

# One-Way Binary RF Module

## Installation and Operation Manual - 06287A

### 1 Overview

EchoStream RF modules are designed to be easily interfaced with your electronic remote application controller (RAC). RF modules allow the assimilation of any user-specific application into an EchoStream system. Once integrated with existing products, RF modules provide you with complete EchoStream functionality. E\*1941 one-way binary RF modules are end-devices that use a logic-level connection to interface with your RAC. E\*1941 one-way binary RF modules can be used in either one-way or two-way EchoStream systems.



Figure 1 One-Way System Components

### 2 One-Way Binary RF Module Components

The E\*1941 is a universal one-way binary RF module with two alarm input pins, allowing the use of dual inputs. Input one is the primary alarm, bit 0; input two is the secondary alarm, bit 1.

There are two models in the E\*1941 product family.

- The EN1941, for 900 MHz applications in North America, New Zealand, and Australia.
- The EE1941, for 868 MHz applications in Europe

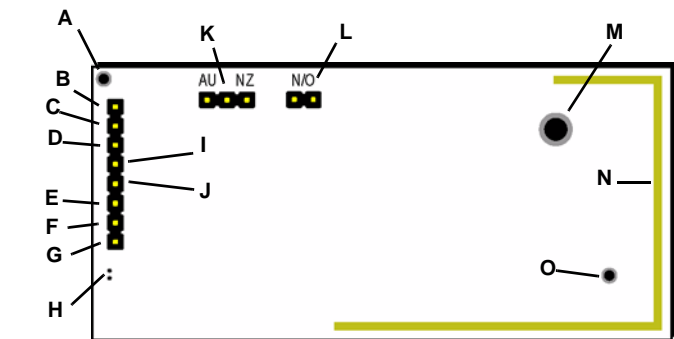


Figure 2 EN1941 One-Way Binary RF Module Components

- |                             |                                 |                            |
|-----------------------------|---------------------------------|----------------------------|
| A Board stabilization hole. | B Reserved                      | C Reserved                 |
| D Secondary alarm           | E Power                         | F Ground                   |
| G Primary alarm             | H LED contacts                  | I Tamper input             |
| J Reset input               | K Frequency band selection pins | L N/O selection pins       |
| M Mounting hole             | N On-board antenna              | O Board stabilization hole |

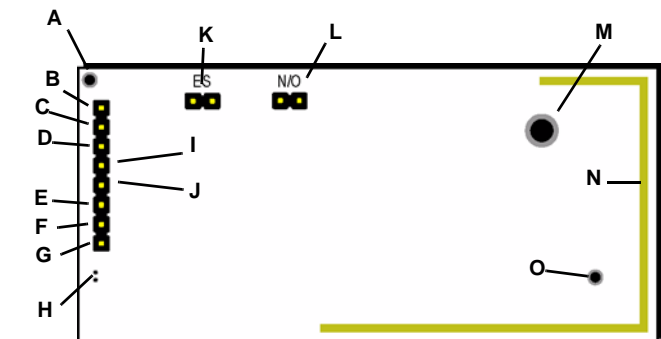


Figure 3 EE1941 One-Way Binary RF Module Components

- |                             |                |                |
|-----------------------------|----------------|----------------|
| A Board stabilization hole. | B Reserved     | C Reserved     |
| D Secondary alarm           | E Power        | F Ground       |
| G Primary alarm             | H LED contacts | I Tamper input |

- |                 |                     |                            |
|-----------------|---------------------|----------------------------|
| J Reset input   | K ES selection pins | L N/O selection pins       |
| M Mounting hole | N On-board antenna  | O Board stabilization hole |

**Frequency band selection pins (EN1941 only)** Place a jumper to select the frequency band for your geographic area.

- Place the jumper on the left two pins to select 915-928 MHz for Australia.
- Place the jumper on the right two pins to select 921-928 MHz for New Zealand.
- Leave the jumper off the pins to select 902-928 MHz for North America.

**ES selection pins (EE1941 only)** To enable compatibility with ES products, place a selection jumper on the ES selection pins; if no ES products are used in your system, remove the selection jumper.

**N/O selection pins** Place a jumper to select normally open inputs; remove the jumper to select normally closed.

**Note:** The E\*1941 is shipped with the jumper unattached. With the jumper unattached, the E\*1941 defaults to normally closed.

**Secondary alarm** Connects a secondary end-device to provide RF alarm data for any user-specific application.

**Primary alarm** Connects a primary end-device to provide RF alarm data for any user-specific application.

**Tamper input** Connects a tamper input to send a message when user-specific end-device is tampered with.

**Reset input** Connects a reset input to reset the one-way binary RF module after a frequency band selection change or N/O - N/C selection change, and to initiate an RF transmission.

**Power** Connect power cabling to an external power supply of 2.4 to 5.5 volts.

**Ground** Connects to ground.

**Mounting hole** Used to mount the one-way binary RF module to the user-specific product. The mounting hole should only be used with a nylon standoff, never metal.

**LED contacts** Use to control an LED switch. Not designed to drive LED power. See "LED Requirements" on page 12 for information on using LED contacts.

**Board stabilization holes** Used to mount and stabilize the board. The board stabilization holes should only be used with non-metal standoffs.

### 3 One-Way Binary RF Module Dimensions

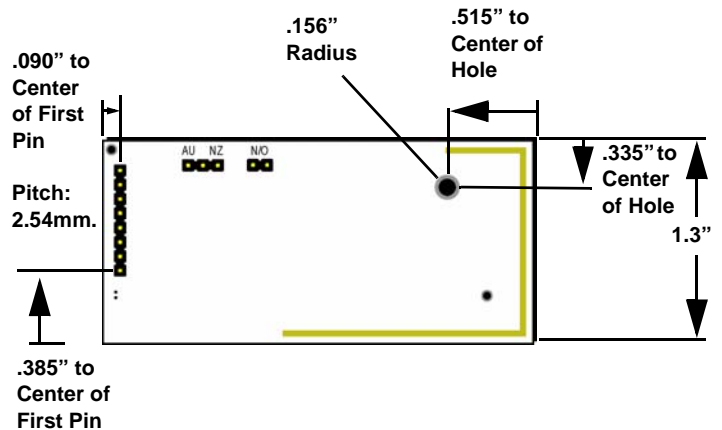


Figure 4 E\*1941 One-Way Binary RF Module Dimensions

## 4 One-Way Binary RF Module Connections and Output Jumpers

	Connection	Output Jumper N/O	Output Jumper N/C
Primary Alarm	Open	Alarm Clear	Alarm
	Ground	Alarm	Alarm Clear
Secondary Alarm	Open	Alarm Clear	Alarm
	Ground	Alarm	Alarm Clear
Tamper	Open	Alarm	Alarm
	Ground	Alarm Clear	Alarm Clear
Reset	Open for normal operation; connect to the ground and release for a board reset.		

## 5 Installation

- A** Connecting the One-Way Binary RF Module
- B** One-way binary RF modules are designed to be easily interfaced with your electronic remote application controller, however integration must conform to the following:
- C** The RF module must only be connected at the eight pin header or eight pin plated thru-holes.
- D** All cables and wires must be routed away from the component side of the RF module.
- E** The integrated antenna must not be tampered with; no connection to an alternate antenna is provided.
- F** The application module must not include an integrated secondary colocated radio module.
- G** The one-way binary RF module antenna should be placed so that it is facing away, or otherwise isolated from, your device's ground plane.
- H** Components that are sensitive to RF transmission, such as high gain circuits, should be isolated from the antenna to prevent interference.
- I** One-way binary RF modules should not be mounted on metal surfaces or inside metal enclosures. They should also not be mounted where sheet metal ductwork, wire mesh screens, etc. might block transmissions.
- J** The RF module should be integrated so the antenna is unobstructed by the end user's PCB, batteries, or any other conductive material.

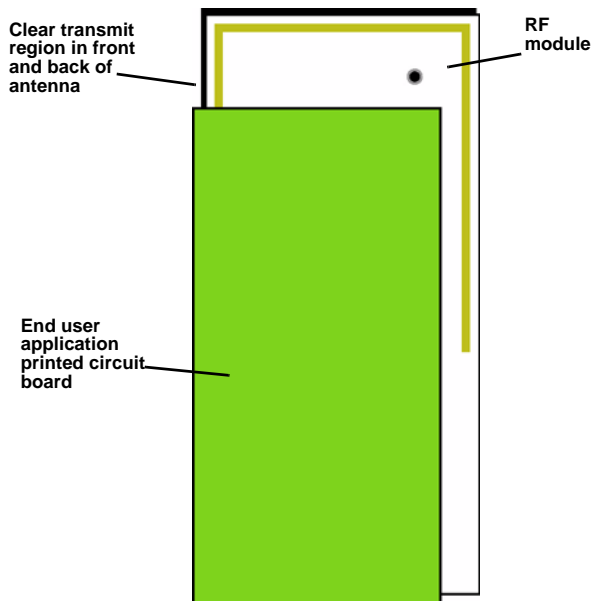


Figure 5 The RF module should be integrated so the antenna is unobstructed

## 6 One-Way Binary RF Module Requirements

### 6.1 Power Requirements

The E\*1941 has an on-board voltage regulator. Connect power cabling to an external power supply (Vcc) of 2.4 to 5.5 volts. Voltage must be sustained at 2.4 volts or above and supply 100 milliamps during the transmit cycle.

### 6.2 EN1941

Assuming check-in messages every 3 minutes and infrequent alarm messages (one per day, on average), the average current draw is 32 uA. Peak current draw while transmitting is less than 100 mA. One alarm/restore cycle per hour results in about 5.3 uA increase in average current.

### 6.3 EE1941

Assuming check-in messages every 12 minutes and infrequent alarm messages (one per day, on average), the average current draw is 15 uA. Peak current draw while transmitting is less than 50 mA. One alarm/restore cycle per hour results in about 5.3 uA increase in average current.

### 6.4 Low Battery Condition

The E\*1941 measures battery voltage every three and a half hours, and, when the battery measures 2.4 volts, a serial message is sent indicating a low battery condition.

### 6.5 Temperature range

-20°C to +60°C, non-condensing

### 6.6 RF network compatibility

EchoStream Commercial Mesh Network

### 6.7 Input Requirements

**Caution:** Input levels must not exceed 3.3 V.

**Open** When an active source (open collector or dry contact) is used to drive the alarm or tamper input, the voltage should be between 0.75xVcc and Vcc. A passive input should have an impedance of greater than 5.1k ohm between the input and ground.  
**Closed** When an active source is used, the voltage should be less than 0.25xVcc. A passive input should have an impedance of less than 240 ohm.

### 6.8 LED Requirements

The LED output is an active output from the microprocessor, with a 1k series resistor to limit current draw. Default state is low, and the LED pin is pulled high during transmit.

## 7 Compliance Requirements

### 7.1 FCC Requirements for the EN1941

The EN1941 one-way binary RF module has received a Limited Modular Grant, requiring Inovonics to retain control of the final installation to ensure compliance to FCC/IC regulations. The integrator is responsible to test the final installation to verify compliance to FCC/IC regulation for unintentional emissions. Prior to marketing the product, the integrator must complete and submit to Inovonics a compliance review form and documentation, and, if requested, a functional product sample for approval. If this is not possible, the integrator must perform the testing themselves and submit proof to Inovonics of compliance to Part 15 of the FCC Rules and Industry Canada RSS-210.

At the end of this guide is an Inovonics compliance review form to be filled out by the integrator.

The integrator is also responsible for properly labeling the product containing the one-way binary RF module. Labels must be placed on the outside of the product, and must include a statement indicating that the product contains the module, along with the FCC and IC number.

**Example 1** "Contains One-Way Binary RF Module  
 FCC ID: HCQ3B6OT9OEM; IC ID: 2309A-ETOEMM"

**Example 2** "Contains FCC ID: HCQ3B6OT9OEM; IC ID: 2309A-ETOEMM"

### 7.2 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.

### 7.3 FCC Part 15 Compliance

This device complies 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.

### 7.4 CE Label Requirements for EE1941

Inovonics Wireless has received European Telecommunications Standards Institute approval to market one-way binary RF modules, and they are manufactured to be RoHS compliant. The integrator is responsible for properly labeling the product containing the one-way binary RF module. Labels must be placed on the outside of the product, and must include the CE logo.

## 8 Warranty and Disclaimer

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

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Inovonics Wireless Corporation ("Inovonics") warrants its EchoStream 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.

# Inovonics One-Way Binary RF Module Compliance Review Form

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Please provide the following information for review of final installation to ensure compliance with FCC/IC regulations:

## Required materials from integrator

The following must also be attached for review with this form:

- A description of the final installation, with attached photographs, as necessary
- The unintentional radiator test report indicating compliance

## Integrator information

First name:	Last name:
Phone number:	Email address:
Address:	
Declaration of conformity to Inovonics' installation instructions:	
Submitted materials:	
Authorized signature:	Submission date:

## Inovonics contact information

Inovonics  
ATTN: Product Management  
315 CTC Blvd.  
Louisville, CO 80027  
Phone: 303.939.9336  
Toll-Free: 800.782.2709  
Fax: 303.939.8977  
productmanagers@inovonics.com

## Required materials from Inovonics

- The record of product sample review and test, as necessary

## Inovonics approval

First name:	Last name:
Phone number:	Email address:
Approval status (pass, fail, samples required, compliance testing required, compliance test report required):	
Approval comments:	
Submitted materials:	
Returned materials:	
Authorized signature:	Approval date: