Badger Meter

ORION® CE Serial Repeater

For Laptop

ORI-UM-01211-EN-02 (December 2014)

User Manual

CONTENTS

INTRODUCTION

Audience and Purpose

The ORION® Serial Repeater Programmer software application is designed for use with the laptop personal computer (PC) for programming the ORION Serial Repeater ("Repeater") to receive transmissions from ORION Classic (CE) endpoints. The instructions in this document are intended for utilities who use the Repeater for mobile meter reading.

Repeaters are typically installed in network applications to increase the endpoint performance in remote areas where the endpoint is installed in a far away from the collection device. Transmissions are received from an ORION endpoint and then re-transmitted by a Serial Repeater.

System Requirements

The ORION Serial Repeater Programmer software application is compatible with WIndows® 7 32-bit operating systems.

Serial Repeater

The Serial Repeater (PN: 66140-001) is a receiver/endpoint that can be used to increase transmission range of any ORION CE water or gas endpoint. With its plastic enclosure, the Repeater can be placed in any indoor or non-submersed outdoor location.

A size D lithium battery provides power. The unit is shipped in the OFF mode.

You can program the Repeater to repeat reading data for up to 12 ORION CE endpoints stored in the data base. Once programmed, the Repeater will cycle through the list of endpoints in its memory and retransmit one reading every four to five seconds.

Programming the Serial Repeater

The Repeater can be programmed in the field using the Serial Repeater Programmer software application. The Repeater can also be programmed at the utility office if the required endpoint serial numbers are known; however, the Repeater should be tested at the location it will be used to ensure the signals are retransmitted as expected.

Positioning the Serial Repeater

The purpose of the Repeater is to receive and re-transmit signals from meter/endpoints whose signals are not being received where needed—near the road, for example. This might be due to distance alone, obstructions or a combination.

Ideally, the Repeater should be placed within clear, line-of-sight path of the ORION gas or water endpoints it is programmed to receive signals from. However, this is not always possible. Obstructions such as trees, shrubbery, buildings, decks, vehicles and uneven terrain are often present and might affect reception and transmission.

Obstructions might also change. Different seasons, increasing vegetation and new construction are among the factors that can affect a Repeater's performance.

NOTE: It is important to test the Repeater to make sure it is able to receive the signals that need to be retransmitted and to verify that its transmissions are received in the desired location. A handheld or other receiver device is required for testing.

About This Manual

This manual includes instructions for the following procedures.

- Programming the Repeater to receive transmissions from specific endpoints.
- Testing to make sure the correct transmissions are being received.
- Verifying the Repeater's re-transmissions are being received at the final location.

Typographic Conventions

- Items you will be asked to select or choose by clicking a button, highlighting, checking a box or another similar means are in **bold** text and capitalized in the manual.

  Example: Click the **View Report** button.

- Names of options, boxes, columns, fields, and sections are *italicized*. In most cases, first letters will be capitalized.

  Example: The information is noted in the *Meter Reading Cycle* field.

- Messages and special markings are italicized and in quotation marks, with first letters capitalized.

  Examples*: "Service Stopped"* displays in the title bar.

Product Unpacking and Inspection

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

License Requirements

ORION meter reading systems comply with Part 15 of FCC Rules. Operation of the ORS is subject to the following conditions: (1) The ORION meter reading systems may not cause harmful interference, and (2) the ORION meter reading systems must accept any interference received, including interference that may cause undesired operation.

In accordance with FCC Regulations, "Code of Federal Regulations" Title 47, Part 2, Subpart J, Section 1091, transmitters (endpoints) pass the requirements pertaining to RF radiation exposure. However, to avoid public exposure in excess of limits for general population (uncontrolled exposure), a 20 centimeter distance between the endpoint and the body of the user must be maintained during testing.

No FCC license is required by a utility to operate an ORION meter reading system.

ORION meter reading systems comply with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) they may not cause interference, and (2) they 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.

Any changes made, but not approved by Badger Meter, can void the user's authority to operate the equipment.

INSTALLING THE SOFTWARE

1. Load the software installation DVD on the PC.
2. Double-click **Setup.exe**.

   If the Visual C++ screen displays, click **Install**.

   Result: The setup Wizard opens.

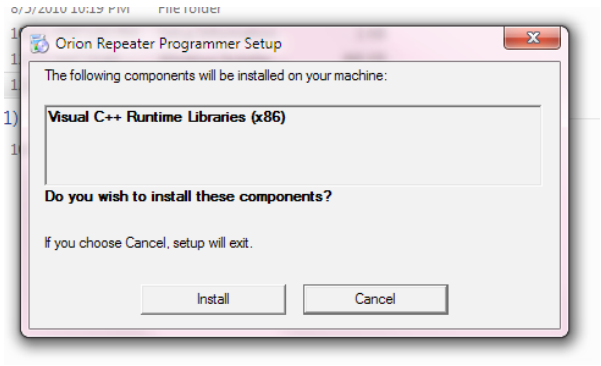


Figure 1: Visual C++ message

3. On the Welcome screen, click the **Next** button.

Figure 2: Software Setup Wizard

4. Verify that the software will be located in the Program Files folder (recommended). You can also click the **Browse** button to change the location of the software file.

   If more than one person will be using the software, click the radio button next to **Everyone**.

   Then click **Next**.
   Result: The Confirm Installation window opens.

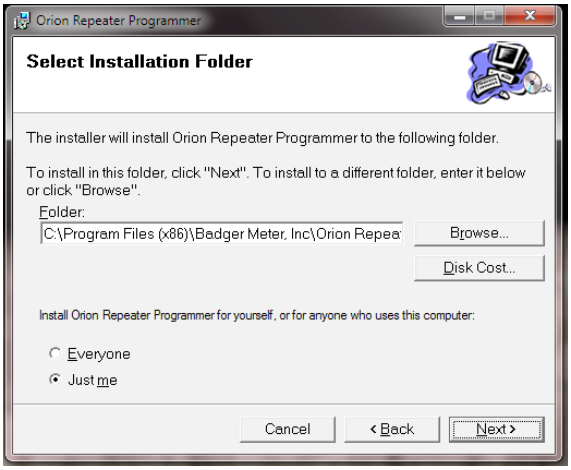


Figure 3: Software file location

5. Click the **Next** button to confirm and begin the installation of the software.
   Result: A progress bar displays while the software installs.

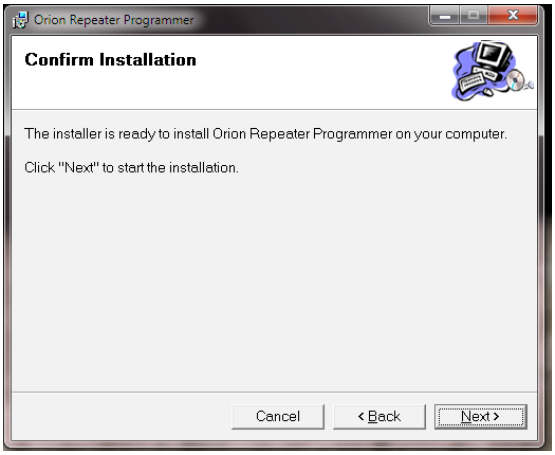


Figure 4: Confirm installation

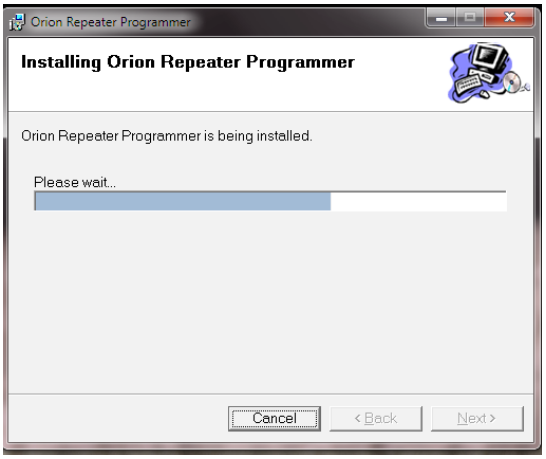


Figure 5: Software installing

6. When installation is finished, click the **Close** button.
   Result: The Setup Wizard closes and the software icon displays on the PC desktop.

