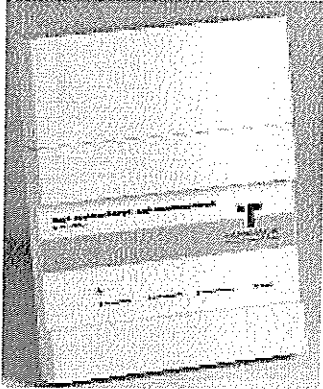


Specification Sheet

Inside RF Data Concentrator and Communicator (DCC)



Description

Operation. Installed at a centralized point on a property, the Data Concentrator and Communicator (DCC), specifically designed for submetering, increases system reliability while offering a cost-effective alternative to an on-site personal computer. The DCC collects and stores data received from Inside RF meters by the Inside RF Receiver. The DCC transmits reading data to a billing site PC with TapWatch™ software via telephone modem, or to a technician's on-site laptop PC via a serial port. The DCC simplifies installation by allowing pre-programming of site information. On-site or remotely a technician can perform site data entry, data retrieval, troubleshooting and site data modification.

Installation. The DCC is designed for indoor installation, generally in an unobtrusive location near phone lines and a single standard 120 VAC wall outlet. Device is wall mounted with two screws. A maximum of 100 feet of 4-conductor, 22 gauge, unshielded cable must connect DCC and Receiver. DCC should never be installed on the floor or at floor level.

Application. Data Concentrator and Communicator is designed for installation in a multi-unit residential, commercial or industrial location.

The Inside RF System sets a new standard for fixed network RF reading in multi-family submetering:

- *FCC Certified equipment.*
- *No license required.*
- *Simple installation with minimum disruption.*
- *Compatible with systems for gas and electric metering.*
- *Already installed and reading over 200,000 meters nationwide.*
- *Reading equipment manufactured by Inovonics Corporation, the leading name in submetering RF*

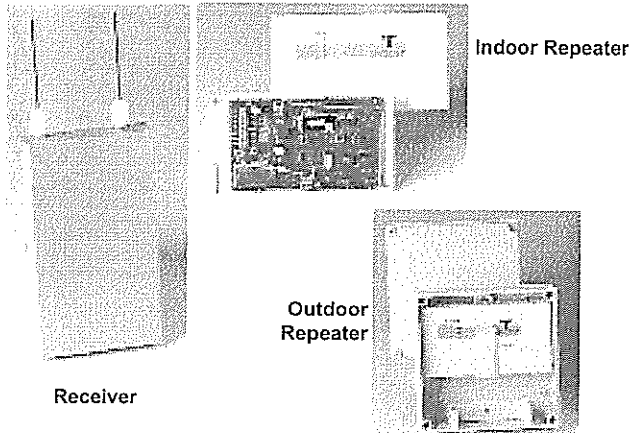
Specifications

Power	14 VAC is needed to power the DCC. A transformer for 110-120 volt AC is supplied with the DCC. The Inside RF Receiver is powered from the DCC.
External Connections	Telephone - terminal block connection Receiver - terminal block connection 12 v power - terminal block connection Laptop PC - standard serial port
Data Capacity	Up to 90 days of data for 2000 meters at each site.
Compliance	FCC Part 15 and FCC Part 68
<u>Enclosure</u>	
Size	11" x 8.5" x 2"
Weight	2.5 pounds
Ambient OperatingTemp	32° to 140° F (0° to 60° C)
Installation	Indoors



Specification Sheet

Inside RF Repeater & Receiver



Description

Operation. The FCC Certified Repeater and Receiver operate in the 902-928 MHz range. The Repeater is installed at strategic locations throughout the site to receive signals from the Inside RF Transmitters and to verify and amplify the signal for transmission to the Receiver. The Receiver relays meter readings and identifiers to the DCC (Data Concentrator and Communicator) through a serial connection. From the DCC data is transferred via telephone line to the billing center.

Compliance to Standards. The Repeater and Receiver are FCC certified and operate at an unlicensed frequency.

