

# SatTerm Manual for SHOUT nano 100

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Version A

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## REVISION HISTORY

Revision	Date	Description
A	05/18/2023	Formal Release

## REFERENCE DOCUMENTS

The latest revisions of the NAL documents are available by request via email.

[Support@nalresearch.com](mailto:Support@nalresearch.com).

Reference	Title	Revision/Date
[1]	SHOUT nano 100 User Guide	Revision A, 15 May 2023

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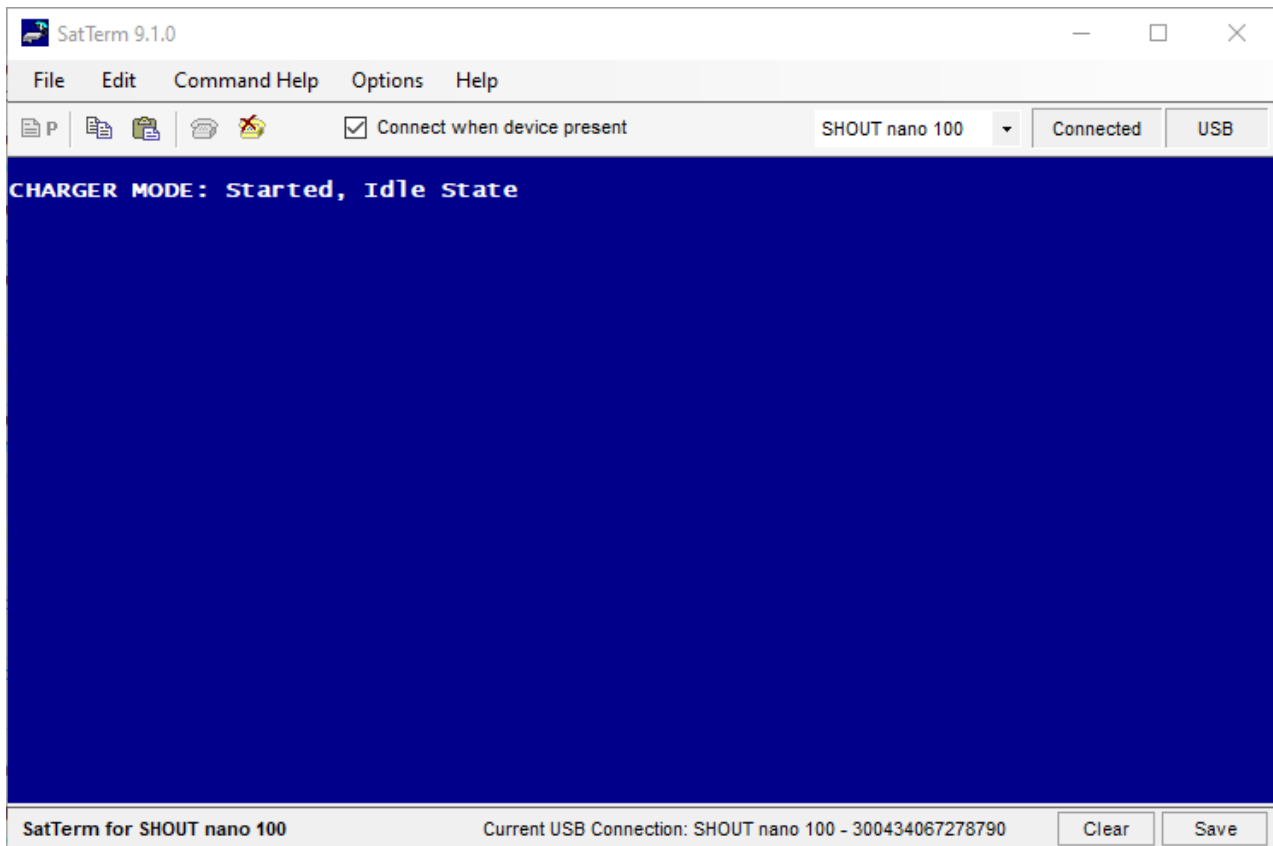
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# 1 INTRODUCTION

SatTerm, short for satellite terminal emulator, is terminal emulation software developed by NAL Research that runs on the Windows® operating system. It communicates with the family of NAL Research devices through RS232 or USB interface. The following sections cover how to use SatTerm 9.1.0 to configure the SHOUT nano 100. **Figure 1** is an example of the SatTerm 9.1.0 *Home* screen.



*Figure 1: SatTerm Home Screen*

## 1.1 INSTALLING SATTERM

To install SatTerm, run the “SatTerm V9.1.0 Setup” program under a Windows® based computer. Follow the on-screen instructions to advance through the installation process. You can cancel at any time without affecting your system by clicking the “Cancel” button. The latest SatTerm version can be downloaded from NAL Research’s website [www.nalresearch.com](http://www.nalresearch.com).

## 1.2 CONNECTING SATTERM TO THE SHOUT NANO 100

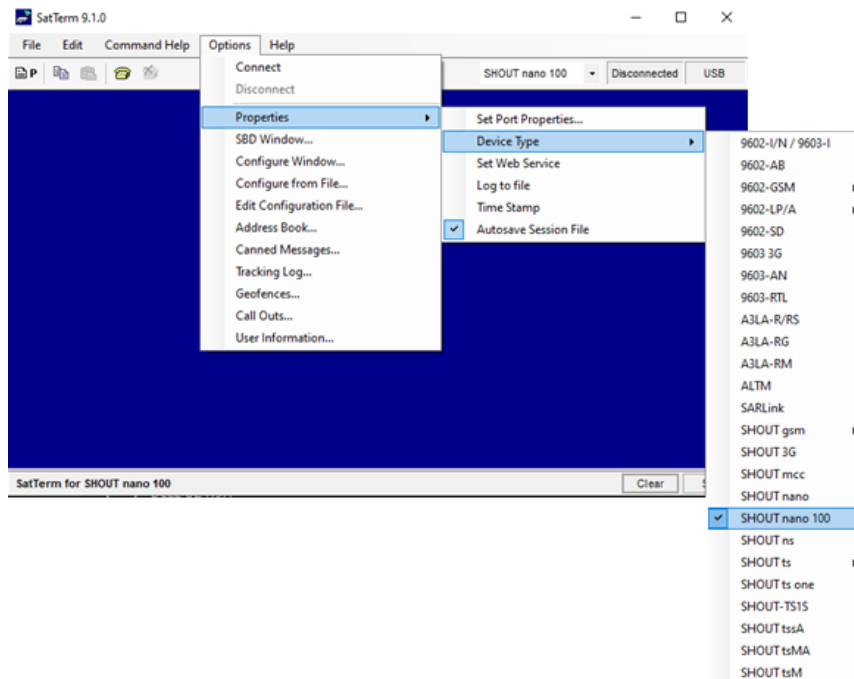
The SHOUT nano 100 can be connected to SatTerm via a USB port of a Windows® PC, and can also be connected to SatTerm through a Bluetooth link.

### 1.2.1 USB CONNECTION

1. Connect the SHOUT nano 100 to an available USB port on your computer with the provided USB cable (or any standard USB cable).
2. Run the SatTerm application and wait for the main window to appear (see **Figure 1**).

SatTerm can be accessed from the Windows® “Start” menu in the All Programs\NAL Research folder. The device may be powered ON or OFF before starting the SatTerm software. The selected device type determines the functionality and tools available in SatTerm. By default, the Device Type may be set to a value other than SHOUT nano 100. If necessary, this setting can be changed from the main window.

3. Select **Options>Properties>Device Type> SHOUT nano 100** from the SatTerm main menu (see **Figure 2**).NOTE: For detailed information on how to connect the SHOUT nano 100 via USB connection, refer to the SHOUT nano 100 User Guide [1] document.



*Figure 2: Select Device*



The selected device type displays on the main window in a gray status bar directly under the blue text area (see **Figure 2**).

## 1.2.2 PAIR SHOUT NANO 100 TO BLUETOOTH DEVICE

Depending on your security requirements, pair the SHOUT nano 100 to a BT device using one of two methods:

- Pairing without a PIN
- Pairing with a PIN

### 1.2.2.1 PAIRING WITHOUT A PIN

SHOUT nano 100 default configuration allows connection to a BT device, such as a BT enabled PC, without having to enter a PIN. The Pairing steps are shown below running on a **Windows® PC** and are as follows:

1. To turn on the SHOUT nano 100, press the **Power/Enter** button for at least two (2) seconds.
2. Scroll down to select **BT Pairing>Enable BT> select [X] Enable** on your Shout nano 100 device.
3. Scroll Back (Left Button), scroll down to select **Enable Passkey> select [X] Disable** on your Shout nano 100 device.
4. Scroll Back (Left Button) to the SHOUT nano 100 device main menu.
5. On your BT enabled PC, select **Start>Settings>Devices**.
6. Slide the **Bluetooth** switch to the **ON** position (see **Figure 3**).

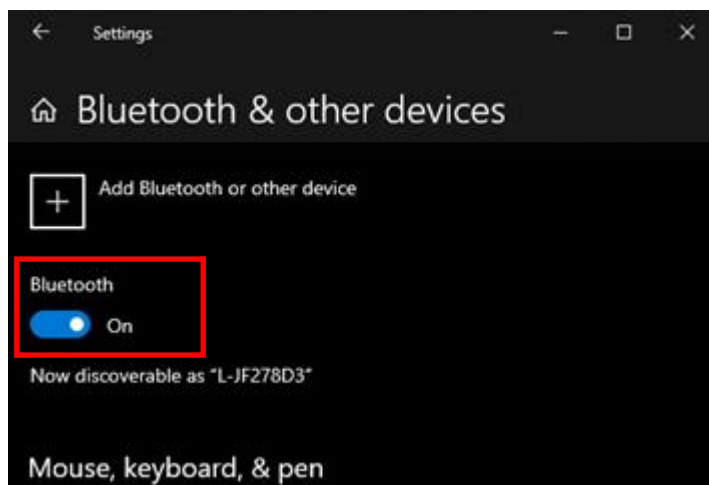



Figure 3: Bluetooth Options

Run SatTerm to connect to the paired SHOUT nano 100

7. Select Port Properties  at the top left corner of the *SatTerm* window (see **Figure 4**).

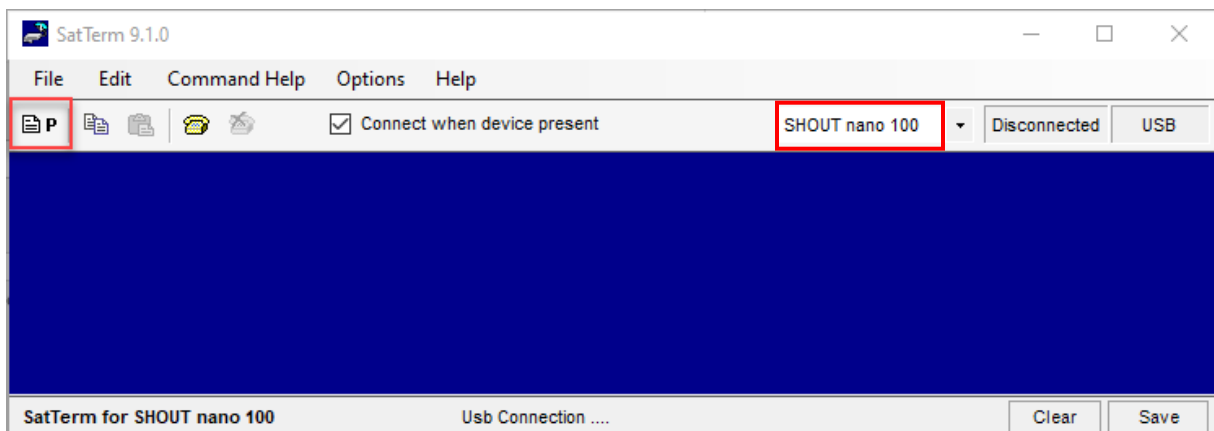
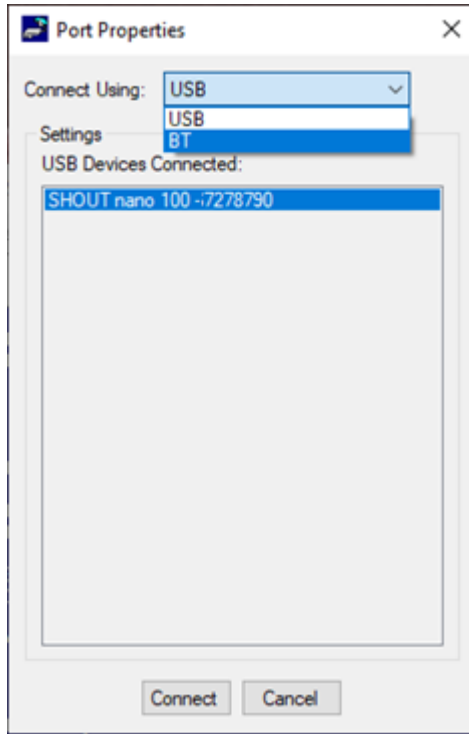


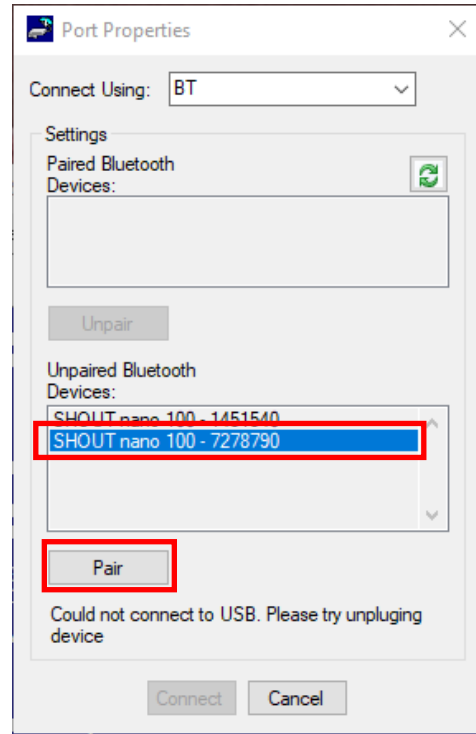
Figure 4: Select Port Properties in SatTerm

The *Port Properties* window appears (see **Figure 5**).

8. Select **BT** from the *Connect Using* drop down list (see **Figure 5**).



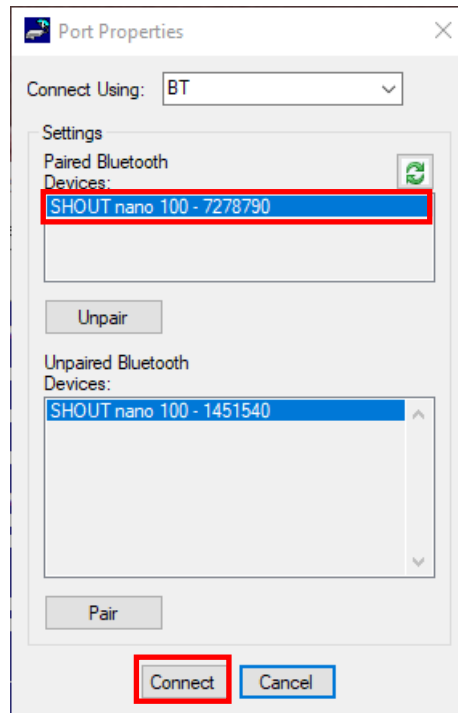
**Figure 5: Select BT**



**Figure 6: Port Properties**

9. Select your **SHOUT nano 100** device from the Unpaired Bluetooth Devices List and press **Pair** when the Pair button becomes enabled (see **Figure 6**).

The selected device now displays in the Paired Bluetooth Devices section of the Port Properties window (see **Figure 7**).



**Figure 7: Paired BT Device**

10. Select the Paired SHOUT nano 100 and press **Connect** when the Connect button becomes enabled (see **Figure 7**).
11. Verify the “Current BT Connection:” is the desired SHOUT nano 100 at the bottom of the SatTerm screen, and the SHOUT nano 100’s Bluetooth icon is green (see **Figure 8**).



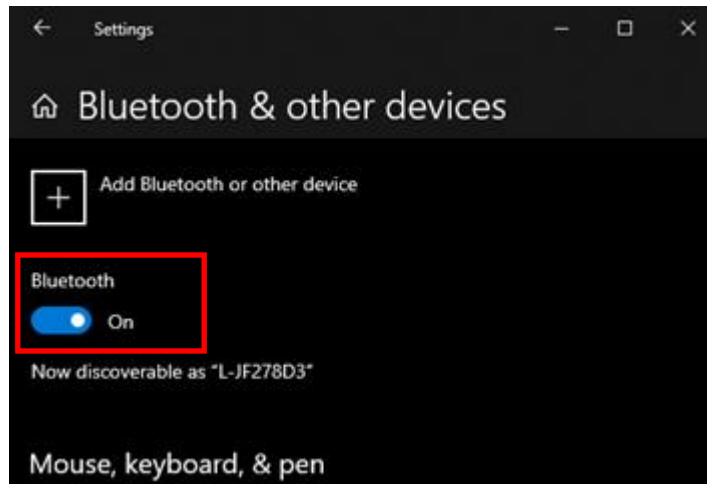
**Figure 8: Device Connected**

### 1.2.2.2 PAIRING WITH A PIN

The SHOUT nano 100 allows connection to a BT device, such as a BT enabled PC, with the extra security of a requiring a PIN (**AT^BTPASSEN=1**). The Pairing steps are show below running on a **Windows® PC** and are as follows:


1. To turn on the SHOUT nano 100, press the **Power / Enter** button for at least two (2) seconds.
2. Scroll down to select **BT Pairing > Enable BT > select [X] Enable** on you SHOUT nano 100 device.

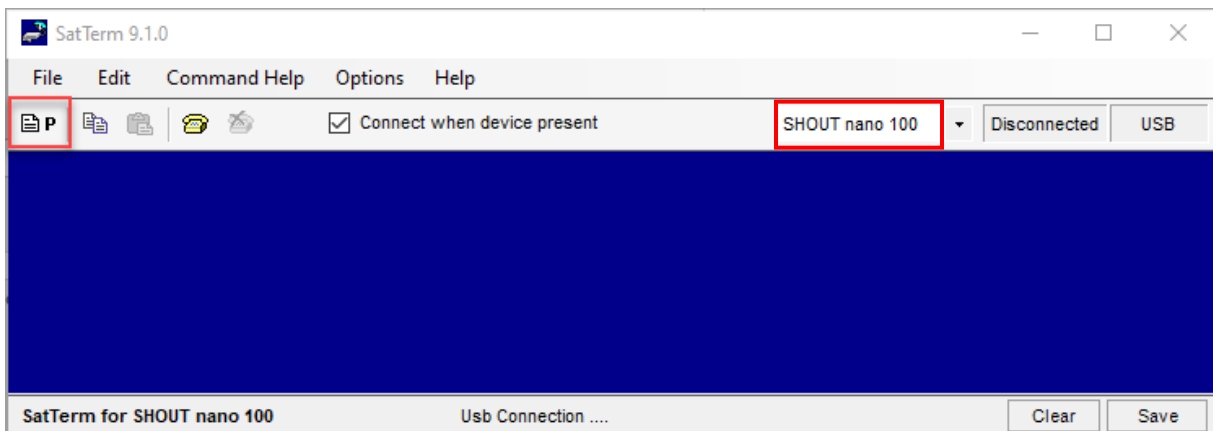
3. Scroll Back (Left Button), scroll down to select **Enable Passkey> select [X] Enable** on your Shout nano 100 device.
4. Scroll Back (Left Button) to the SHOUT nano 100 device menu.
5. On your BT enabled PC, select **Start>Settings>Devices**.
6. Slide the Bluetooth switch to the ON position (see **Figure 9**).



*Figure 9: Bluetooth Options*

**Run SatTerm to connect to the paired SHOUT nano 100**

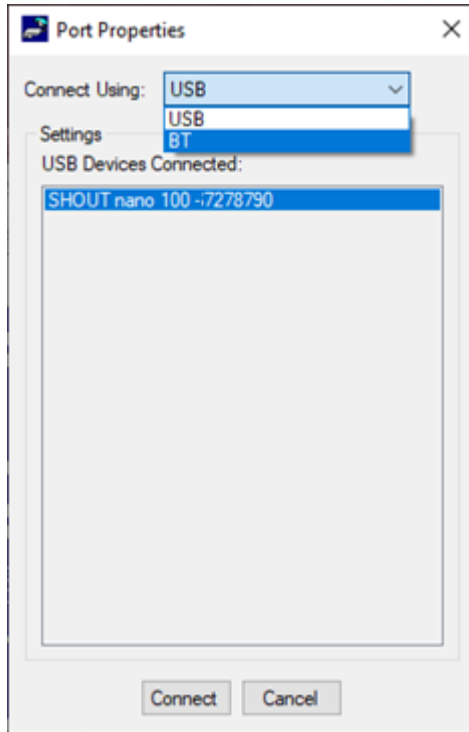
7. Select Port Properties  at the top left corner of the *SatTerm* window (see **Figure 10**).



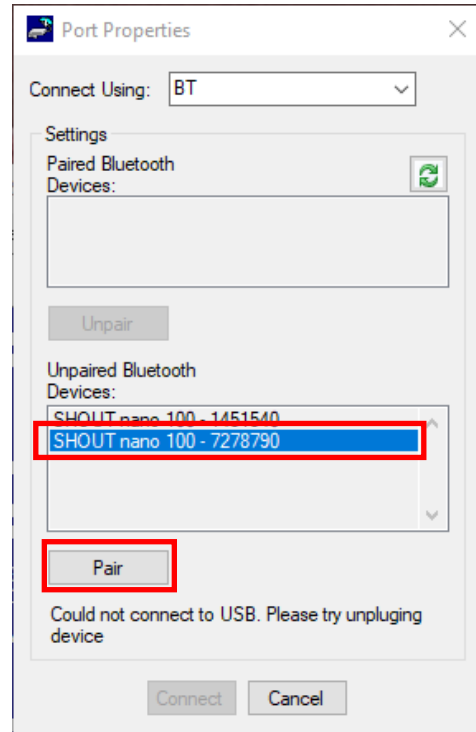
*Figure 10: Select Port Properties in SatTerm*

The *Port Properties* window appears (see **Figure 11**).

8. Select **BT** from the *Connect Using* drop down list (see **Figure 11**).

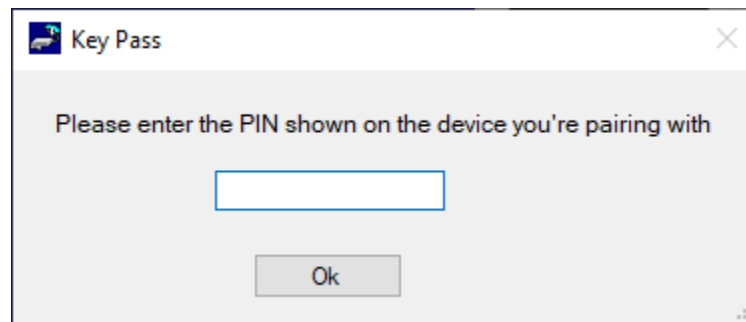


**Figure 11: Select BT**



**Figure 12: Port Properties**

9. Select your **SHOUT nano 100** device from the Unpaired Bluetooth Devices List and press **Pair** when the Pair button becomes enabled (see **Figure 12**).



**Figure 13: Key Pass Entry Window**

10. Enter the Passkey that is displayed on the SHOUT nano 100 into the Key Pass data entry field. You have 20 seconds to enter the Passkey displayed on the SHOUT nano 100 before the pairing process will expire, in which case, press the Pair button again when it becomes enabled (see **Figure 13**).
11. Upon successful entry of the Passkey, the device will move up to the 'Paired Bluetooth Devices' panel for selection to connect (see **Figure 14**).

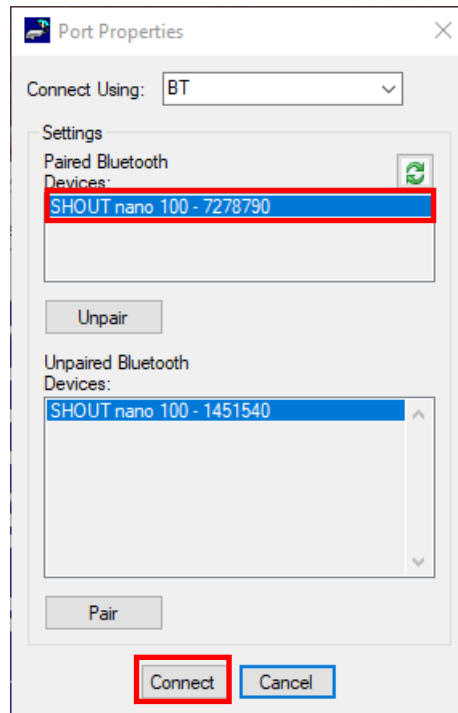


Figure 14: Paired BT Device

12. Select the Paired SHOUT nano 100 and press **Connect** when the Connect button becomes enabled (see **Figure 14**).
13. Verify the “Current BT Connection:” is the desired SHOUT nano 100 at the bottom of the SatTerm screen, and the SHOUT nano 100’s Bluetooth icon is green (see **Figure 15**).



Figure 15: Device Connected

### 1.3 PROFILE DESCRIPTIONS

A profile is a group of user-modifiable settings saved to nonvolatile memory. There are three (3) types of profiles on the SHOUT nano 100: *General Profile*, *Tracking Profile*, and *Other Profile*).

1. **General Profile:** General Profile contain settings that have a general impact on the operation of the SHOUT nano 100 (see **General Profile Settings**). There are two (2) stored general profiles numbered 0 and 1. In addition to the stored general profiles, there is an “active” general profile, which is the set of general settings that are currently in effect.

- At power-up, by default, general profile 0 is loaded into the “active” general profile. However, you can change the power-up profile using AT command **&Y**.
- After power-up, you can load the “active” general profile with any stored general profile using the soft reset command **Z**.
- Alternatively, you can use **&F** to load factory default settings back into the “active” general profile.
- Any modifications made to general profile settings apply to the “active” general profile and are temporary. To save the modifications, write the “active” general profile to one of the stored general profiles using **&W**.
- Settings that fall under general profiles can be displayed using **&V**.

2. **Tracking Profiles:** Tracking profiles contain settings that have an impact on the SHOUT nano 100 during tracking mode (see **2.2 Tracking Profile Settings**). There are 12 stored tracking profiles numbered from 0 to 11. In addition to the stored tracking profiles, there is an “active” tracking profile, which is a temporary tracking profile for the purpose of modifying a stored tracking profile. The “active” tracking profile is not used in tracking mode. Instead, tracking mode loads the stored tracking profiles directly based on the current state.

- At power-up, tracking profile 0 is always loaded into the “active” tracking profile. However, after power-up, you can load any of the stored tracking profiles using the soft reset AT command **ZT**.
- Alternatively, you can use **&FT** to load factory default settings back into the “active” tracking profile.
- Any modifications made to tracking profile settings apply to the “active” tracking profile and are temporary. To save the modifications, user must write the “active” tracking profile to one of the stored tracking profiles using **&WT**.
- Settings that fall under tracking profiles can be displayed using **&VT**.

3. **Additional Setup Parameters (Other):** Additional setup parameters affect the SHOUT nano 100 globally and immediately. Unlike general profiles and tracking profiles, there is no



“active” profile associated with these parameters to be saved or retrieved. Any modifications to these settings are saved to nonvolatile memory directly.

## 2 CONFIGURE WINDOW

Use the SatTerm *Configure Window* option to set up the profiles. Follow the steps below first to synchronize communication between the SHOUT nano 100 and a connected DTE (computer, laptop, etc.).

1. Connect the SHOUT nano 100 to an available USB port on your computer with the provided USB cable.
2. Launch SatTerm software from the Windows® *Start* tab.  
**Note:** If SatTerm is not installed; the software can be downloaded from NAL Research's website <http://www.nalresearch.com>.
3. Select **Options > Properties > Device Type > SHOUT nano 100** (see **Figure 2**). This option selects the type of device connected to the computer. Only NAL Research's devices appear on the list.
4. Again, use the *Options* menu to open *Configure Window...*

### 2.1 GENERAL PROFILE SETTINGS

This section describes the general profile settings using SatTerm, and covers the configuration tabs associated with the General Profile. The *Configuration* window organizes the General Profile Settings into four (4) tabs: *Miscellaneous*, *Tracking*, *Motion*, and *GPS*.

1. Select **Options>Configure Window** on the *Home* screen (see **Figure 16**).

The *Configuration for SHOUT nano 100* screen displays (see **Figure 17**).