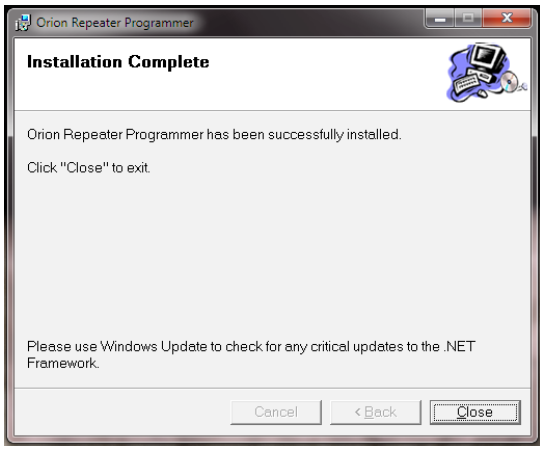


Figure 6: Installation complete

Installation is complete. The software is ready to use.

Figure 7: Desktop icon

LAPTOP SETUP

Before using the software to program the Repeater, connect the Repeater to the PC using the DB9 null modem cable supplied with the Repeater.

Both ends of the DB9 cable are the same. Either end can be plugged into the PC and the Repeater.

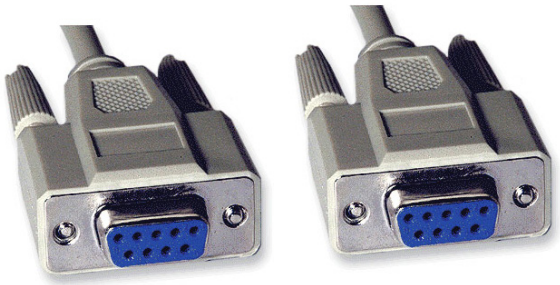


Figure 8: DB9 null modem cable connector ends

1. Using a screwdriver, loosen the four screws on the Repeater and remove the cover.
2. Connect one end of the DB9 cable to the port on the Repeater circuit board.

   The words "NULL MODEM CABLE ONLY" appear above the cable port on the Repeater circuit board as shown in *Figure 9*.

Figure 9: Cable connected to Repeater circuit board

3. Connect the other end of the DB9 cable to the serial port on the PC.

IMPORTANT

The COM port for the Repeater must be set correctly for the PC and the software to operate correctly. See "SETTING COM Ports" on page 11 for more information.

PROGRAM STARTUP AND EXIT

1. Double click the desktop icon to open the Repeater login screen (*Figure 11*).
2. Type a three-character personal identification number (PIN) in the field below *Enter your Initials*.

   NOTE: The PIN must be entered by an authorized representative of the customer/licensee. The PIN is user defined and can be a initials, an ID number or other information.
3. Click **OK** to open the software application..

   NOTE: If an invalid PIN is entered, the **OK** button will not activate. Re-enter a valid PIN and click **OK** or press **ENTER**.

Figure 10: Desktop icon

Figure 11: Login screen

Exiting the Software

Exit the software application in one of three ways.

On the Read screen, click **Done** at the bottom of the menu bar on the left side of the screen, or click **File**> **Exit** from the top menu bar, or click the **X** in the top right corner of the screen (*Figure 12*).

Then click **OK** when the confirmation screen displays to exit the software program.

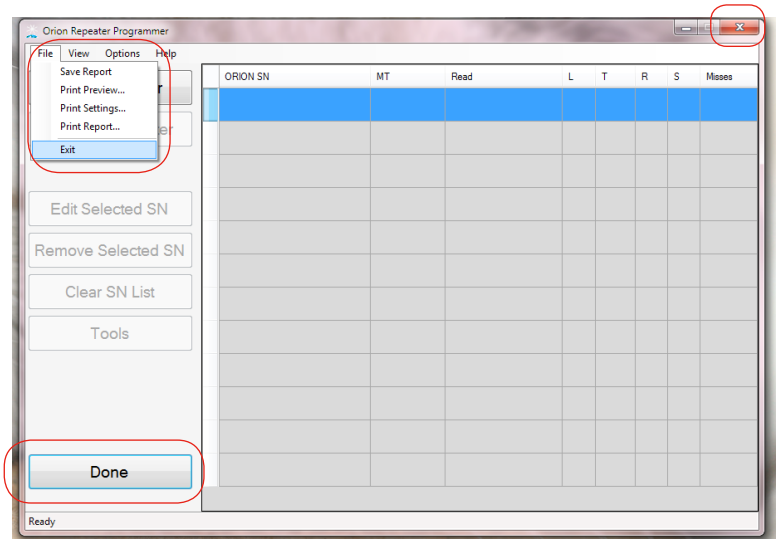


Figure 12: Read screen

SETTING COM PORTS

Before you use the software application, go to **Options**> **Settings** to set the communication (COM) ports for the hardware attached to the PC. The COM ports must be set correctly for the Repeater to operate as designed.

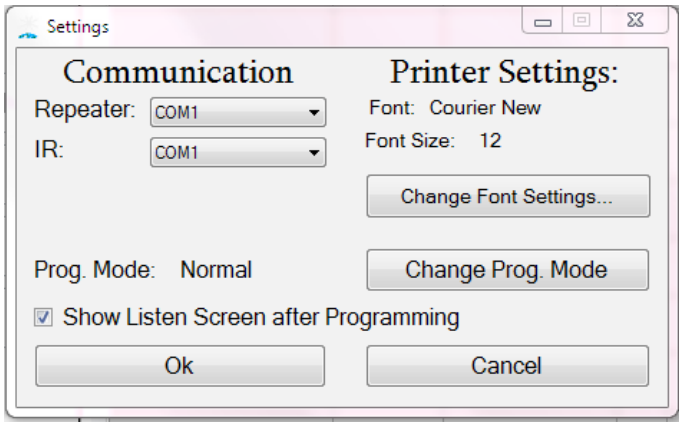


Figure 13: Settings

Use COM 1 for the Repeater if the DB9 cable is connected to the serial port on the PC. If you are using a different COM port, click the arrow in the drop-down menu to select a different COM port.

Using an IR Programming Cable

The IR programming cable and the ORION CE Repeater can both use the nine-pin serial port on the PC. If you are using the IR cable, select COM 1 for IR as shown in *Figure 13*.

NOTE: To use the IR cable, you will disconnect the Repeater temporarily while using the IR cable to read endpoints.

For additional information about Settings, see *"Settings" on page 18*.

REPEATER PROGRAMMER

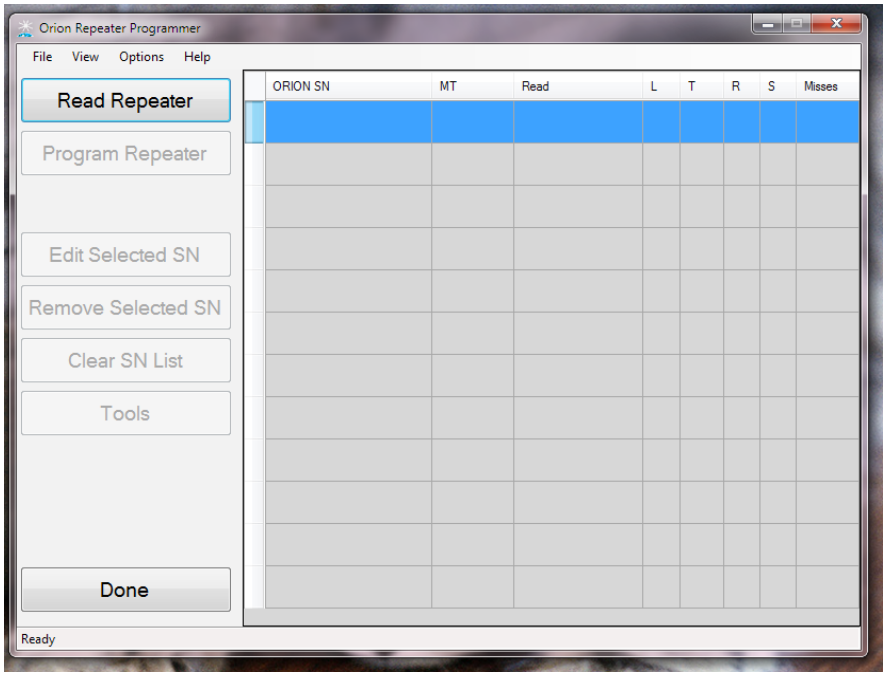


Figure 14: Repeater Read screen

The buttons along the menu bar on the left side of the screen perform these functions.

Read Repeater	This option is the first step in programming or updating the Repeater. After programming, click **Read Repeater** to display the list of ORION CE serial numbers programmed and stored in the Repeater.
Program Repeater	Sends the displayed list to the Repeater. The Repeater will replace its list of endpoint serial numbers with this button.
Edit Selected Serial Number	Change or correct a selected endpoint serial number in the list.
Remove Selected Serial Number	Remove a selected endpoint serial number from the list.
Clear SN List	Removes all serial numbers from the list. This function is handy when removing a Repeater from a service location.
Tools/Listen	Causes the Repeater to forward every ORION endpoint transmission it receives to the Repeater software for 30 seconds. As each transmission is received from the Repeater, the software will display it in a separate window, allowing you to view all of the endpoints within range of the Repeater. This function helps to determine a mounting location for the Repeater.
Tools/Transmit	Causes the Repeater to transmit a programmed endpoint signal to ensure a handheld or PC with Quick Read software can hear the transmissions.
Done	Exit the Repeater software application.

READ REPEATER

The **Read Repeater** button is the first function you perform when using the Repeater software. It initiates communication with the Repeater itself, fetches the list of ORION endpoints in the Repeater memory, and displays them in a list on the right side of the screen.

A message as shown in *Figure 15* displays if any communication errors occur. Check the DB9 cable and the COM port settings and retry.

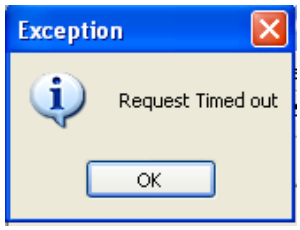
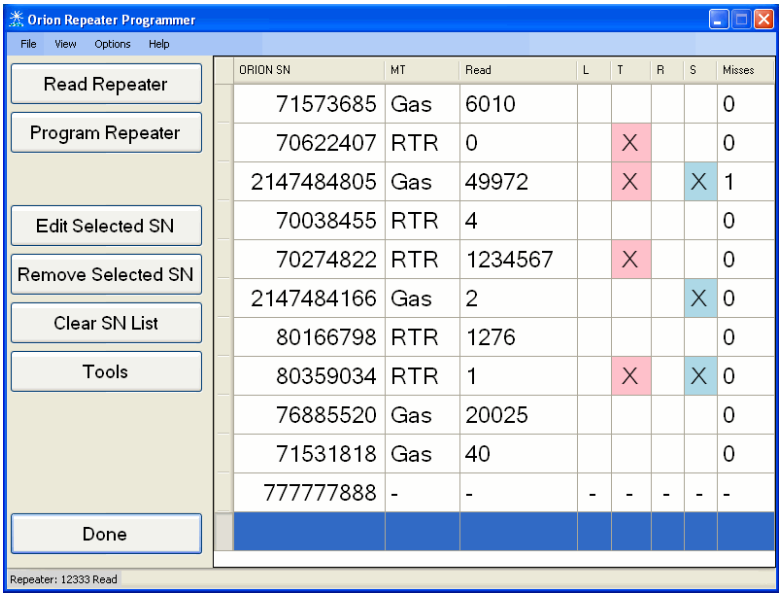


Figure 15: Exception message

Information on the Read Screen

The Repeater Read screen displays the programmed endpoint serial numbers.



ORION SN	MT	Read	L	T	R	S	Misses
71573685	Gas	6010					0
70622407	RTR	0		X			0
2147484805	Gas	49972		X		X	1
70038455	RTR	4					0
70274822	RTR	1234567		X			0
2147484166	Gas	2				X	0
80166798	RTR	1276					0
80359034	RTR	1		X		X	0
76885520	Gas	20025					0
71531818	Gas	40					0
777777888	-	-	-	-	-	-	-

Figure 16: Read screen with endpoint list

The table below describes the information in the columns on the Read screen.

Label	Description
ORION SN	Endpoint serial number.
MT	Meter/encoder type.
Read	The last reading received from the endpoint.
L/T/R/S	Status reported, if any, including Leak (L), Tamper (T), Reverse Flow (R), and S (Stopped Meter). The field is checked if the status is reported for the endpoint serial number in the list.
Misses	Reports the number of times the Repeater missed a meter reading from the endpoint. **NOTE:** The Repeater listens for transmissions once an hour.

Adding An Endpoint Serial Number

NOTE: Make sure the Repeater and PC are connected with the DB9 cable.

1. Click the **Read Repeater** button on the Repeater Read screen.
2. When the list of serial numbers from the Repeater is displayed, click on an open spot in the *ORION SN* field and click the **Edit Selected SN** button.

   Result: The screen in Figure 17 opens.

Figure 17: Add serial number

3. Enter the endpoint serial number in one of three ways.
   - Type the endpoint serial number you want to add using the PC keyboard.
   - Click the **Keypad** button to use the numeric keypad on the software.
   - Use the IR programming cable to read the serial number. To do this, temporarily disconnect the DB9 cable from the PC and connect the IR cable. Align the optical head of the IR cable with the IR LED port of the endpoint you want to add and click the **IR** button.

     NOTE: Make sure the COM port is set for the IR cable. When finished adding endpoints, remove the IR cable and reconnect the DB9 cable to the PC serial port.
4. Once the serial number is entered, click **OK**.

   Result: The screen will show the Read screen with the serial number added to the list. The rest of the data for the endpoint will be blank.

Changing a Serial Number

1. Click on the serial number in the list on the Read screen. Then click the **Edit Selected SN** button.

   Result: The Edit ORION SN screen opens.

2. Change the serial number by using the keyboard, the numeric keypad, or by reading the serial number using the IR head. See *"Adding An Endpoint Serial Number" on page 14* *if you need help.*
3. Once the serial number is corrected, click the **OK** button.

   The Read screen will show the corrected serial number.

Figure 18: Edit serial number

Removing a Serial Number from the List

1. To remove one of the serial numbers on the Read screen list, click on the serial number.
2. Click the **Remove Selected SN** button.

   The screen will show the Read screen with the serial number removed from the list. If there were other serial numbers below it, they will be moved up the list so that there are no open slots in the list.

Clearing All Serial Numbers

To clear all serial numbers from the list on the Read screen, click the **Clear SN List** button.

The screen will show the Read screen with no serial numbers on the list.

PROGRAMMING THE REPEATER

NOTE: Make sure the Repeater and PC are connected with the DB9 cable.

A Repeater must be programmed in the field in order to activate the device. Once the ORION endpoint is installed, a Repeater can be installed within range of the endpoint to increase the performance.

To program the Repeater, make sure the list on the Read screen is updated to show the endpoint serial numbers you want to store in the Repeater. Then click the **Program Repeater** button.

The endpoint serial numbers on the list are stored in the Repeater.

ORION Repeaters can be tested in the field using either the ORION laptop or handheld with the ORION Quick Read software.

USING THE REPEATER TO LISTEN TO ENDPOINTS

NOTE: Make sure the Repeater and PC are connected with the DB9 cable.

To see a list of the endpoints the Repeater is receiving, click the **Tools Listen** button on the Read screen. This function is helpful in determining a good place to mount the Repeater.

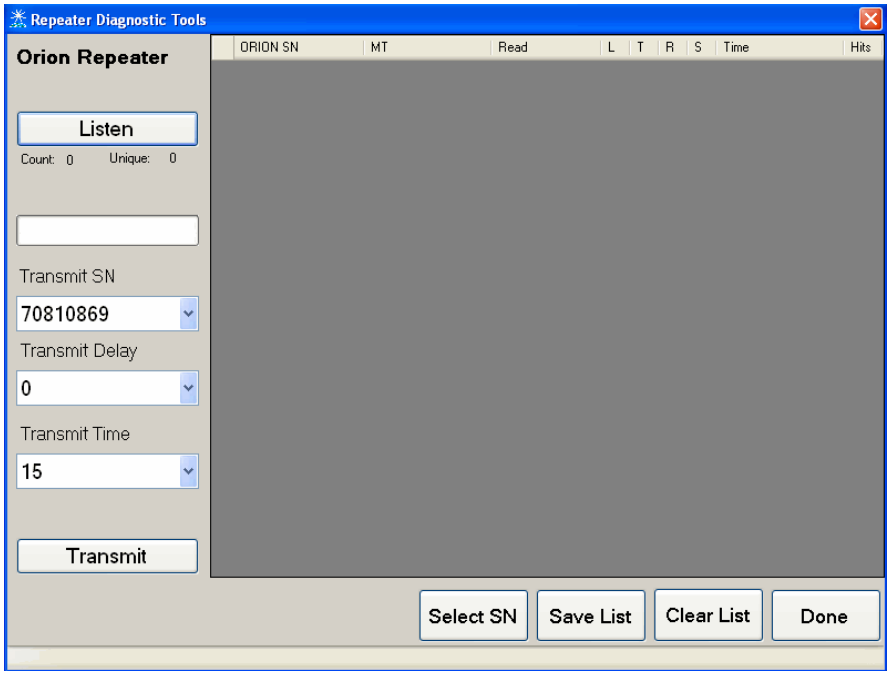


Figure 19: Listen/Transmit screen

When you click the **Listen** button, every time the Repeater receives a transmission from an ORION endpoint, the software will display it on the list. The most recent transmission will be shown at the top of the list. This will continue for 30 seconds.

1. To verify that the Repeater can hear the selected endpoints, place the Repeater in the desired mounting location.
2. Click the **Listen** button.
3. Verify that the endpoints you programmed all display on the screen. If they do not, reposition the Repeater and tap Listen again.

   The process is complete when the Repeater hears all the programmed endpoints.

CHECKING THE RECEPTION AT THE DESTINATION POINT

NOTE: Make sure the Repeater and PC are connected with the DB9 cable.

In choosing a location for the Repeater, you must also verify that the Repeater's signal reaches the area where you intend to receive the meter readings. To test this, the Repeater has a Constant Transmit function. When activated, the Repeater will, after a specified wait time, transmit the meter reading for one endpoint over and over again for 30 seconds.

1. Click the **Tools Transmit** button on the Read screen.
2. Click the arrow on the **Transmit SN** drop-down menu to select the endpoint serial number.
3. Click the arrow on the **Transmit Delay** drop-down menu to choose the amount of seconds for the Repeater to wait before transmitting.
4. Click the arrow on the Transmit Time drop-down menu to choose the number of seconds you want the Repeater to transmit.
5. When you are ready, click the **Transmit** button and move to the meter reading location.

