EE1941XS/EN1941XS One-Way Serial RF Module

Installation and Operation Manual - 06288D

1 Overview

EchoStream RF modules are designed to be easily interfaced with your electronic remote application controller (RAC). Your RAC contains application specific functionality and uses the RF module to send application-specific data over the wireless network. The RF module communicates with your application controller via a wireless connection, and your remote application controller via a serial connection, allowing the assimilation of any user-specific application into an EchoStream system. Once integrated with an existing product, an RF module provides you with complete EchoStream functionality.

The E*1941XS, equipped with the UART logic-level serial connection, is primarily intended for use as a daughter board, interfacing directly with your RAC.

Figure 1 One-Way System Components

2 One-Way Serial RF Module Components

The E*1941XS is a one-way serial data transmitter, designed to physically interface with your product. Serial data sent to the E*1941XS from your remote application controller is formatted by the E*1941XS, and the data is then transmitted as an RF message to the network coordinator.

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

- The EN1941XS, for 900 MHz applications in North America, New Zealand, and Australia
- The EE1941XS, for 868 MHz applications in Europe

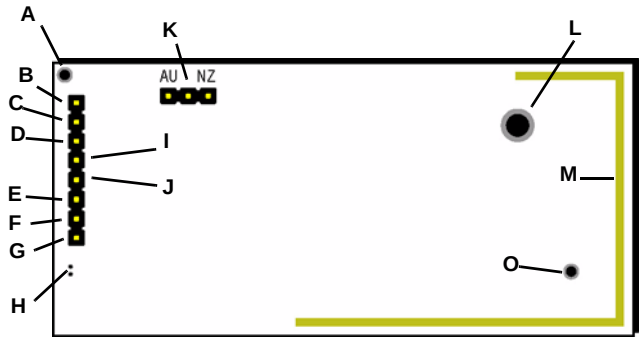

Figure 2 EN1941XS One-Way Serial RF Module Components

A Board stabilization hole.
B Data output
C Data input
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 Mounting hole
M On-board antenna
N Board stabilization hole

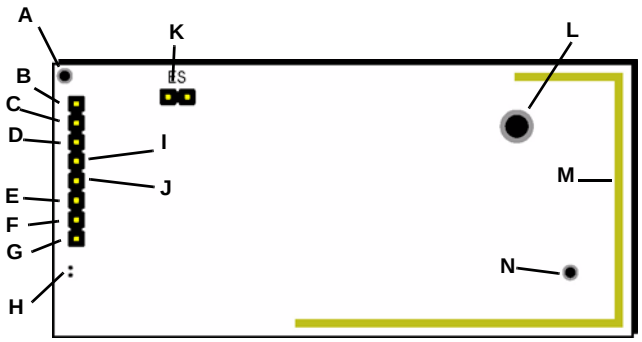

Figure 3 EE1941XS One-Way Serial RF Module Components

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 Mounting hole
M On-board antenna
N Board stabilization hole

Frequency band selection pins (EN1941XS 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 (EE1941XS 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.
Secondary alarm Driving pin high triggers a secondary serial alarm status message.
Primary alarm Driving pin high triggers a primary serial alarm status message.
Tamper input Driving pin high triggers a serial tamper status message from the RF module to the RAC. Does not trigger an RF tamper message.
Reset input Connects a reset input, to reset the one-way serial data RF module after a frequency band selection change.
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 serial data RF module to the user-specific product. The mounting hole should only be used with a nylon standoff, never metal.
Board stabilization holes Used to mount and stabilize the board. The board stabilization holes should only be used with non-metal standoffs.
Data output Outputs messages to the RAC.
Data input Receives messages from the RAC.

3 One-Way Serial RF Module Dimensions

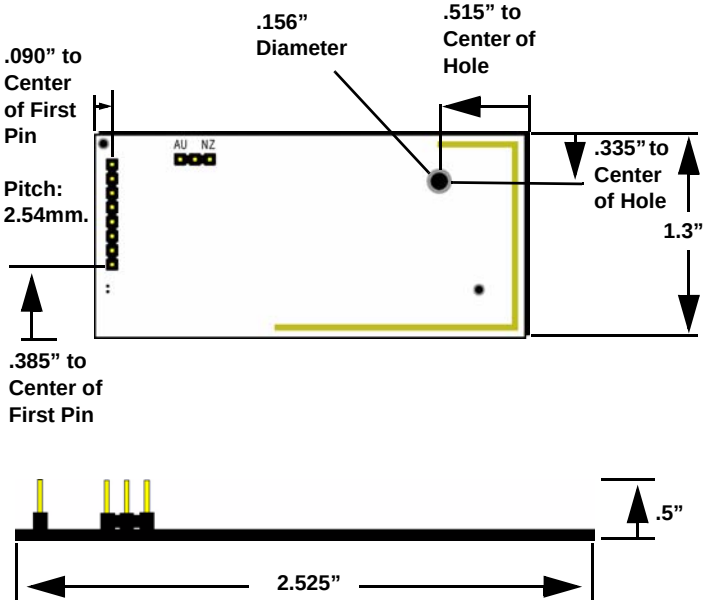

Figure 4 E*1941 One-Way Serial RF Module Dimensions

4 One-Way Serial RF Module Connections and Output Jumpers

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

5 Installation

A The RF module must only be connected at the eight pin header or eight pin plated thru-holes.
B All cables and wires must be routed away from the component side of the RF module.
C The integrated antenna must not be tampered with; no connection to an alternate antenna is provided.
D The application module must not include an integrated secondary colocated radio module.
E The one-way serial data RF module antenna should be placed so that it is facing away, or otherwise isolated from, your device's ground plane.
F Components that are sensitive to RF transmission, such as high gain circuits, should be isolated from the antenna to prevent interference.
G One-way serial 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.
H The RF module should be integrated so the antenna is unobstructed by the end user's PCB, batteries, or any other conductive material.

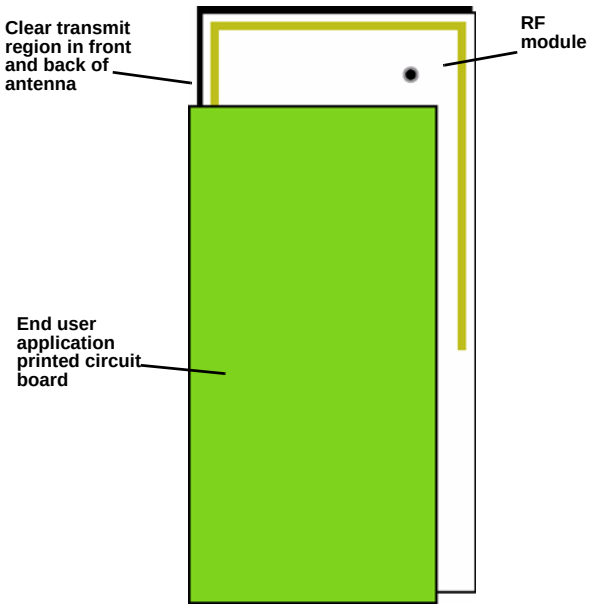

Figure 5 The RF module should be integrated so the antenna is unobstructed

6 One-Way Serial RF Module Requirements

6.1 Timing requirements

All data is sent at a default rate of 9600 baud, no parity, 8 data bits and one stop bit. The data is transmitted least significant bit first.

6.2 Power Requirements

The E*1941XS 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.

EN1941XS

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 with the maximum payload size results in approximately a 23mA increase in the average current.

EE1941XS

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 with the maximum payload size results in approximately a 12mA increase in the average current.

6.3 Low Battery Condition

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

6.4 Temperature range

-20°C to +60°C, non-condensing

6.5 RF network compatibility

EchoStream Commercial Mesh Network

6.6 Payload size

50 bytes maximum

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 Serial I/O - UART logic-levels

Input levels must not exceed 3.3 V. Output levels are limited to 3.3 V, maximum.
Data in pins Vih (minimum high level input voltage): 0.75xVcc
Data in pins Vil (maximum low level input voltage): 0.25xVcc
Data out pins Voh (minimum high level output voltage): Vcc - 0.25 at Ioh: -1.5mA
Data out pins Voh (minimum high level output voltage): Vcc - 0.6 V at Ioh: -6mA
Data out pins Vol (maximum low level output voltage): 0.25 V at Iol: 1.5mA
Data out pins Vol (maximum low level output voltage): 0.6 V at Iol: 6 mA

7 Compliance Requirements

7.1 FCC Requirements for the EN1941XS

The EN1941XS one-way serial data 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 serial data 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 Serial RF Module
FCC ID: HCQ3B6OT9OEM; IC ID: 2309A-OT9OEM (EN1941XS-IC)"
Example 2 "Contains FCC ID: HCQ3B6OT9OEM; IC ID: 2309A-OT9OEM (EN1941XS-IC)"

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.

8 FCC Part 15 and Industry Canada Compliance

This device complies with part 15 of the FCC Rules and Industry Canada 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, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie 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.

8.1 CE Label Requirements for EE1941XS

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

9 Warranty and Disclaimer

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

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 Serial RF Module Compliance Review Form

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

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397 South Taylor Ave.
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: