



Badger Meter

ORION®

Automated Meter Reading System for the Trimble® Ranger™ 3



IMPORTANT:
This manual contains important information.
READ AND KEEP FOR REFERENCE.

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Introduction

The ORION® Automated Meter Reading System for the Trimble® Ranger™ 3 Installation and Operation Manual has two main parts:

- **Part I: Overall Operations**
Part I includes basic information to help you understand the overall operation of the Trimble Ranger 3 handheld and the ORION Field Application meter reading software. Part I includes equipment set up and program start up instructions.
- **Part II: User Guide**
Part II is the technical reference and includes step-by-step procedures and process details.

Audience and Purpose

The ORION Automated Meter Reading System for the Trimble Ranger 3 Installation and Operation Manual is intended to be used by field technicians for collecting accurate utility meter readings from homes and businesses using the handheld.

IMPORTANT:

To provide the best solution for our customers, Badger Meter continually improves software programs and updates this Installation and Operation Manual on a periodic basis to reflect upgrades. Therefore, you may notice discrepancies between your installed program and this manual.

System Overview

The Trimble Ranger handheld computer is a flexible and easy-to-use tool which can be used with various meter reading technologies. It provides utilities with a handheld interrogator that can be operated with a customized keypad for data entry.

The handheld is compatible with ORION manual and touch read systems. An ORION equipped handheld can be used for reading and programming endpoints and as a troubleshooting tool in the field.

- The **ORION Smart Endpoint (SE)** is a full functioning (2) two-way water endpoint for use in either mobile or fixed network mode of operation. Once installed, ORION SE endpoints operate in mobile mode and will automatically transition to fixed network mode of operation once ORION network gateway transceivers and ReadCenter software are deployed. ORION SE endpoints may also transition back to mobile mode at any time via two-way command or will automatically transition back to a backup mobile mode of operation if the network is disrupted for a period of time.
- The **ORION Migratable Endpoint (ME)** is a full functioning (2) two-way water endpoint for mobile applications with the capability of migrating to fixed network mode to support future utility growth. In addition to providing the current reading, the ORION ME endpoint's two-way functionality allows users to capture data profile information wirelessly, without having to access the endpoint during the normal reading process.
- The **ORION Classic Endpoint (CE)** is a one-way endpoint designed for mobile meter reading. ORION CE endpoints support data profile and may be transitioned to fixed network application through approved electric connectivity partner solutions, or with strategic deployment of ORION gateway 4.0 and 2.0 receivers.

The handheld can be ordered with an internal ORION ME transceiver or ORION CE receiver, or a non-radio handheld can be upgraded at a later date to meet the needs of the utility. For utilities deploying mixed ORION ME and CE systems, an external mobile receiver or transceiver may be added. Refer to "[Handheld Setup for Reading Both ORION ME and ORION CE Endpoints](#)" on page 11.

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, endpoints (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 mobile device 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.

Glossary

TERM	DESCRIPTION
ADE®	The Absolute Digital Encoder (ADE) is a position-based encoder that senses the position of each number wheel to determine the reading for touch and AMR/AMI systems.
AMI	Advanced metering infrastructure (AMI).
AMR	Automated meter reading (AMR) system that uses radio frequency technology to transmit meter readings between an endpoint and a data collection device.
comment code	A message from the utility office to the meter reader that is displayed when the meter information is displayed on the read screen. The messages are defined and maintained by the utility and chosen from a defined list created in the Badger Meter reading data management software.
encoder error	<p>A situation (ORION radio or touch read) in which one or more of the number wheels in the mechanical encoder cannot be read. There are two common causes of encoder errors:</p> <ol style="list-style-type: none"> 1. Improper alignment of the number wheels in the encoder 2. A component failure inside the encoder <p>If the error is caused by a misalignment of the number wheels, the error can be cleared by running consumption and changing the reading value of the number wheel causing the error. If the encoder error occurs at the same account over two or more continuous reading cycles, the encoder has most likely failed and should be replaced.</p>
endpoint	A communication device located at the meter that encodes and communicates reading data to a data collection device (handheld, mobile or gateway).
enlargement	A feature on the Read screen that allows you tap on an information field to temporarily view it enlarged. Choose the enlargement feature in Program Options on the Settings menu. Refer to " Program Options " on page 35 for details.
field	A piece of information in the handheld, such as the service address or the meter serial number, that resides on a screen.
final read	A meter reading taken as a customer moves from one location to another in order to send the customer their final bill.
GUID	A globally unique name (GUID) consisting of a number of characters is assigned to every handheld. The GUID is not duplicated anywhere in the world.
main menu	The screen that provides access to the main functions of the handheld software.
mobile receiver	A mobile one-way communication device that receives information from an endpoint via a mobile data collection device (handheld or laptop computer).
mobile transceiver	A mobile two-way communication device that receives and transmits information to and from an endpoint via a mobile data collection device (handheld or laptop computer).
module	In general, an electronic product used to report a meter's reading. The Badger Meter ORION electronics which are needed to perform a radio read is an example of a module.
ORION CE	The ORION CE (classic endpoint) is a one-way local automated meter reading (AMR) system which communicates with a mobile <i>receiver</i> designed to read ORION water and gas endpoints. The receiver has Frequency Hopping Spread Spectrum (FHSS) technology to minimize interference and eliminate FCC licensing.
ORION CE Utility	The ORION CE endpoint programming and quick read software application.
ORION Field Application	The ORION meter reading software application for the handheld.

TERM	DESCRIPTION
ORION ME and ORION SE	The ORION ME (mobile endpoint) and ORION SE (smart endpoint) are two-way utility management solutions. ORION ME and ORION SE (in mobile mode) endpoints communicate with a mobile <i>transceiver</i> designed to receive signals from and send signals to ORION ME and SE water and gas endpoints. The transceiver has Frequency Hopping Spread Spectrum (FHSS) technology to minimize interference and eliminate FCC licensing.
ORION ME/SE Utility programming menu	The ORION ME and SE endpoint programming and quick read software application.
quick read	A specific menu within the Badger Meter AMR software that allows module programming. A feature that allows the operator to capture a reading for a specific module. The quick read function is available for touch modules or ORION endpoints. When quick reading ORION endpoints, you can also display the readings from up to 50 of the endpoints in range of the Badger Meter ORION receiver, not just one endpoint.
potential leak	A status reported by an ORION endpoint showing that the meter has registered continuous flow and may have a potential leak.
reading data management software	Refers to ReadCenter® Analytics, Data + and Data software which acts as an interface between the utility's billing software and the meter reading devices. The handheld software will load and unload meter information to the reading data management software.
reading menu	The handheld screen holding the list of different functions that can be performed when reading meters.
RF	Radio frequency.
route	A list of meters to read.
route management software	The software product or system that loads route information into the computer and accepts completed meter readings from the handheld computer.
route progress	The function that displays the number of meters read in the current route, along with other related information.
RTR®	The Badger Meter Recordall® Endpoint Register (RTR) is used in conjunction with Recordall disc, turbo, compound and fire series water meters to measure totalized flow through the meter and output a signal to Badger Meter meter reading products.
settings	The values that can be changed by the user to control behavior to certain screen functions.
tamper	A status reported by an ORION endpoint showing that the lead line between the register and the endpoint is cut or shorted.
text message	A message entered by the meter reader to be sent to the utility office via the Badger Meter reading data management software.
transceiver	See "mobile transceiver."
trouble code	A message that is chosen by the meter reader from a list stored in the handheld and sent to the utility office describing a condition or status at the meter.
VersaProbe™	A meter reading wand that can be used with the handheld to read touch modules.

Part I: Overall Operations

Trimble Ranger Handheld Overview

System Components

Handheld in Charging Cradle



Battery Pack



Optical Programming Cable



ORION Antenna



Stylus



Hand Strap



Figure 1: Handheld with Antenna, Charger and Components

The Trimble Ranger handheld system components include:

- Trimble Ranger 3 handheld with touch screen and custom keypad
- ORION Field Application meter reading software, pre-installed
- ORION ME/SE Utility, pre-installed
- ORION CE Utility, pre-installed
- ORION antenna (not included with a manual read handheld)
- Handheld charging cradle with power cord
- Multi-pack of screen protectors, one pre-applied (not shown)
- 2-pack stylus
- Hand strap
- Optical programming cable
- Battery pack
- AC charger and international electric outlet adapters (not shown)

Touch Screen

In addition to the keyboard, the handheld is equipped with a touch screen to facilitate function selection and promote ease of use. To make a selection, touch the screen using the stylus tool provided with the handheld or simply **tap** the screen with your finger. The touch screen is sensitive enough to allow selecting with a tap even if you are wearing gloves. For additional information on the touch screen, refer to **"Using the Touch Screen" on page 15**.

Handheld Description

The Trimble Ranger is a handheld computer designed for fully automated data collection along a route for meters equipped with ORION endpoints. The handheld can also accept manual reads to support utilities as they transition from manual read to AMR technology.

The handheld also functions as a programming device for initial setup of endpoints in retrofit installations where matching existing readings is required.

By entering a reading with the numeric keypad, the handheld can be used as a manual data collector. This reading is stored as a normal record and transferred with route information.

The handheld can store up to 5000 accounts. Route file load and unload data is transferred between the handheld and the reading data management software via a USB memory drive or wirelessly depending on the utility.

Configurations

The Trimble Ranger handheld is available in three configuration options:

- Handheld with an internal ORION ME transceiver
- Handheld with an internal ORION CE receiver
- Handheld for manual reads only (no radio)



Figure 2: Inside Battery Compartment of Handheld

The FCC label is displayed on the inside of the battery compartment of the handheld as shown in Figure 2.

Note: Refer to "[Handheld Setup for Reading Both ORION ME and ORION CE Endpoints](#)" on [page 11](#) for instructions on how to set up a single handheld to read both ORION ME and CE endpoints.

Handheld Setup for Reading Both ORION ME and ORION CE Endpoints

To read both ORION ME and CE endpoints, the handheld must be equipped with either an internal ORION ME transceiver or an internal ORION CE receiver.

To set up the handheld for reading both ORION ME and ORION CE endpoints, follow these steps.

1. Connect the ORION antenna to the antenna base on the handheld and hand-tighten until snug.
2. Press the green key to power on the handheld.
3. **If the handheld has an internal ORION ME transceiver**, connect an ORION CE mobile receiver using the receiver's communication cable. Plug the communication cable into the top of the ORION CE mobile receiver and the 9-pin serial end into the serial port at the bottom of the handheld as shown in the **A** setup (left side) in Figure 3.

or

If the handheld has an internal ORION CE receiver, connect an ORION ME mobile transceiver using the transceiver's communication cable. Plug the smaller end of the communication cable into the top of the ORION ME mobile transceiver and the larger end into the USB port at the bottom of the handheld as shown in the **B** setup (right side) in Figure 3.

4. Switch on the ORION CE (or ME) connected to the handheld.
5. Start the ORION Field Application software.

Note: Mobile transceiver and mobile receiver require DC power source to operate.

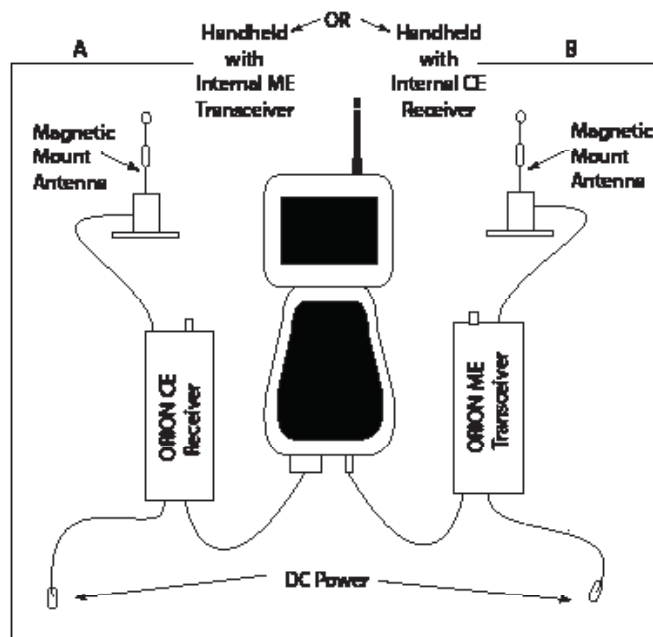


Figure 3: Setup for Reading ORION ME and CE Endpoints

Charging the Handheld Battery

The handheld should arrive fully charged. However, charging the battery before use is a good practice.

The battery pack assembly includes the batteries to power the unit, the power port used to charge the unit and the I/O ports that are used to communicate with other devices using a USB or serial cable.

The AC charger that ships with the unit has adapters to fit almost every electrical outlet. Connect the appropriate outlet adapter to the AC charger. Plug the charger into an electrical outlet. Make sure the handheld is fully seated in the charger and the charging pin is fully engaged.

The handheld is fully charged in approximately 4.5 hours. Acceptable temperature range for charging the battery is between +5° C and +35° C (+41° F and +95° F).

The LED (light emitting diode) on the top left corner of the handheld displays the charging status as shown in this table.

Normal usage	
Off	No charger present or unit is unplugged
Yellow	Charging
Green	Charging complete
Error conditions	
1 - 2 short flashes *	Temperature out of range for charging
3 short flashes	Wrong charger

Note: If the fully-charged unit is still connected to the charger, **Settings > System > Power** status shows the battery power remaining as if the unit were still on battery power.

WARNING Always use the charger included with your unit. Use of other chargers will void the warranty.

Conserving the Battery

The handheld conserves battery power by turning itself off when not in use.

Note: When the Read screen or Quick Read screen is in use, the handheld will NOT turn off automatically because the ORION reading functions are active. If you wish to conserve the battery, be sure to return to the Main Menu so the automatic off function is active.

Press and release the green power key on the keypad to turn the unit back on. The display shows the same screen that was displayed when the unit turned off.

Battery Life

Wireless

The handheld has been designed to operate with the internal BlueTooth® and 802.11 wireless communication features and will automatically turn them off when not in use. Do not turn on the wireless features unless instructed. Leaving the wireless options on reduces battery life.

Charging Cradle

When using the handheld cradle to charge the battery pack, be sure the handheld is fully seated into the cradle. The cradle is designed to be set up on a flat surface or mounted on a wall. Up to 10 cradles can be connected together and use a single power cord.

To verify the unit is being charged, the top line of the screen will indicate **(Batt: A/C)**. It may take a few minutes for the screen to update from the rate of battery charge to the indication that it is being charged by A/C power. To immediately check the battery pack charging status, exit the ORION Field Application and then restart. The top line of the screen shows the battery charge status.

Tips for extending the battery life

- Use the backlight only when necessary. Press the **Fn + power** keys to toggle the backlight on and off.
- Tap **Start> Settings> System> Backlight** to select the amount of time the backlight stays on when the unit is idle. Also, a brighter backlight uses more power than a dim setting.
- When working in cold temperatures, keep the unit as warm as possible.

Swapping the Battery Pack (Low Battery)

If the battery is running low while the handheld is in use, a **low battery** message displays on the screen.

The battery pack is designed to be swapped out quickly in the field (if you purchased additional battery packs). If the battery pack runs low, replace the battery pack and continue with your work.

The unit saves enough power that it will not trigger a reset if you swap the battery pack within a couple of minutes. If the saved power runs out before the new battery pack is connected, the unit will reset. The reset does not impact saved data, programs or configuration; however, unsaved data will be lost and the time will have to be reset.

To swap a battery pack, perform the following steps:

1. Remove the hand strap from the battery pack assembly.
2. Ensure the unit is turned on. (The unit will automatically turn off when you loosen the screws in the next step.)
3. Use a screwdriver or a coin to unlock the two screws on the battery pack assembly by turning them counter-clockwise until the battery pack can be removed. Unscrewing the screws turns the unit off and puts it in a special state that prevents it from turning on for alarms and notifications.
4. Remove the battery pack assembly by taking it out of the unit. Be careful not to press the Power key while the battery pack is detached.
5. Quickly insert the new battery pack onto the unit.
6. Fasten the battery pack securely into place by turning the screw clockwise.
7. Replace the hand strap.
8. Turn the unit on to resume operation.

Note: The handheld will not turn on unless the screws are tightened securely.

Handheld Basic Operations

The Trimble Ranger handheld is made up of a number of functions that all work together to perform meter reading quickly and easily.

Turning the Handheld On (and Off)

- To turn on the handheld, press and hold the green power key until you see the **Booting** message. Release the power key and the handheld boots up in a few seconds.
- To turn off (shutdown) the handheld, press and hold the green power key until you see the message "**Release power button to use menu.**" Release the power key and the Power Menu displays. Tap **Shutdown** to power off the handheld.

When the handheld is in use, one of the most convenient features is "instant on" and "instant off" (also known as "suspend/resume"). The handheld goes into "instant off" when it is not being used. Press and release the green power key to resume use. The screen that was previously displayed will display again. There is no waiting for the unit to boot up every time it is turned on.

Changing the Handheld Date and Time

IMPORTANT

The date and time on the Trimble Ranger handheld must be accurate to ensure communication with the ORION endpoints. Check the date and time and adjust if necessary before reading a route.

If you need to change the time after swapping out the battery pack assembly or for any other reason, follow these steps:

1. Tap the Time icon on the screen.
2. Select **Time** in the top menu bar.
3. Tap the hour, minutes, seconds respectively and use the up/down arrows to make any necessary changes.
4. Once finished, tap **ok** at the top of the screen.
Result: A small window opens allowing you to save the changes.
5. Tap **Yes** to save the changes or **No** to close the screen without saving the changes. Tap **Cancel** to return to Time screen to make additional changes.

When you tap **Yes**, the changes are saved and the Time screen closes.

Restarting the Handheld

To perform a restart, press and hold the green power key. The screen will show a countdown timer. Continue holding the power key until the countdown is completed. The unit will automatically restart. Readings will not be lost if the handheld is restarted using these steps.

Setting the Password Lock (optional)

You do not need to set a handheld password unless you are concerned about unauthorized use. Badger Meter recommends not assigning passwords to prevent the loss of reading data. If you opt for password protection, the password must be entered every time you turn on the unit or use the green power key to resume operation.

IMPORTANT:

Record the password. A forgotten or lost password cannot be recovered and will require a factory reset.

Using the Touch Screen

Note: The manual provides instructions for touch screen navigation and operation of the handheld. Refer to "**Quick Keys**" on page 59 for keypad shortcuts.

Use the stylus to navigate and select objects on the touch screen. Tap the screen with the stylus to select or open an item. Tapping is equivalent to clicking the left mouse button with a computer.

Touch and Hold

When you touch and hold a point on the screen, a circle of dots appears around the stylus to indicate that a pop-up menu will soon appear. Touching and holding is equivalent to clicking the right mouse button.

Drag

Hold the stylus on the screen and drag it across the screen to select text and images. Drag in a list to select multiple items.

Storage Memory

Unlike many handheld computers which can lose data if they lose power, losing power will not impact saved data or configurations other than the real time clock. All your data is stored in non-volatile memory. If the battery is removed for 30 seconds or more, the user will be prompted to enter a current time and date. This must be done prior to operating the ORION Field Application software.

Accessing Storage Memory Using File Explorer

Browse the contents of folders on the handheld using File Explorer (**Start > Programs > File Explorer**). To easily delete, rename or copy an item, touch and hold the item. Then select from the menu that displays.

Note: Unlike desktop computers, Windows Mobile® does not support a Recycle Bin. Once a file is deleted, it cannot be recovered.

General Care of the Handheld

Use a mild detergent and a clean soft cloth to clean the body of the handheld. Do not use solvents, such as paint thinners. Use only a lint free cloth to clean the infrared port. Do not use detergents or solvents to clean the infrared port or display window.

The Trimble Ranger handheld has a wide operating range of -5°F to 140°F ; however, it is important to protect the handheld from extreme temperatures. Leaving the unit in a vehicle on the dashboard during a hot day or in a vehicle on a cold night can affect the Liquid Crystal Display (LCD) screen as well as cause battery drainage.

Care of the Touch Screen

Only use the included stylus or other devices designed specifically for use with touch screens. The use of ballpoint pens, nails or other sharp objects to operate the touch screen will scratch and/or damage the unit.

Do not apply any cleaner directly to the display. Do not use any abrasive cleaners. Abrasives may scratch touch screens. Keep the touch screen clean by gently wiping the display, using a soft cloth dampened by clean water.

Use the screen protectors included with the unit to keep the touch screen clean and protected. To optimize the lifespan of the handheld touch screen, a new screen protector should be applied every 30 days.

Screen Protector

The screen protector uses static to cling to the touch screen. The original screen protectors adhered to the screen with adhesive.

To safely remove an adhesive screen protector without causing damage to the touch screen display:

1. Use adhesive tape to start the lift of the screen protector. Stick the tape to one corner of the screen protector to start the lift. Do not apply the tape to the underlying touch screen.
2. Use your fingers to grasp the screen protector at the lifted corner and slowly peel back the protector to the opposite corner until removal is complete.

To apply a new screen protector:

1. Clean the surface of the touch screen with water only if necessary.
2. Use a display cleaning cloth (included the screen protector kit) to clean and dry the touch screen before installing a screen protector.
3. Align the edge of the new screen protector with the corner of the screen and then drop the remainder onto the display. The screen protector uses static to adhere to the screen until it is removed and replaced.

IMPORTANT:

- Do not use sharp, metal or plastic objects to lift a screen protector. Micro-scratches can occur.
- Replace the screen protector every 30 days per the manufacturer's recommendation.

Program Startup

1. Press the green power key on the keypad to turn on the handheld.
2. At the top left of the Windows main screen, tap **Start**.

Result: If the handheld is in Administrator mode, the Start menu drop-down list displays. If the handheld is in Kiosk mode, skip to step 4.



Figure 4: Start Menu

3. Tap **Programs**.
 4. Tap the folder labeled **Badger Field Applications**.
- Result: The Badger Field Applications folder opens and displays the ORION Reading System icon (Figure 5).*

There may be additional files in the folder, depending on the programs loaded on the handheld.

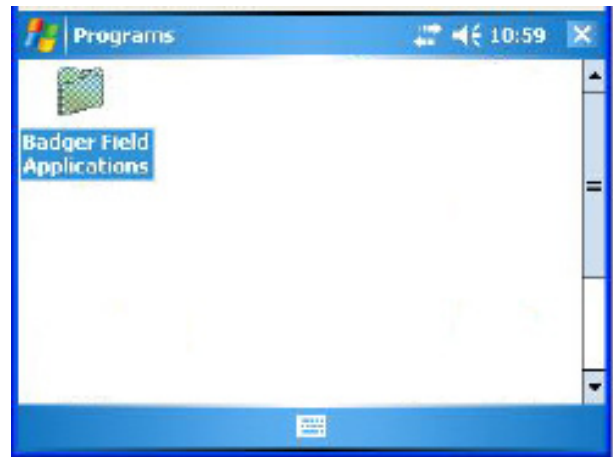


Figure 5: Badger Field Applications Folder

5. Tap the **ORION Reading System** icon.
- Result: The ORION Field Application screen opens with the ORION Field Application selected (Figure 7). This takes a few seconds*

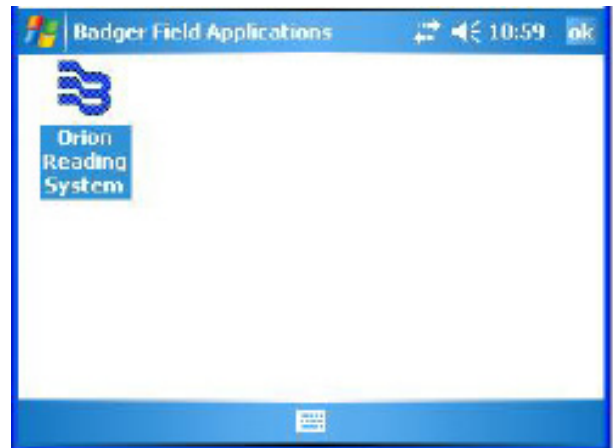


Figure 6: ORION Reading System

6. Tap **ORION Field Application** or press the **Right** key on the keypad to start the application.
*Result: The Loading Route screen displays briefly and closes automatically (Figure 8).
 When the Loading Route screen closes, the Copyright screen opens as shown in Figure 9.*

Note: The first time the software is accessed, the License Agreement screen opens automatically on top of the Copyright screen.

Read the software license agreement and tap **I Accept**. The License Agreement screen closes automatically and the Copyright screen is shown.



Figure 7: ORION Field Application

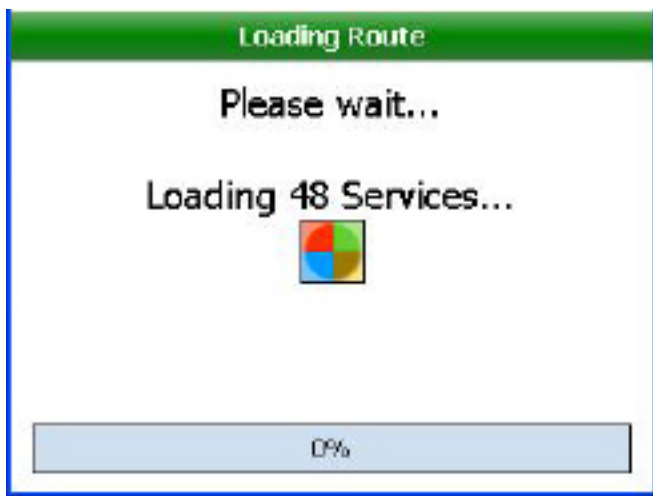


Figure 8: Loading a Route



Figure 9: Copyright Screen

Copyright Screen

The Copyright screen displays the following information.

- Program name, software version and copyright information
- Device Name (handheld Friendly Name)
- Number of routes currently loaded
- Number of read and unread meters
- Last read date
- Trademarks
- License information



Figure 10: Copyright Screen

Changing the Device Name

Every Trimble Ranger handheld is assigned a globally unique name (ID). This ID is not duplicated anywhere in the world and cannot be changed. A device name, "friendly name", can be assigned to a handheld that allows the user to differentiate between multiple handhelds.

1. Tap **Device Name** on the Copyright screen.
2. Tap **Change Name**.
3. Tap in the **New** box and type the name using the keypad.
4. Tap **Save**.
Result: The Name Saved screen displays stating the name was successfully saved.
5. Tap **OK**.
6. Confirm that the Friendly Name has been changed. Tap **Done** to return to Copyright screen.
Result: The Friendly Name displays in the Device Name field.

Battery Status

The color of the Copyright screen title bar shows the battery status. Tap the title bar at any time and the current battery status will display briefly in the title bar.

- Green = > 70% charged
- Red = < 40% charged
- Yellow = 40% and 70% charged
- Blue = handheld is recharging

The same colors are also used for the battery status indicator on the Read screen. Refer to "**Read Screen**" on page 24 for additional information.

Accessing the Main Menu

Tap **Continue** or press the **RIGHT** key on the keypad to access the Main Menu.

Main Menu

The Main Menu is the starting point for all meter reading operations. There are four options on the Main Menu to choose from.



Figure 11: Main Menu

Tap and select an option.

Read Route

Displays the login screen to begin reading meters.

Route Info

Displays information about the meters and routes currently loaded into the handheld.

Program and Quick Read

Displays the program for reading meters when a route is not loaded (e.g., checking an ORION endpoint, obtaining final reads, troubleshooting, etc.) and programs ORION endpoints to set an RTR odometer, clear a tamper or stop/start an endpoint.

Utilities

Displays the Utilities Menu screen to access information on route progress, battery and settings. The Utilities Menu can also be accessed from the Read Menu.

Part II: User Guide

Reading a Route

Read Route Login

1. Tap **Read Route** on the Main Menu.
Result: The Pin/User ID Entry login screen displays.
2. Enter a 3 to 5 character personal identification number (PIN) using the keypad. The PIN is user defined and can be your name, your initials, an ID number, etc.
3. Tap **OK** or press **ENTER** on the keypad.
Result: If your PIN is not valid, an error message displays: "You MUST enter 3 to 5 characters for your PIN/ID."

*Tap **OK** and re-enter the PIN.*

*Tap **OK**.*

When a valid PIN is entered, the Read Screen with the first account is displayed.



Figure 12: Read Route on Main Menu



Figure 13: Login Screen

Read Screen

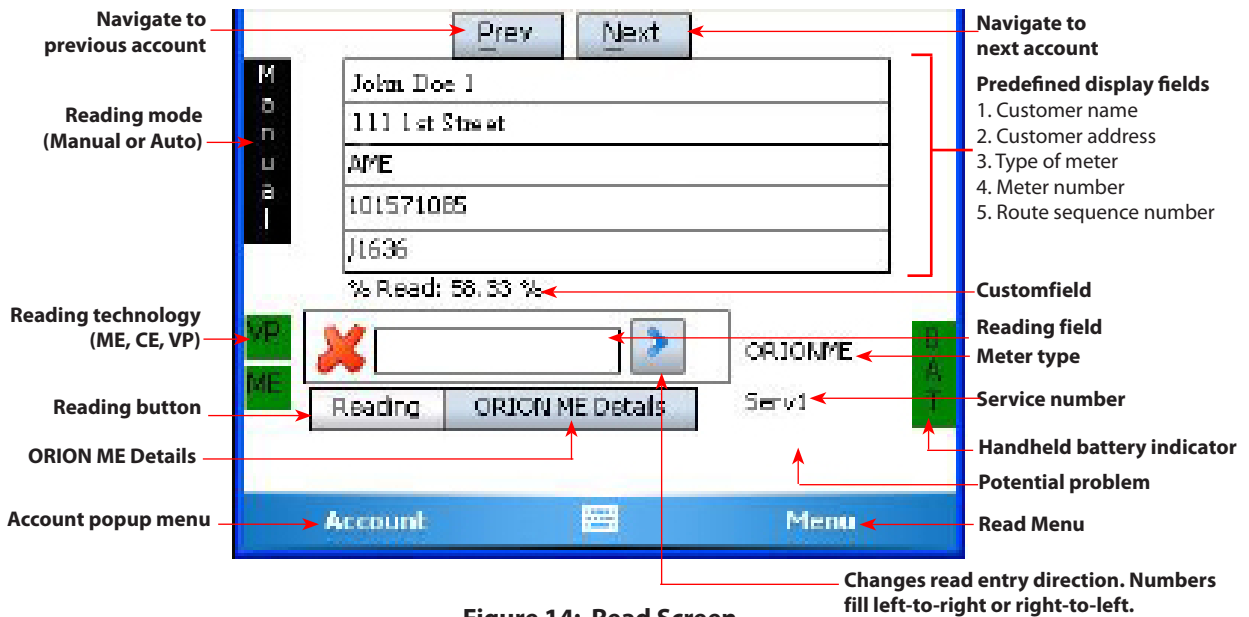


Figure 14: Read Screen

Account Information Fields

Predefined Display Fields

The first five fields display account information. These fields are determined by the reading data management operator and cannot be changed using the handheld.

Custom Field

The sixth field is a custom field, which is user defined in **Settings > Displayable Field Settings > Custom Fields**. It can be set to display one of several options including the route name and the percent of readings completed. For additional information, refer to "**Displayable Field Settings**" on page 53.

Meter Information

Reading

The meter reading displays in this field. In Manual mode, the field is blank until the meter reader enters the reading. The field fills automatically in Auto mode. A green check mark displays next to the field when the reading is received. A red X displays when there is no reading. The arrow to the right of the field allows you to change the direction when typing the reading.

Reading Button

This button displays just below the Reading field.

ORION ME Details

This button displays only for ORION ME/SE endpoints. Tap to access the two-way communications available with the ORION ME/SE.

Meter Type

The meter type displays to the right of the read field. In Figure 14, the meter type is ORION ME.

Service

The service number displays below the meter type. The number changes to designate more than one meter for an account such as an apartment building with multiple meters.

Potential Problem

Any potential problem such as a Tamper or No Usage display in the blank field below the service number. If the field is blank as in Figure 14, no meter problems are detected.

Reading Mode

Meters can be read in Manual or Auto (automatic) mode based on user preference. The selected reading mode is displayed on the upper left side of the screen.

Reading Technology

The available reading technology displays on the lower left side of the screen. In Figure 14, **VP** and **ME** are displayed to indicate Versa Probe and ORION ME/SE technology are included in the route.

Battery

Indicates handheld battery life. The indicator displays on the lower left side of the screen. Battery status is indicated by the color of the background. For additional information about the color indicator, refer to "**Battery Status**" on page 20.

Navigation

- Prev / Next** Moves to the previous or next account. Navigation buttons display at the top of the screen in Manual mode. These buttons do not display in Auto mode.
- Account** Displays a popup menu with options for the selected account (Figure 15). Some of the same options can be accessed using the Hot Keys on the keyboard. Refer to "[Hot Keys and Quick Keys](#)" on page 62 for additional information.
- Menu** Displays the Read Menu. For information on the Read Menu, refer to "[Read Menu](#)" on page 27.

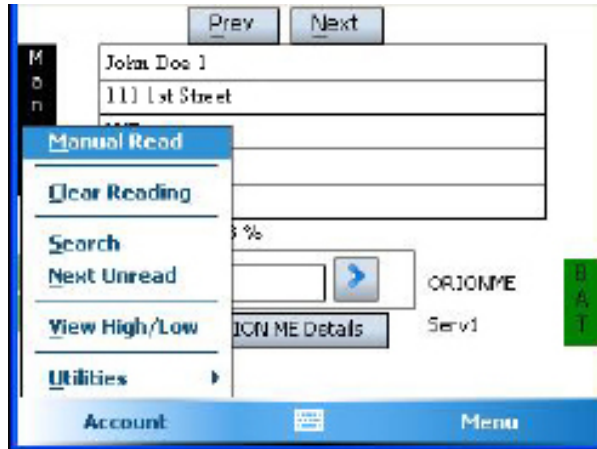


Figure 15: Account Menu

Changing Read Mode

Choose **Manual** mode or **Auto** mode when reading routes with the handheld.

Manual Mode

- Advances to the next account in the reading order once a meter reading is entered/received.
- The **Prev** and **Next** buttons are used to navigate through the accounts.
- When an account comes up that already has an ORION reading entered, the read is displayed and you must manually advance to the next account.

Auto Mode

- Automatically advances to the next unread account once a reading is received.
- No manual navigation capabilities are available.

To toggle between manual and automatic mode, follow these steps.

- From an ORION account, press the **A** key on the keypad.
- The word **Auto** will appear on the left side of the screen to indicate the handheld is now in the automatic mode. The screen will no longer display the **Prev** and **Next** buttons.
- To return to manual mode, press the **A** key again. The word **Manual** will appear on the left side of the screen and the **Prev** and **Next** buttons display at the top of the screen.

Note: **Auto** mode cannot be selected if the account displayed is a manual read or touch account.

Regardless of which mode is active, reads will be applied to the appropriate accounts as they are received. The handheld will accept the read, beep and store the read data.

Quick Keys and Hot Keys

Quick Keys and Hot Keys are keypad shortcuts for performing mobile read functions. Refer to "[Hot Keys and Quick Keys](#)" on page 62 for details about using these keypad shortcuts.

Read Results

The ORION Field Application software captures meter readings in one of three ways:

- ORION RF read
- VersaProbe touch pad read
- Manually keyed read

When an ORION endpoint sends a reading, several results can occur.

- The ORION transceiver/receiver receives the transmission. The handheld stores the reading. If the meter was displayed on the screen, the display will advance to the next customer record.
- The ORION transceiver/receiver receives the transmission that reports either a tamper or a potential leak. The handheld logs the condition and stores a read in the case of a potential leak. If a tamper is displayed on the screen, the handheld will sound an audible alert and prompt you to process the tamper before advancing to the next account.
- No transmission is received from the meter. Try moving closer to the meter or tap **Next** to skip the meter.

No Reading Received

These are the common reasons for not receiving a reading.

- Endpoint ID number is wrong.
- Endpoint has not been started.
- Endpoint is not loaded into the handheld.
- Handheld is too far away from the endpoint.
- The line of site between the handheld and the endpoint is obstructed.

Manual Reads

The handheld can read touch pads, ORION endpoints and collect manual reads. If the route contains a mix of meters, the handheld will always stop at a manual account to allow a manual meter reading. A red **X** displays on an account without a reading as shown in Figure 16.

To enter a manual read

1. Tap in the reading field to activate it.
2. Use the keypad to type the reading.
3. Press **ENTER** to store the reading.

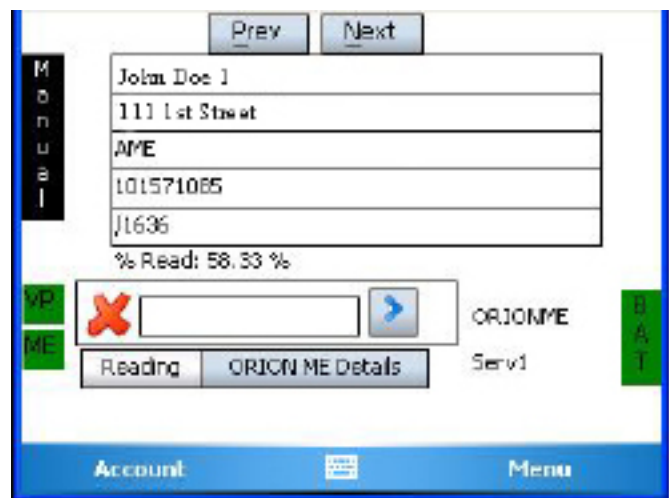


Figure 16: Manual Read Screen

If the meter reading is high or low, the handheld sounds an alarm, displays the condition and may or may not request further action depending on the settings. A manual read can always be entered.

Read Menu

To access the Read Menu, tap **Menu** on the Read screen. The Read Menu has several functions. The functions are associated with the account that was last displayed. Scroll to see the entire list of functions.

Search	Displays the Search Menu to find accounts using various criteria.
Manual Read	Enters a manual read for the current account.
View Hi/Low	Shows the current account's previous read and Low/High threshold read values (if appropriate permissions are set).
Read Direction	Toggles the route direction and allows meter reader to read the route in reverse direction. To go back to the original reading direction, choose this function again.
Comments	Displays the Comments menu, which includes Reader Code , Trouble Code and Text Message .



Figure 17: Read Menu

Utilities	Displays the Utilities menu, which includes route reading Progress, current Battery Info and Settings.
Erase Read	Erases the reading for the current account. A window displays asking for confirmation before the account reading is erased.

Navigation Keys

Navigate from the Read Menu using the keys at the bottom of the screen.

Close	Closes the Read Menu and returns to the last account displayed.
To Main Menu	Cancel out of reading the route and returns to the Main Menu.

Search

There are multiple ways to search for a meter. To find a meter using the account information, use the **Search Fields** function.

Using **Search Fields**, the account name, address, meter location, meter serial number, meter model, account number and AMR module number can be searched.

Search Fields

1. From the Read Menu, tap **Search** or press **SS** on the keypad.

Result: The Search Menu displays as shown in Figure 18.

2. Tap **Search Fields**.

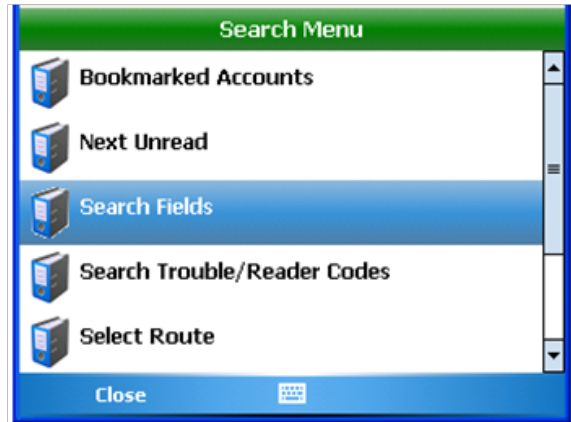


Figure 18: Search Menu

3. Tap the up or down arrows to highlight/select the search field or just tap the correct field.

When the correct field is selected, use the keypad to enter search text in the **Search Text** field.

In Figure 19, **Address** is the selected search field and the address number is keyed into the field.

4. Tap **Search**.

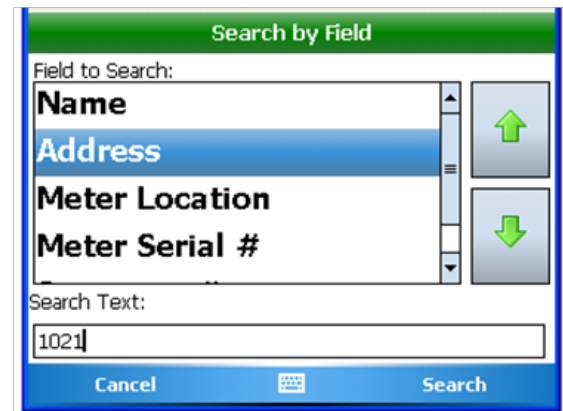


Figure 19: Search by Field

Result: Search Results displays the summarized account data for an account that matches the search criteria.

Note: The message "No accounts found that match your search text" displays if the search is unsuccessful.

5. Tap **Yes** to view the account displayed. Tap **No** to continue the search. You can search through all accounts loaded on the handheld.
6. Tap **Cancel** to return to the Search by Field screen.



Figure 20: Search Results

More Search Options

Bookmarked Accounts Bookmarking accounts make them easier to find later. To bookmark an account press **Fn + B** on the keypad while on the account read screen. A bookmark label displays at the top left of the screen (Figure 21).

To search bookmarked accounts, follow these steps.

1. Tap **Menu** on the Reading screen to open the Read Menu.
2. Then tap **Search > Bookmarked Accounts** to open a search screen. All bookmarked accounts are displayed. If there are multiple bookmarked accounts, scroll using the up and down arrows, or search for the account by keying the name or part of the name in the Search Text field.
3. Tap the account you want to view. Then tap **Select**.

Result: The account Read screen opens.

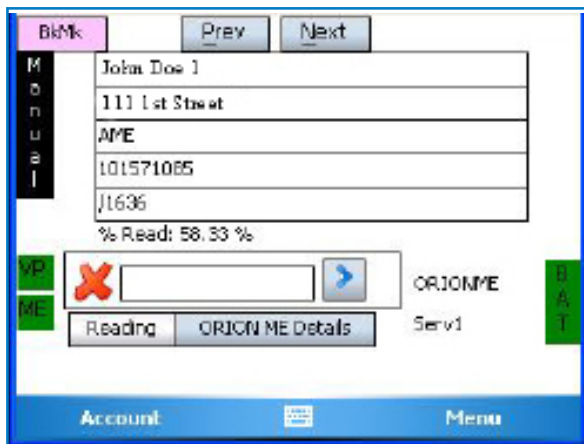


Figure 21: Bookmarked Account

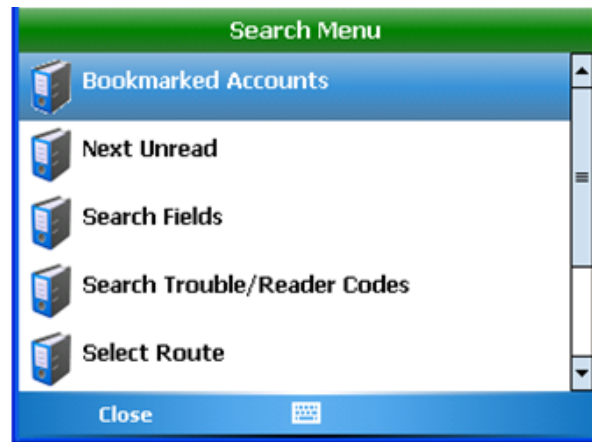


Figure 22: Search Bookmarked Accounts

Next Unread Displays unread accounts one by one. Tap **Yes** to see the Read screen for the account. Tap **No** and the next unread account displays. Tap **Cancel** to return to the Search Menu.

Search Trouble/Reader Codes Finds all accounts tagged with Trouble codes, Reader codes or both. This option allows you to select and view information for accounts tagged with Trouble and Reader codes. Tap **Cancel** to return to the Search Menu.

Select Route Allows you to go to the start of another route. You may also mark a route "complete" using the buttons on the screen. Tap **Close** to return to the Search Menu.

To select a route, tap the selected route from the list of routes that displays. Then tap **Select** to display the Read screen for the first account of the selected route.

Skipped Accounts Displays accounts that have been skipped, allowing the meter reader to return to those meters and perform additional actions. Tap **OK** to return to the Search Menu.

To customize the definition for a skipped meter, go to **Settings > Customizations > 3 of 3 > Skipped Meter Definitions**.

Manual Read

Manual Read allows you to edit a meter reading that is already stored on the account which you were viewing prior to choosing the Read Menu option.

1. From the customer account Read screen, tap **Menu** to open the Read Menu screen.

2. Tap **Manual Read**.

Result: The Manual Entry screen opens for the account.

3. Use the keypad to type the manual read value in the **Reading** field and tap **OK** to store the reading. Or tap **Cancel** to return to the Read Menu.

*Result: Tapping **OK** will automatically take you to the next account in the sequence.*

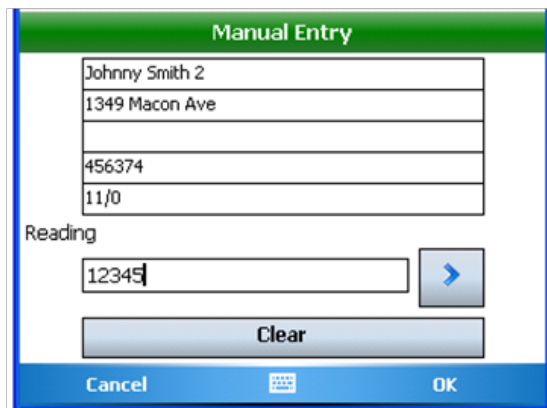


Figure 23: Manual Read

View High/Low

1. Tap **View High/Low** on the Read Menu to see the high and low values for the account that were displayed before selecting the Read Menu.

Result: This screen displays the account number, the high and low values set by the billing program and the previous reading that was stored in the reading data management software.

Note: This information can be blocked by the reading data management operator.

2. Tap **Close** to return to the Read Menu.

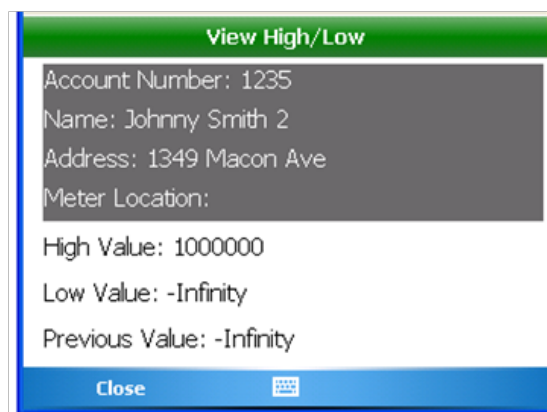


Figure 24: High/Low Reads

Read Direction

The Read Direction option allows the meter reader to walk the route in reverse of the order it was loaded into the handheld.

1. Tap **Read Direction** on the Read Menu.
Result: The Reverse Direction screen displays with the question "Read your route in Reverse direction?"

2. Tap **Yes** to reverse the route direction or **No** to return to the account screen.

*Result: Selecting **Yes** displays the route in reverse order. The screen will be black and the font will be white as shown in Figure 25.*

3. To revert to the "normal" route direction, repeat steps 1 and 2.

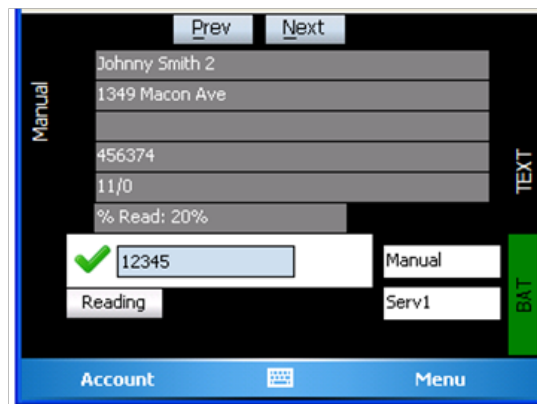


Figure 25: Reverse Direction

Comments

The ORION Field Application software has three different ways to send information back to the utility office: Reader Codes, Trouble Codes and Text Messages.

1. From the Read Menu, tap **Comments**.
Result: The Comments Menu displays with three options. See Figure 26.
2. Tap to select **Reader Codes**, **Trouble Codes** or **Text Messages**.
Result: After a code or message is saved on an account, a green check mark as shown in Figure 26 indicates that a code or message has been entered. The next section provides additional details about codes and comments.
3. Tap **Close** to exit and return to the Read Menu.

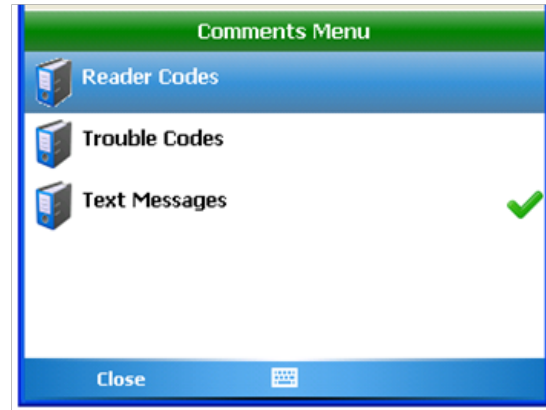


Figure 26: Comments Menu

Reader Codes

Reader Codes are predefined by the reading data management software operator. The codes describe non-emergency information about an account.

You may attach up to three Reader Codes to an account.

1. Tap **Reader Codes** on the Comments Menu.
Result: The Reader Codes screen displays with the customer name and address shown.
2. Tap **1**, **2** or **3** to enter the 1st, 2nd and/or 3rd code, respectively.
Result: A list of available codes display. This list is generated by reading data management software operator prior to loading a route.
3. Use the arrow keys to move up and down to highlight the code you want.
4. Tap to select the code you want or use the optional **Search Text** function to find a code. There are 99 Reader Codes available.
5. When the desired code is highlighted, tap **Select** to accept the code and return to Reader Codes.
6. Repeat steps 2-5 to attach another Reader Code to the account or tap **OK** to accept the selected code(s) and return to the Comments Menu. Tap **Cancel** to return to the Comments Menu without saving a code.
7. Tap **Close** on the Comments Menu to return to the Read Menu. Tap **Close** on the Read Menu to return to the account Read screen.

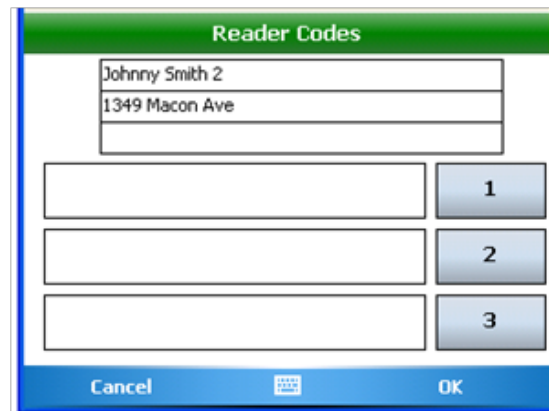


Figure 27: Reader Codes

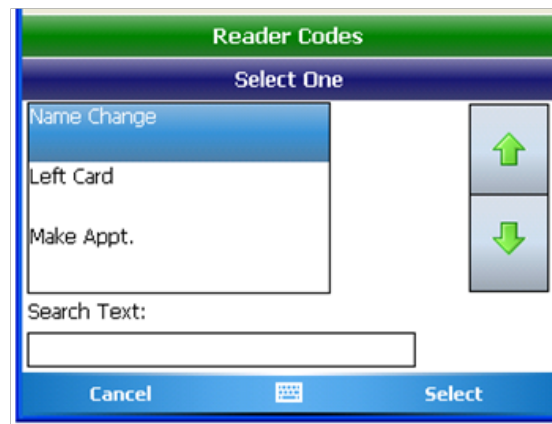


Figure 28: Select Reader Code

Trouble Codes

Use Trouble Codes when urgent attention is required. The process to enter Trouble Codes is similar to Reader Codes, however only one Trouble Code may be attached to an account.

1. Tap **Trouble Codes** on the Comments Menu.
2. Tap **1**.
Result: A list of available trouble codes displays.
3. Use the arrow keys to move up and down to highlight the code you want. Then tap **Select**.
4. Tap **OK** to accept the code and return to the Comments Menu. Tap **Cancel** to return to the Comments Menu without saving a code.

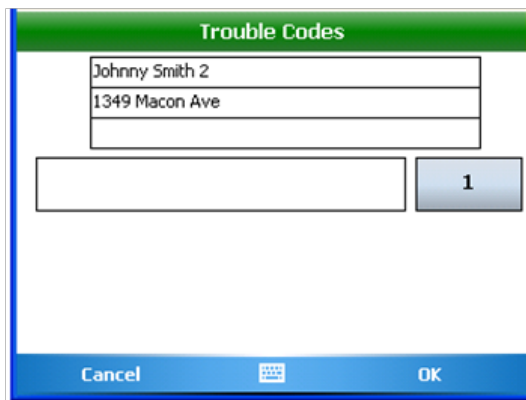


Figure 29: Trouble Codes

Text Messages

Text Messages can be created when an appropriate Trouble Code or Reader Codes is not available. Text messages can be alphanumeric with up to 140 characters for each message.

Create a Message

1. From the Comments Menu, tap **Text Messages**. You may also press **Fn+N** keys on the keypad from an account screen to open the Text Message screen.
Result: The Text Message screen opens with the customer name and address shown in Figure 30.
2. Use the keypad to enter a message in the Message field using letters, numbers and spaces.
3. Tap **OK** to save the message to the account.
4. Tap **Close** to return to the Comments Menu.

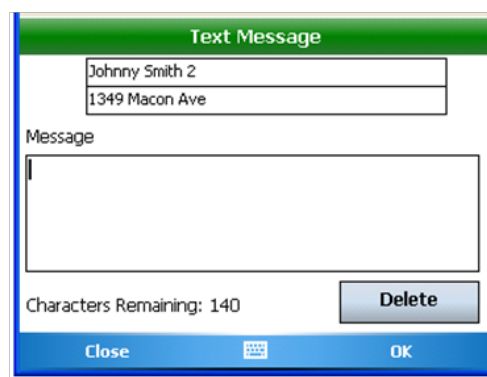


Figure 30: Text Message Field

Note: After a message is created, the account screen displays the word "TEXT" on the right side of the screen as shown in Figure 31 and the Comments Menu displays a green check mark next to Text Messages (Figure 32).

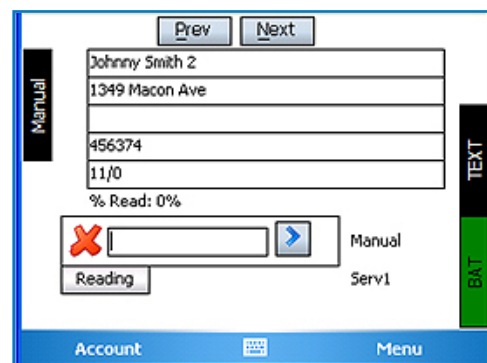


Figure 31: Read Screen with Text Message

Edit a Message

1. From an account screen with a text message, tap **Menu > Comments > Text Messages**. You may also press **Fn+N** keys on the keypad from an account screen to open the Text Message screen.

Note: An account with a text message displays a green check mark next to Text Messages on the Comments Menu as shown in Figure 32.

2. Tap in the **Message** field to activate it. Drag across the previous message to highlight it. Then use the keypad to edit the message.
3. Tap **OK** to save the edited message to the account.

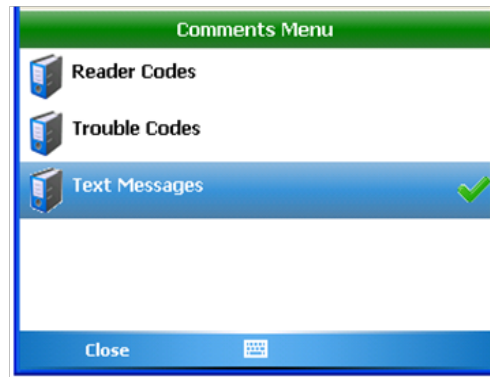


Figure 32: Text Message Created

Delete a Message

1. From the Comments Menu, tap **Text Messages**.
2. Tap **Delete** to remove the message for the account.

*Result: The **Clear?** screen displays asking if you want to clear the text you entered. If you select **Yes**, the display returns to the Text Message screen and the Message field is cleared.*

3. Tap **OK** to return to the Comments Menu when you are finished.
4. Tap **Close** to return to the account screen.

Result: The green check mark is removed and "TEXT" no longer displays on the account screen.



Figure 33: Account with Text Message

Utilities

Utilities is part of the Read Menu and it can also be accessed from the Main Menu. The Utilities menu provides access to the settings for the software screens and programs. It also provides information about route progress and battery life.

For complete details about the Utilities menu, refer to "**Utilities**" on page 50.

Erase Read

1. Tap **Erase Read** on the Read Menu.
Result: The Erase Reading? screen displays the current account and asks for confirmation to erase the reading and return the account record to an unread status.
2. Tap **Yes** to erase the current reading.
Result: The customer account displays with a blank reading field.

Note: If a reading is not stored in the customer record, the **Erase Read** option will not display on the Read Menu.

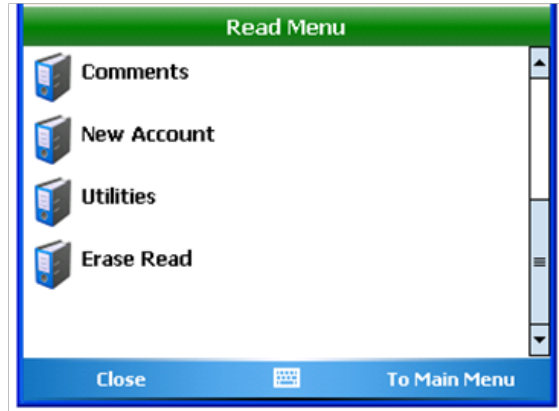
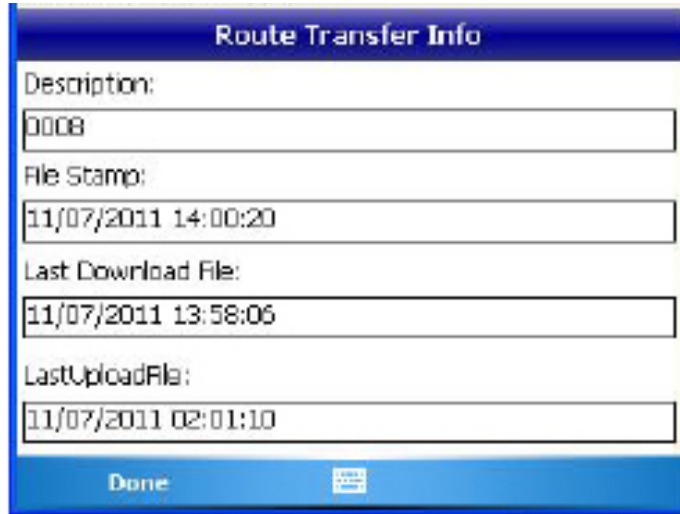


Figure 34: Erase Read on Read Menu

Route Info



The screenshot shows a mobile application screen titled "Route Transfer Info". It contains four text input fields with the following values:

Field Label	Value
Description:	0008
File Stamp:	11/07/2011 14:00:20
Last Download File:	11/07/2011 13:58:06
Last Upload File:	11/07/2011 02:01:10

At the bottom of the screen, there is a blue bar with the text "Done" and a keyboard icon.

Figure 35: Route Transfer Information

Select **Route Info** from the Main Menu to quickly see the Route Transfer Info screen which includes a summary of route information. The screen includes the following information.

Description	The description assigned to the route by the reading data management software operator.
File Stamp	The date and time the route was loaded from the reading data management software.
Last Download File	The date and time of the last downloaded file..
Last Upload File	The date and time of the last uploaded file.

Tap **Done** to close the Route Transfer Info screen and return to the Main Menu.

Program & Quick Read

Program & Quick Read is used to perform a number of functions on ORION endpoints and touch modules.

Quick Read allows you to read one meter at a time without having meters loaded into the handheld. The handheld gathers the meter reading and displays the results on the screen.

The most common uses of the Quick Read feature are:

- Reading an endpoint or touch module when troubleshooting or testing at a customer site
- Reading one or more endpoints or touch modules that are to be installed at a customer site, to verify that they are working correctly
- Testing a newly installed endpoint
- Performing meter testing at the meter shop
- Gathering a final reading from a meter

Note: The handheld does not store any Quick Read information and cannot send any Quick Reads back to the reading data management software.

Quick Reads offer flexibility. You can view up to 50 readings received or you can request to view readings from a specific ORION endpoint.

Accessing Program & Quick Read

1. Tap **Program & Quick Read** on the Main Menu.
Result: The available technologies are displayed.
2. Tap to choose the technology you want to quick read, then tap **Open**.
Result: The ORION Quick Read log in screen displays.
3. Enter your initials using the keypad and then tap **OK**.

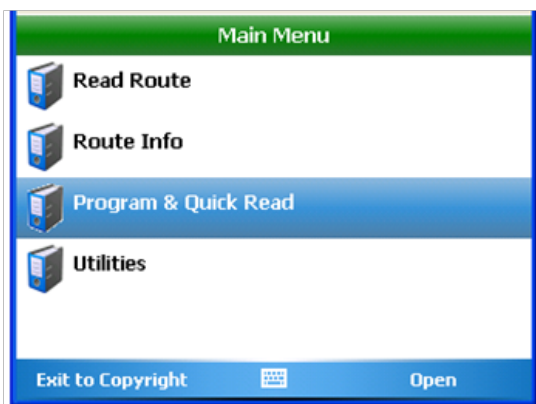


Figure 36: Program & Quick Read

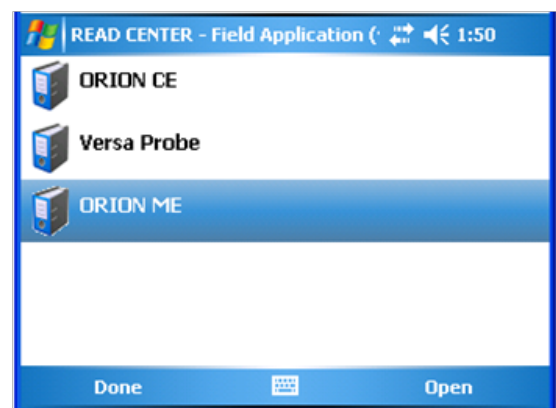


Figure 37: Technology Selection Screen

ORION CE

To access the Quick Read and Programming functions for ORION CE endpoints, tap **ORION CE** on the Program & Quick Read main menu. The ORION CE Utility is divided into five tabs: IR Programming, RF, RF S/N, Settings and About.

IR Programming

Using the functions on the IR Programming tab, you can start, stop, pause and program ORION CE endpoints. An endpoint connected to an RTR with a tamper (cut wires between the endpoint and the RTR) will need to be programmed after the wires are repaired.

Note: An ORION endpoint connected to an ADE (or approved competitor encoder) does not require programming if the wires are cut. The endpoint will update itself with the new encoder reading in the first hour after the wires have been repaired.

Programming Functions

The Program screen includes these functions:

Read	Exports data (read and status) from the endpoint through the optical LED.
Program	Changes the odometer or clears a tamper.
HPwr	Highpower forces a brief high powered signal so an endpoint will report to a gateway.
Odometer	Registers the amount of water flowing through the meter.
Stop	Stops the endpoint from sending a signal until it is programmed again.
Pause	Stops the endpoint temporarily until a unit of water is registered. (Common practice of seasonal users.)
Start	Starts the radio transmission on an endpoint.
Listen	Switches to RF and "hears" the endpoint if it is active.
Drive Circle?	Used for gas meters only.

ORION RF and IR COM Settings

At the bottom of all the Quick Read & Program screens for the ORION CE Utility, the reading technology, **ORION RF** and **IR**, are displayed. If the background color is green, the correct COM (communication) ports have been set.

If the COM port is not set correctly, the field changes. For example, RF BAD COM with a clear background conveys the wrong COM port is set for RF. To view and adjust the COM ports, select the Settings tab. For additional information, refer to "**Settings Tab**" on page 41.

Start, Pause, Stop

All ORION endpoints are programmed at the factory to begin sending meter readings as soon as the register senses flow through the meter. As a result, you can install ORION endpoints on meters without having to manually start the endpoint. When water usage is registered on the meter, the endpoint sends a signal every four seconds.

To start an endpoint before installing the meter, use the **Start** function. Align the optical port and the LED and tap **Start**.

To pause the radio signal temporarily, use the **Pause** function.

To stop the endpoint from sending a signal until the Start function is used to turn the endpoint on again, use the **Stop** function.

Note: Stopped radios must be reprogrammed to start the radio signal.

Programming an ORION CE Endpoint

1. From the Program & Quick Read main menu, tap **ORION CE**. Refer to "**Program & Quick Read**" on page 36 if you need help.
2. Use the keypad to log in.
3. Tap the **IR Programming** tab to access the Program screen.
4. Connect the IR sensor to the nine-pin serial port at the bottom of the handheld.

Note: You must perform a Read function before you can perform any other function.

5. Align the IR sensor with the endpoint LED and tap **Read**.
Result: The screen fills with the endpoint serial number, odometer value, radio status, meter type (MT) and any alarms that are set.
6. Tap **Odometer** to adjust the stored odometer value. If necessary, use the **DELETE** key on the keypad to remove each character. Tap at the end of the odometer reading then press the **DELETE** key.
7. Type the meter reading to which you want to program the endpoint in the Odometer field.

It is not necessary to enter the leading zeros, however adding the zeros may help to program the endpoint correctly. Only seven digits (6 moving dials and the sweep hand) can be entered when programming an endpoint, regardless of meter size.

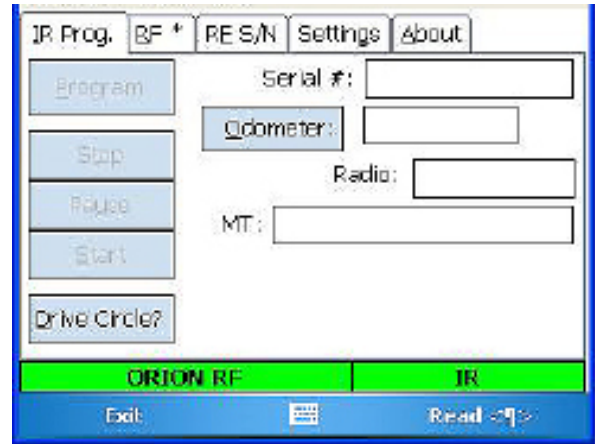


Figure 38: IR Programming Tab

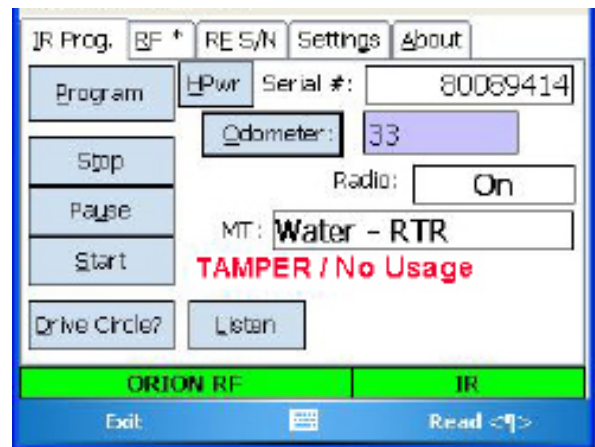


Figure 39: Programming

8. Align the handheld IR sensor with the LED of the endpoint and tap **Program** or press the P key.
Result: The handheld will beep when the new value is stored.
9. To verify the programming and splicing were successful, tap the RF* tab and perform a Quick Read on the endpoint.

If the endpoint still reports a tamper, check all the splices and repair as necessary.
Result: When the endpoint information has been successfully read, the fields on the screen will be updated.
10. Tap **Exit** to leave the ORION CE Utility and return to the Quick Read Menu.

Setting the Odometer

On the Program screen, you can set the odometer. Setting the odometer is performed in two steps:

1. Perform a Read function.
2. Enter the new odometer value.

You can perform a Read function to verify that the new reading is now being reported by the endpoint.

Note: If the endpoint's radio is stopped, the odometer value will be stored but the endpoint will remain stopped. If the radio is running, the odometer value will change and the radio will remain running.

The following example will help you through the steps of setting an odometer value.

Let's assume that you are installing an ORION CE endpoint on an active meter with usage on the RTR. Follow these steps to ensure that the value in the endpoint matches the current odometer value on the RTR once the endpoint is connected to the RTR.

When programming ORION CE endpoints, enter the value of the six moveable odometer wheels plus the sweep hand for all meter types (gallons, cubic feet, etc.) and all meter models.

For this example, we'll assume the odometer value (both black digits and white digits) is "001234." The RTR odometer would look like the example in Figure 40.

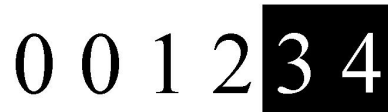


Figure 40: Odometer Value

Let's also assume that the sweep hand is pointing between the "5" and the "6." Because the sweep hand has not yet hit the "6", use the value of "5" as the last digit of the meter reading. Therefore, the value to be entered into the ORION endpoint is "0012345."

Now follow these steps for setting the Odometer value.

1. Align the optical port with the endpoint's LED and tap **Read**.
2. Update the odometer value on the handheld on the Program screen. Tap behind the reading in the field and use the DELETE key on the keypad to delete the current odometer value.
3. Use the keypad to enter the desired odometer reading (0012345).

Note: Leading zeros are not required but on larger meters it may be helpful to enter them as placeholders. The handheld only allows seven digits to be entered during this function.

4. Align the optical port over the endpoint's LED and tap Program.

Result: The handheld beeps when communication between the optical port and the endpoint has been completed and the endpoint holds the new odometer value.

To check the odometer value, place the optical port over the LED and perform the Read function again. You should see the new odometer value of "12345" in the Odometer field.

RF

The RF tab on the CE Utility includes the functions to perform quick reads using radio frequency. The RF screen displays up to 50 CE endpoints in range, one endpoint at a time.

To display the next CE endpoint, tap **Next**.

- S/N** Displays an ORION CE endpoint serial number in range.
- Reading** Displays the odometer value (water or gas) or the index value (gas only) for the endpoint.
- RSSI** Fills with a single bar graph to show the strength of the RF signal. If you select **Show Value**, the field will also show the numeric value of the signal strength.
- MT** Displays the meter and type. Example: Water - ADE
- Reset** Clears the command and refreshes the screen.
- Unique S/Ns** Receive one read for each endpoint serial number in range.
- This S/N ONLY** Reads a single endpoint serial number. To activate this function, tap **This S/N ONLY**, then tap the **RF S/N** tab.

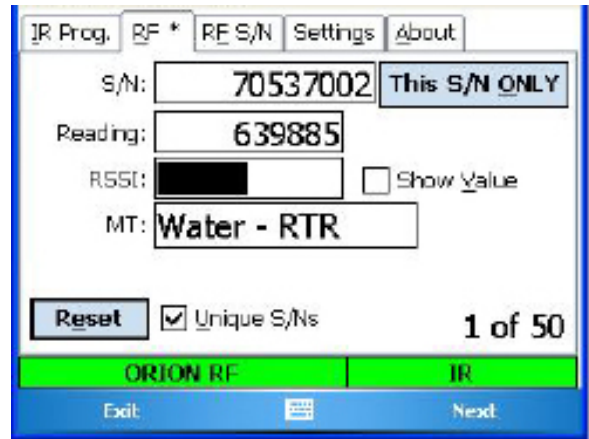


Figure 41: RF Tab

RF S/N

The RF S/N tab on the CE Utility includes the functions to perform a quick read with radio frequency on a single CE endpoint. The RF S/N screen displays a table of Readings and corresponding RSSI values and Attempts, plus the Time of each Reading.

- S/N** Displays the selected ORION CE endpoint serial number.
- MT** Displays the meter and type. Example: Water - RTR
- At** Attempts: This field changes to display the seconds that lapse between one received transmission and the next.
- Stop** Stops new data from displaying.
- Reset** Clears the screen and refreshes. To begin Readings again, tap **Start**.
- Dur** Displays the accumulated time in seconds from the first attempt.
- Tot. #** Displays the number of Attempts
- S/N #** The number of times the serial number is read.

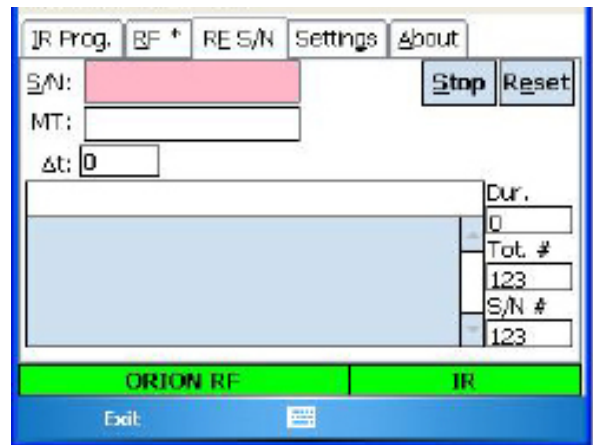


Figure 42: RF S/N Tab

Settings

The COM (communication) ports for the reading technology are displayed on the Settings tab of the ORION CE Utility.

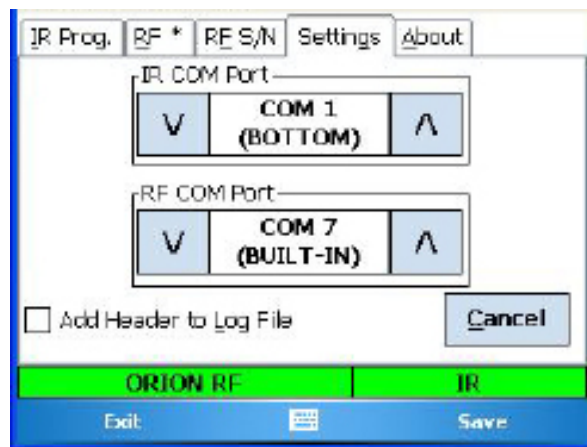


Figure 43: ORION CE COM Settings

- IR COM port - connected using the serial port (COM 1) at the bottom of the handheld
- RF COM port - built in to the handheld (COM 7)

Standard settings are shown above. Adjust the COM ports using the up and down arrows. When the COM ports are adjusted correctly, tap **Save**.

Note: Adjustments to the COM ports should be made only under the direction of Badger Meter Technical Support.

About

The About tab displays information about the current version of the Quick Read software.



Figure 44: Software Information

ORION ME/SE Utility

To access the quick read and programming functions for ORION ME/SE endpoints, tap **ORION ME** on the Program & Quick Read main menu. The ORION ME is divided into five tabs: IR, RF, Profile, Install and Settings.

IR

Using the functions on the IR tab, you can start and program ORION ME endpoints.

Programming Functions

The Program screen includes these functions:

S/N	Displays the serial number of the ORION ME endpoint.
Type	Displays the meter type. Example: ADE
Listen	Switches to RF and "Hears" the endpoint if it is active.
Reading	Used to reprogram the endpoint. ADE readings cannot be reprogrammed but you may tap Reading to perform a Forced Read.
Status	Displays the Status screen for the ME endpoint and provides programming and usage information for the meter.
Clear	Asks if you want to clear exceptions from the endpoint status.
Radio	Displays the radio selection screen with the current mode. Allows you to select another mode from a list of available modes. Refer to " Selecting Modes for ORION ME/SE Endpoints " on page 46 for additional information.
Read	Exports data (read and status) from the endpoint through the optical LED.
Program	Changes the odometer or clears a tamper.
HPwr	Highpower forces a brief high powered signal so an endpoint will report to a gateway.
More	Displays the More Commands screen which includes the firmware version and type of meter. You may also set the date and time, get battery status or get the results of a flow rate study from this screen.

The purpose of the IR function is to start, stop, pause and program endpoints. An endpoint connected to an RTR with a tamper (i.e., cut wires between the endpoint and the RTR) must be programmed after the wires are repaired. The following steps are used to program an ORION endpoint connected to an RTR.

Note: ORION endpoints connected to a Badger Meter ADE or an approved competitor encoder DO NOT require programming if the wires get cut. The first hour after the wires have been properly repaired, the ORION endpoint updates itself with the new encoder reading.

Programming an ORION ME Endpoint

1. Tap **Program & Quick Read** on the Main Menu. Refer to "**Program & Quick Read**" on page 36 if you need help.
2. Tap to choose **ORION ME**, then tap **Open** on the bottom right of the screen.
Result: The ORION ME/SE Utility login screen opens.
3. Use the keypad to log in.
4. Tap the **IR** tab to access the ORION ME programming software.

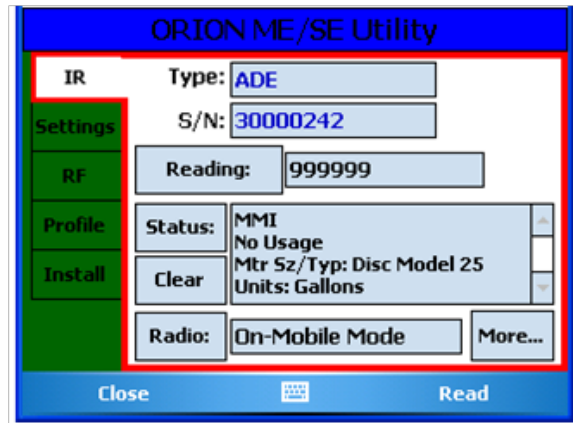


Figure 45: IR Programming Tab

5. Connect the IR cable to the 9-pin serial port on the bottom of the handheld.
6. Align the optic read head of the IR cable connected to the handheld with the endpoint LED port.
7. Tap **Read**.
Result: The screen fills with endpoint information.
8. Tap **Reading** to adjust the stored Reading value.
Result: The Program New Reading screen opens.

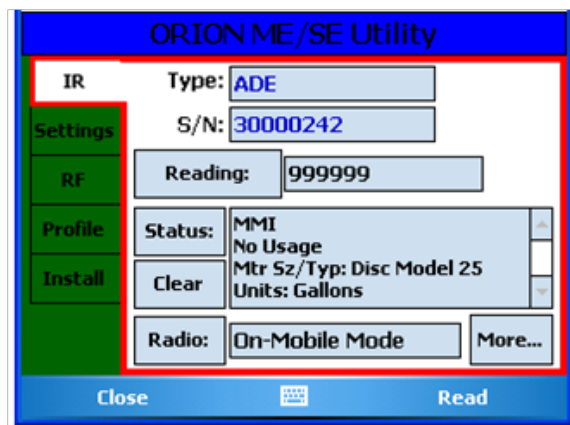


Figure 46: Endpoint with Reading

9. Using the keypad, type the meter reading to which you wish to program the endpoint.

Note: Leading zeros are not required, however it may help to enter leading zeros so that the endpoint is programmed correctly. Only 7 digits can be entered when programming an endpoint regardless of the meter size.

10. Align the optic read head of the IR cable with the endpoint LED port and tap **Program**.
Result: The handheld will beep when the new value is stored.

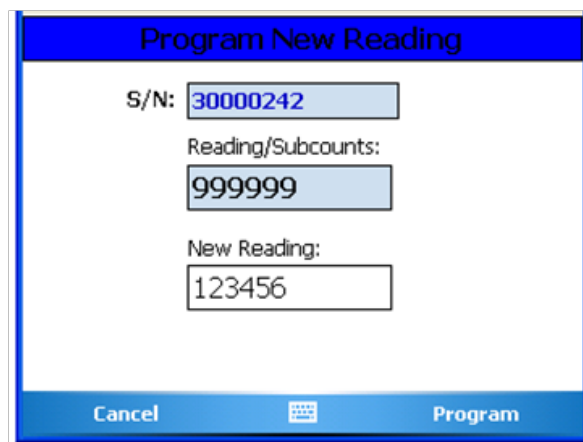


Figure 47: Program New Reading

11. If you are programming the endpoint due to a tamper, verify that the programming and wire splicing was successful. Tap the **RF** tab and tap **Start Reading** to perform a Quick Read on the endpoint.
12. If the endpoint still reports a tamper, have the wire splices checked and repaired as necessary.
13. Once the endpoint information has been successfully read, the fields on the screen will be updated.

Radio Modes for ORION ME/SE Endpoints

All ORION endpoints are programmed at the factory to begin sending meter readings when the register senses flow through the meter. As a result, you can install ORION endpoints on meters without having to manually start the endpoint. When water usage has been registered on the meter, the endpoint will send a signal every four (4) seconds.

To start the endpoint before installing the meter, tap the **Radio** button on the IR programming screen to start the Radio functions. There are several functions or modes to choose from.

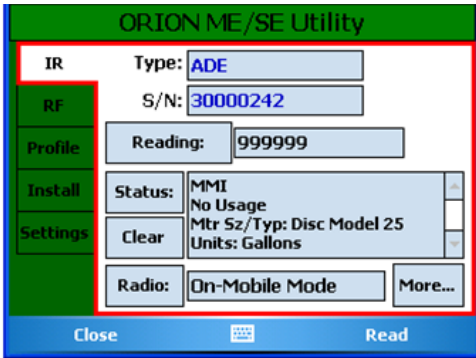


Figure 48: Mode Selection

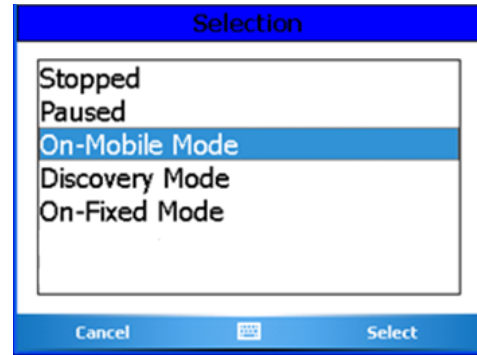


Figure 49: Mode Options

- Stopped** Stops the endpoint until the endpoint is restarted.
- Paused** Pauses the endpoint until a unit of water flows through it.
- On- Mobile Mode** The endpoint always starts in On-Mobile Mode. Every 6 hours the endpoint "talks" to the gateway. After another six hours, the gateway assigns a time slot to the endpoint. Then the endpoint goes into On-Fixed Mode. If the endpoint does not communicate with a gateway, it stays in On-Mobile Mode.
- Discovery Mode** Done at installation to discover gateways.
- On-Fixed Mode** Indicator of what the unit is transmitting at the current time. This option should not be used to set the endpoint.

Tap the **More** button on the IR screen to see more IR commands.

The IR More Commands screen displays the Firmware version and the meter type. The Lat/Longs may be stored if a GPS antenna is present. The Date and Time can also be set.

Flow Rate Study for ME/SE endpoints

ME/SE endpoints inside the firmware can run a study for a week and report High, Low and Average flow rates. A file of the study is created for ReadCenter Analytics.



Figure 50: More Commands

RF

Wildcard Read

The Wildcard Read screen displays a reading for all ORION ME endpoints in range up to 50 readings.

- S/N** Displays the serial number of the ORION ME endpoint.
- Reading** Displays a reading for the corresponding endpoint serial number.
- Status** Displays any potential exception issues such as a tamper (T) or no usage (NU). If no exception is noted, the Status field is blank.
- RSSI** Display the numeric value of the RF signal strength.
- Clear** Clears the current screen. Tap **Start Reading** to begin reading again.
- Save** Saves the current reading values.

1. Tap the **RF** reading tab on the ORION ME/SE Utility screen to select it.
2. To listen for all endpoints in range, tap the **Wildcard Read** tab and then tap **Start Reading**.
Result: All ORION ME/SE readings within range will display in a table format.
3. View the readings by tapping the up and down arrows to the right of the table.

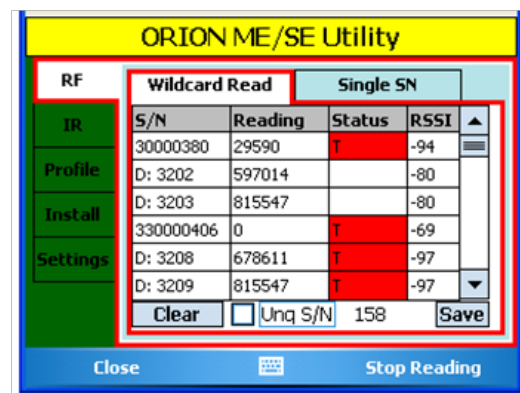


Figure 51: Wildcard Quick Read

Single Serial Number Read

The Single SN screen displays a reading for one ORION ME endpoint.

- S/N** Displays the serial number of the ORION ME endpoint. The meter type displays to the right of the serial number.
- Reading** Displays a reading for the corresponding endpoint serial number.
- RSSI** Display the numeric value of the RF signal strength.
- Midnight Reading** Displays the reading taken at the previous midnight hour.
- Status** Displays how the endpoint was programmed originally and displays any potential exception issues such as a tamper (T) or no usage (NU). Tap the up and down arrows to view all status messages.
- More** Displays the RF More Commands screen on which you can access the firmware version, endpoint date and time, location and full status.

1. To obtain a reading for a specific endpoint, tap the **Single S/N** tab as shown in Figure 52.
2. Key the ORION serial number in the **S/N** field, then tap **Start Reading** on the lower right of the screen.
Result: The screen displays the reading for the serial number entered.
3. Tap **Stop Reading** on the lower right of the screen to stop the Quick Read.

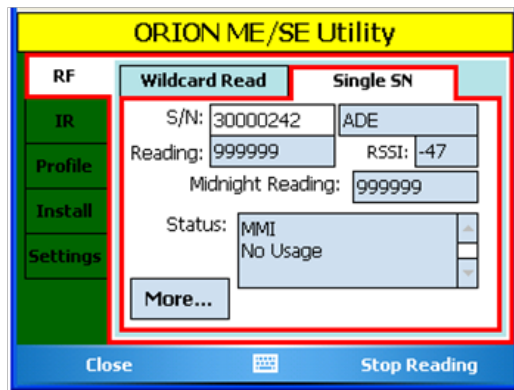


Figure 52: Single Endpoint Reading

Profile

The Profile tab displays an historical record for the ME/SE endpoint. A water endpoint will store 90 days of hourly readings. The number of days of storage for more frequent intervals is proportionally decreased (22 days for 15 minute intervals and 7 days of five minute intervals).

This data is stored as blocks of 24 readings. In handheld and mobile applications, customers can request all 90 days or certain blocks (days) of data.

S/N	Displays the serial number of the ORION ME endpoint.
1st Dt/Tm	Displays the first date of the selected profile. For example, if you request 7 in the Days field, the date displayed is 7 days prior to the current date..
Days	Select the number of days of data for the profile. Available choices: 1, 7, 14, 30, 60, ALL (90)
Interval	Displays the interval for the profile calculation. For example, 60 = hourly reads.
Quantity	Display the number of hourly reads chosen/heard.
Consumption	The difference between the start and end reads in the profile requested.
Status(es)	Displays any potential issues that require attention. Example: tamper, no usage, etc.
Save	Save the data to send back with the route information.

1. Tap the **Profile** tab.
 To use IR, select **IR** from the drop down and use the IR cable to read the SN. Then tap **Prime Read**.
 or
 To use RF, select **RF** from the drop down and enter the serial number using the keypad. Then tap **Read Data**.
Result: All profile data for the endpoint, up to 90 days of hourly reads, is collected.

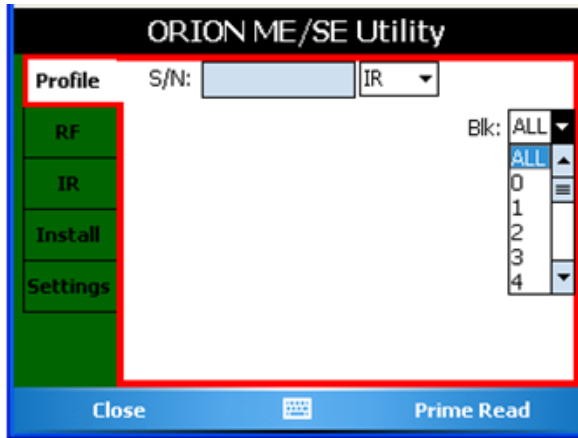


Figure 53: Profile Screen - No Data

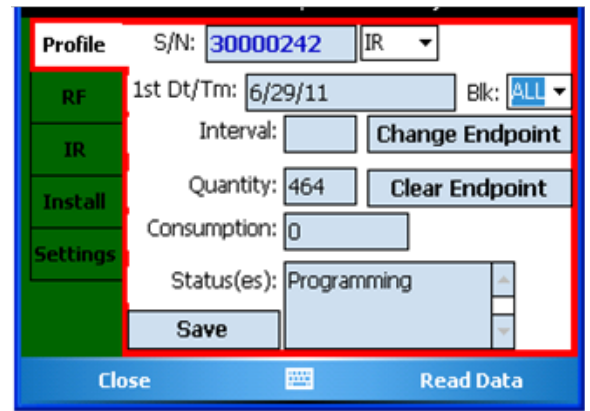


Figure 54: Profile Screen with Data

2. Tap the **Save** button.
Results: The historical data is saved and can be viewed in ReadCenter Analytics. A screen displays to confirm the save. See Figure 55.

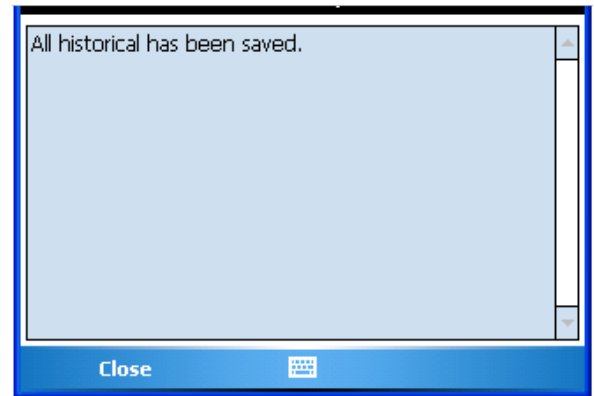


Figure 55: Historical Data Saved

Install

The purpose of the Install tab is to let the installer know that the endpoint is being heard from at least one gateway and that it will switch over to fixed network mode. It also may be used to troubleshoot. If the endpoint fails to switch to a fixed network, it can be manually assigned to a certain gateway, however, it is always best to let the system decide which gateway the endpoint gets assigned to.

Step 1 - With the Install tab selected, tap **Initial Read**.

Step 2 - Tap **IR START**.



Figure 56: Step 1

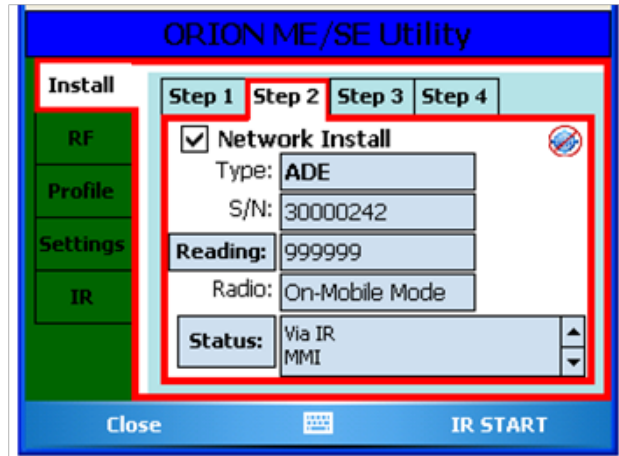


Figure 57: Step 2

Step 3 - Tap **RF GO!**

Step 4 - The endpoint heard from the gateways are listed as shown in Figure 59. Tap **Finish**.

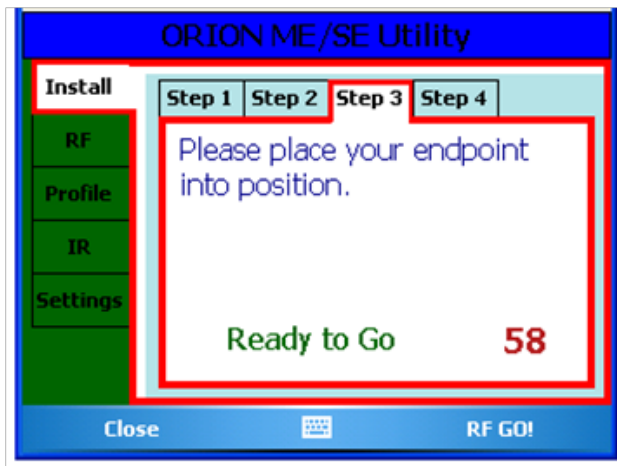


Figure 58: Step 3

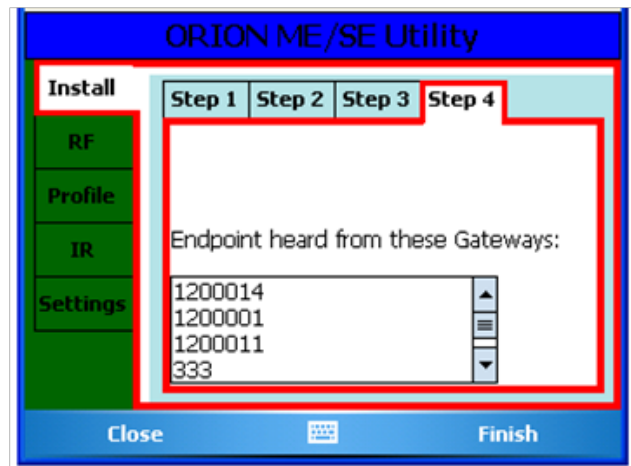


Figure 59: Step 4

Settings

The COM (communications) Ports for any hardware attached to the handheld are displayed on the Settings screen. The ORION ME transceiver version number is also displayed. Before reading meters for the first time, check the Settings to ensure the correct COM Ports are set for the hardware connected to the handheld to establish communication with the software.

1. Tap the **Settings** tab to access the IR and RF COM Ports on the handheld.
2. Tap in the COM Port field and make changes using the keypad.
3. Tap **Save** to save any changes. Tap **Close** to exit the screen without saving changes.

Note: Adjustments to the COM ports should be made only under the direction of Badger Meter Technical Support.

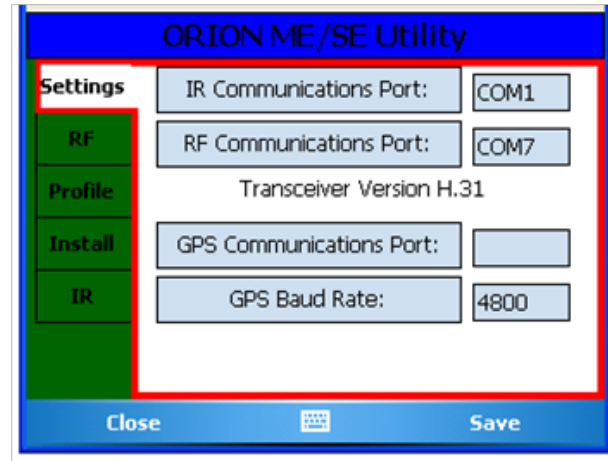


Figure 60: COM Ports

Utilities

The Utilities Menu can be accessed either from the Main Menu or from the Read Menu by tapping **Utilities**.

The Utilities Menu has three options: **Progress**, **Battery Info** and **Settings**.

Progress

1. Tap **Progress** on the Utilities Menu to see a summary of the number of meters loaded, number of meters read and other information about the routes loaded to the handheld.
2. If there is more than one route loaded, tap **Route Progress** to display a summary per route as shown in Figure 63.
3. Tap **Previous** or **Next** to view other route summary information. Previous and Next displays if more than one route is loaded.
4. Tap **Close** to return to the Utilities Menu.



Figure 61: Utilities Menu

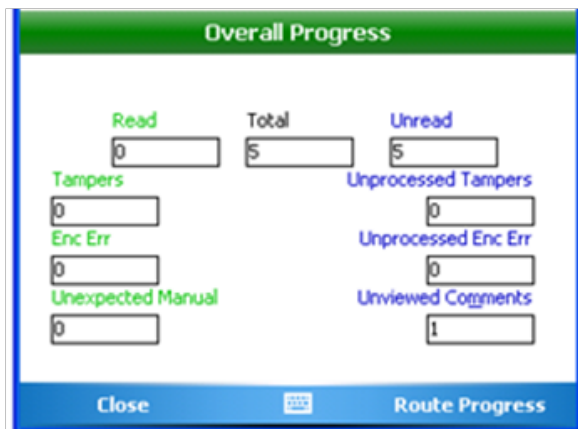


Figure 62: Route Progress

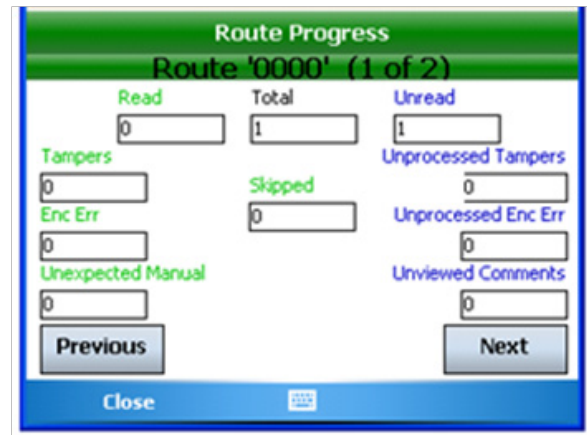


Figure 63: Route 1 of 2

Battery Info

The second option on the Utilities Menu is **Battery Info**.

1. Tap **Battery Info** to display:
 - the percentage of battery power left in the handheld
 - the percentage of battery power left in the backup battery
 - whether or not the battery is charging
2. Tap **Close** to return to the Utilities Menu.

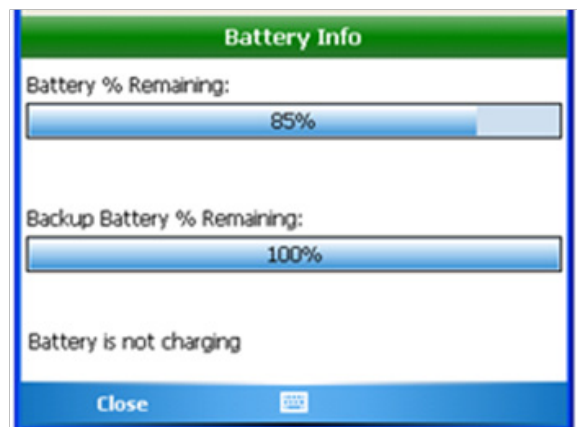


Figure 64: Battery Information

Settings

The third option on the Utilities Menu is **Settings**. Tap **Settings** to display the Settings Menu for the handheld.

Note: Although the meter reader can change these settings, the next time the unit is loaded with a new route from the reading data management software, it will return to the default settings. If the settings need to be changed permanently, consult the reading data management operator.

The Settings Menu has five sections: **Hardware**, **Program Options**, **High/Low Options**, **Displayable Field Settings** and **Customizations**. These five sections allow the meter reader to view the parameters at which the unit operates or how it treats certain situations.



Figure 65: Settings Menu

Hardware

The Hardware Settings screen displays the communication (COM) ports for the hardware attached to the handheld. The COM ports will be set during training to establish communication between the software and the handheld.

COM port settings should only be changed under the direction of Badger Meter Technical Support. If the COM ports must be adjusted, follow these steps.

1. Tap **Hardware** on the **Settings Menu** to display the **Hardware Settings** screen.
2. Tap the hardware name to display the selection screen.
3. Use the up and down arrows to select the setting. Then tap **Select**.
4. Tap **Save** to save the change or tap **Cancel** to return to the Settings Menu without saving any changes.

Note: When using a VersaProbe with a wireless connection to the handheld, tap to check the box next to "Versa Probe is Bluetooth."

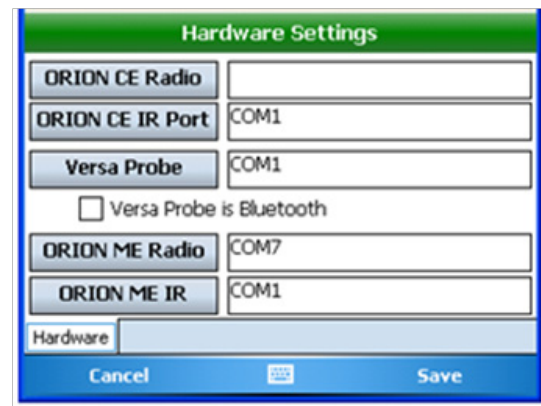


Figure 66: COM Port Settings

Program Options

1. Tap **Program Options** on the Settings Menu to display the first of three Program Options screens.
2. On the Options 1 of 3 screen, tap in the box next to the option to choose one or more of the settings that tell the handheld how to handle certain operations and conditions.
3. Tap **Save** to save the settings.
4. To advance to the next screen of Program Options tap **2 of 3**.



Figure 67: Program Options 1 of 3

On the Options 2 of 3 screen, choose the settings for route alerts.

1. Tap to check the **Alert on Route Boundary** box to activate an audible alert if the meter reader crosses from one route to another.
2. Tap the **Serv1**, **Serv2** and **Serv3** buttons to change the meter reading direction.

Note: The button names can be changed by the reading data management software operator to describe the type of utility (e.g., water, gas, sewer).

Tap the up and down arrows to select.



Figure 68: Program Options 2 of 3

Tap **Enlargement Timeout** to change the timeout settings for the enlargement feature. Tap the up and down arrows to select the desired setting. 5000 (5.0 seconds) is the maximum setting.

3. Tap **Save** to save any changes.
4. To advance to the last screen of Program Options tap **3 of 3**.

On the Options 3 of 3 screen, choose the settings for route loading and for Quick Keys.

1. Tap to choose FTP Server or Memory Stick for loading/unloading a route.
2. Tap to choose Single Tap or Double Tap for Quick Key selection.
3. Tap **Save** to save any changes to the settings or tap **Cancel** to return to the Settings menus without saving any changes.

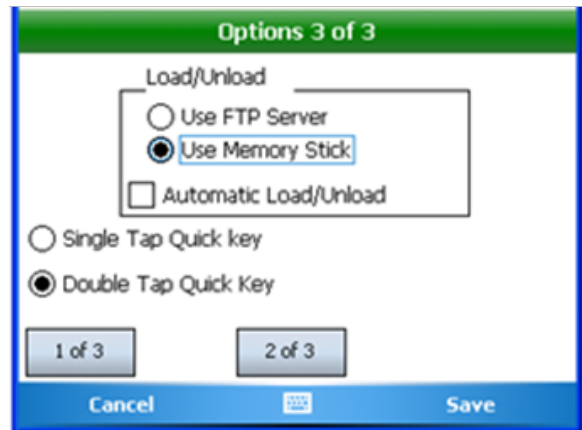


Figure 69: Program Options 3 of 3

High/Low Options

Tap **High/Low Options** on the Settings Menu to display the settings for high or low readings.

Advance on High/Low: The next account displays after a high or low reading.

Beep on High/Low: An audible alert sounds for a high or low reading.

Show High/Low Values: Displays the high and low values on the screen. If the values are set NOT to display by the reading data management software operator, changing the option on this screen will not affect the setting.



Figure 70: High/Low Reading Options

Hi/Low Readings Fail: When checked, a reading is considered high or low if it MATCHES the high or low value. Unchecked, the high reading must be HIGHER and the low reading must be LOWER.

High/Low Entry Disposition: The High/Low Options screen opens so you can manually enter reading information.

Displayable Field Settings

Tap **Displayable Field Settings** on the Settings Menu to see the User Defined Fields screen. This screen displays the pre-defined fields that display on the Read screen.

The first five field settings are determined by the reading data management operator. These fields cannot be changed.

The sixth (Custom) field may be changed by the meter reader. Refer to "**Read Screen**" on page 24 for additional information.

Tap **Custom Fields** to display the options for the Custom Field (Figure 72).

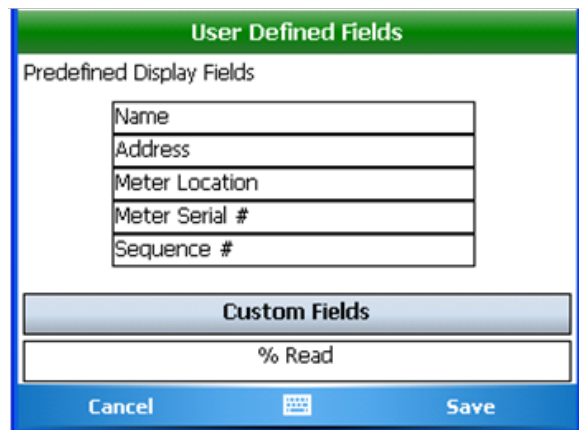


Figure 71: Read Screen Fields

Use the up and down arrows to scroll. Then tap to select the desired option. In Figure 72, **Module SN** is chosen to display in the Custom field.

Tap **Select**. The User Defined Fields screen reopens and the new selection displays below the Custom Fields button and on the Read screen.

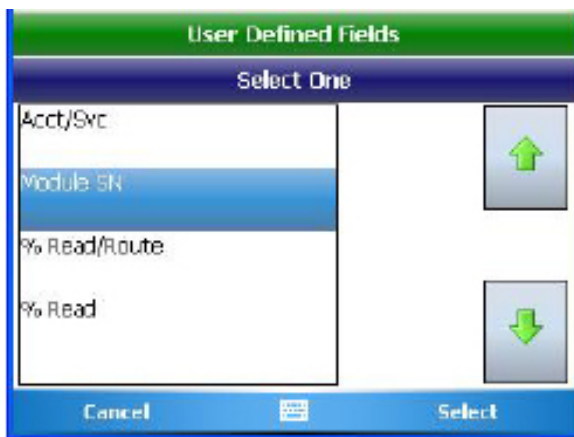


Figure 72: Custom Field Options

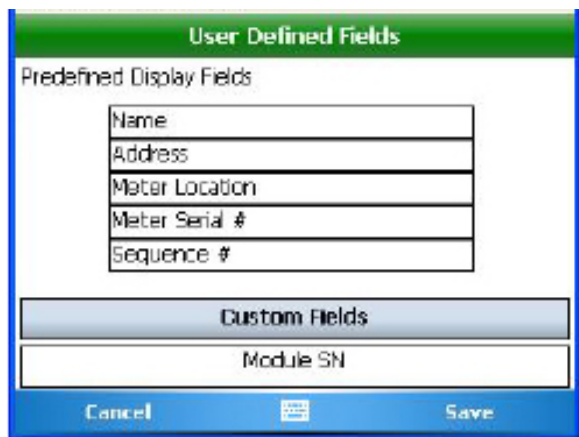


Figure 73: Custom Field Changed

Customizations

Tap **Customizations** on the Settings Menu to access the three customization screens. The meter reader has complete control of these three screens.

The Customization 1 of 3 screen is used to determine what information is displayed when a bookmark is set or a hot key is used. This aids the meter reader in finding a bookmark in the Search mode.

Tap **Bookmark Display Using Field** or **Search Hot Key** to display the selection screen. Tap the desired option. Then tap **Select**. The selected options display below the related button as shown in Figure 74.

To advance to the next screen, tap **2 of 3**.

On the Customization 2 of 3 screen, the meter read may change the selections for unread meters.

Tap the **Unread Hot Key** button to display the selection screen. Tap the desired option. The tap **Select**. The selected option displays below the button as shown in Figure 75.

Check the box to "Treat Skipped in Progress as Unread" instead of treating the account as read (attempted).

Tap **Save** to save any changes/selections made.

Also on this screen the meter reader may choose to "Limit Searches to Current Route." Left unchecked the handheld will use all the routes loaded on the handheld to conduct searches. To select this option, tap to check the box and tap **Save**.

To advance to the next screen, tap **3 of 3**.

On the Customization 3 of 3 screen, the meter reader may choose how to treat a skipped meter.

Tap the **Skipped Meter Definition** button to display the selection screen. Tap the desired option for defining a skipped meter. The tap **Select**. The selected option displays below the button as shown in Figure 76.

If "Show message when automated read is applied to a skipped service" is checked, the screen automatically displays the Reader/Skip code list, Trouble code list or both when a meter is skipped.

If an Account/Service is skipped, you must remove the skip prior to entering a reading.

And, if an Account/Service is skipped and an automated reading is read, that reading will be applied to the Account/Service and the skip condition will be removed. The user is optionally notified of this happening if "Show message when automated read is applied to a skipped service" is checked. To change the setting, tap to check the box and then tap **Save**.



Figure 74: Customization for Bookmarks



Figure 75: Customization for Unread Meters

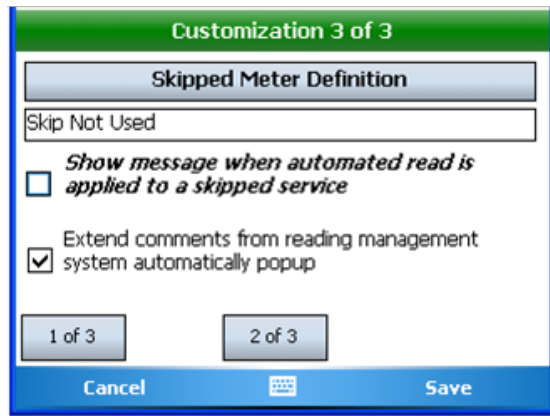


Figure 76: Customization for Skipped Meters

PROGRAMMING AN ORION GAS MODULE

Gas meters are programmed using ORION ME/SE Utility software.

1. From the Main Menu tap **Program & Quick Read**.
2. Tap to choose **ORION ME**, then tap **Open**.

Result: The ORION ME/SE Utility screen opens.

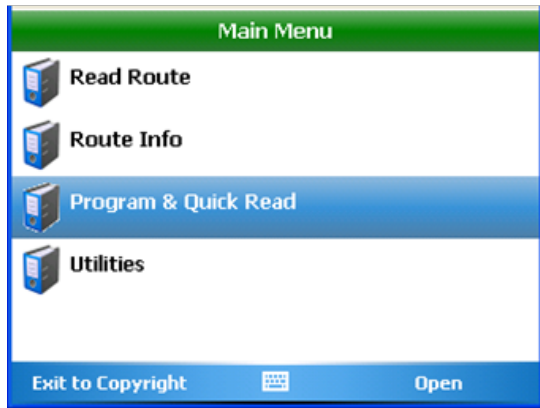


Figure 77: Main Menu

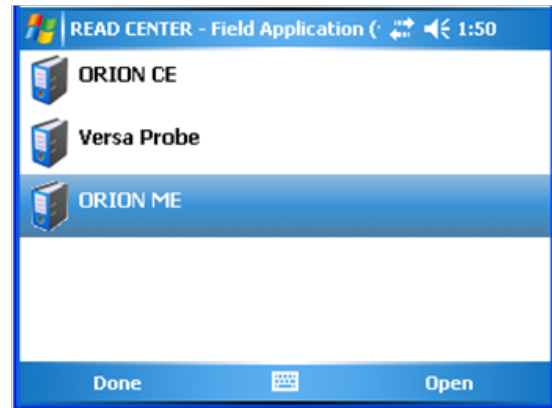


Figure 78: Select ORION ME

3. Tap the **IR** tab to access the ORION programming software.
4. Connect the IR cable to the 9-pin serial port on the bottom of the handheld.
5. Align the IR cable with the gas endpoint. Then tap **Read** on the ORION ME/SE Utility screen.

Result: The Gas Drive Circle window opens.

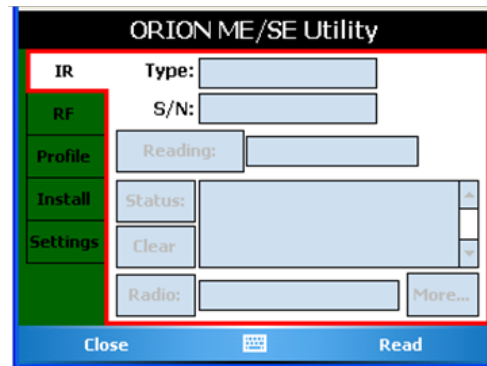


Figure 79: ME/SE Utility Programming

6. Tap **Yes** to select a Gas Drive Circle.

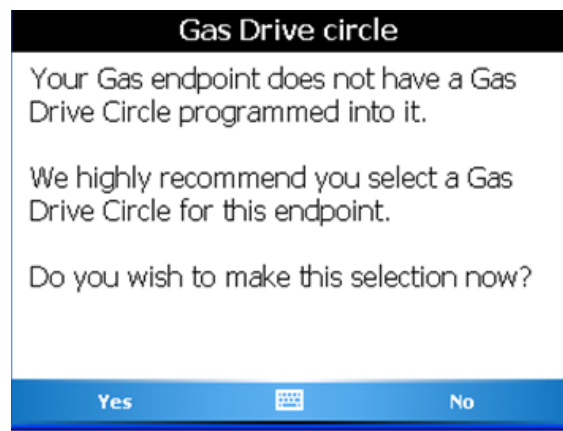


Figure 80: Select a Drive Circle

Result: The Gas Endpoint Status screen opens. All detected statuses will have a check mark.

7. Tap **Drive Circle Info**.

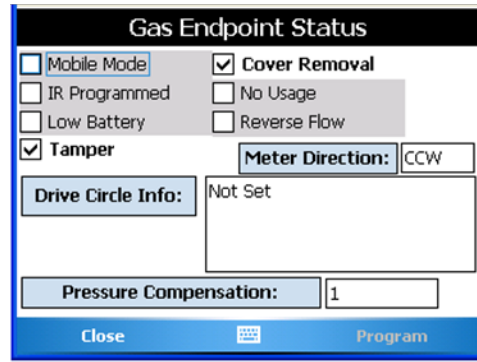


Figure 81: Endpoint Status

8. Select **All**, **Integral** or **Remote** to narrow down the options. Narrow down the selection further by choosing **Units**, **Resolution** and **Dials**.

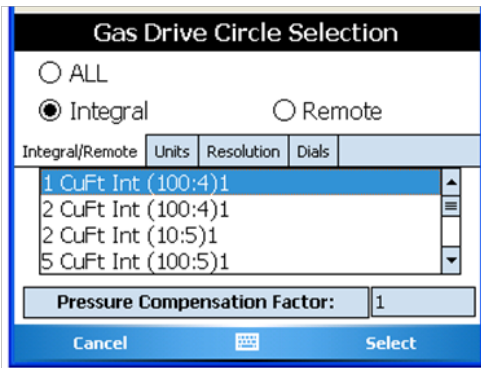


Figure 82: Drive Circle Selection Integral/Remote

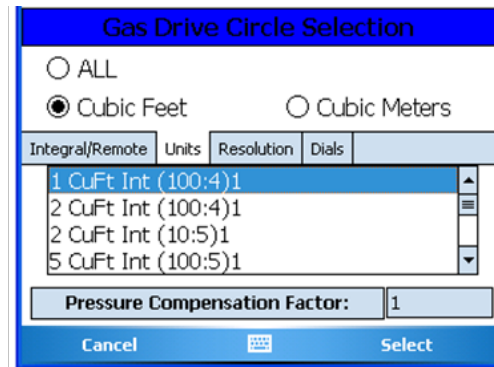


Figure 83: Drive Circle Selection Units

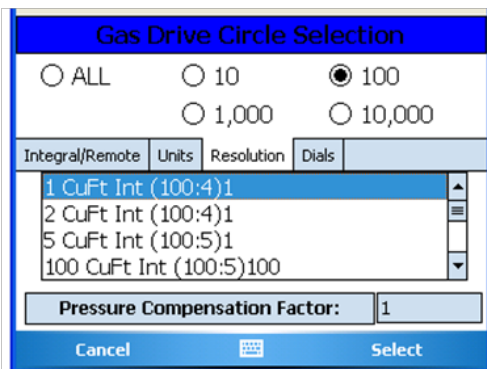


Figure 84: Drive Circle Selection Resolution

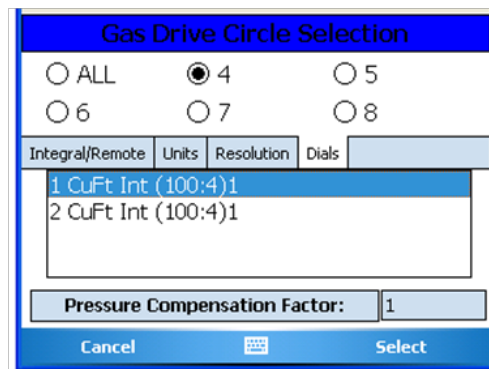


Figure 85: Drive Circle Selection Dials

9. Tap to highlight the appropriate Gas Drive Circle. Then tap **Select**.

10. Align the IR cable with the endpoint and tap **Program**.
Result: The Drive Circle screen changes color and the Program button becomes inactive.

The gas endpoint is programmed.

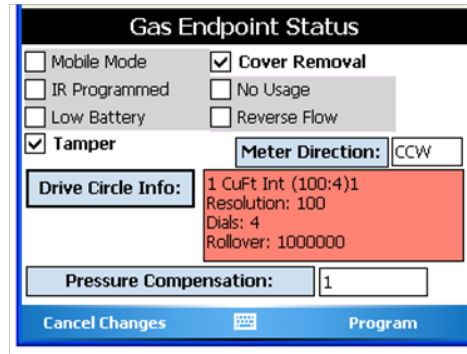


Figure 86: Endpoint Status

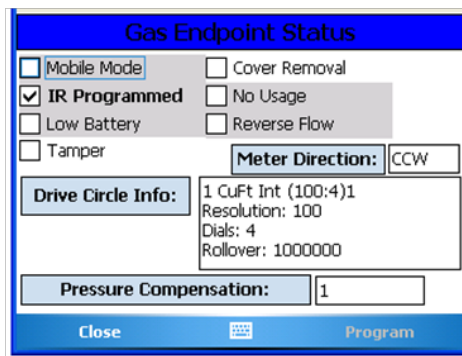


Figure 87: Endpoint Programmed

Changing the Drive Circle (Reprogramming)

1. Tap **Drive Circle Info** on the Gas Endpoint Status screen.

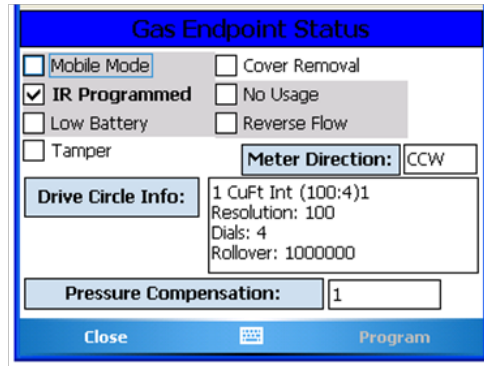


Figure 88: Endpoint Status Screen

2. Tap to highlight a different Drive Circle than the one previously programmed. Then tap **Select**.
*Result: The Drive Circle information changes and the **Program** key becomes active.*

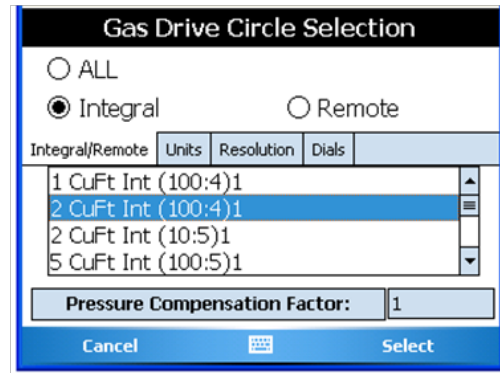


Figure 89: Selection Screen

3. Tap **Program**.
Result: The endpoint has been reprogrammed.

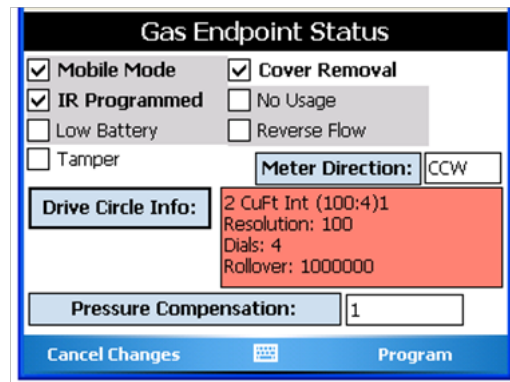


Figure 90: Endpoint Programmed

Clearing Exceptions

1. On the ORION ME/SE Utility screen, tap **Clear**.
Result: A window opens asking if you want to clear exceptions from the endpoint status.
2. Tap **Yes** to clear any exceptions.

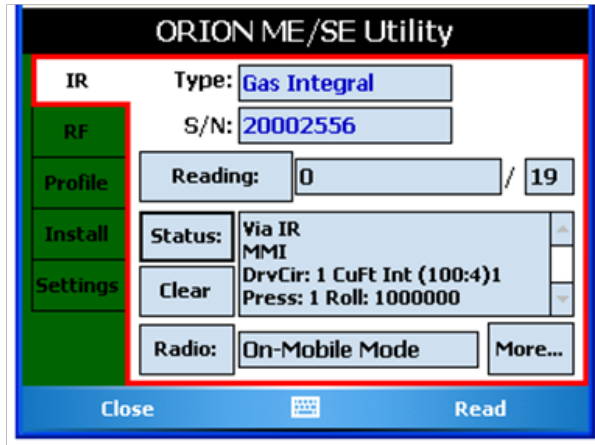


Figure 91: Clearing Exceptions

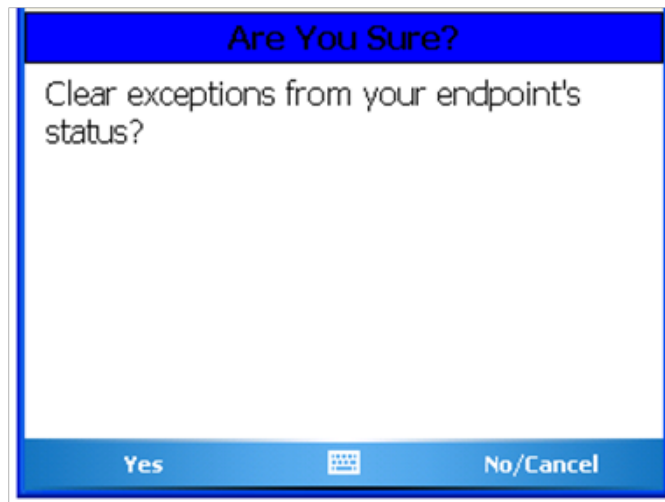


Figure 92: Clear Confirmation Screen

Appendix

Using the Handheld Keypad



Figure 93: Trimble Ranger 3 Keypad

Hot Keys and Quick Keys

The handheld software includes a number of Hot Keys and Quick Keys that provide meter reading shortcuts.

Hot Key Press the **Fn** key then quickly press the alpha key for the function you want to perform.

Example: Press Fn + B to bookmark an account.

Quick Key Double or single press the alpha key (depending on Settings) for the function you want to perform.

Example: To change the route reading direction, press **DD** on the keypad. To change the route reading direction back, press **DD** again.

Read Key Several functions can be performed with a single key press only when the Read screen is in use. They are displayed in the Read Screen (last) column in the table below.

Key	Hot Key Function	Quick Key Function (double/single press)	Read Screen On-screen Usage
A	--		Auto-mode
B	BOOKMARK	Toggle Bookmark	--
C	--	Next Bookmark	
D	RD DIRECT	Toggle route reading direction	
E	RESEQ	Resequence (not active)	
F	RTSTART	Route Start	
G	--		
H	HI/LO	View High/Low Reads for current account	
I	--		
J	--		Encoder error processing
K	SETTINGS	Settings	
L	--		
M	MAN RD	Manual Read Entry	
N	MESSAGE		Next account
O	--	Read extended comment from ReadCenter	
P	--		Previous account
Q	PROGRESS	Progress	
R	RD CD	Reader Code	
S	SEARCH	Search	
T	TRBL CODE	Trouble Code	
U	UNREAD	Next Unread	
W	NXT SKIP	Next Skipped	
X	--		
Y	--		
Z	SKIP	Toggle Skipped	

Note: Refer to "**Settings Tab**" on page 44 to change from double press to single press when using quick keys.

Technical Support

Errors do not normally occur, so it is important to report all occurrences of error windows to Badger Meter Technical Support.

Note: Trouble Codes and/or information from any Notes you created in Comments Codes/Messages can be useful when contacting Technical Support.

What to Report

When you contact Technical Support, provide the following information if possible:

- The handheld screen that was active
- The steps being performed at the time
- Any entries that were made on the screen
- The error message, including any error code and explanation that is shown
- The current condition of the laptop

Your Technical Support Specialist may ask you to fax Notes or other information to assist in the investigation.

Contact Badger Meter Technical Support by phone, email or fax

Phone: 800-456-5023

E-mail: TechSupport@BadgerMeter.com

Fax: 888-371-5982

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