Installation. When installed outdoors the Repeater requires a weatherproof enclosure. Unless directed by the system designer, do not mount Repeaters on metal surfaces or inside metal enclosures, or where metal ductwork, wire mesh, etc., might block transmissions. The Receiver may be mounted in any orientation. It must be installed inside or in a protected area, within 100 feet of the DCC.

Application. The Repeater and Receiver are designed for installation in a multi-unit residential, commercial or industrial location.

The Inside RF System sets a new standard for fixed network RF reading in multi-family submetering:

- FCC Certified equipment.
- No license required.
- Simple installation with minimum disruption.
- Compatible with systems for gas and electric metering.
- Already installed and reading over 200,000 meters nationwide.
- Reading equipment manufactured by Inovonics Corporation, the leading name in submetering RF

Specifications

System

Operating Frequency 902-928 MHz
Modulation Frequency Hopping, Spread Spectrum

Repeater

Power Requirements 120 VAC Transformer (to 14 VAC) included (plugs into standard 120V wall outlet)
Open Field Range 4 miles
Dimensions Indoor Repeater: 6.5 x 3.5 x 1"
Outdoor Repeater: 7 x 7 x 3"
Operating Temperature -20 to 145° F
FCC ID HCQ3B6SSRL
Outdoor Enclosure NEMA 4 (optional)

Receiver

Power Requirements 11-14 VDC, 80mA (from DCC)
Dimensions 6.9 x 3.9 x 1.2" (excludes 3" antennas)
Output 9600 Baud serial data
Operating Temperature 32 to 140° F
FCC ID HCQ3B6FA403



DCC

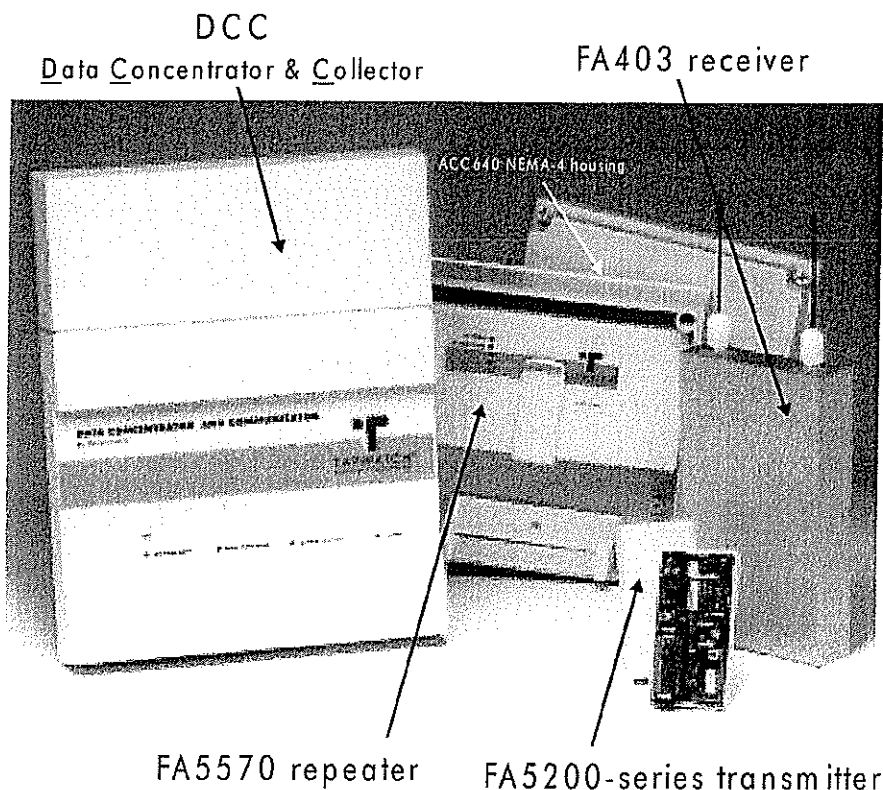


Installation Instructions



The DCC (Data Concentrator and Communicator) is installed at the submetering site's Head-End location to collect data from the transmitters via the FA403 receiver. It communicates with the Read/Bill/Collect service via modem over the telephone line, or to a technician's laptop PC via a serial port when the technician is on-site. This allows the service technician to do site data entry, data retrieval, trouble shooting, and to easily make changes to the site information in the DCC.

TapWatch™ 2 System Hardware



INFORMATION SUPPLIED TO THE USER (Required per Part 68, FCC rules)

This equipment complies with Part 68 of the FCC rules. On the modem card is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive REN's on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the REN's should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total REN's, contact the telephone company to determine the maximum REN for the calling area.

If the terminal equipment (DCC5800) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

If trouble is experienced with this equipment (DCC5800), please contact the following for repair and/or warranty information.

Inovonics Wireless Corporation, 315 CTC Boulevard, Louisville, CO 80027 Phone 800782.2709

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

INOVONICS must make any necessary repairs to modem portion of this equipment in order to maintain valid FCC registration. Do not attempt to repair or service your modem, return it to **INOVONICS**.

No repairs can be performed by the customer or user.

This equipment cannot be used on public coin service provided by the telephone company. Connection to Party Line Service is subject to state tariffs.

Use of Attested Plugs and Jacks:

Inovonics attests that the network interface plugs or jacks used on this equipment comply with and will continue to comply with the mechanical requirements specified in Part 68, Subpart F, specifically the dimensions, tolerances, and metallic plating requirements. The compliance of these connectors will be assured by purchase specifications and incoming inspections. Documentation of such specifications and/or inspections will be provided to the FCC within 30 days of their request for same.

Inovonics Submetering Products Warranty

INOVONICS CORPORATION ("Inovonics") warrants its Products ("Product" or "Products") to conform to its own specifications and to be free of defects in materials and workmanship under normal use for a period of fourteen (14) months from the date of manufacture. Within the warranty period Inovonics Corporation will repair or replace, at its option, all or any part of the warranted product. Inovonics will not be responsible for dismantling and/or reinstallation charges. To exercise the warranty, the User must be given a Return Material Authorization Number ("RMA") by Inovonics. Details of shipment will be arranged at that time.

This warranty does not apply in cases of improper installation, misuse, damage due to lightning or water, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than Inovonics.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express, or implied, including any warranty of merchantability or fitness for a particular purpose. Inovonics will not be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties.

This warranty will not be modified, varied or extended. Inovonics does not authorize any person to act on its behalf to modify, vary or extend this warranty. This warranty will apply to Inovonics Products only. All other products, accessories or attachments used in conjunction with Inovonics equipment, including batteries, will be covered solely by their own warranty, if any. Inovonics will not be liable for any direct, incidental or consequential damage or loss whatsoever caused by the malfunction of Product due to products, accessories, or attachments of other manufacturers, including batteries, used in conjunction with Inovonics Products.

This warranty does not warrant the replacement of batteries that are used to power Inovonics Products.

Inovonics does not claim that the Product may not be compromised and/or circumvented.



Warning: The User should follow all installation, operation and maintenance instructions. Changes in environmental conditions, electric or electronic disruptions and tampering, may cause the Product to not perform as expected.

SUBMETERING PRODUCTS WARRANTY

Inovonics Corporation ("Inovonics") warrants its Products ("Product" or "Products") to conform to its own specifications and to be free of defects in materials and workmanship under normal use for a period of fourteen (14) months from the date of manufacture. Within the warranty period Inovonics Corporation will repair or replace, at its option, all or any part of the warranted product. Inovonics will not be responsible for dismantling and/or reinstallation charges. To exercise the warranty, the User must be given a Return Material Authorization ("RMA") Number by Inovonics. Details of shipment will be arranged at that time.

This warranty does not apply in cases of improper installation, misuse, damage due to lightning or water, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than Inovonics.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express, or implied, including any warranty of merchantability or fitness for a particular purpose. Inovonics will not be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties.

This warranty will not be modified, varied or extended. Inovonics does not authorize any person to act on its behalf to modify, vary or extend this warranty. This warranty will apply to Inovonics Products only. All other products, accessories or attachments used in conjunction with Inovonics equipment, including batteries, will be covered solely by their own warranty, if any. Inovonics will not be liable for any direct, incidental or consequential damage of loss whatsoever, caused by the malfunction of Product due to products, accessories, or attachments of other manufacturers, including batteries, used in conjunction with Inovonics Products.

This warranty does not warrant the replacement of batteries that are used to power Inovonics Products.

Inovonics does not claim that the Product may not be compromised and/or circumvented.

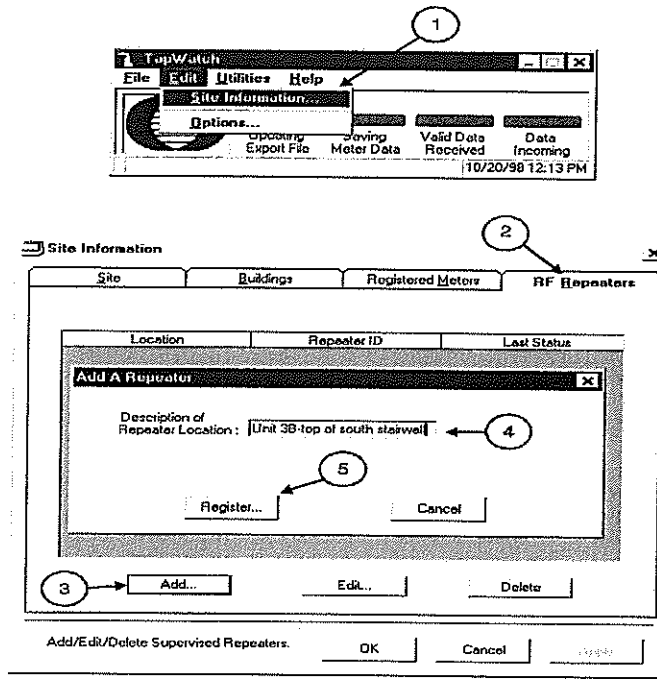


Warning: The User should follow all installation, operation and maintenance instructions. Changes in environmental conditions, electric or electronic disruptions and tampering, may cause the Product to not perform as expected.

Repeater Registration into the TapWatch Receiver and PC

FA5570 repeaters should be registered to report status to the TapWatch system. The system will be able to determine that the repeater is functioning and will receive fault reports if the supply voltage drops into a preset range.

Registering in the TapWatch system: Repeaters are registered into the TapWatch system as described below.



- 1) Select *Edit - Site Information*.
- 2) Click on *RF Repeaters* tab.
- 3) Click on *Add*.
- 4) Type in a description of the repeater's location.
- 5) Click on *Register*.
- 6) Apply power to the repeater or press the Reset button if power is already present.
- 7) TapWatch will confirm that the repeater is registered and it will appear on the list of RF repeaters.

Operation

Power supply: A 14VAC transformer is provided with the FA5570.

Backup battery: An optional 1.2AH 12VDC battery (not included) can be mounted outside the FA5570 housing.

Low voltage detection: The repeater will report low voltage if the supply voltage (either primary or backup) drops into a preset range.

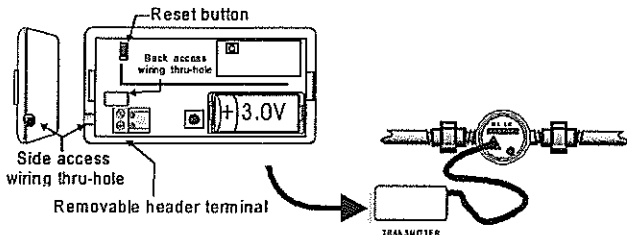
- AC power failure will not be reported directly—the system receiver and PC will detect inactivity if repeater power is off for the duration of the supervision period.

Supervision: Once every 5 minutes, the repeater sends a check-in transmission to the receiver. The repeater will be declared inactive if no check-ins are received before the expiration of the supervision period.

Test mode: Pressing the Test button will cause the repeater to transmit its current status until the button is released.

Note: Repeaters do not show a "Test" state. Status will be displayed as "OK", "Low Battery" or "Inactive".

Figure 1: FA5200-series transmitter



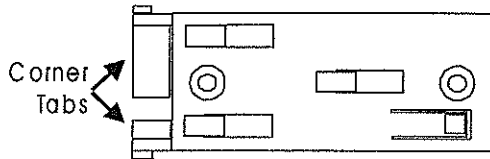
FA5200-series TapWatch transmitters

Intended use: Transmit data from multiple-residence water meters to TapWatch receiver. Data is collected in a PC, which transmits data to billing centers.

Specifications

Dimensions: 3.55" x 1.70" x 0.920"
 Average battery life: 8 years at 70 to 90°F (20 to 30°C)
 (Higher temperatures reduce battery life.)
 Battery (BAT604): 3.0V lithium (DL123A)
 (The battery is always supervised.)

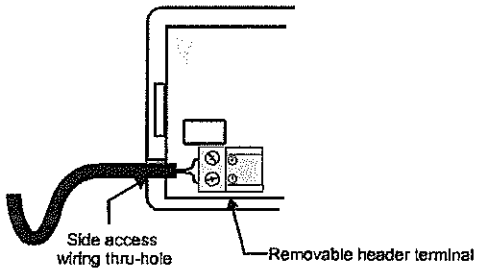
Figure 2: Backplate



Mounting transmitters

1. Use screws provided to mount backplate on wall.
2. Fit housing over backplate latches and slide toward corner tabs to lock.
3. Wire enters the housing through side access thru-hole. (Figure 1)
4. To dismount: **remove the battery and depress the release latch** while sliding housing off backplate. (Figure 2)

Figure 3: Wiring via terminal



Connecting transmitters to meters

Connect FA5200-series transmitters as follows:

- Screw stripped wires into the detachable terminal block. (Figure 3)

Note:

FA5200-series transmitters retain programming data in non-volatile memory. They do not require reprogramming after loss of power. Install new battery and press the transmitter reset button to re-initialize the transmitter and restore programming. Its count will go to zero and the initial Meter Read field will be updated in the TapWatch setup.

HJKLHKLHKLHKLHKLH

Registering transmitters

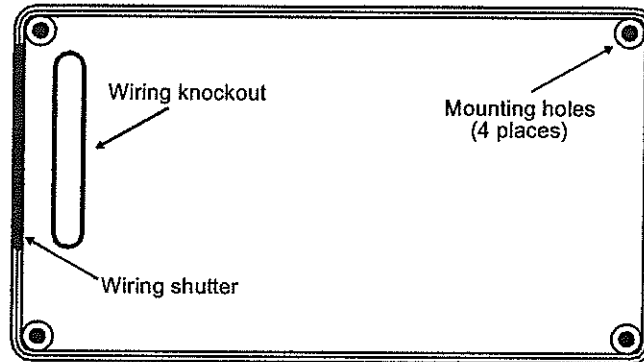
See "Programming the PM1-Meter Pair" in *TapWatch User Manual*

1. Connect meter to transmitter.
2. Confirm that battery is installed.
3. Go to "Registered Meters" tab of the Site Information editor.
4. Click "Add" on the "Registered Meters" page; confirm selected building.
5. Complete the "Add New Meter To..." form when it appears.
6. Click the "Register" button.
7. When prompted, press the reset button on the transmitter; wait for confirmation.

Installation

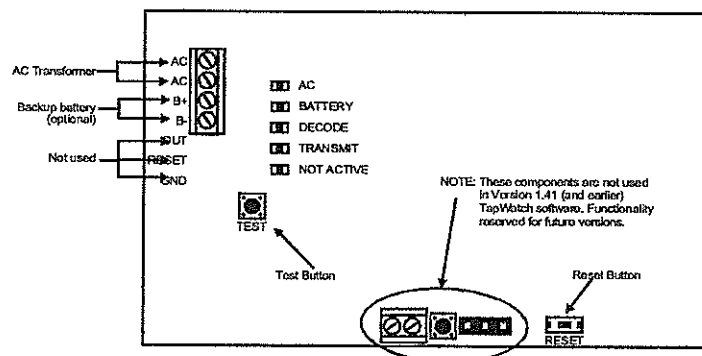
Mounting repeaters:

- Unless directed by the system designer, do not mount repeaters on metal surfaces or inside metal enclosures, or where sheet metal ductwork, wire mesh screens, etc., might block transmissions.
- Outdoor installations require a weatherproof enclosure. (Available separately.)
- The FA5570 housing has an inside knockout to permit wires from power sources to be brought into the housing from behind the unit.
- The FA5570 also has a removable shutter to permit wires to enter the housing from the side of the unit.



Power Supply:

- The FA5570 transformer requires an *unswitched* 120VAC power outlet.
- The transformer case should be secured to the electrical outlet to prevent accidental unplugging.
- AC power requirement of repeater: 14VAC transformer (included).
- Backup power requirement (optional): 12VDC.
- Recommended wire requirements: 2-conductor 20AWG (or larger) stranded tinned copper with PVC insulation rated to 300 volts @ 80°. (Belden #8205, for example.) Maximum recommended wire length between transformer and repeater: 100 meters (328 feet). Measure voltage at repeater on long wire runs. (Source: Tech Note #1053.)
- Wire runs should be hidden, stapled or protected by conduit.
- Recommended power supply is 200mA, or 20VA at 14VAC.

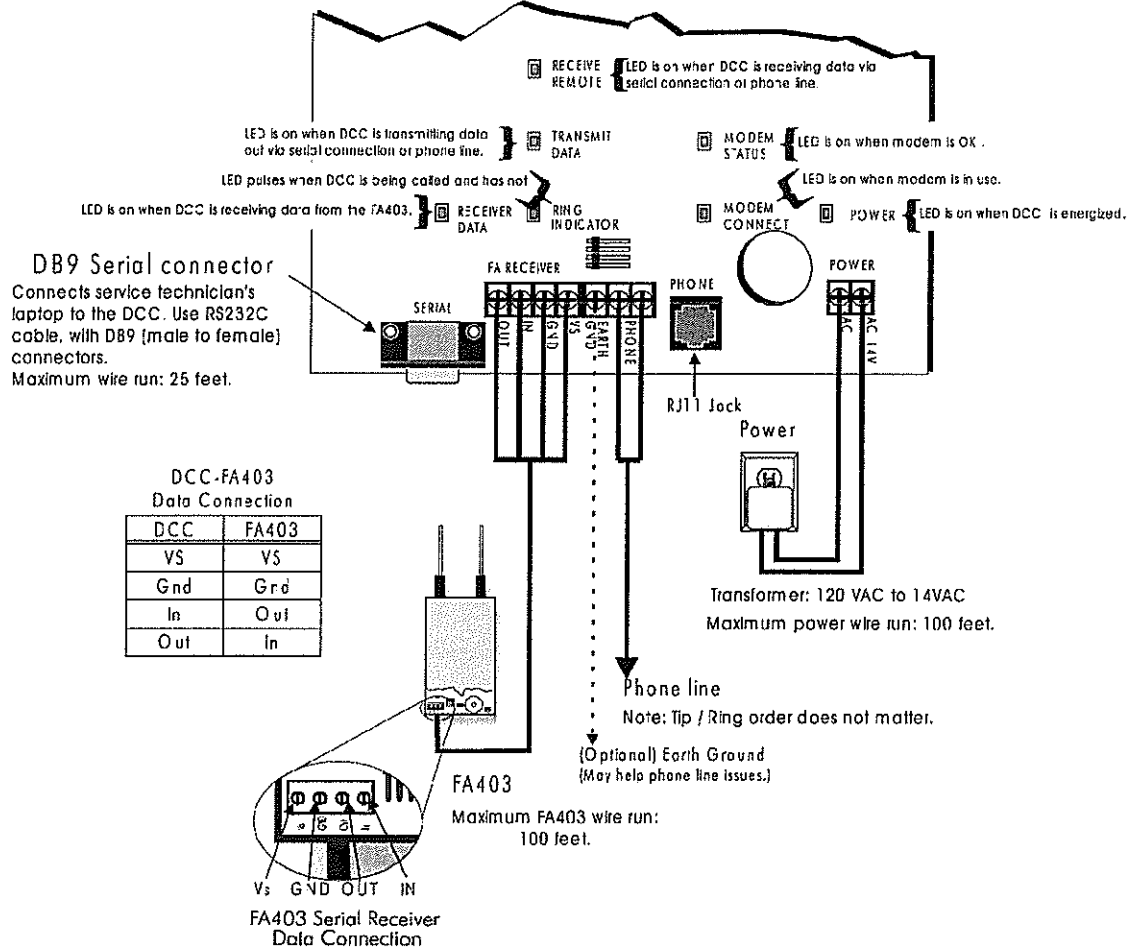




Installation Instructions



1. Mount the DCC below the FA403 on wall using anchors and screws provided. The DCC and FA403 are usually mounted in an unobtrusive location near phone lines and a single standard 120VAC wall outlet.
 Note: The FA403 provides the means for passing RF messages to the DCC.
2. Connect the FA403 to the DCC using 4-conductor, 22 gauge, unshielded wire with a maximum length of 100 feet. In typical applications, the FA403 can be wall-mounted at 6 to 7 feet. As a general rule, the higher inside the building that the FA403 is mounted, the better the RF reception.



3. Connect the phone line from the screw terminals on a hardwired wall bracket to the terminal blocks on the DCC.
 - a. The phone line should be connected via the screw terminals to the telephone wall outlet. The RJ11 plug-in phone connector is provided for easy access to the phone line during future on-site maintenance.
4. Connect 14VAC power to the DCC with the transformer provided. Inovonics recommends 18 or 20-gauge wire.
 - a. Circuit protection is built into the DCC. Therefore, there is no need for any additional power strip protection.
 - a. Secure the transformer to the outlet with the screw provided.
5. Wiring should exit through the back of the DCC, be cut to length, and stapled neatly to the wall for a professional appearance and to reduce danger to personnel and equipment damage.
6. **The DCC and FA403 should never be installed on the floor or at floor level.**

NOTE: It is strongly recommended that telephone and power connections be made as mechanically robust as possible, and protected from inadvertent or accidental disconnections.

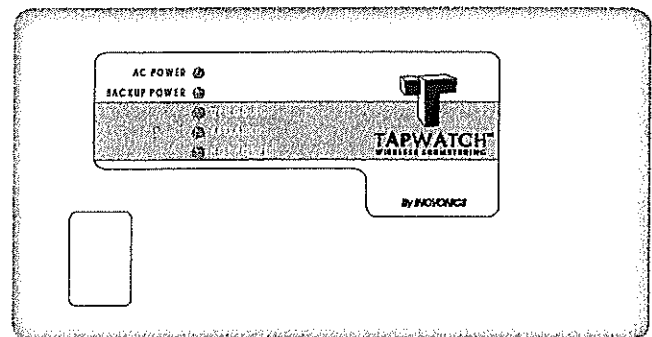


Product Description

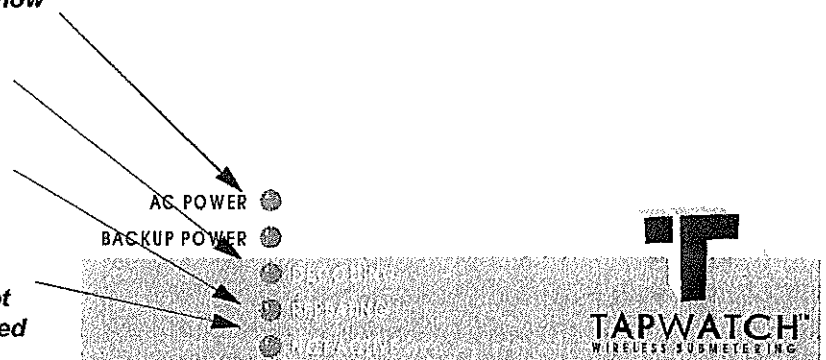
The FA5570 is a sophisticated repeater that receives, decodes, and re-transmits signals from TapWatch Submetering transmitters. It acts as a "range extender" for any decodable TapWatch transmission. The FA5570 is intended for quick and easy indoor installation. (Kits are available for outdoor installation.)

Specifications

- Housing dimensions: 6.38" x 3.60" x 1.10"
- Weight: 6.9 oz.
- Power requirement: 14 VAC
- (Optional) Backup battery: 12VDC
- Low voltage threshold: 10.5-11.5VDC
- Receiver type: frequency-hopping spread spectrum
- Operating frequency: 902-928 MHz
- Operating Environment: -20° to 145°F (-29 to 63°C), up to 95% relative humidity (non-condensing)



- "AC POWER" and "BACKUP POWER" LEDs show repeater power source.
 - "DECODING" indicates that the repeater is receiving RF energy.
 - "REPEATING" indicates that the repeater is transmitting.
- Note: The repeater does NOT decode while transmitting.**
- "NOT ACTIVE" means that the repeater has not received a TapWatch transmission in a specified period. It is "waiting" for incoming traffic.



The repeater will not send its supervision transmission while in Not Active condition. This adds receiver side supervision, because the system receiver will declare the repeater "Inactive" if no signal is received when the Supervision Window elapses.

By INOVONICS

INOVONICS/TAPWATCH INSTRUCTIONS

General Rules:

- Always restore the most recent file from the F: drive before updating any TapWatch files
- Save frequently when setting up a property, buildings, units, or programming radios
- Back up your changes to the F: drive after making any edits and notify Brannon and Alan that there is a new update so that files are not overwritten
- Make sure that a property file has not already been set up before starting a new one

To Open the Newest Version of a Property Database

- Open TapWatch
- Highlight the property name that you need to edit
- Click "Restore"
- Look in "Applications on 'Wsisrv02'(F:)"
- Double click "TapWatch2" folder
- Look for the correct property name with the most current date, highlight that file and click "Open"
- If the info in the gray box is correct, click "Yes"
- Click "OK"
- Open the property, connect, and edit

To Back Up Your Work:

- Click "Save & Close"
- Click "Disconnect"
- Click "Close"
- Select Property
- Click "Back Up"
- Save In "Applications on 'Wsisrv02'(F:)"
- Double click "TapWatch2" folder
- Click "Save"
- Click "OK"
- Exit TapWatch

To Set Up a Property:

- Open TapWatch
- Click "Add"
- Enter a site name (i.e., Jacksonian)
- Enter the property name (entire name of property)
- Click "OK"
- Click "Connect"
- Click "Edit"
- Click "OK"
- Enter the name, addresses, phone number, etc.
- Click "Save"
- Back up this file before closing TapWatch

To Set Up Building Numbers:

- Restore the most recent database for your property (see instructions above)
- Open the property
- Click "Connect"
- Click "Edit"
- Click "Buildings"
- Click "Add"
- Enter the building number (i.e., 1)
- Click "Save"
- Continue adding buildings until all are set up
- Click "Save & Close"
- Click "Disconnect"
- Back up the database (see instructions above)

To Set Up Unit Numbers:

- Restore the most recent database for your property (see instructions above)
- Open the property
- Click "Connect"
- Click "Edit"
- Click "Meters"
- Browse and click on the appropriate building #
- Click "Add"
- Enter unit # (i.e., 101-from unit list sent by property)
- Click "Save"
- Save & Close
- Back up database and notify Brannon/Alan

To Program Radios:

- Restore most recent database
- Open property
- Click "Meters" Tab
- Choose correct building
- Click "Register Unregistered Meters for this Building"
- If ABB Insider enter initial meter count (usually 30-35-look on meter face) then hit reset button
- If radio only, reset radio
- When the bar on the screen turns green, hit enter (this will take you directly to the next unit)
- Put the unit number label on the meter/radio
- Complete building until it says there are no unregistered meters in this building and click "OK"
- "Save"
- Continue until all desired radios/meters are programmed
- "Save and Close"
- Back up the database
- Notify Brannon/Alan that database has been backed up