



User Manual

TapWatch Application

Preface

Notice

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Revision

Revision H

Trademarks

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Technical Services Contact Information

For Inovonics technical services:

- E-mail: support@inovonics.com
- Phone: (800) 782-2709; (303) 939-9336

Document Conventions

The following notices are used throughout this document:

Note: Emphasizes points, provides supplementary information, or indicates minor problems in an expected outcome.

Caution: Indicates possible damage to equipment or loss of data, as well as potential problems in an expected outcome.

Warning: Indicates the possibility of minor injury to oneself or others.

Danger: Indicates the possibility of serious or fatal injury to oneself or others.

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Chapter 1

TapWatch Application Overview

1.1 TapWatch Application Introduction

The TapWatch application is a cloud-based application for generating reads from IP-connected Inovonics submetering systems in support of a submetering provider's utility billing operations.

Note: In addition to utility billing applications, reads data from TapWatch can also be used for leak detection and utility usage benchmarking applications.

TapWatch makes reads data and supervisory messages from Inovonics submetering systems available to a billing system in two ways:

- Providers can generate reads directly from the web-based application.
- Providers can pull reads data directly into their billing system through the use of APIs.
- Customers also have the ability to collect data from an Inovonics Tapwatch gateway and feed it directly into their IP-based application. Please contact Inovonics for more details.

Submetering system installers and providers can also use the TapWatch application to configure and troubleshoot sites.

Note: For tutorials, please visit <https://www.tapwatchtraining.com>, or contact Inovonics technical support to schedule in-depth training.

Note: This document is for TapWatch application users only. TapWatch3 users should refer to the *TapWatch3 Wireless Submetering User Manual*.

1.1.1 How TapWatch Works

Each TapWatch system includes the following components:

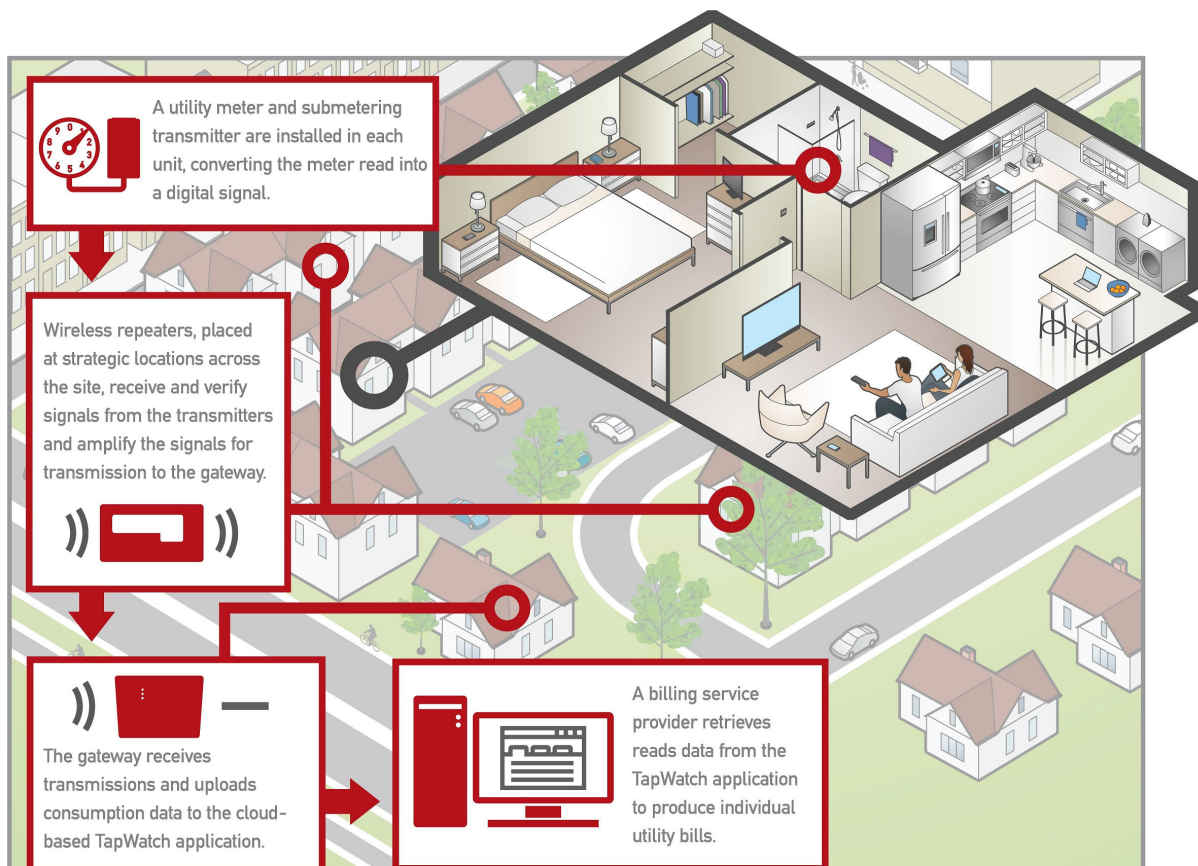


Figure 1-1 How Tapwatch works

1.1.2 Pulse Meter Transmitter

Inovonics offer two types of pulse meter transmitter (PMT). The first is a one-way end device that uses a meter's standard pulse or reed switched output. The second, also a one-way end device, is used with encoder registers, converting encoder data into a pulse output.

As the meter counts consumption, resulting pulses or switch closures are counted by the PMT. The PMT then transmits the data via the Inovonics network.

The PMT:

- Accepts data from the water, gas or electric meter.
- Transmits the data to the repeater or gateway.
- Is self-monitoring.
- Is primary battery powered, with either an easily replaceable battery or an extended life, non-replaceable battery.

1.1.3 Repeater

The repeater is an optional component of an Inovonics system that expands the coverage area of the network. Repeaters can be easily included in the initial installation, or added as the system grows.

The repeater:

- Receives messages and retransmits them at high power.
- Optimizes communication paths to effectively manage RF traffic.
- Retransmits messages to other repeaters, extending site coverage.

1.1.4 RF Gateway

There are several kinds of RF gateway used in Inovonics systems, depending on the application. The TapWatch application uses either the EN7580 TapWatch gateway, the EN7581 TapWatch gateway lite or an IP-connected data logger along with an EN4000 serial receiver.

The EN7580 TapWatch gateway:

- Listens for transmitted signals from end devices and repeaters.
- Stores output data on the device.
- Transmits data at regular intervals via Internet protocol (IP) to the TapWatch application.
- Supports up to 2000 devices.
- Is compatible with legacy Frequency Agile (FA) systems.

The EN7581 TapWatch gateway lite:

- Listens for transmitted signals from end devices and repeaters.

- Stores output data on the device.
- Transmits data at regular intervals via Internet protocol (IP) to the TapWatch application.
- Supports up to 50 devices.
- Is compatible with legacy Frequency Agile (FA) systems.

The RDL8500 data logger:

Note: The RDL8500 is obsolete as of 10/15/18. The TapWatch application remains backwards compatible with sites using the RDL8500.

- Receives meter data from the EN4000 or FA403 serial receivers.
- Stores data until needed.
- Transmits data at regular intervals via Internet protocol (IP) to the TapWatch application.

Note: The TapWatch application is not compatible with the Data Collector and Communicator (DCC). Please contact Inovonics to discuss options for DCC sites.

1.1.4.1 Migrating Legacy Sites to the TapWatch Application

Note: See the TapWatch gateway installation instructions for details on wiring an FA403 receiver to the TapWatch gateway.

1. Identify IP-connected RDL8500 sites. These sites communicate to TapWatch 3 and the TapWatch application concurrently. You can begin using the TapWatch application to generate reads for these sites immediately. Contact Inovonics technical support if you require training on the TapWatch application.
2. Prior to your next regularly scheduled maintenance at DCC sites still using modem connectivity, check if the property has access to Ethernet connectivity.

Note: Inovonics currently has a DCC trade in program available with aggressive pricing to help reduce the upgrade costs. Contact your Inovonics account manager for details.

3. You may also consider developing marketing campaign for the property owners based on the following:
 - Migration enables reporting on abnormally high/low reads which can indicate a leak or faulty meter, as well as other threshold notifications. This can be required to gain access to an apartment to address problems.
 - Migration enables robust diagnostic reporting, as well as alerts from other Inovonics transmitters, including pipe freeze warnings, leaking hot water heaters, and etc.
4. For DCC sites you plan on migrating, create a backup file of the DCC site.
5. Forward that backup file to support@inovonics.com, noting whether it is an EchoStream or Frequency Agile (FA) site, the name of the utility billing provider, and the TapWatch gateway authorization code and serial number.
6. Inovonics technical support will perform the necessary migration steps, typically in a single business day.
7. Once Inovonics technical support notifies you that the migration is complete, you will be able to access the site in the TapWatch application.

1.1.5 Billing System

The billing system generates a bill for each tenant based on their personal usage.

Note: Please contact Inovonics to discuss options for non-billing applications.

Chapter 2

Access Window

2.1 Overview

The administration window is used to manage users, and provide access to the TapWatch application for your organization. New users can be added or removed, roles and access changed, and passwords reset.

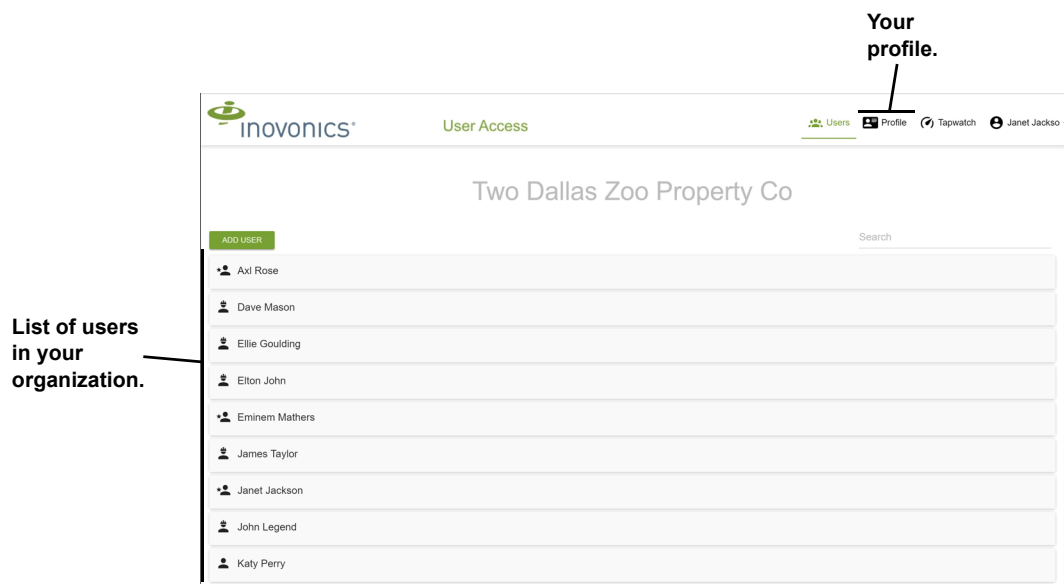


Figure 2-1 Administration Window

2.1.1 User Roles

Each user who has access to the TapWatch application is assigned a role used to control who can access information and change parameters in your portfolio.

There are three access roles: viewer, technician and administrator.

2.1.1.1 Viewer

Users with the viewer role cannot add, remove or edit anything in the TapWatch application. They can only download reads, export site configurations and view information for sites they have been given access to, and, optionally, within a timeframe specified by an administrator.

2.1.1.2 Technician

Users with the technician role can download reads and view and edit information in sites they are given access to by an administrator, and, optionally, within a timeframe specified by an administrator. Technicians can also reset passwords.

2.1.1.3 Administrator

Users with the administrator role can download reads and view and edit information for all sites within an organization. They can also assign site access and add or remove users, including other administrators.

2.2 Add a New User

To add a new user:

1. Click ADD USER.
2. Enter the new user's email.
3. Confirm the email address.
4. Assign a role.
5. Click ADD USER.

Once the user is added, a link will be created that the administrator will need to email to the new user. The user will follow this link to create their profile.

2.3 Manage your Profile

Click on profile in the top right of the window to manage your profile. From here you can edit your email, name, and phone numbers, as well as change your password.

2.4 Manage Users

Click on a user to remove them, change their role, or, in the case of viewers and technicians, give them access to all sites.

Viewers and technicians can be assigned access to specific sites and within specific timeframes by an administrator.

To assign access for a viewer or technician:

1. Click ADD ACCESS on a viewer or technician who has not been given access to all sites.
2. Select the site or sites to which you wish to give them access.
3. As desired, select a start date and an end date for their access.
4. Click ADD ACCESS.

Chapter 3

Portfolio Window

3.1 Overview

The portfolio window allows you to view and manage all of the sites in your organization. From this window, you can add, edit or remove a site, import and export the site's configuration, retrieve reads, define exceptions and create email subscriptions for them, and download a copy of your portfolio. You can use the search bar to find a specific property, search by gateway authorization code, or enter "RDL," "EN7580" or "EN7581" to show sites with the desired hardware.

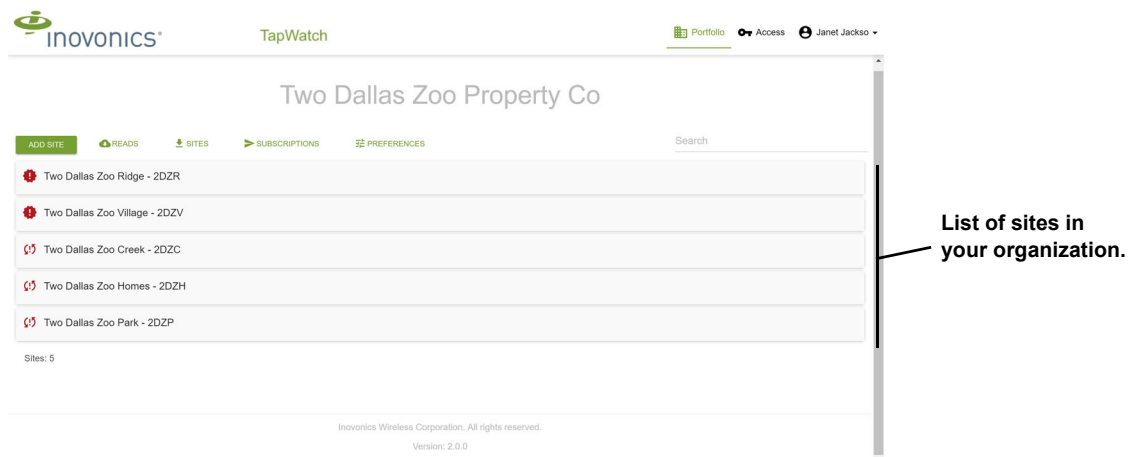


Figure 3-1 Portfolio Window

3.2 Add a New Site

To add a new site:

1. Click ADD SITE.
2. Enter the name of the site.
3. Enter a property ID. The property ID is user-defined code that must be unique to the site.
4. Select the site's time zone.
5. Enter the site address.
6. Enter any site notes.
7. Click ADD SITE.
8. The Add Site window will display. To use the quick site setup template click DOWNLOAD SETUP TEMPLATE; otherwise click CLOSE.
9. If using the quick site setup template, navigate to the download location.
10. Fill out the quick site setup template with your site information.
11. Referring to 3.7.3, "Import" on page 21, import the filled-out quick site setup template.

3.3 Collect Reads

The collect reads option is used to download the read files used by the billing system to create a bill for all of the reads in your organization. The files can be downloaded as one of nine meter read file types, and are consistent with those used in TapWatch 3.

Reads can also be collected through the use of TapWatch APIs. With the APIs, users can generate reads for a specific property or a portfolio and have them automatically delivered to a file folder of their choosing. TapWatch APIs can also be used for leak detection and other troubleshooting utilities. For more information, please see <https://www.inovonics.com/tapwatchapis/>

Note: For more information about meter read file types, see "Reads" on page 31.

To create reads for all sites in your organization:

1. Click READS.

2. Select the type of file you want to be downloaded.
3. Select the end date for which you want to collect the reads.

Note: Read files will include the most recent data for each transmitter, with the ability to select any date range within the last 90 days. Transmitters that haven't been heard will show up as inactive within the read files.

The reads for all sites will be downloaded in the file type you chose, combined in a .zip file.

3.4 Download Site Information

The download site information option is used to generate an Excel spreadsheet with information for all the sites you have access to.

To download site information:

1. Click SITES.
2. Click DOWNLOAD LIST.

3.5 Subscriptions

The subscriptions option is used to generate a daily email of exceptions or reads for all the sites in your portfolio that you have access to.

3.5.1 Exceptions

Note: If you want to subscribe to a daily email of flow exceptions for a specific site, you can do that as well. See section 3.7.2, "Reports" on page 18.

The following exceptions are included:

- Flow exception, as defined using by the preferences option, described in section 3.6, "Preferences".
- Transmitters with a low battery, inactive and/or tamper status.
- Repeaters for TapWatch gateway sites that have an inactive status.

- Remote data loggers and TapWatch gateways that have failed to connect in the last day and the last three days.

To subscribe to a daily flow exception email:

1. Click SUBSCRIPTIONS.
2. Check the box next to Exception Status Report.
3. Click SAVE SUBSCRIPTIONS.

3.5.2 Reads

Subscribing to reads will provide you with a Google Drive folder updated with reads every day. The Google Drive folder can be synced to a local folder on your computer using the Google Backup and Sync desktop application.

To subscribe to daily reads:

1. Create a Google account associated with the same email address as your TapWatch account.
2. Click SUBSCRIPTIONS.
3. Check the box next to Daily Reads.
4. Click SAVE SUBSCRIPTIONS.
5. You will receive an email from Inovonics inviting you to view a Google Drive folder.
6. View the folder, and select “Add to My Drive” to add it to your Google Drive.
7. Download and install the Backup and Sync application from Google.
8. Make sure the reads folder is selected to sync.
9. Choose a folder location that makes sense for you.
10. Make sure “Sync my drive to this computer” is checked.

Your read files will appear in this folder as they're generated. They can then be moved to another location or accessed directly.

Note: After 40 days files will disappear from this folder; if they need to be retained longer they should be moved elsewhere. If reads are lost, they can always be downloaded from <https://www.tapwatch.com>.

3.6 Preferences

The preferences option allows you to establish the thresholds that must be met to qualify for a flow exception report as well as the type of reads file you wish to receive if you have subscribed to daily reads.

3.6.1 Flow Exception Reports

Setting a minimum flow can identify issues such as a disconnected transmitter or meter failure; setting a maximum flow can identify leaks.

The value you enter for both the minimum and maximum flow represents a percentage of the ninety-six fifteen-minute check in periods during a day. For instance, if you set the minimum flow to two percent, then you will receive an exception report for any transmitter that detects activity in only two percent or less of those ninety-six check in periods. Likewise, if you set the maximum flow to eighty percent, then you will receive an exception report for any transmitter that is active more than eighty-percent of those ninety-six check in periods.

To set flow exception preferences:

1. Click PREFERENCES.
2. Set a value for minimum flow.
3. Set a value for maximum flow.
4. Click SAVE PREFERENCES.

3.6.2 Daily Reads File Type

Daily reads files can be downloaded as one of ten meter read file types. See “Reads” on page 31 for information about meter read file types.

To set the daily reads file type:

1. Click PREFERENCES.
2. Select your preferred read file type.
3. Click SAVE PREFERENCES.

3.7 Manage Sites

Click on an individual site to see the site name, time zone, address and any notes. All fields can be edited by clicking EDIT.

The following options are also provided:

- Setup
- Reports
- Import
- Reads
- Export
- Remove

3.7.1 Setup

Setup is used to add, view and manage the buildings, associated units and network devices for each of your sites. You can also import this information as described in section 3.7.3, "Import".

Click SETUP to go to the buildings and units window for the selected site. See "Buildings and Units" on page 24.

3.7.2 Reports

There four types of reports available: device status, exception status, device discovery and read history.

To access reports:

1. Click REPORTS.
2. Select desired report.

3.7.2.1 Device Status

Device status displays information for all transmitters and repeaters in the site. Click REFRESH at any point to refresh information for all devices.

Inactive devices are highlighted in red. The percentage of devices in this site that are active is displayed under the page title.

The following information displays for each device.

Device

Displays the type of device for which information is displayed on this line.

Location

Displays the location of the device.

TXID

Displays the unique identification number of the repeater or transmitter.

Utility Type

Displays the type of utility for which the transmitter is providing the read.

Status

Displays the status of the transmitter that sent the message.

- Check mark: Indicates the transmitter is operating as it should be.
- Low battery: Indicates the transmitter has a low battery.
- Inactive: Indicates the RF gateway is no longer receiving messages from the transmitter.
- Tamper: Indicates the transmitter has been tampered with.
- Reset: Indicates the transmitter has been reset.
- Error: Indicates a communication error between the RF gateway and the transmitter.

Last Heard in 24 Hours

Displays the date and time when the last message from this device was received, if a message has been received within the last 24 hours.

Signal Level

Displays the signal level of the message as measured by the RF gateway. The signal level values indicate the signal's relative strength, ranging from 0-99. The higher the value number, the stronger the signal strength.

Signal Margin

Displays the signal margin of the message as measured by the RF gateway. The signal margin is the measurement of the decibel level of the message, minus the decibel level of any interfering signals.

3.7.2.2 Exception Status

Exception status displays exception information for the site. The following exceptions are included:

- Flow exception, as defined using by the preferences option, described in section 3.6, “Preferences”.
- Transmitters with a low battery, inactive and/or tamper status.
- Repeaters for TapWatch gateway sites that have an inactive status.
- Remote data loggers and TapWatch gateways that have failed to connect in the last day and the last three days.

Note: Click REFRESH at any point to refresh information for all devices.

Download

Download allows you to download the flow exception report for this site as an Excel file.

To download the exception report:

1. Click DOWNLOAD.
2. Click DOWNLOAD EXCEPTIONS.

Subscribe

The subscribe option is used to generate a daily email of flow exceptions for this site.

Note: If you want to subscribe to a daily email of flow exceptions for your entire portfolio, you can do that as well. See section 3.5, “Subscriptions” on page 15.

To subscribe:

1. Click SUBSCRIBE.
2. Click SUBSCRIBE again.

3.7.2.3 Device Discovery

Device discovery is used in troubleshooting and to confirm setup. To initiate device discovery:

1. Click DEVICE DISCOVERY.

2. Select whether to discover repeaters, transmitters or all devices from the Device Type pulldown menu.
3. Select whether to discover registered, unregistered or all devices from the Register Status pulldown menu.
4. Click START DISCOVERY.
5. To confirm, click START DISCOVERY again in the pop-up window.
 - All devices that fit the parameters you selected will appear. If confirming setup, ensure all registered devices appear; If troubleshooting, look for errors in the device discovery data table.
 - Click DOWNLOAD to download the device discovery table; click CLEAR ROWS to clear the devices discovery table.

3.7.2.4 Read History

Read history allows you to pull a span of reads from up to ten units for troubleshooting or move-ins and move-outs.

To download a read history.

1. Click SELECT UNITS.
2. Select a start date within six months of the current date.
3. Select an end date within 60 days of the start date.
4. Select up to ten units.
5. As desired, click DOWNLOAD to download the report as an Excel file.

3.7.3 Import

The import feature can be used to either import backed-up site configurations or to create a new site. If creating a new site, refer to your organization's policies for importing files into TapWatch.

To import a site:

1. Click IMPORT.
2. Navigate to the Microsoft Excel® spreadsheet containing backed-up configuration information for this site.
3. Click IMPORT SITE.

3.7.4 Reads

The reads option is used to download the files used by the billing system to create a bill. The files can be downloaded as one of nine meter read file types, and are consistent with those used in TapWatch 3.

Note: For more information about meter read file types, see “Reads” on page 31.

To create reads for an individual site:

1. Click READS.
2. As desired, edit the file name to be downloaded.
3. Select the type of file you want to be downloaded.
4. Select the end date for which you want to collect the read.

Note: Read files will include the most recent data for each transmitter, with the ability to select any date range within the last 90 days. Transmitters that haven't been heard will show up as inactive within the read files.

3.7.5 Export

Export allows you to backup your site configuration information.

Note: Export can also be used to create a template for new sites. For more information, see section 4.5.1, “Add a Unit” on page 28.

To backup your site configuration information:

1. Click EXPORT.
2. In the File Type dropdown menu, choose whether to download a Full Site Backup or a Quick Site Setup Template.

Note: The quick site setup template is designed for site setup, and contains a limited range of site information.

3. Enter a new file name, as desired.

4. Click EXPORT SITE.

A Microsoft Excel spreadsheet containing the site configuration information will be downloaded into your PC's downloads folder.

3.7.6 Remove

Click REMOVE to remove the selected site.

Chapter 4

Buildings and Units

4.1 Overview

Setup is used to manage the buildings, associated units and network devices for each of your sites. You can also import this information as described in section “Import” on page 21.

From this window, you can add, remove and manage buildings, as well as add, manage and review units within each building. You can also manage the Inovonics RF network for the site.

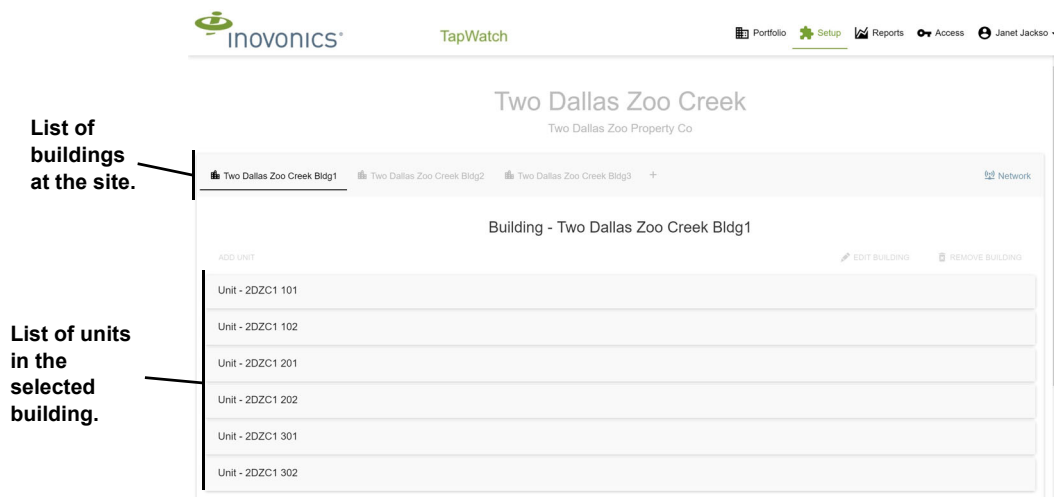


Figure 4-1 Buildings and Units Window

4.2 Add a New Building

To add a new building:

1. Click the plus sign to the right of your building list.
2. Enter the name of the building.
3. Enter any building notes.
4. Click ADD BUILDING.

4.3 Network

A building's Inovonics RF network consists of repeaters to carry messages from the transmitters and a gateway to receive them. To add, edit or remove a gateway or repeaters for the site, click NETWORK.

4.3.1 Add Gateway

Each site has one gateway. If there is already a gateway associated with the site, you will not be able to add another.

To add a gateway:

1. Click ADD GATEWAY.
2. Select the model.
3. Enter the authorization code. You can find the authorization code on the TapWatch gateway. It is the eight-character alphanumeric code located on a label in the lower right-hand portion of the printed circuit board, just above the Inovonics logo.
4. Enter the location of the gateway for future maintenance.
5. Enter any notes for the gateway.
6. Click ADD GATEWAY.

Note: The first time you connect a TapWatch gateway to the Internet it will check for and initiate firmware updates. This may take up to 15 minutes and the gateway may experience a re-boot cycle to complete the update.

4.3.2 Add IP-Enabled Data Logger

Inovonics has synced all IP-connected RDL8500 data loggers to the Inovonics cloud and TapWatch application. Data for properties with IP-connected data loggers will be available to authorized users at log in.

To add a new IP-connected data logger to the TapWatch application, provide Inovonics technical support with the data logger's serial number. No other steps are required.

4.3.3 Add Repeater

Each site can support multiple repeaters to help ensure that read information from each building makes it to the gateway.

To add a repeater.

1. Click ADD REPEATER.
2. Select the repeater model.
3. Enter the eight-digit serial number of the repeater located on the printed circuit board above the backup battery and on the removable sticker on the top of the outside edge of the housing.

Enter the eight digit serial # of the repeater, located on the printed circuit board above the back up battery. There may also be a removable sticker at the top outside edge or on the outside back of the housing.