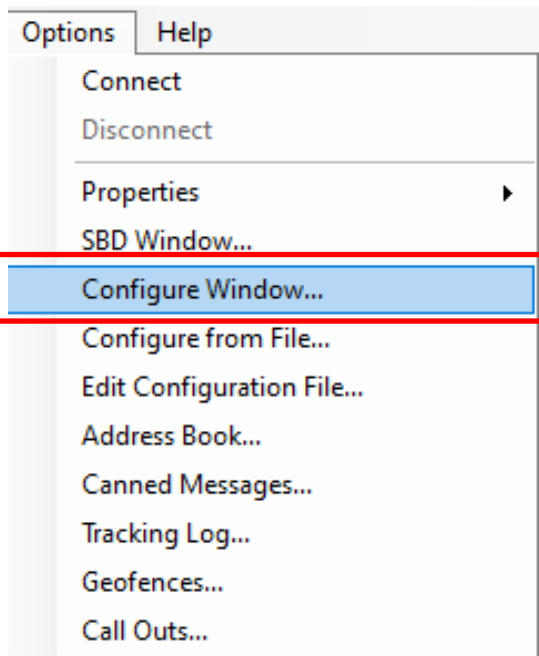


Figure 16: Home Screen –Configure Window

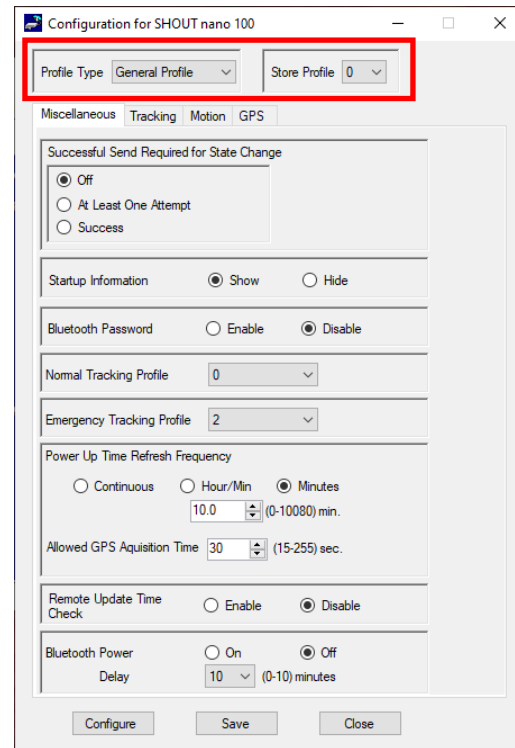


Figure 17: General Profile Window with Miscellaneous Tab

2. Select **General Profile** from the *Profile Type* drop-down list, if not already selected (see **Figure 17**), and then select the Store Profile value (**0** or **1**) from the *Store Profile* drop-down list (see **Figure 17**).

### 2.1.1 MISCELLANEOUS TAB

When selected the Miscellaneous tab offers eight (8) settings (see **Figure 17**) – *Successful Send Required for State Change*, *Startup Information*, *Bluetooth Password*, *Normal Tracking Profile*, *Emergency Tracking Profile*, *Power Update Time Refresh Frequency*, *Remote Update Time Check*, and *Bluetooth Power Delay*.

1. **Successful Send Required for State Change:** This option restricts the SHOUT nano 100 from changing to a lower priority tracking mode based on whether or not a tracking report has been transmitted. Among the three tracking modes, the order of priority is Emergency, Geofence, and then Normal. When set to off, a change to the tracking mode takes effect immediately (i.e. Emergency to Normal). When set to “At Least One Attempt”, the mode

change will be delayed until at least one tracking cycle is complete. When set to “Success”, the mode change will be blocked until a tracking report is transmitted successfully.

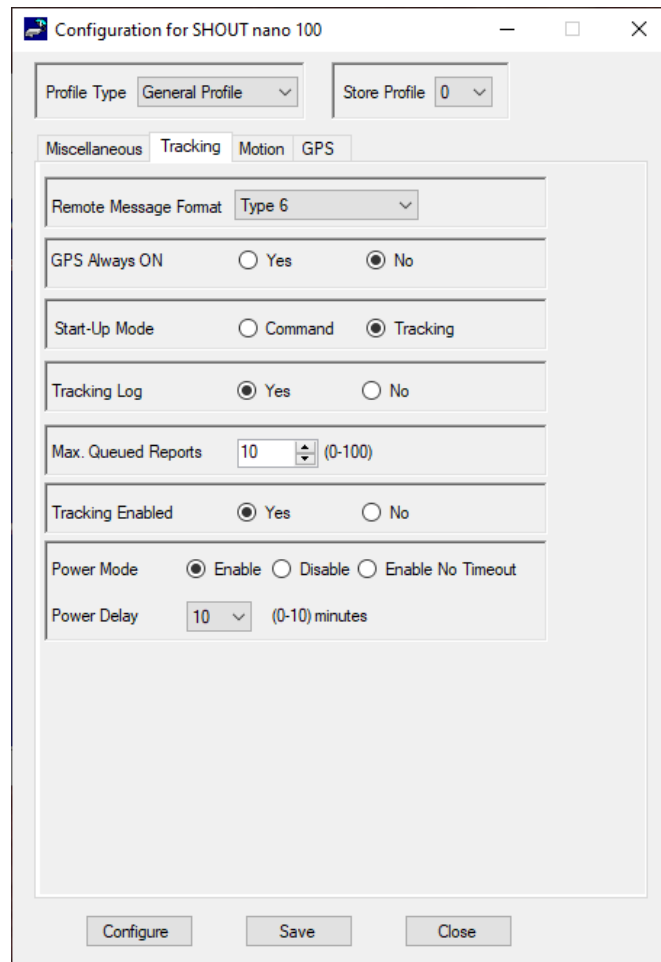
- a. The AT command associated with this setting is **AT^SSR**.
2. **Startup Information:** This option hides/shows the power-up text (copyright, model number, etc.) that is echoed to the SHOUT nano 100’s USB port.
    - a. The AT command associated with this setting is **AT^SSI**.
  3. **Bluetooth Password:** Enables or disables the requirement to enter a password when pairing a device with the SHOUT nano 100.
    - a. The AT command associated with this setting is **AT^BTPASSEN**.
  4. **Normal Tracking Profile:** This option selects the stored tracking profile to be used in Normal tracking mode.
    - a. The AT command associated with this setting is **AT^TPN**.
  5. **Emergency Tracking Profile:** This option selects the stored tracking profile to be used in Emergency tracking mode.
    - a. The AT command associated with this setting is **AT^TPE**.
  6. **Power Up Time Refresh Frequency:** When a power-up delay is set, the SHOUT nano 100 periodically wakes up from sleep to adjust its internal clock against the GPS receiver timing signal. If the GPS receiver does not yet have a time fix, the SHOUT nano 100 stays awake for a specified period of time (Allowed GPS Acquisition Time) waiting for a GPS time fix. After which, the SHOUT nano 100 sleeps for another period of time (Power Up Time Refresh Frequency) before retrying to find a time fix.
    - a. These values are configured through the AT command **^PUPT**.
  7. **Remote Update Time Check:** This enables a time check for incoming remote updates. When enabled, remote updates with a timestamp less than or equal to the last remote update time are not applied.
    - a. The AT command associated with this setting is **AT ^RUTC**.

8. **Bluetooth Power Mode and Delay:** This sets the Bluetooth power settings. When set to off, the Bluetooth radio will not turn when the device powers on. The Bluetooth radio can be turned back on by using the device menu option or setting this option to on. When turned on, the delay setting determines how long the Bluetooth will stay turned on while there is no active connection with the Bluetooth.

The AT command associated with this setting is **AT^BTPWR**.

## 2.1.2 TRACKING TAB

When selected the Miscellaneous tab offers seven (7) settings display as shown in **Figure 18:** *Remote Message Format, GPS Always ON, Start-up Mode, Tracking Log, Max Queued Reports, and Track Enabled, and Power Mode/Power Delay.*



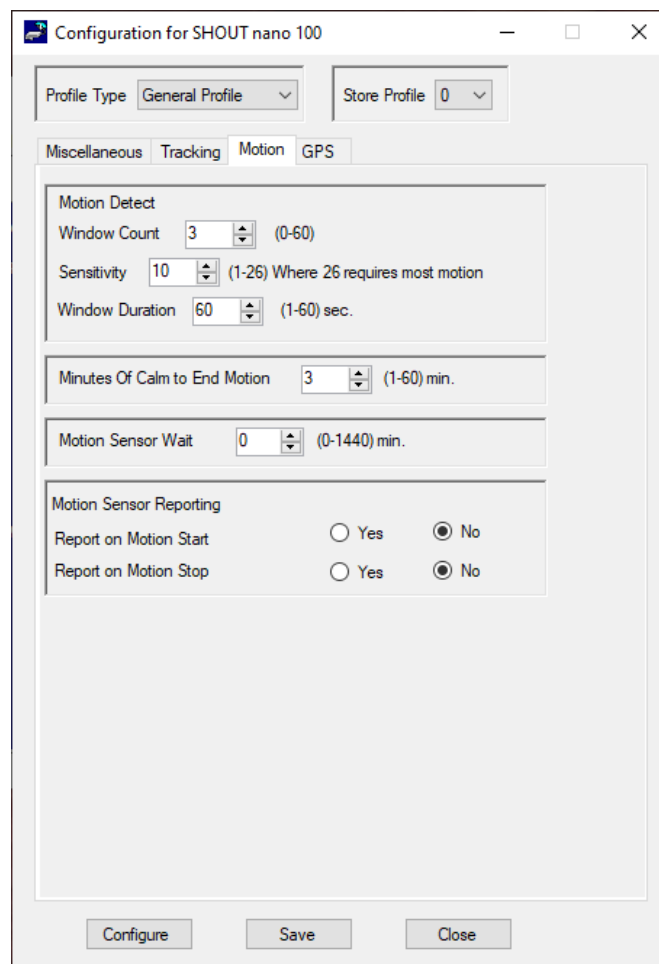
**Figure 18: General Profile Window with Tracking Tab**

1. **Remote Message Format:** Sets the format of the messages that are sent from the SHOUT nano 100 to the recipient.
  - a. Currently, available message formats include:
    - i. PECOS P3
    - ii. PECOS P4
    - iii. NAL Type 3: (A3LA Trackers)
    - iv. NAL Type 4: (with DOPs)
    - v. NAL Type 5: (with Pins)
    - vi. NAL Type 6: Includes short codes and free text fields
    - vii. NAL Type 7:
    - viii. NAL 10 Byte Ver 0: A 10-byte message format to reduce data usage
  - b. The AT command associated with this setting is **^RMF**.
2. **GPS Always On:** Forces the GPS receiver to remain on between reports, allowing the SHOUT nano 100 to have immediate location information (GPS hot start, assuming the SHOUT nano 100 always has full view of the sky) each time it is ready to transmit a tracking report.
  - a. When low-power consumption is not critical, enabling this option is recommended for faster GPS acquisition and more accurate location information. If the SHOUT nano 100 turns off to sleep while idle, the GPS receiver also turns off.
  - b. The AT command associated with this setting is **^GAO**.
3. **Start-Up Mode:** Sets the operating mode for when the unit is powered on or wakes up from sleep. The default is to power up the unit in tracking mode to allow the unit to begin tracking after a power cycle and to automatically send reports at a predetermined interval. Alternatively, the SHOUT nano 100 can also be configured to turn on in command mode, allowing users to enter AT commands via a connected computer.
  - a. The AT command associated with this setting is **^START**.
4. **Tracking Log:** Forces the SHOUT nano 100 to save all tracking reports, whether successfully sent or attempted during tracking mode, to nonvolatile memory.
  - a. The device can save up to about 4,000 reports in a circular memory (oldest saved reports are overwritten when memory reaches maximum capacity).

- b. SatTerm can be used to retrieve tracking reports later using **Options > Tracking Log**.
    - c. The AT command associated with this setting is **^DLTRK**.
5. **Max. Queued Reports:** Sets the maximum number of reports that can be queued on the SHOUT nano 100 for retransmit.
  - a. This setting applies only if *Queue Failed Reports*, *Queue Restricted Reports*, or both are set (see section **2.2 Tracking Profile Settings**).
    - i. A restricted report is a report that attempts to send while the Iridium link is configured to be disabled. For example, if Iridium were disabled in a certain geographic area by a geofence, any reports that attempt to send while in the geofence would be considered a restricted report. In this case, queuing restricted reports would cause these reports to be queued to retransmit when outside that geographic area.
    - ii. Failed reports are reports that are unable to send after the specified *Time to Keep Trying* value (see section **2.2 Tracking Profile Settings**).
  - b. When the number of queued reports reaches its maximum number, the oldest queued reports are overwritten.
  - c. The AT command associated with this setting is **^ERQM**.
6. **Tracking Enabled:** This option enables tracking.
  - a. The AT command associated with this setting is **AT^TRKE**.
7. **Power Mode and Delay:** This feature keeps the device turned on while it is operating in tracking mode and Bluetooth or USB are connected. When both become disconnected, the device will remain turned on for a minimum period to allow the user to reconnect. If the mode is 0, the feature is disabled. If the mode is 1, the feature is enabled once both USB and Bluetooth are no longer connected, and a countdown is started for a number of minutes set with the <delay> parameter. If the mode is 2, the feature is disabled with no timeout.
  - a. The AT command associated with this setting is **AT^PWRAO**.

### 2.1.3 MOTION TAB

The SHOUT nano 100 has a built-in sensor that can reliably detect motion. The *Motion* tab, as shown in **Figure 19**, provides ways to detect different motion characteristics without having to interpret the raw motion sensor signals. Motion detection can be enabled or disabled through the *Motion Enabled* option in the tracking profile (see section **2.2 Tracking Profile Settings**). When selected the Miscellaneous tab offers six (6) settings (see **Figure 17**) – *Window Count*, *Sensitivity*, *Window Duration*, *Minutes Of Calm to End Motion*, *Motion Sensor Wait*, *Motion Sensor Reporting*.



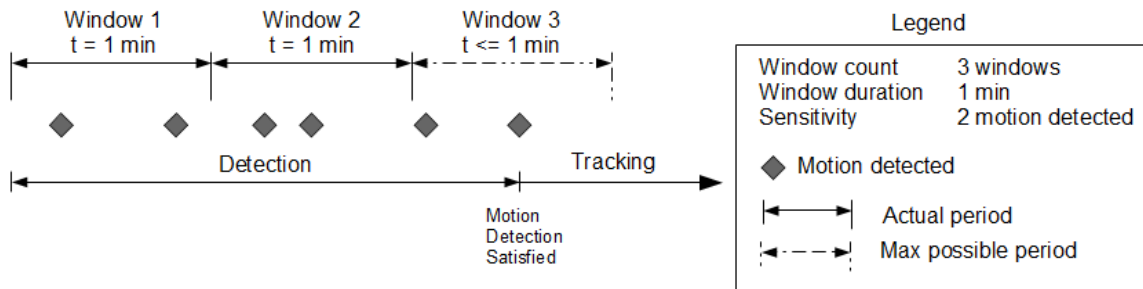
**Figure 19: General Profile Window with Motion Tab**

When motion detection is enabled, the device monitors the motion sensor to detect when the device is in motion. To detect the start of motion, an algorithm involving motion detection windows is used. This algorithm succeeds to detect motion when a certain number of contiguous windows are each satisfied by a minimum number of Transistor–Transistor Logic (TTL) pulses



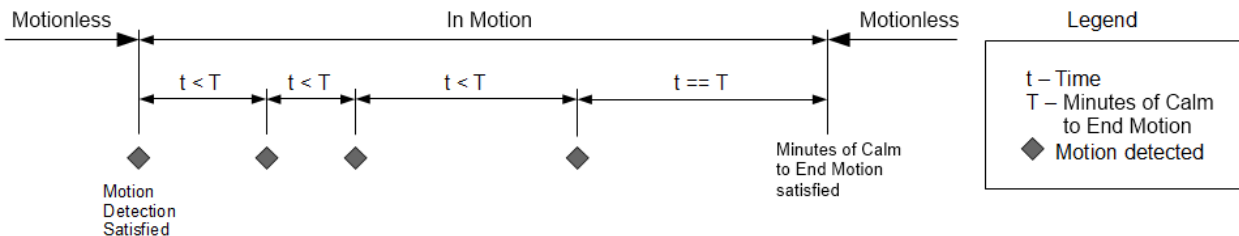
from the motion sensor. **Figure 20** illustrates the algorithm with a window count of 3, window duration of one (1) minute, and a sensitivity of two (2) TTL pulses.

