iScout® System
User's Manual
April 2, 2008
Version 1.2

McQ Inc.
1551 Forbes Street
Fredericksburg, VA 22405
(540) 373-2374
info@mcqinc.com

Table of Contents

Table of Figures

1 Introduction

Figure 1-1: iScout® Kit with LHCN (left) and iScout Basic Kit (right)

The **iScout® Kit** (Figure 1-1, left) includes **iScout® sensors**, a **Wireless Mobile Relay (WMR)**, a **Long Haul Communications Node (LHCN)** and a **Handheld Programmer Monitor (HHPM)**. The **iScout® sensor** is the device that detects activity within a specific range and reports the information to the user. The **iScout® sensor** reports the information to the **WMR**, which then transfers the information to **HHPM** over the Bluetooth link. The LHCN is a bridging device that allows the sensor network to be remotely monitored via the Iridium satellite system. Each kit has up to six iScout sensors; one HHPM; one WMR; one LHCN; one battery housing for three BA series batteries; two sets of lithium AA batteries for the iScout sensors; one charger for the HHPM and the WMR; an external battery pack connector; microphone port water sealing plug; PIR lens protective caps for each iScout; antennas for each iScout, for the WMR, and satellite antenna and local comms antenna for the LHCN; optional switch closure cables if this option is provided; and a copy of this iScout System User's Manual. Also available is the iScout Basic Kit (Figure 1-1, right) which does not include the LHCN.
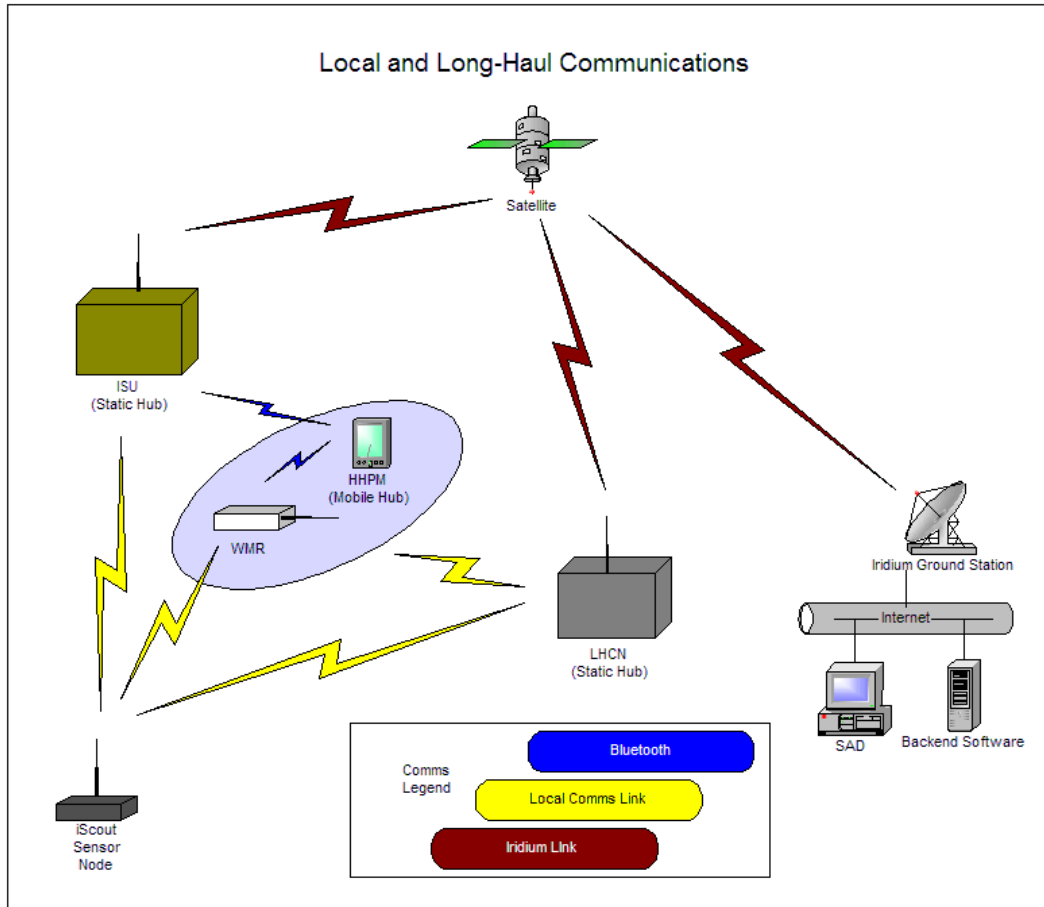
Figure 1-2: iScout® Communications

Figure 1-2 shows how the iScout® sensors, the WMR, the LHCN, the ISU and the HHPM communicate with each other and the OmniSense® Backend SAD.

Communications in the iScout® system take place over the local communication links and via the Iridium satcom link. The communication between an iScout® sensor node and the Wireless Mobile Relay (WMR) is through a 900 MHz local communications radio. The WMR is responsible for taking the data sent by the iScout® sensor node and sending the same information to the HHPM over the Bluetooth link. The HHPM is responsible for establishing the Bluetooth link between the WMR and HHPM through the OmniSense® program. Once the link between the WMR and the HHPM has been established, the data will appear on the HHPM from the iScout® with no interference. Also available is communication with the iScout sensor via either the OmniSense ISU or via a LHCN relay.

1.1 iScout® Sensor Description

The iScout® sensor node's purpose is to detect activity in a specific area based on the transducer that is being used. The iScout® sensor (Figure 1-3) is equipped with GPS positioning capability and a 900 MHz communications radio as well as internal transducers that include a geophone, a microphone, a passive infrared module, and a magnetometer. The external connectors for the iScout® sensor include an optional connector for a switch closure cable and an antenna for the

local communications. An optional external battery pack connector is also available. The iScout® sensor is powered with 2 AA batteries and the operator has the choice of whether to use alkaline or lithium, although 4 lithium batteries are delivered with each sensor. The iScout sensor also reports status messages over a configurable interval and alerts the user when the sensor is tampered. The iScout® sensor can communicate with OmniSense® sensors through the 900 MHz link to command images and send detections over Iridium if necessary. A Long Haul Comms Node (LHCN) can send iScout messages and forward backend command and control messages via the Iridium satcom link.

Figure 1-3: iScout® Sensor

1.1.1 iScout® Features
Size: 3 ½ x 3 ½ x 1 ¾ Inches
Weight: 8 Oz
Op Temperature Range: –20˚C to +60˚C
Power: Two internal AA Batteries (Lithium preferred) or External Battery Pack (One BA 5390)
Operating Lifetime:
  ➤ Internal Batteries: 15 – 45 Days (Activity Dependent)
  ➤ External Battery Pack: 1 – 3 Years (Activity Dependent)
Sensors: Seismic, Acoustic, Magnetic, Passive IR
Position: GPS Receiver

Communications:
  ➢ 902 to 928 MHz, Frequency Hop, Two Way, External ½ Wave Antenna, Star Architecture
  ➢ **Long Haul Comms Node (LHCN) Relay**: IRIDIUM to SADU Backend User Interface, Local Comms Relay to Wireless Mobile Relay
  ➢ **Wireless Mobile Relay**: Local Comms Relay to User via Bluetooth RF Link to Handheld Display
  ➢ **Range (Line of Sight)**:
      300 – 500m   Ground to Ground Height
      500 – 1000m   Ground to 1m Height
      >1000m   1m to 1m Height

Data Structure: Common Data Interchange Format (CDIF)
Data Rate: Up to 115 Kbps
Field User Display: PDA or Handheld PC, Map Based Display, Sensor Detection Reports, Sensor Command and Control, Sensor Status Reports
Fully Compatible with OmniSense®
  ➢ Commands OmniSense® Pictures
  ➢ Communicates Through OmniSense®
Positive Indication of Unit Comms Link Status
Accurate Timestamp of Activities From GPS and Internal Clock
Emplacement Mode for Easy Installation and Set Up
Normal Mode Provides Automated Operation
Sleep Mode Programmable by Operator
Tamper Report with Option to Disable Sensor or Continue Tamper Reports
Unique ID for Each Sensor Plus User Programmed Alphanumeric Sensor Description
Detection Algorithms:
      Operator Configurable Detection Algorithms
  ➢ Seismic: On/Off with Four Sensitivity Levels;   Vehicles, People, or Both;
  ➢ Magnetic: On/Off
  ➢ Acoustic: On/Off with Two Sensitivity Levels;   Blast
  ➢ PIR: On/Off
  ➢ External Switch Detection (optional)
  ➢ External Switch Control (optional)
Target Detection Ranges:
  ➢ **Vehicles:** Seismic: up to 80m / PIR: up to 60m / Magnetic: up to 3m
  ➢ **Personnel**: Seismic: up to 30m
  ➢ **Other:** Gunfire/Explosion: up to 10m

1.2   Wireless Mobile Relay (WMR) Description

Figure 1-4: The Wireless Mobile Relay (WMR)

The WMR (Figure 1-4) is used solely to convert the messages sent from the iScout® to the HHPM for the user to see. The WMR receives sensor messages with a 900 MHz local communications radio and transmits to the HHPM with a Bluetooth module. This allows the user to receive instantaneous messages from the sensor on the HHPM without the requirement of an Situation Awareness Display Unit (SADU) server. The only step that a user is required to perform is to link the HHPM with the WMR once the WMR has been powered on. To power on the WMR, the operator only needs to turn the switch located on the top of the box. When the switch is turned to the **On** position, the Power LED turns green. If the WMR is in the **Off** position, the Power LED is not on. The second LED, or **Battery LED**, on the WMR shows when the unit is being charged. The unit is red when it is charging and green when the charge has exceeded 90% of battery capacity. The connector for the battery charger is located on the side of the unit. The battery charger is the same model as the one used for the HHPM and is included in the kit.

1.2.1 WMR Features

Battery Powered: Lithium Ion- Rechargeable/Battery Indicator LED
        On LED
Power Switch: Rotary On/Off
Operating Life: Approx 24 Hours
Size: 5 in X 3in X 2in
Weight: 10oz
Antenna: 900 MHz Whip
Communications:
        900 MHz Transceiver Link to iScout® Sensors
        2.4 GHz Bluetooth Link to Handheld Monitor

1.3 Long Haul Communications Node (LHCN) Description

The OmniSense Model 2501 Long Haul Communications Node (LHCN) provides a satellite based Terrestrial Network (TNet) communications hub for a small field of sensors. Its sole duty is to relay sensor messages to and from the OmniSense Backend. The LHCN allows for the deployment of TNet compatible sensors for long-term monitoring in remote locations.

The LHCN operates on 12 VDC power and can accept either a single battery pack, or three-battery pack for extended missions. The unit has three external connectors:

1. The ANT connector is for the RF antenna cable.
2. The SAT connector is for the shared satellite communications and GPS antenna cable.
3. The PWR/SER connector is for powering the unit with an external 12 VDC power source or use with a serial cable, which allows the HHPM to communicate directly with the unit.

Built-In Functionality

1. Satellite Communications
    o Relay traffic between the sensor fields and OmniSense Backend
2. Terrestrial RF Communications
    o Provides a Communications Hub for Sensor Fields
- Self-locating via an internal GPS module
    o Antenna
        ▪ TNC connector for active GPS antenna
- Wireless setup
    o Local communications radio with TNC connector to the antenna
        - Programmable Status Report Interval
        - Emplacement Duration of 10 minutes

1.3.1 LHCN Features

Battery Powered: 9 to 16.5 Volts DC (BA-2590 or BA-5390)
Size: 6 x 8 x 14 Inches
Weight:
      10 lbs (With B1 Single-Battery Pack)
      18 lbs (With B3 Three-Battery Pack)
Antennas:
      900 MHz Whip Terrestrial Communications Antenna
      Dual-band Passive Satellite Communications and GPS Antenna
Communications:
      900 MHz Transceiver Link to OmniSense® Sensors
      Satellite Transceiver Link to OmniSense® Backend

1.4 Handheld Programmer Monitor (HHPM) Description

Figure 1-5: The Handheld Programmer Monitor (HHPM), left and HHPM Sensor Map, right

The HHPM (Figure 1-5) is a ruggedized pocket PC that is equipped with GPS positioning capability, Bluetooth communications technology and a map-based display. The HHPM has several functional capabilities. First, it is used to program the configuration of the iScout® sensors. Second, the GPS positioning provides the capability to download to the sensor its location and the HHPM time. Both of these functions are accomplished via Bluetooth communications between the HHPM and the iScout® sensor using a WMR. Third, the HHPM is used to display sensor data for the user. These displays show the detections in time order, show the sensor detections on a map as shown in Figure 1-5, right, and display status reports received from the sensor. Additionally, the individual sensors have the capability to send their location and configuration via relays to the SADU at a central monitoring location.

1.4.1 HHPM Features

Battery Powered: Lithium Ion -Rechargeable
Rugged: Submersible to 1 meter, Drop Resistant
Operating Life: Approx 12 Hours
Operating System: Windows Mobile 6.0
Application Software: OmniSense® HHPM Software
Bluetooth: Built In
GPS: Built In
Display: 480 X 640 Pixel (VGA) Color TFT with LED Backlight
Sound: Integrated sealed speaker and microphone. Audio headset jack with mono speaker and microphone
Keypad: PDA Touchscreen

2 iScout® Long Haul Communications Node Set Up

2.1 Mission Planning

The most important factor in successful deployment of the OmniSense System is the mission planning. From the mission planning, the operator should have a list of parameters that will be used to configure the LHCN for its particular mission and placement. Mission planning topics that should be resolved prior to the actual deployment of LHCNs are:

2.1.1 Location

Where exactly is the LHCN to be deployed? The field operator should have a basic idea of the terrain, and concealment options. Since LHCNs extend the communications capability of the iScout Sensors, location has a direct impact on the performance of the overall system. An improperly deployed LHCN can cause the loss of data from an entire sensor field to the OmniSense Backend.

2.1.2 Communications

The LHCN uses two types of communications, a terrestrial local communications system, and satellite communication. The terrestrial system requires the proper installation of the antenna on LHCNs and the associated OmniSense sensing units (Cores or iScouts). Sensing units should be placed no more than 1 kilometer from a LHCN line-of-sight. If the Sensor antenna is located on or near the ground, mounting the LHCN antenna on a tower or high ground will extend the RF range. The terrestrial local communications system can also operate on one of ten channels, so it is important that all devices (Cores or iScouts) communicate on the same channel, otherwise data will be lost.

Satellite communications provide an access point for the RF traffic. It is important that the satellite communications antenna have an unobstructed view of the sky. Placing the antenna at the base of a tree may cause an intermittent communications issue. No configuration is required for satellite communications, it will be configured to be operational from the factory. The only requirement for satellite communications is the proper installation of the antenna. The satellite antenna should not be buried.

NOTE: It is necessary to deploy the LHCN prior to deploying the sensor field. Proceeding in this manner will allow the field operator to verify the integrity of communications of each deployed sensor.

2.2 OmniSense LHCN Operation

A LHCN will startup following this scenario:

1. Upon power up of the unit, a 10 minute interval called **Emplacement** begins which does the following:
   - Conducts a BITE
   - Sends a status and configuration message through the RF Radio
   - Attempts to connect to a satellite and send a status and configuration to an OmniSense Server
   - Determines a GPS position

The purpose of this installation section is to provide the field operator with the necessary steps to quickly deploy the OmniSense LHCN without detailed knowledge of the operation of the system. The goal is to outline a set of steps for the quick deployment of the LHCN and then allow more fully trained personnel to use the OmniSense system's remote configuration capability to tailor the LHCN once it is in place.

2.2.1 LHCN Installation

Installing the Local Comms Antenna to the LHCN Housing

Figure 2-1: LHCN Connectors

NOTE: Refer to Figure 2-1 throughout this procedure.
---

1. Secure the Local Communications antenna either on the antenna connector on the LHCN case or remote it using the 6 meter Antenna Cable.
2. Attach the female connector of the local comms antenna to the "ANT" connector (bottom right connector) on the LHCN Housing.
3. If remoting the antenna, hide the antenna in the camouflage or in a nearby tree or bush. Do not lay the antenna on the ground; it must be elevated off the ground to work. It can be oriented in an upward direction or can hang upside down.
4. Cover antenna wire with dirt or trench it.

Installing the Iridium Antenna to the LHCN Housing

NOTE: Refer to Figure 2-1 throughout this procedure.

1. Position the Iridium Antenna in the camouflage or hide in bush or tree.
2. Attach one of the female connectors of the Antenna Cable to male connector on the Iridium Antenna.
3. Attach the second female connector of the Antenna Cable to the 'SAT' connector (top right connector) on the Sensor Housing.
4. Cover antenna wire with dirt or make a trench and cover.

Installing Batteries into Battery Housing

Figure 2-2: The Battery Box contains the housing that the batteries plug into

NOTE: Refer to Figure 2-2 throughout this procedure.

1. Remove the battery from its package and ensure the protective cap is removed from the battery connector.
2. Open the metal battery housing completely. Ensure that the hinged part is completely open or the batteries will not slide into the connectors.
3. With the base of the battery slightly angled upward, align the battery connector with the connector on the Battery Housing.
4. Carefully push inward to seat the battery connection onto the Battery Housing connection.
5. After the battery is fully seated and base of the battery clears the restraining tab on the Battery Housing, lower the base of the battery the rest of the way into the battery housing.

6. Repeat step 1-5 for remaining two batteries if using the 3 battery (B3) battery housing.
7. Close the hinged access cover on top of the Battery Housing.

> **CAUTION: Do not hold on to the power connector when lowering the Battery Housing into the Battery Box.**

8. Align the Battery Housing with the Battery Box. Then reinsert the Battery housing back into the Battery Box. The top of the Battery Housing should be flush with the opening of the Battery Box.

> **NOTE: The system does not contain a power switch. Power is applied to the system when the LHCN is attached to the Battery Box via the Battery Housing.**

> **NOTE: Do not connect the Battery Box to the LHCN housing until all antennas have been connected.**

Connecting the Battery Box to the LHCN Housing

1. Connect the battery box to the LHCN housing:
    a. Place the base of the battery box on the ground so that the LHCN housing is skyward.
    b. Line up the black power connector on the battery housing with the mate on the LHCN housing.
    c. Push two units together so that both are mated.
    d. Fasten the four latches that are located on the Battery box to the LHCN housing.
2. Removing the Battery Box from the LHCN Housing
    a. Place the unit down on the ground with the battery box on the bottom.
    b. Unlatch the four latches between the LHCN housing and the battery box.
    c. Lift the LHCN housing straight up slowly so that the weight of the Battery Housing unplugs from the power connector.

> **CAUTION: Do not use the power connector to remove the Battery Housing from the Battery Box.**

Changing the Batteries in the LHCN Housing

1. Remove the Battery Housing from the Battery Box by gripping the Battery housing and sliding it out of the Battery Box.
2. Lift and completely open the hinged access cover of the Battery Housing.
3. Remove any used batteries present in the Battery Housing:
    a. Grab the bottom of one of the batteries in the Battery Housing.
    b. Lift the battery upward approximately ½ inch, until the base of the battery clears the restraining tab on the Battery Housing.
    c. Pull the battery away from the power connectors.
    d. Repeat step 1-c for remaining batteries.
4. Discard used batteries in accordance of the approved disposal procedures.

WARNING: Do not mix new and used batteries.

WARNING: Do not mix different types of batteries. Fire or explosion could occur.

2.2.2 Configuring the LHCN

Communicating with the LHCN is done via three possible methods:

1. Using the HHPM with the direct serial cable connection. Communication between the HHPM and the unit is automatic
2. Using the HHPM/WMR and using the RF communications link between the HHPM and the unit. An RF connection must be established between the HHPM/WMR and the Unit prior to being able to configure the unit.
3. Using satellite communications and the backend OmniSense applications software (SADU). This method is usually not used during the initial installation and is used only after the unit has been configured in the field and the Operator wants to change something remotely.

Using either of the first two configuration methods, the OmniSense application software on the HHPM is used to configure the unit and the steps are identical except for establishing the communications between the HHPM and the unit.

The complete HHPM operations are described in a separate HHPM Users Manual. This Installation Guide describes the HHPM operations needed by the user to prepare, install, and verify successful operation of OmniSense units in the field. This Installation Guide recommends the LHCNs be checked out in a Rear Area before Field Deployment.

NOTE: It is necessary to deploy the LHCN prior to deploying the sensor field. Proceeding in this manner will allow the field operator to verify the integrity of communications of each deployed sensor.

Establishing Communications with the LHCN

Serial :

1. Connect the serial cable to the HHPM and the PWR/SER connector on the LHCN.
2. Using the HHPM OmniSense application software under the Windows tab, select Preferences, Comm Ports.
3. In the Comm Ports menu, select Serial Cable, then select OK
4. The HHPM should announce that the Serial communications has been established. The HHPM is now communicating directly with the unit.

WMR RF Comms:

> **Note: In using this method, the WMR and the units must be on the same network ID to communicate and the LHCN must be in Emplacement Mode. The default factory Network ID is set to 1. During Normal Mode, the LHCN will only be addressable when it communicates.**

1. Power up the unit and the WMR
2. Using the HHPM OmniSense application software under the **Windows tab**, select **Preferences | Comm Ports**.
3. In the **Comm Ports menu**, select **Bluetooth WMR**, then select **OK**.
4. Under the **Windows tab**, select **Switch Device**. This will bring up a window with all the devices that the HHPM is currently linked to via Bluetooth. Select the **Find button** and the HHPM will refresh this list.
5. Once the Find function is completed, highlight the WMR and choose the **Select button**.
6. The HHPM should notify that the WMR is connected.
7. <u>If this fails</u>, it may be because the unit is on a different Network ID. The only remedy is to systematically go through all 10 Network IDs until the communications established annotation is received. To change the WMR Network ID.
    a. In the Windows tab, select **Preferences | Network ID**. Using the stylus, select a Network ID and choose **OK**. If communications with the unit is not established, repeat this procedure using a different Network ID.

Configuring the LHCN

1. Connect the HHPM to the Unit via the serial cable or WMR.
2. Once connected, the Unit will report its current configuration to the HHPM. The configuration is automatically displayed in the **Configuration Editor** (Figure 2-3, center and right). View the entire configuration by choosing different tabs at the bottom of the screen. Click **ok** in the upper right-hand corner. When asked **Configure Device?** Click **No**.

Figure 2-3: Devices Menu (left), Configuration Editor (center) and Comms Tab (right)

3. Using the HHPM, verify that the Unit has passed the BITE. Go to the **Devices Menu** (Figure 2-4, left) and choose the **Request Status option**. The screen will only display the results of the BIT failures (Figure 2-4, right). Ensure that there are no BIT failures.
4. Confirm that the LHCN has successfully sent at least one SBD message by checking the **SBD row** of the **SATCOM Succ/Att section**. If this reads 0/0 successful; the sensor will continue to retry the message. Continue requesting a new status from the LHCN every minute until this changes to 1/X.
5. If possible, call the **SAD Operator** to verify that the Unit has communicated via the satellite to the **Operational Center**.
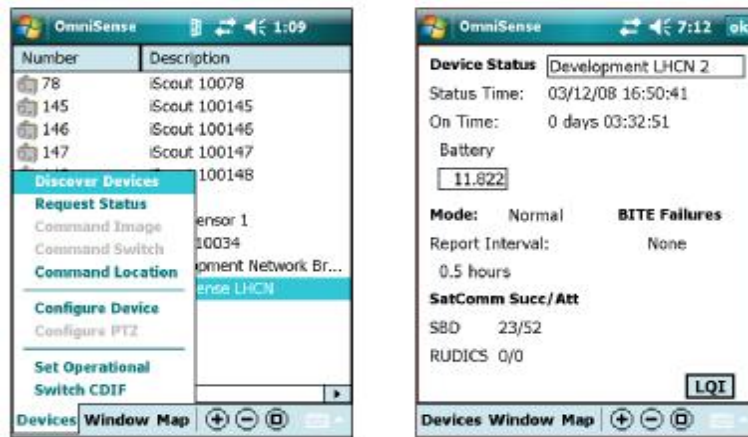
Figure 2-4: Devices Menu (left) and LHCN Status Screen (right)

6. From the **Mission Planning**, determine what is required for this deployment. The Network ID must be configured.
7. Go to **Devices Menu** (Figure 2-4, left).
8. Select **Configure Device**. Using the configuration tabs configure the unit
    a. <u>Location tab</u>: Enter in the **Number** and **Description** of the unit. If GPS is desired, it will obtain a fix during the 10 minute **Emplacement period**.
    b. <u>Comms tab</u>: Select the **Status Report Interval** using the slider and enter in the Network ID that the unit is to operate on.
    c. <u>Algorithms tab</u>: Select the action desired if a tamper occurs (Figure 2-5).
        i. **Off** (Tamper detection disabled)
        ii. **Report Tamper Only** (Tamper detection sent; unit continues to operate normally)
        iii. **Report and Disable** (Tamper detection sent and unit becomes disabled; unit can be recovered by plugging into the LHCN with a cable to the HHPM)
        iv. **Report and Kill** (Tamper detection is sent and the unit is now rendered useless and non-recoverable; requires recovery and shipment to depot)
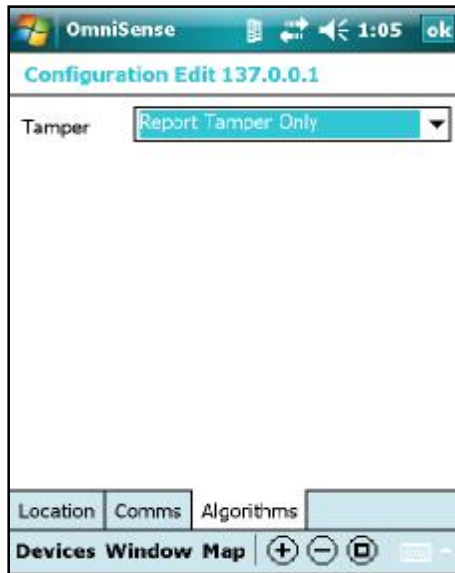
**Figure 2-5: LHCN Configuration Editor
| Algorithms Tab**

9. When finished entering data, using the stylus hit the **OK** button in the upper right hand corner and when asked to **Configure Device?** Select **Yes**. The HHPM will send the configuration to the device, which will respond with its updated configuration. Once verified, select **OK** in the upper right-hand corner, then **No** when asked **Configure Device?**
10. Using the HHPM, select the **Begin Operation** from the **Devices Menu**.
11. A recommended procedure is to request a status from the unit after it has begun normal operations. Once the status has been received, the **LQI** button will display a table indicating RF signal strength of nearby units.
12. Disconnect the HHPM cable from the device if a cable connection is used.

3 iScout® Sensor Set Up

Figure 3-1: Hand Held Programmer Monitor (HHPM) and Wireless Remote Relay (WMR)

The iScout® sensor is set up using a **Wireless Mobile Relay (WMR)** and a **Handheld Programmer Monitor (HHPM)** (Figure 3-1). There are two basic modes of operation for the sensor unit: **Emplacement Mode**, used to configure the sensor and **Normal Mode**, the mode for standard monitoring operations. A third mode, called **Sleep** is a programmable mode that disables the sensor's detection abilities to save power but is only used if programmed by the user.

3.1 Set Up Procedure for iScout® Sensor

It is assumed that the operator is already familiar with the HHPM and WMR (refer to the previous sections) and therefore, only applications specific to the set up of the iScout® sensor will be addressed here.
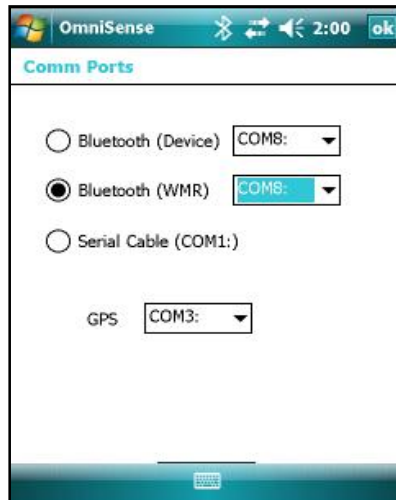
Figure 3-2: Comms Port Window

1. Turn on the WMR by turning the black knob on the top of the device (Figure 3-1).
2. Turn on the HHPM and start the OmniSense® application. Make sure that the HHPM **Communication Preference** (Figure 3-2) is set to **Bluetooth (WMR)**. See Comms Preferences in Section 5.4.2.

Figure 3-3: Window Menu

3. Use the HHPM to find the WMR over the Bluetooth link by selecting **Find** on the **Switch Device option** of the **Window menu** (Figure 3-3). A list of Bluetooth devices that the HHPM detected will be on the list. Select the WMR that is being used for the set up.

Figure 3-4: a. Battery /Switch cover   b. Polarity Markings c. Lithium AA Batteries

4. Refer to Figure 3-4 above. Remove the round **Battery/Switch Cover** by turning it counter-clockwise. Insert two new lithium AA batteries (note polarity markings).

CAUTION: Use two new batteries; DO NOT put in two used batteries or a combination of new and used batteries.

---

5. Put the **Battery/Switch Cover** back over the battery compartment making sure to line up the locking tabs. Rotate the cover clockwise to secure it as shown in Figure 3-4, left.
6. Attach the antenna to the top of the sensor making sure it is finger tight (do not overtighten).

**Figure 3-5: Battery Switch Cover
Rotated to ON Position**

7. Rotate the **Battery/Switch Cover** clockwise to the mark on the case to apply power (Figure 3-5).

**Figure 3-6: PIR Lens Cover
(observe LED indication through
the lens)**

8. Remove the PIR lens cover and observe the LED through the lens (Figure 3-6). For the first twenty seconds it will be solid red. When the sensor completes its internal test the LED will either flash **RED** or **GREEN** and then it will go out.
   a. Flashing red with a pattern of flashing forty times at twice a second, (it will light **RED** twice each second for twenty seconds), indicates that the internal test was successful but that the power-on **Configuration message** was not acknowledged by an HHPM. The unit is functional but the communications link has not been verified. The HHPM settings should be checked to ensure **Bluetooth (WMR)** is selected and that a Bluetooth connection has been verified with a popup message on the HHPM. Also check to make sure that the WMR is completely charged.
   b. Flashing **GREEN** with a pattern of flashing 20 times at once each second, (it lights **GREEN** every second for twenty seconds and then goes out), indicates a successful transmission and receipt of the power-on **Configuration message**.
9. After the LED goes out, the unit should have sent its **Status** and **Configuration messages** to the HHPM. If the sensor is not listed in the **Device List**, the operator cannot communicate with the unit and any configuration attempts will not work. Using the **Discover Devices option** from the **Devices menu**, the HHPM should receive a response from the sensor and populate its **Device List** with the new sensor. The operator can also

wait for the five minute **Configuration Message** (updated location), the ten minute **Configuration Message** (transition to **Normal Mode**), or as a last resort, power cycle the unit to have its power-on **Configuration** and **Status messages** sent to the HHPM again.

10. After powering up, the sensor tries to acquire GPS to update its internal clock to GPS time and to obtain a location fix. Five minutes after power-on, the sensor will send a **Configuration Message** with its location. The HHPM operator can decide to either allow the sensor to update its time and position or mark it using the HHPM's position and time. To allow the sensor to do it automatically, simply set the unit with a view of the sky and allow five minutes for the unit to update its location

11. Configuration options are discussed in Section 5.5.5 and are not duplicated here. Once the decision is made that the configuration is acceptable for that sensor unit, the HHPM operator can **Begin Operations** which forces the sensor to go into **Normal Mode**. All algorithms that are enabled that have transducers attached will report detections. **Tamper** is also enabled by going in to **Normal Mode**. Repeat this procedure for the remaining iScout® sensors that need to be set up.

3.2   iScout® Normal Mode

In **Normal Mode**, configuring the sensor is a three step process. The receiver in the sensor is normally off to conserve power. Therefore,

1) the HHPM must send out a request for **Configuration**.

2) the sensor must send in a report to the HHPM to initiate communications and to allow a return message (configuration request or command) be sent back to the sensor unit.

3) Adjust the configurable settings as desired and then send the configuration to the unit (highlighted on the **Device List**), the message is transmitted and the HHPM waits for acknowledgement that it was received. To facilitate the sensor sending a message to the HHPM, the sensor may be tampered by the user to force a transmission. If it doesn't get the acknowledgement, then it queues up that message in the HHPM. It will be retrieved when that sensor calls in with another report. If the operator does not respond to the **Configuration** sent in by the calling sensor unit (5 minutes to do so), then this process must be started again. In **Normal Mode** the sensor reports detections immediately (a **Tamper** is considered a detection) and **Status** on a programmable interval.

3.3   Sleep Mode

The sensor can be placed in **Sleep Mode** for a configurable period of time (up to 23 hours, 59 minutes and 59 seconds) at a particular time of the day. Section 5.5.5 describes this functionality. This feature is useful in extending the sensor's lifetime through disabling the sensor during a portion of the day when monitoring is not required. For example, monitoring a remote location during normal work hours may require no monitoring until the gates are locked. The sensor could be programmed to **Sleep** during that time of the day that the gates are unlocked. The **Sleep Interval** that is set puts the sensor in this mode each day until the **Sleep Interval** is removed from the table. **Tamper** detections are active during **Sleep Mode**.

3.4 Tamper
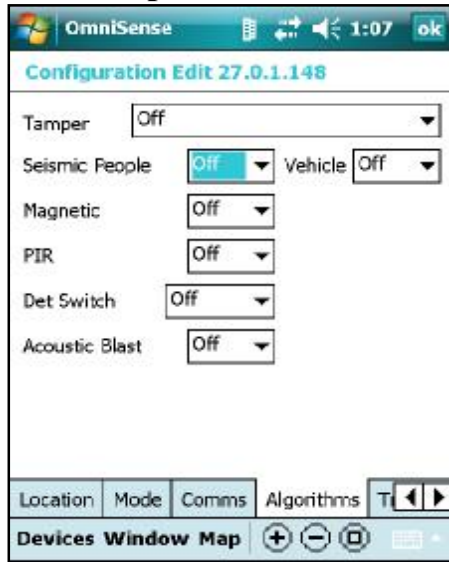
Figure 3-7: HHPM Algorithms Tab

The **Tamper** feature provides three selections:

1. Off: if a tamper is detected, it is ignored and not reported.

2. Tamper and Report: any tamper detected is reported immediately.

3. Tamper and Kill: this feature renders that sensor inoperable.

The three options are selectable using the HHPM in the **Configuration screen | Algorithms Tab** (Figure 3-7). If output switch is not present no other algorithms need to be configured at this time.

4   iScout® Deployment Guidance

The iScout® sensor can be deployed in a variety of settings depending on the monitoring scenario. Some deployment options include:
1.   Direct burial in the ground.
2.   Setting the unit on the ground.
3.   Placing the sensor on a stake that is in the ground.
4.   Locating the unit in a building or a structure.

The iScout sensor can be deployed using the four settings above, but certain modes will not work in certain positions. It is recommended that when using the seismic sensor, the unit be buried using a cable antenna or the stalk antenna sticking out of the ground. If the sensor is not buried, it is highly likely that false alarms will occur frequently. When using the PIR sensor, it is recommended that the sensor be positioned off the ground on a provided stake or on surrounding objects. Attempt to remove all objects that could move in front of the beam and trigger the PIR transducer. The acoustic transducer should be used above ground as well and in the same direction as projected blasts. When the unit is buried, the provided lens cover should be used to cover the PIR window to prevent scratches and the rubber stopper should be placed in the acoustic hole to prevent dirt from clogging it. The magnetic transducer in the sensor can be used above ground or buried. The transducer in the unit can function without having to be raised.

4.1   Using the PIR Sensor

The PIR sensor is a pencil beam that detects a change in the temperature against a relatively stable background thermal level. Sudden changes caused by a target against the stable background cause a detection to be reported.

Ideally, the sensor should be set to stare at an unchanging background to optimize its detection performance. Examples of stable backgrounds include the inside of a building looking across the room at a wall, outside looking at a dense forest slightly below the foliage concentration (minimizing effects of blowing limbs or leaves), in a valley looking at the wall of a hill or mountain, etc.

Placing the sensor on the ground to do a PIR detection increases the possibility of picking up nuisance alarms due to ground cover that may be in the near vicinity of the PIR lens and subject to movement due to wind. If the sensor is to be deployed on the surface, then the unit should be stabilized to prevent it from moving due to wind, and any nearby vegetation that may be directly in the view of the PIR lens should be removed. Placing a sensor on a stake that has already been driven into the ground helps reduce nuisance alarms that may be generated due to wind effects. It is now important to ensure that the sensor base is securely attached to the stake to prevent it from rocking about the inset screw. Additionally, it is important that the stake be firmly driven into the ground and secured prior to attaching the sensor to it.

> **CAUTION: The sensor should never be attached to the stake prior to the stake being pushed or driven into the ground. Significant case damage can occur if the sensor is used to "push" the stake down into the ground.**

If the sensor is going to be buried, it is recommended that the PIR algorithm be turned off during the set up and the lens cover be placed on the sensor.

