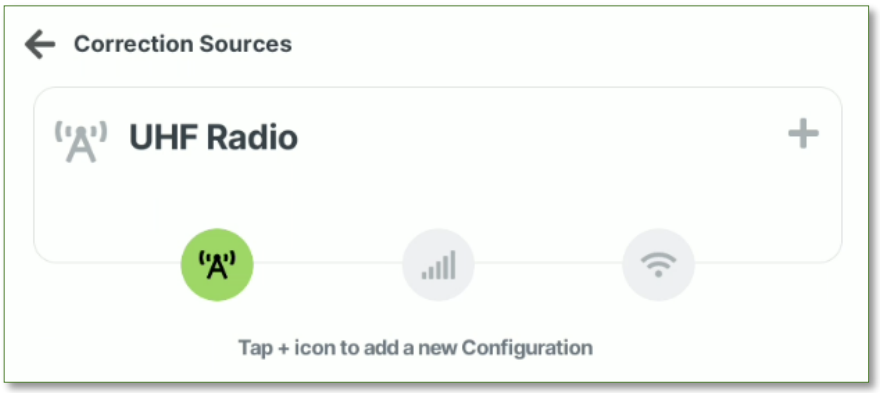


Figure 53: Correction Sources – UHF Radio

#### 8.5.3.1. Correction Sources

For a GNSS Base, correction sources can be from:

- Internal UHF Radio
- Internal Cell Modem
- WIFI Network

Each of these sources are further described below.

##### 8.5.3.1.1. UHF Radio

This is the initial landing page for Correction Sources. The radio icon filled out in green indicates UHF Radio. To begin a UHF configuration, click the + button. This will open the UHF Radio screen where a new UHF configuration can be completed (shown below with default values).

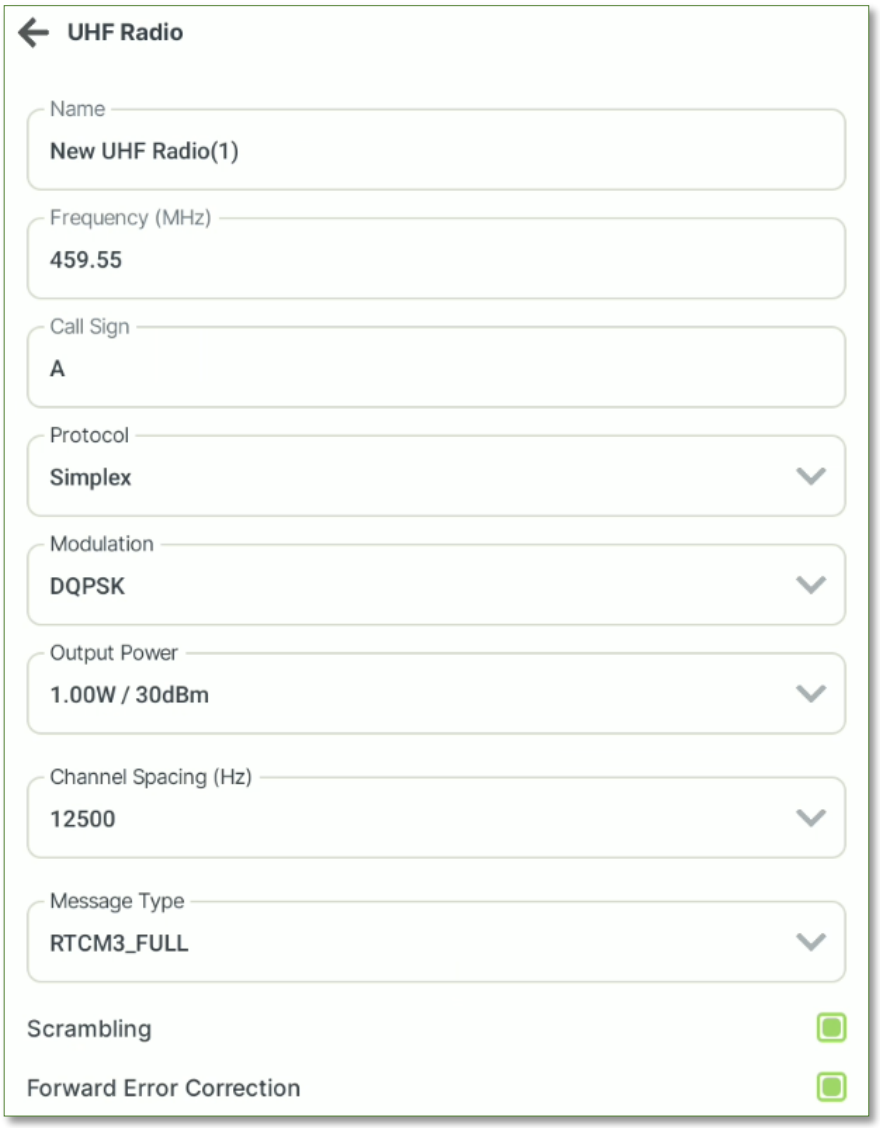


Figure 54: UHF Radio Configuration

Here, the UHF parameters can be selected along with a name. The name (example: 459.55 UHF Low Power) will be saved by JDC to use. It is recommended to have FEC and Scrambling on along with DQPSK to minimize transmission and reception errors in the field. Tap “Save” to save the new UHF configuration. The name given will be now shown in the UHF Radio section of the Correction Sources (shown below).

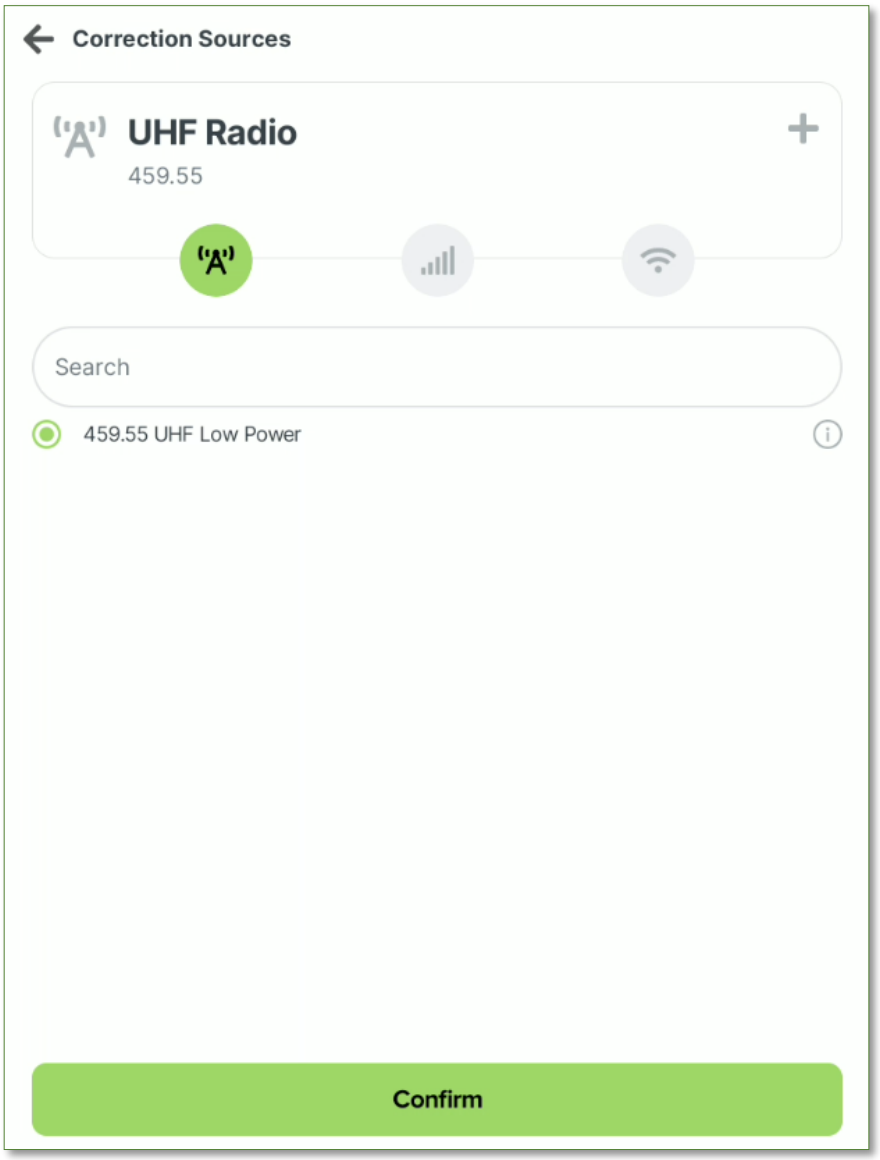


Figure 55: Saved UHF Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected base receiver.

#### 8.5.3.1.2. Cell Modem

Ensure a SIM card is properly installed on the connected device. By default, JDC will show the cell modem as inactive.

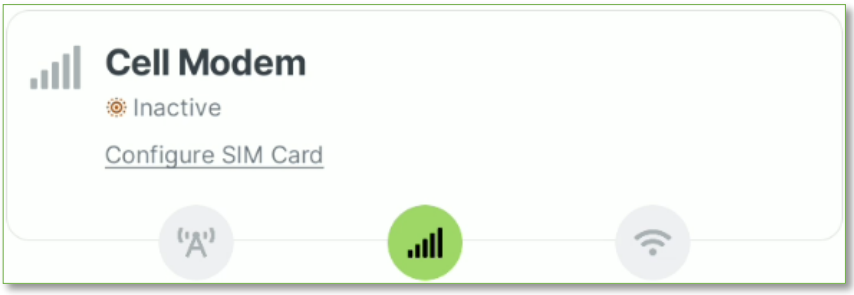


Figure 56: Cell Modem - Inactive

The SIM card can be activated by tapping “Configure SIM card”. This will allow for SIM card settings to be entered.

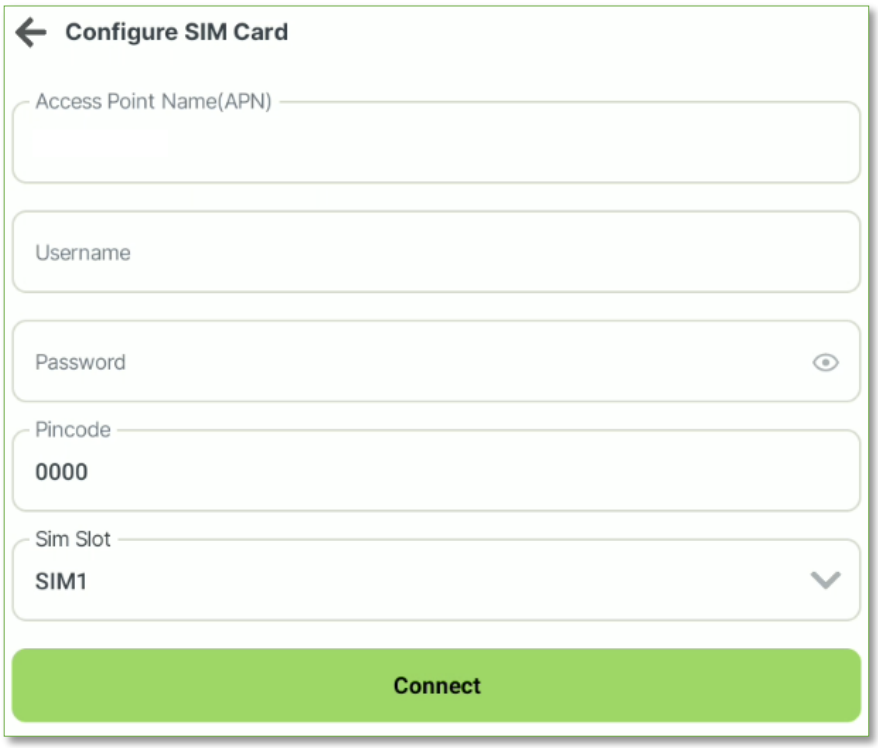


Figure 57: Configure SIM Card

Once the parameters are entered, click “Connect”. A message will appear during the connection process.

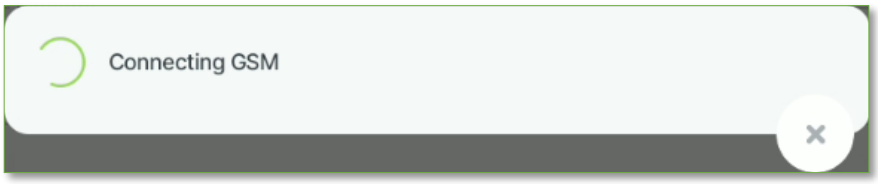


Figure 58: Connecting GSM

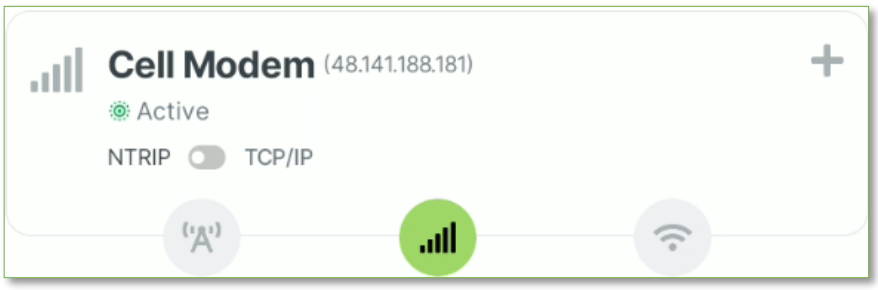


Figure 59: Cell Modem - Active

With the Cell Modem now active, select either NTRIP or TCP/IP and click the + button. This will open the cell modem screen where a new configuration can be completed.

#### 8.5.3.1.2.1. NTRIP

Configuring the connected GNSS rover to receive RTK corrections via the Data Collector over NTRIP can be initiated by setting the toggle to “NTRIP” and clicking the + button. This will open the NTRIP Rover screen where the details can be entered. Each detail is further described in the table below.

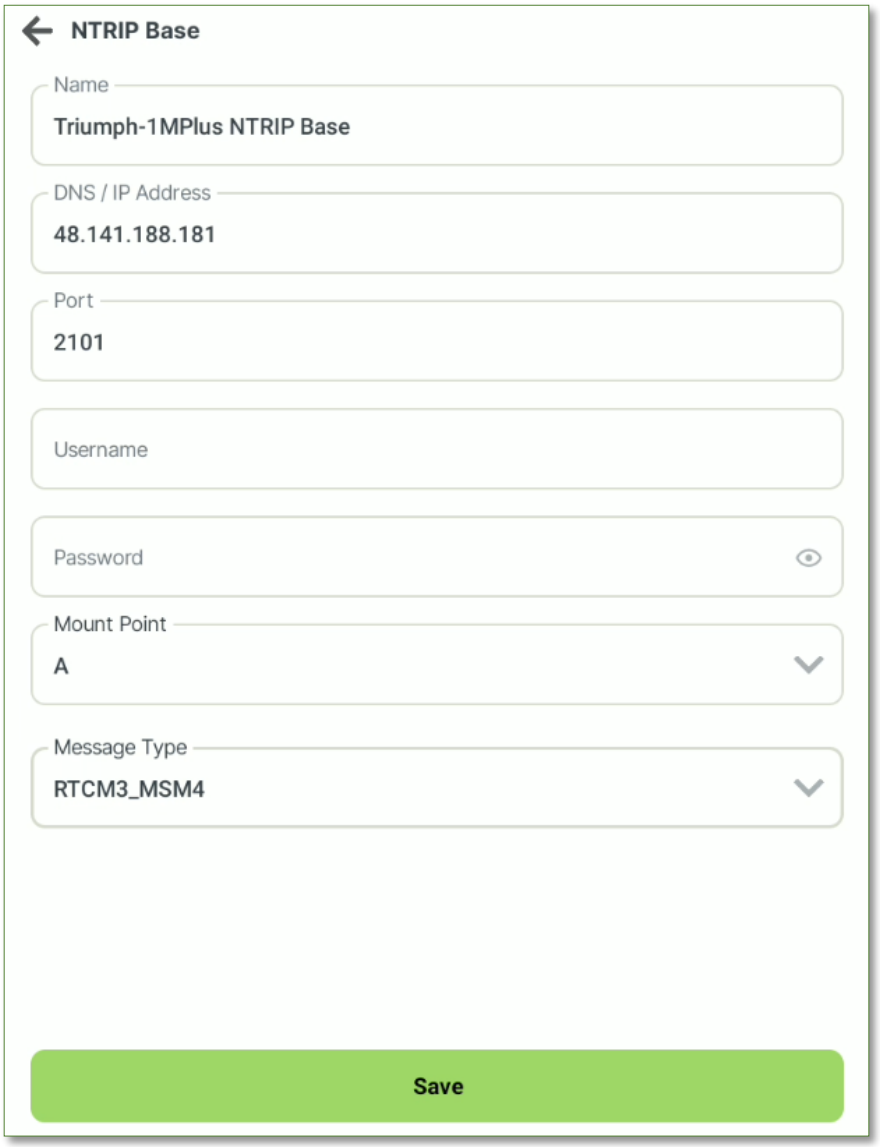


Figure 60: NTRIP Base

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the Corrections. |
| Port | Default is 2101 and it is the Port to access the RTK corrections. |
| Username | Optional Username |
| Password | Optional Password |
| Mount Point | Options each provider has for RTK Correction Origin |
| Correction Type | The type of corrections to be received. |
| GGA | This sends the Rover's position to the network. Enable if a VRS, Disable if not a VRS. |

Once all details are entered, tap the "Save" button to save the NTRIP Rover configuration source.

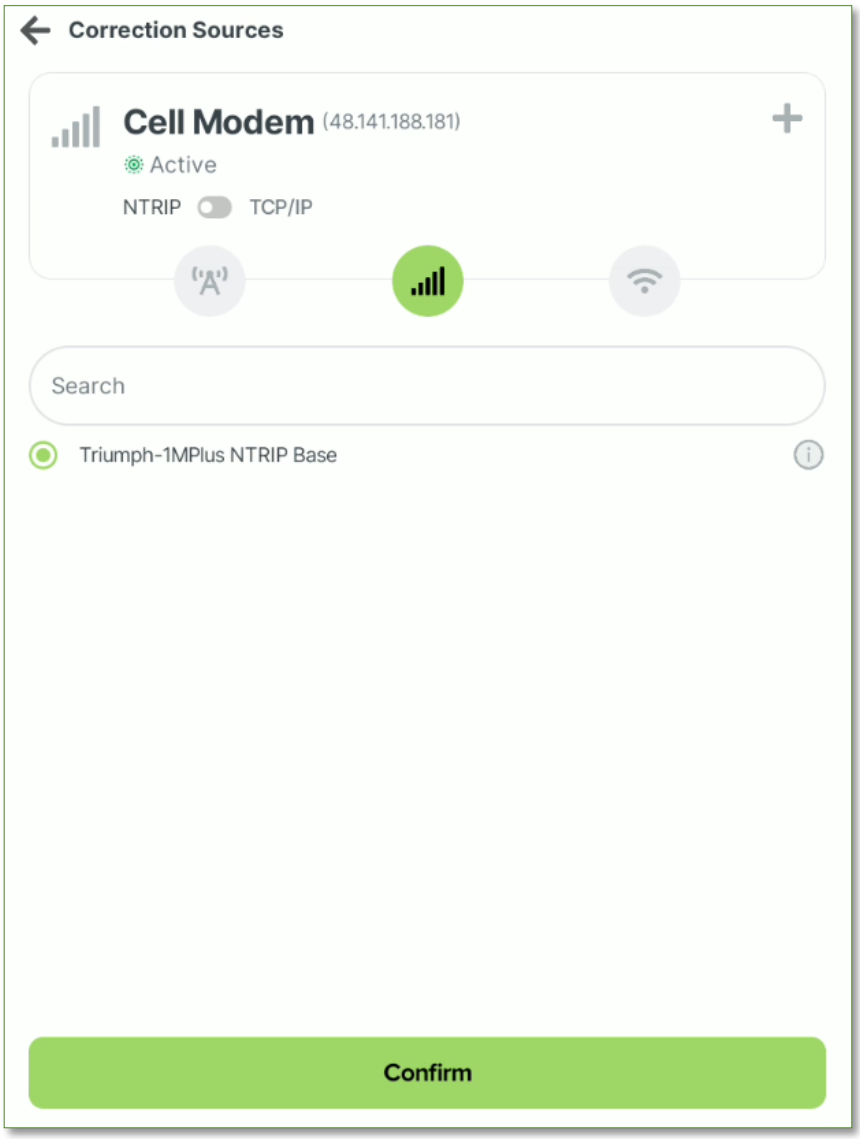


Figure 61: Saved Cell Modem - NTRIP Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS rover.

#### 8.5.3.1.2.2. TCP/IP

Configuring the connected GNSS rover to receive RTK corrections via the Data Collector over TCP/IP can be initiated by setting the toggle to “TCP/IP” and clicking the + button. This will open the TCP/IP Base screen where the details can be entered. Each detail is further described in the table below.

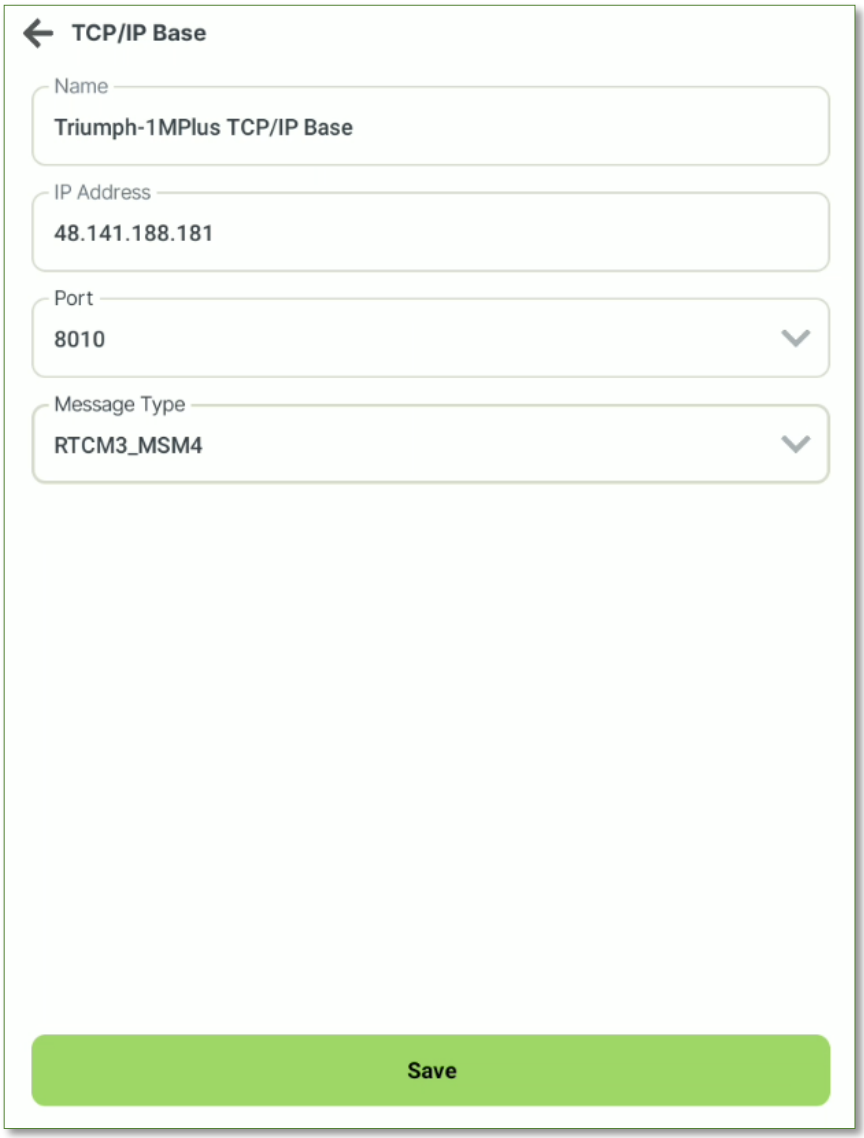


Figure 62: TCP/IP Rover

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the Corrections. |
| Port | Default is 2101 and it is the Port to access the RTK corrections. |
| Mount Point | Options each provider has for RTK Correction Origin |
| Correction Type | The type of corrections to be received. |

Once all details are entered, tap the “Save” button to save the TCP/IP Base configuration source.

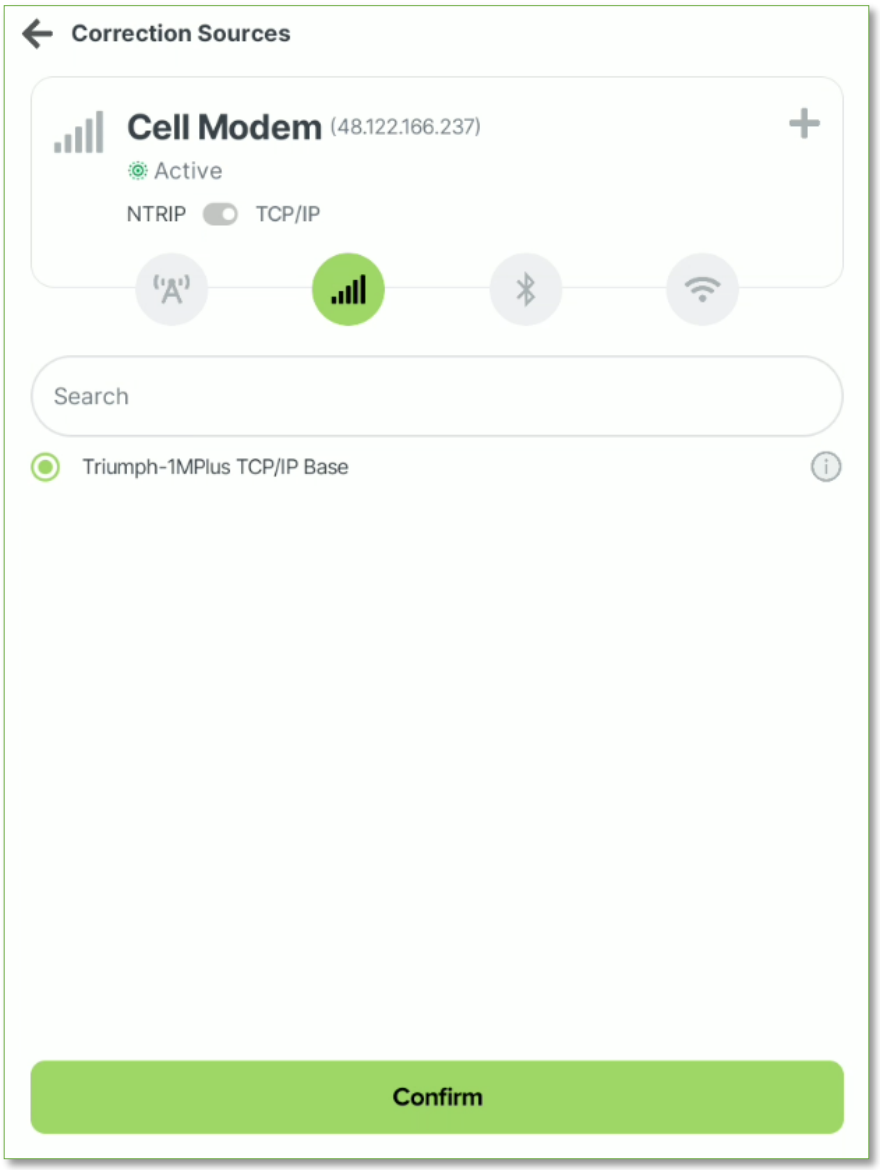


Figure 63: Cell Modem TCP/IP Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS rover.

#### 8.5.3.1.3. WIFI

JAVAD Smart Antennas can easily be configured to connect to any existing network via WIFI. JDC achieves this in two areas: One to connect to the receiver for configuration and another to transmit RTK corrections over a network via NTRIP or TCP/IP. Tapping on the WIFI icon will open the WIFI card (shown below). Configuring the receiver to connect to a WIFI network and to transmit RTK corrections are done here. This is discussed in further detail below.

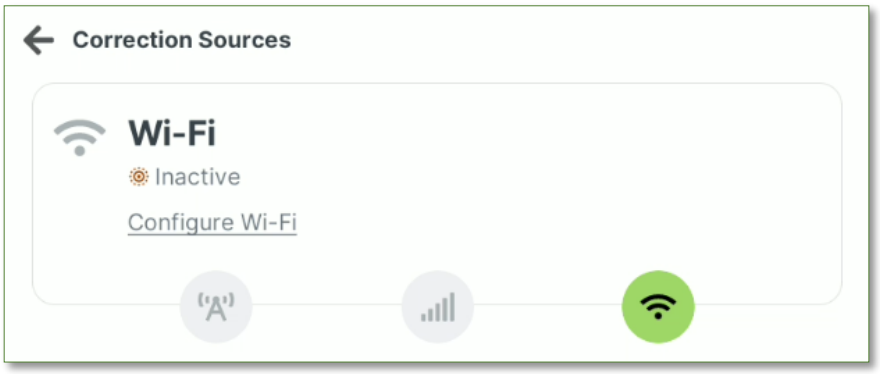


Figure 64: Correction Sources - WIFI

##### 8.5.3.1.3.1. Configure WIFI

To configure the JAVAD Smart Antenna to connect to a network via WIFI, tap "Configure WIFI" to open the Add WIFI screen (shown below). Type in the SSID (name) and the Password of the preferred WIFI network and tap the "Connect" button to configure the receiver.

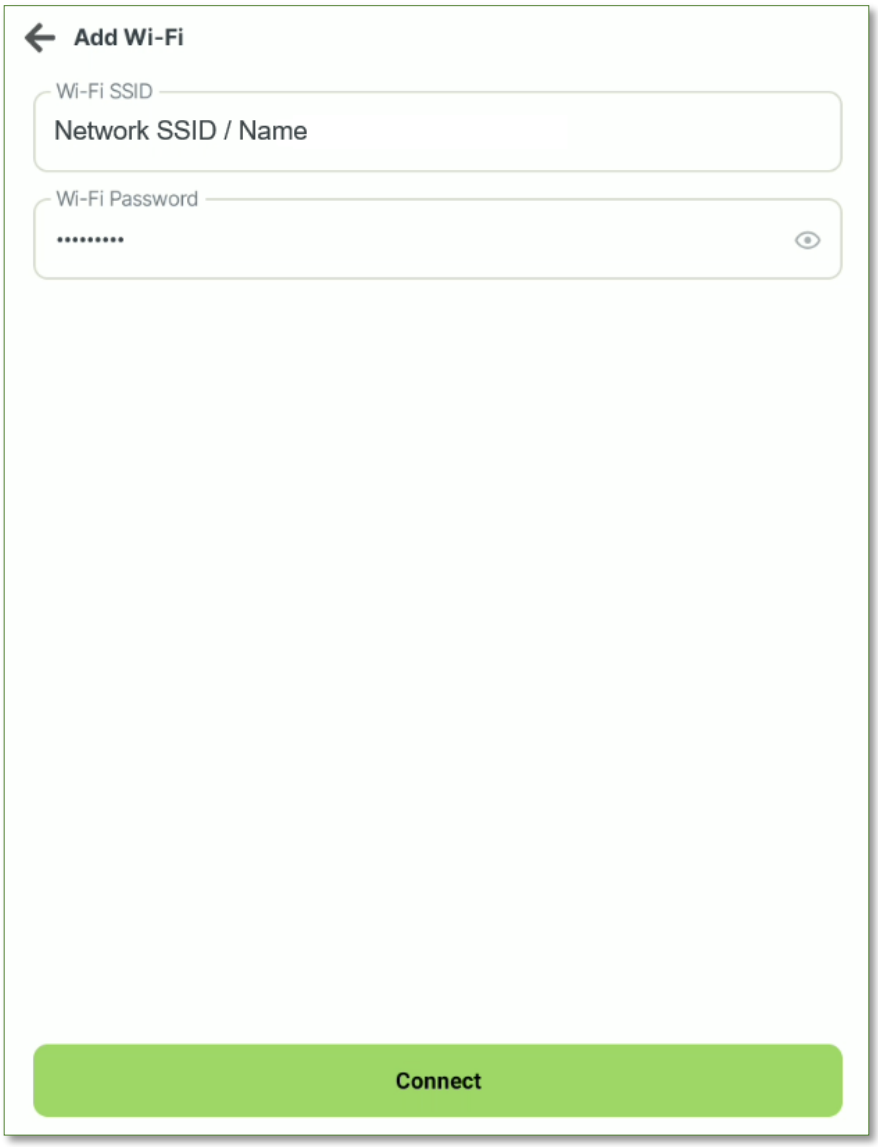


Figure 65: Configure WIFI

After the “Connect” button is tapped, the connected receiver will be programmed and reboot with the new WIFI parameters. Connection to the network is automatic and may take a few minutes. A pop-up message will show onscreen, the message may be closed during this process if preferred (shown below).

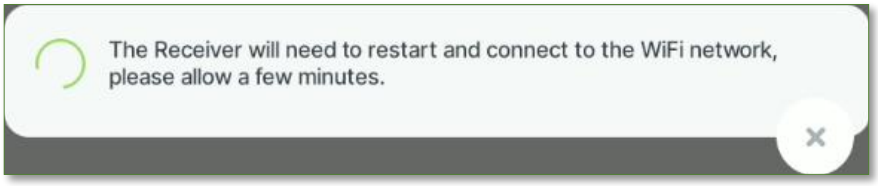


Figure 66: WIFI Receiver Configuration Message

Once the connection is established, the WIFI card will show the connected receivers IP address along with “Active” (shown below).

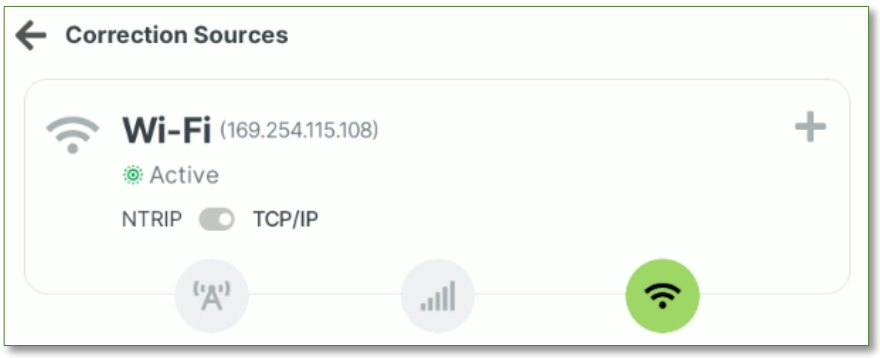


Figure 67: WIFI Active

The connected GNSS base receiver can now be configured to transmit RTK corrections via WIFI. This can be done either by NTRIP (Username, Password, IP Address and Port Number) or by TCP/IP (IP Address and Port Number only). Both methods are further described below.

#### 8.5.3.1.3.2. NTRIP

Configuring the connected GNSS base receiver to transmit RTK corrections over NTRIP can be initiated by setting the toggle to “NTRIP” and clicking the + button. This will open the NTRIP Base screen where the details can be entered. Each detail is further described in the table below.

Once all details are entered, tap the “Save” button to save the NTRIP Base configuration source.

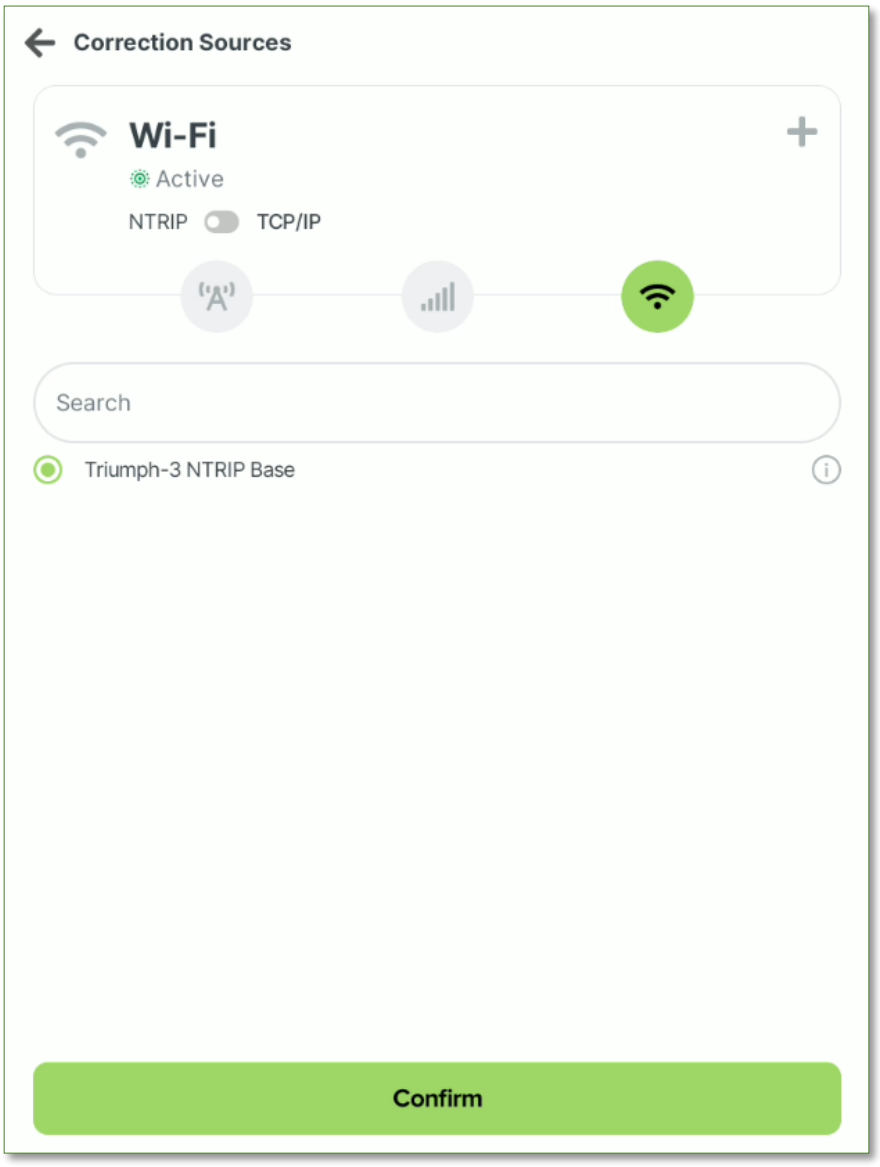


Figure 68: Saved WIFI Correction Source

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the connected GNSS base receiver. |
| Port | Default is 2101 and it is the Port for the transmitted RTK corrections. |
| Username | Optional Username |
| Password | Optional Password |
| Mount Point | Default for this “[Receiver Name_A]” and it is the Mount Point for the transmitted RTK corrections. |
| Correction Type | Default for this is RTCM_MSM4 and is the type of transmitted RTK corrections. |

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS base receiver.

#### 8.5.3.1.3.3. NTRIP Option Not Purchased

Please note that NTRIP is an option that can be purchased directly from JAVAD GNSS, if the option is not purchased the following pop-up message will be shown.

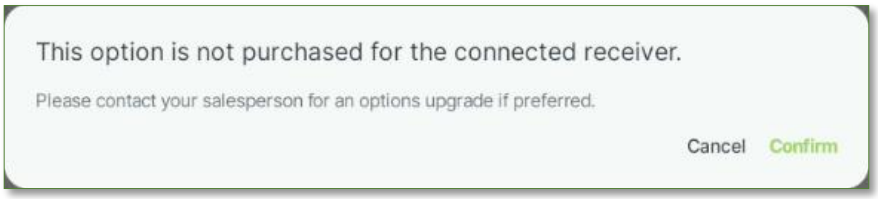


Figure 69: Options Upgrade Needed

If this is the case and the option is preferred, please contact JAVAD GNSS Sales to purchase. Tap the “Confirm” to exit the pop-up.

#### 8.5.3.1.3.4. TCP/IP

Configuring the connected GNSS base receiver to transmit RTK corrections over TCP/IP can be initiated by setting the toggle to “TCP/IP” and clicking the + button. This will open the TCP/IP Base screen where the details can be entered. Each detail is further described in the table below.

Once all details are entered, tap the “Save” button to save the TCP/IP Base configuration source.

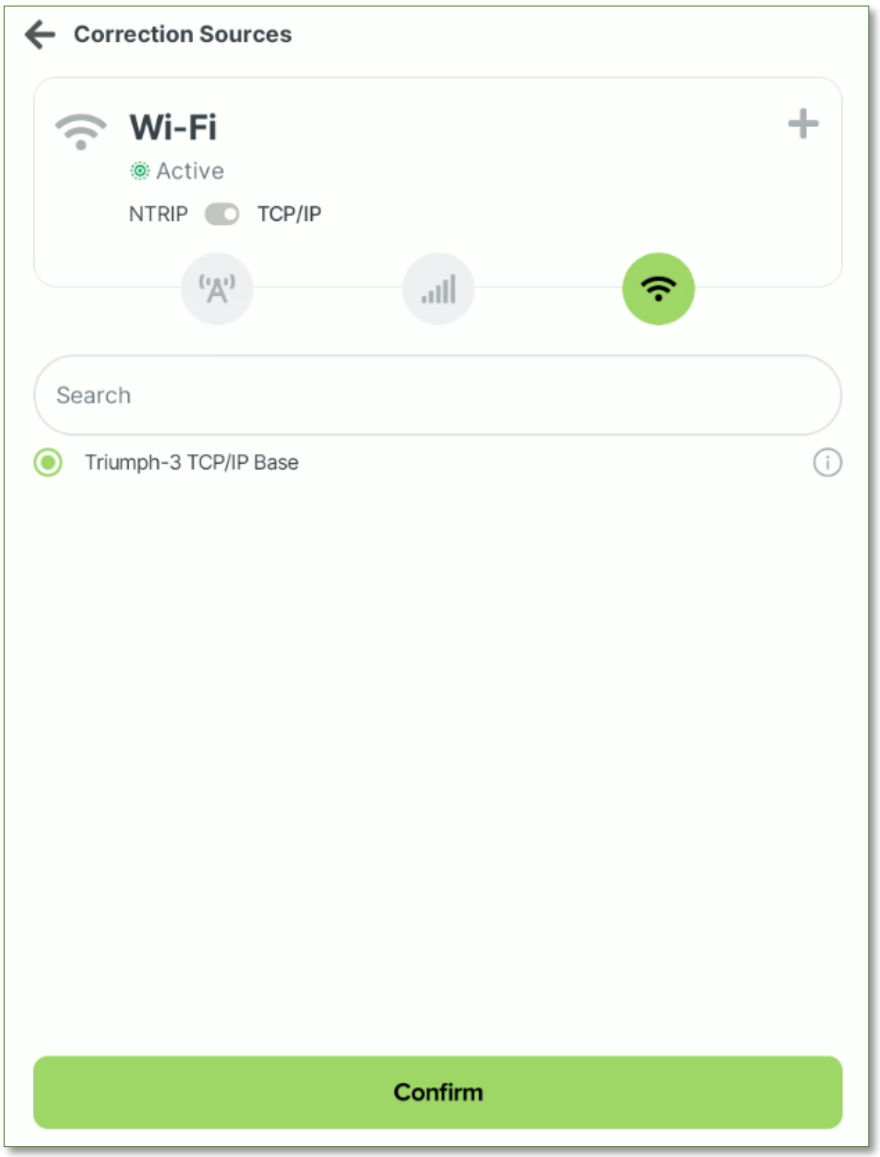


Figure 70: Saved TCP/IP Correction Source

| TCP/IP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the connected GNSS base receiver. |
| Port | Default is TCPO_A_8010 and it is the Port for the transmitted RTK corrections. |
| Correction Type | Default for this is RTCM_MSM4 and is the type of transmitted RTK corrections. |

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS base receiver.

### 8.5.4. Base Position

By default, all JAVAD Smart Antenna will not have a base position stored as this is updated for each GNSS Base session. The base position can be stored either by the point list of the project or directly from the connected receiver. Tap the Base Position card to expand the details and "Edit Settings" to set the preferred base position (shown below).

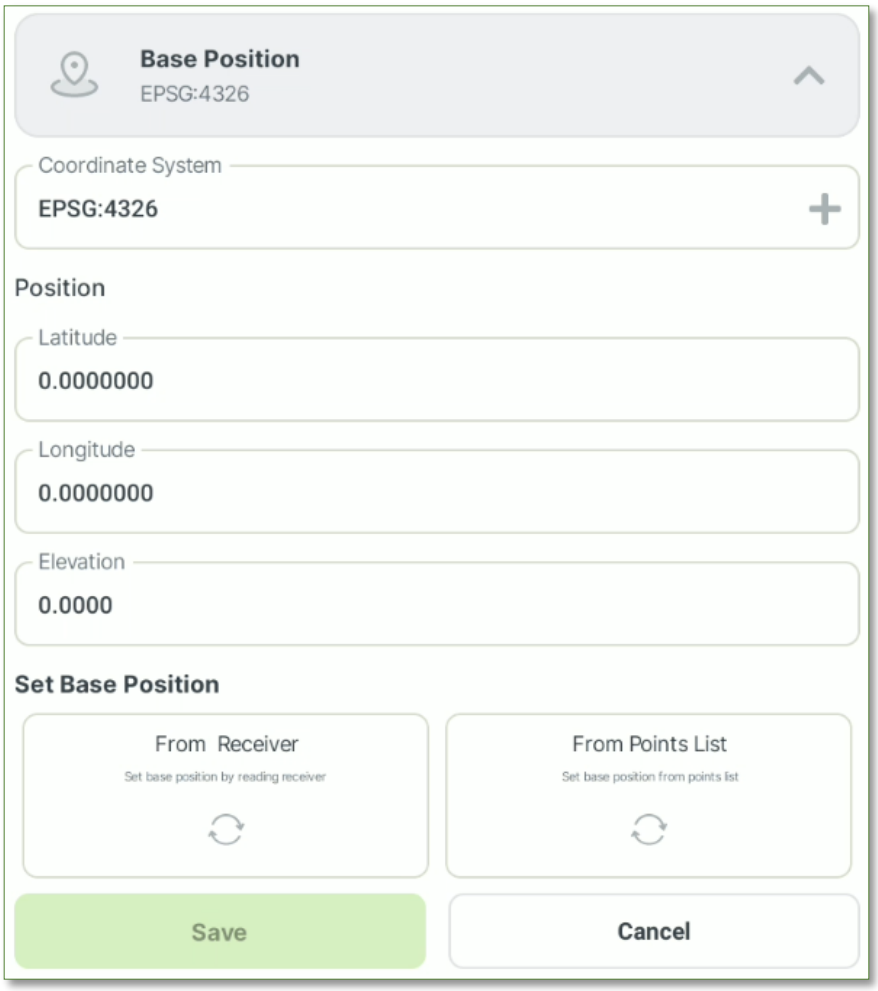


Figure 71: Base Position - Edit Settings

Tap "From Receiver" or "From Points List" to establish a base position for the connected GNSS base receiver for the position values to be entered (shown below).

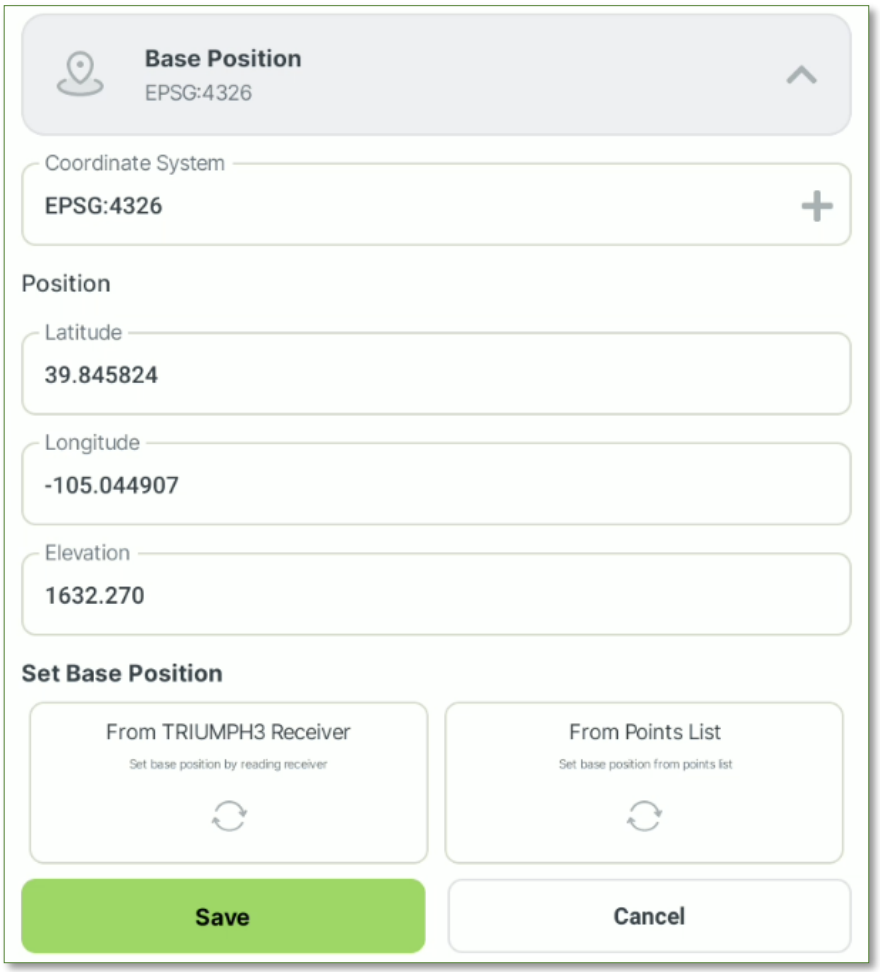


Figure 72: GNSS Base Position Values Entered

Click on the “Save” button to continue the base configuration.

### 8.5.5. Data Logging

If logging data during the GNSS base session is preferred, tap the Data Logging card. Settings can be selected by clicking on "Edit Settings" (shown below), this will allow for the type (Post Processing, Support, or NMEA) to be selected. Each type is described below.


Figure 73: GNSS Base - Data Logging

#### 8.5.5.1. Post Processing

Post Processing will allow for logging a file that can later be post processed to a more precise solution of the static GNSS Base during this session. Tap the "Edit Settings" to open the Data Logging Screen and to configure this type of data logging. The Post Processing card can be expanded to see the current settings (shown below).


Figure 74: GNSS Base - Data Logging - Post Processing Current Settings

| Post Processing Item | Description |
|---|---|
| Post Processing Checkbox | This enables / disables this type of data logging. |
| File Name | This is the file name for the data logging file. |
| Logging Rate | Default for this is 1 second (1 sec) and allows for the rate of stored values in the data logging file. |
| Elevation Mask | This is the elevation mask for the stored values in the data logging file. |
| Message Set | Default for this is def, which is the set of binary messages needed for this data logging type. |

Tap the “Save” Button to save the entered settings for this data logging type. With the settings for this data logging type entered, tap the “Enable Logging” checkbox to enable data logging for this GNSS Base session.

#### 8.5.5.2. Support

Support will allow for logging a file that can later be used for any support activity. Tap the "Edit Settings" to open the Data Logging Screen and to configure this type of data logging. The Support card can be expanded to see the current settings (shown below).


Figure 75: GNSS Base - Data Logging - Support Current Settings

| Support Item | Description |
|---|---|
| Post Processing Checkbox | This enables / disables this type of data logging. |
| File Name | This is the file name for the data logging file. |
| Logging Rate | Default for this is 1 second (1 sec) and allows for the rate of stored values in the data logging file. |
| Elevation Mask | This is the elevation mask for the stored values in the data logging file. |
| Message Set | Default for this is def, which is the set of binary messages needed for this data logging type. |

Tap the "Save" Button to save the entered settings for this data logging type. With the settings for this data logging type entered, tap the "Enable Logging" check box to enable data logging for this GNSS Base session.

### 8.5.5.3. Streams (NMEA)

Stream (NMEA) will allow for NMEA Streams to be logged. Tap the "Edit Settings" to open the Data Logging Screen and to configure this type of data logging. The Streams (NMEA) card can be expanded to see the current settings (shown below). NMEA messages are further described in our GREIS manual.

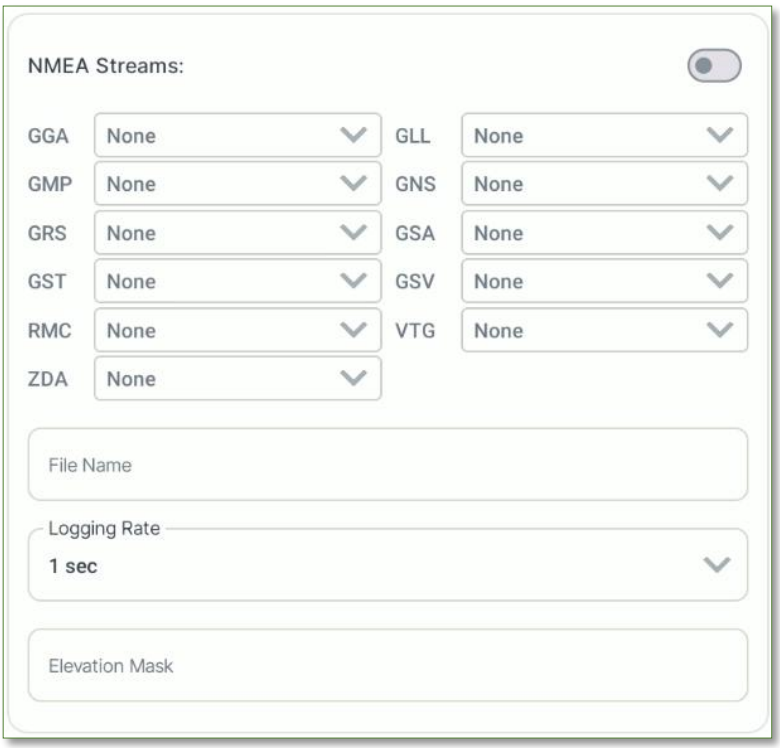


Figure 76: GNSS Base - Data Logging – Streams (NMEA) Current Settings

| Streams (NMEA) Item | Description |
|---|---|
| GGA | Global Position System Fix Data |
| GLL | Geographic Position – Latitude / Longitude Data |
| GMP | GNSS Map Projection Fix Data |
| GNS | GNSS Fix Data |
| GRS | GNSS Range Residuals Data |
| GSA | GNSS DOP and Active Satellites Data |
| GST | GNSS Pseudo-range Error Statistics Data |
| GSV | GNSS Satellites in View Data |
| RMC | Recommended Minimum Specific Data |
| VTG | Course Over Ground and Ground Speed Data |
| ZDA | UTC Time and Data |

Tap the "Save" Button to save the entered settings for this data logging type. With the settings for this data logging type entered, tap the "Enable Logging" checkbox to enable data logging for this GNSS Base session.

### 8.5.6. Start

Once all parameters for the Base Station, Antenna, Corrections, Base Position and Data Logging cards are set, tap “Start” to start the connected GNSS base receiver. A pop-up message will appear to show the status of the current configuration (example: TCP/IP Base, shown below).

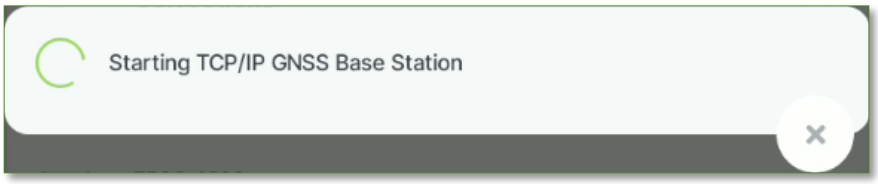


Figure 77: Start GNSS Base

### 8.5.7. Stop

The “Stop” button will appear after a GNSS Base station is active, tap this to stop the GNSS Base session.

### 8.5.8. Restore Default Settings

Tap “Restore Default Settings” to reset all parameters on this screen back to default settings.

## 8.6. GNSS Rover

If a GNSS Rover setup is preferred, click on the “GNSS Rover” card. This will open the GNSS Rover screen and allow for easily configuring the rover parameters. These parameters include antenna, corrections, and data logging. Each of these are further discussed below.

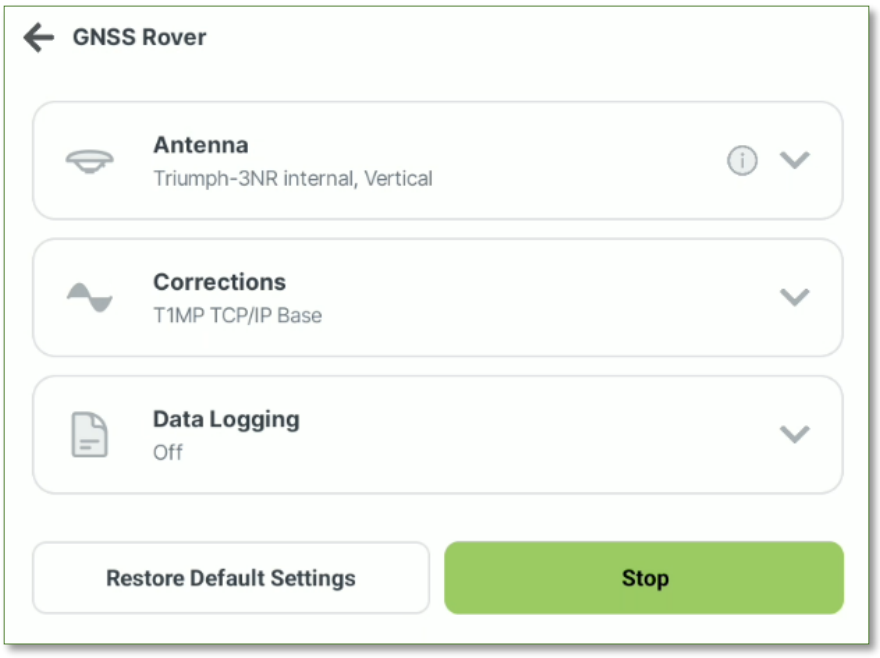


Figure 78: GNSS Rover

### 8.6.1. Antenna

The Antenna card inputs in the values for the Antenna height, height type, and elevation mask. These items are further described below.

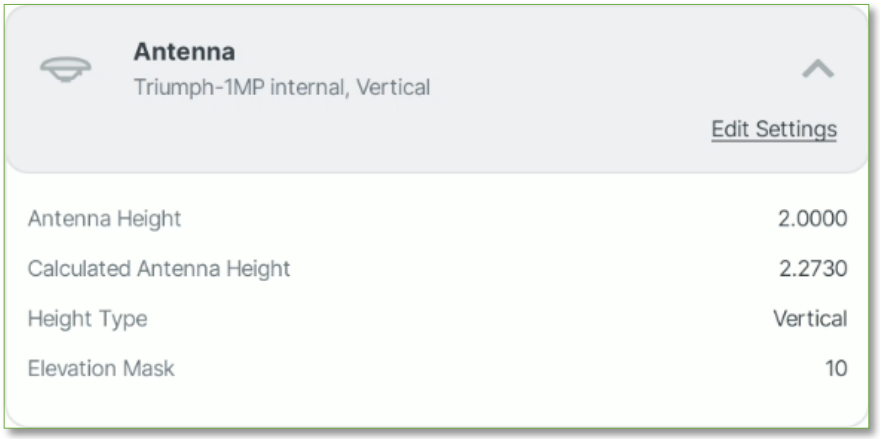


Figure 79: GNSS Rover – Antenna

| GNSS Rover – Antenna Card Item | Description |
|---|---|
| Antenna Height | JAVAD Smart Antennas have a 5/8” threaded adapter to connect to an industry standard tribrach or rod. The check box “Includes JAVAD Thread Adapter” indicates if this adapter is used and will calculate the antenna height value. |
| Calculated Antenna Height | JDC will calculate the antenna height based on the antenna type (vertical / slant) and if a 5/8” thread adapter is being used. |
| Height Type | Receiver height can be measured as either a slant height or vertical height. Vertical height is defined as the distance from the ground marker to antenna reference point. If a 5/8” adapter is used, this height is the distance from the ground to the 5/8” adapter. Slant height is defined as the distance from the ground marker to the slant height mark on the receiver. This value is used to calculate the vertical height. |
| Elevation Mask | The elevation mask is the degrees up (from the 0-degree horizon) the connected receiver will disregard satellite signals. The default value for this parameter is 10 degrees. |

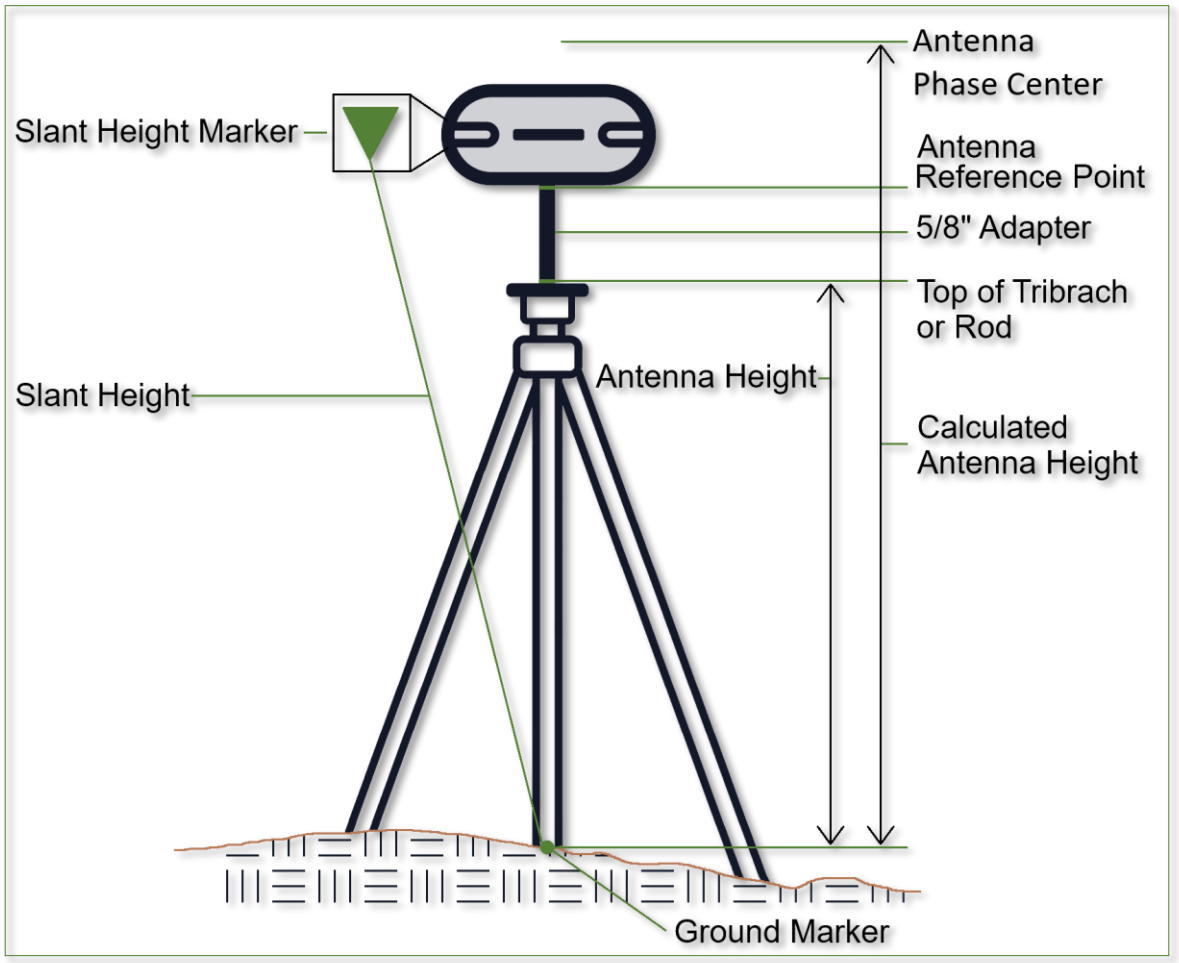


Figure 80: Antenna Diagram

### 8.6.2. Corrections

Configuring the connected receiver as a base requires RTK corrections to be set up. There are many types of corrections setups. JDC will store these correction setups as “Correction Sources” for ease of use. The Correction Sources screen can be accessed by clicking on “Edit Settings” (shown below).

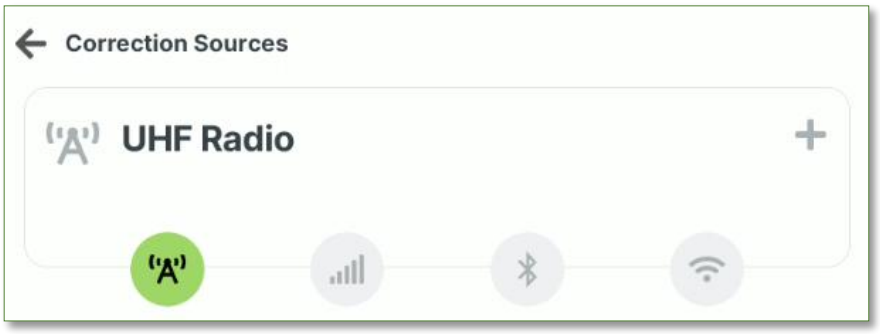


Figure 81: Correction Sources – UHF Radio

#### 8.6.2.1. Correction Sources

For a GNSS Rover, correction sources can be from:

- Internal UHF Radio
- Internal Cell Modem
- Android Data Collector
- WIFI Network

Each of these sources are further described below.

#### 8.6.2.1.1. UHF Radio

This is the initial landing page for Correction Sources. The radio icon filled out in green indicates UHF Radio. To begin a UHF configuration, click the + button. This will open the UHF Radio screen where a new UHF configuration can be completed (shown below with default values).

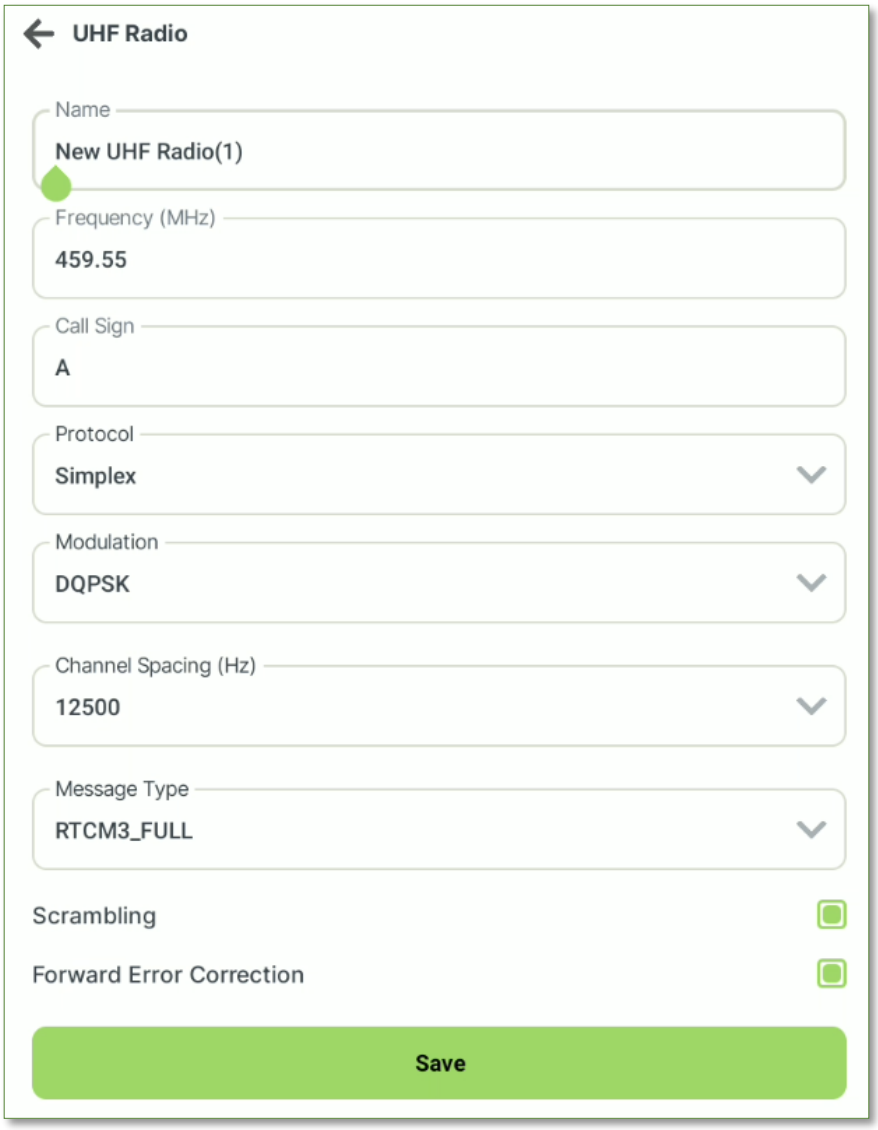


Figure 82: UHF Radio Configuration

Here, the UHF parameters can be selected along with a name. The name (example: 459.55 UHF Low Power) will be saved by JDC to use. It is recommended to have FEC and Scrambling on along with DQPSK to minimize transmission and reception errors in the field. Tap “Save” to save the new UHF configuration. The name given will be now shown in the UHF Radio section of the Correction Sources (shown below).

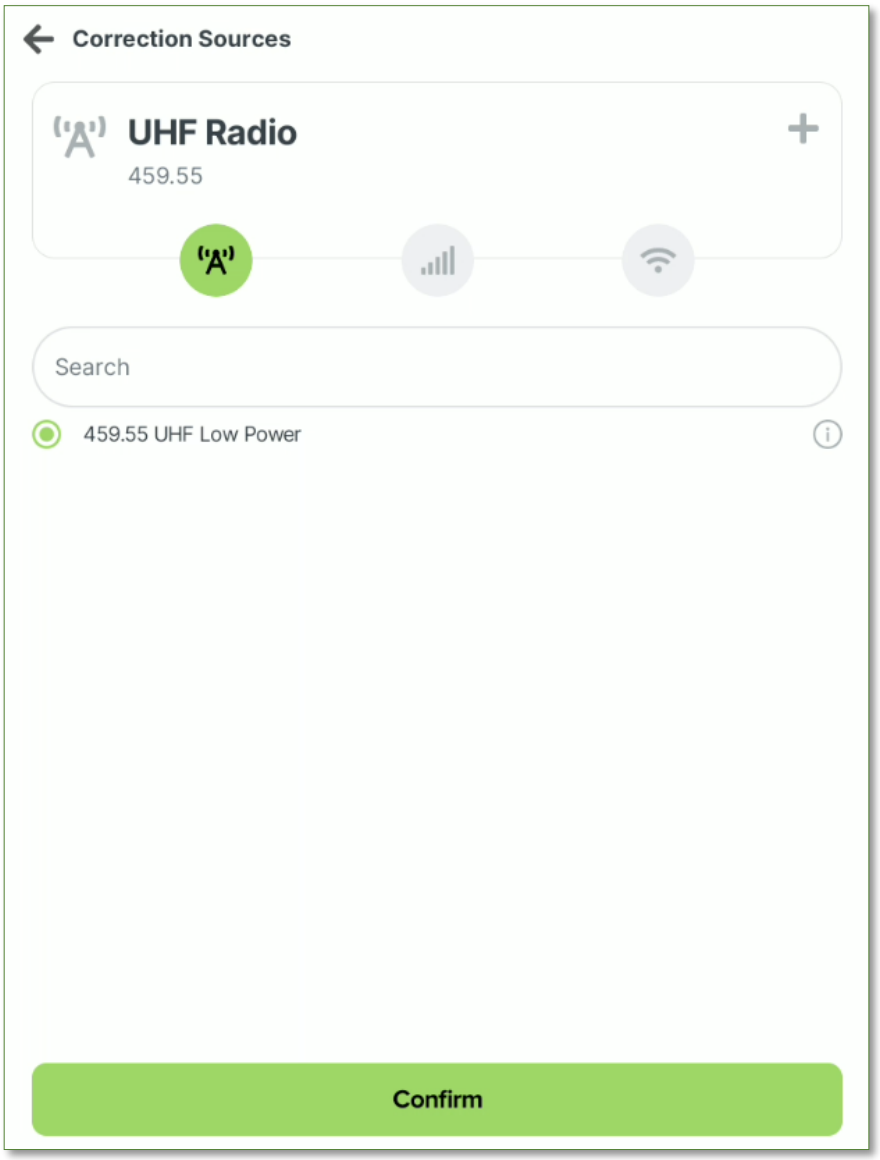


Figure 83: Saved UHF Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected base receiver.

#### 8.6.2.1.2. Cell Modem

Ensure a SIM card is properly installed on the connected device. By default, JDC will show the cell modem as inactive.

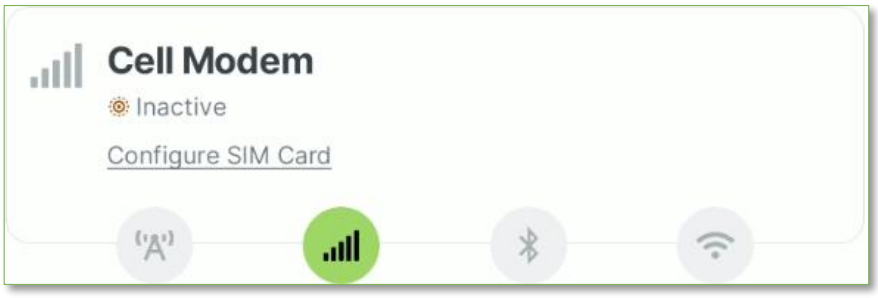


Figure 84: Cell Modem - Inactive

The SIM card can be activated by tapping "Configure SIM card". This will allow for SIM card settings to be entered.

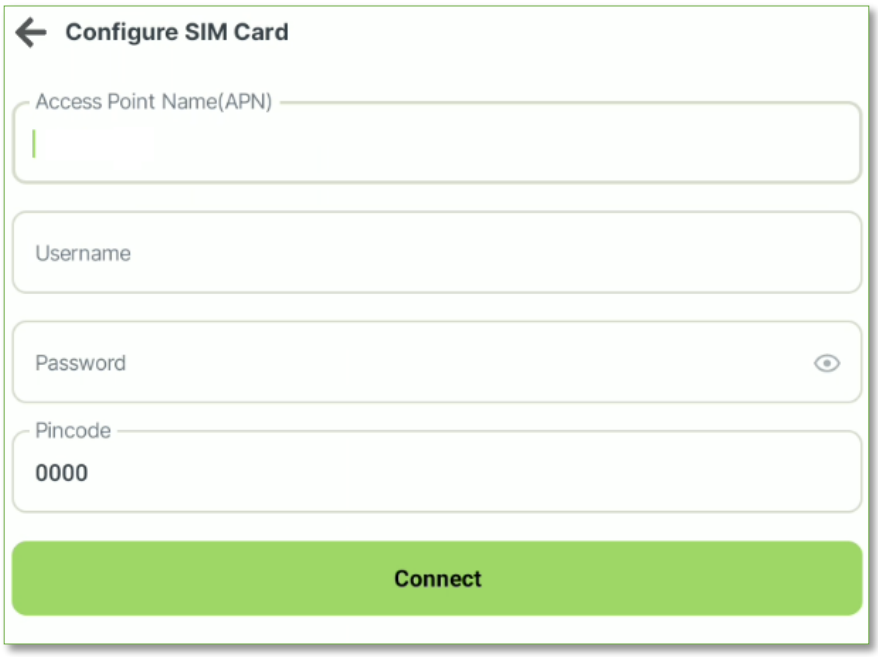


Figure 85: Configure SIM Card

Once the parameters are entered, click "Connect". A "Connecting GSM" pop-up will appear during the connection process.

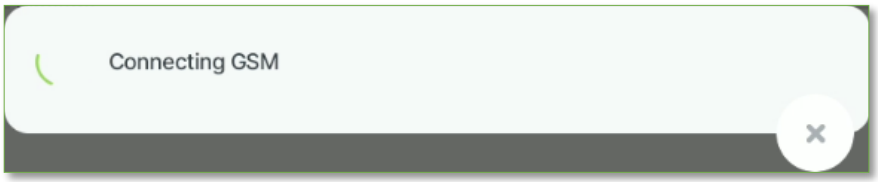


Figure 86: Connecting GSM

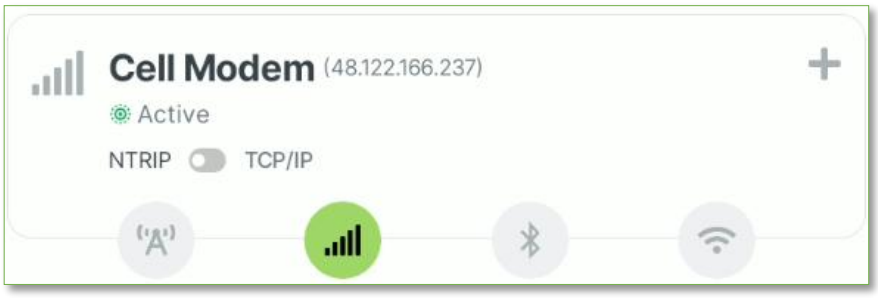


Figure 87: Cell Modem - Active

With the Cell Modem now active, select either NTRIP or TCP/IP and click the + button. This will open the cell modem screen where a new configuration can be completed (shown below with default values).

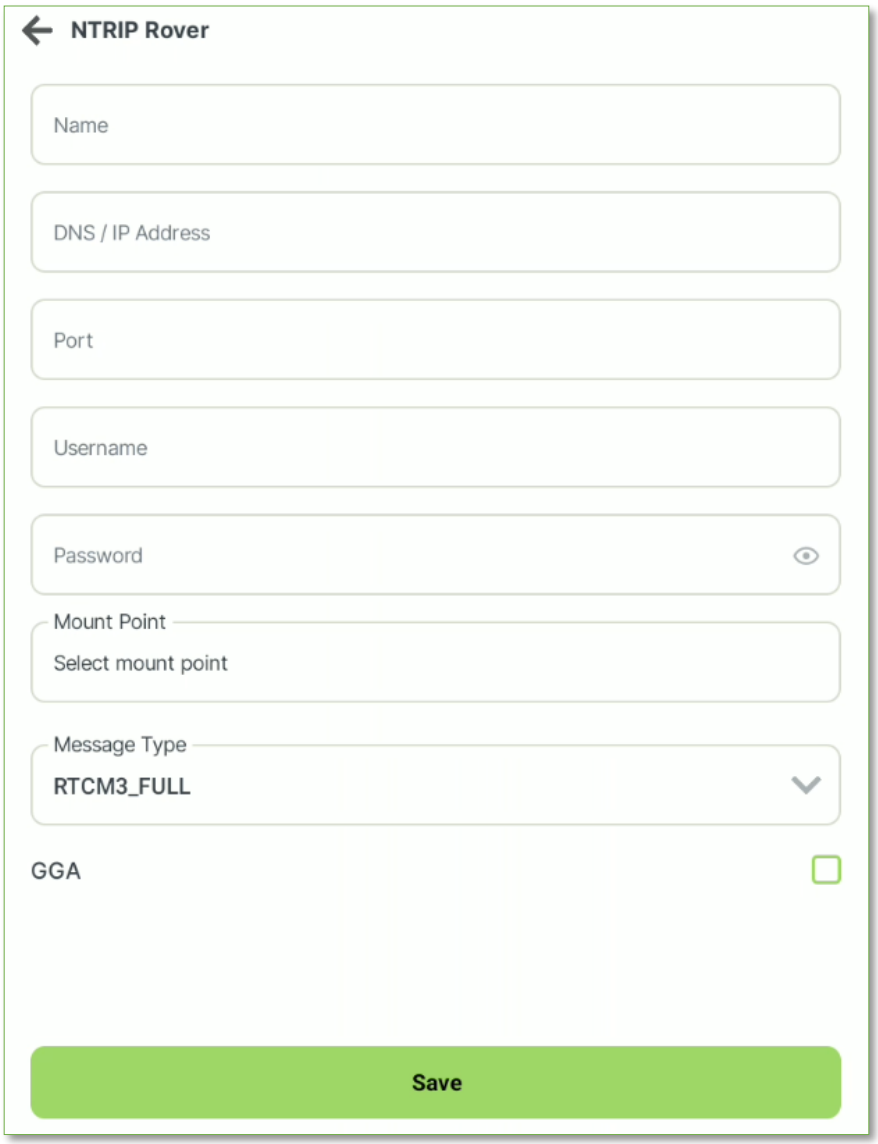


Figure 88: Cell Modem - NTRIP Configuration

#### 8.6.2.1.2.1. NTRIP

Configuring the connected GNSS rover to receive RTK corrections via the Data Collector over NTRIP can be initiated by setting the toggle to “NTRIP” and clicking the + button. This will open the NTRIP Rover screen where the details can be entered. Each detail is further described in the table below.

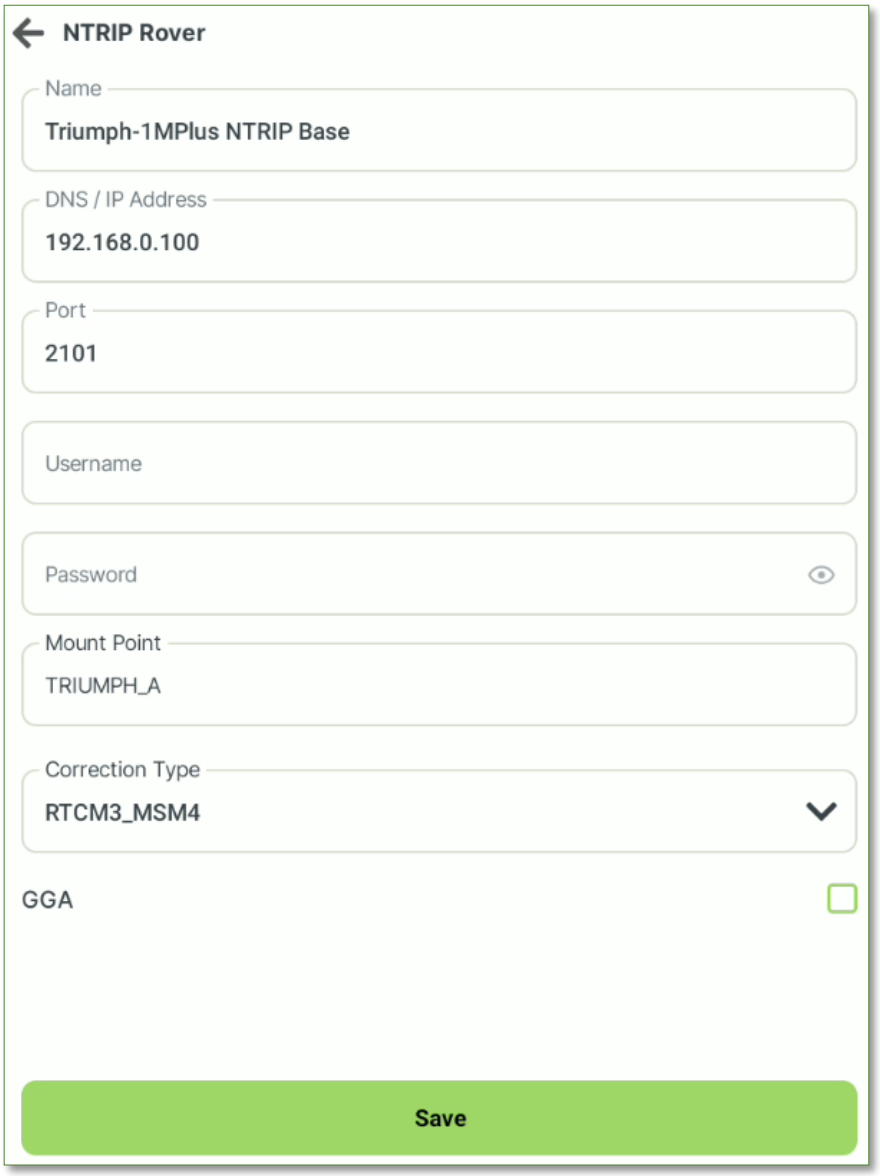


Figure 89: NTRIP Rover

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the Corrections. |
| Port | Default is 2101 and it is the Port to access the RTK corrections. |
| Username | Optional Username |
| Password | Optional Password |
| Mount Point | Options each provider has for RTK Correction Origin |
| Correction Type | The type of corrections to be received. |
| GGA | This sends the Rover's position to the network. Enable if a VRS, Disable if not a VRS. |

Once all details are entered, tap the "Save" button to save the NTRIP Rover configuration source.

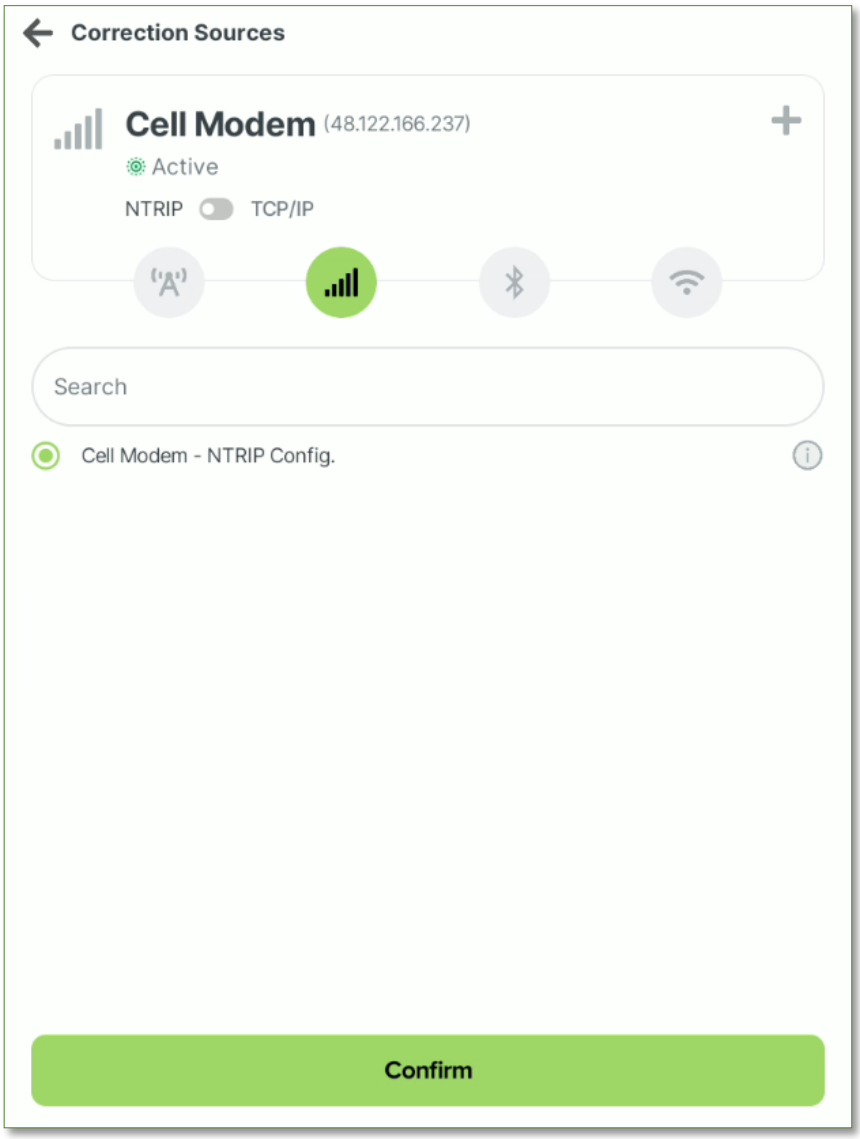


Figure 90: Saved Cell Modem - NTRIP Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS rover.

#### 8.6.2.1.2.2. TCP/IP

Configuring the connected GNSS rover to receive RTK corrections via the Data Collector over TCP/IP can be initiated by setting the toggle to “TCP/IP” and clicking the + button. This will open the TCP/IP Rover screen where the details can be entered. Each detail is further described in the table below.

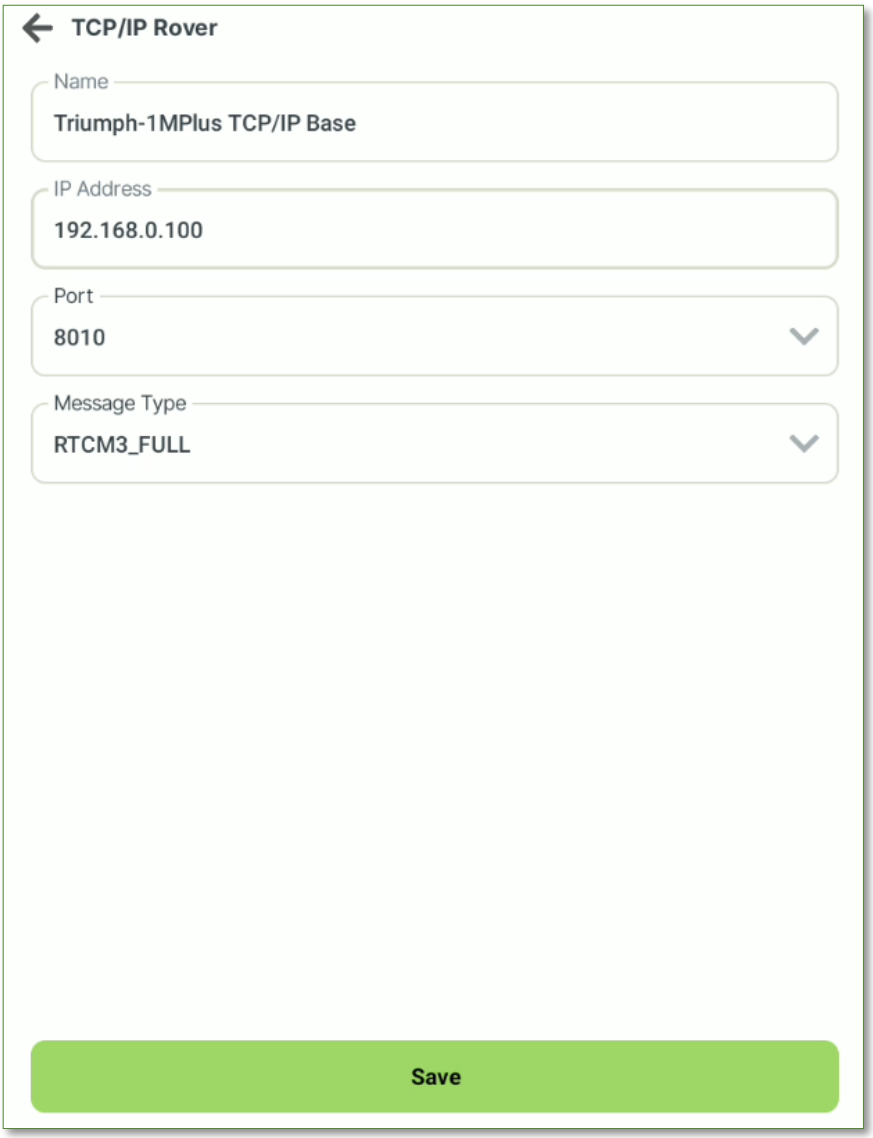


Figure 91: TCP/IP Rover

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the Corrections. |
| Port | Default is 2101 and it is the Port to access the RTK corrections. |
| Mount Point | Options each provider has for RTK Correction Origin |
| Correction Type | The type of corrections to be received. |

Once all details are entered, tap the “Save” button to save the NTRIP Rover configuration source.

