UHF HANDHELD TRANSCEIVER
USER MANUAL
VERSION 05

DOCUMENT NUMBER: 1100-0004-CS-02

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CLASSIFICATION: Restricted
1. **Introduction**

The UHF Handheld Transceiver provides wildlife animal tracking with the aid of Encrypted GPS, Digital Compass, Audio tones and RSSI indicators. Bi-directional communications between Transceiver and Tags allow for setting Operational Mode Settings, Status requests and GPS Log downloads.

2. **Applicable Documents**

   - Animal wildlife Tracking Products Overview
   - Africa Wildlife Tracking Tag User Manual
   - AWT Tracker Quick Start Guide
   - AWT Tracker Application Installation Instructions

   Table 1. Applicable Documents.

3. **Features**

   **Receive Tag Data**
   - Tag ID, Encrypted GPS, Log Data, RF Power, Operational Modes, Temperature, Battery Voltage, Software Version.

   **Transmit Tag Configuration**
   - Log Intervals, RF Power, Power Pulse, Operational Modes, Heartbeat Interval, Track Mode Interval, Track Mode Timeout, Status Request.

   **Five Viewing Options**
   - Basic, GPS, Dual, VHF and GSM

   **Single or Multiple TAG tracking**

   **Dual Receive Signal Strength Indicator**

   **Internal Memory for storing GPS, UHF and VHF Log downloads**

   **Internal Signal Detection Buzzer**

   **Stereo Headphone Output**

   **Silent Mode**

   **Master Tag RS232 Interface**

   **Encrypted GPS and Digital Compass**

   **128-bit Digital Encryption with Key Management via RS232 Interface**

   **5-Digit Login Code**

   **Programmable Power Down Timers**

   **Battery Operated with Programmable Voltage Alarm Levels**

4. **Transceiver Fitment Options**

   - GSM Module (2G Global System for Mobile Communications Module) (*Optional)
   - VHF Module (Very-High Frequency Narrow Band Receiver Module) (*Optional)
   - SD-Card (Secure Digital Memory Card) (*Optional)
5. **Abbreviations and Definitions**

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<th>Definition</th>
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<td>Africa Wildlife Tracking</td>
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<tr>
<td>OP MODE</td>
<td>Operational Mode</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>DEF</td>
<td>Default</td>
</tr>
<tr>
<td>PLS</td>
<td>Pulse</td>
</tr>
<tr>
<td>PWR</td>
<td>Power</td>
</tr>
<tr>
<td>TK MODE</td>
<td>Track Mode</td>
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<tr>
<td>TM OPTION</td>
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<tr>
<td>TM INTVL</td>
<td>Track Mode Heartbeat Interval</td>
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<td>NM INTVL</td>
<td>Normal Mode Heartbeat Interval</td>
</tr>
<tr>
<td>TM TIMEOUT</td>
<td>Time Out</td>
</tr>
<tr>
<td>HB INT</td>
<td>Heart Beat Interval</td>
</tr>
<tr>
<td>UHF</td>
<td>Ultra-High Frequency</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning Satellite</td>
</tr>
<tr>
<td>GSM</td>
<td>Global System for Mobile Communications</td>
</tr>
<tr>
<td>M</td>
<td>Pending Tag Message</td>
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<tr>
<td>S</td>
<td>Transceiver in Silent Mode</td>
</tr>
<tr>
<td>H</td>
<td>Transceiver RF Power set to High</td>
</tr>
<tr>
<td>L</td>
<td>Transceiver Contains Saved Log Data</td>
</tr>
<tr>
<td>RSSI</td>
<td>Receive Signal Strength Indicator</td>
</tr>
<tr>
<td>S\W</td>
<td>Software</td>
</tr>
<tr>
<td>VER</td>
<td>Version</td>
</tr>
<tr>
<td>BAT</td>
<td>Battery</td>
</tr>
<tr>
<td>NO CHG</td>
<td>No Change</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>SEL</td>
<td>Selected</td>
</tr>
<tr>
<td>ACCEL</td>
<td>Accelerometer</td>
</tr>
<tr>
<td>MAG</td>
<td>Magnetic</td>
</tr>
<tr>
<td>VHF</td>
<td>Very High Frequency</td>
</tr>
<tr>
<td>BIT</td>
<td>Built in test</td>
</tr>
<tr>
<td>DT</td>
<td>Data Throttle</td>
</tr>
<tr>
<td>KEKS</td>
<td>Key Encryption Keys</td>
</tr>
<tr>
<td>DOP</td>
<td>Dilution Of Precision</td>
</tr>
<tr>
<td>CUR</td>
<td>Current</td>
</tr>
<tr>
<td>dBm</td>
<td>Decibel Milli-Watt</td>
</tr>
<tr>
<td>UTC</td>
<td>Coordinated Universal Time</td>
</tr>
</tbody>
</table>

Table 2. Abbreviations.
<table>
<thead>
<tr>
<th><strong>Tag</strong></th>
<th>A tag is defined as a unit to be placed on an animal (i.e. collar) that transmits a VHF, UHF, GSM or Satellite signal to be tracked.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UHF Handheld Transceiver</strong></td>
<td>The UHF Handheld Transceiver is a tracking device that allows for bidirectional communications to and from the tag.</td>
</tr>
<tr>
<td><strong>Heart Beat</strong></td>
<td>A heart beat is a transmitted RF signal containing tag information. (absence/presence signals)</td>
</tr>
<tr>
<td><strong>Logger</strong></td>
<td>Recording data over time or in relation to location. Typically GPS, UHF or VHF data</td>
</tr>
<tr>
<td><strong>Power Pulse</strong></td>
<td>A power pulse is one high power heart beat between many low power heart beats.</td>
</tr>
<tr>
<td><strong>Data Throttle</strong></td>
<td>Limit the data throughput (absence/presence signals only).</td>
</tr>
<tr>
<td><strong>GPS Logs</strong></td>
<td>GPS data: Data from UHF Tags contain Tag ID, GPS data, date, time, 3-axis accelerometer, temperature, movement, and ground speed.</td>
</tr>
<tr>
<td><strong>UHF Logs</strong></td>
<td>Absence/presence signals: Data from UHF Tags containing Tag ID, date and time from Transceiver, GPS coordinates from Transceiver and RSSI. Accelerometer, temperature will also be logged if enabled under the Activity menu. Note: If the Transceiver does not have GPS signal, no GPS and time data will be added to UHF Log.</td>
</tr>
<tr>
<td><strong>VHF Logs</strong></td>
<td>Absence/presence signals: Data from VHF Tags contain Tag frequency, date and time from Transceiver, GPS coordinates from Transceiver and RSSI. Note: If the Transceiver does not have GPS signal, no GPS data will be added to VHF Log.</td>
</tr>
<tr>
<td><strong>Track Mode</strong></td>
<td>Track Mode is when the Tag is set to use maximum RF power while transmitting continuous GPS data. This mode will revert back to Normal Mode after a track mode timeout period to conserve battery power.</td>
</tr>
<tr>
<td><strong>Normal Mode</strong></td>
<td>Normal Mode of operation with low power settings while taking GPS Logs readings at set intervals.</td>
</tr>
<tr>
<td><strong>Sleep Mode</strong></td>
<td>Sleep Mode is the lowest power mode with all features disabled. The Tag will only transmit a UHF signal and listen for new commands every 5 minutes.</td>
</tr>
<tr>
<td><strong>Geofencing</strong></td>
<td>Geofencing is a virtual geographical boundary using the global positioning system.</td>
</tr>
<tr>
<td><strong>AWT Server</strong></td>
<td>A computer dedicated to hosting Africa Wildlife Tracking’s database, for clients to store or access data.</td>
</tr>
</tbody>
</table>

Table 3. Definitions.
6. Electrical Parameters

6.1. General
- Operating Voltage: 4.5 – 12VDC (<0.5 Watts)
- Control Interface (Logs, key): RS232 (115200bps, 8 Data bits, No Parity, 1 Stop bit)
- Audio Interface: Stereo (Left Tag, Right Tag)
- Internal Buzzer: 80dB
- Encryption: 128-bit Encryption with Key Management
- Memory: Secure Digital Non-Volatile Memory (SD Card Internal) (*Optional)
- GPS: 1575.42MHz

6.2. UHF Transceiver
- Crystal Frequency: 26MHz (<10ppm)
- RF Power: +30dBm (1Watt)
- Over the Air Data Rate: 9600 Baud
- Modulation: 2-FSK
- UHF RF Receive Frequency: 433.92MHz
- UHF RF Transmit Frequency: 433.5MHz
- Channel Spacing: 200KHz
- RX Filter Bandwidth: 58KHz
- Deviation: 5.2KHz
- Master Tag Interface: RS232 (115200bps, 8 Data bits, No Parity, 1 Stop bit)

