



GUARDTRAX
Personnel Tracking
Solutions for the
Security Industry
(DoD)

USER & OPERATING MANUAL

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GUARDTRAX USER & OPERATING MANUAL

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RADIO FREQUENCY RADIATION EXPOSURE INFORMATION:

For body worn operation, this phone has been tested and meets the FCC RF exposure guidelines when used with an accessory that contains no metal and that positions the handset a minimum of 0cm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.



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1 DESCRIPTION

The NovaTracker GuardTrax security-tracking unit provides a convenient way for a security firm to maintain contact with its most important asset, their personnel. Whether in an outdoor environment or inside structures with an adequate view of the sky the GPS (global positioning system) tracking and GSM (global system for mobile communications) network compatibility of the GuardTrax unit make it a convenient way to acquire near instantaneous feedback on guard location and status.

The unit is battery supported, fully portable and self contained in a durable plastic housing.

1.1 Features, Advantages and Benefits

- ✓ *Report location and guard station status over the GPRS (general packet radio service) data network using the GuardTrax's multifunction keys.*
- ✓ *Initiate an outgoing voice call to a pre-programmed terminal station via the GuardTrax red panic key.*
- ✓ *Send voice through the GSM cellular network and data transactions through the GPRS cellular data networks.*
- ✓ *IP based messaging protocol allows the unit to direct messages to any internet-enabled portal for graphical as well a textual security monitoring.*
- ✓ *GPS and GSM status indicator LEDs allow the user to determine network connectivity.*
- ✓ *Autonomous location and status message are initiated via the GuardTrax integrated motion detector. No personnel interaction is required.*
- ✓ *A replaceable, rechargeable Lithium-Ion battery pack provides hours of uninterrupted portable operation.*
- ✓ *An integrated speaker and microphone or an optional hands-free headset provides voice communication functionality.*

The benefit of the GuardTrax unit to you and your security force is in its ability to determine and communicate security related events with little to no personnel interaction.



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The GuardTrax unit can determine if:

- ✓ *guard is in motion*
- ✓ *guard is on the assigned property*
- ✓ *guard has visited assigned station(s) accommodated through 5-key sequence codes*



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2 OPERATIONAL OVERVIEW

While in motion the unit will transmit time and GPS location messages using IP protocol in response to user-selectable key sequences, time, or motion events over the GSM cellular network. If the device is out of GSM range then, data messages are stored and transmitted in reverse chronological Last-in-First-Out (LIFO) order when the device is back in range. The unit has the ability to store approximately 3000 data messages.

For the GuardTrax unit the default key sequence is 5-keys in length. The meaning of each sequence is user defined at the server application level.

A regional geo-fence feature is also included. A user can program up to 25 non-overlapping circular regions. The geo-fence region is defined as a center point latitude and longitude, and a radius.

A red panic key is included for emergencies. This key sends a time and location message via a GPRS cellular data network, and initiates a GSM cellular network voice call to a pre-programmed phone number.

2.1 Requirements for Operation

- ✓ *For optimum GPS reception, the unit must have an unobstructed 120-degree circular view to sky.*
- ✓ *To receive and transmit messages the unit must be deployed in an area with adequate GSM and GPRS cellular network coverage.*
- ✓ *A GSM network compatible SIM (subscriber identity module) card with caller ID activated is installed in the unit. The SIM card is factory installed. Only an authorized dealer can locate and manage SIM card insertion and activation.*
- ✓ *GuardTrax should be operated with a fully charged Lithium-Ion battery, and should be charged in its cradle 3-4 hours/night.*

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3 DETAILED OPERATION

The GuardTrax unit is compatible with the GSM/GPRS voice and data cellular network and is capable of receiving GPS time and location information. The unit operates on a time, motion and key entry event driven basis. Compressed data and optionally, encrypted data is sent, via the GPRS network, to a pre-determined IP addressed, or alternatively a URL-addressed server. Messages are transmitted in response to time, motion, and server or key entered events.

3.1 Basic operation

- ✓ If the unit detects motion, (i.e. vibration or rocking, or walking) it will transmit a time event message at regular, programmable intervals.
- ✓ While the unit is in-motion, it is fully functional and will actively receive GPS information. Additionally, it will respond to key presses, transmit messages or receive commands over the GSM/GPRS network and receive in-coming and initiate out-going voice calls.
- ✓ If no motion is detected during a user programmable period, the unit will send out a non-motion message and enter a low power *non-Motion-sleep* mode. While in *non-Motion-sleep*, if moved, the unit will wake-up and continue normal operation.
- ✓ Additionally, the GuardTrax can enter a very low power *Forced-sleep* mode. This mode can be user initiated, by key entry, or automatically when the unit detects a low battery condition.

If the unit is in non-Motion-sleep, then shake or move it to initiate a Wake-up sequence. Refer to the GuardTrax Power-Up Sequence for a description of the power up sequence.

If the unit is in Forced-sleep, resulting from a previous key entry sequence, press and hold any single key to initiate a Wake-up sequence. If the Forced-sleep is the result of a low battery condition, either replace or fully re-charge the unit's battery to return to full operation.



In some instances, if the unit is not recharging, this may be caused by a faulty battery. In order to remedy this, insert only the battery into the optional battery charger. If the battery begins charging (within five (5) minutes), re-insert the battery back into the unit and return the unit back to its charging cradle until fully charged. If charging does not resume, call NovaTracker Customer support.

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It is required that these units be charged daily for 3 to 4 hours in order to see maximum battery-life performance. Battery performance will deteriorate over time.

3.2 Key Sequences

The red Panic-key is fully functional when the unit has a valid GSM connection.



The Panic-key is active when the unit is awake, and if pushed will attempt to acquire a GSM connection and If successful, a Panic message will be sent and an outgoing voice call will be established to a pre-determined emergency location.

Press and hold the red Panic-key down for approximately three (3) seconds to initiate the following operating sequence:

- ✓ If the unit has a valid GPS connection, a message with a GMT time stamp and the current GPS location along with the Panic-key event is transmitted.
- ✓ If the unit does not have a valid GPS connection a message with a time stamp derived from the unit's Real Time Clock, the last valid GPS location along with the Panic-key event is transmitted.
- ✓ The unit initiates an out-going CALL event.



An out-going CALL event will be successful only if the GuardTrax's panic number has been pre-programmed by the user via the addressed server.

A called party hanging up, or a User-key sequence of "22PPP", or holding down the "1" Hot-key terminates the out-going call at any time.

3.2.1 User-key Sequence

A User-key sequence is defined as a 5-key sequence and is not a Reserved-key sequence, a Hot-key, or the Panic-key. The meaning of each User-key sequence is defined by the user and has no meaning in the contexts of the operation of the unit.

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A key sequence must be completed within approximately two (2) seconds to be valid. If after entering a key sequence a new sequence is started in less than two (2) seconds, the former sequence will be voided. After two (2) seconds, a valid key sequence is confirmed by being flashed back to the user.

A valid User-key sequence will initiate one the following operations:

1. *If the unit has a valid GSM and GPS connection, a GMT time stamp along with the current GPS location and the User-key sequence is transmitted.*
2. *If the unit has a valid GSM connection but does not have a valid GPS connection, a time stamp derived from the unit's Real Time Clock along with the last valid GPS location and the User-key sequence is transmitted.*
 - a. *If the unit did not previously have a valid GSM connection and now does, it first sends a time stamped message with either the last valid GPS location or the current GPS location (refer to 1 and 2 above) and then sends any stored messages. A stored message is a stored GPS message resulting from a previous dropped GSM connection.*
 - b. *If the unit does not have or cannot option a valid GSM connection, the message is stored and will not be transmitted until a valid connection is obtained.*

3.2.2 Reserved-key Sequence

A Reserved-key sequence is defined as a 5-key sequence that is not a User-key sequence or a Panic-key. Each Reserved-key sequence is reserved for unit operation and is otherwise not available.

The Reserved-key sequences, perform unique system operations as follows:

- ✓ Key sequence “11PPP” will initiate the Forced-sleep mode.
- ✓ Key sequence “22PPP” will terminate a voice CALL event.
- ✓ Key sequences “33111”, “33222”, “33333” or “32333” will initiate an out-going voice CALL event to pre-programmed terminal stations.



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Single key, Hot-key sequences when held for a minimum of three (3) seconds perform specific functions. A list of hot-keys and their associated function is given in the following table.

<u>Function</u>	<u>Response</u>
1	<i>Answer or Hang up call</i>
2	<i>Battery reserve status</i>
3	<i>Shut down unit (Forced-sleep)</i>
P	<i>Panic</i>

The number of key LEDs on when Hot-key "2" is held indicates battery reserve power. Four (4) LEDs on indicate a reserve of between 75 and 100%; three (3) LEDs on indicates a reserve of between 50 and 75%; two (2) LEDs on indicates a reserve of between 25 and 50%; and one (1) indicates a reserve of < 25%

3.3 In-coming and Out-going CALL Processing

The NovaTracker GuardTrax unit has the ability to receive (in-coming) as well as initiate (out-going) voice calls over a GSM network connection. Up to five out-going call numbers can be stored (four reserved for Reserved-key sequences and one for the Panic-key).



To process voice calls properly over the GSM network requires a configured and active SIM card. The GuardTrax has a factory installed active SIM card. The SIM card in the called unit must have CALLER ID active and the calling party must not have CALLER ID blocked for the GuardTrax in-coming call feature to work properly.

3.3.1 In-coming CALL Sequence

1. *When detecting an in-coming call, the GuardTrax unit's GSM cell phone receiver generates up to 5 ring signals, alerting the user, and then automatically opens up the communication line with caller. Alternatively, the user can answer the call once ringing starts by holding down the "1" key*
2. *The GuardTrax unit will also generate and transmit to the pre-programmed IP address a message indicating a successful in-coming CALL was completed.*



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3.3.2 *Out-going CALL Sequence*

The user presses the Panic-key or enters a Reserved-key sequence (e.g. the preset values "33111", "33222", "33333" or "32333") corresponding to the desired stored telephone number.

1. *The GuardTrax unit negotiates network call set-up;*
2. *The user hears ring back tone when a connection is established;*
3. *The call is connected when called party answers.*

Called party hanging up or the user entering key sequence "22P" or pressing Hot-key "1" terminates the out-going call.

3.4 **Geo-fence**

The GuardTrax unit can store and monitor up to 25 non-overlapping circular Geo-fence regions. The user can configure, over-the-air (OTA), all 25 circular Geo-Fence regions.

A Geo-fence region is defined in miles by a center point latitude and longitude and a radius defined in miles. The radius can range from less than one (1) mile to a maximum of 999 miles.

3.5 **Charge message**

If an operational unit is placed into its battery charger base, an In-charger message will be transmitted and the unit will continue normal operation while its battery is charged.

If a unit is removed from its battery charger base, an Out-charger message will be transmitted and the unit will resume normal operation.



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4 GUARDTRAX TECHNICAL SPECIFICATIONS

4.1 GSM/GPRS Support

- ✓ *GSM/GPRS Dual Mode Support (voice, data and SMS)*

When out of GSM range data messages are stored. When back in GSM range stored data messages sent in LIFO order. The unit can store up to approximately 3000 data messages.

4.2 GSM/GPRS Modem Specifications

- ✓ *Tri band operation*

[850/1800/1900 MHz] for North American market

[900/1800/1900 MHz] for Rest-of-World (ROW) market

- ✓ *GPRS multi-slot class 10*
- ✓ *Coding scheme CS1-CS4*
- ✓ *GPRS mobile station class B*
- ✓ *Compliant to GSM phase 2/2+*
- ✓ *RF Transmit Power:*

Class 4 (2W) at EGSM 900MHz and GSM 850MHz

Class 1 (1W) at GSM 1800MHz and GSM 1900MHz

4.3 GPS Engine Specifications

General

- ✓ **Frequency:** L1 (1575.42 MHz)
- ✓ **C/A Code:** 1.023 MHz chipping rate
- ✓ **Average Tracking Sensitivity:** -152 dBm
- ✓ **Average Acquisition Sensitivity:** -139 dBm
- ✓ *Twelve (12) parallel satellite-tracking channels for fast acquisition and reacquisition*



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4.4 Accuracy

- ✓ **Position:** Five (5) to fifteen (15) meters (under optimal conditions)
- ✓ Utilizes standard NMEA protocol

4.5 Environmental & Electrical Specifications

- ✓ **Operating Temperature Range:** -10°C (+14 F) to +40°C (+104 F)
- ✓ **Humidity:** 5% to 95% non-condensing

Vibration

- ✓ 0.008 g²/Hz (5 Hz to 20 Hz)
- ✓ 0.05 g²/Hz (20 Hz to 100 Hz)
- ✓ -3dB/octave (100 Hz to 900)

4.6 Power Consumption

- ✓ **Unit Operating Voltage:** nominal 3.6V DC rechargeable Li-Ion battery
- ✓ **Current Drain:**
 - Operational: 150 mA average; 1.6 A burst
 - Forced-sleep Mode: approximately 200 uA
- ✓ **Battery Life:** A fully charged unit will operate minimum of twelve (12) hours depending on selected operating modes and battery capacity.
- ✓ **Optional Charging Method:** A separate battery charger is recommended. This is in addition to the included cradle charger. The battery charger is useful for charging extra battery and boast charging batteries that have discharged to zero (0) volts.

4.7 Physical Specifications

- ✓ **Assembly:** Injection molded plastic weather resistant case with integrated battery pack and carrying loop
- ✓ **Weight:** 6.4 ounces



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4.8 Accessories

Standard

- ✓ *Bench top charger base with USB port for unit configuration set-up*
- ✓ *Quick release neck cord lanyard*
- ✓ *2000 mAh re-chargeable Li-Ion battery*

Optional

- ✓ *Carrying case*
- ✓ *Battery charger*
- ✓ *Extra batteries*
- ✓ *Additional lanyard*
- ✓ *Ear bud & microphone*

4.9 Interfaces

- ✓ *Internal SIM card holder*
- ✓ *Integrated USB com & charger port*

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5 UNDERSTANDING THE LEDs

The GuardTrax's three key LEDs and two status indicators, labeled GSM and GPS, are useful in determining the state of the unit.