   The Repeater will begin counting down the number of seconds in the *Transmit Delay* field. When the countdown is completed, the Repeater will transmit the meter reading for the chosen serial number over and over again for the amount of time chosen by the *Transmit Time* field. This allows you verify that the repeated signal is reaching the desired area.

   After a successful test, the Repeater is ready to use.

6. Unplug the DB9 cable from the PC and the Repeater and replace the cover on the Repeater.

SETTINGS

Choose **Options> Settings** from the top menu bar to open the Settings screen and view, configure or modify the PC settings for working with the Repeater. Each menu option is described in this section.

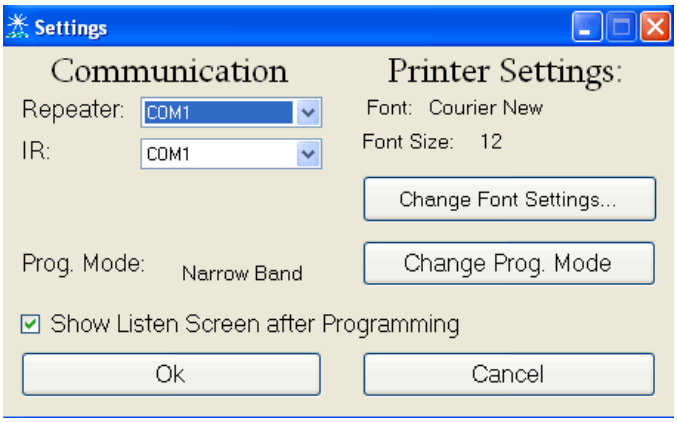


Figure 20: Settings

Repeater	When the Repeater is attached to the PC with the DB9 null modem cable, select the COM port for the Repeater. Click the arrow on the drop-down menu to select a COM port. If the Repeater is attached to the PC nine-pin serial port, the port is **COM 1**.
IR	Set the IR COM port if you are reading endpoints using the IR programming cable. The IR programming cable and the ORION CE Repeater can both use the nine-pin serial port on the PC. If they do, select COM 1 for the IR cable. Click the arrow on the drop-down menu to select a COM port.
Change Prog. Mode	Click the button to change the programming mode. Choose frequency hopping or narrow band based on the type of endpoints you are programming.
Change Font Settings	Click the button to change the font settings for the reports from the Repeater. The font style and size displays on the Settings screen.
Ok	Saves the changes made to Settings and closes the screen.
Cancel	Removes any changes made that were not saved and closes the screen.

TECHNICAL SUPPORT

While errors do not occur normally, errors can happen in any software product. Contact Badger Meter Technical Support if you have a question about the software application or if you receive an error message you cannot resolve.

What To Report

If possible, give the following information to the Support Specialist:

- The screen that was active when the problem occurred.
- The steps being performed.
- Any entries that were made on the screen.
- Any error code or explanation that is shown.
- The current state of the Serial Repeater Programmer.

Contact Badger Meter Technical Support

Phone: 800-456-5023

Email: TechSupport@BadgerMeter.com

Fax: 888-371-5982

The Badger Meter Technical Support Group is also available via electronic mail through the Internet. To send questions or comments to the Technical Support group, address your e-mail to TechSupport@BadgerMeter.com. The Technical Support Group can respond to your comments or questions via phone, fax, or e-mail. Just let us know in your message the type of response you would prefer.

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www.badgermeter.com

The Americas | Badger Meter | 4545 West Brown Deer Rd | PO Box 245036 | Milwaukee, WI 53224-9536 | 800-876-3837 | 414-355-0400
México | Badger Meter de las Americas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01050 | México, DF | México | +52-55-5662-0882
Europe, Middle East and Africa | Badger Meter Europa GmbH | Nurtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0
Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503
Czech Republic | Badger Meter Czech Republic s.r.o. | Maříkova 2082/26 | 621 00 Brno, Czech Republic | +420-5-41420411
Slovakia | Badger Meter Slovakia s.r.o. | Racianska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01
Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | Singapore 449269 | +65-63464836
China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412

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