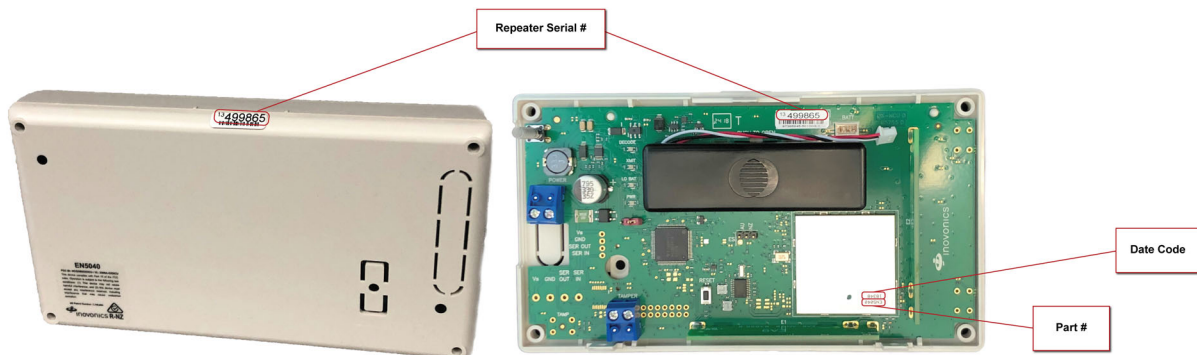


Figure 4-2 Repeater serial number location

Note: Once you enter the serial number of the repeater, the TapWatch application will convert it to an eight-digit TXID. This will not match the ten-digit serial number used by TapWatch3, due to functional differences between the PC-based TapWatch3 software and the cloud-based TapWatch application, but it will reference the same repeater.

4. Enter the location of the repeater for future maintenance.
5. Enter any notes for the repeater.
6. Click ADD REPEATER.

Once the repeater is added successfully, you will have the option to add another repeater with the same settings. This will allow you to only fill in the unique fields for the new repeater.

4.3.4 Manage Repeaters and Gateways

Click on an repeater or gateway to see device information and any notes. All fields can be edited by clicking EDIT, and the repeater or gateway can be removed by clicking REMOVE.

4.4 Manage Buildings

Click on any building to see building information and any notes. All fields can be edited by clicking EDIT, and the building can be removed by clicking REMOVE.

4.5 Units

When a building is selected, all of the units in the building are displayed, along with associated meter and transmitter information.

Note: You can use the export function described in section 3.7.5, “Export” on page 22 to create a template which you can also use to create new units. The export function outputs an Excel file that contains pulldown menus containing preformatted data to ensure compatibility with the TapWatch application. Users can also copy and paste data from a TapWatch3 export directly into the TapWatch application file.

4.5.1 Add a Unit

To add a unit:

1. Click ADD UNIT.
2. Enter a name for the unit. Usually this is the unit number.
3. Click the plus sign to add a meter and transmitter to the unit.
4. Select the utility type. If the type is not shown, select Other.
5. Enter the TXID for the Inovonics submetering transmitter attached to the meter in one of three ways:
 - Enter the TXID manually.

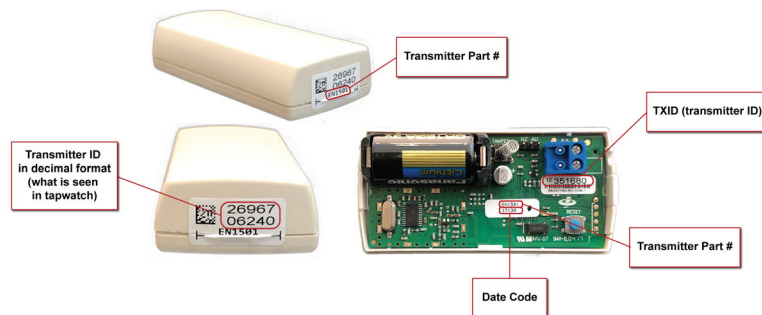


Figure 4-3 Transmitter serial number location

- Click START AUTO REGISTRATION and press the reset button on the transmitter; the TXID will populate automatically.
 - Use any 2D barcode scanner connected to your PC or mobile device to scan the transmitter ID on the outside case stick into the TXID field.
6. Select the Inovonics transmitter model.
 7. Select the meter model. If you are not using one of the list of approved meter models included in this dropdown menu, select Other.
 8. Enter the meter serial number.
 9. The initial meter count is the meter reading when the transmitter last reset. As desired, enter an initial meter count.
 10. The count factor is the number of units which each meter pulse represents. If you have selected an approved meter model, this will be prefilled with the default based on the meter model selection. As desired, enter a count factor.
 11. Enter any notes for the unit; include the meter model if Other was selected.

12. If there if there are more transmitters and meters in the unit, click the plus sign and enter meter and transmitter information.
13. When all meters and transmitters have been added click ADD UNIT.
14. To confirm setup, use device discovery detailed in 3.7.2.3, “Device Discovery” on page 20.

Once the unit is added successfully, you will have the option to add another unit with the same settings. This will allow you to only fill in the unique fields for the new unit.

4.5.2 Add Units using an Export File

1. Add a single unit as described in section 4.5.1, “Add a Unit” on page 28.
2. Export your site configuration information as described in section 3.7.5, “Export” on page 22.
3. Enter the required information into the Meters_Transmitters tab in the columns with an asterisk.
 - Data can be manually entered or copied and pasted.
 - TXIDs can be manually entered or entered using any 2D barcode scanner connected to your PC or mobile device.

4.5.3 Manage Units

Click on a unit to see unit information and any notes. All fields can be edited by clicking EDIT, and the unit can be removed by clicking REMOVE.

4.5.4 Perform Flow Test

A flow test can be perform to make sure a transmitter has been correctly installed, and the flow count is being captured correctly.

To perform a flow test:

1. Ensure the transmitter is in rapid transmit mode per the installation instructions.
2. Click FLOW.
3. Enter a flow count.
4. Click START TEST.