**Note:** The motion detection algorithm starts over whenever the device receives a remote update. A remote update, in addition to restarting the motion detection algorithm, also resets the motion state of the device back to motionless.



**Figure 20: Motion Detection Example**

Once motion has been detected using the motion detection algorithm, the device is considered in motion and report formats that support motion indication will have the motion indicator set. While in motion, the device switches to a different algorithm for detecting the end of motion. The device is considered motionless if there is a certain duration of calm. The definition of calm for this algorithm differs depending on whether the device is awake or sleeping. While awake, a single TTL pulse resets the calm timer; whereas while sleeping, the same algorithm used for detecting the start of motion is used to detect motion that will reset the calm timer. An example of this algorithm is shown in **Figure 21**.



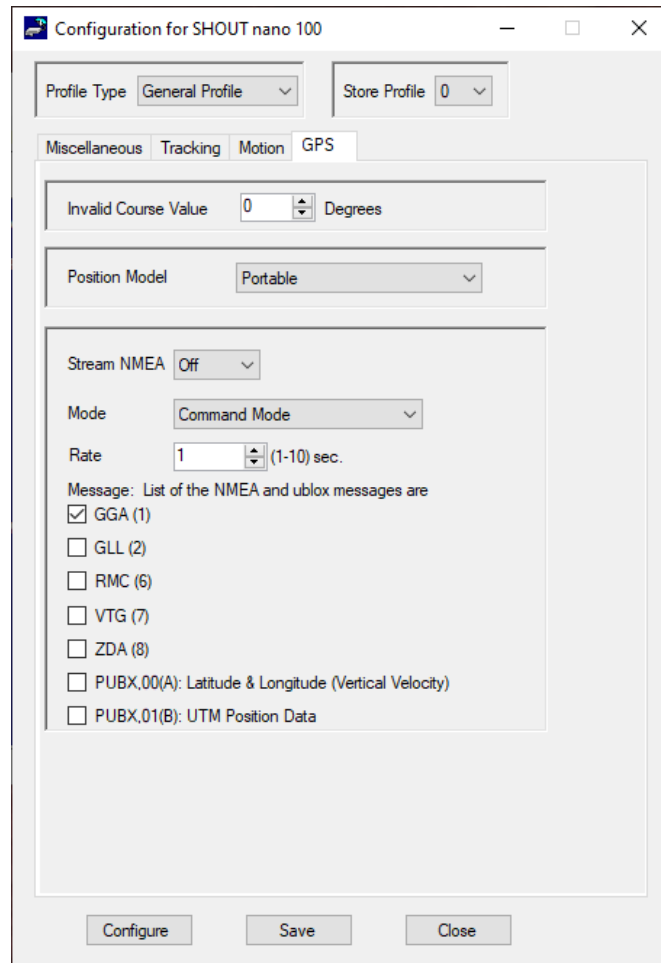
**Figure 21: End of Motion Example**

1. **Window Count:** Specifies the number of contiguous windows for the motion detection algorithm. If set to 0, then a single TTL pulse from the motion sensor will satisfy the motion detection algorithm.
  - a. The AT command associated with this setting is **^MSB**.

2. **Sensitivity:** Specifies the minimum number of motion sensor TTL pulses that must be detected in order to satisfy a single motion detection window for the motion detection algorithm.
  - a. The AT command associated with this setting is **^MSB**.
3. **Window Duration:** Specifies the duration of each motion detection window for the motion detection algorithm. The AT command associated with this setting is **^MSB**.
4. **Minutes of Calm to End Motion:** Specifies the duration of calm needed in order for the device to return to the motionless state.
  - a. The AT command associated with this setting is **^MSE**.
5. **Motion Sensor Wait:** Specifies the duration of time to ignore the motion sensor whenever the SHOUT nano 100 goes to sleep. Once this time has elapsed, motion detection begins again.
  - a. The AT command associated with this setting is **^MSW**.
6. **Motion Sensor Reporting:** Determines whether to send a report when motion starts and/or ends. For this setting to have an effect, it is required that the *Motion Enabled* option is enabled.
  - a. If the *Report on Motion Start* option is enabled, a NAL format GPS version 6 report with short code 20 will be transmitted when motion starts. See document [NAL GPS Report Version 6 Format \[2\]](#) for details.
  - b. If the *Report on Motion Stop* option is enabled, a version 6 report with short code 21 will be transmitted when motion ends.
  - c. The AT command associated with this setting is **^MSR**.

#### 2.1.4 GPS TAB

The GPS tab provides the option to configure the GPS receiver and stream NMEA formatted GPS data from the SHOUT nano 100 USB port while in Command mode, Tracking mode, or both modes (see **Figure 22**). When selected the *GPS* tab offers three (3) settings (see **Figure 17**) – *Invalid Course Value*, *Position Model*, and *Stream NMEA*.



**Figure 22: General Profile Window with GPS Tab**

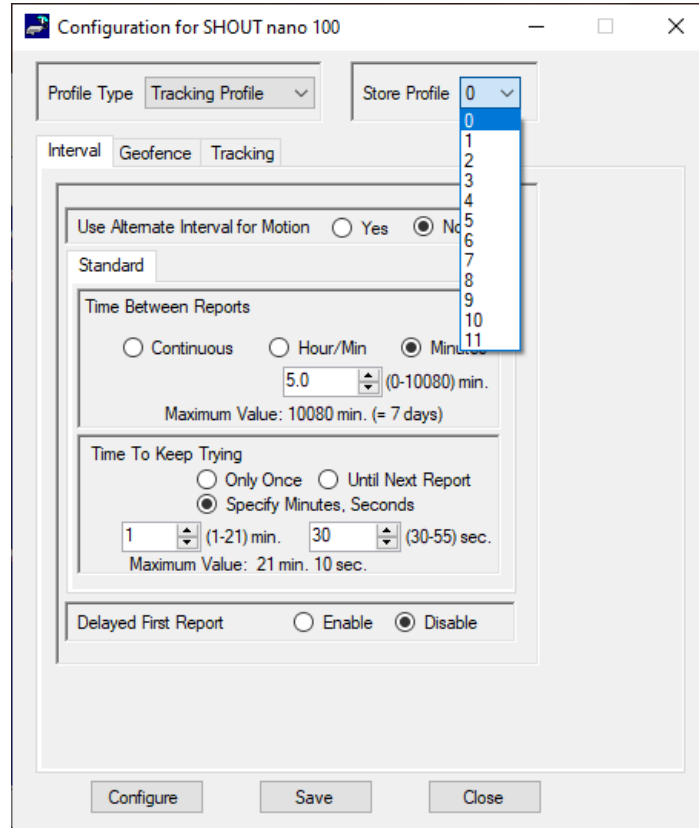
1. **Invalid Course Value:** This value is sent in GPS reports to indicate an invalid course when the GPS receiver is unable to determine the course.
  - a. The AT command associated with this setting is **AT+ICV**.
  
2. **Position Model:** This setting allows the GPS receiver to be more accurate by telling the unit what it's environment is like. For applications operating below 12 km, the Portable setting is sufficient. Those requiring operation above 12 km should refer to the "AT Commands for SHOUT nano 100" document for detail.
  - a. The AT command associated with this setting is **AT+PNAV**.
  
3. **Stream NMEA:** This parameter sets NMEA streaming on or off.
  - a. The AT command associated with this setting is **AT+PG**.

- **Mode:** This parameter selects the mode (Tracking, Command or both modes) in which GPS data streaming is active.
- **Rate:** This parameter sets the NMEA streaming update rate in seconds.
- **Message:** The checked boxes select which NMEA sentences stream through the SHOUT nano 100 USB port.

## 2.2 TRACKING PROFILE SETTINGS

This section describes the general profile settings using SatTerm, and covers the configuration tabs associated with the General Profile. The *Configuration* window organizes the Tracking profile settings into three tabs: *Interval*, *Geofence*, and *Tracking*.

1. Select **Options > Configure Window** on the *Home* screen (see **Figure 16**).
2. Select **Tracking Profile** from the *Profile Type* drop-down list (see **Figure 23**).
3. Select the **Store Profile** value (**0** thru **11**) from the *Store Profile* drop-down list (see **Figure 23**).



**Figure 23: Tracking Profile Window with Interval Tab**

## 2.2.1 INTERVAL TAB

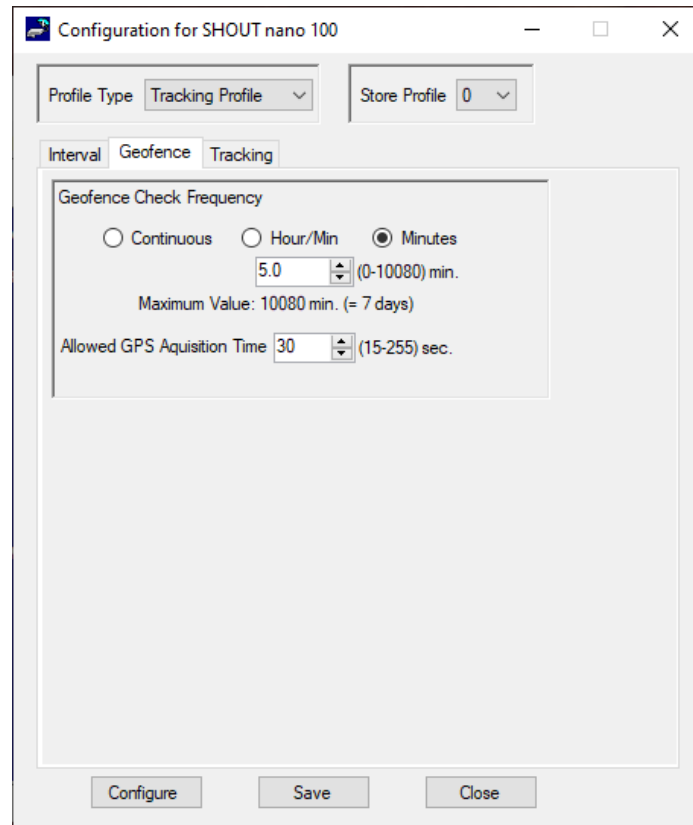
When selected the *Interval* tab offers four (4) settings: *Use Alternate Interval for Motion*, *Time Between Reports*, *Time To Keep Trying*, and *Delayed First Report*, as shown **Figure 23**.

1. **Use Alternate Interval for Motion:** When this setting is set to *Yes*, the SHOUT nano 100 uses alternate *Time Between Reports*, *Time To Keep Trying*, and *Delayed First Report* settings while in motion. To set these alternate settings, use the *Motion* tab that appears when *Yes* is selected.
  - a. The AT command associated with this setting is **^UAMS**.
2. **Time Between Reports:** Sets the interval between tracking report cycles. The interval can range from 0 and 10080 minutes in increments of 0.5 minutes (i.e., 30 seconds).
  - a. The AT commands associated with this setting are **^TBR** (Standard) and **^TBRA** (Motion).
3. **Time To Keep Trying:** Sets the duration in which the SHOUT nano 100 attempts to retry sending a tracking report. During a report cycle, the SHOUT nano 100 attempts to acquire a valid GPS fix and acceptable communication link signal strength. Once the tracking fix and signal strength requirements are met, the device sends a report. If the report fails to send, the SHOUT nano 100 retries until the specified *Time To Keep Trying* window expires.
  - a. There are three (3) additional special values for *Time To Keep Trying* (TTKT): *Only Once*, *Until Next Report*, and *Specify Minutes, Seconds*.
    - I. *Only Once* forces the SHOUT nano 100 to send only once per report cycle regardless of whether the tracking report was successfully transmitted or not.
    - II. *Until Next Report* forces the SHOUT nano 100 to retry sending a tracking report up to the next reporting cycle if there is no successful transmission.
    - III. *Specify Minutes, Seconds* specifies the timeframe, in minutes and seconds, to retry sending a tracking report, if there is no successful transmission.
  - b. *Time To Keep Trying* is specified in 5-second increments. It has a minimum value of 1.5 minutes and a maximum value of 21 minutes and 10 seconds.

- c. The AT command associated with this setting are **^TTKT** (Standard) and **^TTKTA** (Motion).
4. **Delay First Report:** When enabled, this setting prevents the transmission of the first tracking report. This applies when tracking is turned on from off or if there is a mode change. A mode change occurs when entering/leaving a geofence and when emergency is enabled/disabled.
- a. An example of how this parameter might be useful is to avoid unwanted transmissions that may accumulate airtime costs. If tracking mode is restarting repeatedly because of frequent power cycling, reports are transmitted each time. Enabling *Delay First Report* would delay that first report and reduce the airtime usage.
  - b. The AT commands associated with this setting is **^DFR** (Standard) and **^DFRA** (Motion).

### 2.2.2 GEOFENCE TAB

When selected the *Geofence* tab offers two (2) settings, as shown in **Figure 24: Geofence Check Frequency and Allowed GPS Acquisition Time**.

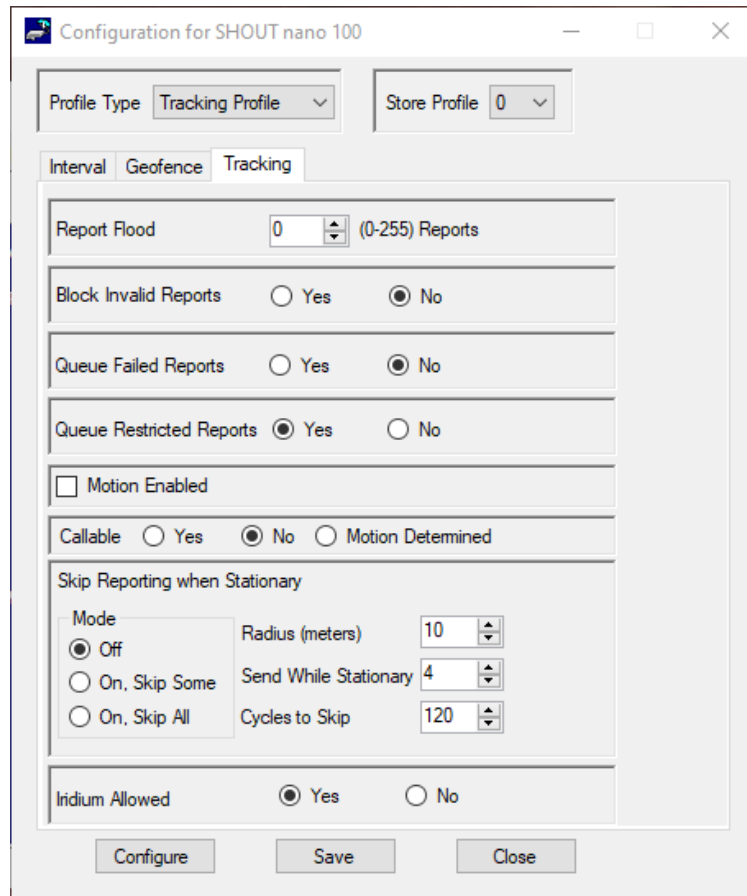


**Figure 24: Tracking Profile Window with Geofence Tab**

1. **Geofence Check Frequency:** Sets the maximum time between position updates to check if the device is in a geofence. If a valid GPS position is received before the next check, the countdown to the next check is restarted.
  - a. The AT command associated with this setting is **^GFCE**.
2. **Allowed GPS Acquisition Time:** Sets the amount of time the geofence check attempts to acquire a GPS position. If the SHOUT nano 100 fails to acquire a position in the time allowed, the geofence check is aborted and occurs at the next scheduled check or the next time the GPS receiver has a valid position.
  - a. The AT command associated with this setting is **^GFCE**.

### 2.2.3 TRACKING TAB

When selected the *Tracking* tab offers eight (8) settings — *Report Flood*, *Blocked Invalid Reports*, *Queue Failed Reports*, *Queue Restricted Reports*, *Motion Enabled*, *Callable*, *Skip Reporting when Stationary*, and *Iridium Allowed* (see **Figure 25**).



**Figure 25: Tracking Profile Window with Tracking Tab**

1. **Report Flood:** This parameter sets the number of tracking reports that are to be transmitted continuously when first entering Tracking mode and when the tracking mode changes (for example, from Normal to Emergency). After the specified tracking reports have been transmitted, the pre-programmed reporting interval will take effect. In the Emergency tracking mode, the report flood will be ended prematurely when an emergency acknowledgement is received.
  - a. The AT command associated with this setting is **AT^RF**.
  
2. **Block Invalid Reports:** When this setting is enabled, only tracking reports with a valid GPS position fix are transmitted. This can be useful in filtering out possibly misleading GPS data points.
  - a. The AT command associated with this setting is **AT^BIGR**.



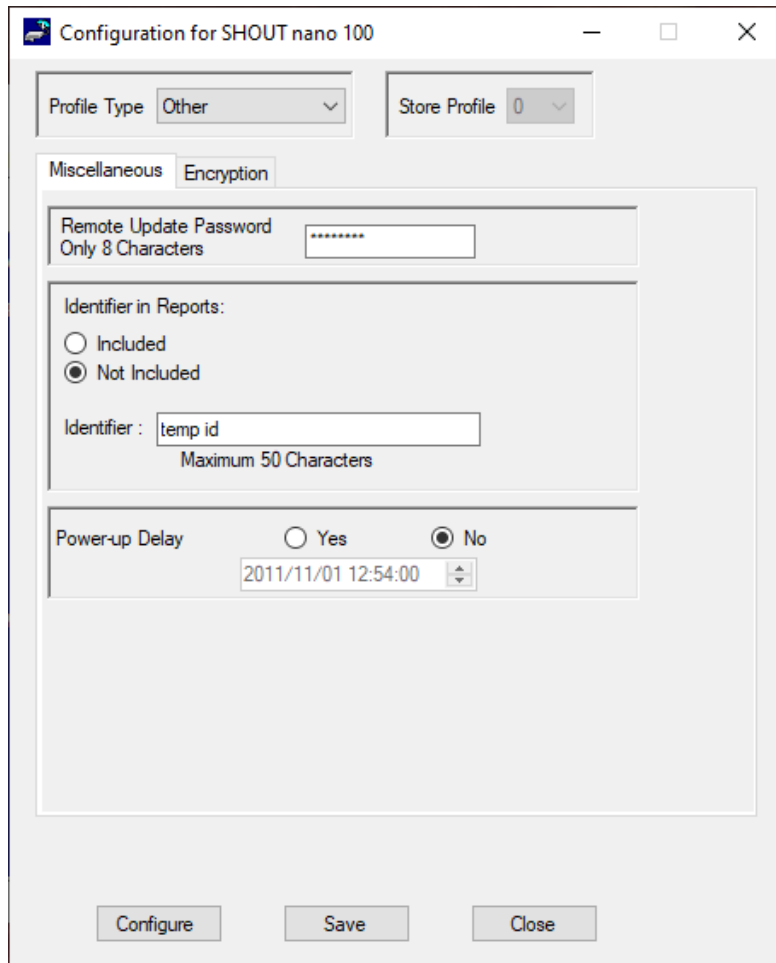
3. **Queue Failed Reports:** When this setting is enabled, tracking reports that fail to transmit are queued in the Outbox for retransmission. A tracking report that cannot be sent before the specified *Time to Keep Trying* value is considered a failed report.
  - a. The command related to this setting is **AT^ERQ**.
4. **Queue Restricted Reports:** When this setting is enabled, tracking reports that are restricted from transmitting will be queued for later transmission. A report is considered restricted when the Iridium link has been disabled. For example, in the case where Iridium is disabled in a certain geographic area by a geofence, tracking reports collected while in the geofence would be considered restricted reports. And, if configured for queuing, the restricted reports will be later transmitted when outside that geographic area or in an area that allows transmitting.
  - a. The command related to this setting is **AT^ERQ**.
5. **Motion Enabled:** Enables the motion sensor in tracking mode. This setting can vary between tracking profiles. For example, the motion sensor could be enabled for normal tracking but be disabled while operating inside in a geofence.
  - a. The AT command associated with this setting is **^MSA**.
6. **Callable:** Sets the callable state of the SHOUT nano 100 in tracking mode.
  - a. When *Callable* is set to *Yes*, the Iridium modem remains turned on between reports to listen for incoming messages. Any incoming messages or updates from a control center occur immediately. However, the SHOUT nano 100 consumes the most power because the device never goes into sleep mode.
  - b. When *Callable* is set to *No*, the SHOUT nano 100 puts all its internal circuitry in sleep mode while idle. Any incoming messages or updates from a control center have to wait until the next reporting cycle (when the RF module wakes up for sending). For this configuration, the SHOUT nano consumes the least power in between reports.
  - c. When *Callable* is set to *Motion Determined*, the SHOUT nano 100 is callable when the device is in motion and is in sleep mode when the device is stationary.
  - d. The AT command associated with this setting is **^CAL**.

7. **Skip Reporting when Stationary:** This parameter limits the SHOUT tssA from sending tracking reports when it has not moved out of a specified radius. When enabled, this causes the unit to be bounded by a sphere with a specified radius. While the unit remains in the sphere, report sending skips a specified *Cycles to Skip* number of report cycles. When the *Cycles to Skip* value is reached, the SHOUT tssA will report for a specified *Send While Stationary* cycles. The process is repeated until the unit leaves the sphere. Upon leaving the bounding sphere, a new boundary will be created at the current location of the unit and the SHOUT tssA will report for the specified *Send While Stationary* cycles. If *On, Skip All* is selected, the *Cycles to Skip* parameter is disregarded and the unit only sends the *Send While Stationary* cycles each time a new sphere is established.
  - a. The AT command associated with this setting is **AT^SPSR**.
8. **Iridium Allowed:** This setting lets the user enable/disable the Iridium Link.
  - a. The AT command associated with this setting is **AT^LNK**.

## 2.3 OTHER PROFILE SETTINGS

This section describes the general profile settings using SatTerm, and covers the configuration tabs associated with the Other Profile Settings. The *Configuration* window organizes the Other Profile Settings into two tabs: *Miscellaneous*, and *Encryption* (see **Figure 26**). The Store Profile number has no effect for this profile type.

1. Select **Options > Configure Window** on the Home screen (see **Figure 16**).
2. Select **Other** from the Profile Type drop-down list (see **Figure 26**).



**Figure 26: Other Profile Window with Miscellaneous Tab**

### 2.3.1 MISCELLANEOUS TAB

When selected the Miscellaneous tab offers three (3) settings **Figure 26** –*Remote Update Password, Identifier in Reports, and Power-up Delay.*

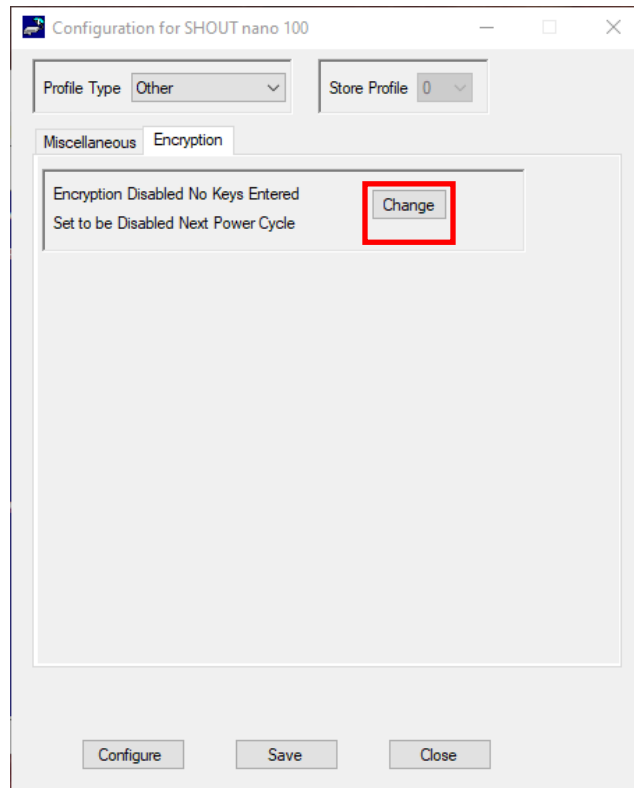
1. **Remote Update Password:** An unattended SHOUT nano 100 can be reconfigured without requiring direct access to the device. All of the tracking profile parameters and most of the general parameters can be configured via remote updates. This parameter sets the required remote update password. The password entered must be eight characters in length. All printable characters are allowed. The factory-set default password is 12345678 and there is no requirement to change this password.
  - a. The AT command for this setting is **^RUP**.

2. **Identifier in Reports:** Allows a unique static identifier to be entered and added to the GPS report.
  - a. The AT command for this setting is **^ID**.
3. **Power-Up Delay:** Sets the device to power up at the specified date and time when in tracking. If emergency is activated, the device will power up and begin emergency mode tracking. Once emergency is cleared the power up delay will resume.
  - a. The AT command for this setting is **^PUPD**

### 2.3.2 ENCRYPTION TAB

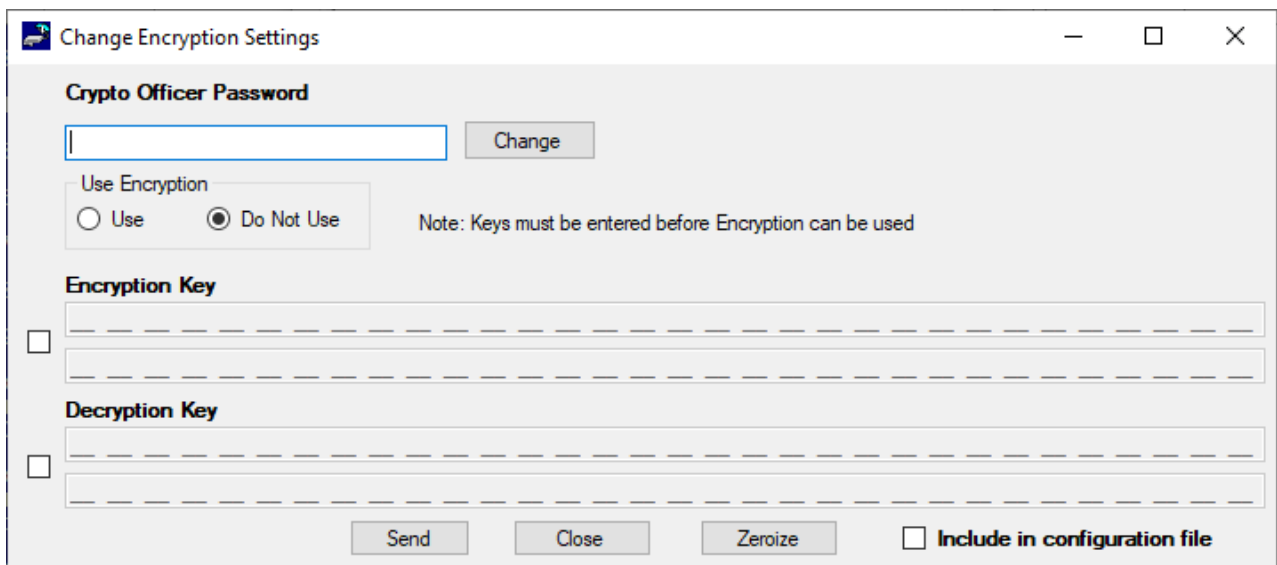
The SHOUT nano 100 can send and receive data in AES 256-bit encrypted format. Options include changing the *Crypto Officer Password*, enabling or disabling encryption, and setting the encryption and decryption keys. A factory-default *Crypto Officer Password* is initially set on the SHOUT nano 100. This default password must be changed before any encryption properties can be set. When selected the Encryption tab offers one (1) settings – *Change*. The *Encryption* tab is shown in Figure 27.

1. Select **Change** (see Figure 27).



**Figure 27: Other Profile Window with Encryption Tab**

The *Change Encryption Setting* screen displays (see **Figure 28**).



**Figure 28: Change Encryption Settings**

2. Enter the default password, “temp password,” in the *Old Password* box.
3. Select **Send**. Encryption properties can now be modified via the *Change Encryption Settings* window using the new Crypto Officer Password.

4. After the default password has been changed, set the encryption and decryption keys in order to use encryption.

5. In the *Change Encryption Settings* window, select **Use** under *Use Encryption*.

6. Select the **Encryption Key** checkbox and enter the key twice.

7. Select the **Decryption Key** checkbox and enter the key twice.

NOTE: The *Decryption Key* is optional but required to receive encrypted data.

8. Select **Send**. The message *Update Made* is displayed to confirm successful configuration of the selected settings.

The encryption settings are included in the configuration file when the Save to file checkbox is selected.

NOTE 1: The *Zeroize* button erases the encryption/decryption keys on the SHOUT nano 100.

NOTE 2: Configuration can also be accomplished by using AT commands. The following five

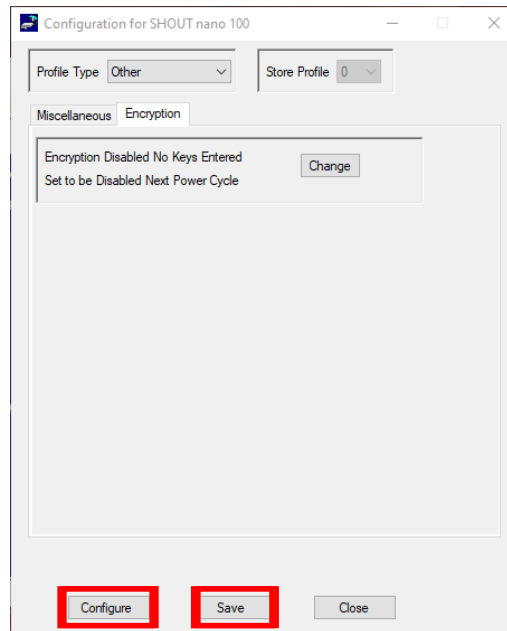
AT commands are used to configure the SHOUT nano 100 device's cryptographic options:

Change Crypto Officer Password (**^CCOP**), Key for Decryption (**^KD**), Key for Encryption

(**^KE**), Use Encryption (**^UE**), and Key Zeroization (**^KZ**).

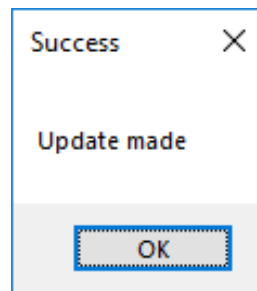
### 2.3.3 CONFIGURE SETTINGS

1. Select **Configure** at the bottom of the *Configuration* window (see **Figure 29**).



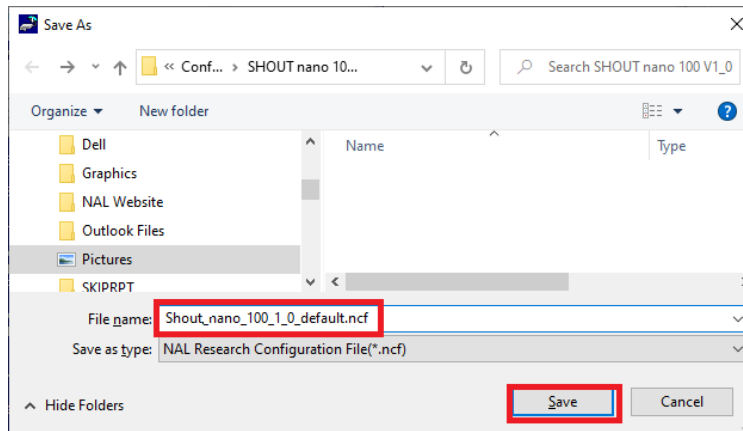
**Figure 29: Other Profile Window with Encryption Tab**

SatTerm displays the confirmation message (see **Figure 30**).



**Figure 30: Successful Update Made Window**

2. Press **OK** (see **Figure 30**).
3. Select **Save** to save the current *Configuration* window settings to a file (see **Figure 29**).

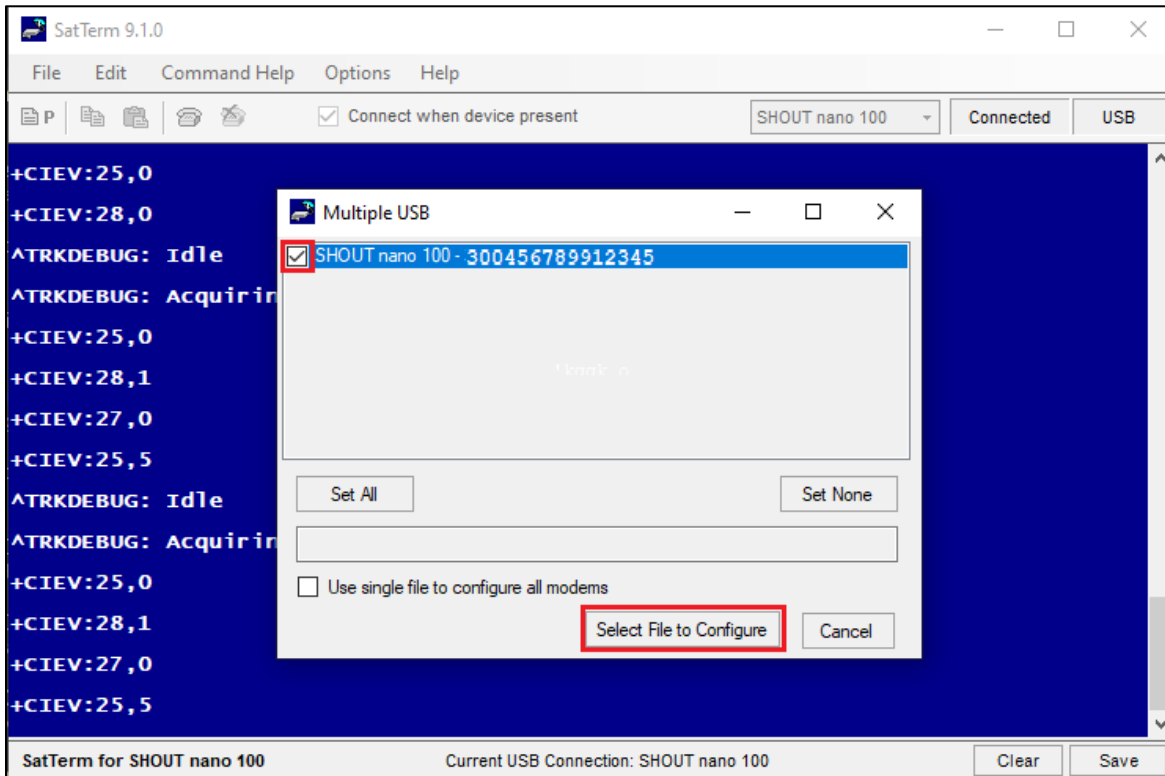


**Figure 31: Save Configuration File**

4. Enter the desired File Name for the configuration, and press **Save (Figure 31)**.

NOTE: The SHOUT nano 100 can also be configured from an existing \*.ncf configuration file.

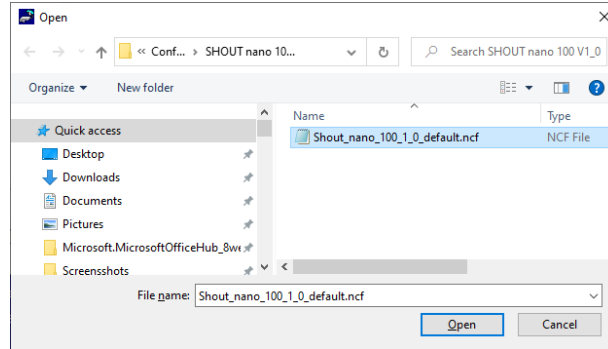
5. To load an existing \*.ncf configuration file into the SHOUT nano 100:
  - a. Select **Options > Configure from File** on the SatTerm main window (see **Figure 32**).



**Figure 32: Load \*.ncf Configuration File**



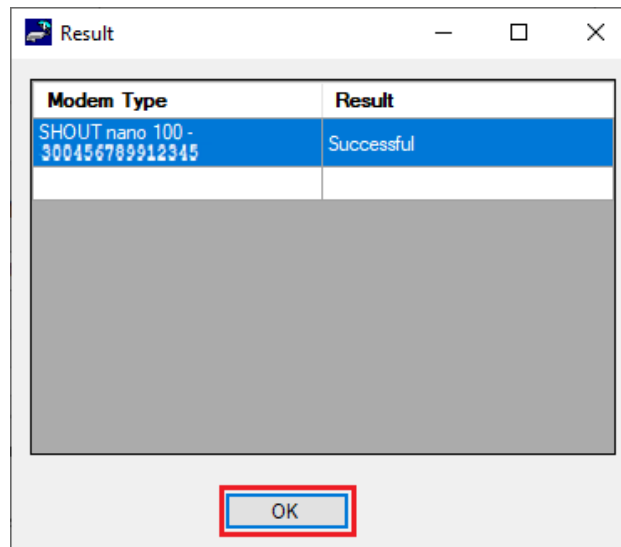
- b. Select the device name to select it for processing (see **Figure 32**).
- c. Press **Select File to Configure** (see **Figure 32**) to open a file browsing window prompting you to select a file (see **Figure 33**).



**Figure 33: Browsing Window**

- d. Locate the configuration file you wish to load, and select **Open** (see **Figure 33**).

SatTerm proceeds to configure the SHOUT nano 100 with the settings contained in the selected configuration file. When this has completed, the *Success* window appears (See **Figure 34**).

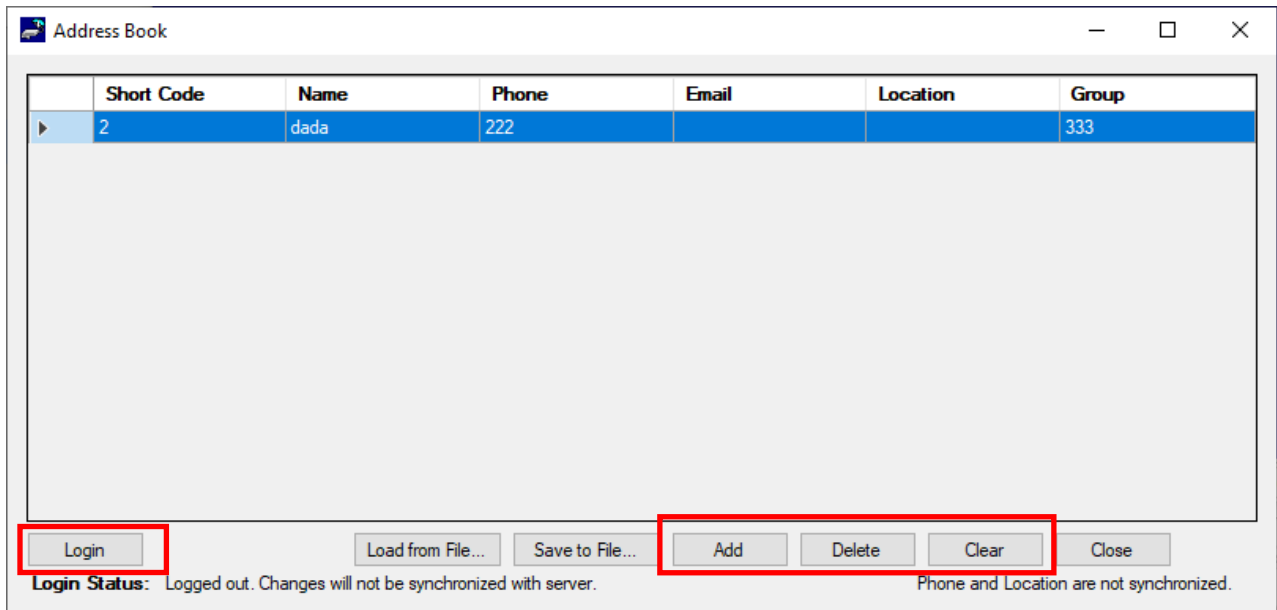


**Figure 34: Successful Update Made Window**

- e. Select **OK** to close the window and return to SatTerm’s main window. (see **Figure 34**).

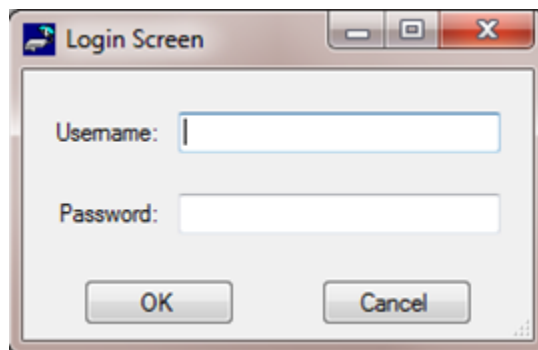
### 3 ADDRESS BOOK

SatTerm can be used to edit the SHOUT nano 100's address book using the *Address Book* window. To access the *Address Book* window, select **Options > View Address Book...** from the SatTerm main window. SatTerm must have an open connection with a SHOUT nano 100 for the *Address Book* window to be available.



**Figure 35: Address Book**

To edit the address book you must log in as an administrator. To do this, press the **Login** button at the bottom left of the Address Book window (see **Figure 35**). Enter your login information and click **OK** (see **Figure 36**). Once you are logged in successfully, your Login Status on the Address Book window will display as “Logged In Successfully as Administrator” and additional buttons become available to edit the address book.



**Figure 36: Login Screen**

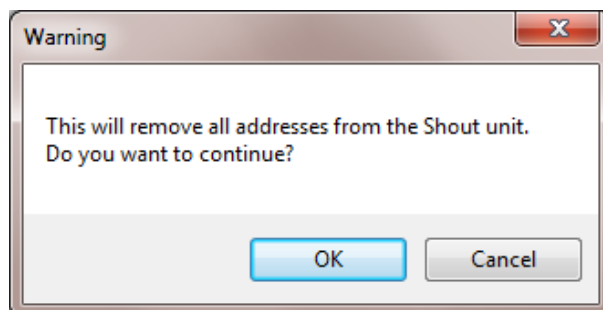
**NOTE:** If you have a firewall installed on your PC you may need to configure it to allow SatTerm to access the Internet.

**NOTE:** The login requirement is disabled by default and can be enabled by unselecting **Options > Properties > Disable Login** from the menu bar. Disabling the login allows SatTerm to change the address book and canned messages without synchronizing with the NOC server.

**NOTE:** SatTerm is setup specifically to communicate with NAL Research’s network operation center (NOC) server using a web service. Application developers can configure SatTerm to use a different web service through the **Options > Properties > Set Web Service** menu option. When using the default web service, a login can be created at <http://nws.nalresearch.com/>.

To add a new contact to the address book, click the **Add** button (see **Figure 35**). This will pop up the *Add to Address Form* window. Here you can enter the contact’s name, phone number, email, and location in the fields provided (name is required). Clicking **OK** adds the contact to the SHOUT nano 100 as well as the server.

**Figure 37: Add to Address Form**



**Figure 38: Warning**

To edit an existing contact, double click the contact in the address book. This will pop up the *Edit Address Form* window. Click **Update** to update the contact’s information on the SHOUT nano 100 and the server.

