EN4000 Universal Serial Receiver
Installation Instructions

1 Overview
The universal serial receiver is a wireless gateway between EchoStream one-way transmitters (security, temperature, or analog) and a head end application using an RS-232 serial interface.

1.1 Installing an Inovonics Security System
An EchoStream survey kit should be used to establish an EchoStream system. The EchoStream survey kit measures the signal strength of high-power repeater and sensor messages to help optimize your EchoStream system.
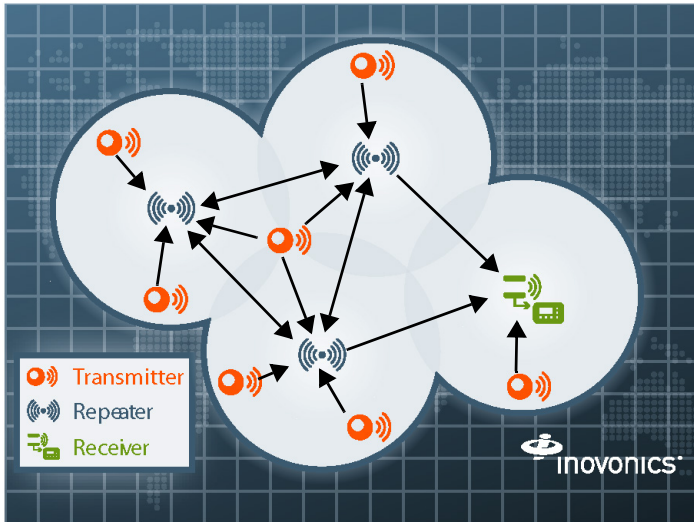

Figure 1 Sample EchoStream system

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 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: Inovonics offers two options for site surveys: the EN7017 survey kit and app and EN4016SK survey receiver. The EN4016SK survey receiver displays the decibel level, while the EN7017 survey kit and app displays only that the reception is good or weak. For more information, see the *EN4016SK Survey Receiver Installation and Operation Manual* or the *EN7017 Survey Kit and App Installation and Site Survey Instructions*.

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.

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 support:

- E-mail: support@inovonics.com.
- Phone: (800) 782-2709.

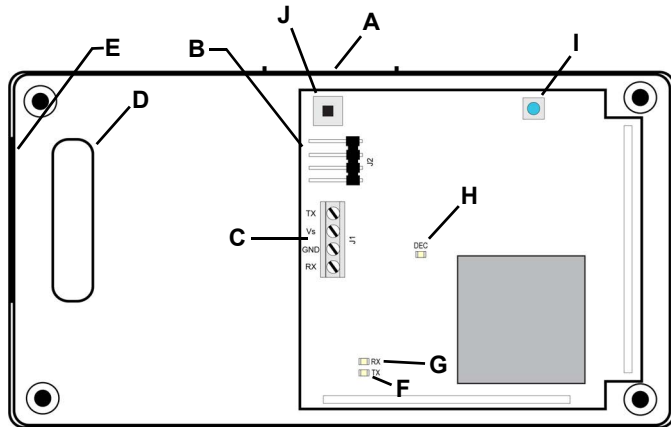## 1.4 EN4000 Universal Serial Receiver Internal Components

Figure 2 EN4000 serial receiver components

A	Housing release tab	**B**	Serial data port
C	Serial data terminal	**D**	Bottom cabling knockout
E	Side cabling knockout	**F**	Transmit LED
G	Receive LED	**H**	Decode LED
I	Reset button	**J**	Housing tamper switch and spring

1.5 EN4000 Universal Serial Receiver Operation LEDs

The following LEDs are used to monitor serial receiver operation:

Transmit LED: Lit when the serial receiver is transmitting data to the application controller.

Receive LED: Lit when the serial receiver is receiving data from the application controller.

Decode LED: Lit when the serial receiver is decoding an RF transmission from another Inovonics device.

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.
- Each manually operated holdup alarm initiating device shall be installed so that it cannot be observed by the public and so that it can be operated in a manner that will not be obvious to an attacking party.
- Each semi-automatic holdup alarm initiating device shall be installed so that it is not noticeable to an attacking party during a holdup attempt and is not noticeable to the public or an attacking party prior to a holdup attempt.

2.2 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 cable capacitance. Measure voltage supply at the universal serial receiver to ensure power requirement is met for long cable runs.

1. Connect a serial cable to either the serial data port or the serial data terminal. Cabling should meet the following specifications:
   - Four-conductor 20AWG (or larger) stranded-tinned copper with PVC insulation rated to 300 volts at 60°C (140°F). (Belden #8205, for example.)
2. Route the cabling through either the bottom cabling knockout or the side cabling knockout.

Note: All field-wiring circuits that derive energy from power sources connected to a control unit shall be power limited. Route the cabling through the side cabling or back housing knockout.

2.3 Mount the Universal Serial Receiver

Caution: Mount the EN4000 universal serial receiver in a location removed from metal. Metal objects (duct work, wire mesh screens, boxes) will reduce RF range.

Note: A best practice is to ensure the EN4000 universal serial receiver is mounted in an easily accessible location for future maintenance.

1. Use the provided anchors and screws to mount the serial receiver in a location accessible for future maintenance.
2. Close the serial receiver housing.
3. Perform a walk test, activating each transmitter assigned to the receiver and ensuring a good signal.

Caution: Always test the system for operation upon completion of the installation.

3 Troubleshooting

Problem	Possible Solutions
Receiver won't power up.	• Verify your power and ground wires are securely connected to VS and GND on the power terminals. • Meter incoming power to make sure it is operating at 10-14 VDC, 55-90mA. • Keep cable lengths as short as possible to minimize cable capacitance. Measure voltage supply at the receiver to ensure power requirement is met for long cable runs.
Messages from registered transmitters are not being received.	• Verify receiver is getting enough power. • Bring the transmitter close to receiver to verify it is in range and can be heard by the receiver.

4 Specifications

Housing dimensions: 6.54" x 3.62" x 1.05" (166.1mm x 91.9mm x 26.67mm).

Weight: 145g (5.1oz).

Power requirement: 10-14 VDC at a minimum of 121mA.

Radio: Inovonics Wireless EchoStream .

Operating frequency: 902-928 MHz (USA) 915-925 MHz (AUS) 921-928 MHz (NZ).

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

Note: Inovonics supports recycling and reuse whenever possible. Please recycle these parts using a certified electronics recycler.

5 Television and Radio Interference

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6 FCC Part 15 and Innovation, Science and Economic Development Canada (ISED) Compliance

This device complies with part 15 of the FCC Rules, and ISED license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: Inovonics commercializes products utilizing open source third party software. For additional information, please visit: https://www.inovonics.com/support/embedded-third-party-licenses/.