4.2   Using the Optional Switch Closure Detection and Control Functions

Figure 4-1: iScout® Sensor and Switch Cable

Switch Closure Detection
The **Switch Cable** (Figure 4-1) allows the sensor to be connected to a switch (can be a normally open switch, a normally closed switch, or a toggle switch). The HHPM can then configure the sensor to monitor
  1) A change in state (Open to Close, Close to Open).
  2) Switch Closure.
  3) Switch Open.

CAUTION: Do not apply an external voltage across the Switch Closure Detection Connectors.

This type of monitoring can be used to monitor a pressure mat, a door or window switch to alert the operator to a door or window being opened, etc.

SWITCH CLOSURE CONTROL

iScout(R) Sensor   Customer System

```
                    3      Green              Switch Input
        Switch
Control Closure
        Chip
                    4      Yellow             Switch Output
                    5      White
```
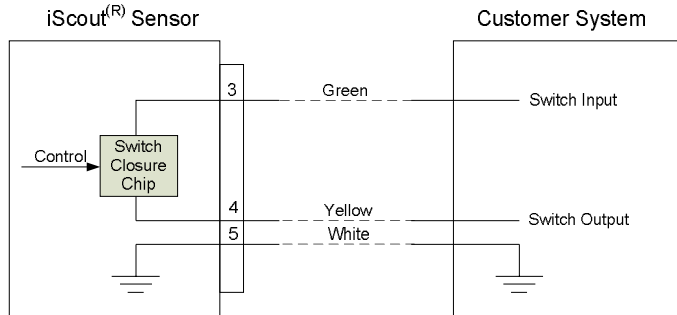
Switch Closure Specifications			
Switch Input Voltage	Min	+1.8	[V]
	Max	+7.0	[V]
Switch Current	Max	0.1	[A]

User Notes:
- **Polarity:** Voltage must always be applied to Switch Input. Applying voltage to Switch Output can result in damage to the switch closure chip.
- **Switch Current:** The user must limit the switch to within the specified current ratings to prevent damage to the switch closure chip.

SWITCH CLOSURE DETECT

iScout(R) Sensor   Customer System

```
                1      Red
Detect

                2      Black
```
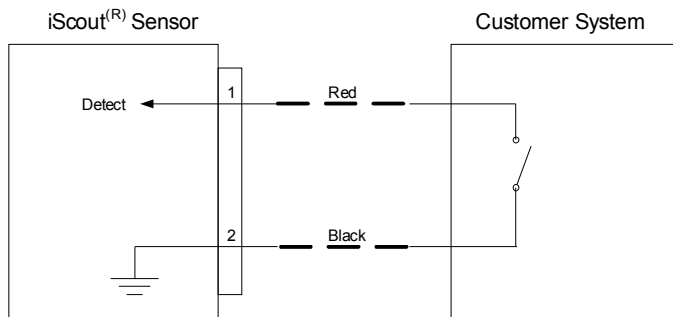
User Notes:
- Do not apply voltage to either of the wires.
- If not using switch closure detect feature, isolate bare copper wires to prevent damage to the sensor.

Figure 4-2: Switch closure Specifications and Usage Guidelines

Switch Closure Control
The Switch Cable also allows the sensor to be connected to another device and provides both a DC voltage and current to turn on or turn off the device. This active closure control must meet the Closure Control Chip requirements for voltage and current. It is possible to damage this Closure Control Chip in the iScout unit by reversing the voltage polarity shown in Figure 4-2.

CAUTION: **Do not apply a reverse voltage polarity on the closure control wires.**

4.3   Seismic Algorithms
The seismic portion of the unit is an internal geophone that detects energy levels in the surrounding area and differentiates between vehicles and people. In order to get the most accurate performance from the seismic transducer, the sensor should always be buried. If the sensor is not buried, the noise from different sources including wind can cause frequent false alarms. The operator has the ability to enable and disable seismic people as well as the seismic vehicle using the HHPM. The operator can select one of four different sensitivity levels for the seismic algorithm. Four bars is the most sensitive and one bar is the least sensitive.

NOTE: **The sensor should be buried in order for the seismic algorithm to work properly.**

4.4   Magnetic Algorithms
The magnetic portion of the unit is an internal magnetometer that detects magnetic levels in the surrounding area and monitors for a change in the amplitude against a relatively stable background level. These sudden changes caused by a target against the stable background causes a detection to be reported. In order to get the most accurate performance from the magnetic transducer, the sensor should be positioned upright and parallel to the line that targets will be passing. The operator has the ability to enable and disable the magnetometer using the HHPM.

4.5   Acoustic Blast Algorithms
The acoustic blast portion of the unit is an internal microphone that detects impulses in the surrounding area and monitors for a change in the amplitude against a relatively stable background level. These large impulses caused by a target against the established levels cause a detection to be reported. In order to get the most accurate performance from the acoustic transducer, the sensor should be positioned in the direction of the sound in an area being monitored. The operator has the ability to enable and disable the acoustic blast using the HHPM. The operator can select one of two sensitivity levels. In future releases, different types of acoustic algorithms will be available for the operator to enable.

CAUTION: **When the sensor is buried a plug is included for the microphone port to seal it against water penetration. This plug must be used to prevent water damage when the sensor is buried.**

5 Hand-Held Program Monitor (HHPM) User Guide

5.1 Primary Operations

5.1.1 Aligning the Touch Screen

When the HHPM first turns on (or after a hard reset) the touch screen will require calibration. The **Align Screen message** will display a series of targets to tap in sequence on the screen. Use the stylus to tap the targets firmly and accurately. Sometimes you need to perform the alignment procedure more than once to provide a satisfactory alignment. You can start the alignment process by going to **Settings** / **Screen** / **Align Screen**.

5.1.2 Power Key Features

The **Power key** turns the unit on and off and performs a number of other functions:

Turn Backlight On/Off

To toggle the backlight on or off, hold down the **Power key** for approximately one second. Once toggled off, the backlight will stay off until it is toggled back on. Screen taps and presses will not cause it to turn back on.

> **NOTE: Manually turning the backlight off disables auto turn on with screen taps or button presses until the backlight is manually turned back on or the HHPM is turned off and back on.**

Power Menu
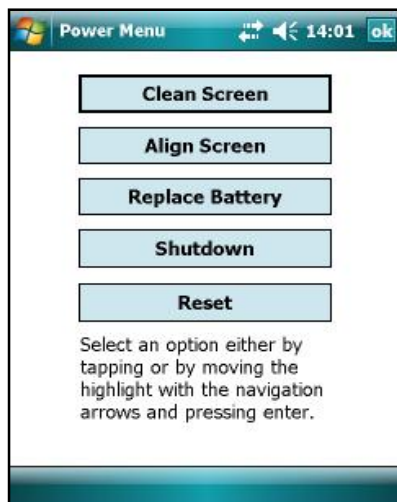
Figure 5-1: Power Menu

Hold down the **Power key** for about three seconds to display a countdown. Continuing to press the **Power key** will cause a reset when the countdown reaches zero. If you release the **Power key** while the countdown is proceeding you access the **Power Menu** (Figure 5-1). Tap an option or **OK** to exit.

Clean Screen: Disables the touchscreen for cleaning. Press the enter key to re-enable the touchscreen.
Align Screen: Repeats the alignment procedure.
Replace Battery: Ensures that alarms will not wake up the unit while changing the battery.
Shutdown: Intended for use if the unit is going to be placed in long term storage. This option puts the unit in its lowest power mode. Running application state, unsaved data, and real-time clock settings will be lost. Internal GPS parameters will be reset to their default settings. To take the unit out of the shutdown mode, press the power key and the unit will boot up.

> **NOTE: While in shutdown mode the battery LED does not work but if the AC adapter is plugged in, it will still charge.**

Reset: Stops all running programs and restarts the unit. No file system data is lost; only open or unsaved files will be lost. All registry settings, control panel, personal information, GPS settings and databases are preserved.

5.1.3 Using the Stylus

The touch screen on the HHPM works like a PC mouse. The stylus is found in a holder on the back of the HHPM and is used to navigate and select objects on the screen. Use the stylus in the following ways:

Tap: Tap the screen with the stylus to select or open an item.
Touch and hold: When the stylus is used in this way, a circle of red dots appears around the stylus to indicate that a pop-up menu will soon appear.
Drag: Hold the stylus on the screen and drag across the screen to select text and images. Drag in a list to select multiple items.

NOTE: DO NOT use the screwdriver part of the stylus on the touchscreen because it will scratch the screen. Only use the spring-tip end of the stylus on the screen.

HHPM Keyboards

Figure 5-2: Keyboard Icon

The HHPM uses Windows CE keyboards.
To access them, tap the keyboard icon at the bottom of the screen (Figure 5-2). This will display the Windows CE alphabetic keyboard. Tap the **123 button** at the top left of the Alphabetic keyboard to display the Numerical keyboard (Figure 5-3).

Figure 5-3: Windows Alphabetic and Numeric Keyboards

To select a number or letter, use the stylus to tap the character. When you are finished, tap the bottom keyboard icon to close the keyboard.

Performing a Clean Boot

> **WARNING: All application software (installed by the factory and the customer), licenses, settings and user data will be cleared if you perform this function!**

Hold down the **Power key** and press the right soft key ⬛ to display a countdown. Continue to hold **both** keys until the countdown reaches zero, followed by a brief appearance of a boot screen. Continue to hold down both keys until a screen appears warning that if you continue, this operation will clear the persistent store. Follow the instructions on the screen ONLY if you want to completely clear your unit.

> **NOTE: Installed GPS applications will need to be reinstalled, but certain configuration parameters of the internal GPS receiver (baud, parity, etc.) will remain unchanged.**

Notification LEDs

Figure 5-4: Battery Status and Notification LEDs

At the top of the unit are two LEDs that provide status information (Figure 5-4). The LED states are described in the following table.

LED	COLOR	FUNCTION
Battery Status	Off	On battery power
	Solid Yellow	Charging on AC adapter
	Solid Green	Fully charged on AC adapter
	Blinking Yellow	Battery problem during charging (temperature out of range, defective or missing battery)
Notification	Off	No notifications
	Blinking	Appointment/task due

Table 1: Notification LEDs

5.1.4 GPS

The iScout® HHPM is configured with internal GPS and the OmniSense® software that it runs is GPS-aware. You can turn the GPS receiver on or off using the OmniSense® software (see Section 5.4.7).

5.2   Settings on Your HHPM
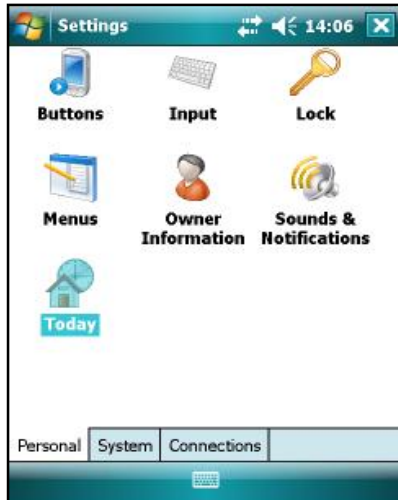
Tap **Start** / **Settings** to display the **Nomad Settings Screen** (Figure 5-5). Tap any of the icons on the **Personal**, **System** or **Connections tabs** to customize the unit settings to your own preferences. Tap **OK** to exit the settings. The settings that are important for the operation of the OmniSense® software are described below.

Figure 5-5: Nomad Settings Screen

5.2.1 Backlight for Display and Keypad
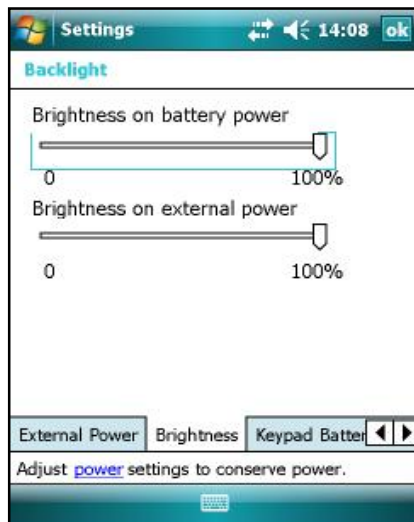
Tap **System | Backlight** to display the **Settings | Backlight screen** (Figure 5-6). Scroll through the menu tabs at the bottom of the screen and change the settings as follows:

Display Backlight: The default is **On**. Tap **Battery Power**, E**xternal Power**, and **Brightness tabs** to change settings.

Keypad Backlight: The default is **Off**. Tap the arrows to scroll over to **Keypad Battery**, **Keypad External** and **Keypad Brightness** tabs to change settings.

Figure 5-6: Settings | Backlight

5.2.2 Clock Settings

To set the time or to change clock settings, choose the **System tab** and then the options called **Clocks and Alarms**. The HHPM will display the **Settings | Time screen** (Figure 5-7).

Figure 5-7: Settings | Time Screen

5.2.3 Power

Tap **System | Power** to display the **Settings | Power screen** (Figure 5-8). Here, you can view the approximate battery power remaining. Tap the **Advanced tab** and choose the settings for automatically turning off the unit when not in use.

Tap **System | Power | Calibration** to see if the message reads "Calibration recommended" or "Calibration not necessary."

Figure 5-8: Settings | Power Screen

5.2.4 Memory

Tap **System | Memory** to display the **Settings Memory screen** (Figure 5-9), to see how much Storage memory (Flash) and Program memory.
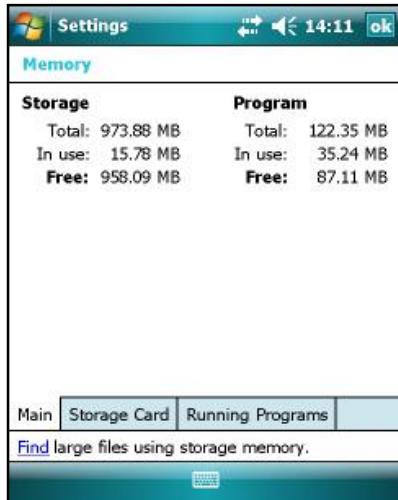
Figure 5-9: Settings | Memory Screen

5.2.5 System Information

Tap **System | System Information** to display the **Settings | System Information screen** (Figure 5-10). Information that can be found here includes firmware version, serial number, processor speed, RAM and Flash size, plus battery and card port information.

Figure 5-10: Settings | System Information Screen

5.2.6 Volume

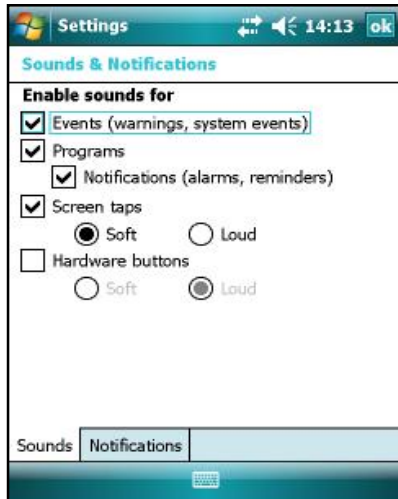To adjust the volume, select the **Personal tab** and tap **Sounds and Notifications**. The **Settings | Sounds and Notifications screen** (Figure 5-11) will be displayed. To run the OmniSense® HHPM software, choose your desired settings for hardware buttons, screen taps and events. If you choose to enable these sounds, select **Soft** or **Loud** for the volume. Be sure to enable the sounds for **Programs** and **Notifications** on this screen. You can turn these sounds off using the HHPM software.

Figure 5-11: Settings | Sounds and Notifications Screen

NOTE: If you do not enable the Programs sounds option on this screen, the HHPM software sounds will not be heard regardless of HHPM settings.

5.3   Quick Start

This Section provides you with overview information so that you can begin using the HHPM right away.

5.3.1 Creating and Using a Map

Maps on the HHPM are saved in the My Documents folder as GPS files. The GPS map file must first be created. Map files are created by adding layers then simply saving the map. Layers can be ESRI shape files (SHP), JPEG files (JPG), or Windows Bitmap files (BMP). The shape file must include the SHP, SHX, and DBF files. Both the JPG and the BMP file must include the associated world file. For JPG the world file is JPW and for BMP the world file is BPW. Many mapping applications, including the OmniSense SAD, save the world file when exporting a map. All layers must first be installed on the HHPM in the *My Docume*nts folder. The *My Documents* folder can either be on the device or on a storage card.

5.3.1.1 Creating a Map

**Figure 5-12: Map Menu | Add Layer (left) and Open File
Screen (right)**

To create a map, first add a layer. Tap the **Map menu** and select **Add Layer**. The **Open File
screen** will list all SHP files in the *My Documents* folder. To view JPG or BMP files select the
type from the **Type drop down menu** (Figure 5-12, right).

To save the map, tap the **Map menu** and select **Save Map**. The following example (Figure
5-13) shows a Virginia SHP file was selected and saved to a GPS file named "mcq". When the
HHPM is restarted, the last map saved with the current zoom is displayed. Sensors are
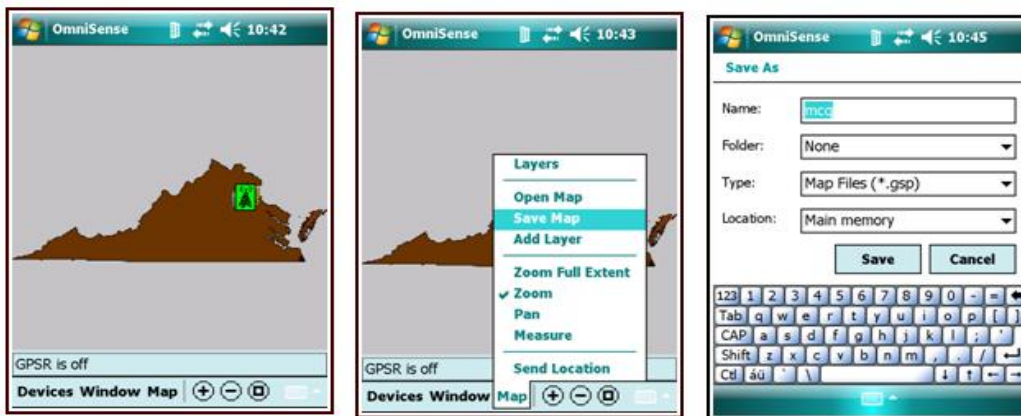geographically displayed on the map.

Figure 5-13: HHPM Map Screen (left), Map Menu (center) and Save As Screen (right)

5.3.2 Sensor Map

Figure 5-14: Sensor Map

When turned on, the HHPM will display the Sensor Map, along with the sensors currently reporting to the database (Figure 5-14).

5.3.3 Navigating the Map

With the map you can **zoom**, **pan** and **measure distances**. To **zoom in** tap ⊕. To **zoom out** tap ⊖ . To **zoom to the full extent** of the map tap ⊚ or tap the **Map menu** and select **Zoom Full Extent**. The other three **Map menu options** (Zoom, Pan, Measure) are modes to interpret the stylus. When *Zoom* is checked you can zoom in with the stylus by stretching a box from upper-left to lower-right. A box in the other direction will zoom out.

When *Pan* is checked you can pan the map by dragging the stylus across the screen. When *Measure* is checked dragging the stylus shows the distance between two points.

Moving Using the Map Menu
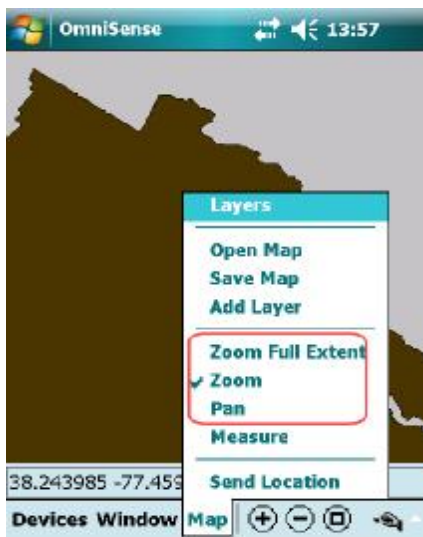
Figure 5-15: Map Menu Options

Tap **Map** at the bottom of the screen to display the **Map Menu** (Figure 5-15).

Zoom Full Extent

This option zooms the display out to the widest view of the map.

Zoom

To use this feature, draw a diagonal box from bottom right to top left to zoom out and from top left to bottom right to zoom in. This feature will remain active until you uncheck the **Zoom option**.

Pan

To use this feature, use the stylus to drag the desired section of the map into the viewing area. This feature will remain active until you uncheck the **Pan option**.

5.3.4 Using Sensors

All sensor functionality can be accessed via the Devices menu. First, highlight the desired sensor on the map then use the **Devices** menu to access sensor options.

The actual functions and selections available to you will depend on your security credentials for the device as setup by the OmniSense® administrator.

5.3.5 Further Information

For further details on sensors, maps and other functionality, refer to the full instructions below.

Figure 5-16: Window Menu

5.4 Window Menu

Select the **Window button** at the bottom of the screen to display the **Window menu** (Figure 5-16).

5.4.1 Window Menu: Legend

The HHPM **Legend Screen** (Figure 5-17) provides a key to sensor icons displayed on the **Sensor Map**. This screen can be accessed by selecting the **Legend option** on the **Window menu**. To close the **Legend Screen**, tap on the **OK button** at the top right of the screen.

Figure 5-17: Legend Screen

5.4.2 Window Menu: Preferences

Selecting the **Preferences option** displays the **Preferences menu** (Figure 5-18).
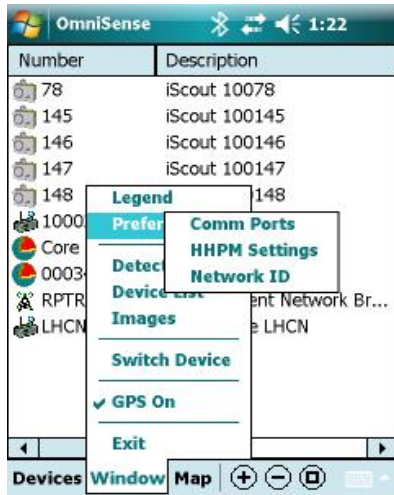
Figure 5-18: Preferences Menu
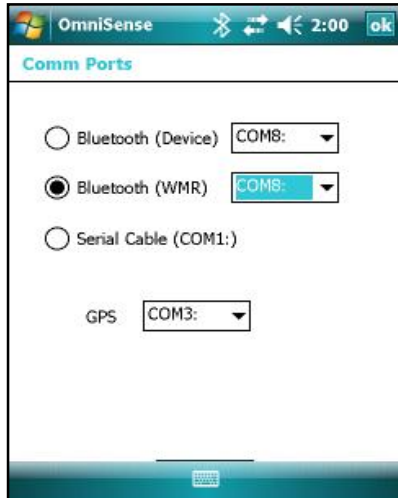
Figure 5-19: Comms Port Window

Preferences: Comm Ports

The HHPM **Comms Port Window** (Figure 5-19) allows you to set the communications method and port settings.

Bluetooth (Device): Use this option to communicate with the sensor directly via Bluetooth. This option is not available with the iScout® System.

Bluetooth (WMR): Use this option to communicate with the sensor using Bluetooth via a **Wireless Mobile Relay**. Set the **Comm Port** at 8 or 9.

Serial Cable: Use this option when plugging the HHPM into a sensor.

GPS: Set the GPS **Comm Port** to COM2.

Preferences: HHPM Settings
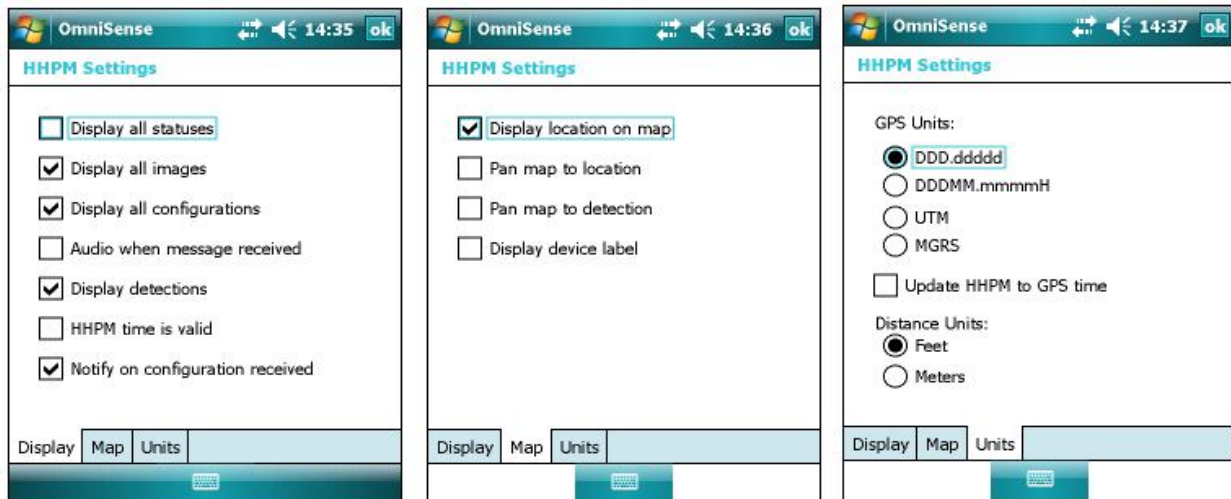
Figure 5-20: HHPM Settings Preferences

The HHPM **Setting Preferences window** (Figure 5-20) allows the user to configure a variety of options. This configuration will be saved by the HHPM until reconfigured by the user. There are three tabs: one for **Display preferences**, one for **Map preferences** and the other for **Unit preferences**. The options on each tab are described below.

Display Tab

Display All Statuses

If checked the HHPM will automatically display all status messages received from any sensor. If unchecked only the requested status messages will be displayed.

Display All Images

If checked the HHPM will automatically display all images received from any sensor. If unchecked only the requested images will be displayed.

Display All Configurations

If checked the HHPM will automatically display all configurations received from any sensor. If unchecked only the requested configurations will be displayed.

Audio When Message Received

If this box is checked, all incoming messages prompt the HHPM audibly alert the user. If the box is unchecked there will be no audible alert.

NOTE: This setting does not affect audible detection alerts.

Display Detections

If this box is checked, a detection bubble containing data about the detection will be displayed any time a sensor makes a detection. If the box is unchecked the detection bubble will not be displayed but the detection data will still be added to the **Detection List**.

HHPM Time is Valid

By checking this box you are confirming that the HHPM's time corresponds to that of an accurate time source. If the box is checked, the HHPM will send the time with all configurations. This box is always unchecked when you start the HHPM regardless of how it was set during the previous session.

Notify on Configuration Received

If this box is checked the user will be alerted if a new configuration is received while the current configuration is being edited. If the box is not checked the user will not be alerted.

Map Tab

Display Location on Map

Displays the location in the selected units in a status bar at the bottom of the map. This status bar will not be present if the box is unchecked but the **Current Location Icon** will appear on the map.

Pan Map to Location

If this box is checked the map will be displayed so that the **Current Location Icon** will be in the center.
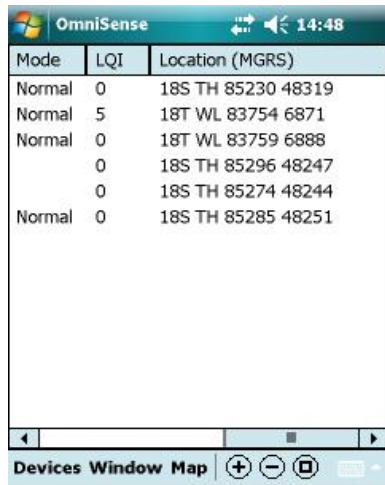
Pan Map to Detection

If this box is checked the map will automatically pan to any sensor that makes a detection. The map will not pan if the box is unchecked.

Display Device Label

When checked this option displays the device number on map display. If unchecked, the number will not be displayed.

Units Tab

Figure 5-21: MGRS Display

GPS Units

Four options are given. The first option displays the GPS reading in decimal degrees. The second, in degrees, minutes and hemisphere. The third as Universal Transverse Mercater. The fourth as MGRS (Military Grid Reference System) as in Figure 5-21. The GPS data in the units of your choice will be displayed on the **Status Bar**, in the **Location Tab** and in the **Device List**.

Update HHPM to GPS Time

If this box is checked the HHPM clock will be automatically updated to reflect the GPS time. If the box is unchecked the time will not be updated.

Distance Units

Select **Feet** or **Meters**. The unit you choose will be used on the **Status Bar**, the **Location Tab** and will be displayed on the map when the HHPM is in **Measure Mode**.

5.4.3 Window Menu: Detections

The **Detections option** displays a list of detections received from the sensors. Each detection entry includes **Date**, **Time**, **Device Number** and **Detection** by type. If you hold the stylus on the screen you will display the **Clear All option**. Continuing to hold the stylus on the screen will clear all detections from the list.

5.4.4 Window Menu: Device List
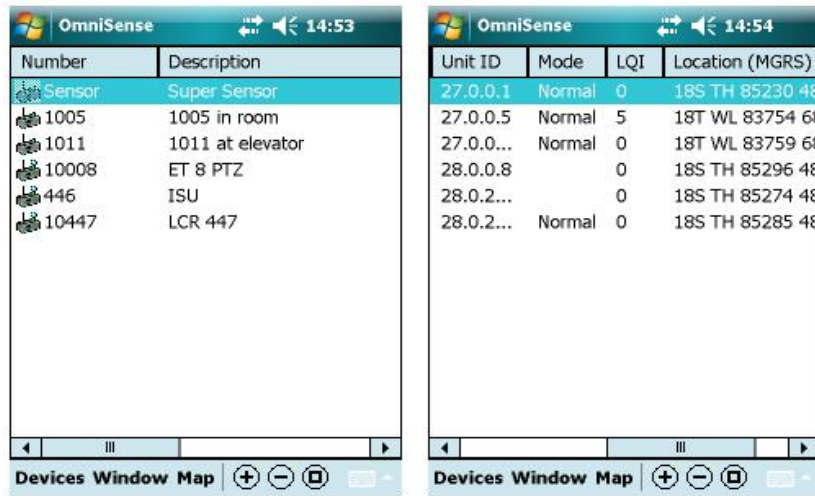
Figure 5-22: Device List Left and Right Screens

The **Device List option** displays the **Device List** (Figure 5-22), a list of the devices in the current sensor field. Each device is described by the following characteristics: number, description, unit ID, mode, Link Quality Indicator (LQI), latitude and longitude.

The data in the **Device List** may be arranged in ascending order with respect to number, description or label. To sort, tap on the desired heading. An item can be selected from the **Device List** by tapping on it. It can then be commanded and configured using the **Device menu**.

5.4.5 Window Menu: Images

Figure 5-23: Current Image Screen

The iScout® is not configured with this option so a blank screen will be displayed (Figure 5-23).

5.4.6 Window Menu: Switch Sensor

This option is available in local comms mode (Bluetooth). It allows you to switch to a different sensor.

5.4.7 Window Menu: GPS On

If this option is checked, the HHPM GPS capabilities are turned on. Unchecking the option turns them off.

5.4.8 Window Menu: Exit

This option closes the HHPM program. Use the **Exit option** to shut down the HHPM.
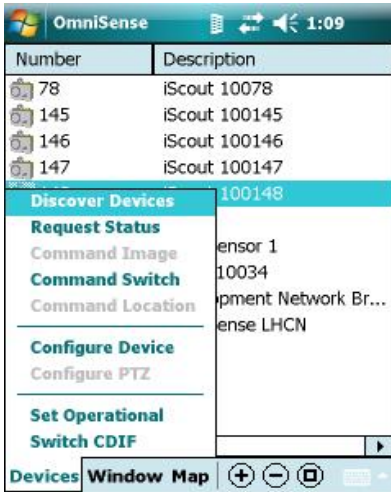
Figure 5-24: Devices Menu

5.5 Devices Menu

Selecting the **Devices button** generates the **Devices menu** (Figure 5-24). The options that are available on this menu depend on what type of device you are working with.

5.5.1 Devices Menu: Discover Devices

This option sends a configuration request to any devices that the HHPM can communicate with. Any devices that respond will appear in the **Device List**.

5.5.2 Devices Menu: Request Status

This option displays the **Device Status window** (Figure 5-25). This window displays the current status of the device that you currently have highlighted on the **Sensor Map** or in the **Device List**. The **Time** and **Date** of the status message is displayed at the top right of the window.
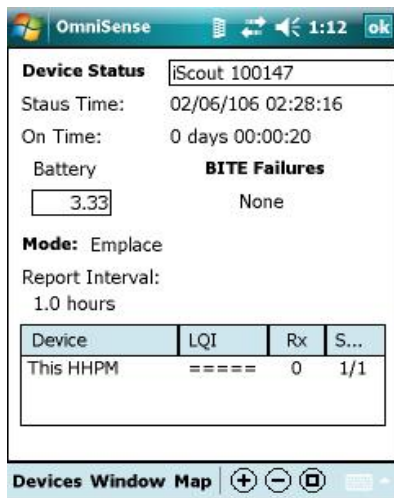
Figure 5-25: Device Status Window

Device Name

This is the user-assigned name of the highlighted device.

Status Time

The date and time that the displayed status data was taken.

On Time

This time represents the length of time that the device has been continuously powered on without being reset.

Battery

This number represents the battery voltage at the time of the status message. Acceptable battery voltage falls within the range of 2.8 to 3.4 VDC.

BITE Failures

Displays the results of the last GPS, Local Communications and Extended Communications tests.
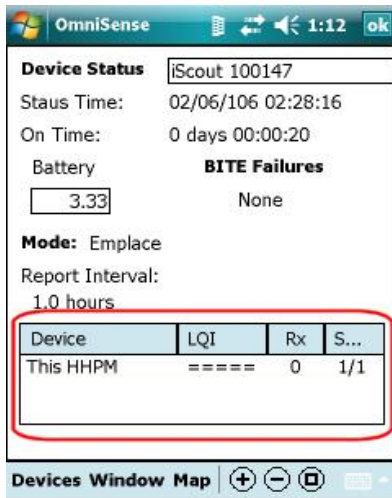
Mode

The current sensor mode.

Report Interval

This number shows how often the device sends a status report. You have to configure the sensor to modify this value.

Communication Statuses

Figure 5-26: Device Status Window | Communications Status Table

The **Communications Status Table** on the **Device Status** window (Figure 5-26) shows the metrics of the communications quality between the device that you currently have selected and up to five devices that the currently selected device has heard from.

The first column lists the **Device** that has communicated with your selected sensor.

The second column shows the **Link Quality Indicator (LQI)**. This indicator is represented as 0 to 5 bars.

The third column (**Rx)** shows the number of packets correctly received from the **Device ID** listed to your currently selected device.

The final column (**Succ/Att**) represents the number of successful transmissions versus the number of transmission attempts between the two devices.

5.5.3 Devices Menu: Command Image

The **Command Image** option is not available on this system at this time.

5.5.4 Devices Menu: Command Switch
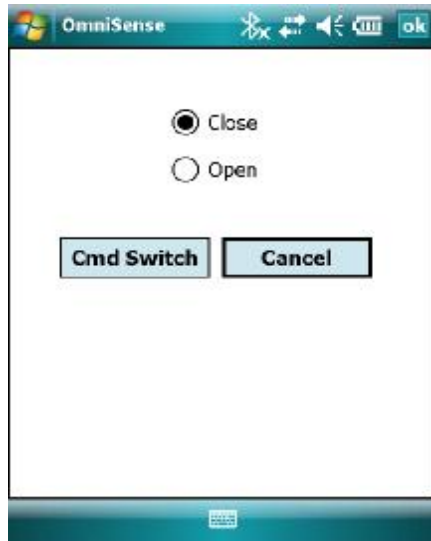
Figure 5-27: Command Switch Screen

Command Switch option display the **Command Switch screen** (Figure 5-27) and allows you to set the output switch state. The state that is shown on the **Command Switch screen** is the *opposite* of the currently known switch state. To change the switch state, tap the **Cmd Switch button** and then the **OK button**. See Section 4.2 for more information about Switch Closure capabilities.

5.5.5 Devices Menu: Configure Device

Selecting this option commands the device to report its current configuration. The configuration will be displayed in screens identical to those described in Section 0 below.

Location

The **Number** and **Description** are assigned to the device by the user and can be modified on the **Location Panel** (Figure 5-28). Both fields accept alphanumeric data

The **Latitude, Longitude** and **Altitude** of the device can be changed by typing in a new value or by using GPS readings. To use GPS, position the HHPM so the current **Latitude**, **Longitude** and **Altitude** values reflect the location of the device then tap the **Mark button**. The GPS fix will be placed in the **Latitude**, **Longitude** and **Altitude** boxes. The **Send button** will automatically be checked so that the location is sent to the sensor. If you do not want to send the GPS location to the sensor, uncheck the **Send box**.