You can click CANCEL TEST at any point during the flow test. If the entered number of pulses are detected, you will receive a Success message; if the pulses are not detected, you will receive a Timed Out message. In the case of a Timed Out message, verify that the transmitter is correctly installed.

- 5.** Once the test is complete, click CLOSE.

Chapter 5

Reads

5.1 Overview

The reads option is used to download the files used by the billing system to create a bill. The files can be downloaded as one of ten meter read file types, most of which are consistent with those used in TapWatch 3.

Note: Read files will include the most recent data for each transmitter, going back one month in time from the end date selected. Transmitters that haven't been heard within that month will show up as inactive within the read files.

5.1.1 OUT File Types

The following tables contain .out file information with the following parameters:

- “Field” shows the type of information that follows.
- “Start Column” shows the character at which this information begins.
- “Length” shows the number of characters required to convey the information.
- “Description” shows the information contained in the field.

5.1.1.1 MOD 1

Field	Start Column	Length	Description
Building Name	1	25	Building name
Apartment Unit #	27	5	Apartment or unit within building
Property ID	33	7	Site short name or billing identifier
Transmitter ID	40	10	Factory-assigned serial number; universally unique
Meter Count	51	6	Reading on meter in respective unit (Count plus Initial_Meter_Count)
Utility Type	58	1	W: Water; E: Electric; G: Gas; R: Runtime; O: Other
Meter Connection	60	1	H: Hot; C: Cold; A: All; O: Other
Date of Last Read	62	8	Date, MM/DD/YY, when last meter read was recorded
Time of Last Read	71	5	Time, HH:MM, when last meter read was recorded
Meter Serial Number	77	12	User-assigned to help identify the meter location
Exception Code	90	4	E: Exception that cleared on same day; I: Inactive; B: Low battery; T: Tampered; R: Reset; P: Registered but never checked in
	95	1	End of line indicator

5.1.1.2 MOD 2

Field	Start Column	Length	Description
Reserved	1	5	Reserved, always " 0 00"
Transmitter ID	7	10	Factory-assigned serial number, universally unique
Meter Count	20	6	Reading on meter in respective unit (Count plus Initial_Meter_Count)
Utility Type	27	1	W: Water; E: Electric; G: Gas; R: Runtime; O: Other
Meter Connection	29	1	H: Hot; C: Cold; A: All; O: Other
Exception	32	1	E: notes that an exception has occurred on the same day

Date of Last Read	34	8	Date, MM/DD/YY, when last meter read was recorded
Time of Last Read	43	5	Time, HH:MM, when last meter read was recorded
Meter ID	49	12	User-assigned to help identify the meter location
	79	1	End of line indicator

5.1.1.3 MOD 3

Field	Start Column	Length	Description
Reserved	1	5	Reserved, always " 0 00"
Transmitter ID	7	10	Factory-assigned serial number, universally unique
Meter Count	20	6	Reading on meter in respective unit (Count plus Initial_Meter_Count)
Utility Type	27	1	W: Water; E: Electric; G: Gas; R: Runtime; O: Other
Meter Connection	29	1	H: Hot; C: Cold; A: All; O: Other
Exception	32	1	E: notes that an exception has occurred on the same day
Date of Last Read	34	8	Date, MM/DD/YY, when last meter read was recorded
Time of Last Read	43	5	Time, HH:MM, when last meter read was recorded
Meter ID	49	12	User-assigned to help identify the meter location
Exception Code	62	5	I: Inactive; B: Low battery; T: Tampered; R: Reset; P: Registered but never checked in
	79	1	End of line indicator

5.1.1.4 MOD 4

Field	Start Column	Length	Description
Reserved	1	5	Reserved, always " 0 00"
Meter ID	7	12	User-assigned to help identify the meter location

Meter Count	20	6	Reading on meter in respective unit (Count plus Initial_Meter_Count)
Utility Type	27	1	W: Water; E: Electric; G: Gas; R: Runtime; O: Other
Meter Connection	29	1	H: Hot; C: Cold; A: All; O: Other
Exception	32	1	E: notes that an exception has occurred on the same day
Date of Last Read	34	8	Date, MM/DD/YY, when last meter read was recorded
Time of Last Read	43	5	Time, HH:MM, when last meter read was recorded
	79	1	End of line indicator

5.1.1.5 MOD 5

Field	Start Column	Length	Description
Building Name	1	25	Building name
Apartment Unit #	27	5	Apartment or unit within building
Property ID	33	7	Site short name or billing identifier
Transmitter ID	40	10	Factory-assigned serial number; universally unique
Meter Count	51	10	Reading on meter in respective unit (Count plus Initial_Meter_Count)
Utility Type	62	1	W: Water; E: Electric; G: Gas; R: Runtime; O: Other
Meter Connection	64	1	H: Hot; C: Cold; A: All; O: Other
Date of Last Read	68	8	Date, MM/DD/YY, when last meter read was recorded
Time of Last Read	77	5	Time, HH:MM, when last meter read was recorded
Meter ID	83	12	User-assigned to help identify the meter location
Exception Code	96	4	E: Exception that cleared on same day; I: Inactive; B: Low battery; T: Tampered; R: Reset; P: Registered but never checked in
	101	1	End of line indicator

5.1.2 XML File Types

There are two XML file types as follows:

5.1.2.1 XML 1

The XML 1 format contains the following fields:

Field	Parent	Data Type	Description
Date	OutFile	Date/Time	When the outfile was generated
Property	OutFile	Record	Contains reads for one property
Code	Property	String	Site short name or billing identifier
Name	Property	String	Name of the property
Period	Property	Array	Contains the reads of a period
Read	Period	Record	Contains the details of a read
Building	Read	String	Name of the building via associated transmitter
Unit	Read	String	Name of the unit via associated transmitter
Meter	Read	String	One of: Hot, Cold, All, Other
UtilityType	Read	String	One of: Water, Electric, Gas, Runtime, Other
SerialNumber	Read	String	The serial number of the meter
Transmitter	Read	String	The model number of the RF transmitter
SerialNumber	Read	String	The serial number of transmitter
HadExceptionDuringPeriod	Read	Boolean	If there was an exception today on this transmitter.
IsBatteryLow	Read	Boolean	If the transmitter reported a low battery condition
IsInactive	Read	Boolean	If the transmitter failed to report in
IsReset	Read	Boolean	If the transmitter reported a reset condition
IsTamper	Read	Boolean	If the transmitter reported a case tamper condition
Period	Read	Date/Time	When this period ended

Read	Read	Integer	Reading on meter in respective unit
InitialMeterCount	Read	Integer	The meter reading when transmitter last reset
Received	Read	Date/Time	When the transmitter was last heard from

5.1.2.2 XML 2

The XML 2 format contains the following fields:

Field	Parent	Data Type	Description
Date	OutFile	Date/Time	When the outfile was generated
Property	OutFile	Record	Contains reads for one property
Code	Property	String	Site short name or billing identifier
Name	Property	String	Name of the property
Period	Property	Array	Contains the reads of a period
Read	Period	Record	Contains the details of a read
Building	Read	String	Name of the building via associated transmitter
Unit	Read	String	Name of the unit via associated transmitter
MeterConnection	Read	String	One of: Hot, Cold, All, Other
MeterUtilityType	Read	String	One of: Water, Electric, Gas, Runtime, Other
MeterSerialNumber	Read	String	The serial number of the meter
TransmitterModel	Read	String	The model number of the RF transmitter
TransmitterSerialNumber	Read	String	The serial number of transmitter
TransmitterCount	Read	Integer	The pulse count reported by the transmitter
InitialMeterCount	Read	Integer	The meter reading when transmitter last reset
HadExceptionDuringPeriod	Read	Boolean	If there was an exception today on this transmitter.
IsBatteryLow	Read	Boolean	If the transmitter reported a low battery condition

IsInactive	Read	Boolean	If the transmitter failed to report in
IsReset	Read	Boolean	If the transmitter reported a reset condition
IsTamper	Read	Boolean	If the transmitter reported a case tamper condition
PeriodEnd	Read	Date/Time	When this period ended
Received	Read	Date/Time	When the transmitter was last heard from

5.1.3 CSV File Type

5.1.3.1 CSV 1

The CSV format is a comma separated values version of the XML 2 format, with the same data fields. The first line contains a list of the field/column names as follows:

Field	Description
Property Code	Site short name or billing identifier
Property Name	Name of the property
Building	Name of the building
Unit	Name of the unit
Meter Serial Number	The serial number of the meter
Meter Connection	One of: Hot, Cold, All, Other
Meter Utility Type	One of: Water, Electric, Gas, Runtime, Other
Transmitter Model	The model number of the RF transmitter
Transmitter Serial Number	The serial number of transmitter
Had Exception During Period	If there was an exception today on this transmitter
Is Battery Low	If the transmitter reported a low battery condition
Is Inactive	If the transmitter failed to report in
Is Reset	If the transmitter reported a reset condition
Is Tamper	If the transmitter reported a case tamper condition
Period End	When this period ended

Transmitter Count	The pulse count reported by the transmitter
Initial Meter Reading	The meter reading when transmitter last reset
Received	When the transmitter was last heard from

The following is an example of the CSV 1 format:

```
Property Code, Property Name, Building, Unit, Meter Serial Number,
Meter Connection, Meter Utility Type, Transmitter Model,
Transmitter Serial Number, Had Exception During Period, Is Battery
Low, Is Inactive, Is Reset, Is Tamper, Period End, Transmitter
Count, Initial Meter Reading, Received
```

```
Test-RDL, "IWC HQ", "397 S Taylor Ave, Louisvi", 1909735, 1909735,
All, Water, EN1501, 2686264295, False, False, False, False, False,
02/09/2018 20:59:42, 15128, 0, 02/09/2018 20:56:51
```

5.1.4 JSON File Type

Field	Description
Property_Code	Site short name or billing identifier
Property_Name	Name of the property
Building	Name of the building
Unit	Name of the unit
Meter_Serial_Number	The serial number of the meter
Meter_Count_Factor	The number of units a meter pulse represents
Meter_Connection	One of: Hot, Cold, All, Other
Meter_Utility_Type	One of: Water, Electric, Gas, Runtime, Other
Transmitter_Model	The model number of the transmitter
Transmitter_Serial_Number	The serial number of the transmitter
Had_Exception_During_Period	If there was an exception during the period on the transmitter
Is_Battery_Low	If the transmitter reported a low battery
Is_Inactive	If the transmitter failed to report in
Is_Reset	If the transmitter reported a reset condition
Is_Tamper	If the transmitter reported a case tamper condition
Period_End	When the period ended
Transmitter_Count	The pulse count reported by the transmitter

Initial_Meter_Reading	The meter reading when the transmitter last reset
Received	When the transmitter was last heard from

The following is an example of the JSON format:

```
[
  {
    "Property_Code":"3SWP",
    "Property_Name":"Three SeaWorld Park",
    "Building":"Three SeaWorld Park Bldg3",
    "Unit":"3SWP3 202",
    "Meter_Serial_Number":"3SWP3202M1",
    "Meter_Count_Factor":10.0,
    "Meter_Connection":"All",
    "Meter_Utility_Type":"Water",
    "Transmitter_Model":"FA5200M",
    "Transmitter_Serial_Number":"858791969",
    "Had_Exception_During_Period":true,
    "Is_Battery_Low":false,
    "Is_Inactive":true,
    "Is_Reset":false,
    "Is_Tamper":false,
    "Period_End":"2018-07-10T17:50:02.013543-04:00",
    "Transmitter_Count":0,
    "Initial_Meter_Reading":1,
    "Received":"1979-12-31T19:00:00-05:00"
  },
]
```