1. *All LEDs are off for a unit in Forced (key “3”) or non-Motion sleep; light movement or pressing and holding any single key will power up the unit. At power-up and during any GSM transaction the GPS and GSM LEDs flash rapidly indicating an event message is being sent.*
2. *User events can be entered and in-bound Calls answered when the status LEDs have returned to a slow flash. At this point, the unit is operational and capable of performing any of the operating events described above.*
3. *An entered user-key sequence will be acknowledged by the miming back of the sequence followed by the three key LEDs flashing three times.*
4. *The GSM LED displays flashing GREEN if a GSM/GPRS connection is active and flashing RED if the connection has been lost. To re-connect the unit must be brought back into GSM network range.*
5. *The GPS LED displays flashing GREEN if a GPS connection has been established and flashing RED if a connection cannot be established or has been lost.*



The GuardTrax will not accept key entry while the GSM LED is flashing rapidly. Rapid flashing of the GSM LED indicates a GSM cellular connection is being negotiated and no other operation is possible until this transaction is complete.



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6 KEY SEQUENCES

The GuardTrax unit communicates by sending events and receiving instructions from an addressed server using IP protocol over a GSM network. As explained previously events include time interval, geo-fence and key entry. This section provides additional detail on key sequence events. Key-sequence events are subdivided into Out-going-Call-keys, User-keys, Panic-key or Hot-keys. The user sequence length is five (5) keys, with the Panic-key and Hot-keys being a single key input for user convenience functions. Listed below are a summary of key-sequence events.

6.1 Panic and Hot-key Events

The Panic and Hot-keys are convenient single key inputs for performing common GuardTrax events.

<u>Function</u>	<u>Event</u>
1	<i>Answer or Hang up call</i>
2	<i>Battery reserve status</i>
3	<i>Shut down unit (Forced-sleep)</i>
P	<i>Panic</i>

6.2 Out-going-Call-Key Events

The GuardTrax can store up to five (5) user selectable pre-programmed phone numbers. Four (4) are accessible through reserved key-sequence events and one, through the Panic-key event. By default the four (4) reserved out-going call events are accessed through a reserved five (5) key-sequence as shown below.

<u>Function</u>	<u>Event</u>
33111	<i>Out-going Call #1</i>
33222	<i>Out-going Call #2</i>
33333	<i>Out-going Call #3</i>
32333	<i>Out-going Call #4</i>

6.3 5-Key Sequence Events

All key-sequences that are not reserved for specific GuardTrax events are available for use by the user. The definition of these sequences is totally user defined and has no



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meaning in the context of any other GuardTrax event. For convenience the following table provides a suggested definition for some of the available 5-key sequences.

<u>5 Key Sequence</u>	<u>Sequence Definition</u>
11111	<i>Nothing to report/All Clear</i>
11211	<i>Officer Down/Need Assistance</i>
11311	<i>Intruder/Unauthorized Person</i>
11P11	<i>Force Low Power Sleep</i>
12111	<i>Safety Hazard Reported</i>
12211	<i>Fire Hazard Reported</i>
12311	<i>Property Damage</i>
13111	<i>Door found open/ajar/broken</i>
13211	<i>Crime in progress</i>
13311	<i>Bomb Threat</i>
21111	<i>Burglary/Breaking and Entering</i>
21211	<i>Vandalism</i>
21311	<i>E.M.S Notified of emergency</i>
22111	<i>Client POC requires contact</i>
22211	<i>Civil/Domestic Disturbance</i>
22311	<i>Vehicle Accident</i>
23111	<i>Workplace Violence Threat</i>
23211	<i>Officer use of force</i>
23311	<i>Workplace accident</i>
31111	<i>Assault reported</i>
31211	<i>Power outage</i>
31311	<i>Burned out light</i>
32111	<i>Law Enforcement on Property</i>
32211	<i>Window damaged or broken</i>

Table of 5-Key USER Sequences

5-key sequences not listed above are either reserved for specific unit functions or are undefined. All key sequence events, user or reserved, are reported back to the addressed server.



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FCC Compliance:

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna
2. Increase the separation between the equipment and the receiver
3. Consult the manufacturer or supplier for help

Changes or modifications made to this unit not expressly approved by NovaTracker may void the FCC authorization to operate this equipment.