# EE4000 EchoStream® Serial Receiver
Installation Instructions

1 Overview
The EE4000 serial receiver is a gateway that uses reliable frequency-hopping, spread-spectrum technology to decode radio frequency (RF) transmissions from end devices and high-power repeaters, and then output the decoded data to the application controller in a common serial data format. The EE4000 is used for all one way Inovonics applications.

1.1 Installing an Inovonics Security System
The EchoStream survey kit measures the signal strength of high-power repeater and sensor messages to help optimize your EchoStream system.
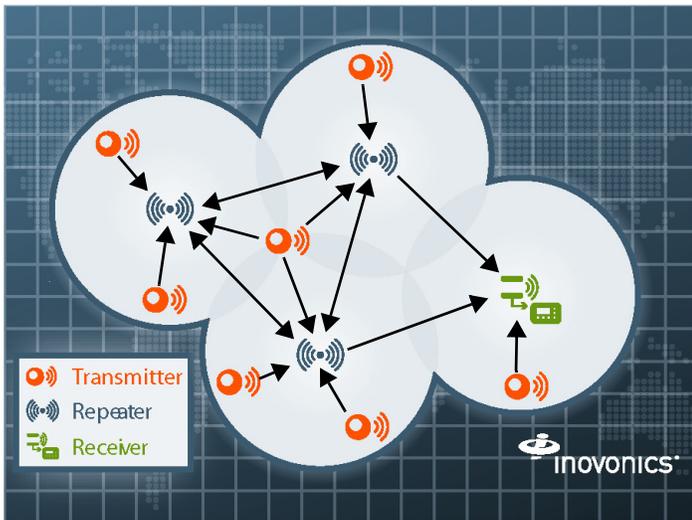
Figure 1 Sample EchoStream System

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.

Note: For more information about the EchoStream survey kit, see the *EN/EE7016SK EchoStream® Survey Kit Installation and Operation Manual*.

1.2 RF Signal Propagation
While wood, drywall and glass usually let the RF signals pass, some materials may inhibit or attenuate radio frequency (RF) signal propagation by blocking, reflecting, deflecting or absorbing RF signals.

Consider anything between transmitters and repeaters and/or the receiver. Is there concrete and steel construction? Are there earthen berms or hills? Are there a lot of trees? Devices should be mounted such that they are least affected by these elements.

For best results, transmitters and repeaters should be mounted at the optimal height to achieve line of sight to repeaters and/or the receiver. Usually this means they will be mounted as high as possible.

Following are some typical obstacles to RF signal propagation:

Material	Affect	Recommendation
Metal construction, including ductwork; pipes; studs; stucco, plaster or concrete with wire mesh; satellite dishes, metal-lined rooms such as walk-in coolers or freezers; metal siding, safes, etc.	Can reflect, absorb and/or disrupt RF signals.	Perform a site survey using an Inovonics wireless survey kit to verify the RF signal is acceptable, and, when necessary, to determine where to locate repeaters.
Completely enclosed metal boxes/enclosures.	Can restrict RF signals.	
Solar panels, cinder block walls, windows with built-in solar tinting.	Can absorb and/or reflect RF signals.	
Vegetation.	Can attenuate RF signals. The RF environment can alter as trees shed or sprout leaves.	Add repeaters as issues arise.
Automobile and truck traffic.	Can disrupt RF signals.	Mount Inovonics devices at a height sufficient to achieve line of sight above traffic.

1.3 Inovonics Contact Information

For product and installation videos visit us at www.inovonics.com/videos or use the QR code below.

If you have any problems with this procedure, contact Inovonics technical services:
- E-mail: support@inovonics.com.
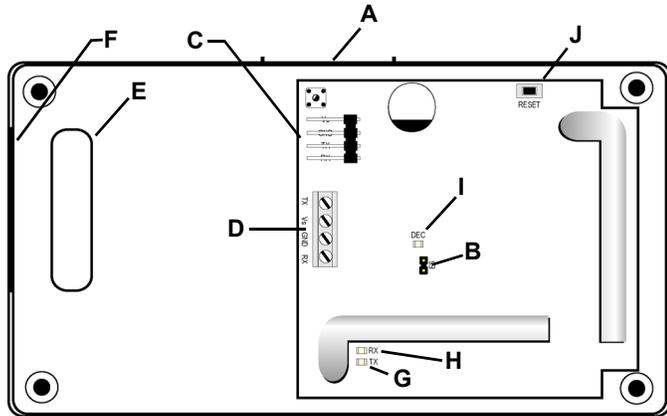- Phone: (800) 782-2709; (303) 939-9336.

1.4 EE4000 Internal Components

Figure 2 EE4000 serial receiver components

A Housing release tab
B EchoStream Select compatibility selection pins
C Serial data port
D Serial data terminal
E Bottom cabling knockout
F Side cabling knockout
G Transmit LED
H Receive LED
I Decode LED
J Reset button

1.5 What's in the Carton

- Two drywall anchors.
- Two #6 x 1/4 mounting screws.
- Three optional #6 x 3/4 housing screws.
- Two pieces of mounting tape.
- One frequency band selection shunt.

2 Installation and Startup

2.1 Installation Notes

- These products are designed to be maintained by professional security technicians.
- Products are tested for indoor use.
- All products should be manually tested weekly.

2.2 Enable EchoStream Select

To meet ETSI requirements, Inovonics has developed a new line of EE 868MHz-only products. These new 868MHz-only products are compatible with older systems that include EchoStream Select (ES) products. If you are using any ES products in your current system, you will need to enable EchoStream Select compatibility on this new 868MHz-only product; if you are not using any ES products in your current system, skip to 2.3, "Connect the Serial Cable".

To enable/disable EchoStream Select compatibility:

1. To enable compatibility with ES products, place a selection jumper on the ES selection pins.

Note: Selection jumpers are included in the EE4000 hardware packet.

2. If no ES products are used in your system, remove the selection jumper from the ES selection pins.

3. Cycle power.

2.3 Connect the Serial Cable

Caution: Long cable runs should not be adjacent to high current power feeds. Keep cable lengths as short as possible to minimize noise pickup. Measure voltage at the serial receiver on long cable runs.

4. Connect a serial cable to either the serial data port (Fig. 1C) or the serial data terminal (Fig. 1D). Cabling should meet the following specifications:

Cable requirements 4-conductor 20AWG (or larger) stranded-tinned copper with PVC insulation rated to 300 volts at 26°C (80°F). (Belden #8205, for example.)

Maximum cable length 15.25 meters (50 feet).

5. Route the cabling through either the bottom cabling knockout (Fig. 1E) or the side cabling knockout (Fig. 1F).

2.4 Mount the Serial Receiver

Caution: Mount the serial receiver in a location removed from metal. Metal objects (duct work, wire mesh screens, boxes) will reduce RF range.

6. Use the provided anchors and screws to mount the serial receiver in a location accessible for future maintenance.

7. Close the serial receiver housing.

3 Serial Receiver Operation

Caution: The EchoStream system should be tested regularly to ensure operation. To test, place the system in test mode, activate an end device, and ensure an appropriate response.

The following LEDs are used to monitor serial receiver operation.

Transmit LED Lit when the serial receiver is transmitting data to the application controller (Fig. 1G).

Receive LED Lit when the serial receiver is receiving data from the application controller (Fig. 1H).

Decode LED Lit when the serial receiver is decoding an RF transmission from another Inovonics Wireless device (Fig. 1I).

4 Specifications

Housing dimensions 162.0 mm x 91.4 mm x 27.9 mm (6.38" x 3.60" x 1.10").

Weight 133 g (4.7 oz).

Power requirement 10-14 VDC at 100mA.

Radio Inovonics Wireless EchoStream.

Operating frequency 868 MHz.

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

Output power: N/A.

Firmware revision: 90549, v3.00.

Countries in which Inovonics European products can be distributed: Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Note: Specifications and data are subject to change without notice.

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

5 Simplified Declaration of Conformity

Hereby, Inovonics declares that the radio equipment type EE4000 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following Internet address: www.inovonics.com

6 US Patent Numbers

- 7,154,866.
- 7,554,932.
- 7,746,804.
- Other patents pending.