

EN7016SK EchoStream™ Survey Kit Installation and Operation Manual

1 Quick Start

By following this procedure you can quickly configure the supplied equipment to perform a site survey. Review the main body of this manual for additional options, features and a more detailed startup process.

Note: If performing site surveys in Australia or New Zealand, the additional setup steps in the main body of this manual must be performed.

1. Slide off the battery cover on the back of the EN4016SK survey receiver.
2. Load four AA batteries into the survey kit receiver.
3. Press the **Power** button to turn on the survey kit receiver.

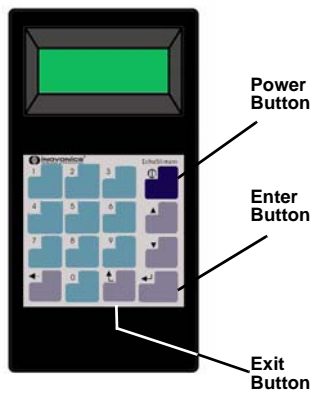


Figure 1 EN4016SK Survey Receiver

4. Press the enter button to advance to MAIN MENU.
5. Select REGISTER POINT on the MAIN MENU.
6. Select POINT 1 on the REGISTER POINT menu.
7. Press the EN1223SK **Reset** button.



Figure 2 EN1223SK Survey Transmitter

8. Select PENDANT. The survey transmitter should now be registered.
9. Press the EN1223SK **On/Off** button. The transmit LED should begin to flash.
10. Use the small flat-blade screwdriver to press the housing release tab on either end of the EN1210SK and separate the housing.
11. Select POINT 2 on the REGISTER POINT menu.

12. Press the EN1210SK **Reset** button. The transmitter should now be registered.

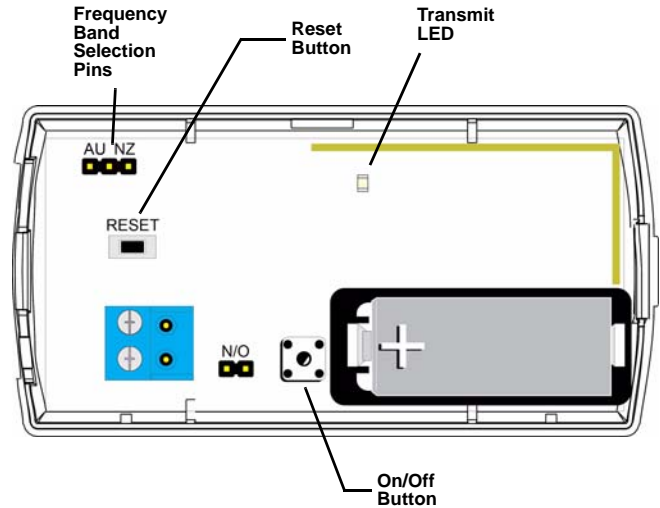


Figure 3 EN1210SK Survey Transmitter

13. Press the EN1210SK **On/Off** button. The transmit LED should begin to flash.
14. Place the survey transmitters where you plan to mount your network coordinator or receiver.
15. Walk the receiver to the first point you plan to use a transmitter or a two-way end device.

Note: Reversing the position of the end device and the high-power repeater will make the survey easier to perform. This equipment reversal will not affect the accuracy of the results.

16. Press **Exit** to return to the MAIN MENU.
17. Select POINT STATUS on the MAIN MENU.
18. Select POINT 1 or POINT 2 to view signal information.

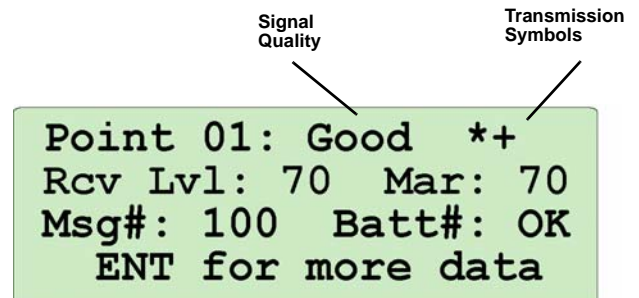


Figure 4 The Point Status Summary Screen

2 EN7016SK Overview

The EchoStream survey kit is a portable, easy-to-use system for conducting EchoStream site surveys to determine optimal location of Inovonics wireless receivers, high-power repeaters and end-devices.

2.1 Measuring Signal Strength

The EchoStream survey kit measures the signal strength of high-power repeater and end-device messages to help optimize your EchoStream system. The EchoStream survey kit provides you with two signal strength measurements: signal level and signal margin.

Signal level The signal level is the measurement of the overall decibel level of the message.

Signal margin The signal margin is the measurement of the decibel level of the message, minus the decibel level of any interfering signals. Inovonics Wireless equipment should be placed within a facility such that all end-devices produce signal margin readings of at least 4 decibels.

Both the signal level and signal margin are measured in decibels. Because signal strength and signal margin are measured on a logarithmic scale, the difference between a decibel level of 3 (Weak) and a decibel level of 4 (Good) is a much larger difference than it would be on a linear scale.

2.2 Inovonics Wireless Contact Information

If you have any problems with this procedure, contact Inovonics Wireless technical services:

- E-mail: support@inovonics.com
- Phone: (800) 782-2709; (303) 939-9336

2.3 EchoStream Survey Kit Components



Figure 5 EchoStream Survey Kit Components

- A** EN4016SK Survey Receiver **B** Screwdrivers **C** EN1223SK Survey Transmitter
D EN1210SK Survey Transmitter **E** Accessory Compartment (Battery Charger and Headphones Not Included)

The EchoStream survey kit is battery-powered for portability. The following components are included in the survey kit:

- An EN4016SK EchoStream survey receiver
- An EN1223SK survey transmitter for testing the location of pendant transmitters or two-way end devices
- An EN1210SK survey transmitter for testing the location of all other end devices
- A flat-blade screwdriver
- A Phillips screwdriver
- The EN7016SK EchoStream Survey Kit Installation and Operation Manual

You will also need:

- A set of four fresh AA alkaline batteries, or four fully-charged AA NiMH rechargeable batteries, for the receiver

You may also want:

- Headphones with a 3.5 mm plug
- A battery charger, if using rechargeable batteries

- Inovonics Wireless recommends either Rayovac PS5/PS6 or Energizer CH30MNCP-4 batteries

3 Startup

3.1 Configure Survey Transmitters

Note: The survey transmitters are designed for use with the survey kit only. Survey transmitters should not be used to perform range tests with any EchoStream receivers other than the EN4016SK survey receiver.

EchoStream devices are able to use a range of radio frequencies, and must be configured for your geographic area. This devices in the EN7016SK survey kit ship with a default frequency range of 902-928 MHz for use in North America. If you are using the survey kit in North America, skip to section 3.2, "Configure the Survey Receiver"; if you are using the device in Australia or New Zealand, you will need to configure the survey transmitters.

Select EN1223SK Survey Transmitter Frequency Band

1. Use the small Phillips head screwdriver to remove the three housing screws on the back of the unit.
2. Remove the front of the housing.
3. Place a selection jumper on the appropriate frequency band selection pins (6).
 - Place the jumper on the left two pins, marked AU, to set the frequency range to 915-928 MHz for Australia.
 - Place the jumper on the right two pins, marked NZ, to set the frequency range to 921-928 MHz for New Zealand.

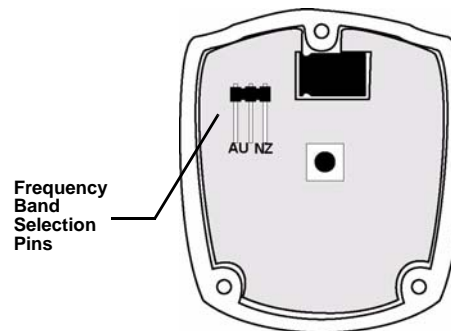


Figure 6 EN1223SK Internal View

4. Close the housing and replace the three housing screws.
5. Press the **Reset** button to complete frequency band selection.



Figure 7 EN1223SK External View

Select EN1210SK Survey Transmitter Frequency Band

6. Use your thumb to press the housing release tab on bottom of the transmitter; separate the housing.
7. Place a selection jumper on the appropriate frequency band selection pins (7).
 - Place the jumper on the left two pins, marked AUS, to set the frequency range to 915-928 MHz for Australia.

- Place the jumper on the right two pins, marked NZ, to set the frequency range to 921-928 MHz for New Zealand.

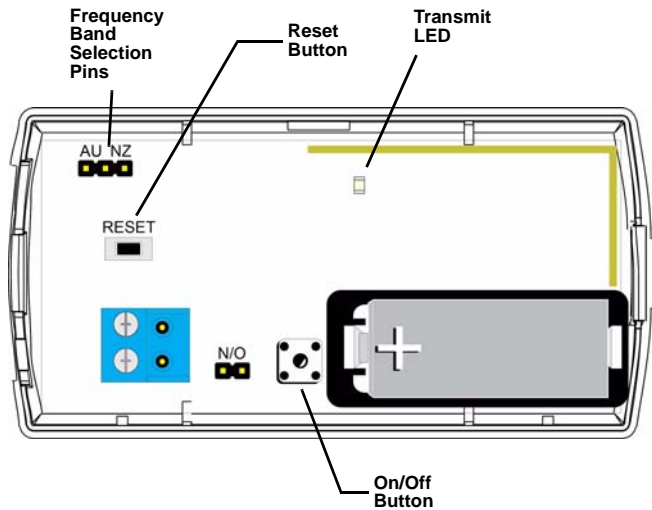


Figure 8 EN1210SK Components.

- Press the **Reset** button to complete frequency band selection.
- Replace the housing.

3.2 Configure the Survey Receiver

Observe the following rules to navigate the display screens and select options:

- Press the **Up** and **Down** buttons to highlight (CAPITALIZE) menu items on the display screen.
- Press the **Enter** button to select highlighted menu items.
- Press the **Exit** button to exit the current display screen. The display will return to the last higher-level display screen.

Note: The EN4016SK survey receiver is set for North America by default. If you are using an EN4016SK survey receiver to perform your site survey in North America there is no need to configure the survey receiver's frequency band for your geographic area.

Note: The EN4016SK survey receiver will turn itself off if no key is pressed for 30 minutes, unless the survey receiver is in one of the POINT STATUS screens. If in one of the POINT STATUS screens, the survey receiver will turn itself off after five hours.

- Press the **Power** button on the EN4016SK keypad to power on the receiver. When the receiver information screen displays, press **Enter** to advance to the main menu.

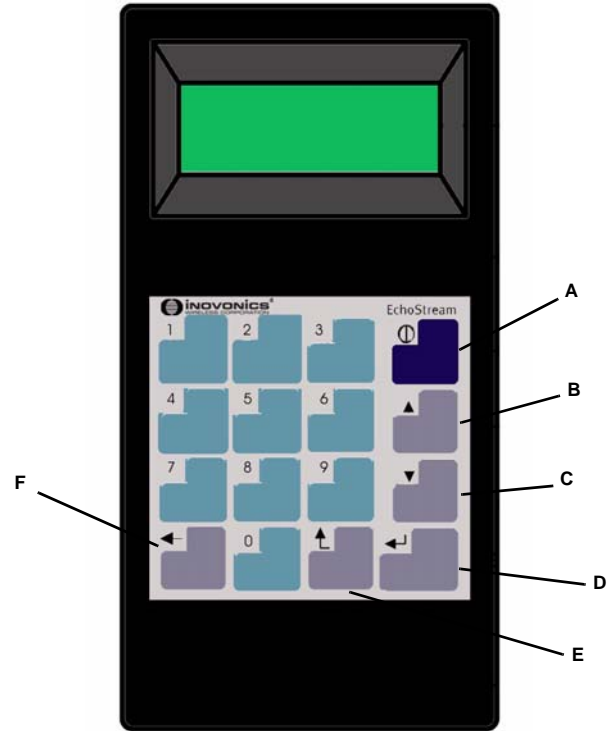


Figure 9 Survey Receiver Keypad.

- | | | |
|-----------------------|----------------------|---------------------------|
| A Power Button | B Up Button | C Down Button |
| D Enter Button | E Exit Button | F Backspace Button |

The MAIN MENU displays:

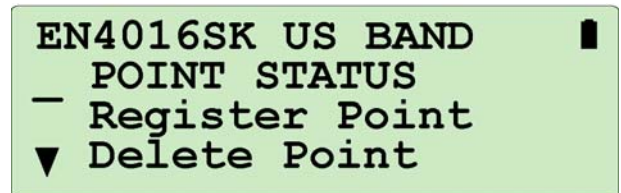


Figure 10 The Main Menu, Point Status Highlighted

The MAIN MENU displays the model number and frequency band on the first line. If the battery is low, the first line will also display the low battery symbol. The low battery symbol will also display on many other screens.