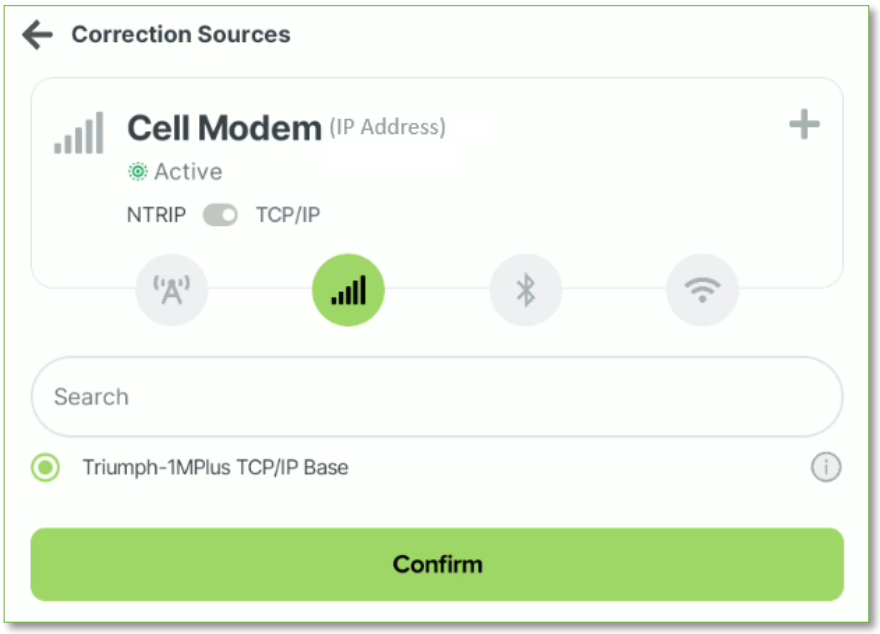


Figure 92: Cell Modem TCP/IP Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS rover.

#### 8.6.2.1.3. Data Collector

A JAVAD Smart Antenna can use Bluetooth to receive corrections directly from the Android with JDC installed. The only requirement (functionally) for this is that the Android device must be connected to the internet (SIM card or WIFI). Given that the Android device is already on the internet, RTK correction streams can be directly established by JDC and sent to the GNSS Rover via Bluetooth.

To start this type of correction source, tap on the Bluetooth icon to open the Data Collector Via an Internet Connection. This can be done either by NTRIP (Username, Password, IP Address and Port Number) or by TCP/IP (IP Address and Port Number only). Both methods are further described below.

##### 8.6.2.1.3.1. NTRIP

Configuring the connected GNSS rover to receive RTK corrections via the Data Collector over NTRIP can be initiated by setting the toggle to “NTRIP” and clicking the + button. This will open the NTRIP Rover screen where the details can be entered. Each detail is further described in the table below.

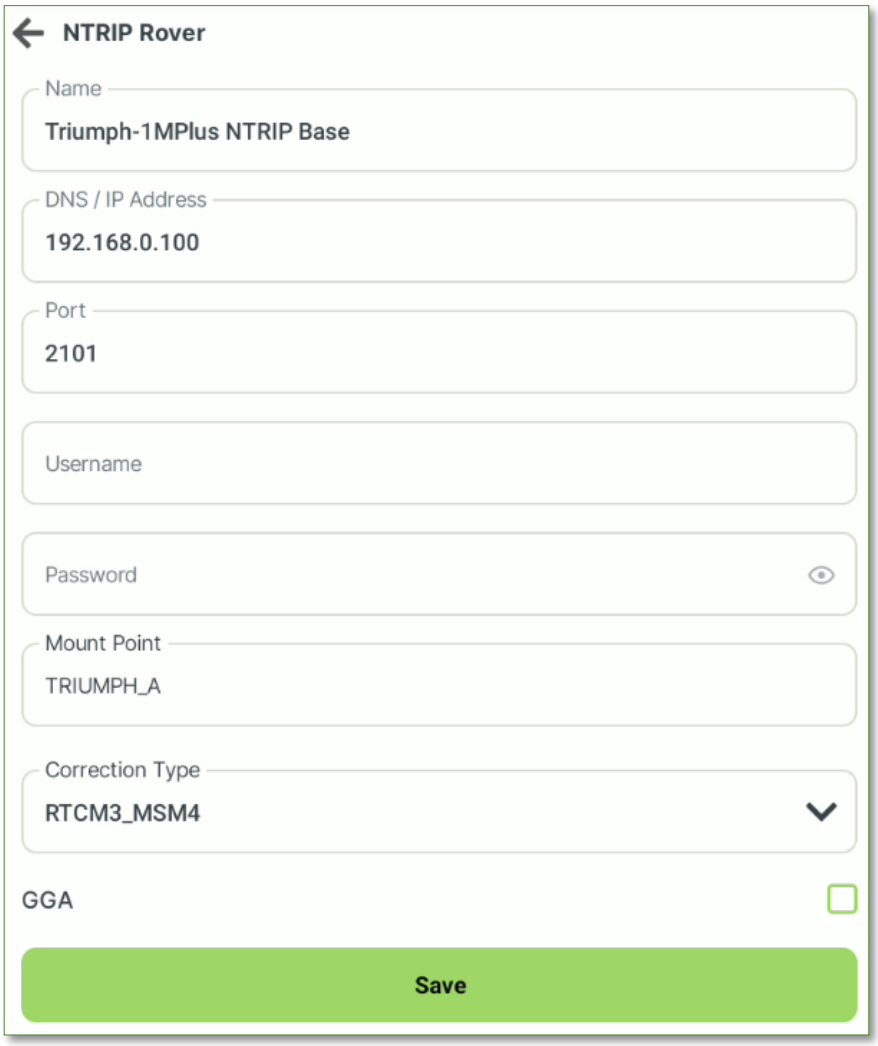


Figure 93: NTRIP Rover

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the Corrections. |
| Port | Default is 2101 and it is the Port to access the RTK corrections. |
| Username | Optional Username |
| Password | Optional Password |
| Mount Point | Options each provider has for RTK Correction Origin |
| Correction Type | The type of corrections to be received. |
| GGA | This sends the Rover's position to the network. Enable if a VRS, Disable if not a VRS. |

Once all details are entered, tap the "Save" button to save the NTRIP Rover configuration source.

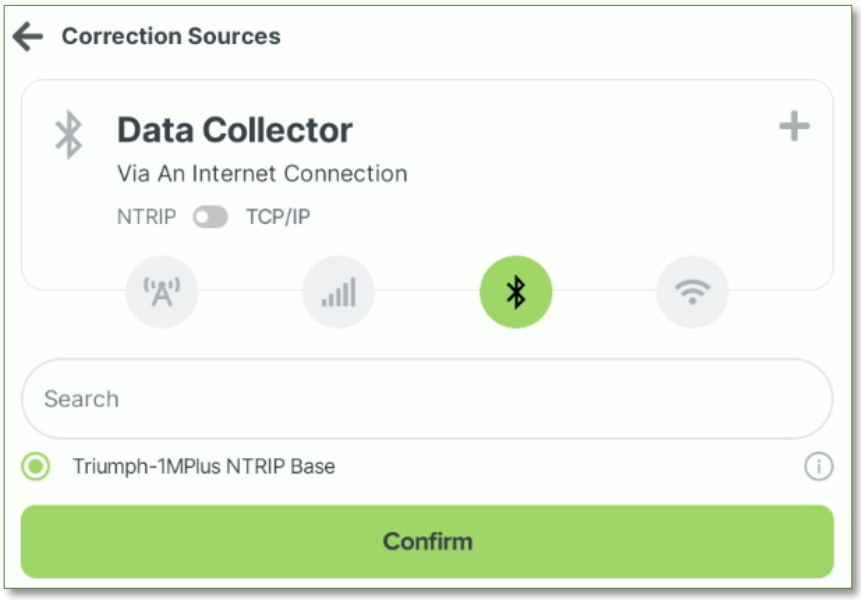


Figure 94: Saved Data Collector Correction Source

Tap the "Confirm" button on the bottom to set this Correction Source for the connected GNSS rover.

#### 8.6.2.1.3.2. TCP/IP

Configuring the connected GNSS rover to receive RTK corrections via the Data Collector over TCP/IP can be initiated by setting the toggle to “TCP/IP” and clicking the + button. This will open the TCP/IP Rover screen where the details can be entered. Each detail is further described in the table below.

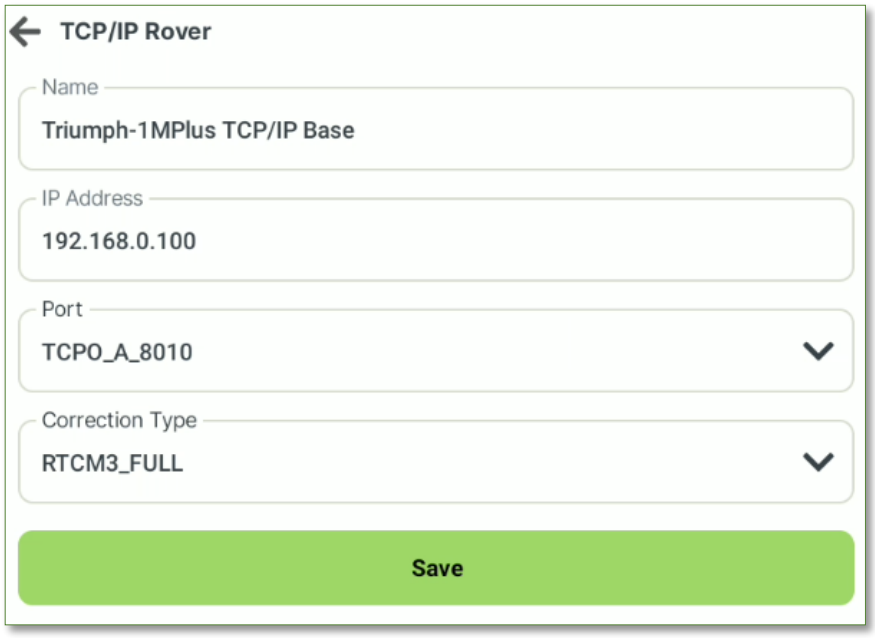


Figure 95: TCP/IP Rover

| NTRIP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the Corrections. |
| Port | Default is 2101 and it is the Port to access the RTK corrections. |
| Mount Point | Options each provider has for RTK Correction Origin |
| Correction Type | The type of corrections to be received. |

Once all details are entered, tap the “Save” button to save the NTRIP Rover configuration source.

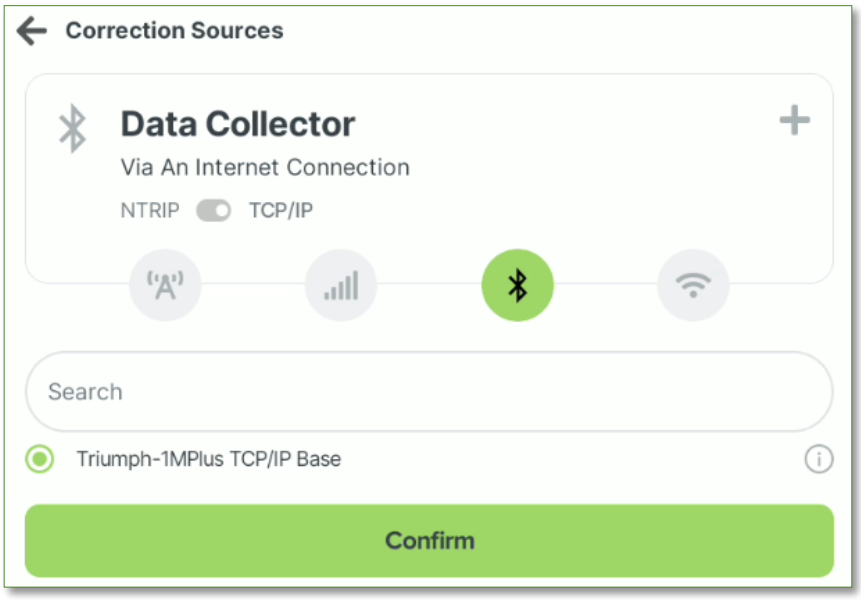


Figure 96: Saved Data Collector Correction Source

Tap the “Confirm” button on the bottom to set this Correction Source for the connected GNSS rover.

#### 8.6.2.1.4. WIFI

JAVAD Smart Antennas can easily be configured to connect to any existing network via WIFI. JDC achieves this in two areas: One to connect to the receiver for configuration and another to receive RTK corrections over a network via NTRIP or TCP/IP. Tapping on the WIFI icon will open the WIFI card (shown below). Configuring the receiver to connect to a WIFI network and to receive RTK corrections are done in this card. This is discussed in further detail below.

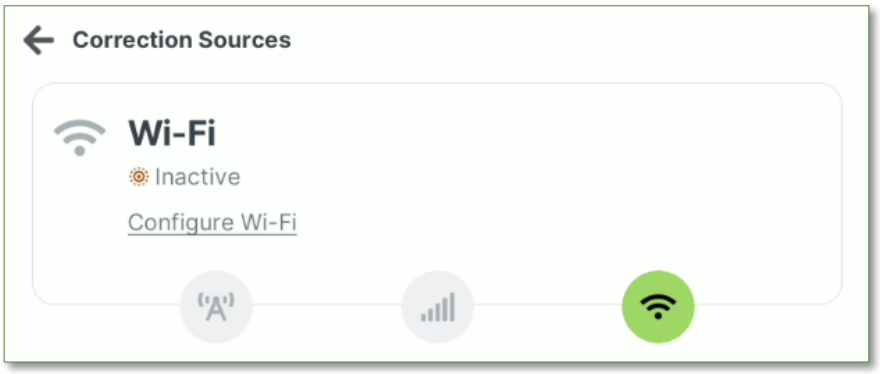


Figure 97: Correction Sources - WIFI

##### 8.6.2.1.4.1. Configure WIFI

To configure the JAVAD Smart Antenna to connect to a network via WIFI, tap "Configure WIFI" to open the Add WIFI screen (shown below). Type in the SSID (name) and the Password of the preferred WIFI network and tap the "Connect" button to configure the receiver.


Figure 98: Configure WIFI

After the "Connect" button is tapped, the connected receiver will be programmed and reboot with the new WIFI parameters.

Connection to the network is automatic and may take a few minutes.  A pop-up message will show onscreen, the message may be closed during this process if preferred (shown below).

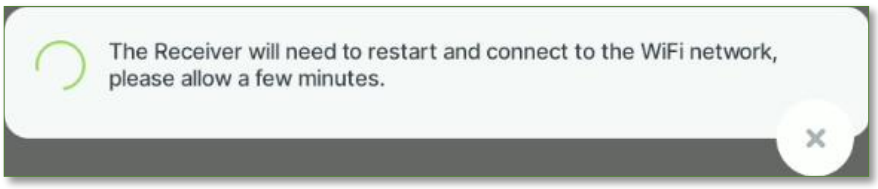


Figure 99: WIFI Receiver Configuration Message

Once the connection is established, the WIFI card will show the connected receivers IP address along with “Active” (shown below).

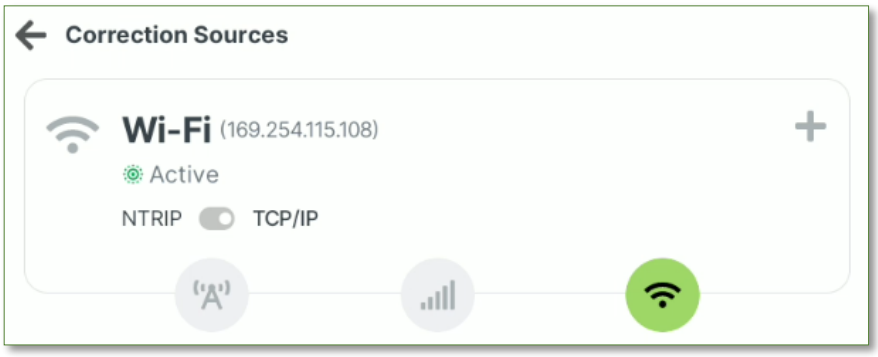


Figure 100: WIFI Active

The connected GNSS rover receiver can now be configured to receive RTK corrections via WIFI.  This can be done either by NTRIP (Username, Password, IP Address and Port Number) or by TCP/IP (IP Address and Port Number only). Both methods are further described below.

#### 8.6.2.1.4.2. NTRIP

Configuring the connected GNSS rover receiver to receive RTK corrections over NTRIP can be initiated by setting the toggle to “NTRIP” and clicking the + button. This will open the NTRIP Rover screen where the details can be entered. Each detail is further described in the table below.

Once all details are entered, tap the “Save” button to save the NTRIP Rover configuration source.

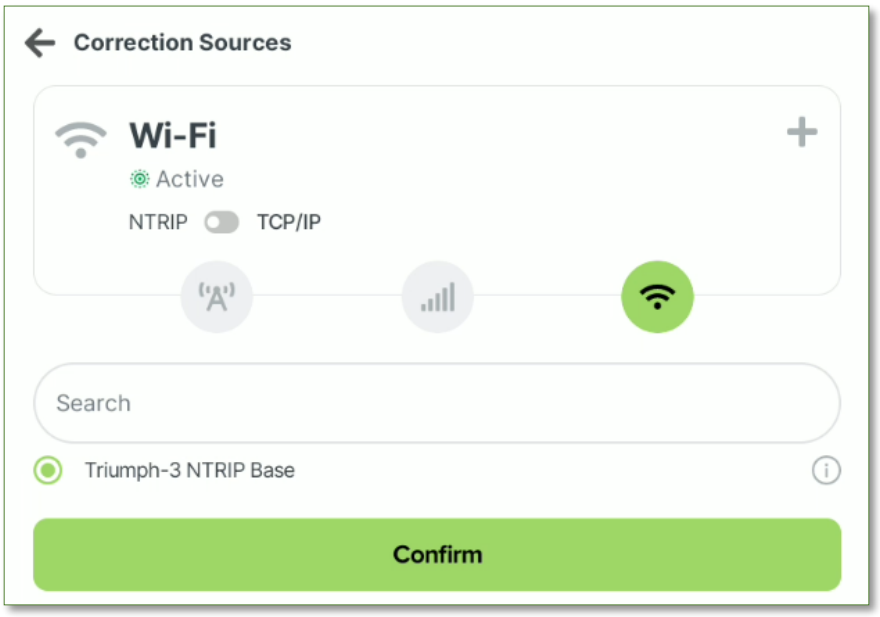


Figure 101: Saved WIFI Correction Source

| NTRIP Rover Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the corrections. |
| Port | Default is 2101. |
| Username | Optional Username of the NTRIP correction source. |
| Password | Optional Password of the NTRIP correction source. |
| Mount Point | The Mount Point is the specific stream of RTK data. |
| Correction Type | The type of RTK corrections. |

Tap the “Confirm” button on the bottom to set the preferred Correction Source for the connected GNSS rover receiver.

#### 8.6.2.1.4.3. NTRIP Option Not Purchased

Please note that NTRIP is an option that can be purchased directly from JAVAD GNSS, if the option is not purchased the following pop-up message will be shown.

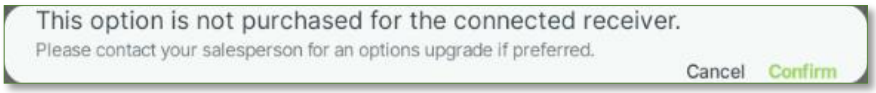


Figure 102: Options Upgrade Needed

If this is the case and the option is preferred, please contact JAVAD GNSS Sales to purchase. Tap the “Confirm” to exit the pop-up.

#### 8.6.2.1.4.4. TCP/IP

Configuring the connected GNSS rover receiver to receive RTK corrections over TCP/IP can be initiated by setting the toggle to “TCP/IP” and clicking the + button. This will open the TCP/IP Rover screen where the details can be entered. Each detail is further described in the table below.

Once all details are entered, tap the “Save” button to save the TCP/IP Rover configuration source.

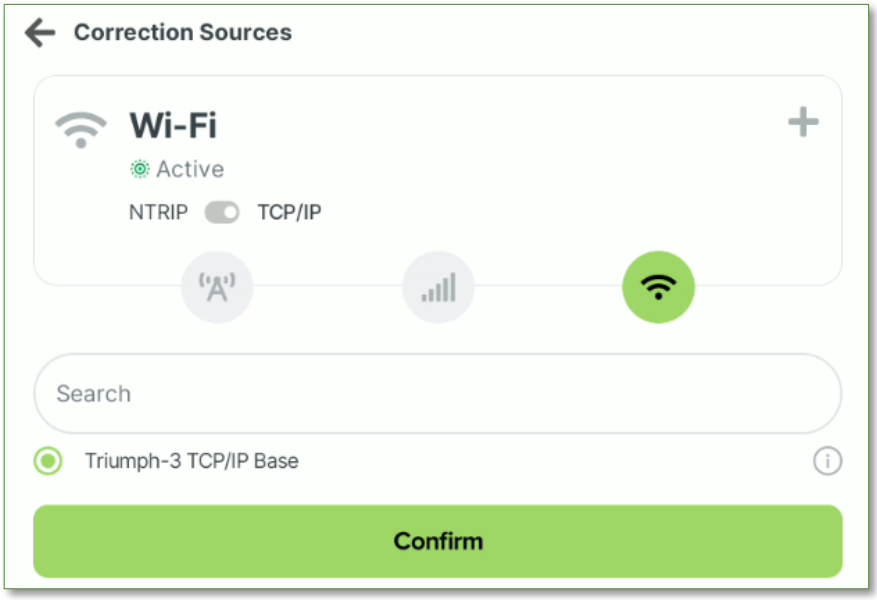


Figure 103: Saved TCP/IP Correction Source

| TCP/IP Base Item | Description |
|---|---|
| Name | The Name of the Correction Source. |
| DNS / IP Address | The IP Address of the RTK corrections. |
| Port | The Port of the RTK corrections. |
| Correction Type | The type of RTK corrections. |

Tap the “Confirm” button on the bottom to set the preferred Correction Source for the connected GNSS rover receiver.

### 8.6.3. Data Logging

If logging data during the GNSS rover session is preferred, tap the Data Logging card. Settings can be selected by clicking on "Edit Settings" (shown below), this will allow for the type (Post Processing, Support, or NMEA) to be selected. Each type is described below.

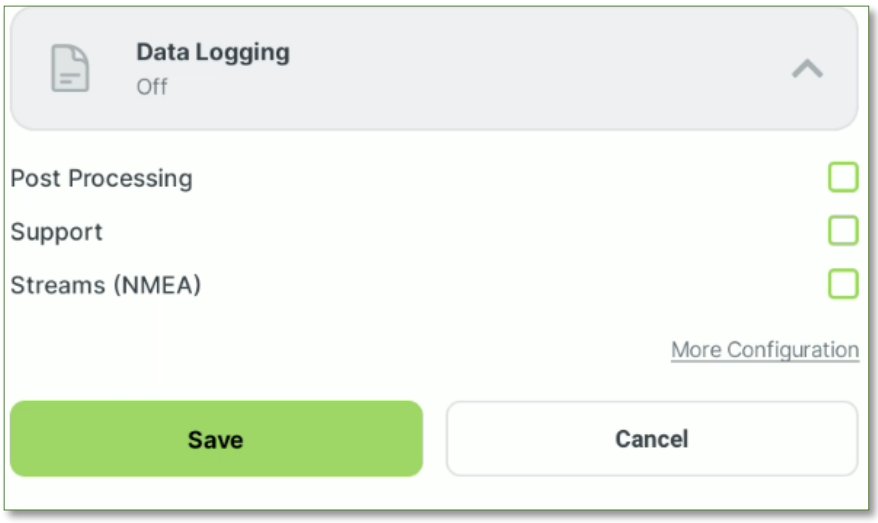


Figure 104: GNSS Rover - Data Logging

#### 8.6.3.1. Post Processing

Post Processing will allow for logging a file that can later be post processed to a more precise solution of the static GNSS Rover during static periods of this session. Tap the "More Configuration" to open the Data Logging Screen and to configure this type of data logging. The Post Processing card can be expanded to see the current settings (shown below).

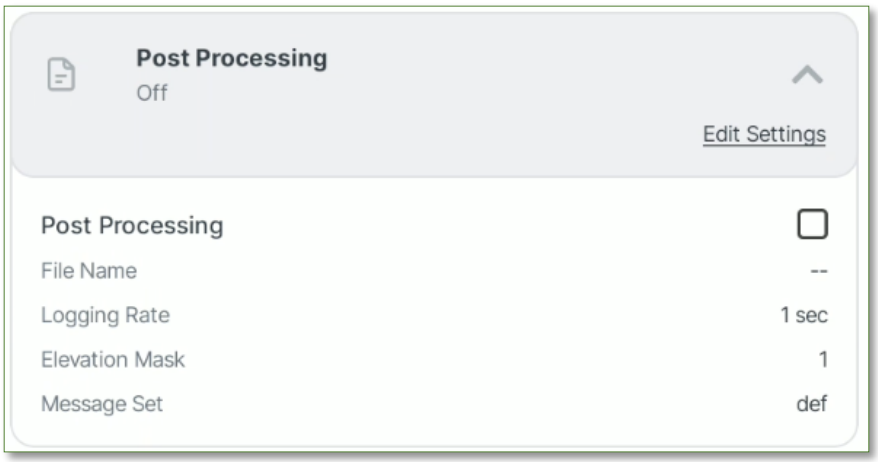


Figure 105: GNSS Rover - Data Logging - Post Processing Current Settings

By default, these settings will be blank.  Tap “Edit Settings” to enter the preferred post processing data logging parameters.

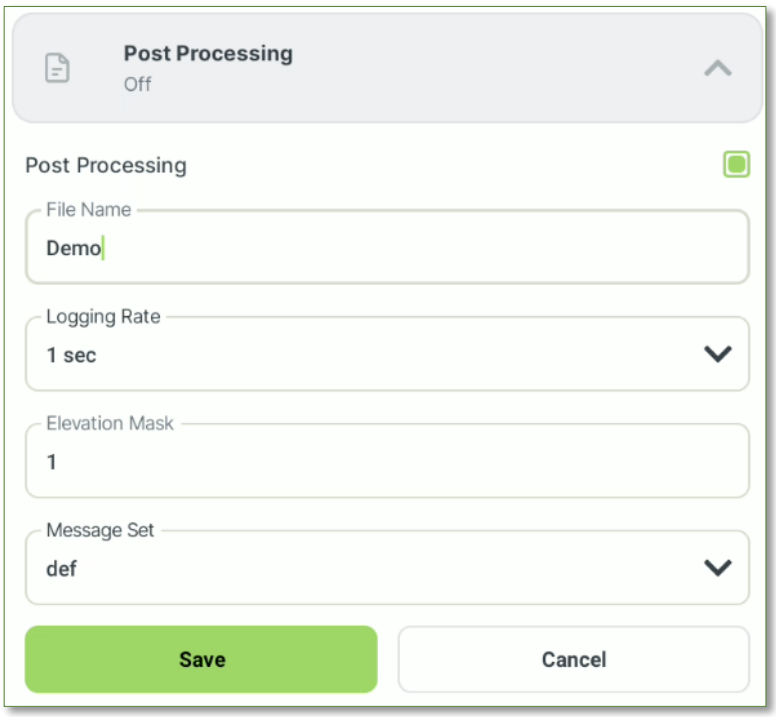


Figure 106: GNSS Rover - Data Logging - Post Processing - Enter Settings

| Post Processing Item | Description |
|---|---|
| Post Processing Checkbox | This enables / disables this type of data logging. |
| File Name | This is the file name for the data logging file. |
| Logging Rate | Default for this is 1 second (1 sec) and allows for the rate of stored values in the data logging file. |
| Elevation Mask | This is the elevation mask for the stored values in the data logging file. |
| Message Set | Default for this is def, which is the set of binary messages needed for this data logging type. |

Tap the “Save” Button to save the entered settings for this data logging type. With the settings for this data logging type entered, tap the “Enable Logging” checkbox to enable data logging for this GNSS Rover session.

### 8.6.3.2. Support

Support will allow logging a file that can later be used for any support activity. Tap the "More Configuration" to open the Data Logging Screen and to configure this type of data logging. The Support card can be expanded to see the current settings (shown below).


Figure 107: GNSS Rover - Data Logging - Support Current Settings

By default, these settings will be blank. Tap "Edit Settings" to enter the preferred parameters.

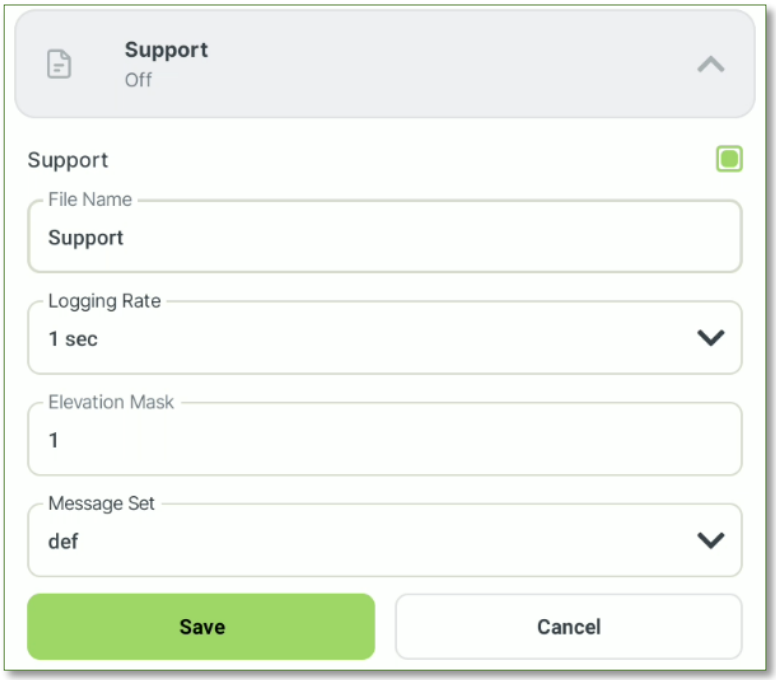


Figure 108: GNSS Rover - Data Logging - Support - Enter Settings

| Support Item | Description |
|---|---|
| Post Processing Checkbox | This enables / disables this type of data logging. |
| File Name | This is the file name for the data logging file. |
| Logging Rate | Default for this is 1 second (1 sec) and allows for the rate of stored values in the data logging file. |
| Elevation Mask | This is the elevation mask for the stored values in the data logging file. |
| Message Set | Default for this is def, which is the set of binary messages needed for this data logging type. |

Tap the “Save” Button to save the entered settings for this data logging type. With the settings for this data logging type entered, tap the “Enable Logging” check box to enable data logging for this GNSS Rover session.

#### 8.6.3.3. Streams (NMEA)

Stream (NMEA) will allow for NMEA Streams to be logged. Tap the "More Configuration" to open the Data Logging Screen and to configure this type of data logging. The Streams (NMEA) card can be expanded to see the current settings (shown below). NMEA messages are further described in our GREIS manual.

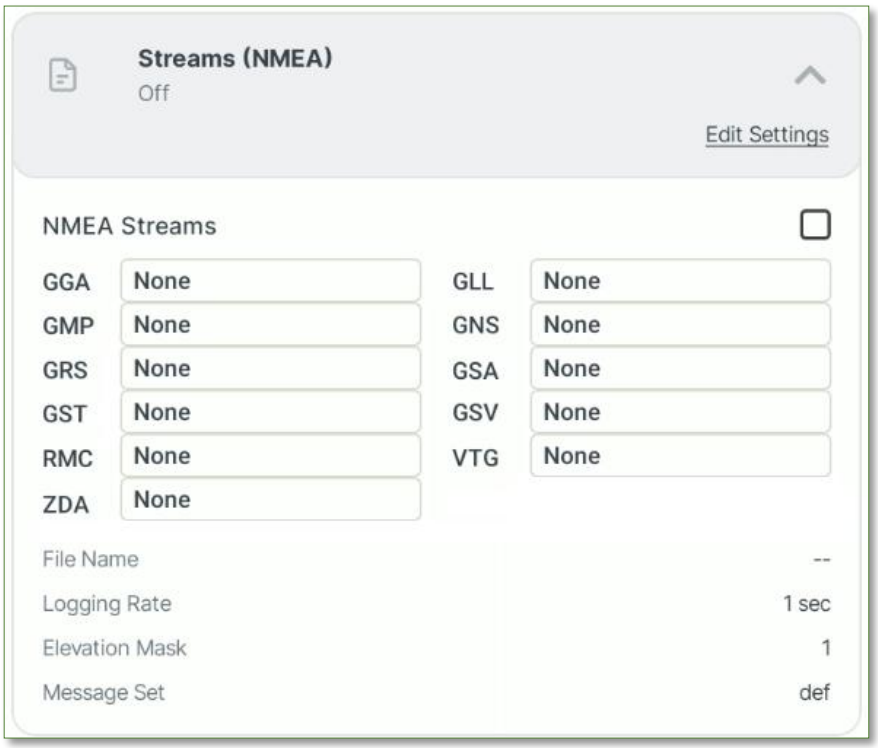


Figure 109: GNSS Rover - Data Logging – Streams (NMEA) Current Settings

By default, these settings will be blank. Tap "Edit Settings" to enter the preferred parameters.

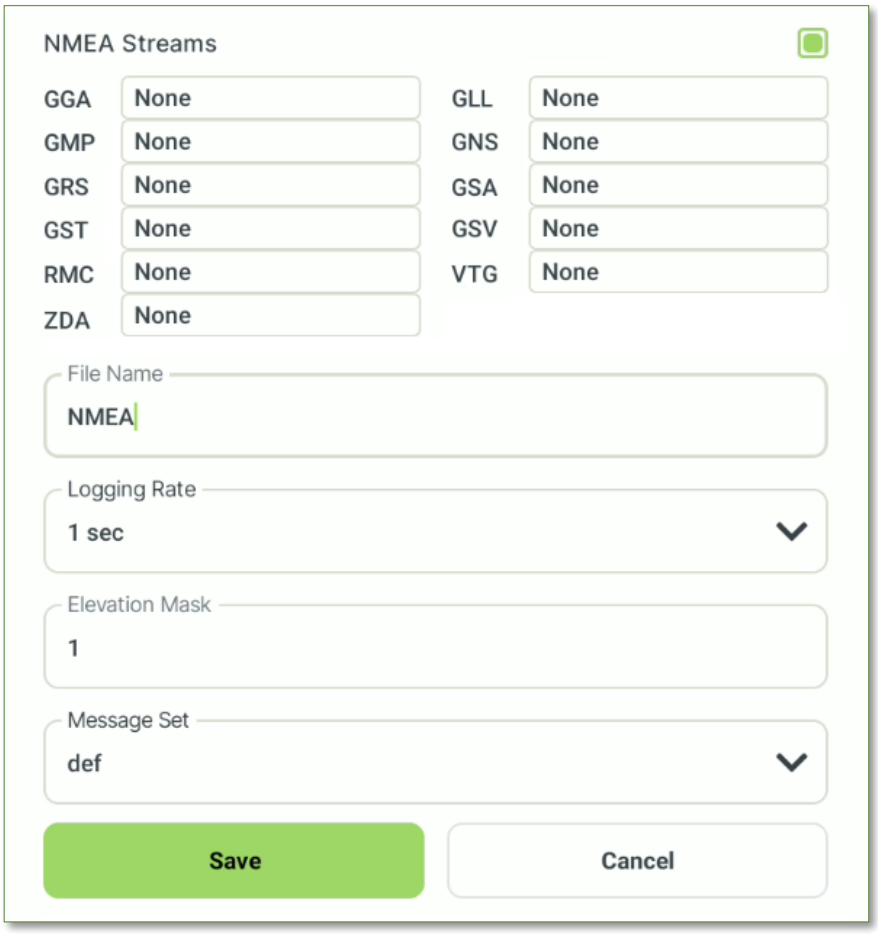


Figure 110: GNSS Rover - Data Logging – Streams (NMEA) - Enter Settings

| Streams (NMEA) Item | Description |
|---|---|
| GGA | Global Position System Fix Data |
| GLL | Geographic Position – Latitude / Longitude Data |
| GMP | GNSS Map Projection Fix Data |
| GNS | GNSS Fix Data |
| GRS | GNSS Range Residuals Data |
| GSA | GNSS DOP and Active Satellites Data |
| GST | GNSS Pseudo-range Error Statistics Data |
| GSV | GNSS Satellites in View Data |
| RMC | Recommended Minimum Specific Data |
| VTG | Course Over Ground and Ground Speed Data |
| ZDA | UTC Time and Data |

Tap the “Save” Button to save the entered settings for this data logging type. With the settings for this data logging type entered, tap the “Enable Logging” checkbox to enable data logging for this GNSS Rover session.

### 8.6.4. Start

Once all parameters for the Base Station, Antenna, Corrections, Base Position and Data Logging cards are set, tap “Start” to start the connected GNSS base receiver. A pop-up message will appear to show the status of the current configuration (example: TCP/IP Base, shown below).

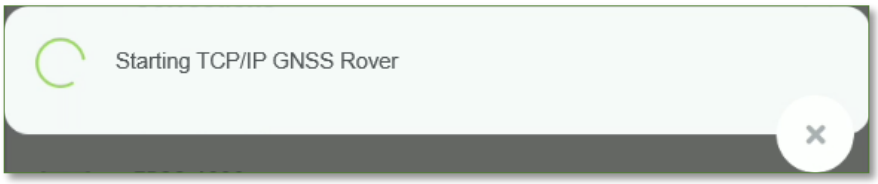


Figure 111: Start GNSS Base

### 8.6.5. Stop

The “Stop” button will appear after a GNSS Rover is active, tap this to stop the GNSS Rover session.

### 8.6.6. Reset Rover

Tap “Reset Rover” to reset all parameters on this screen back to default settings.

## 8.7. GNSS Static

If a GNSS Static setup is preferred, click on the “GNSS Static” card. This will open the GNSS Static screen and allow for easily configuring the static parameters. These parameters include antenna, and data logging. Each of these are further discussed below.

### 8.7.1. Antenna

The Antenna card inputs in the values for the Antenna height, height type, and elevation mask. These items are further described below.

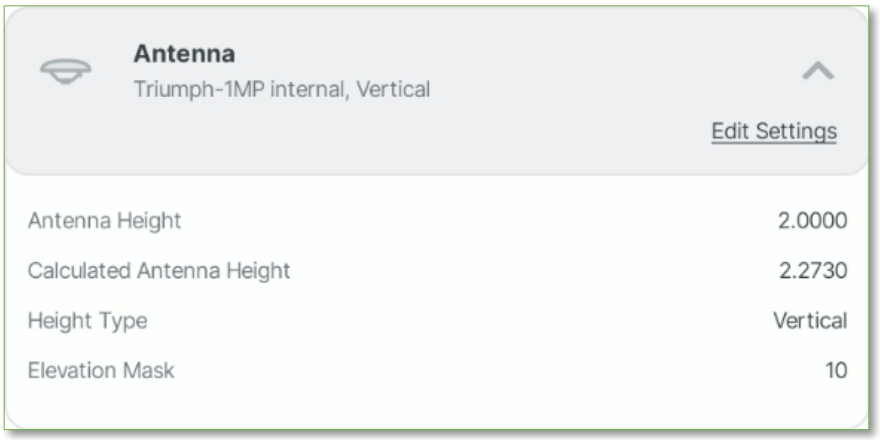


Figure 112: GNSS Static – Antenna

| GNSS Static – Antenna Card Item | Description |
|---|---|
| Antenna Height | JAVAD Smart Antennas have a 5/8” threaded adapter to connect to an industry standard tribrach or rod. The check box “Includes JAVAD Thread Adapter” indicates if this adapter is used and will calculate the antenna height value. |
| Calculated Antenna Height | JDC will calculate the antenna height based on the antenna type (vertical / slant) and if a 5/8” thread adapter is being used. |
| Height Type | Receiver height can be measured as either a slant height or vertical height. Vertical height is defined as the distance from the ground marker to antenna reference point. If a 5/8” adapter is used, this height is the distance from the ground to the 5/8” adapter. Slant height is defined as the distance from the ground marker to the slant height mark on the receiver. This value is used to calculate the vertical height. |
| Elevation Mask | The elevation mask is the degrees up (from the 0-degree horizon) the connected receiver will disregard satellite signals. The default value for this parameter is 10 degrees. |

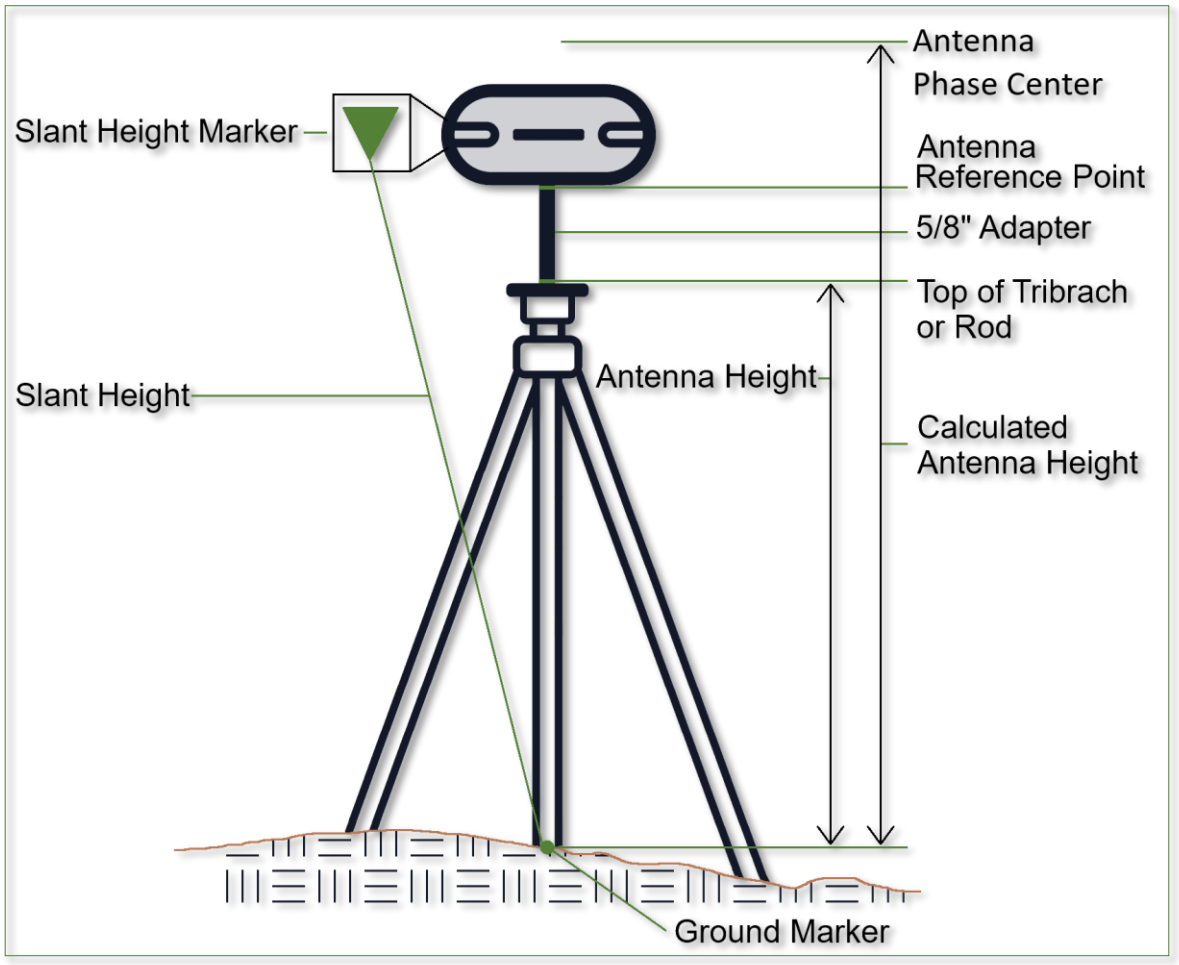


Figure 113: Antenna Diagram

### 8.7.2. Data Logging

Logging data during a GNSS Static session will be for purposes of post processing. The file name, occupation time, logging rate, and elevation mask can be selected for each GNSS Static logging file. Each of these will be further discussed below.


Figure 114: GNSS Static - Data Logging

#### 8.7.2.1. Static Data Logging Parameters

Tap on the "Edit Settings" to open the static data logging parameters. These parameters are:

- File Name – The file name for the logged GNSS Static file.
- Logging Rate – The rate at which measurements will be logged within the logged file.
- Elevation Mask – The degrees (above the horizon, which is 0) for the elevation mask to filter the GNSS measurements within the logged file.

## 8.8. Localization

The localization routine will start with a selected coordinate system and with linked control points (from another system) will calculate a localized coordinate system for the user to name and use when preferred.

To start this routine, tap on “Localization” from the setup menu.

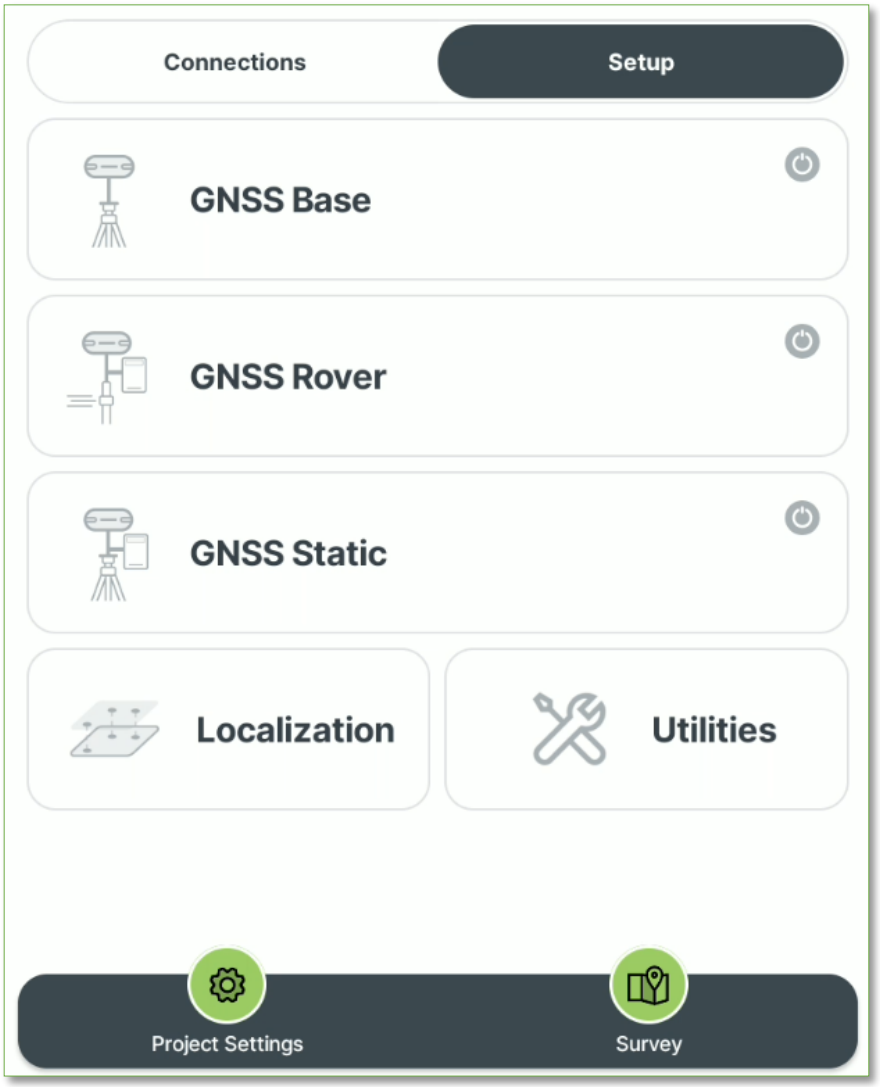


Figure 115: Setup – Localization

This will open Localization where three cards are shown.  These cards are:

- Current Coordinate System
- Localization Name
- Control Points

Below is a button to “Add Control Points”, and a “Calculate” button.

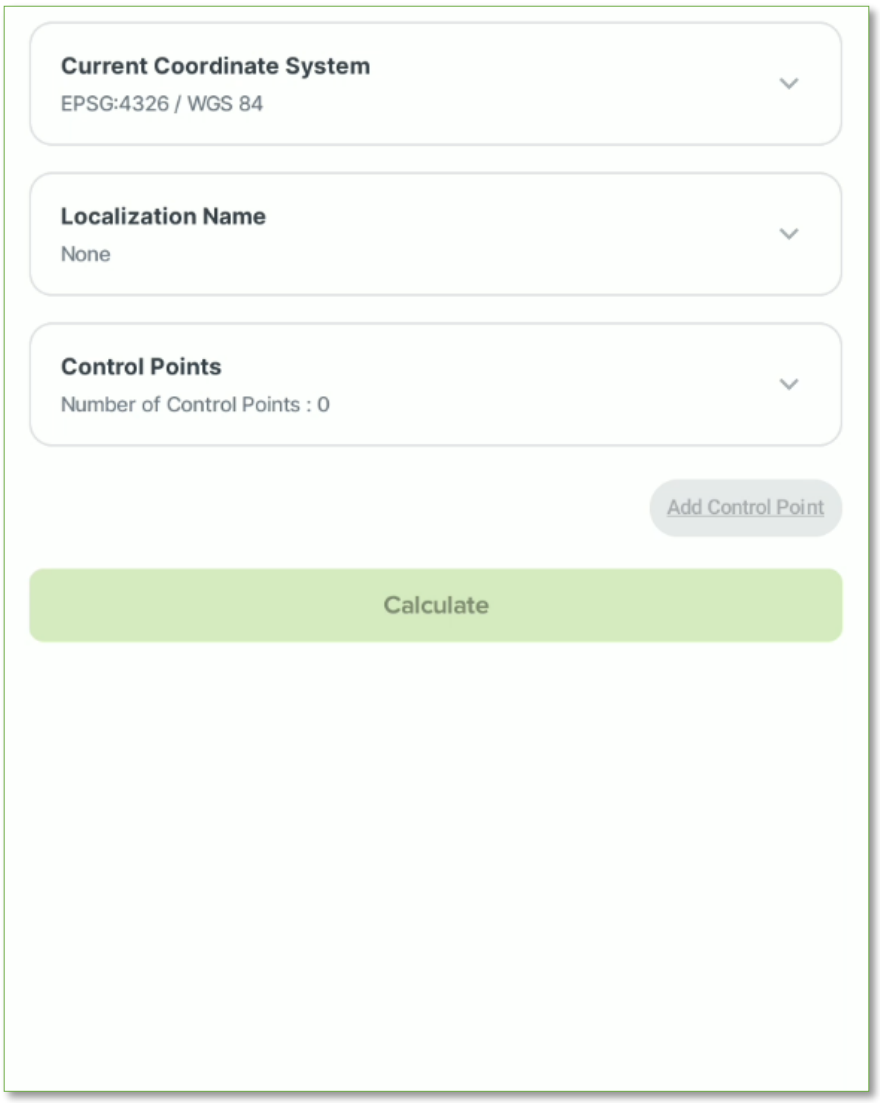


Figure 116: Localization Menu

The Current Coordinate System card can be expanded to show the user-selected coordinate system name and code for that project.

The Localization Name card can be expanded to show options to Add a new Localization or Select Localization.


Figure 117: Localization Name Card Expanded

Tap “Add a new Localization” to create a new localization. Tap “Select Localization” to select previously created localization. Selecting “Add a new Localization” will expand to allow for the Localization name to be entered, along with the coordinate system and measurement system.

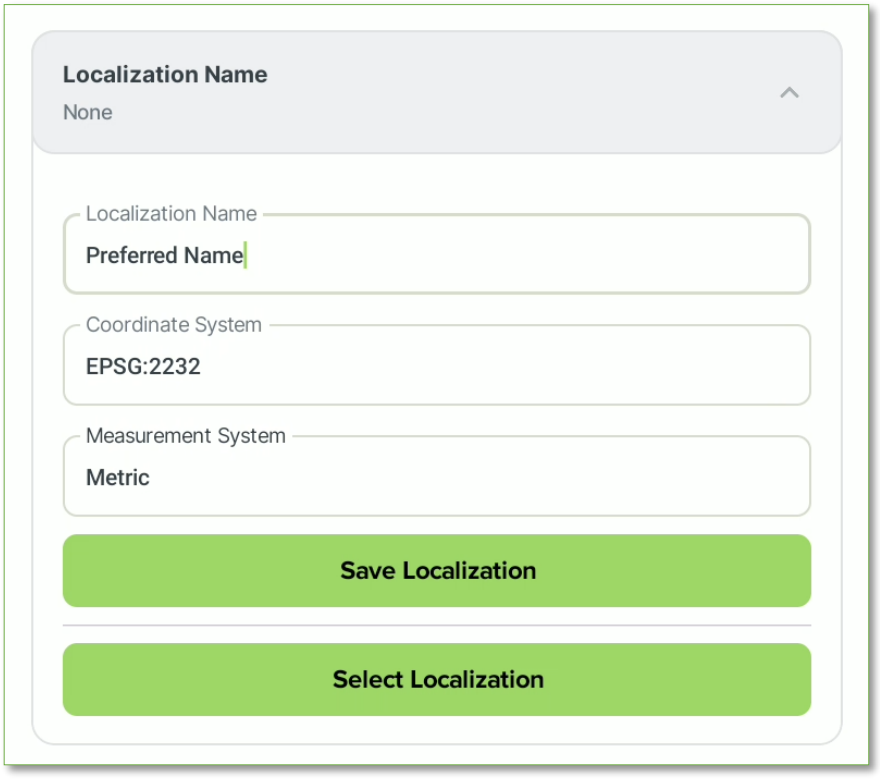


Figure 118: Add a New Localization

With a new selected localization, the user can now add in control points.

The Control Points card will start empty and can be expanded to show this status. Tap on "Add Control Point" to add in control points.

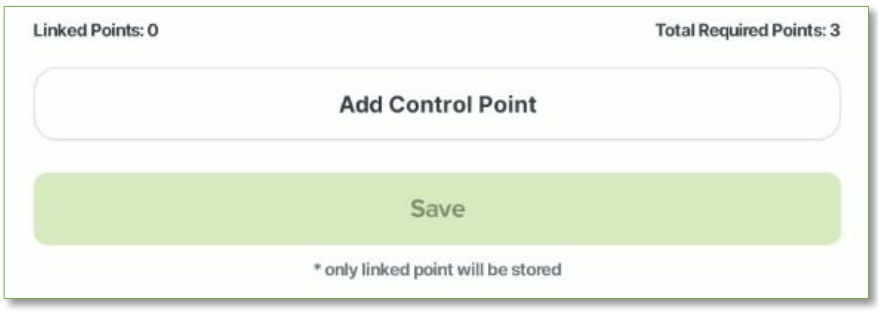


Figure 119: Add Control Point

Control Points can be added from a file or added manually.

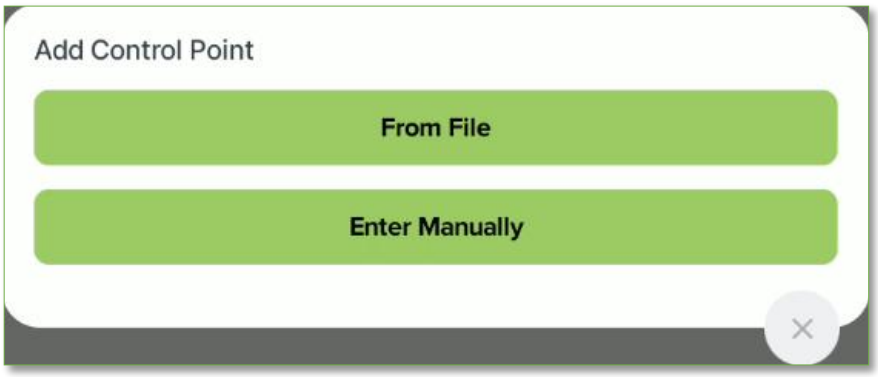


Figure 120: Localization - Add Point "From File" or "Enter Manually"

Control Points can then be linked to a current point in the current coordinate system. Linking a Control point can be done from a file or from the map.

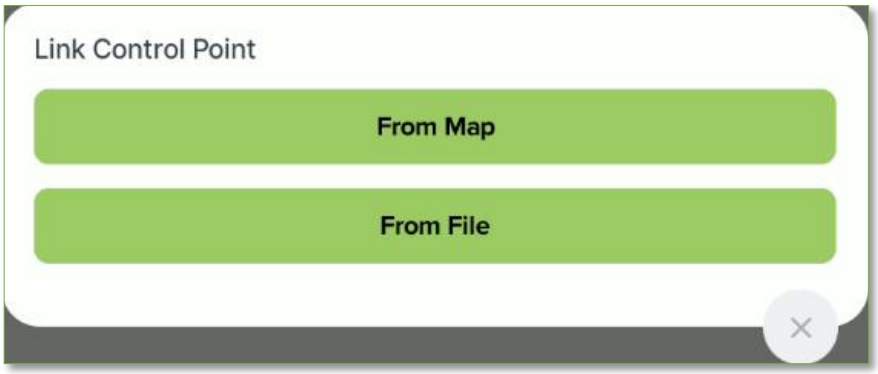


Figure 121: Localization - Link Point "From Map" or "From File"

With a minimum of three (3) linked Control points (shown below), a localization will be calculated by tapping the ‘Calculate’ button.

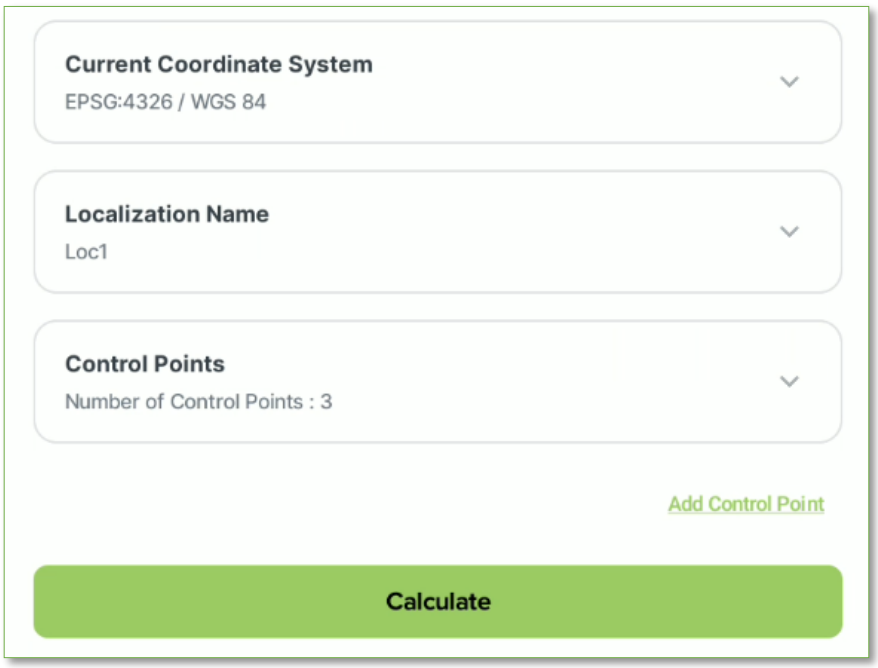


Figure 122: Calculate Localization Parameters

Tapping on the “Calculate” button will calculate a residuals table. If the values are within preferred parameters, the localization can be saved by selecting the “Save” button.

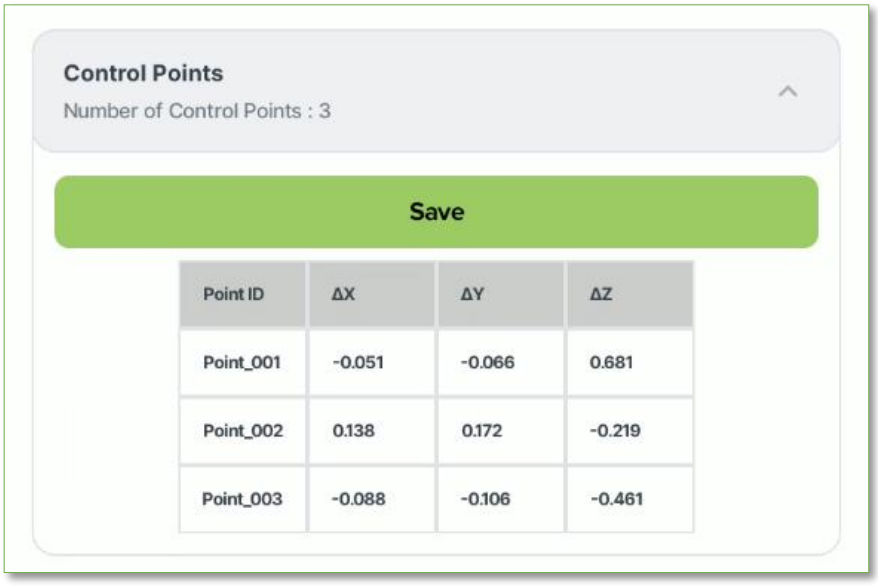


Figure 123: Localization - Residuals

## 8.9. Utilities

The Utilities section allows the user to send commands to the receiver directly through a terminal window. This can be done via line commands or by script files. This can be useful for specific setups or receiver settings.

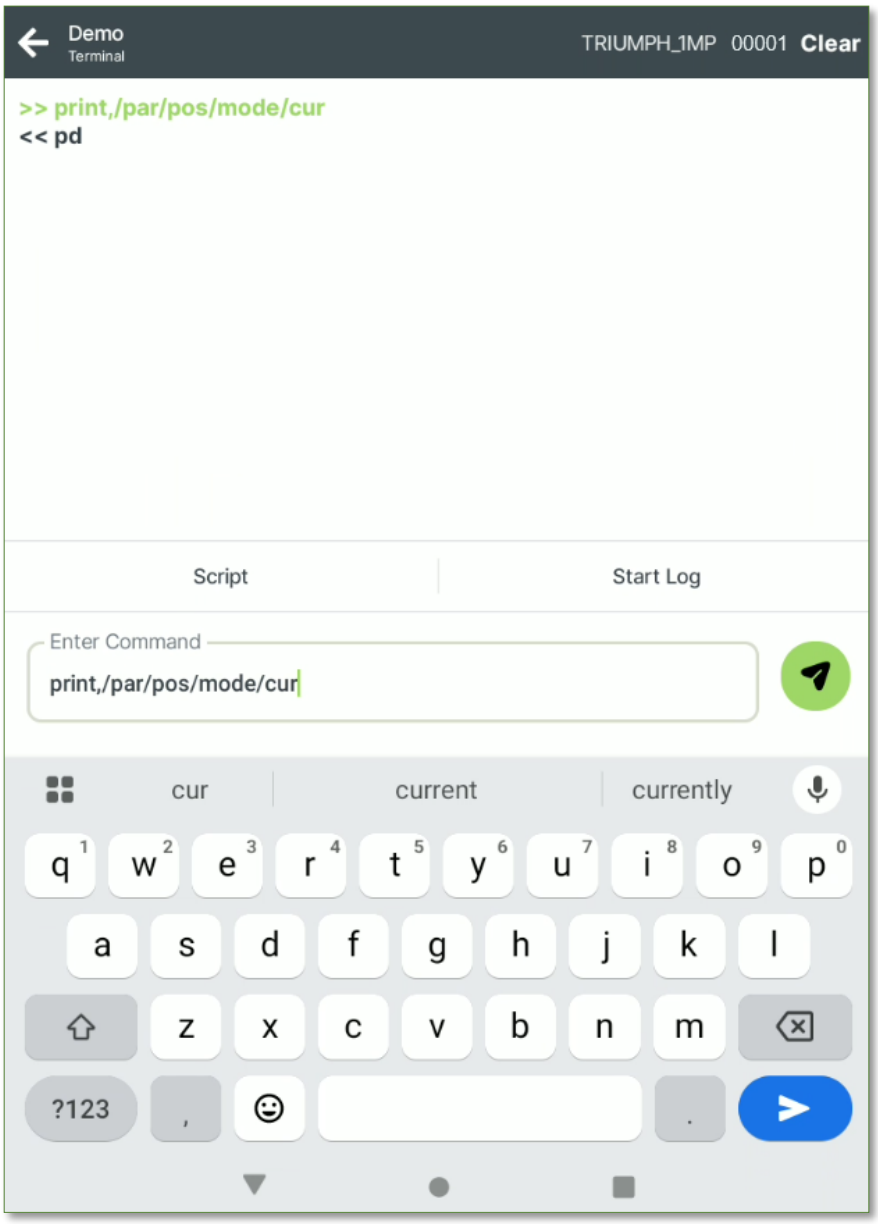


Figure 124: Utilities - Send GNSS Command

# 9. Survey

Tapping “Survey” open the Map, where all Survey routines (Store, Stake, COGO) can be operated.

## 9.1. Map Layout

JDC has been designed with simplicity. There are two main screen types: Configuration and Map. The Status bar on top of the screen shows information from any connected JAVAD Smart Antenna with an Information bar below it. The Information bar informs the user of the current screen and any connected JAVAD Smart Antenna. On the bottom are applicable menu items. The Map screen also shows the Menu, Scale Bar, Current Location, Zoom Control and the Shortcut bar. Each item is further discussed below.

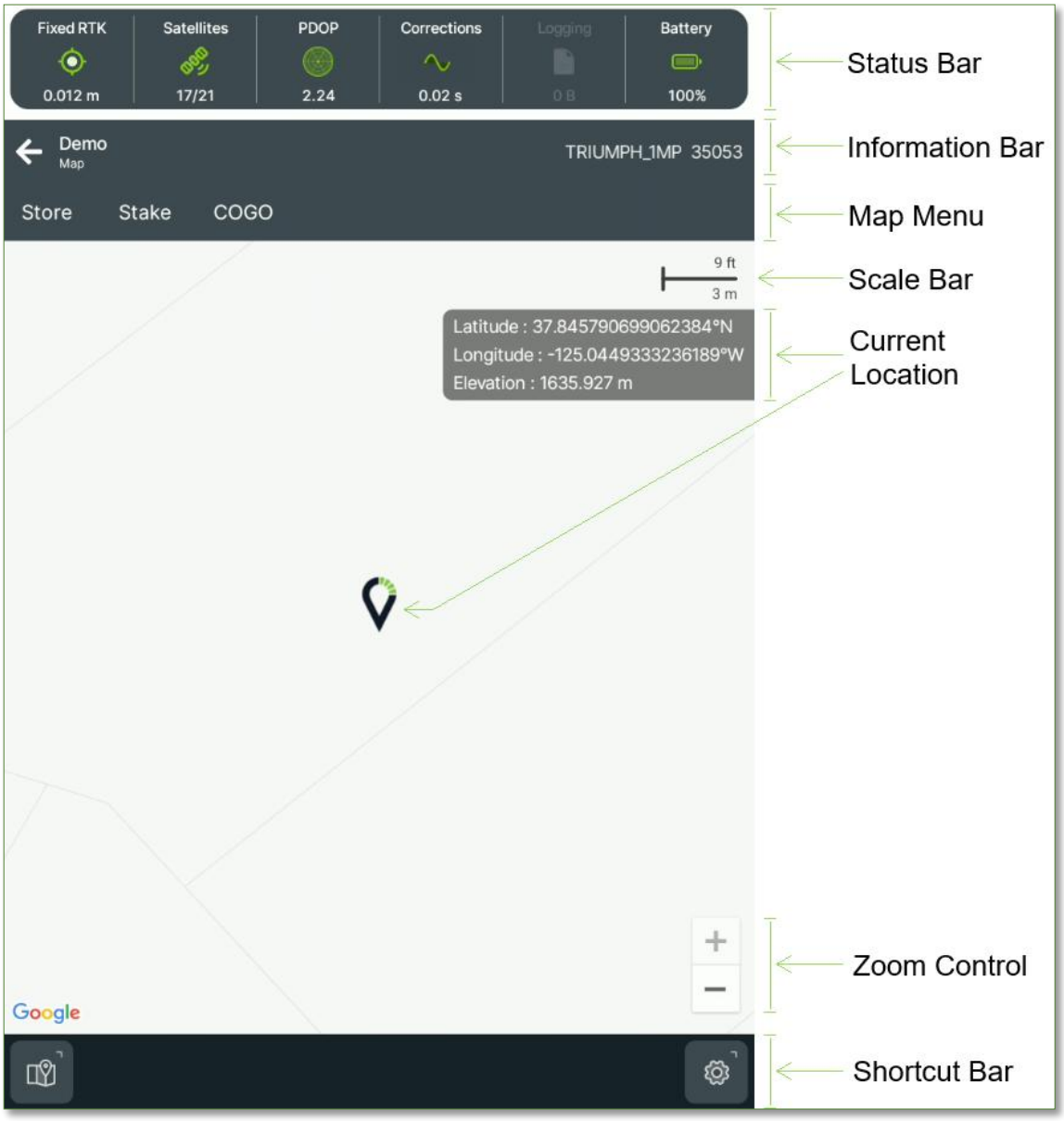


Figure 125: Map Layout

### 9.1.1. Menu

The Menu is where all Survey routines may be initiated. Tap on the Menu item (Store, Stake, COGO) to select from the desired routine.

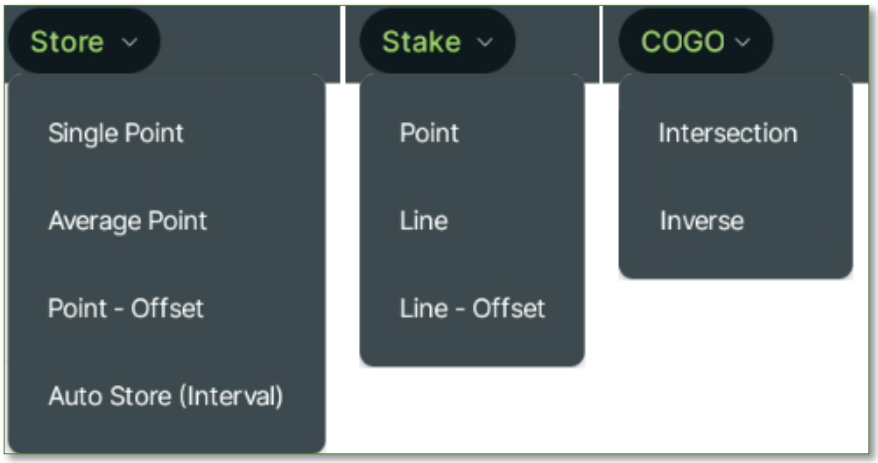


Figure 126: Menu

Each of these routines will be further discussed in the sections below.

### 9.1.2. Scale Bar

The scale bar will show the current zoom level of the map view.

### 9.1.3. Position

The connected GNSS receiver's current position in the selected coordinate system is shown in this area of the map view.

### 9.1.4. Shortcut Bar

The Shortcut Bar allows the user to quickly view the list of points along with a shortcut to the Project Settings.

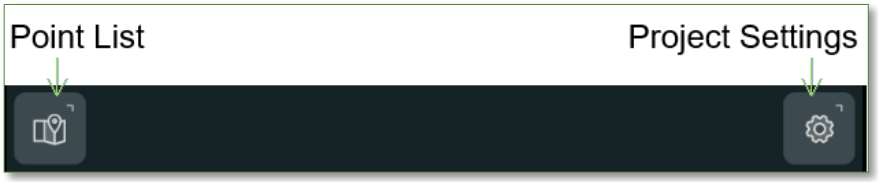


Figure 127: Shortcut Bar

## 9.2. Store

The Menu item “Store” allows the user to select from store point routines:

- Store a single point.
- Store an average point by either time or epochs.
- Store an offset point.
- Auto Store points by either a time interval or a distance interval.

Each of these will be further discussed below.

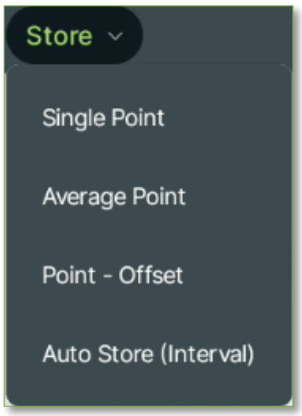


Figure 128: Store - Menu Dropdown

### 9.2.1. Single Point

Select this to run the Store – Single Point routine. This routine will store a single point from a single observation to the database. Once selected, the Store – Single Point card will appear below the map (shown below).

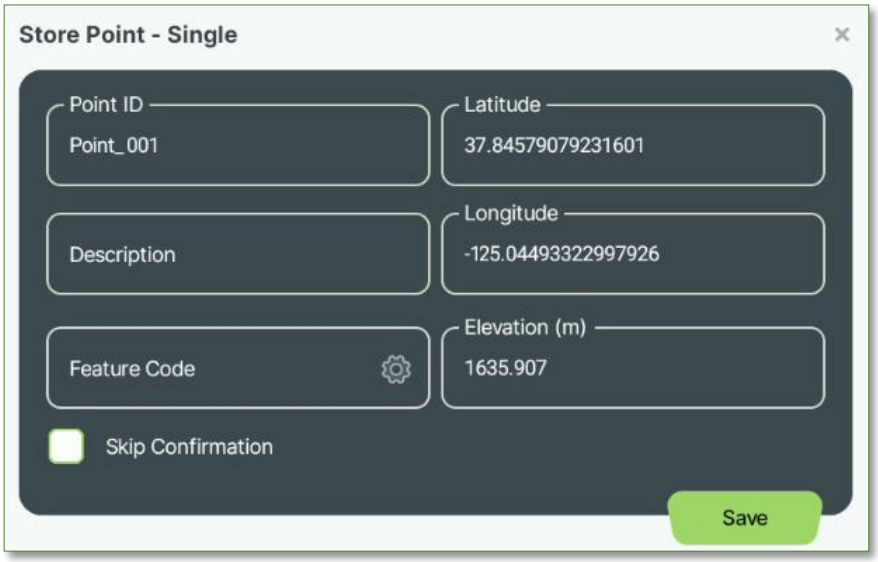


Figure 129: Store - Single Point Card

This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| Store Point – Single Card Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “Point_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Store Point – Single card, the Confirmation screen also has:

| Store Point – Single Item | Description |
|---|---|
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the Store Point – Single routine is complete, a pop-up window will show asking if the user would like to repeat the Store Point – Single routine or are done (shown below).

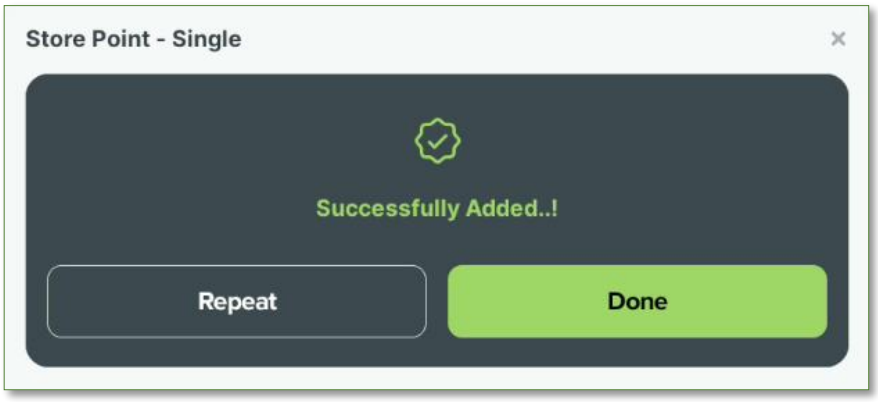


Figure 130: Store Point - Single: Repeat Routine or Done

To repeat the Store Point – Single routine, tap the “Repeat” button; otherwise, tap the “Done” button.

### 9.2.2. Average Point

Select this to run the Store Point – Average routine. This routine will store a single point from the calculated average from several observations to the database. Once selected, the Store Point – Average Method Card will show below the map (shown below).


Figure 131: Store Point - Average Method

There are two methods for the Store Point – Average routine: Number of Reading, or Time. Number of readings will average the number typed in the “Readings” box. Time will average the readings during the specified time (in seconds) typed in the “Seconds” box. Tap on the “Go” button to continue to active averaging screen (shown below).

Once the averaging is complete, the “Save” button will show at the bottom. Like the Store Point – Single routine, the user may select to go to the confirmation screen or simply save the point.

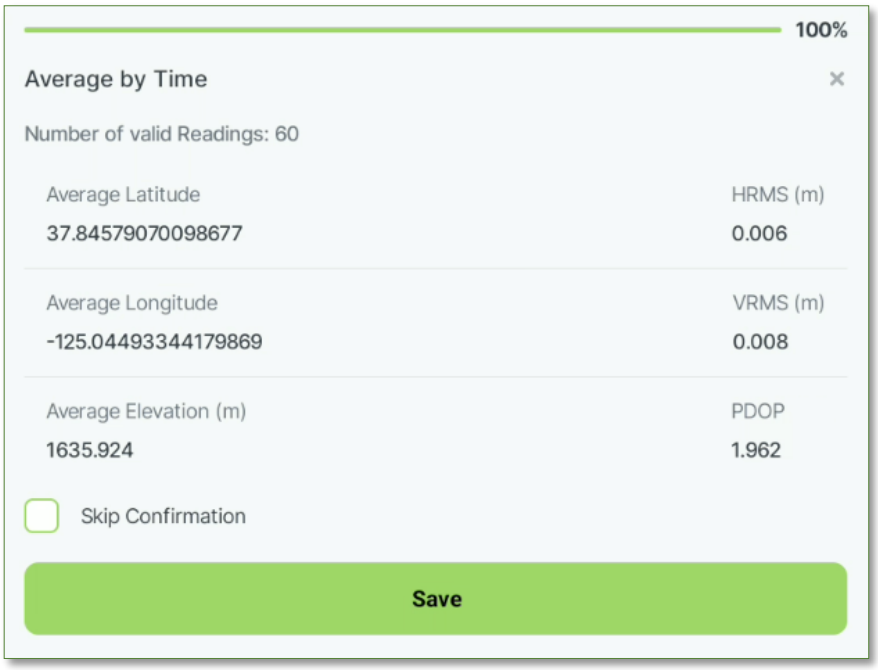


Figure 132: Averaging Results

By default, the “Skip Confirmation” checkbox is disabled, thereby once the “Save” button is selected, the confirmation screen will appear. The confirmation screen allows for any point data to be entered and saved with the point.

| Store Point – Average Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “Point_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the Store Point – Average routine is complete, a pop-up window will show asking if the user would like to repeat the Store Point – Average routine or are done (shown below).

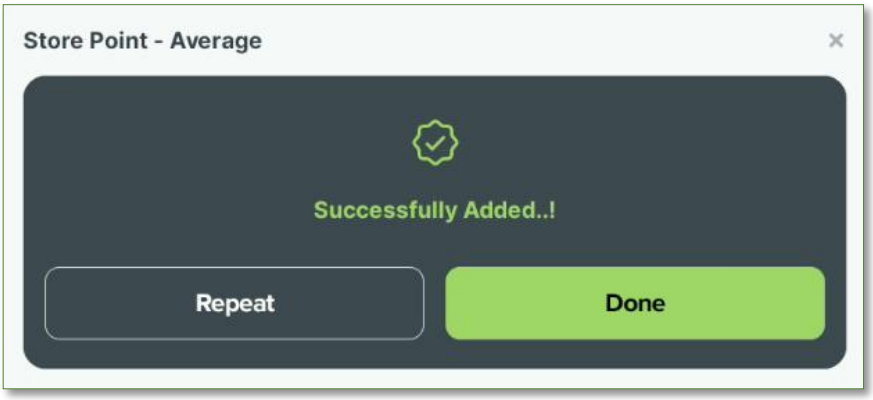


Figure 133: Store Point - Single: Repeat Routine or Done

To repeat the Store Point – Average routine, tap the “Repeat” button; otherwise, tap the “Done” button.

### 9.2.3. Point – Offset

Select this to run the Point - Offset routine. This routine will store a single point offset from the current location a specified direction and distance to the database. Once selected, the Store Point – Offset Card will show below the map (shown below).

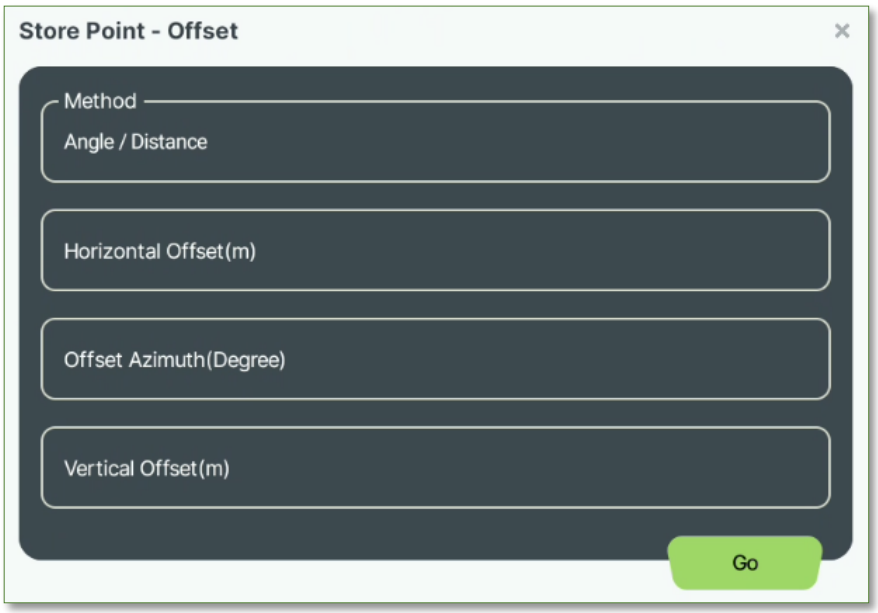


Figure 134: Store Point - Offset Card

The Store Point – Offset card allows values to be entered for the offset calculation. These values are described in the table below.

| Store Point – Offset Item | Description |
|---|---|
| H.Offset | Depending on the Measurement Unit selected, this is the Horizontal Offset value to be used in the offset calculation. |
| Offset Azimuth (Degree) | This is the offset direction to be used in the offset calculation. |
| V.Offset | Depending on the Measurement Unit selection, this is the Vertical Offset value to be used in the offset calculation. |
| Go | This will initiate the calculation. |

Once the “Go” button is tapped, the calculation results will be shown along with the “Skip Confirmation” checkbox. By default, this checkbox is disabled and will proceed to the Store Point – Offset confirmation screen once the “Store” button is tapped.

The Store Point – Offset confirmation screen will show the offset calculation values entered by the user and the offset calculation results, along with several added options for the user to enter. The added options are further described in the table below.

| Store Point – Offset Confirmation Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “Point_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the “Confirm” button is tapped, the point and all the details will be stored to the database.

Once the Store Point – Offset routine is complete, a pop-up window will show asking if the user would like to repeat the Store Point – Offset routine or are done (shown below).

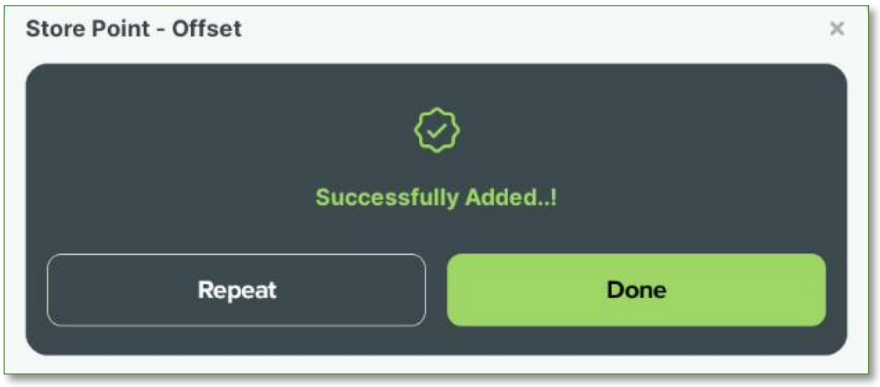


Figure 135: Store Point – Offset: Repeat Routine or Done

### 9.2.4. Auto Store (Interval)

Select this to run the Auto Store (Interval) routine. This routine will store a single point per interval to the database. Time or distance can be used for the interval. This is useful to auto store many points along a map element. Once selected, the Store Point – Auto Interval Card will show below the map (shown below).

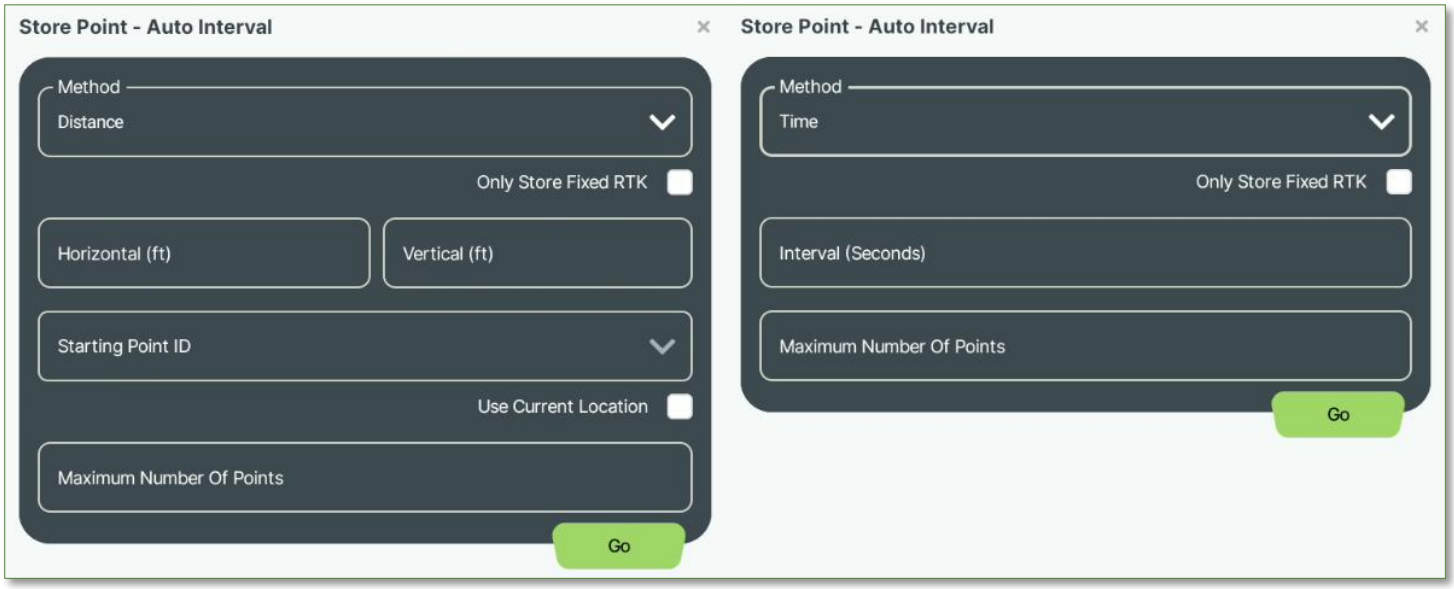


Figure 136: Auto Store (Interval) Cards

Intervals may be selected as Distance or Time. If Distance is selected, the distance is defined by the horizontal and vertical values entered. Starting Point ID is a dropdown for selection of a current point within the database, or the “Use Current Location” checkbox may be enabled instead. If Time is selected, the number of seconds between point storage is defined by the values entered. Both methods allow for a maximum number of points to be stored for this routine. Tapping the “Go” button will initiate the routine showing the Time Elapsed and the Number of Points stored (shown below).

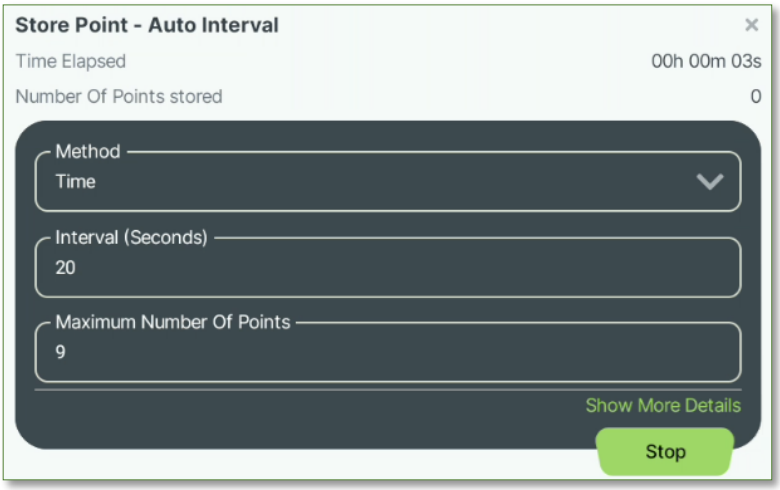


Figure 137: Store Point - Auto Interval Active

Once the Auto Store (Interval) routine is complete, a pop-up window will show asking if the user would like to repeat the Auto Store (Interval) routine or are done (shown below).

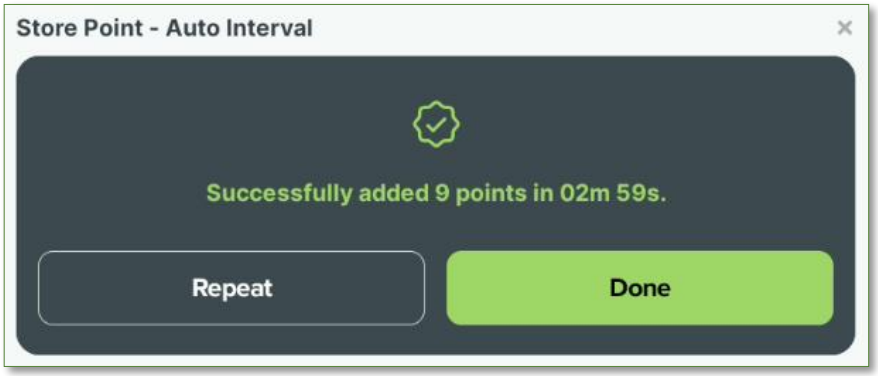


Figure 138: Auto Store (Interval): Repeat or Done

## 9.3. Stake

The Menu item “Stake” allows the user to select from store point routines:

- Stake a single point.
- Stake a line.
- Store a line with an offset.

Each of these will be further discussed below.

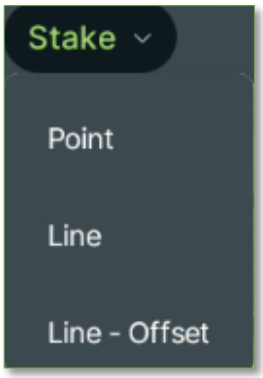


Figure 139: Stake - Menu Dropdown

### 9.3.1. Stake Point

Select this to run the Stake Point routine. This routine will stake a selected point and save it to the database. Once selected, the point list card will appear below the map to select which point to be staked (shown below).

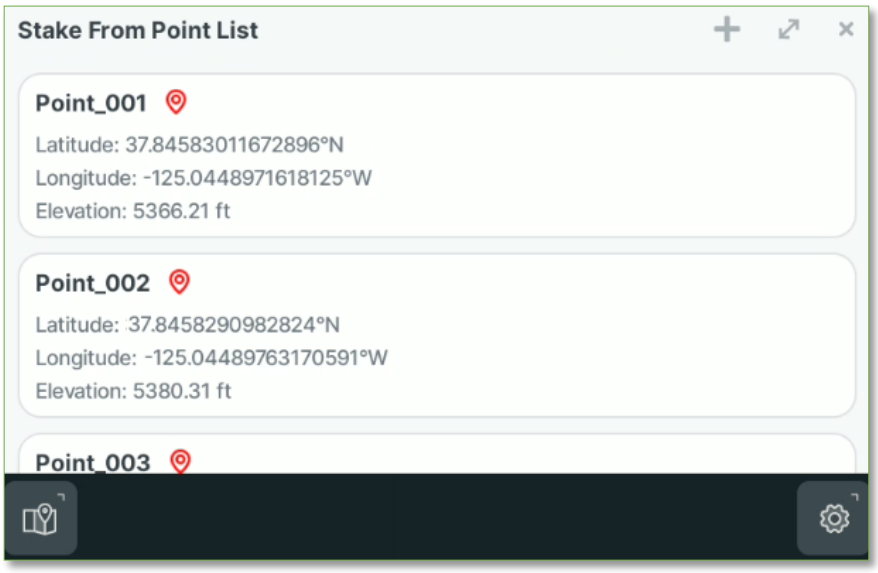


Figure 140: Stake from Point List

The list can be scrolled through to find the preferred point. The point list can be expanded to full screen by tapping the icon.

Select the preferred point and tap the “Confirm Selection” button.

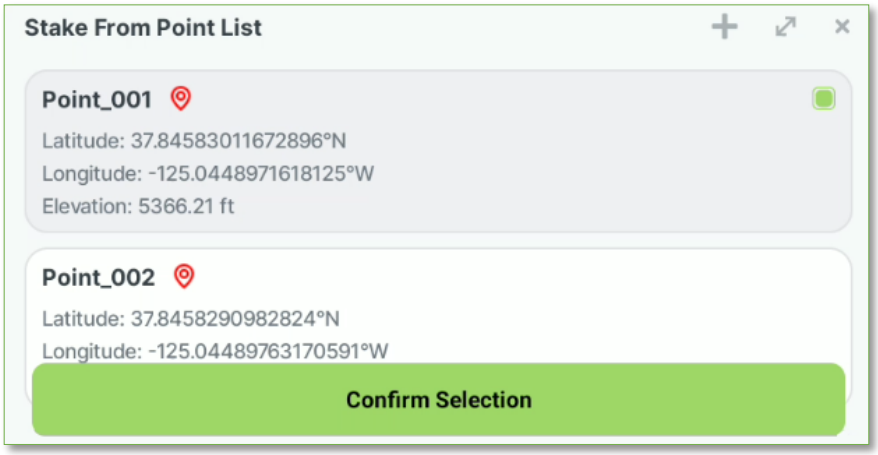


Figure 141: Stake Point Selected

If staking to a point not in the point list, entered coordinates can be staked to by tapping the + icon (shown below).

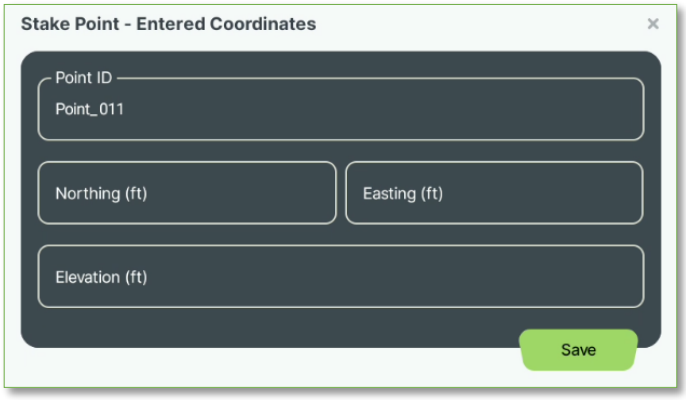


Figure 142: Stake Point from Entered Coordinates

Once the “Confirm Selection” button is tapped, the Stake Point routine will begin. The Stake Point’s position card along with the calculated direction and distance values are shown.


Figure 143: Stake Point - Away

Depending on the current Project Settings – Stake – Proximity values, the Proximity screen will pop-up to direct the user to the stake point (shown below).

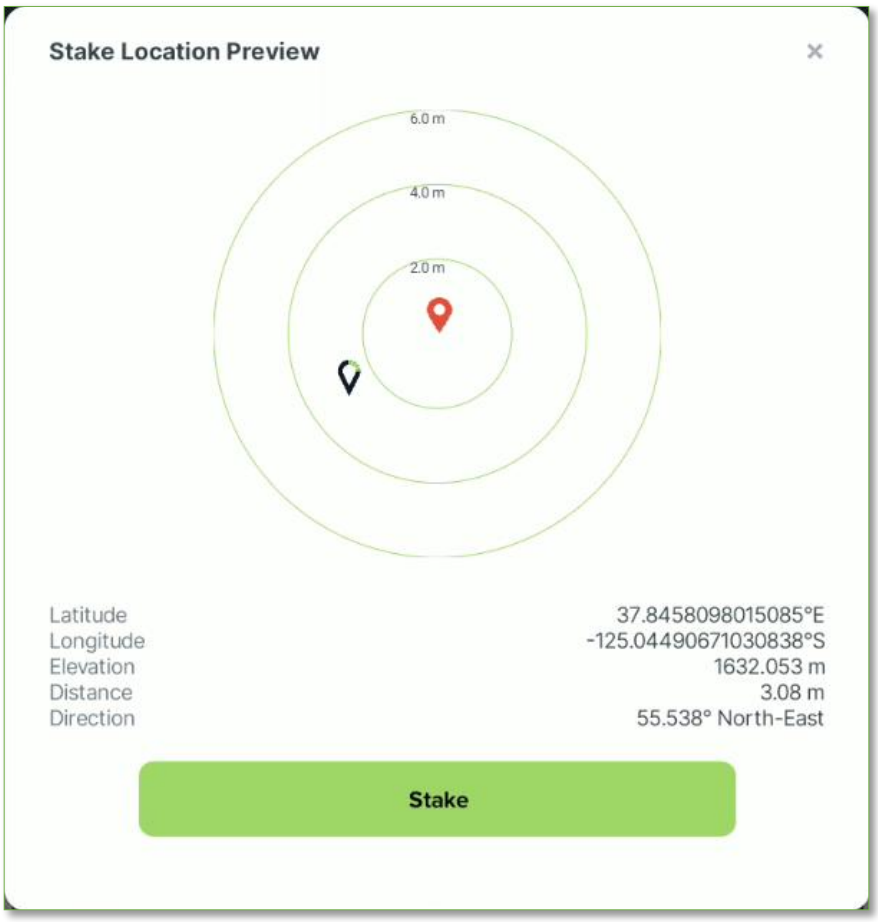


Figure 144: Stake Point - Proximity Screen

At any time, a stake point may be saved by tapping the “Stake” button. This will bring up the Stake Point – Save card. This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| Stake Point – Single Card Item | Description |
|---|---|
| Point ID | This is auto filled with STKPoint_001 (to start) and will be incremented by 1 for each successive point. “STKPoint_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |

| | |
|---|---|
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Stake Point – Save card, the Confirmation screen also has:

| Stake Point – Save Item | Description |
|---|---|
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the Stake Point routine is complete, a pop-up window will show the stake point is successfully saved (shown below).

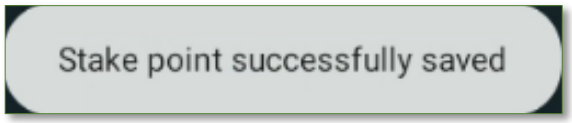


Figure 145: Stake Point Saved

### 9.3.2. Stake Line

Select this to run the Stake Line routine. This routine will define a line and stake a selected end point on the line, once the line has been reached the user can stake along the defined line. Once selected, the Stake Line card will appear below the map to select or create a line to be staked (shown below).

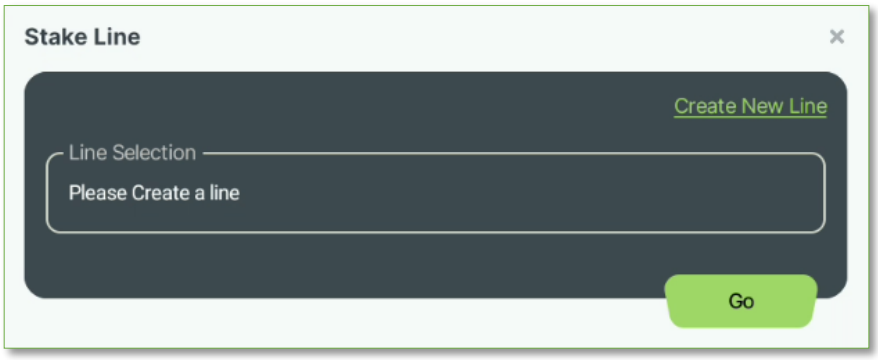


Figure 146: Stake Line - Select or Create a Line

By default, no line will have been created to stake to and requires a new line to be created. If a line has been previously created, it can be selected from the dropdown menu. Tap "Create New Line" to create a new line. This will bring up the Line Selection card where a line may be created by two points (the line going between these two points) or by Azimuth from a selected point (point and direction).

#### 9.3.2.1. Create Line – 2-Point

To create a line using this method, two points need to be selected. The Line ID will be defaulted with a prefix of Line_, and the number of 001 (the number may be edited). Each of the two points may be selected from a point list or from the map. Tap the preferred option for each point. When both points have been selected the Azimuth and Slope will be calculated and shown at the bottom of the Create Line card.


Figure 147: Create Line - 2-Point

Click the “Save” button to save this newly created line.

This will open the Line Selection Location card with the newly selected / created line and the line shown on the map (shown below).

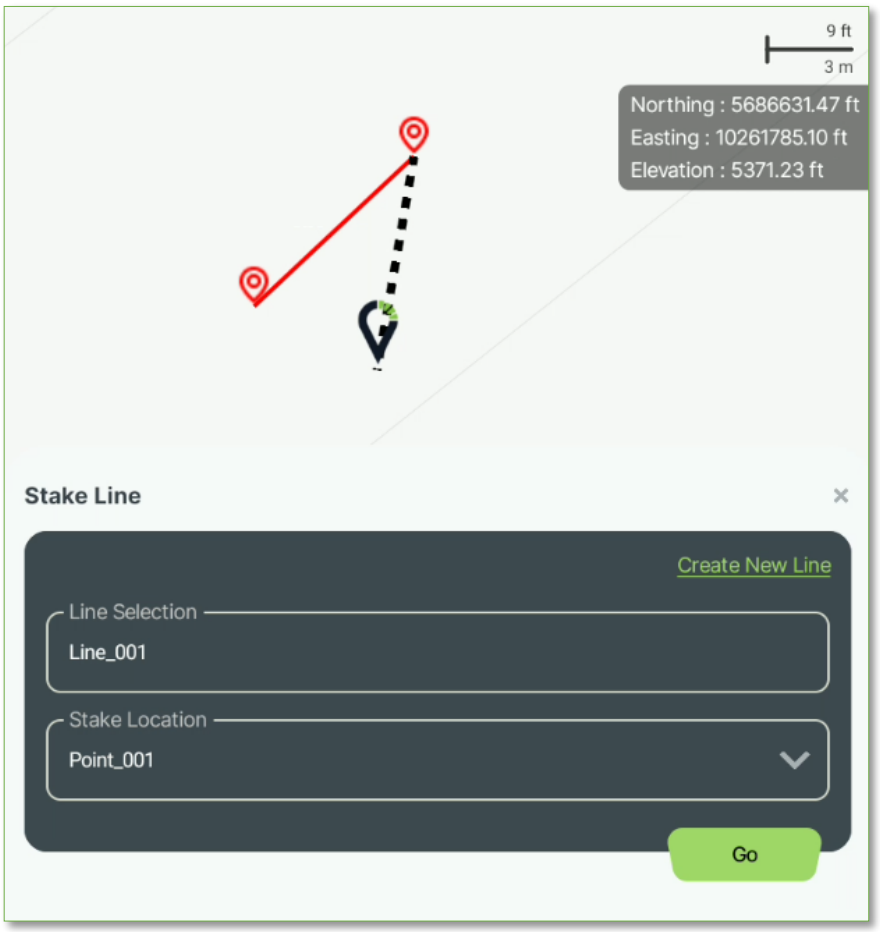


Figure 148: Stake Line - 2-Point - Line Created

The “Stake Location” box will now ask the user which endpoint to stake to (default will be the lowest number). Point_001 is shown in the figure above.

Selecting Point_002 is shown in the figure below.

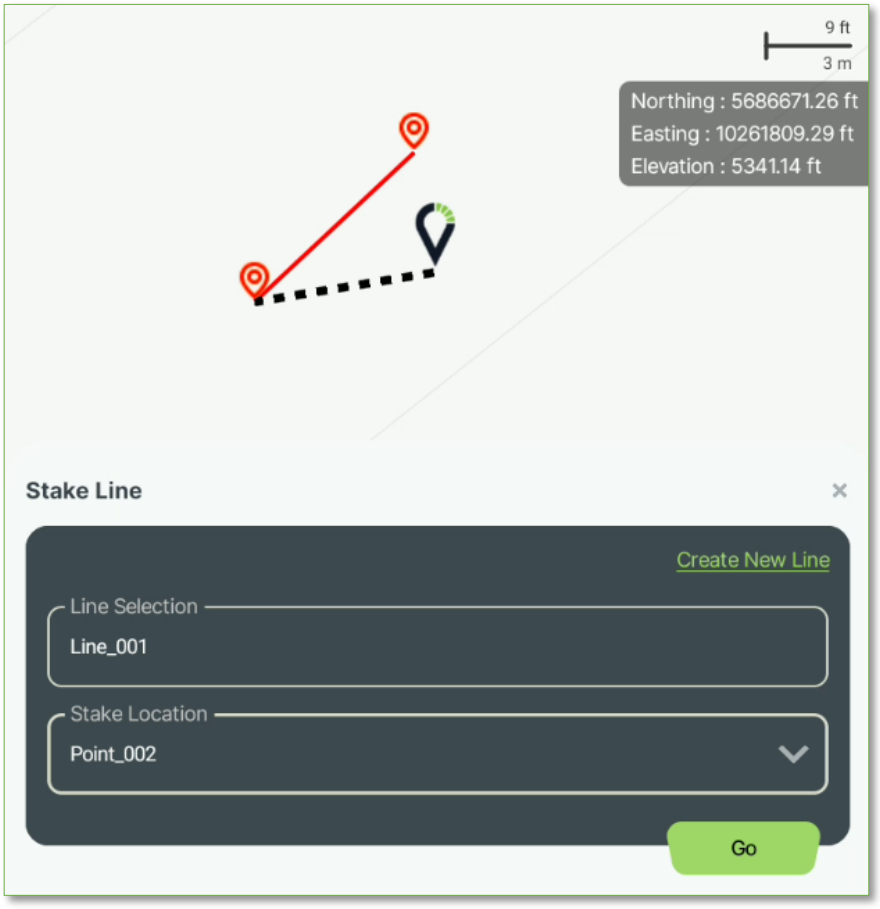


Figure 149: Stake Line - Line Selected - Point_002 Selected

With the preferred Stake Location selected, tap the “Go” button to proceed to stake to the line.

#### 9.3.2.2. Create Line – Azimuth

To create a line using this method, a point needs to be selected along with an azimuth, horizontal distance and slope value. The Line ID is defaulted with a prefix of Line_, and the number of 001 (the number may be edited). The point may be selected either from a point list or from the map. Tap the “Define Points” button to calculate the endpoint of the line.

With the preferred Stake Location selected, tap the “Go” button to proceed to stake to the line.

The Stake Point routine will begin. The Stake Point’s position card along with the calculated direction and distance values are shown.

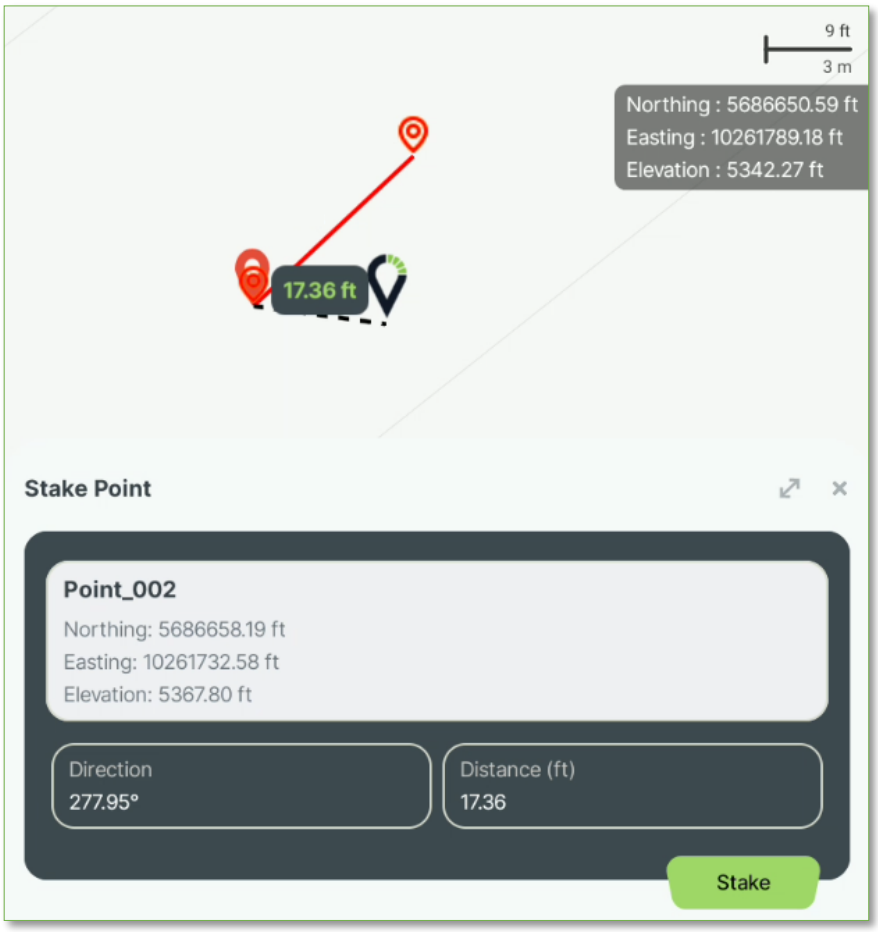


Figure 150: Stake Line - Stake Selected Point – Away

Depending on the current Project Settings – Stake – Proximity values, the Proximity screen will pop-up to direct the user to the stake point (shown below).

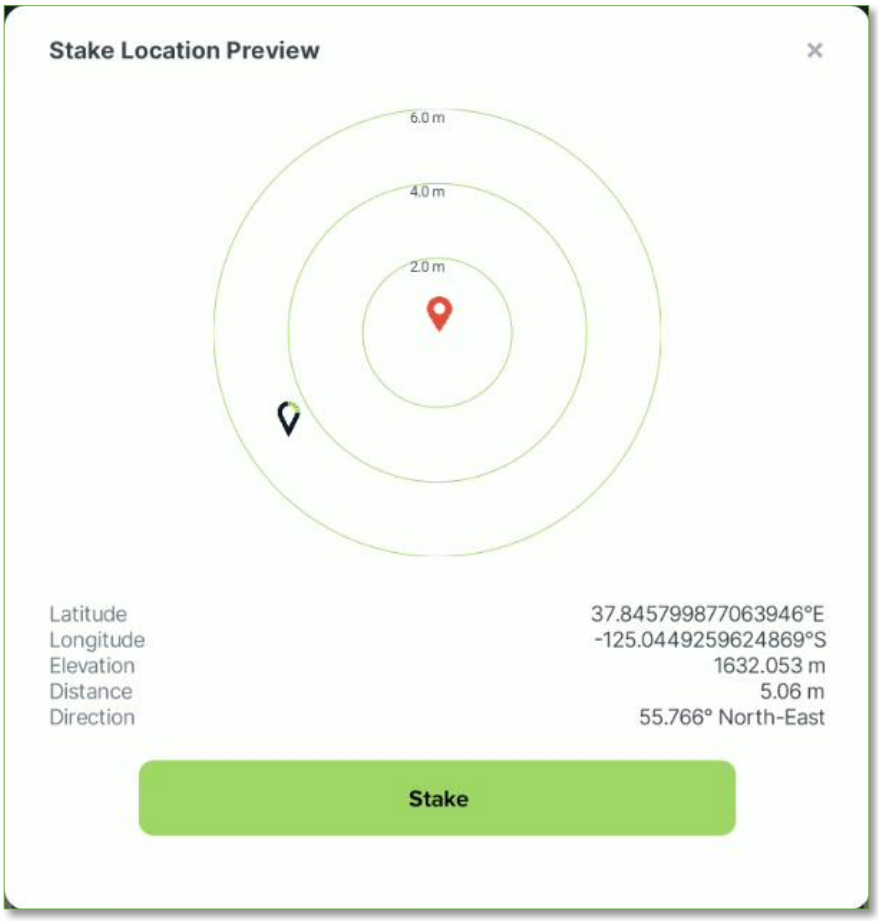


Figure 151: Stake Line - Selected Point - Proximity Screen

At any time, a stake point may be saved by tapping the “Stake” button. This will bring up the Stake Point – Save card. This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| Stake Point – Single Card Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “STKPoint_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the |

| | |
|---|---|
| | Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Stake Point – Save card, the Confirmation screen also has:

| Stake Point – Save Item | Description |
|---|---|
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

The selected point on the line is reached when the staked point is within the proximity value set in project settings. With the staked point reached, a dialogue box “Line Reached” will show.

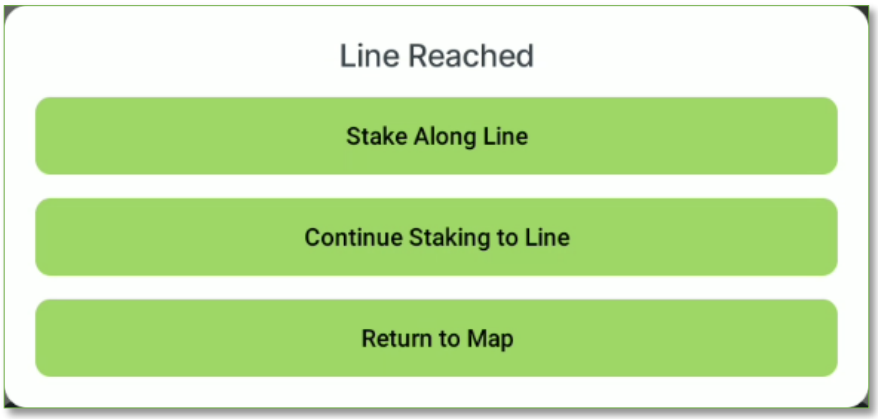


Figure 152: Stake Line - Line Reached

Along with the Stake point routine, once the Stake Line - Selected Point routine is complete, a pop-up window will show the stake point is successfully saved (shown below).

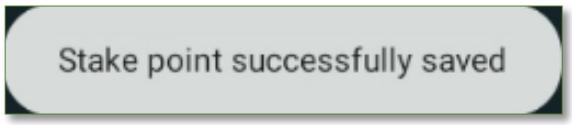


Figure 153: Stake Point Saved

The user may select to proceed to “Stake Along Line” by tapping this button. Alternatively, the user may select to “Continue Staking to Line” by tapping this button. The routine may be exited by selecting “Return to Map”.

To proceed to “Stake Along Line” tap this button. JDC will then ask the user which direction along the line to stake.


Figure 154: Select Direction Along Line

The direction selected is highlighted with a green arrow and white background. With the direction selected, tap the "Next” button. This will open the Mini Map in the upper left corner of the map screen. The Mini Map illustrates the direction to move to stay on top of and along the line selected.

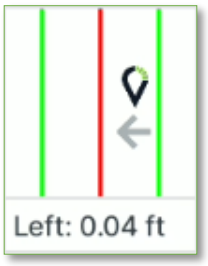


Figure 155: Stake Line - Stake Along Line - Mini Map

At any time, a stake point may be saved by opening the Stake Point card by selecting . A Stake point along line may be saved by tapping the “Stake” button. This will bring up the Stake Point – Save card. This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| Stake Point – Single Card Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “STKPoint_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Stake Point – Save card, the Confirmation screen also has:

| Stake Point – Save Item | Description |
|---|---|
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the Stake Point routine is complete, a pop-up window will show the stake point is successfully saved (shown below).

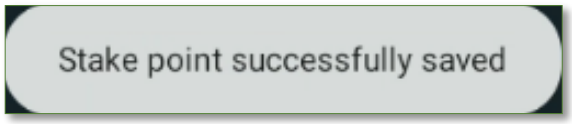


Figure 156: Stake Point Saved

The process of staking points along a line will continue until the user selects  to exit the Stake Line routine. This will bring up a confirmation dialogue box to ensure exiting the routine is preferred. Tap “Confirm” to exit.

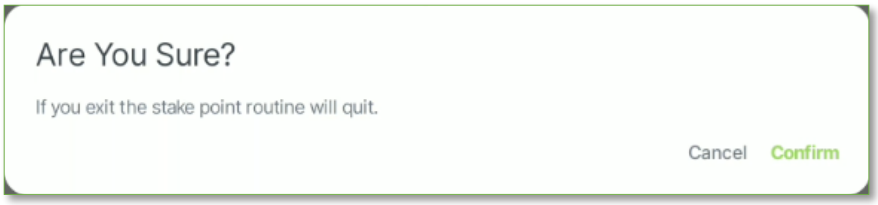


Figure 157: Exit Confirmation

### 9.3.3. Stake Line – Offset

Select this to run the Stake Line – Offset routine. This routine will define a line and stake an offset from a selected end point on the line, once the offset line has been reached the user can stake along the defined offset line. The Stake Line – Offset card will appear below the map to select or create a line to be staked (shown below).

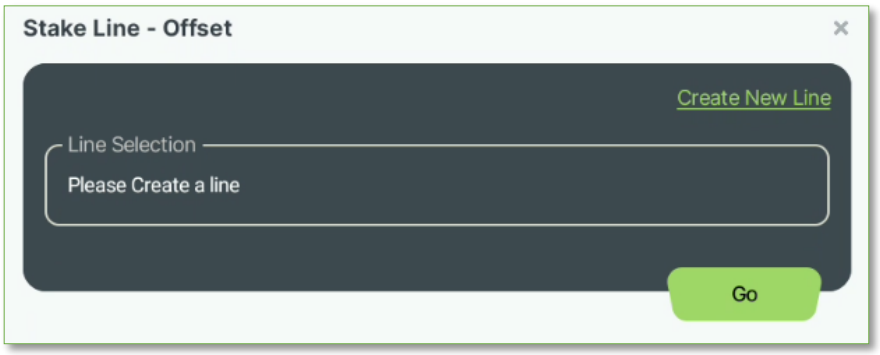


Figure 158: Stake Line – Offset - Select or Create a Line

By default, no line will have been created to stake to and requires a new line to be created. If a line has been previously created, it can be selected from the dropdown menu. Tap "Create New Line" to create a new line. This will bring up the Line Selection card where a line may be created by two points (the line going between these two points) or by Azimuth from a selected point (point and direction).

#### 9.3.3.1. Create Line – 2-Point

To create a line using this method, two points need to be selected. The Line ID will be defaulted with a prefix of Line_, and the number of 001 (the number may be edited). Each of the two points may be selected from a point list or from the map. Tap the preferred option for each point. When both points have been selected the Azimuth and Slope will be calculated and shown at the bottom of the Create Line card.


Figure 159: Create Line - 2-Point

Click the “Save” button to save this newly created line.

This will open the Line Selection Location card with the newly created line selected and the line shown on the map (shown below). Stake Location is the point at which to be staked (Point_002 shown below). The offset values, both direction (in degrees) and distance (in user-selected units) can be entered here to generate the offset line relative to the Stake Location point selected.


Figure 160: Stake Line - 2-Point - Line Created

The Offset Direction (180 degrees used and shown below) and the Offset Distance (50 feet used and shown below) can be entered.


Figure 161: Stake Line – Offset - Line Selected – Offset Direction and Distance Entered

With the preferred Stake Location, offset direction and distance selected, tap the “Go” button to proceed to stake to the selected location on the offset line.

The Map screen will now show the generated offset line. Along with the current receiver's position, the distance and direction are shown in the legend on the upper-right of the map screen. When the receiver is within the proximity value (set in Project Settings – Stake), the proximity screen icon will show  .

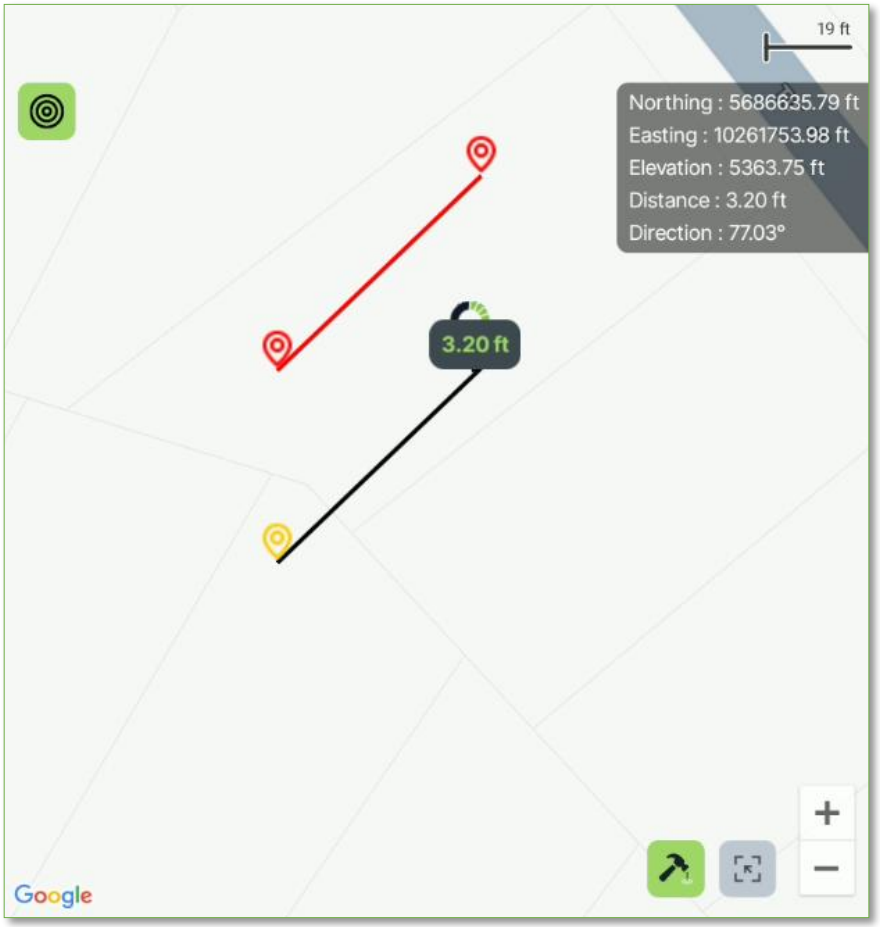


Figure 162: Stake Line - Offset

#### 9.3.3.2. Create Line – Azimuth

To create a line using this method, a point needs to be selected along with an azimuth, horizontal distance and slope value. The Line ID will be defaulted with a prefix of Line_, and the number of 001 (the number may be edited). The point may be selected either from a point list or from the map. Tap the "Define Points" button to calculate the endpoint of the line.

With the preferred Stake Location selected, tap the "Go" button to proceed to stake to the line.

The Stake Point routine will begin. The Stake Point - Save position card is shown.

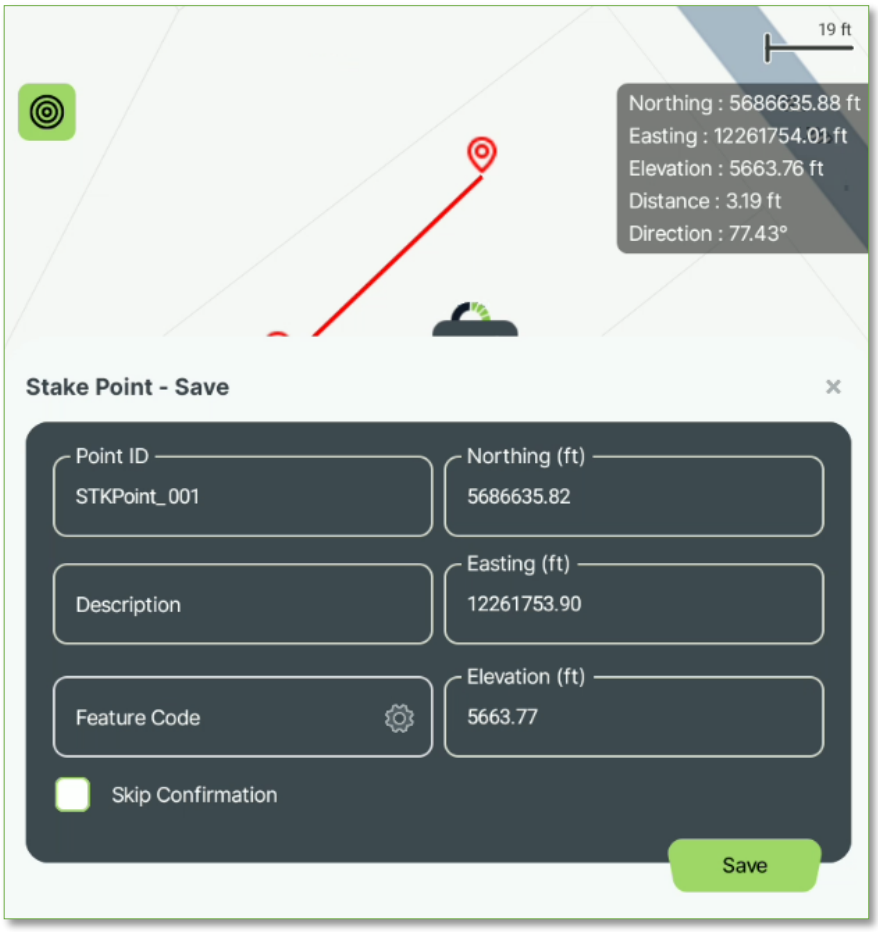


Figure 163: Stake Line - Stake Selected Point – Away

Depending on the current Project Settings – Stake – Proximity values, the Proximity screen will pop-up to direct the user to the stake point (shown below).

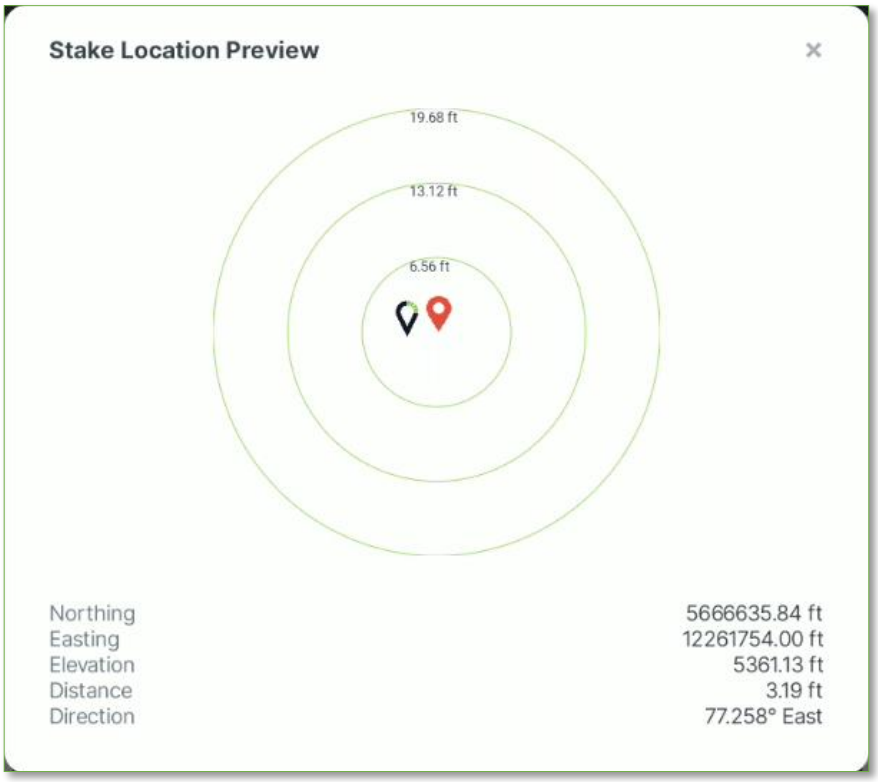


Figure 164: Stake Line - Selected Point - Proximity Screen

At any time, a stake point may be saved by tapping the “Stake” button. This will bring up the Stake Point – Save card. This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| Stake Point – Single Card Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “STKPoint_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |

| | |
|---|---|
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Stake Point – Save card, the Confirmation screen also has:

| Stake Point – Save Item | Description |
|---|---|
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

The selected point on the line is reached when the staked point is within the proximity value set in project settings. With the staked point reached, a dialogue box “Line Reached” will show.

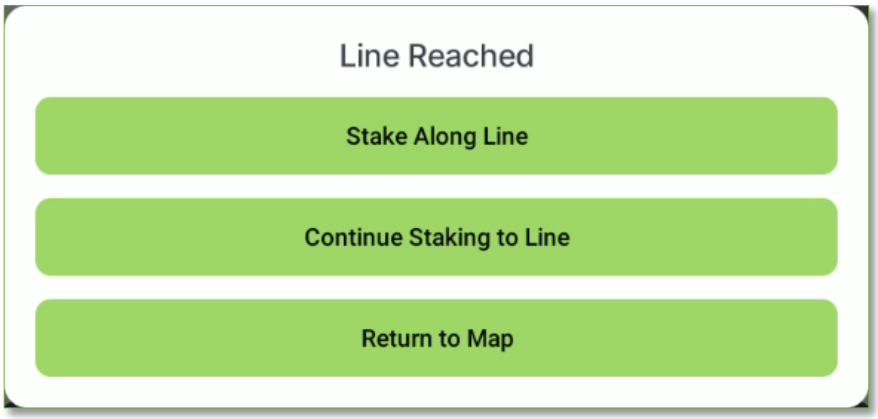


Figure 165: Stake Line - Line Reached

Along with the Stake point routine, once the Stake Line - Selected Point routine is complete, a pop-up window will show the stake point is successfully saved (shown below).

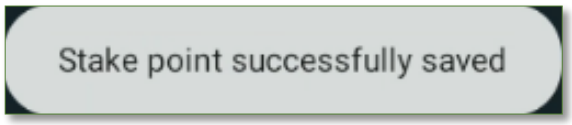


Figure 166: Stake Point Saved

The user may select to proceed to “Stake Along Line” by tapping this button. Alternatively, the user may select to “Continue Staking to Line” by tapping this button. Exit the routine by selecting “Return to Map”.

To proceed to “Stake Along Line” tap this button. JDC will then ask the user which direction along the line to stake.


Figure 167: Select Direction Along Line

The direction selected is highlighted with a green arrow and white background. With the direction selected, tap the "Next” button. This will open the Mini Map in the upper left corner of the map screen. The Mini Map illustrates the direction to move to stay on top of and along the line selected.

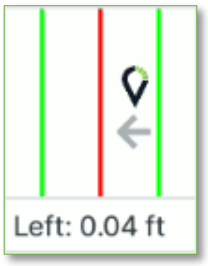


Figure 168: Stake Line - Stake Along Line - Mini Map

At any time, a stake point may be saved by opening the Stake Point card by selecting . A Stake point along line may be saved by tapping the “Stake” button. This will bring up the Stake Point – Save card. This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| Stake Point – Single Card Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “STKPoint_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Stake Point – Save card, the Confirmation screen also has:

| Stake Point – Save Item | Description |
|---|---|
| HRMS | This is the calculated Horizontal RMS value. |
| VRMS | This is the calculated Vertical RMS value. |
| PDOP | This is the calculated Position DOP value. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the Stake Point routine is complete, a pop-up window will show the stake point is successfully saved (shown below).

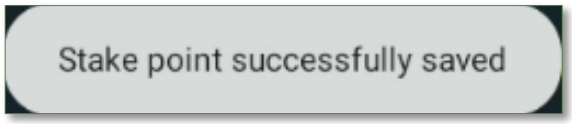


Figure 169: Stake Point Saved

The process of staking points along a line will continue until the user selects  to exit the Stake Line routine. This will bring up a confirmation dialogue box to ensure exiting the routine is preferred. Tap “Confirm” to exit.

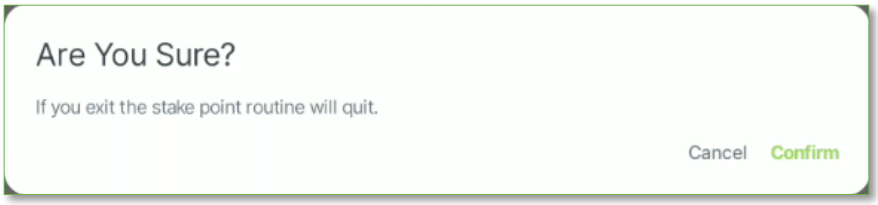


Figure 170: Exit Confirmation

## 9.4. COGO

The Menu item “COGO” allows the user to run select coordinate geometry routines using the points within the project. These routines are:

- Intersection
- Inverse

Each of these will be further discussed below.

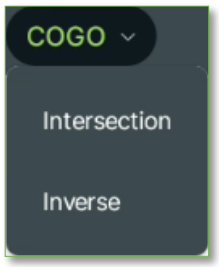


Figure 171: Store - Menu Dropdown

### 9.4.1. Intersection

The Intersection routine will calculate the intersection point of two lines. The lines can be selected by the endpoints of each line.


Figure 172: COGO - Intersection - Select Lines (2 Points)

To select the endpoints of each line, tap the icon. This will open the Point List to select the two points defining each line.

Tap the “Confirm” button to complete the point selection process.

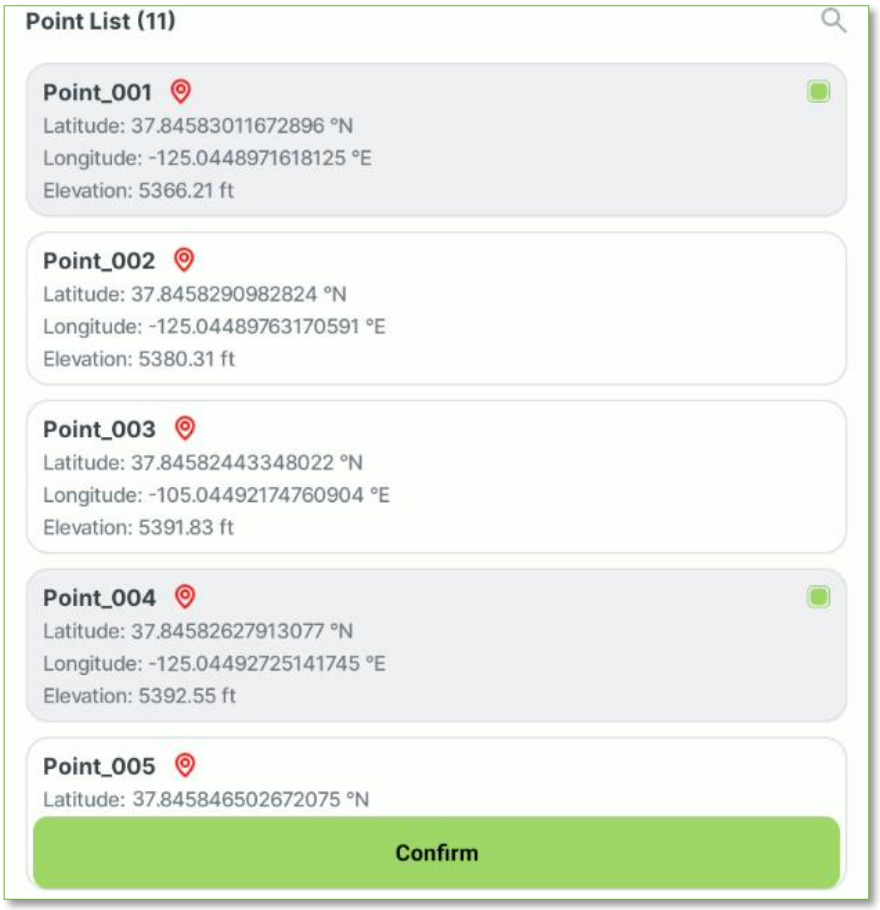


Figure 173: COGO - Intersection - Line Endpoints Selected

With points selected, tap the “Calculate” button to perform the calculation.

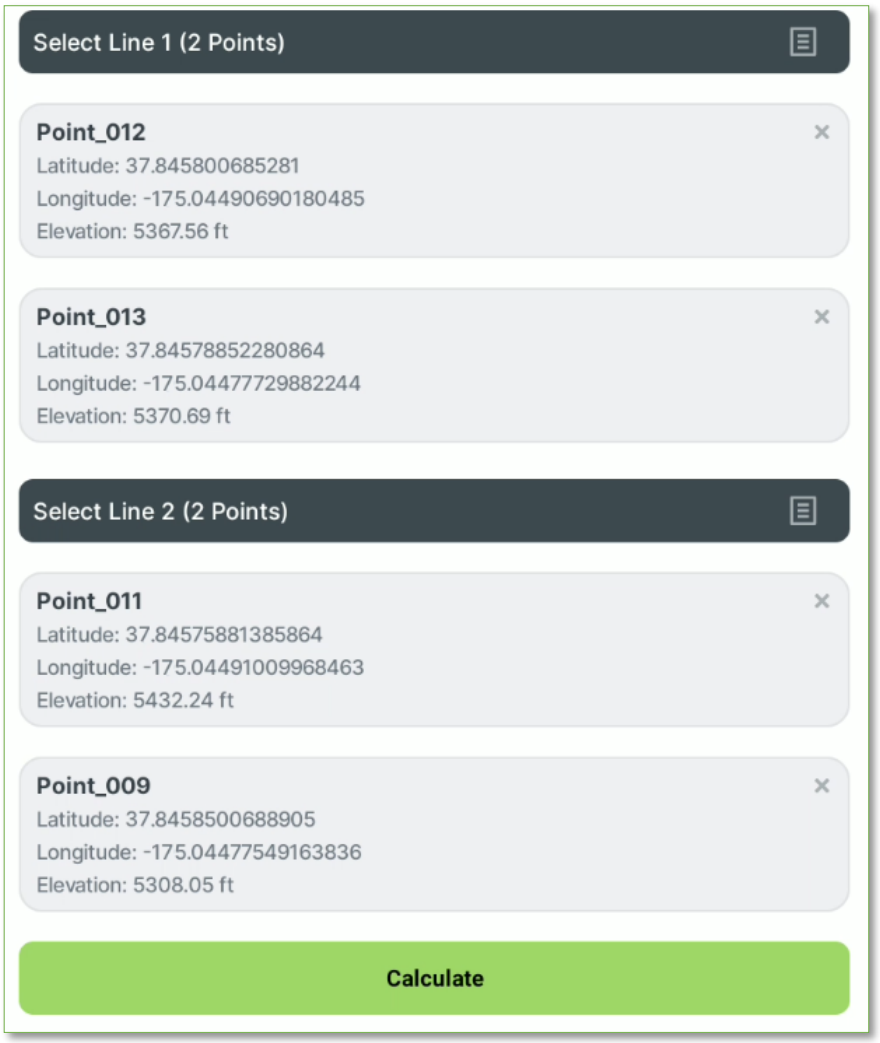


Figure 174: COGO - Intersection - Lines Defined

The result screen will show the calculated intersection point on the map and allow the user to store this intersection point in the point list. The COGO – Intersection card will display below the map.

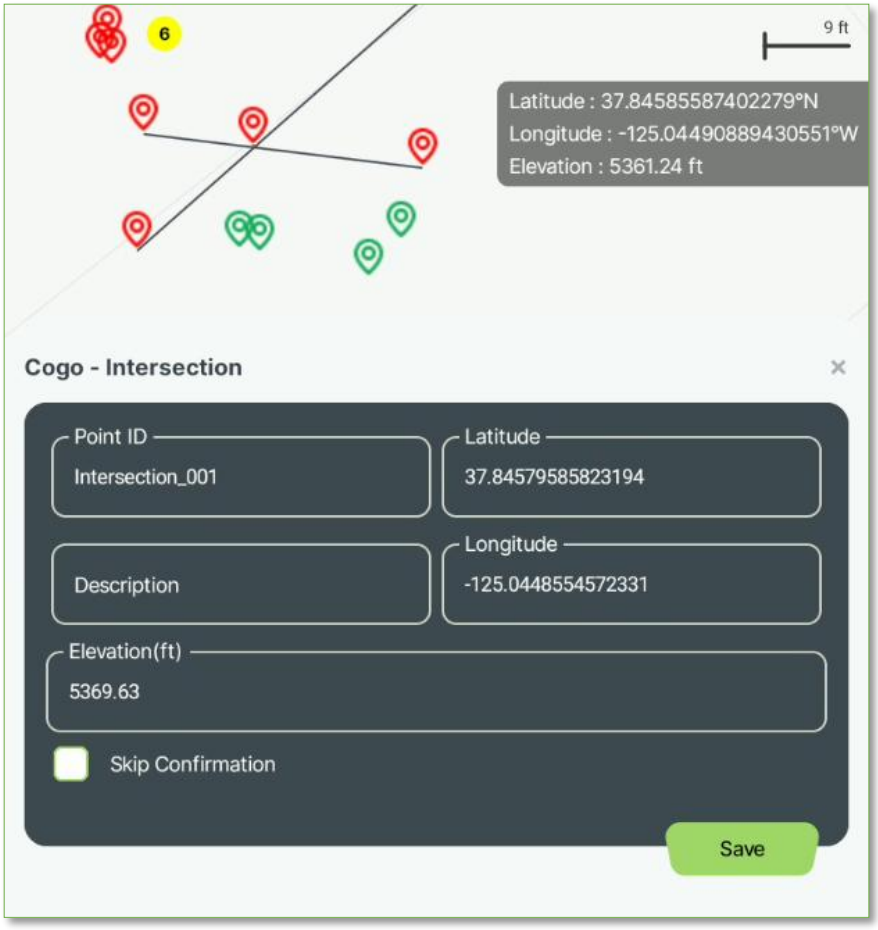


Figure 175: COGO - Intersection - Point Calculated

This card will show simple details about the point to be stored. Please see the table below for a description of each. To simply store the point with default values, tap the “Save” button.

| COGO – Intersection Card Item | Description |
|---|---|
| Point ID | This is auto filled with Point_001 (to start) and will be incremented by 1 for each successive point. “Intersection_” will always be shown, but the value can be changed to any whole number desired for the point to be stored. |
| Northing / Latitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Northing / Latitude value of the current point to be stored. |
| Description | By default, this will be left blank. This allows a description to be entered for the current point to be stored. |
| Easting / Longitude | Depending on the Coordinate System and the Measurement Unit selected, this is the Easting / Longitude value of the current point to be stored. |
| Feature Code | Depending on the active Feature Code List, this will search feature codes and auto fill the Description based on the selected code. |
| Elevation | This is the Elevation (ellipsoid) of the current point to be stored, based on the Measurement Unit selected. |
| Skip Confirmation Checkbox | This is disabled by default and will show the confirmation screen. The confirmation screen may be skipped with this checkbox enabled. |
| Save | This will save the current point and store the values in the point list. |

By default, the “Skip Confirmation” checkbox is disabled, leading the user to the Confirmation screen. The Confirmation screen allows for more complete details for the point to be entered.

Along with the basic items shown on the Store Point – Single card, the Confirmation screen also has:

| COGO – Intersection Confirmation Item | Description |
|---|---|
| Description | By default, this is blank. The user may type in any description to be saved along with the point. |
| Comments | By default, this is blank. The user may type in any comment to be saved along with the point. |
| Notes | By default, this is blank. The user may type in any note to be saved along with the point. |
| Upload / Take Picture | Select this to add a picture or take a picture to be saved along with the point. |
| Point Type | Points can be saved as Survey, Design, or Control. |
| Confirm | Tap this to save the point and all details to the project database. |

Once the “Confirm” button is tapped, the COGO – Intersection point will be saved to the database.

### 9.4.2. Inverse

The Inverse routine will calculate the direction and distance of two points. The points selected are used for the calculation.


Figure 176: COGO - Inverse - Point Selection

To select points, tap the icon. This will open the Point List.

Tap the “Confirm” button to complete the point selection process.

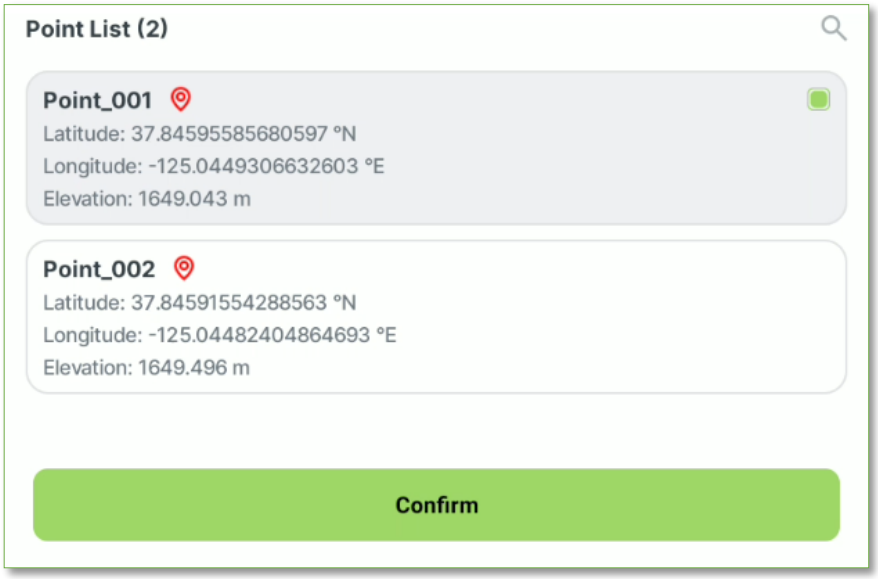


Figure 177: COGO - Inverse - Point Selected

With points selected, tap the “Calculate” button to perform the calculation.

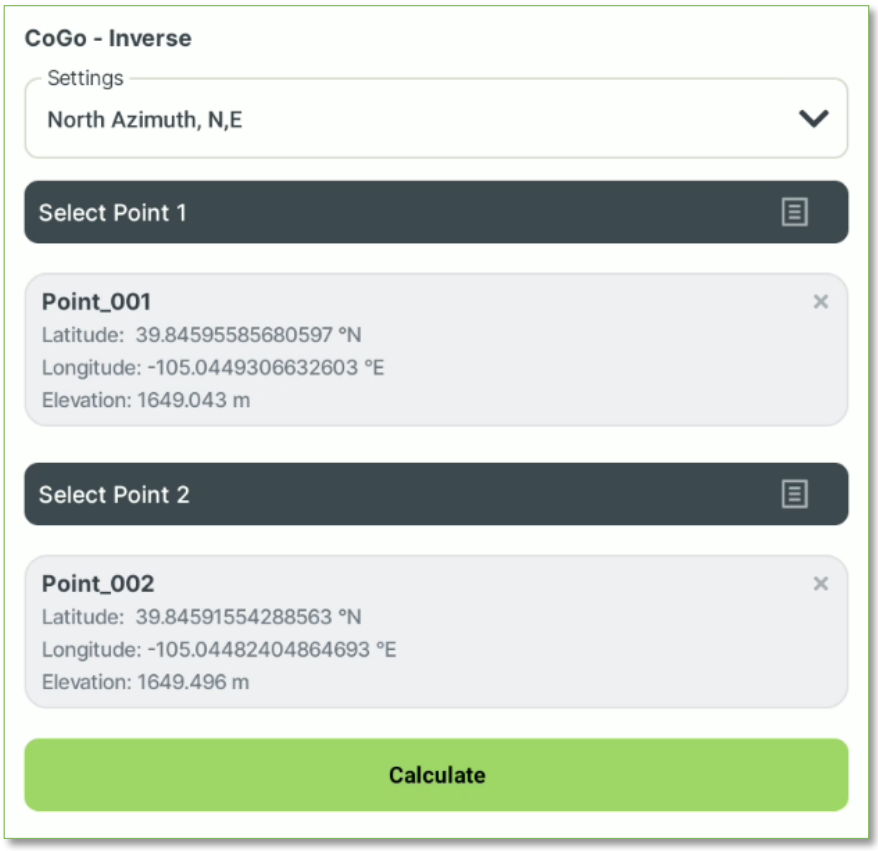


Figure 178: COGO - Inverse - Points Selected

The result screen will show the calculated results. Tap the “OK” button to exit the COGO – Inverse routine.

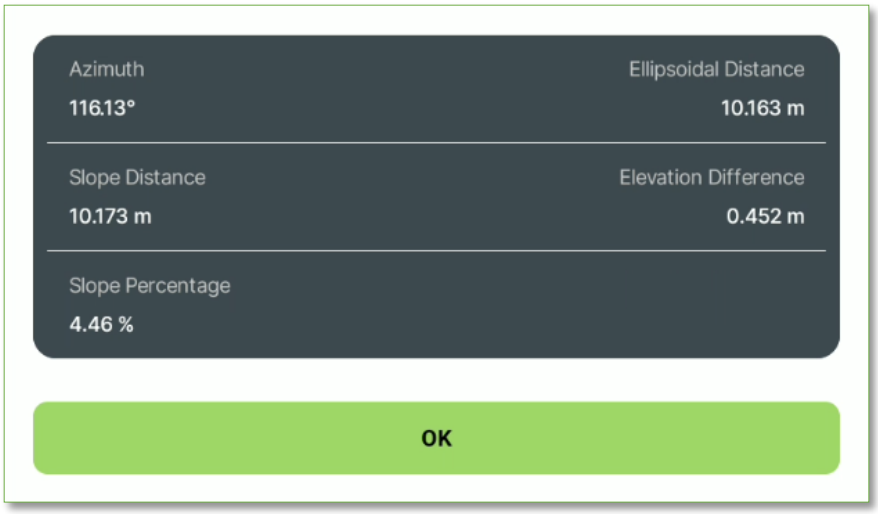


Figure 179: COGO - Inverse - Results