6.3. VHF Receiver (*Optional)
- VHF Narrow band Receiver: 148 to 152Mhz
- Sensitivity: -148 to -150dBm
- Variable RF Gain Control: 80dB range
- Frequency Increments: 0.1 KH

6.4. GSM Transceiver (*Optional)
- Connectivity: GPRS
- Transmit Power: Class 4 (2W) at GSM850 and GSM900
  Class 1 (1W) at DCS1800 and PCS1900

7. Physical Parameters
- Dimensions: Length 240mm, Width 100mm, Height 32mm
- Weight: <1Kg (excluding Batteries)
- Operating Temperature: 1 to +55°C
- Humidity: 10% to 95%
- Display: 64W x 128H pixel Backlight LCD (Blue, Green, Red)
- Keypad: 18 key Backlight Numeric Keypad
- UHF RSSI Indicators: 2 x 5 LED
- Battery Compartment: 4 x AA Batteries (1.5V each)
- Audio Interface: 2.5mm Stereo Jack Socket
- Power Interface: 2.5mm Power Socket
- Antenna Interface: 3 x BNC Socket (50 ohm)
8. UHF Handheld Transceiver and PC Application Overview

The figures below show the interfaces and indicators for the UHF Handheld Transceiver and AWT PC application. Special attention must be given to the services provided by the AWT PC application.

The Transceiver service allows the UHF Handheld Transceiver to be connected to the PC application via the data port for live data (Not for downloading Log data). The IM-Sat service allow the PC application to receive data sent from the Inmarsat Towers (UHF/Satellite Towers) that are routed to the registered user. The GSM service allows the PC application to retrieve data from the AWT server that has been sent by GSM or Satellite Tag. This service will not retrieve data sent form a UHF Tag.

Figure 1. UHF Handheld Transceiver and PC Application Overview.
9. Display Overview

9.1. Display Layout

9.1.1. Main Menu

To navigate the Main Menu, use the left and right buttons. Pressing the enter button when a menu item is highlighted will bring up the sub menu. To exit a sub menu and return to the main menu press the cancel button. The Main Menus are as follows:

- TAGS: Tag related functions such as Tag settings and requests.
- VIEW: Displaying data on the screen.
- LOGS: Viewing, deleting or setting Transceiver Log memory.
- SETTINGS: Changing Transceiver settings.
- SYSTEM: Viewing Transceiver settings.
- VERSION: Transceivers software, encryption and ID version and numbers.

9.1.2. Tag Entry List

The Tag Entry List can display up to eight tags at a time. If there are more than eight tags as shown in the Total Tag Counter, one can use the up and down buttons to scroll through the tags list. Scrolling will only be enabled when in the main menu.

9.1.3. Status Bar

The status bar is used to display the following:

- Transceivers own GPS co-ordinates and time (this is not the Tags GPS data)
- Transceiver Silent mode (S)
- Pending Tag Message (M)
- Transceiver contains saved Log data (L)
- Transceivers High power RF setting (H)
- Data Throttle in hours and minutes (DT)
- Battery Voltage

9.1.4. Main Screen

The Main Screen is used to display sub menus and Tag information. The Tag information will vary depending on the View menu selected.

9.1.5. Alarm and Error Screens

All Alarm and Error screens are indicated with a red display. Alarm notifications are just feedback for the user whereas Error screens require the Transceiver to be sent back to manufacturer for repairs.
Alarm screens:
- Incorrect Code (user entered incorrect login code)
- Tag Limit Reached (more than 100 Tags detected)
- Memory Limit Reached (Transceivers internal memory)
- Input Voltage Too Low (battery or external voltage too low)
- Invalid Tag ID
- GSM Module Not Supported
- VHF Module Not Supported
- Tag ID Not in List (Requesting a Status from a tag that has not been detected by Transceiver)

Error Screen:
- Memory Error
- Accelerometer Error
- No Encryption Keys
- Headphones Error
- GSM Module Error
- VHF Module Error

Figure 2. Display Layout.
9.2. Login Screen

Logging into the Transceiver will require a 5 digit login code provided by the manufacturer in the form of an encryption certificate. Once the code is entered and authenticated with the preloaded encryption keys, the transceiver will always start in Basic View. This allows the system to immediately commence tracking using absence/presence signals from the tags.