The MAIN MENU offers the following choices:

Point Status Select to view point status. See section 4, "Perform a Site Survey using Survey Transmitters" for more information.

Register Point Select to register a point. See section 3.3, "Register End-Devices" for more information.

Delete Point This is selected to delete any particular point or all points that have been registered.

Receiver Setup Select to configure the receiver.

- Press the **Down** button three times to highlight RECEIVER SETUP.

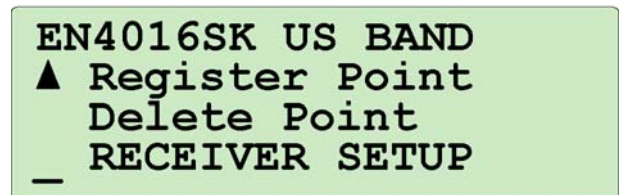


Figure 11 The Main Menu, Receiver Setup Highlighted

12. Press **Enter** to select. The RECEIVER SETUP menu displays.

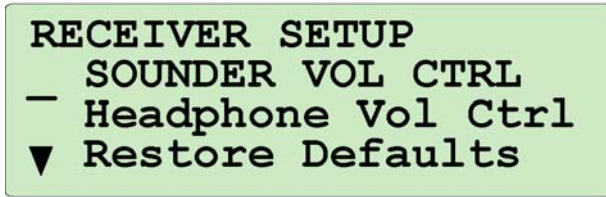


Figure 12 The Receiver Setup Menu, Sounder Vol Ctrl Highlighted

RECEIVER SETUP includes the following options:

Sounder Vol Ctrl Select to change the volume for the EN4016SK sounder. The volume is given as a percentage, with a default of 100%. Press the **Up/Down** buttons to raise or lower the volume.

Headphone Vol Ctrl Select to change the volume for the optional headphones. The volume is given as a percentage, with a default of 100%. Press the **Up/Down** buttons to raise or lower the volume.

Restore Defaults Select to restore all default receiver configuration settings.

Caution: Choosing restore defaults will erase all programmed points. If you choose to restore defaults you will need to re-register all points.

Freq Band Setup If you are using an EN4016SK, select to choose the frequency band appropriate for your geographic area. The options are: US, AUSTRALIA and NEW ZEALAND. US is the default. Use the **Up/Down** buttons to highlight the selection for your geographic area and press **Enter** to select.

13. Press the **Down** button three times to highlight FREQ BAND SETUP.

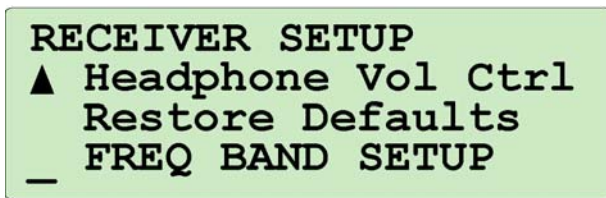


Figure 13 The Receiver Setup Menu, Freq Band Setup Highlighted

14. Press **Enter** to select FREQ BAND SETUP. The FREQ BAND SETUP screen displays.



Figure 14 The Frequency Band Setup Screen, United States Highlighted

15. Use the **Up/Down** buttons to highlight your geographic area, and press **Enter** to select.

16. Press the **Exit** button until the MAIN MENU displays.

3.3 Register End-Devices

Before beginning the site survey, you must register all survey transmitters and/or any other end-devices you will use to conduct the survey. To register end-devices:

17. Highlight REGISTER POINT on the main menu.

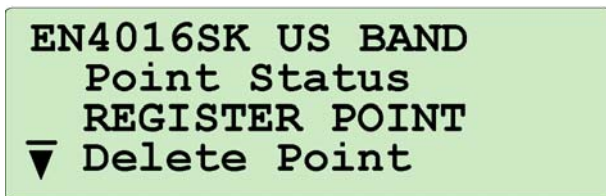


Figure 15 The Main Menu, Register Point Highlighted

18. Press **Enter** to select. The REGISTER POINT menu displays.

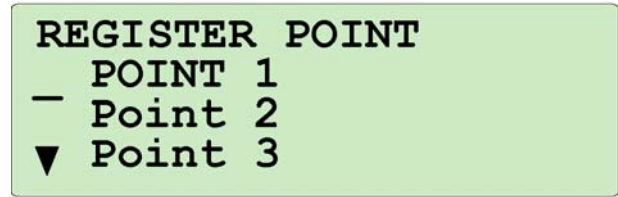


Figure 16 The Register Point Menu, Point 1 Highlighted

Note: The survey receiver can register end-devices to up to 16 points. Only points that do not already have an end-device registered to them will display. If all points have an end-device registered to them, the ALL POINTS ARE REGISTERED message displays. If this is the case, use the DELETE POINT option to delete a point, and return to the REGISTER POINT screen to register an end-device.

19. Use the **Up/Down** buttons to highlight a point, and press **Enter** to select. The PRESS RESET BUTTON message displays.

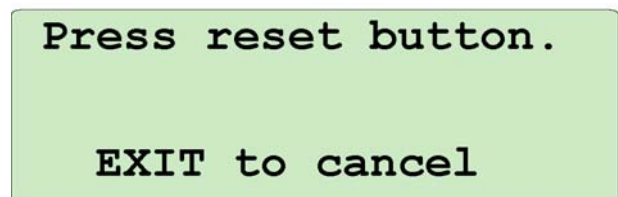


Figure 17 The Press Reset Button Message

20. Press the **Reset** button on the end-devices to be registered.

21. If registering the EN1210SK, the registration complete message displays.

Note: If there are no repeaters present in the site under survey an EN1210SK may also be used to simulate the transmit power output of a repeater.

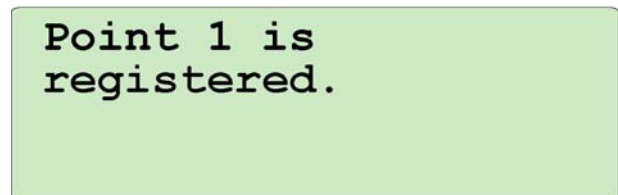


Figure 18 The Registration Complete Message

22. If you are registering an EN1223SK, the simulation menu displays with the following options.



Figure 19 The Simulation Menu

23. Choose **PENDANT** if the EN1223SK will be used to simulate a pendant transmitter; choose **TWO-WAY** if the transmitter will be used to simulate a two-way end-device.

24. Repeat steps 17 through 23 for each end-device you want to register.

3.4 Register High-Power Repeaters

If no high-power repeaters are registered to a point, the EN4016SK will use every high-power repeater in your EchoStream system to determine the end-device RF signal strength for the first hop and last hop, displaying the results on the point status signal strength screen.

If you would like to see the first hop results from specific high-power repeaters, you will need to register the high-power repeaters to be monitored. (Last hop information from an end-device, however, will continue to be influenced by all repeaters in the system.) High-power repeaters are registered in the same way as end-devices. Refer to section

3.3. "Register End-Devices" to register a high-power repeater, pressing the high-power repeater **Reset** button to complete registration.

If you want to monitor signal strength from just a registered high-power repeater (as opposed to an end-device), refer to section 4, "Perform a Site Survey using Survey Transmitters", and choose the point to which you registered the high-power repeater. Messages the high-power repeater is repeating are not included in the signal strength information; only supervision, reset/restoral and tamper messages count towards signal strength information.

4 Perform a Site Survey using Survey Transmitters

The EchoStream survey kit provides continuous monitoring of the signal strength of end devices and high-power repeaters using the end-device and repeater transmission received symbols (* and +) on the display screen and the sounder or headphones. If receiving a good signal, the transmission symbols will beat once a second and the survey kit will beep accordingly.

1. Prepare a site map, indicating where you plan to mount all end-devices and the receiver.
2. Place the survey transmitters where you are planning to mount your network coordinator or receiver.

Note: Place the survey transmitters as close as possible to the point where you will place the receiver. Pay attention to height; if you are planning to mount the receiver at a six-foot height, position the transmitter at the same height.

3. Press the EN1223SK **On/Off** button to begin test transmissions (6).

Note: Test transmission will continue for four hours, unless stopped. Press the **On/Off** button again to stop test transmission. Each time the **On/Off** button is toggled, a new four-hour time-out will begin.

4. Open the EN1210SK housing and press the **On/Off** button to begin test transmissions (7).

Note: Test transmission will continue for four hours, unless stopped. Press the **On/Off** button again to stop test transmission. Each time the **On/Off** button is toggled, a new four-hour time-out will begin.

5. Walk the receiver to the first point of coverage and place the receiver where you will locate the first end-device.

Note: To ensure an accurate signal reading, place the receiver as close as possible to the point where you will mount the end-device. If mobile end-devices will be used, check signals from the most difficult locations from which users may activate alarms.

From the main menu, highlight **POINT STATUS**, and press **Enter** to select. The **REGISTER POINT** menu displays.

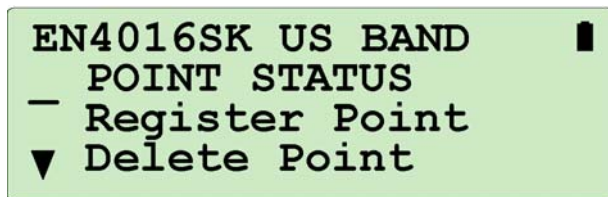


Figure 20 The Main Menu, Point Status Highlighted

6. All registered points display. Highlight the point for the end-device that will be placed in this location, and press **Enter** to select. The **POINT STATUS SUMMARY** screen displays.

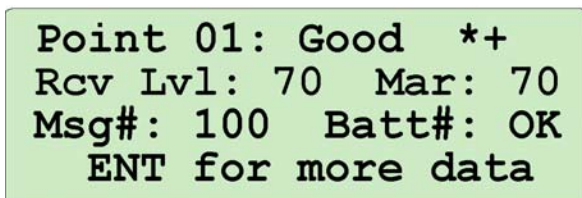


Figure 21 The Point Status Summary Screen

The **POINT STATUS SUMMARY** screen contains the following information:
Point # The point number you've selected displays here along with the signal level of the selected end-device. **GOOD** indicates a signal sufficient for EchoStream functionality; **WEAK** indicates a signal insufficient for EchoStream functionality; **N/S** indicates no signal received.
GOOD displays when the signal margin is 4 decibels or more. **WEAK** displays when the signal margin is less than 4 decibels.

N/S displays when no recognizable message is received at all, no matter how weak.

End-device transmission symbol: The end-device transmission symbol, *, beats when the receiver is hearing a signal directly from a selected end-device. When receiving a good signal, the end-device transmission symbol beats approximately once a second, and the receiver beeps accordingly.

High-power repeater transmission symbol: The high-power repeater transmission symbol, +, beats when the receiver is hearing a signal from the selected end-device that has been passed on by a high-power repeater. When receiving a good signal, the high-power repeater transmission symbol beats approximately once a second.

Rcv Lvl Indicates the overall strength of messages received from the selected end-devices and repeaters, in decibels.

Rcv Mar Indicates the signal margin of messages received from the selected end-devices and repeaters, in decibels.

Msg# Indicates the total number of messages received, up to 999.

Batt Indicates the battery status of the end-device as either **OK** or **LOW**.

7. Press **Enter** for more signal information. The **POINT STATUS MESSAGE COUNT** screen displays.

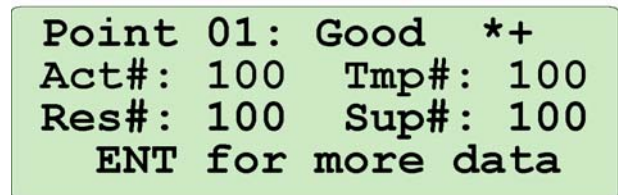


Figure 22 The Point Status Message Count Screen

Act# Indicates the total number of activation messages received, up to 999. An activation message is defined as a message that does not fall into the Tmp, Res and Sup categories described below. For example, an alarm message on a pendant transmitter would be displayed as an Act message.

Tmp# Indicates the total number of tamper messages received, up to 999.

Res# Indicates the total number of reset and restoral messages received, up to 999.

Sup# Indicates the total number of supervisory messages received, up to 999.

8. Press **Enter** for more signal information. The **POINT STATUS SIGNAL STRENGTH** screen displays.

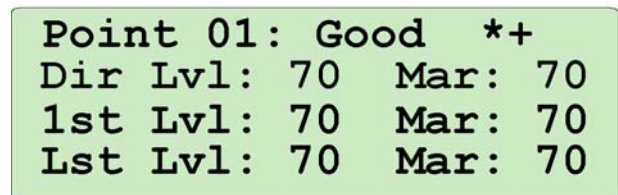


Figure 23 The Point Status Signal Strength Screen

Dir Lvl Indicates the overall strength of messages received directly from the selected end-device, in decibels.

Dir Mar Indicates the signal margin of messages received directly from the selected end-device, in decibels.

1st Lvl Indicates the overall strength of first hop end-device messages received by high-power repeaters, in decibels.

1st Mar Indicates the signal margin of first hop end-device messages received by high-power repeaters, in decibels.

Lst Lvl Indicates the overall strength of last hop high-power repeater messages received by the survey kit, in decibels.

Lst Mar Indicates the signal margin of last hop high-power repeater messages received by the survey kit, in decibels.

9. Repeat all steps for the next point on your site map.

10. When the site survey is complete, press the EN1223SK and EN1210SK **On/Off** buttons to stop transmission.

11. Press the EN4016SK **Power** button to turn off the survey receiver.

5 Perform a Site Survey without using Survey Transmitters

The EN4016 site survey receiver can be used to monitor the signal strength of any end-device or high-power repeater in your EchoStream system.

1. Register the end-device or high-power repeater you want to monitor.

- Refer to section 3.3, "Register End-Devices" to register an end-device; refer to section 3.4, "Register High-Power Repeaters" to register a high-power repeater.
2. Place the EN4016 site survey receiver where your network coordinator or receiver is normally located.
 3. Activate the end-device.
 4. Monitor signal strength.
 - Refer to step 5 through 8 in section 4, "Perform a Site Survey using Survey Transmitters" to monitor signal strength.

6 Specifications

Operating frequency 915-928 MHz (Australia), 921-928 MHz (New Zealand) 902-928 MHz (USA)

Operating environment 0°- 60°C (32°- 140°F), 90% relative humidity, non-condensing

Measurement accuracy +/- 2dB @ 25°C (77°F), +/- 3dB @ 0°C - 60°C (32°F-140°C).

Receiver type Frequency hopping spread spectrum

Battery life and ordering info EN4016SK: Eight hours of continuous use, 1.5V, AA alkaline or NiMH; EN1223SK: 200 hours of continuous use, 3.0V, Inovonics Wireless part number BAT609; EN1210SK: 200 hours of continuous use, 3.0V, Inovonics Wireless part number BAT604.

7 Warranty/Disclaimer

Caution: Changes or modifications to this unit not expressly approved by Inovonics Wireless Corporation may void the installer's authority to operate the equipment as well as the product warranty.

Inovonics Wireless Corporation ("Inovonics") warrants its products ("Product" or "Products") to conform to its own specifications and to be free of defects in materials and workmanship under normal use for a period of thirty-six (36) months from the date of manufacture. Within the warranty period, Inovonics will repair or replace, at its option, all or any part of the warranted Product. Inovonics will not be responsible for dismantling and/or reinstallation charges. To exercise the warranty, the User ("User", "Installer" or "Consumer") must work directly through their authorized distributor who will be given a Return Material Authorization ("RMA") number by Inovonics. Details of shipment will be arranged directly through the authorized distributor.

This warranty is void in cases of improper installation, misuse, failure to follow installation and operating instructions, alteration, accident or tampering, and repair by anyone other than Inovonics.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express, or implied. There is no warranty by Inovonics that Inovonics product will be merchantable or fit for any particular purpose, nor is there any other warranty, expressed or implied, except as such is expressly set forth herein. In no event shall Inovonics be liable for an incidental, consequential, indirect, special, or exemplary damages, including but not limited to loss of profit, revenue, or contract, loss of use, cost of down time, or interruption of business, nor any claim made by distributor's customers or any other person or entity.

This warranty will not be modified or extended. Inovonics does not authorize any person to act on its behalf to modify or extend this warranty.

This warranty will apply only to Inovonics Products. Inovonics will not be liable for any direct, incidental, or consequential damage or loss whatsoever, caused by the malfunction of Product due to products, accessories, or attachments of other manufacturers, including batteries, used in conjunction with Inovonics Products.

Note: E-mail support@inovonics.com for a copy of the CE Declaration of Conformity.