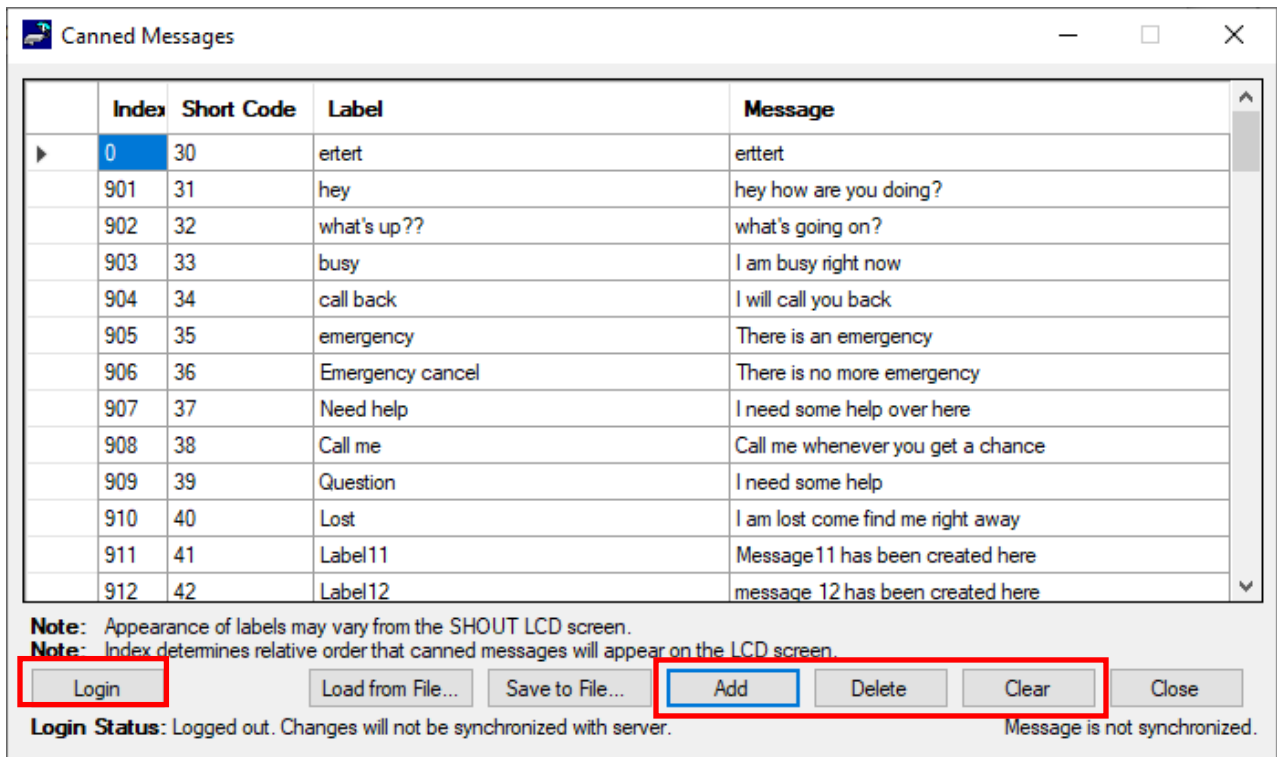
To delete a contact from the address book, single-click to select the contact you wish to delete then click the **Delete** button (see **Figure 35**). Clicking the Delete button erases the selected contact from the SHOUT nano 100 and the server.

To erase the entire address book, click the **Clear** button (see **Figure 35**). A warning message will pop up asking to confirm the removal of all addresses from both the SHOUT nano 100 and the server. Click **OK** to confirm or **Cancel** to reject (see **Figure 38**).

## 4 CANNED MESSAGES

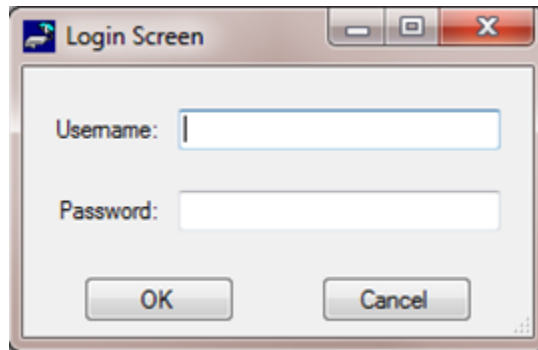
The SHOUT nano 100 can be pre-programmed with user defined canned messages using SatTerm. Canned messages are useful to save time while composing messages on the SHOUT nano 100, and also to reduce cost, as canned messages effectively shorten the transmitted message size in terms of the total number of bytes.

To access the *Canned Messages* window, select **Options > View Canned Messages...** from the SatTerm main window. SatTerm must have an open connection with a SHOUT nano 100 for the *Canned Messages* window to be available.



**Figure 39: Canned Messages**

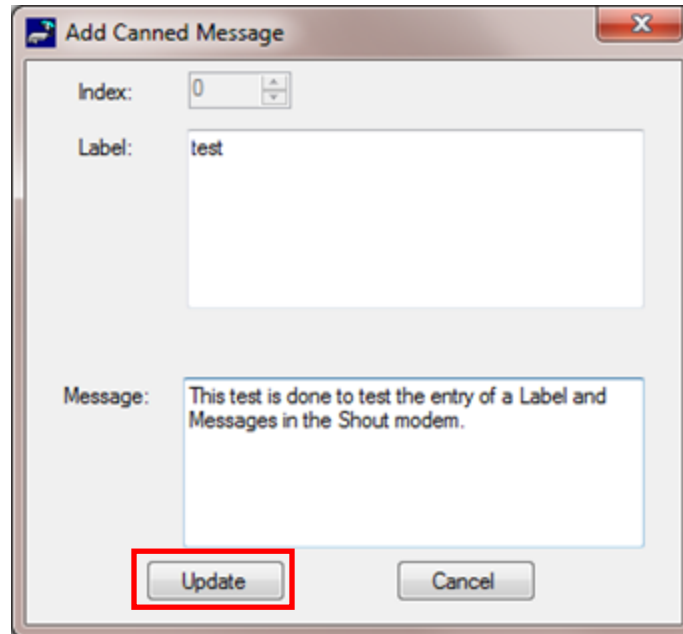
To edit the canned messages you must log in as an administrator. To do this, click the **Login** button at the bottom left of the *Canned Messages* window (see **Figure 39**). Enter your login information and click **OK** (see **Figure 40**). Once you are logged in successfully, your *Login Status* on the *Canned Messages* window will display as “Logged In Successfully as Administrator” and additional buttons become available to edit the canned messages.



**Figure 40: Login Screen**

**NOTE:** If you have a firewall installed on your PC you may need to configure it to allow SatTerm to access the Internet.

To add a new canned message, click the **Add** button (see **Figure 39**). This will pop up the *Add Canned Message* window (see **Figure 41**). This form prompts you to enter a label for the canned message and optional message text. This label is displayed on the SHOUT nano 100 LCD screen while scrolling through the canned messages stored on the device. Clicking **Update** adds the canned message to the SHOUT nano 100 as well as the server.

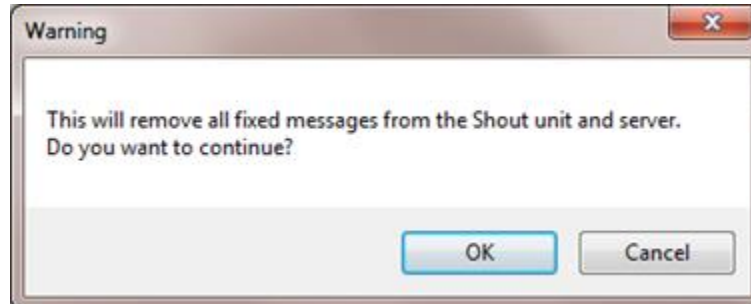


**Figure 41: Add Canned Message Screen**

To edit an existing canned message, double click its row in the Canned Message window (see **Figure 39**). This will pop up the Edit Canned Messages window. Click **Update** to update the canned message information on the SHOUT device and the server.

To delete a canned message, single-click to select the canned message you wish to delete then click the **Delete** button (see **Figure 39**). Clicking the Delete button erases the selected canned message from the SHOUT nano 100 and the server.

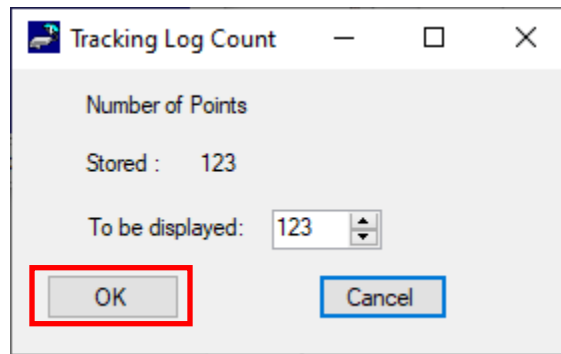
To erase all canned messages, click the **Clear** button (see **Figure 39**). A warning message will pop up asking you to confirm the removal of all canned messages from both the SHOUT nano 100 and the server. Click **OK** to confirm or **Cancel** to reject (see **Figure 42**).



*Figure 42: Warning Screen*

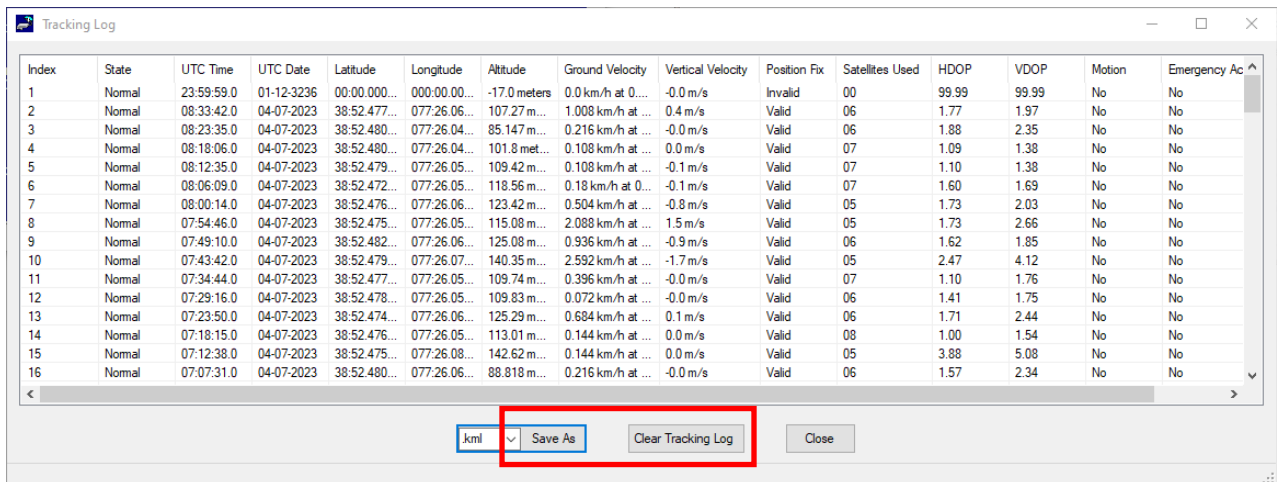
## 5 TRACKING LOG

The Tracking Log is a collection of reports that may or may not have been transmitted from the SHOUT nano 100. This log can be viewed, saved, and cleared using the *Tracking Log* window in SatTerm. To access the *Tracking Log* window, select **Options > Tracking Log...** from the SatTerm main window. SatTerm must have an open connection with a SHOUT nano 100 for the *Tracking Log* window to be available. When the Tracking Log Count screen displays (see **Figure 43**), click **OK**.



**Figure 43: Tracking Log Count**

When the *Tracking Log* window is opened (see **Figure 44**), it first queries the attached SHOUT nano 100 and displays the number of points in the unit’s tracking log, and allows you to choose how many points to display. Click **OK** to display the selected points. The Tracking Log screen displays (see **Figure 44**).

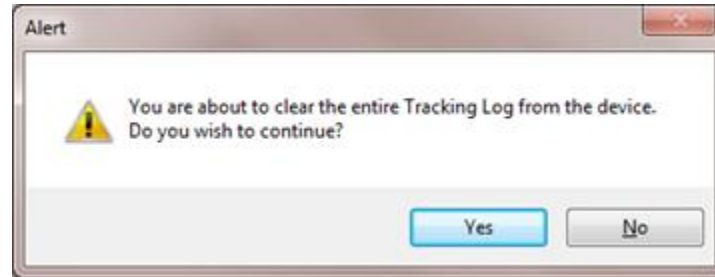


**Figure 44: Tracking Log Screen**



To save the points displayed in the *Tracking Log* window in a Microsoft Excel (CSV) or Google Earth (KML) compatible format, click the **Save As** button (see **Figure 44**) after selecting a file format from the drop down list. You will be prompted to enter a name for the file.

To clear the entire tracking log from the SHOUT nano 100, click the **Clear Tracking Log** button (see **Figure 44**). You will be prompted to confirm deletion of all logged points on the device. Click **Yes** to confirm or **No** to cancel (see **Figure 45**).



**Figure 45: Alert Confirmation Screen**

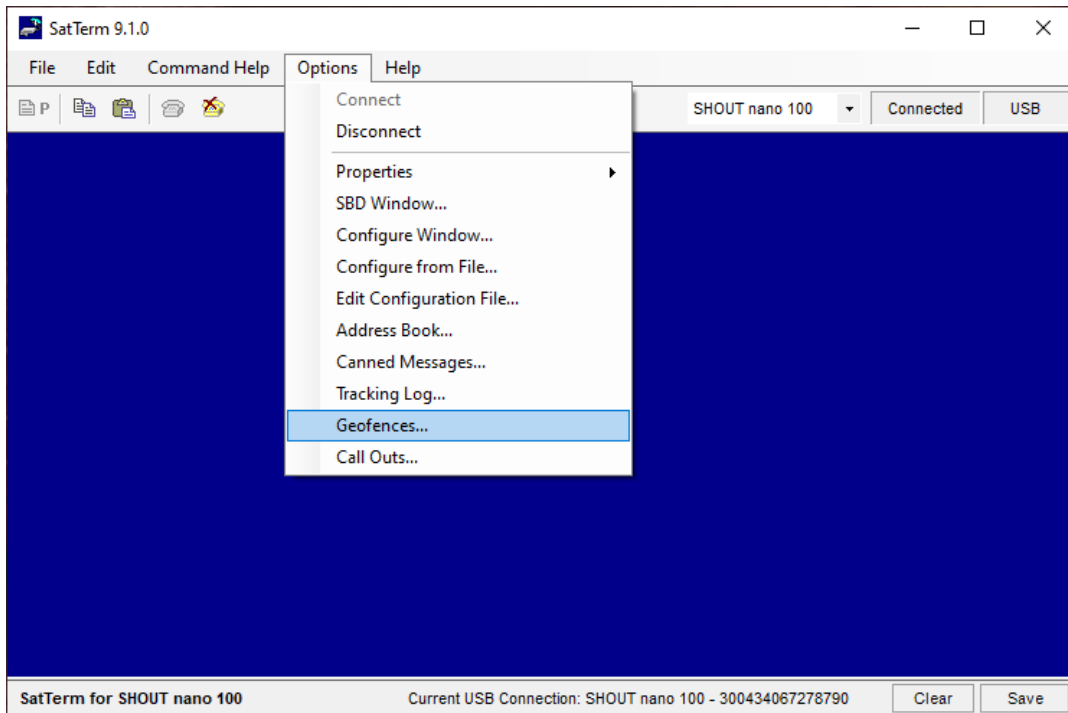
## 6 GEOFENCING

The SHOUT nano 100 can utilize location information from its GPS receiver to determine whether it has entered or exited the bounds of preconfigured geofences. A geofence is a set of connected latitude and longitude coordinates that defines a region or zone. A SHOUT nano 100 can be configured to send a report when entering or exiting a geofence, and to use a different tracking profile. This provides the ability to change the behavior of the SHOUT nano 100 based on its location.

Geofences can be configured two (2) ways: using the AT commands and using SatTerm. If latitude and longitude coordinates are known, geofences configuration can be done using the following AT commands: Start Geofence (**^GFBS**), Add Geofence Point (**^GFAP**), and Finish Adding Geofence Points (**^GFF**).

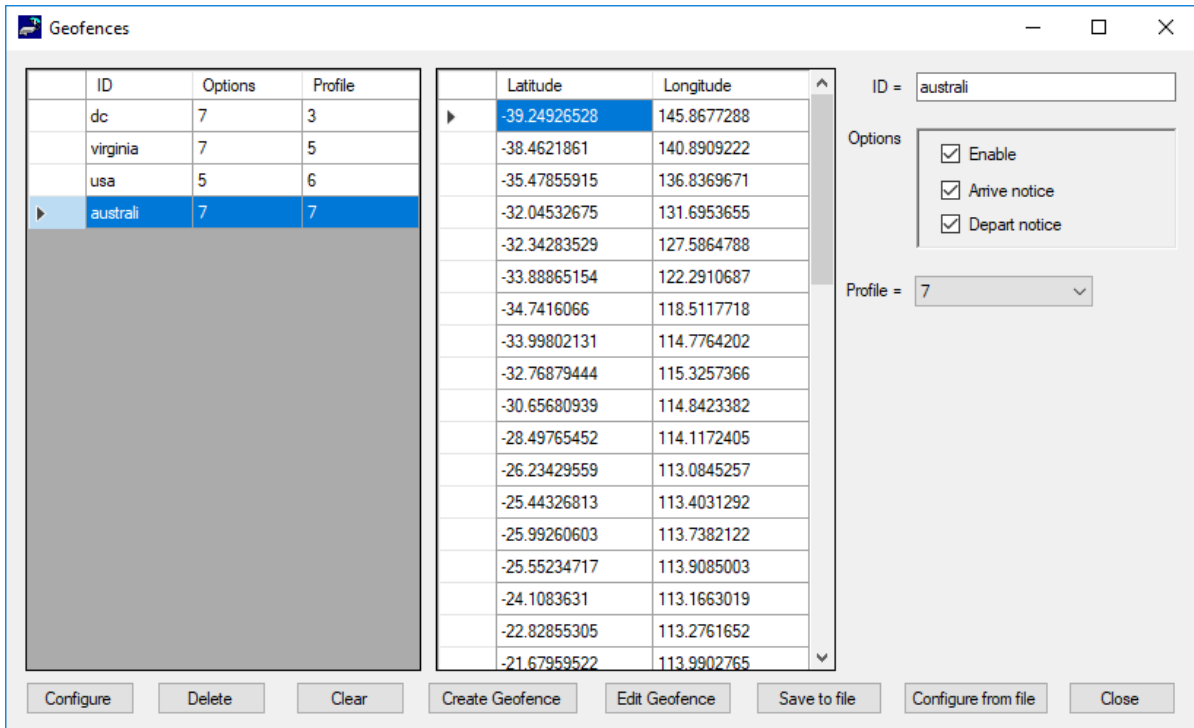
Geofence maintenance and modification can be accomplished using the following AT commands: Geofence Check Frequency (**^GFCS**), Modify Geofence (**^GFM**), Delete Geofence (**^GFD**), Erase Geofence (**^GFE**), and Read Geofence Points (**^GFR**).

A Geofence forms-based GUI configuration tool is available using SatTerm. To configure Geofences with SatTerm: select **Options > Geofences** on the *Home* screen (see **Figure 46**).



**Figure 46: Geofences**

The *Geofences* window displays (see **Figure 47**).



**Figure 47: Geofences Window**

Note that the visual map-based Geofence options *Create Geofence* and *Edit Geofence* utilize Google Maps, so an internet connection is required for a map to appear.

There are two (2) lists in the *Geofences* window. The one on the left shows a list of geofences, and the one on the right shows a list of coordinates corresponding to the selected geofence. To the far right are settings for the selected geofence. The list of Geofences contains three columns that reflect values set in the settings section on the right.

1. The *ID* column indicates the identifier assigned to the geofence. This identifier is used to reference the geofence when the SHOUT nano 100 sends arrival and departure notices and when updating geofence parameters via AT commands or remote updates.
2. The *Options* column shows a combined bit field value of the options parameters (000 (0) – 111 (7), with each digit corresponding to *Enable*, *Arrive notice*, and *Depart notice*).
3. The *Profile* column indicates the tracking profile assigned to the geofence.

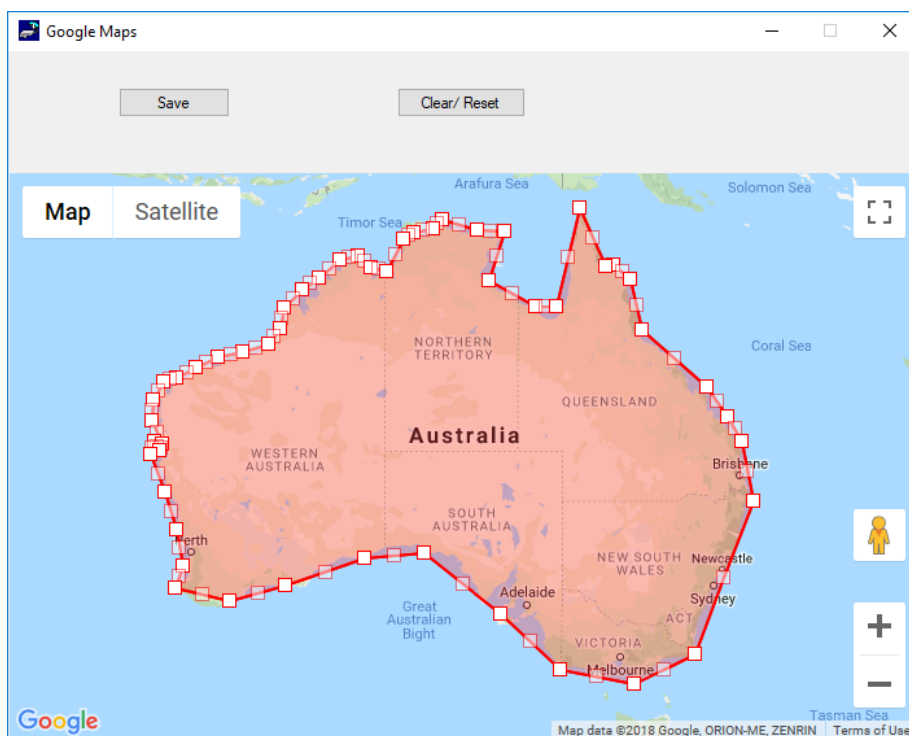
Descriptions of the geofence settings listed on the right side of the window are as follows.

4. **ID:** Defaults to an incremented integer value. It can be set to any 8-character string to identify the geofence (e.g., "USA", "BASE", and "DANGERZN").
5. **Enable:** Enables this specific geofence.
6. **Arrive notice:** Sends a NAL format GPS version 6 tracking report with short code 18 when entering this specific geofence. See document [NAL GPS Report Version 6 Format \[2\]](#) for details.
7. **Depart notice:** Sends a GPS version 6 tracking report with short code 19 when exiting this specific geofence.
8. **Profile:** Sets a tracking profile to be used while inside this specific geofence.

At the bottom of the *Geofences* window is a set of buttons. Descriptions of the buttons are as follows:

9. **Configure:** Selecting the *Configure* button saves the list of Geofences on the SHOUT nano 100.
10. **Delete:** Deletes the selected geofence.

11. **Clear:** Deletes all configured Geofences.



**Figure 48: Create/Edit Geofence Window**

12. **Create Geofence:** Opens a window to create a geofence by adding points on a map. The window is shown in **Figure 48**.

- Clicking anywhere on the map adds a point to the geofence. Each point is connected to its previous point.
- Clicking an existing point deletes it from the geofence.
- Dragging an existing point moves that point to where it is dragged.
- A geofence is complete when the start point is clicked.
- The *Save Points* button transfers the marked points to the coordinates list and closes the map.
- The *Clear/Reset* button clears all points on the map.
- The minimum number of points in a geofence is 3 and the maximum number of points is 50.

**Note:** The *Create Geofence* option utilizes Google Maps. An internet connection is required for the map to appear.

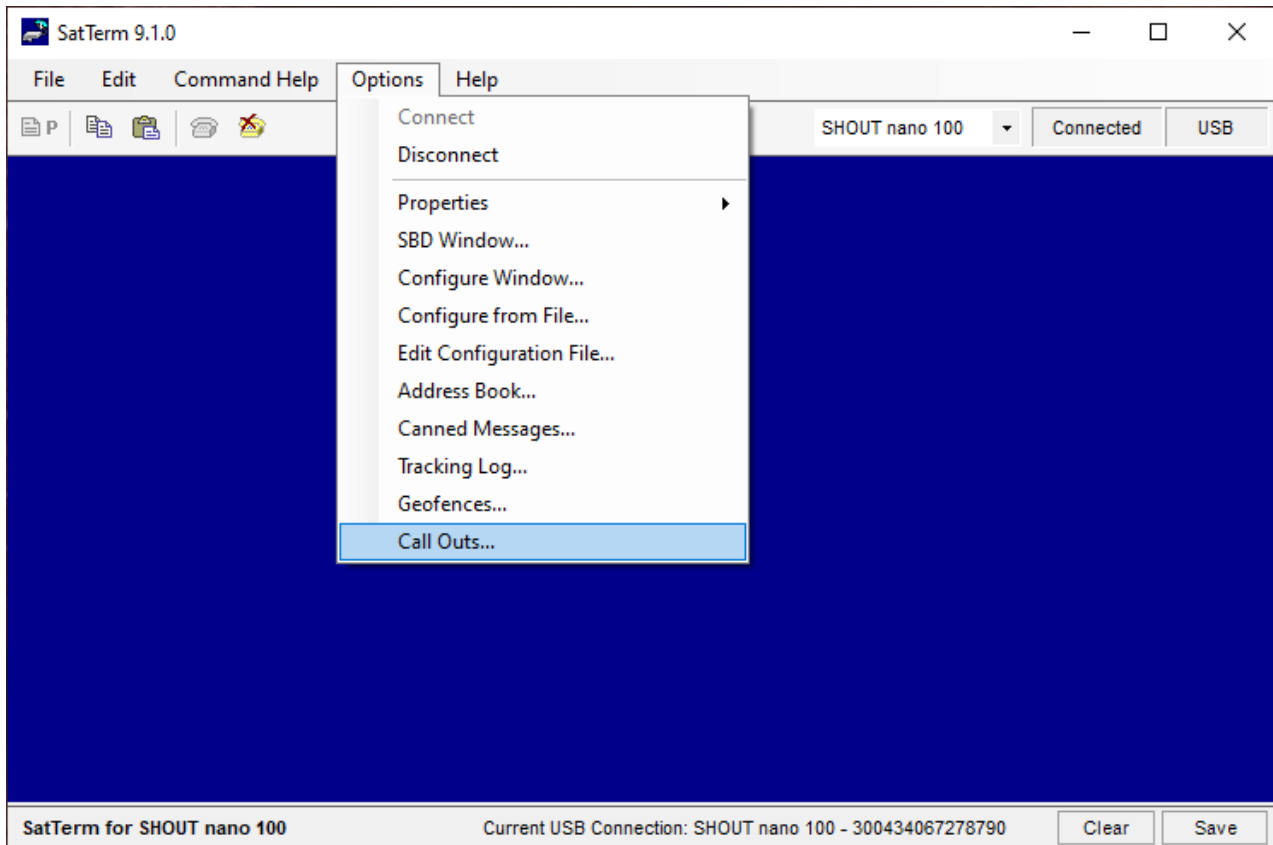
13. **Edit Geofence:** Opens a window to edit the coordinates of the selected geofence. The window is the same as *Create Geofence* with the same functionality, but it opens prepopulated with coordinates, as shown in **Figure 48**.
14. **Save to file:** Saves the list of geofences to a comma-separated values (CSV) file.
15. **Load from file:** Loads geofences from a CSV file.
16. **Close:** Closes the Geo Fencing Information window.

## 7 CALL OUTS

In addition to normal tracking reports sent at a predefined interval, the SHOUT nano 100 can also send daily tracking reports at specific UTC times. These daily reports are called Call Outs. Call Outs can be configured two ways: using AT commands and using SatTerm.

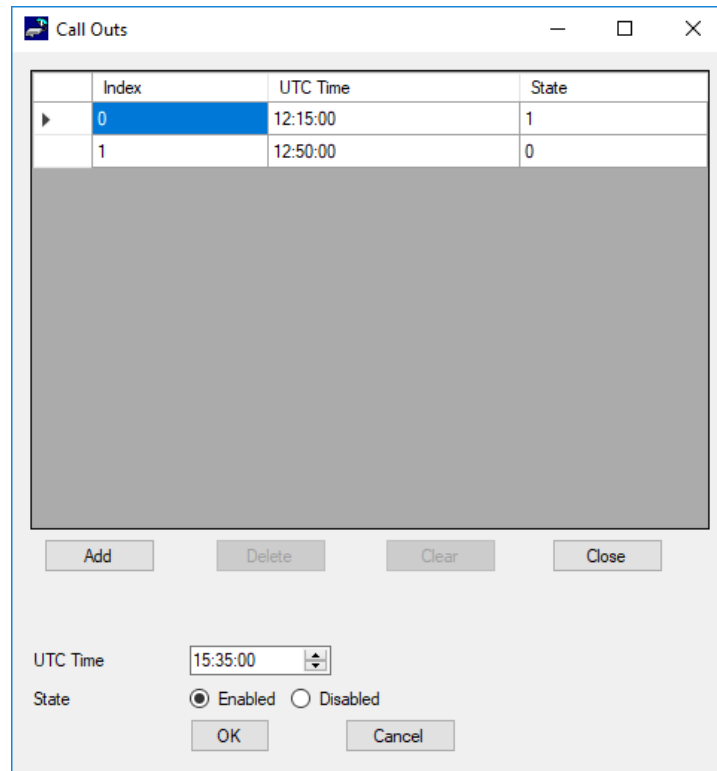
Call Outs configuration can be done using the following AT command: Add Call Out (**^COA**). Call Outs' maintenance and modification can be accomplished using the following AT commands: Delete Call Out (**^COD**), Erase Call Out (**^COE**), and Read Call Out (**^COR**).

1. Select **Options > Call Out** to (see **Figure 49**).



**Figure 49: Call Out**

The *Callouts* window shown in **Figure 50** appears. As long as there is at least one enabled entry in the list, the Call Out feature is enabled.



**Figure 50: Callout Form Window**

The main portion of the *Callout Form* window has a list of existing Call Outs. The list displays three columns: *Index* is the position of the Call Out in the list, *UTC Time* is the time a Call Out is to be made (in HH:MM:SS format), and *State* indicates whether the Call Out is enabled (1) or disabled (0). Below the Call Out list is a set of buttons. Descriptions of the buttons are as follows:

- Add: Adds a Call Out to the list
- Delete: Deletes the selected Call Out
- Clear: Deletes all configured Call Outs
- Close: Closes the Callout Form window