All system settings will be restored from last saved settings upon login. The Transceivers own GPS will immediately try and get PGS lock (>30 seconds using cold start at power up) and then display the co-ordinates and time at the bottom of the display.

Figure 3. Login Screen.
10. MENUS

10.1. TAGS Menu

The Tags menu enables the user to reconfigure a tag into different modes of operation, request Log data, Once off Location, status and Geofence data.

Important: All messages are sent using the left antenna connector.

10.1.1. Tag Settings

The items below describes the different settings available under the three operational modes (Normal, Track and Sleep Modes). See figure below for Normal, Track and Sleep Mode Range Settings.

Normal Mode:
- Normal Mode is a low power mode where the tag uses the least battery power. The tag will always revert back to this mode after a Track Mode Timeout.
- RF Power is the transmit power setting for the Tag.
- A Heartbeat Interval is the rate at which an absence/presence signal from tag is transmitted and is specified in seconds.
- Power Pulse is a single heartbeat at maximum transmit power in Normal Mode only.
- GPS Logger allows changing the GPS Log interval reporting.
- Log Transmit selects how often to transmit the last GPS Log reading via the GSM of Satellite.
- Geofence parameters such as Query, Apply and Disable are available. Applying the Geofence will require Geofence data to be pre-loaded into the Transceiver using the AWT PC Application.
- The Activity option allows the Tag to be placed into a continuous Accelerometer state in Normal Mode, which allows the Tag to transmit raw accelerometer data at the heartbeat interval.

Track Mode:
- Track Mode is a high power mode where high power features are allowed to run for only a short period of time. Track mode will revert back to Normal mode after Track Mode timeout is reached.
- RF Power is the transmit power setting for the Tag.
- The Track Option allows for a continuous GPS or strobe LED. GPS data will be transmitted at the Heartbeat interval rate.
- A Heartbeat Interval is the rate at which the GPS data is transmitted and is specified in seconds.
- Track Mode Timeout is the time to revert back to Normal Mode and is specified in seconds.

Sleep Mode:
- Sleep Mode will disable all Tag features and will only transmit every 5 minutes to reduce battery power.
  (Note: this mode should not be used once Tag is deployed)

10.1.2. Tag GPS Logger

The items below describes the different options available under the GPS Logger menu. All these menus related to GPS Logs only.
Download All Logs:
- This menu item allows all GPS logs to be downloaded from a single Tag at a time. If the download process is interrupted, it will do an auto retry after 5 seconds by sending another download all message to the tag, resuming from the last downloaded entry. Note that Logs are not deleted automatically after downloading.
- All downloaded logs are stored with encrypted coordinates in the Transceivers internal memory, and will only be decrypted once download onto AWT PC application.

Download Selected Logs:
- The download all option allows GPS logs to be downloaded from a single Tag at a time between Start and Stop date/time. If no Date and time is entered, all data will be downloaded from the Tag. The auto retry will also apply to this option. Note that selected download Logs are not deleted automatically after downloading.
- All downloaded logs are stored with encrypted coordinates in the Transceivers internal memory, and will only be decrypted once download onto AWT PC application.

Query Logs:
- The Query Logs will simply get the total GPS Log count from the Tag, but not download any Logs.

Delete Logs:
- This menu option will delete all logs from the Tag. It is recommended that the user does a query after issuing this message to confirm the Logs have been deleted as the Tag does not confirm Log deletion.

10.1.3. Tag Location

The Tag Location requests the immediate once off GPS location from the selected Tag with the Tags response time being up to 120 seconds (allowing for GPS lock time). The Transceiver will automatically revert to the GPS View once this message has been sent to the selected tag. While waiting for the GPS data from the Tag, the Transceiver will display “GPS OFF” until a valid coordinate is received.

10.1.4. Tag Status

A Tag Status Request will request a Tag to run a built in test and report back the results, along with its current and default setting. The current settings are those that are currently active, and the defaults are the settings that have been programmed into the Tag to be used at startup.

The following information is returned on Tag Status Request:
- Tag ID (Tag ID number reporting back the Status results)
- Op Mode (Current Operational Mode)
- Temperature (Current temperature in Degrees Celsius on Tag)
- Battery voltage (Tags Battery Voltage)
- Self-Test (Self-Test result)
- S\W Version (Tags Software Version)
- Cur GPS-log (Current GPS Logger reporting Interval)
- Def GPS-log (Default GPS Logger reporting Interval)
- Cur Power Pls (Current Normal Mode Power Pulse setting)
- Def Power Pls (Default Normal Mode Power Pulse setting)
- Cur NM-Int (Current Normal Mode Heartbeat Interval in seconds)
- Def NM-Int (Default Normal Mode Heartbeat Interval in seconds)
- Cur TM-Int (Current Track Mode Heartbeat Interval in seconds)
- Def TM-Int (Default Track Mode Heartbeat Interval in seconds)
- Cur TM-Exit (Current Track Mode Timeout in seconds)
- Def TM-Exit (Default Track Mode Timeout in seconds)
- Cur RF-Pwr (Current Normal Mode RF power setting)
- Def RF-Pwr (Default Normal Mode RF power setting)
- Tag GPS (Built in Test result for GPS Module)
- Tag Accel (Built in Test result for Accelerometer)
- Tag Memory (Built in Test result for Memory)
- Tag Battery (Built in Test result for Battery)
- Tag RF Path (Built in Test result for RF Path)
- Tag GSM (Built in Test result for GSM Module)
- Tag SAT (Built in Test result for Satellite Module)
- Norm Count (Normal Mode Heartbeat count since battery connected)
- Track Count (Track Mode Heartbeat count since battery connected)
- GPS Count (GPS Reading count since battery connected)
- Dload Count (GPS Log Download count since battery connected)

10.1.5. Tag Geofence

The Tag Geofence has the following options:
- Query Geofence request the four coordinates forming the Geofence perimeter from the Tag, with the top left corner being the N/W Latitude and Longitude and the bottom right corner being the S/E Latitude and Longitude. A coordinate set to “Off” means that Geofence perimeter is not active.
- Clear Geofence Alarms sends a message to the selected Tag to clear any Geofence perimeter breach alarm.
- Apply sends the new Geofence parameters consisting of a set of two coordinates. These parameters must be uploaded into the Transceiver using the PC application.

![Geofence Overview](image)

**Figure 4. Geofence Overview.**
Figure 5. Tags Menu.
<table>
<thead>
<tr>
<th>Operational Mode</th>
<th>Normal Mode</th>
<th>Track Mode</th>
<th>Sleep Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Default</td>
<td>Range</td>
</tr>
<tr>
<td>RF Power</td>
<td>-30dBm to +10dBm</td>
<td>+10dBm</td>
<td>-30dBm to +30dBm</td>
</tr>
<tr>
<td></td>
<td>×</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Heartbeat</td>
<td>1 to 600 seconds ✓</td>
<td>10 seconds</td>
<td>1 to 600 seconds ✓</td>
</tr>
<tr>
<td></td>
<td>×</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Pulse (+30dBm)</td>
<td>None ✓ 1/2 1/10 1/20 1/30 1/40 1/50</td>
<td>1/10 is typical but may change</td>
<td>Off ✓</td>
</tr>
<tr>
<td>GPS Logger</td>
<td>Off ✓ 10 Minutes 1 Hour 3 Hours 6 Hours 12 Hours 24 Hours 48 Hours</td>
<td>1 Hours is typical but may change</td>
<td>Off ✓</td>
</tr>
<tr>
<td>Variable Log Transmit</td>
<td>Off 1/1 to 1/12</td>
<td>1/1 is typical but may change</td>
<td>Off ✓</td>
</tr>
<tr>
<td>Activity</td>
<td>On/Off ✓</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Track Mode Option</td>
<td>Off</td>
<td>Off</td>
<td>GPS LED ✓</td>
</tr>
<tr>
<td>Track Mode Time Out</td>
<td>Off</td>
<td>Off</td>
<td>1 to 999 seconds ✓</td>
</tr>
</tbody>
</table>

This setting will be restored to the default setting upon mode change.

This setting will not be restored to the default setting upon mode change and must be explicitly changed by the user under the “Tag” menu.

This setting is not changeable under current mode.

Table 4. Normal, Track and Sleep Mode Range Settings.
Set tags operational mode to "Track Mode". GPS will be turned on by default.

Set Transceivers View to "UHF GPS VIEW" and select tags ID.

Wait for Tag to get GPS lock and then transmit the data to Transceiver.

Wait for "Track Mode Interval" time. If "Track Mode Timeout", Tag will return to "Normal Mode".

Transceivers GPS has lock

Calculate distance and bearing (from Transceiver to Tag) using Transceiver and Tags GPS data.

Display only Tags GPS coordinates.

Transceiver held horizontal

Display distance and bearing from Transceiver to tag using compass.

Display distance and bearing only. Compass not active.

Figure 6. Using "Track Mode" to track a Tag.
10.2. **VIEW Menu**

The View menu allows for different information to be displayed on the screen. The default view is UHF Basic View.

All the Viewing options allow for audio tones to be generated for Tag detection dependent on the Tag ID entered. Entering a “0” will generate a tone for any Tag detected, else only on the selected Tag number entered. Pressing the Silent button will mute the Transceiver.

The headphones are never muted, and will also be played in stereo for UHF Dual view. The headphones have the added feature of playing a higher pitched tone for higher RSSI signals. RSSI levels range from -120 to 0, with 0 being the strongest.

10.2.1. **UHF Basic View**

To use the UHF Basic View a UHF antenna must be connected to the left antenna connector. The Transceiver will then display basic information from detected Tags. This Menu option allows for single or multiple Tags to be viewed. If “0” is entered as a Tag ID, it will allow any Tag to be displayed.

This View will automatically allow Activity (Continuous Accelerometer) data from the Tag to be viewed in the form of Pitch and Roll if available. The Tag will send the raw accelerometer data (X, Y and Z data) with the Transceiver converting it to Pitch and Roll.

10.2.2. **UHF GPS View**

To use the UHF GPS View a UHF antenna must be connected to the left antenna connector. The Transceiver will then display basic information and GPS data (if Tag has GPS signal) from detected Tags. This Menu option allows for single or multiple Tags to be viewed. If “0” is entered as a Tag ID, it will allow any Tag to be displayed.

This view also allows for distance and bearing of Tag in relation to the Transceiver, provided both have GPS signal. Using the up and down arrow keys will toggle between coordinates only and distance/bearing. Holding the Transceiver horizontal will allow the built in compass to operate with a line pointing in the direction of the transmitting Tag.

10.2.3. **UHF Dual View**

To use the UHF Dual View a UHF antenna must be connected to both the left and right antenna connectors. The Transceiver will then display basic information from detected Tags. This Menu option allows for single or multiple Tags to be viewed. If “0” is entered as a Tag ID, it will allow any Tag to be displayed. This view is useful in scanning for Tags in different directions, for example in an aircraft.

**Important:** All messages are transmitted from the left antenna connector.
10.2.4. **VHF View**

To use the VHF View a VHF antenna must be connected to VHF antenna connector. The Transceiver will then scan for a CW tone on the selected frequency. Note that the Transceiver is now a VHF Receiver and will not be capable of sending messages to the Tags. There are also channels available for storing and recalling VHF Receiver settings.

10.2.5. **GSM View**

To use the GSM View no antenna is required as the GSM module has a built in antenna. The GSM view allows data to be retrieved from the AWT server and displayed in a similar manor to the GPS View. This option does require a valid Tag ID to be entered. The GSM module will then have 3 attempts to retrieve the data, if unsuccessful it will revert back to the basic UHF view. The RSSI levels for the GSM module are 0 to 31, with 31 being the strongest signal strength. This view also allows for distance and bearing of Tag in relation to the Transceiver, provided both have GPS signal. Using the up and down arrow keys will toggle between coordinates only and distance/bearing. Holding the Transceiver horizontal will allow the built in compass to operate with a line pointing in the direction of the transmitting Tag.
10.3. **LOGS Menu**

The Logs menu is used to view, delete or configure the memory in the Transceiver for downloading log data from Tags. Transceivers are fitted with two types of memory, namely SC-Card that is capable of storing up to 10 million log entries and Flash memory capable of up to 2000 log entries. Transceiver that are not fitted with SC-Cards will by default use the Flash memory and will not be able to save UHF and VHF log data. Only GPS Logs are allowed to be stored on flash memory due to size constraints. Transceiver that have saved log data in memory will display a “L” in the status bar.
10.3.1. View Saved Logs

The view menu provides a summary of the log data on the Transceivers memory, this includes a log entry count and memory percentage used. It must be noted that the transceiver does not process the data and therefore downloading the same data from a tag will result in duplicate entries on the Transceiver. Each entry will be counted whether it a duplicate copy or not. However, when downloading the log data to the PC application, all duplicate data will be discarded.