Figure 5-28: HHPM Location Panel

If the HHPM does not have a GPS fix the **Mark button** will be greyed out (Figure 5-29).
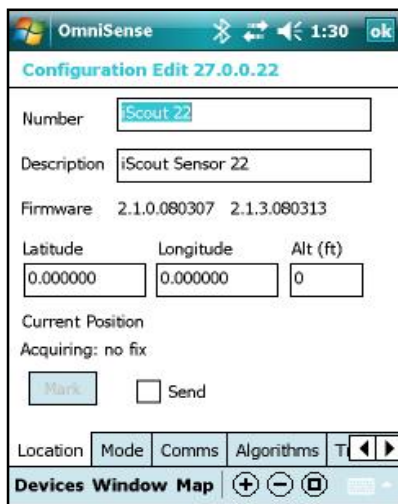
Figure 5-29: Mark Button | No GPS Fix
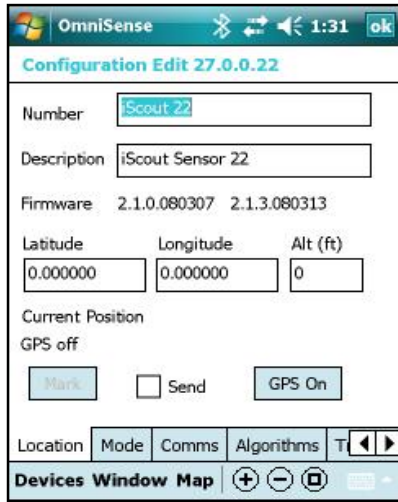
Figure 5-30: HHPM Location Panel with GPS Off

If GPS is currently turned off, a message will be displayed under **Current Position** (Figure 5-30). Use the **GPS On button** to turn GPS on.
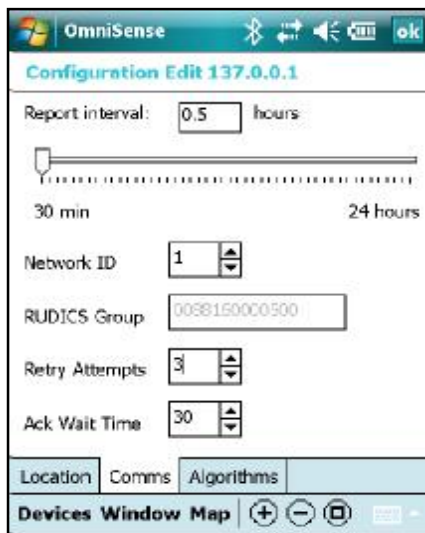
Figure 5-31: HHPM Comms Panel

Configuring Comms

The **Comms Panel** (Figure 5-31) allows you to set communications parameters.

Report Interval

The slider bar at the bottom of the screen allows the user to change the time interval between device status reports

Network ID

Set the local communications network channel to the same channel as the LHCN that the device will use.

Transducers

Upon set up in the field, the device automatically detects all transducers that it has connected and sends this information to the HHPM when requested. The data appears on the HHPM **Transducers Panel** (Figure 5-32) but is not configurable.

Figure 5-32: HHPM Transducers Panel

Algorithms

You can configure the algorithms used by the device to analyze detection data. Figure 5-33 shows the HHPM **Algorithms Panel**. Some algorithms allow you to set a sensitivity level (= or = =), others are simply on or off. **Det Switch** and **Tamper** algorithms have drop down menus described below. Select the desired option for the algorithm using the drop down menu.

Det Switch represents the algorithms for the optional input switch to the sensor. You are presented with four algorithm options:
1. **Off**: disables the switch algorithm.
2. **Change**: commands the sensor to send a detection upon a change in switch state.
3. **Open**: commands the sensor to send a detection if the external switch has opened.
4. **Close**: commands the sensor to send a detection if the external switch has closed.

Figure 5-33: HHPM Algorithms Panel

If you select the **Tamper** algorithm, you will be asked to choose a tamper response from the following list:
1. **Off**: the device will not report when tampered.
2. **Report Tamper Only**: the device will report the tamper detection to the SADU.
3. **Report and Kill Sensor**: the device will report the tamper detection to the SADU and then will be killed. This means that it must be returned to McQ Inc. for reconfiguration.
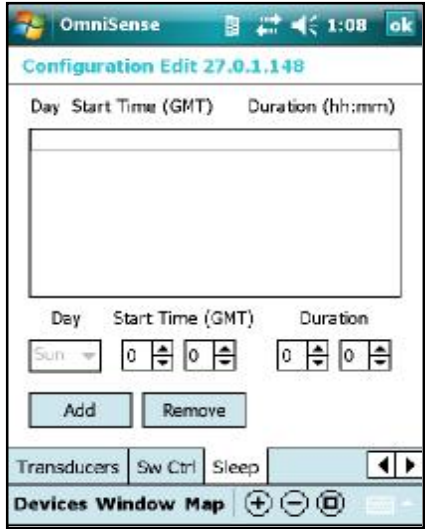
Figure 5-34: HHPM Sleep Panel

Sleep

The **Sleep Panel** (Figure 5-34) allows you to set **Sleep Mode** intervals for the selected device.

First, specify the day for the **Sleep Interval** using the **Day menu**.

Next, specify the endpoints of the **Sleep Mode** period for that day by setting the **Start Time** (in GMT) and the **Duration** (in hours and minutes) of the **Sleep Mode** period. Tap the **Add button** to add the new **Sleep Mode** interval to the device's sleep schedule. Repeat the process to create another interval on the same day or on a new day.

To delete a particular sleep interval from the device's sleep schedule, select it and tap the **Delete button**.

The **Sleep Schedule** will repeat weekly as configured by the user.

NOTE: The device will remain in Sleep Mode as configured by the user. It cannot be awakened ahead of schedule except by reconnecting the battery pack in the field.

5.5.6 Devices Menu: Configure PTZ
The iScout® system is not configured for this option at this time.

5.5.7 Devices Menu: Set Operational

Figure 5-35: Begin Operation Confirmation

Use the **Set Operational option** (Figure 5-35) to switch the sensor from **Emplacement Mode** to **Normal Mode**. This action will begin sensor operation with the characteristics that you have configured.

NOTE: If you forget to switch the sensor mode, the sensor will switch automatically after 10 minutes.

5.5.8 Devices Menu: Switch CDIF

Use this option to switch to a different version of Common Data Interchange Format (CDIF). This action is necessary in order to communicate with older sensors.
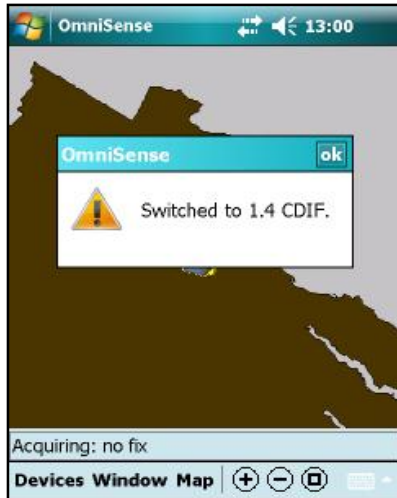
Figure 5-36: Switch CDIF Message

6 Technical Support

6.1 Maintenance

In general, only minor maintenance will be routinely required on iScout components. Typical field maintenance will include changing the batteries and cleaning the PIR lens. There are no user serviceable parts within the electronics. When service on these units is required, these units should be returned to McQ for repair and/or replacement. Training will be provided to allow personnel to use the Built In Test Equipment and unit diagnostics to determine when a system requires maintenance.

6.2 Training

McQ will provide both introductory and advanced level training on the iScout system and its components when the system is delivered. For some customers, McQ trains government trainers who then train the sensor installation and operation teams. This training will enable the users to successfully deploy and operate all of the components of the system. Additional training can be offered under a support contract at times and at a frequency deemed necessary by the customer. In general, the iScout system is designed to be as intuitive as possible and to require only minimal training. All customers are provided with this user's manual providing an overview of system operation and the basic steps necessary to operate and use the system.

6.3 Installation

In general, trained users will not require factory assistance in installations. However, when assistance is desired for either technical or operational reasons, McQ can provide such assistance under a support contract with virtually any type of field installation. This manual includes an iScout Sensor Installation Guide. This guide gives detailed instructions on setting up a system.

6.4 Configuration Management and Program Support

As the number of iScout sensors and other systems expands, the customer may need additional support in tracking and recording the configuration and distribution of all iScout assets. McQ can assist the customer under a support contract by keeping a detailed record of asset status and distribution. This information can be available along with additional support to the customer for all iScout system technical and operational issues.

6.5 Contact Information

Technical Support

McQ will provide technical support during normal business hours 8:00 am to 5:00 pm EST) via the company phone (540.373.2374/866.373.2374) and via E-mail (support@mcqinc.com). After hours the phone will be answered by a service and the user needs to identify "iScout Support" to the service representative to ensure the user is routed to the correct McQ support person. The service representative will have the user provide a telephone number for McQ technical support staff to call. The user needs to identify the urgency of the support response.

Warranty Support

When returning iScout units under warranty, the user will call the technical support number shown above or send an E-mail describing what warranty support is needed. The McQ representative will give the user specific handling instructions.

7 End Users License Agreement

CAREFULLY READ THE FOLLOWING LICENSE AGREEMENT. BY USING THIS EQUIPMENT AND/OR SOFTWARE IN ANY WAY, YOU AND YOUR COMPANY ACKNOWLEDGE THAT YOU HAVE READ THIS AGREEMENT, UNDERSTAND IT, AND ARE AGREEING TO BE BOUND BY THE TERMS AND CONDITIONS OF THIS AGREEMENT.

IF YOU DO NOT CONSENT TO THIS AGREEMENT, THEN DO NOT USE THE EQUIPMENT, SOFTWARE, OR MANUAL. PROMPTLY CONTACT MCQ INC.

1. LICENSE GRANT
The computer programs and algorithms, and any portion thereof, (or "Software") and the related explanatory written materials (or "Documentation"), whether provided independently or loaded onto processors, equipment, sensors, or other media, or components (or "equipment") delivered by McQ Inc, is licensed – not sold – to you by McQ Inc (or "McQ"). Subject to the terms and conditions of this Agreement, McQ hereby grants to you a nonexclusive license to use one copy of the Software on any single computer, such that the Software is in use on only one computer operated by only one person at any time. The Software is "in use" on a computer when it is loaded or installed into the temporary or permanent memory of a computer or other storage device or media. "You" or "you" means the person, company, or other entity that is being licensed to use the Software or Documentation.   You may own the computer or the media on which the Software is provided, but the Software is owned and copyrighted by McQ.

In the event that you have purchased from McQ any upgrades, modifications, updates, additions, or other copies of the Software, then "Software" shall be deemed to include such upgrades, modifications, updates, additions, or other copies.

2. TITLE
All rights not specifically granted to you in this Agreement are reserved by McQ.   Apart from the rights enumerated herein, this Agreement does not grant you any right to engage in any other activity with the Software, to enjoy any ownership right, title, or interest, nor to place any security interest or other interest in any intellectual property relating to the Software or the Documentation. McQ reserves all right, title, and ownership interest to the Software and Documentation, and all rights not expressly granted to you in this Agreement.

3. ARCHIVAL OR BACKUP COPIES
You may either: (a) make one copy of the Software, solely for backup or archival purposes; or (b) make one copy of the Software onto a single hard disk, provided you keep the original solely for backup or archival purposes.

4. THINGS YOU MAY NOT DO
The Software and Documentation contain trade secrets or other proprietary information of McQ, and are protected by state and federal trade secret laws. In addition, the Software is protected by United States copyright laws and international treaties. You agree to respect all applicable copyright and trade secret laws.

The Software and Documentation contain trade secrets or other proprietary information of McQ, and are protected by state and federal trade secret laws. In addition, the Software is protected by United States copyright laws and international treaties. You agree to respect all applicable copyright and trade secret laws.

You agree that you shall not, by way of example and not limitation:

(a) copy the Documentation;
(b) copy the Software, except as permitted in Section 3;
(c) create derivative works, modify, alter, transform, translate, tamper, or adapt the Software or Documentation, or merge the Software into another program;
(d) reverse engineer, disassemble, decompile, or make any attempt to discover or gain access to the source code of the Software;
(e) place the Software onto a processor or server so that it is accessible to any third party, or any public network, such as the Internet;
(f) sublicense, rent, lease, or lend any portion of the Software or Documentation; and
(g) remove, obliterate, or cancel from view any patent, copyright, trademark, or confidentiality notice or legend appearing in connection with the Software, its media, the Documentation or output generated by the Software.

You agree to transfer to McQ all intellectual property and ownership rights for any version created from the unauthorized modification or adaptation of this Software, including versions created from the translation and/or reverse engineering of the Software

5. TRANSFERS
As noted above, you may not sublicense the Software. You may, however, transfer or assign ALL of your rights to use the Software and Documentation to one (and only one) other person or legal entity, provided that they agree to all the terms and conditions of this Agreement, and that you transfer to such person a copy of this Agreement, the Software and Documentation (including any backup copy made under Section 3), and all updates or prior versions.

If you so transfer the Software, then you agree to retain no copies of the Software or Documentation, including copies stored on any computer or media.

6. LIMITED WARRANTY

McQ warrants that for a period of one (1) year after delivery of this copy of the Software to you the physical media, if any, on which your copy of the Software is distributed will be free from defects in materials and workmanship under normal use, and during that one (1) year the Software will perform in substantial accordance with the Documentation. Notwithstanding the foregoing, this Agreement makes no representation or warranty concerning any equipment or any other deliverable or performance of McQ. The foregoing express, limited warranty is in lieu of all other warranties.

THE SOFTWARE AND SUPPORTING DOCUMENTATION IS PROVIDED "AS IS" WITHOUT ANY OTHER WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED. McQ DISCLAIMS ANY AND ALL OTHER WARRANTIES, REPRESENTATIONS, OR CONDITIONS, EXPRESS, IMPLIED, OR STATUTORY, RELATING TO THE SOFTWARE AND DOCUMENTATION, INCLUDING ANY IMPLIED WARRANTY OF TITLE, NON-INFRINGEMENT OF THIRD PARTY RIGHTS, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. McQ DOES NOT WARRANT THAT THE FUNCTIONS CONTAINED IN THIS SOFTWARE WILL MEET YOUR REQUIREMENTS OR THAT THE OPERATION OF THE SOFTWARE WILL BE UNINTERRUPTED OR ERROR FREE. IN ADDITION, McQ DISCLAIMS ANY AND ALL WARRANTIES OR REPRESENTATIONS TO ANY PERSON OTHER THAN YOU WITH RESPECT TO THE SOFTWARE.

No employee, agent, dealer, or distributor of McQ is authorized to modify this limited warranty, or to make any additional warranties.

SOME STATES AND/OR COUNTRIES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE

THE LIABILITY LIMITATIONS IN THIS ARTICLE SHALL APPLY REGARDLESS OF WHETHER (A) McQ HAS BEEN ADVISED OF THE POSSIBILITY OF THE CORRESPONDING LIABILITY, (B) THE SERVICES WERE INTENDED TO PREVENT THE EVENTS THAT GAVE RISE TO THE CLAIMED LIABILITY, OR (C) THE CLAIMED LIABILITY IS BASED ON BREACH OF CONTRACT OR WARRANTY, NEGLIGENCE (SOLE OR CONCURRENT, ACTIVE OR PASSIVE), STRICT LIABILITY, FAILURE OF ESSENTIAL PURPOSE OR ANY OTHER LEGAL OR EQUITABLE THEORY.

7. LIMITED REMEDY

McQ's entire liability and your exclusive remedy shall be the replacement of any diskette(s) or other media not meeting our Limited Warranty, which is returned to McQ or to an authorized Dealer or Distributor with a copy of your receipt.

ASIDE FROM THE FOREGOING, NEITHER McQ NOR ITS CONTRACTORS SHALL HAVE ANY LIABILITY TO YOU OR ANY OTHER PERSON OR ENTITY FOR ANY DAMAGES ARISING FROM THIS AGREEMENT OR RELATED TO THE SOFTWARE, INCLUDING WITHOUT LIMITATION ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF REVENUE OR PROFIT, LOSS OF OR DAMAGE TO DATA OR OTHER COMMERCIAL OR ECONOMIC LOSS, EVEN IF McQ HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR THEY ARE FORESEEABLE. SPECIFICALLY, McQ IS NOT RESPONSIBLE FOR ANY COSTS INCLUDING, BUT NOT LIMITED TO THOSE INCURRED AS A RESULT OF LOST PROFITS OR REVENUE, LOSS OF USE OF THE SOFTWARE OR OTHER COMPUTER PROGRAMS LOSS OR DAMAGES, THE COST OF RECOVERING SUCH SOFTWARE OR COMPUTER PROGRAMS OR DATA, THE COST OF ANY SUBSTITUTE PROGRAM, CLAIMS BY THIRD PARTIES, OR FOR OTHER SIMILAR COSTS.

THE LIMITATIONS IN THIS SECTION SHALL APPLY WHETHER OR NOT THE ALLEGED BREACH OR DEFAULT IS A BREACH OF A FUNDAMENTAL CONDITION OR TERM OR FUNDAMENTAL BREACH. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, SO THESE LIMITATIONS MAY NOT APPLY TO YOU. THE LIMITED WARRANTY, LIMITED REMEDIES AND LIMITED LIABILITIES ARE FUNDAMENTAL ELEMENTS OF THE BASIS OF THE BARGAIN BETWEEN McQ AND YOU. McQ WOULD NOT BE ABLE TO PROVIDE THE SOFTWARE WITHOUT SUCH LIMITATIONS.

8. TERM AND TERMINATION

This Agreement is effective until terminated. You may terminate this license at any time by destroying all copies of the Software and related Documentation. IN THE EVENT THAT YOU FAIL TO COMPLY WITH ANY TERM OR CONDITION OF THIS AGREEMENT, THEN THIS AGREEMENT WILL AUTOMATICALLY TERMINATE WITHOUT NOTICE FROM McQ OR ANY JUDICIAL RESOLUTION. When McQ learns of any such non-compliance, McQ may confirm such automatic termination by written notice to you.

The requirements and provisions of Sections 4, 6, 7, 8, 9, and 10 of this Agreement shall survive termination.

You hereby agree that on termination of this Agreement, regardless of the reason, You will either destroy or return to McQ all copies of the Software and Documentation in your possession. You agree to stop all use of the Software and Documentation upon termination of this Agreement.

9. CONFIDENTIALITY

The Software, even though provided to you in object code form, inherently contains source code, trade secrets, and proprietary know-how ("Confidential Information") that belong to McQ, and it is being made available to you in strict confidence. ANY UNAUTHORIZED USE OR DISCLOSURE OF THE SOFTWARE, OR OF ITS ALGORITHMS, PROTOCOLS, OR INTERFACES MAY BE ACTIONABLE AS A VIOLATION OF McQ's TRADE SECRET RIGHTS.

Without prejudice to any and all prohibitions against reverse engineering or de-compiling the Software, you acknowledge and agree that maintaining the confidentiality of Confidential Information is vital to the legitimate business interests of McQ. You shall not at anytime, whether during the Term of this Agreement or thereafter, disclose to any person or use any Confidential Information, or permit any person to examine and/or make copies of any media which contain or were derived from Confidential Information, whether prepared by the You or otherwise, without the prior written permission of McQ. You shall take all reasonable precautions to prevent any other person or entity from acquiring, using or divulging Confidential Information anytime, unless McQ expressly permits in writing the disclosure of the Confidential Information. In the event of the loss, disclosure or theft of any item containing such information, You shall promptly notify McQ in writing of such event describing the item and its contents. Upon request by McQ, and in any event immediately without the necessity of a request upon termination or expiration of this Agreement, You shall turn over to McQ all Confidential Information in your possession or under your control. The Parties agree that the Software shall be deemed a trade secret and Confidential Information of the McQ. Any trade secret hereunder shall also be entitled to all of the protections and benefits under state law, 18 U.S.C. § 1831 et seq., and any other applicable law.

10. U.S. GOVERNMENT – UNLIMITED RIGHTS

This Software has previously been delivered and licensed to the U.S. Government with "Unlimited Rights." U.S. Government customers are therefore governed by the terms and conditions delineated under "Unlimited Rights" in FAR 52.227-14 "Rights in Data – General," DFAR 252.227-7013 "Rights in Technical Data - Noncommercial Items," and/or DFAR 252.227-7014 "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation," as applicable. If this Agreement fails to meet the Government's minimum needs, or is inconsistent with Federal procurement law, then the Government agrees to notify McQ in writing. The manufacturer of the Software is McQ Inc, 1551 Forbes Street, Fredericksburg, VA 22405 USA.

11. MISCELLANEOUS

(a) This Agreement shall be governed and construed by the laws of the Commonwealth of Virginia. Any legal action between the parties shall be initiated and conducted exclusively in the federal and state courts located within Alexandria, Virginia, United States of America, and in any such legal action, the parties hereby consent to the exclusive jurisdiction of, and venue in, such courts. In the event of litigation between you and McQ concerning the Software or Documentation, the prevailing party in the litigation will be entitled to recover reasonable attorneys' fees and expenses from the other party.

(b) You agree that the Software and Documentation will not be shipped, transferred, or exported outside of the United States in any manner prohibited by the United States Export Administration Act or any other export laws, restrictions, or regulations.

(c) If, for any reason, a court of competent jurisdiction finds any provision of this license, or portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible so as to effect the intent of the parties, and the remainder of this license shall continue in full force and effect.

(d) No delay on the part of McQ in exercising any right or remedy under this Agreement shall operate as a waiver thereof, nor shall any single or partial exercise of any right or remedy under this Agreement preclude any other or further exercise of such right or remedy. Failure of McQ to enforce compliance with any term, provision or condition of this Agreement shall not constitute a waiver of such term or condition.

(e) This Agreement constitutes the entire agreement between you and McQ relating to the subject matter, and supersedes all other agreements, written or oral, relating to the subject matter. This Agreement may not be amended, modified or altered in any respect whatsoever except in writing designated as such and signed by both parties.

(f) Wherever possible, each provision of this Agreement shall be interpreted in such a manner as to be effective and

valid under applicable law. However, if any provision of this Agreement shall be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity without invalidating the remainder of such provision or the remaining provisions of this Agreement. In such an event, then the parties agree to authorize the court to re-write that provision, to the extent of such un-enforceability, so as to preserve and/or effect the intent of the parties as described herein, to the extent permitted by law.

(g) The parties agree that monetary damages alone shall be an inadequate remedy in the event that you breach Sections 4 or 9, and that any such breach shall cause McQ irreparable injury and damage. Accordingly, McQ shall be entitled, without waiving any additional rights or remedies otherwise available to McQ at law or in equity or by statute, to injunctive and other equitable relief in the event of a breach, or in the event of intended or threatened breach, by you.

(h) Titles contained in this Agreement are inserted only as a matter of convenience and in no way modify, define, amplify, limit, or extend the scope or intent of this Agreement, or any provision thereof

(i) Should you have any questions concerning this Agreement, please write: McQ Inc, 1551 Forbes Street, Fredericksburg, VA 22405 USA.

8 APPENDIX A   FCC (United States) Certification

General Statements

The iScout® sensor and the WMR and their enclosed modularly approved radios comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Device Classification

NOTE: The iScout® sensor and WMR have been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications   FCC part 15.21

Changes or modifications to the iScout® sensor or WMR which are not expressly approved by McQ Inc. will void the user's authority to operate the equipment, per FCC section 15.21 of the FCC guidelines.

FCC Approved ANTENNAS   FCC Part 15.204(c)

Sensor Antennas

This iScout® sensor shall only be operated with the FCC approved antennas listed in Table 2. The antennas listed in Table 2 can be obtained directly from McQ. Antennas not supplied by McQ must be tested to comply with FCC Section 15.203 (unique antenna connectors) and Section 15.247 (emissions).

Table 2: FCC Approved iScout® Sensor Antennas

Part Number	Type	Connector	Gain	Application
IS 8110	Half-wave w/ 8' pig tail	RPSMA	2.3 dBi (excluding cable loss)	Fixed/Mobile
IS 8111	Half-wave	RPSMA	2 dBi	Mobile

WMR Antennas

This WMR shall only be operated with the FCC approved antennas listed in Table 3. The antennas listed in Table 3 can be obtained directly from McQ. Antennas not listed in Table 3 must be tested to comply with FCC Section 15.203 (unique antenna connectors) and Section 15.247 (emissions).

Table 3: FCC Approved WMR Antennas

Part Number	Type	Connector	Gain	Application
IS 8112	Mag. Mount Whip w/ 10' pig tail	RPSMA	5 dBi (excluding cable loss)	Fixed/Mobile
IS 8110	Half-wave w/ 8' pig tail	RPSMA	2.3 dBi (excluding cable loss)	Fixed/Mobile

RF Exposure Cautionary Notice

WARNING: This equipment is approved only for mobile and base station transmitting devices.

Antenna(s) used for the iScout® sensor must be installed to provide a separation distance of at least 30 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Antenna(s) used for the WMR must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.