To download (or delete) log data from the Transceiver follow the procedure below:
- Connect the serial cable provided to the computers serial port.
- Connect the other end to the Transceivers “Controls Port”.
- Power up the Transceiver and enter Login Code.
- Run AWT PC application and press the Download Logs” Icon on the “Home” tab.
- Follow the applications download procedure till done.

10.3.2. Delete Logs

The delete menu option allows for logs to be deleted from the Transceivers memory.

10.3.3. Logger Setting

The logger setting menu option allows for UHF and VHF logs to be enabled or disabled.

Enabling UHF logs:
- Enabling UHF logs will allow the Transceiver to record any UHF Tag activity and as a result use large amounts of memory.
- Can only be enabled if a SD-Card has been installed.
- Saved data from UHF Tags contains Tag ID, date and time from Transceiver, GPS coordinates from Transceiver and RSSI. Note: if the Transceiver does not have GPS signal, no GPS data will be added to UHF Log.

Enabling VHF logs:
- The Transceiver must be fitted with a VHF module for logging VHF data.
- Saved data from VHF Tags contains Tag frequency, date and time from Transceiver, GPS coordinates from Transceiver and RSSI. Note if the Transceiver does not have GPS signal, no GPS data will be added to VHF Log.
Figure 8. Logs Menu.
Download Logs  Used to download save logs on UHF Transceiver

Figure 9. Downloading Logs from Transceiver.
10.4. SETTINGS Menu

The Settings Menu allows the user to change the settings related to the Transceiver only. Once a setting change has been made, it takes immediate affect and is stored in non-volatile memory. The next time the transceiver is powered up, all these settings are applied. If an out of range message is made, the last setting will be kept and an out of range message will be shown. The table below shows the factory default settings and describes each item's function.

The Settings Menu structure is shown in the figure below with all the minimum and maximum ranges.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Defaults</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phones Volume</td>
<td>1.5dBm</td>
<td>External stereo headphone output volume</td>
</tr>
<tr>
<td>Power Down Time</td>
<td>Never</td>
<td>Time to power down the transceiver to save battery power</td>
</tr>
<tr>
<td>Voltage Alarm</td>
<td>4.5Volts</td>
<td>Minimum input voltage alarm</td>
</tr>
<tr>
<td>Time Zone</td>
<td>2Hours</td>
<td>Hour offset to add to UTC time</td>
</tr>
<tr>
<td>Backlight Colour</td>
<td>Blue</td>
<td>Backlight screen colour</td>
</tr>
<tr>
<td>Keypad Backlight</td>
<td>On</td>
<td>Keypad backlight on/off setting</td>
</tr>
<tr>
<td>Load Keysets</td>
<td>-</td>
<td>Load the encryption keys. This is done by manufacturer to match Tag keys.</td>
</tr>
<tr>
<td>RF Power</td>
<td>Low</td>
<td>Transceivers RF output power setting. Low power is +10dBm and high power is +30dBm</td>
</tr>
<tr>
<td>Data Throttle</td>
<td>Off</td>
<td>Allows tag data through only once in selected time (hours and minutes). Red RSSI LED will show signal detected but data will not be processed or displayed.</td>
</tr>
<tr>
<td>Clear Tag Entries</td>
<td>-</td>
<td>Clear all Tag entries from Tag list</td>
</tr>
<tr>
<td>Tag Timer</td>
<td>999seconds</td>
<td>Time in seconds since last tag in. Transceivers GPS time will be used if Tag Timer is set to off</td>
</tr>
<tr>
<td>UHF Test Tag</td>
<td>Off</td>
<td>Built in UHF test Tag</td>
</tr>
<tr>
<td>Restore Defaults</td>
<td>-</td>
<td>Restores all settings to factory defaults</td>
</tr>
</tbody>
</table>

Table 5. Default Transceiver Settings.
Figure 10. Settings Menu.
10.5. **SYSTEM Menu**

The System Menu allows the user to view all the system settings that have been stored in non-volatile memory. These settings can only be changed under the Settings menu.

![Figure 11. System Menu.](image1)

10.6. **VERSION Menu**

All Software, Encryption and Transceiver versions are displayed under this menu item.

![Figure 12. Versions Menu.](image2)
11. Important Notice

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