

## Installation Instructions

02793

### Product Description

The FA422 is a 900MHz receiver that functions as a wireless point expander. This Expander can process information from as many as 16 Inovonics transmitters and communicate their individual point status to a specific class of Radionics control panels. The FA422 can interface to all 2000 Series Control Panels that have wireless point expansion capability by way of Radionics' proprietary MonoBus. All Inovonics FA Series Security Transmitters and Repeaters are compatible with the FA422. This product has been designed for quick and easy indoor installation.

FIGURE 1 FA422 Housing

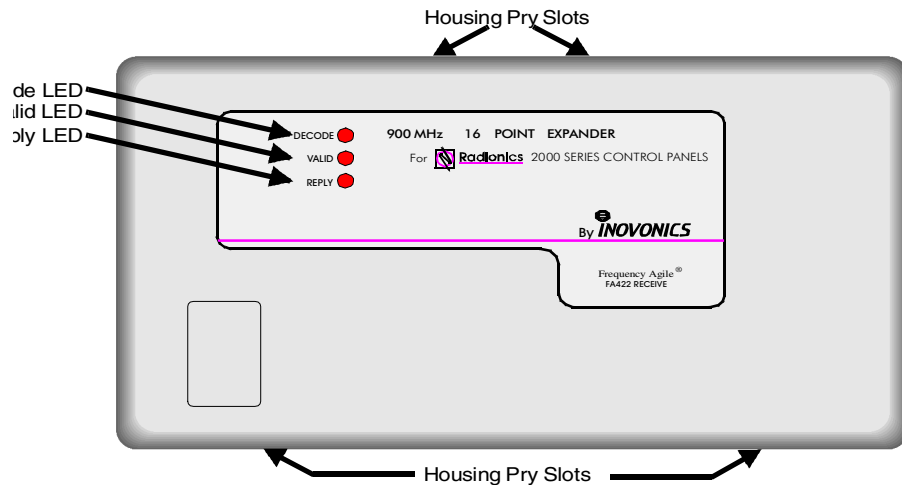
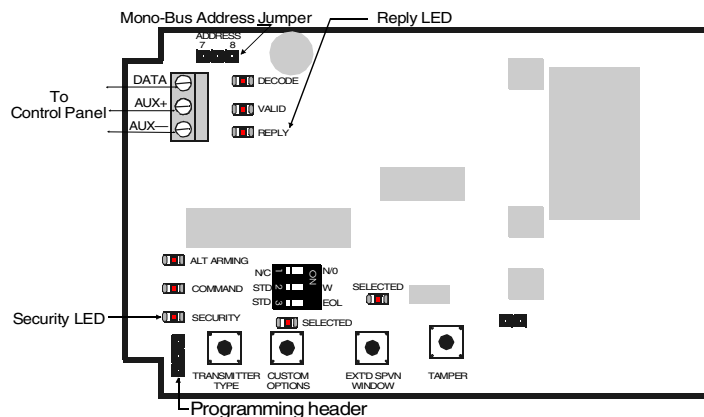


FIGURE 2 FA422 Programming and Diagnostic Components



## Compatibility

Control Panels: All Radionics 2000 Series Control Panels with wireless point expansion capability (includes D2212, D2212B, and D2412U)

Security Transmitters: Most FA Series Security transmitters.

**Table 1: Security Transmitters Compatible with the FA422**

Transmitter Model Number	Transmitter Description	Transmitter Model Number	Transmitter Description
FA200	Universal (Door/Window)	FA206I/S	Inovonics and Sentrol PIRs
FA200W	Universal Wide-Gap	FA206DS	Detection Systems PIR
FA210	Reduced-size Universal	FA207	Glassbreak Detector
FA210W	Reduced-size Universal Wide-Gap	FA209	Billtrap
FA210M	Reduced-size Universal for Momentary Switch	FA216L/H	Low and High Temperature Detectors
FA210DBN	Reduced-size Universal with Switch De-bounce	FA525	Repeater
FA250	High-Power Universal	FA536	Locator
FA201	Smoke detectors	FA570	High-Power Indoor Repeater
FA202			
FA203S/D	Pendants	FA575	High-Power Outdoor Repeater
FA205S/D			
FA204			
FA223S			

Security transmitters can also be made to arm and disarm a system. (See Alt Arming information, page8.)

Security Repeaters: All FA Series Security repeaters  
 Command Transmitters: FA113 Three-function Command transmitter  
 (system arming/disarming and special functions) FA100 Four-function Command transmitter  
 (Note: The FA130 Wireless Keypad is NOT compatible with Radionics 2000 Series Control Panels.)



**CAUTION:** If an FA100 is used with the Expander, the C key on the Radionics keypad(s) must not be programmed for an emergency function.

*Pressing the \* key on the FA100 one time has the same effect on a 2000 series panel system as pressing the C key on a Radionics keypad two times.*

*If the C key is programmed to perform an emergency function (like calling the police), accidentally pressing the \* key on the FA100 one time could activate the emergency function.*

*If it is desired to program the C key for an emergency function and have a Command transmitter activate this function, use the FA113. The two \* keys on the FA113 must be pressed simultaneously to have the same effect as pressing the C key two times.*

## Specifications

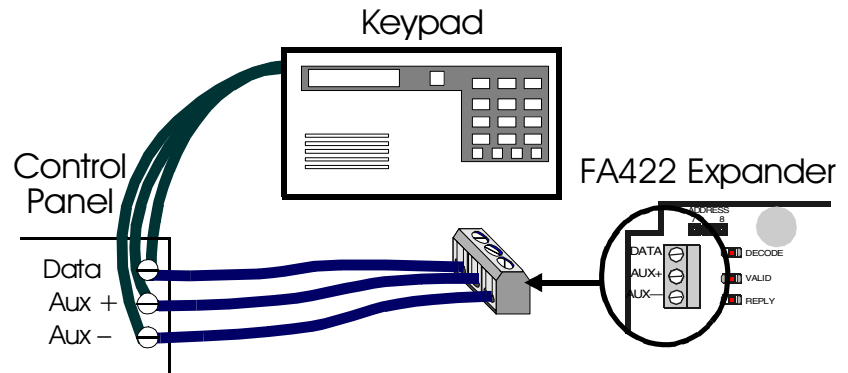
Housing dimensions: 6.38" x 3.60" x 1.10"  
 Weight: 5.3 oz.  
 Power requirement: 10.2VDC-13.9VDC (provided by external power supply or by panel via MonoBus)  
 Current draw: 45mA typical, 60mA maximum  
 Receiver type: frequency-hopping spread-spectru  
 Operating Environment: 32°-122°F (0-50°C), up to 95% relative humidity (non-condensing)

## Expander, Control Panel, and Keypad Setup

Before installing the Expander and wireless point transmitters, it is recommended that the Expander, control panel, and a hard-wired keypad be temporarily wired together. Panel programming should then be performed and each transmitter assigned a point code. (It is easier to complete the necessary programming if all the equipment is in the same location.) The procedure is as follows:

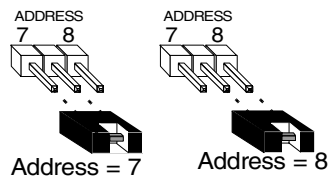
1. Make sure power has been removed from the control panel.
2. Using a short piece of multi-conductor cable, temporarily connect a hard-wired keypad to the control panel. (Refer to Radionics keypad and control panel installation instructions.)
3. Remove the Expander's cover. Use a small flat-bladed screwdriver to *gently* pry housing cover open at pry point slots indicated. (See Figure 1.)
4. Using another short piece of multi-conductor cable, temporarily connect the Expander to the control panel by connecting DATA, AUX+ and AUX- terminals. (See Figure 3.)

**FIGURE 3 Expander, Control Panel and Keypad Connections**



5. Set up the Expander to respond to MonoBus address 7 or 8 by moving its address jumper. (See Figure 4.)

**FIGURE 4 Address Selection Header**



6. Apply power to the control panel.
7. Follow the Radionics control panel operating instructions and installation instructions to set up communication between the keypad, control panel, and Expander. Note that when setting the Supervision Interval in the RF Parameters Group of the panel's program entry guide, a "1" indicates a 4-hour interval, not a 24-hour interval. (A "0" selection, however, still means a 12-hour interval.) *Make sure the Expander address set-up at the control panel matches the Expander address jumper selection.* If everything is working properly, the *REPLY* LED on the Expander should be flashing. (See Figure 2.)
8. Follow the control panel operating instructions to assign point codes to each transmitter. Assign point codes to Command transmitters using the same procedure described for RF keypads.

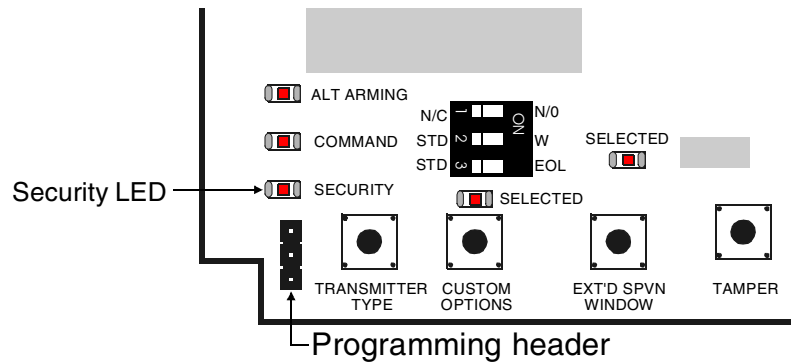
## Transmitter Programming

The Expander can program three different types of Inovonics transmitters:

- **SECURITY** transmitters are devices like universal transmitters (door/window sensors), pendants, wireless smoke detectors, and wireless PIRs that send alarm, restoral, and check-in signals.
- **COMMAND** transmitters are devices that arm and disarm a system and send programmable command signals (such as “Call the police,” or “Open the garage door”) to the control panel.
- **ALT ARMING** (Alternative Arming) transmitters are Security transmitters that are given the capability to arm and disarm a system (like a Command transmitter). When a Security transmitter is programmed as ALT ARMING, its alarm signal is interpreted by the Expander and sent to the panel as a system arming signal, and its restoral signal is interpreted and sent as a system disarming signal. Unlike Command transmitters, Alt Arming transmitters can be assigned point codes that monitor their check-in signals, tamper condition, and battery condition.

To set up the Expander for programming transmitters, locate the programming cable supplied with the Expander and plug one end into the Expander’s programming header. (See Figure 5.) When all transmitters have been programmed, remove the cable from the Expander programming header, store the cable in the open area to the left of the Expander’s printed circuit board, and put the Expander’s cover back on.

**FIGURE 5 Expander Programming Detail**



## Programming SECURITY Transmitters Using Factory Defaults

In most cases, Security transmitters should be programmed without changing the factory default settings (like Normally Open contacts). An exception to the rule might be the programming of universal (door/window) transmitters. To see if factory default settings for these devices match the application requirements, refer to Table 2.

**Table 2: Factory Default Settings for Selected Security Transmitters**

Transmitter Model Number	Transmitter Description-	External Contacts Condition	Internal Contacts Activated?	Expects EOL Resistor?
FA200	Universal (Door/Window)	Normally Closed	No	No
FA200W	Universal Wide-Gap	Normally Open	Yes	No
FA210	Reduced-Size Universal	Normally Closed	No	No
FA210W	Reduced-Size Universal Wide-Gap	Normally Open	Yes	No
FA210M	Reduced-Size Universal for Momentary Switch	Normally Open	No	No
FA210DBN	Reduced-Size Universal with Switch De-Bounce	Normally Closed	No	No
FA250	High-Power Universal	Normally Open	No	No

To program a Security transmitter without changing its factory default settings do the following:

1. Plug the free end of the programming cable into the programming header on one of the Security transmitters. (Refer to the transmitter's user manual to access its programming header.)
2. Follow the "Adding RF Points" instructions in the D2000 Series Keypad Diagnostics manual to program an identification code (ID) into the transmitter while leaving the transmitter's factory default options unchanged. Stop when the keypad display shows the following:

ACTIVATE  
POINT nn

(where **nn** is the transmitter point number to be programmed)

3. Note that the *SECURITY* LED is flashing to show that a Security device is about to be programmed.
4. Decide if the supervision window (or supervision interval) for the transmitter should be extended from the setting chosen when programming the control panel (either 4 or 12 hours). The options are to extend to 96 hours or to "infinite" hours. (Extending to infinite hours simply means that the receiver is programmed not to ever look for check-ins from that transmitter.) Extended time options might be useful when supervising pendant transmitters that are out of the Expander's receiving range for days or weeks at a time.

To extend the supervision window to 96 hours, press the *EXT'D SPVN WINDOW* pushbutton one time. The *SELECTED* LED above this pushbutton should begin to flash at the same rapid rate as the *SECURITY* LED. To extend the supervision window to infinite hours, press the *EXT'D SPVN WINDOW* pushbutton one more time. The *SELECTED* LED above this pushbutton should continue to flash, but at a much slower rate than the *SECURITY* LED.

5. Continue to follow the Keypad Diagnostics manual's instructions except that instead of pressing the transmitter's *tamper* switch, press the transmitter's *reset* pushbutton switch to activate the programming. (Be sure the programming cable is still connected.) Note that the *SECURITY* LED (and possibly the *SELECTED* LED above the *EXT'D SPVN WINDOW* pushbutton) changes from flashing to always-on or "solid". (See Figure 5.) This shows that the programming was completed.

*If the LEDs do not change to solid, the transmitter may not be compatible with this type of programming. The transmitter version must be 1.80 or higher. (See label on box or label on transmitter printed circuit board.) If the transmitter version is lower than 1.80, the transmitter is compatible in every other way except that it must be programmed using Custom Options.*

6. Remove the programming cable from the transmitter and put the transmitter's cover back on.
7. Follow the above procedure to program all other Security transmitters that can use factory default programming.

## Programming SECURITY Transmitters Using Custom Options

1. Plug the free end of the programming cable into the programming header on one of the Security transmitters. (Refer to the transmitter's user manual to access its programming header.)
2. Follow the "Adding RF Points" instructions in the D2000 Series Keypad Diagnostics manual to program an identification code (ID) into the transmitter and to program the transmitter with the desired custom options. Stop when the keypad display shows the following:

ACTIVATE  
POINT nn

(where nn is the transmitter point number to be programmed)

3. Note that the *SECURITY* LED is flashing to show that a Security device is about to be programmed.
4. Set the DIP switches located above the *CUSTOM OPTIONS* pushbutton switch to the desired transmitter options. (See Figure e5 on page 4.) The meaning of the switch settings is as follows:

**Table 3: Custom Option Dip switch settings**

Switch 1		Switch 2		Switch 3	
N/C	N/O	STD	W	STD	EOL
Normally Closed	Normally Open	No Internal Contacts	Internal Contacts	No EOL Resistor	EOL Resistor

5. Indicate to the Expander that these options are desired by pressing the *CUSTOM OPTIONS* pushbutton switch one time. The *SELECTED* LED beneath the DIP switches should start flashing. (Note that whenever *CUSTOM OPTIONS* is selected for a transmitter, its check-in time will be set to 60 seconds.)
6. Decide if the supervision window (or supervision interval) for the transmitter should be extended from the setting chosen when programming the control panel (either 4 or 12 hours). The options are to extend to 96 hours or to "infinite" hours. (Extending to infinite hours simply means that the receiver is programmed not to ever look for check-ins from that transmitter.) Extended time options might be useful when supervising pendant transmitters that are out of the Expander's receiving range for days or weeks at a time.

To extend the supervision window to 96 hours, press the *EXT'D SPVN WINDOW* pushbutton one time. The *SELECTED* LED above this pushbutton should begin to flash at the same rapid rate as the *SECURITY* and *CUSTOM OPTIONS* LEDs. To extend the supervision window to infinite hours, press the *EXT'D SPVN WINDOW* pushbutton one more time. The *SELECTED* LED above this pushbutton should continue to flash, but at a much slower rate than the *SECURITY* and *CUSTOM OPTIONS* LEDs.

7. Continue to follow the Keypad Diagnostics manual's instructions except that instead of pressing the transmitter *tamper* switch, press the transmitter's *reset* pushbutton switch to activate the programming. (Be sure the programming cable is still connected.) Note that all of the flashing LEDs that have to do with supervision time or programming options change from flashing to solid. (See Figure 5.) This shows that the programming was completed and the changes have been accepted by the Expander.
8. Remove the programming cable from the transmitter and put the transmitter's cover back on.
9. Follow the above procedure to program all other Security transmitters that need custom programming options.

## Programming COMMAND (Arming) Transmitters

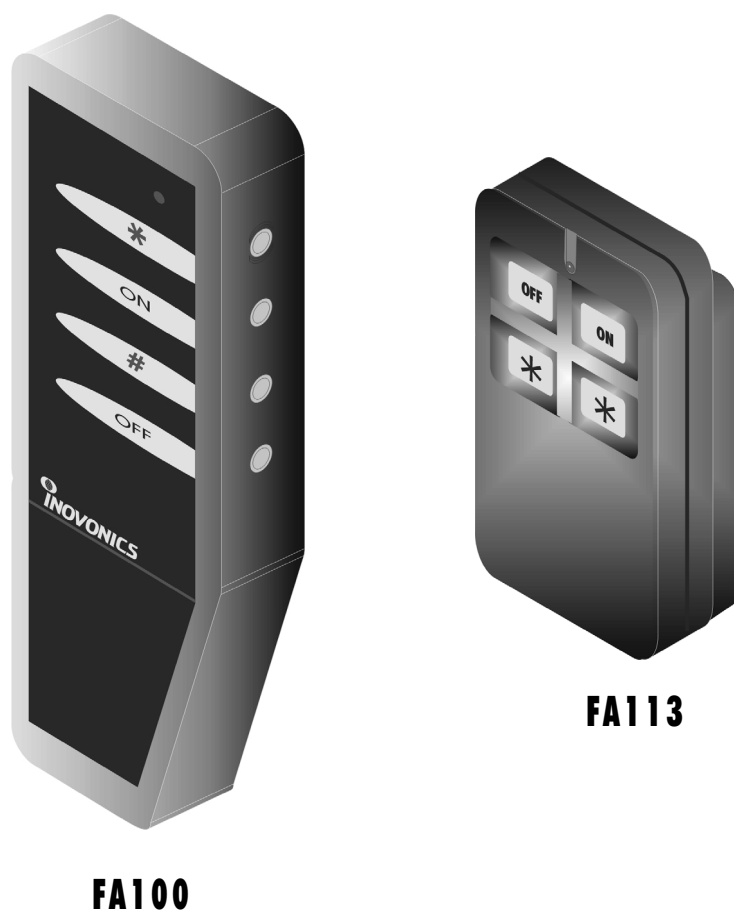
1. Plug the free end of the programming cable into the programming header on one of the Command transmitters. (Refer to the transmitter's user manual to access its programming header.) The two compatible transmitters are shown in Figure 6.
2. Follow the "Adding RF Points" instructions in the D2000 Series Keypad Diagnostics manual to program an identification code (ID) into the transmitter while leaving the transmitter's factory default options unchanged. Stop when the keypad display shows the following:

ACTIVATE  
POINT nn

(where nn is the transmitter point number to be programmed)

3. Press the *TRANSMITTER TYPE* pushbutton one time. The flashing LED above this pushbutton should move from *SECURITY* to *COMMAND*.
4. Continue to follow the Keypad Diagnostics manual's instructions except that instead of pressing the transmitter *tamper* switch, press the transmitter's *reset* pushbutton switch to activate the programming. (Be sure the programming cable is still connected.) Note that the *COMMAND* LED changes from flashing to solid. (See Figure 5.) This shows that the programming was completed. (Note that Command transmitters are unsupervised and, therefore, no extended supervision window changes are permitted.)
5. Remove the programming cable from the transmitter and put the transmitter's cover back on.
6. Follow the above procedure to program all other Command transmitters.

**FIGURE 6 FA100 and FA113 Command Transmitter**



## Programming ALTARMING Transmitter

1. Plug the free end of the programming cable into the programming header on a Security transmitters. (Refer to the transmitter's user manual to access its programming header.) When programming is completed, this transmitter will arm the system when its alarm signal is transmitted, and disarm the system when its restoral signal is transmitted.
2. Follow the "Adding RF Points" instructions in the D2000 Series Keypad Diagnostics manual to program an identification code (ID) into the transmitter and to program the transmitter with any desired custom options. Stop when the keypad display shows the following:

ACTIVATE  
POINT nn

(where nn is the transmitter point number to be programmed)

3. Press the TRANSMITTER TYPE pushbutton two times. The flashing LED above this pushbutton should move from *SECURITY* to *COMMAND* and then to *ALT ARMING*.
4. If custom programming options are desired, set the DIP switches located above the *CUSTOM OPTIONS* pushbutton switch to the desired transmitter options. (See Figur e5 on page 4.) The meaning of the switch settings is as follows:

**Table 4: Custom Option DIP switch settings**

Switch 1		Switch 2		Switch 3	
N/C	N/O	STD	W	STD	EOL
Normally Closed	Normally Open	No Internal Contacts	Internal Contacts	No EOL Resistor	EOL Resistor

5. If custom programming options are desired, indicate this desire to the Expander by pressing the *CUSTOM OPTIONS* pushbutton switch one time. The *SELECTED* LED beneath the DIP switches should start flashing. (Note that whenever *CUSTOM OPTIONS* is selected for a transmitter, its check-in time will be set to 60 seconds.)
6. Decide if the supervision window (or supervision interval) for the transmitter should be extended from the setting chosen when programming the control panel (either 4 or 12 hours). The options are to extend to 96 hours or to "infinite" hours. (Extending to infinite hours simply means that the receiver is programmed not to ever look for check-ins from that transmitter.) Extended time options might be useful when supervising pendant transmitters that are out of the Expander's receiving range for days or weeks at a time.  
  
To extend the supervision window to 96 hours, press the *EXT'D SPVN WINDOW* pushbutton one time. The *SELECTED* LED above this pushbutton should begin to flash at the same rapid rate as the *ALT ARMING* LED. To extend the supervision window to infinite hours, press the *EXT'D SPVN WINDOW* pushbutton one more time. The *SELECTED* LED above this pushbutton should continue to flash, but at a much slower rate than the *ALT ARMING* LED.
7. Continue to follow the Keypad Diagnostics manual's instructions except that instead of pressing the transmitter *tamper* switch, press the transmitter's *reset* pushbutton switch to activate the programming. (Be sure the programming cable is still connected.) Note that all of the flashing LEDs that have to do with supervision time or programming options change from flashing to solid. (See Figure 5 .) This shows that the programming was completed and the changes have been accepted by the Expander.
8. Remove the programming cable from the transmitter and put the transmitter's cover back on.
9. Follow the above procedure to program all other Alt Arming transmitters.

### Testing

After at least one transmitter is programmed, the operation of the Expander can be tested as follows:

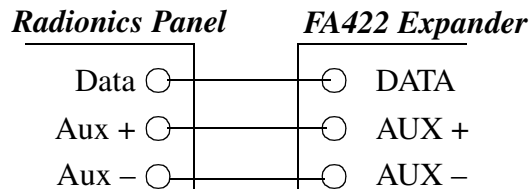
1. Check to see that the *REPLY* LED is still flashing. This shows that the Expander is communicating with the panel.
2. Put one of the transmitters into its alarm or command condition. This should cause the panel and keypad to give the correct alarm or command response.

It is recommended that all transmitters be tested before installation. If a particular transmitter does not give the correct response, troubleshoot the problem by following the "Point Status" instructions in the D2000 Series Keypad Diagnostic manual and the "Troubleshooting with the Cover Off" instructions in this manual.

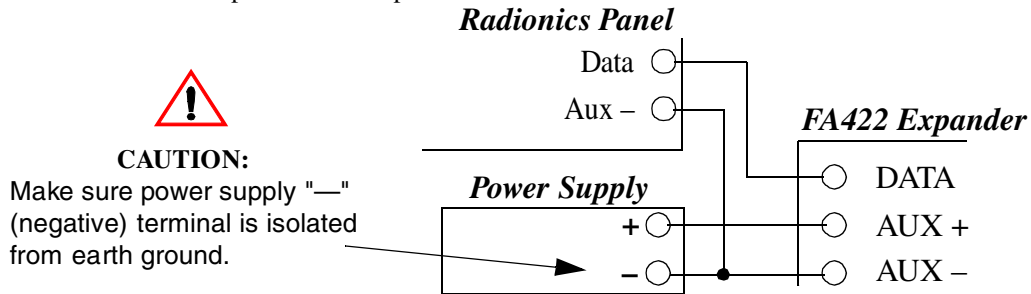


## Installation

1. Remove power from the control panel.
2. Remove the temporary cables between the panel and the keypad, and panel and the Expander.
3. Determine an appropriate indoor location to mount the Expander. (The housing is designed for indoor use only. ) Do not enclose the Expander in a metal box. To assure peak performance, avoid mounting the Expander on a metal surface or near large metal objects
4. Run the cable wiring from the panel to the Expander. Avoid running the wiring next to electrical, telephone, or other data wiring. Refer to the panel installation instructions to determine maximum cable length and other wiring details
5. Route the cable wiring into either the side or back of the Expander. If the wiring is routed through the back of the Expander, use a small side cutter or utility knife to remove the wiring knockout. If the wiring is routed through the side, lift out the wiring shutter. (See Figure7. )
6. If DC power is supplied by the panel, connect the cable wires from the panel to the Expander as follows:

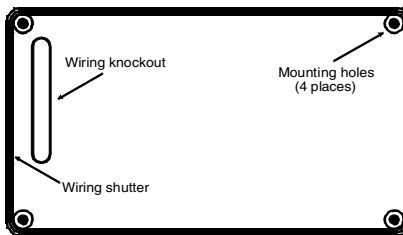


7. There may be some installations where DC power to the Expander must be supplied by an external DC power supply. Refer to the panel installation instructions for further details. If DC power is supplied from an external DC power supply, connect the cable wires from the panel to the Expander as follows:



8. Mount the expander to a wall or surface using the supplied hardware. (See F igure7.)

**FIGURE 7 FA422 Housing Base**



## Troubleshooting

The Expander contains a number of diagnostic LEDs that will aid in troubleshooting system problems. Since some of these LEDs only are visible with the cover off, this section will be divided into troubleshooting with cover on and troubleshooting with cover off.

### Troubleshooting with the Cover On

Three diagnostic LEDs are visible when the Expander cover is on: *DECODE*, *VALID*, and *REPLY*. The way they help to troubleshoot a problem is as follows:

The *REPLY* LED shows the status of the communication between the Expander and the control panel. This LED should flash once each time it responds to a data request from the panel. During normal operation, *REPLY* should be continually flashing.

<i>REPLY</i> Status		
	<b>Always Off</b>	<b>Flashing</b>
Probable Causes of Problem:	Broken cable connection No power to Expander Panel communication problem Expander address not programmed at panel Broken Expander	Normal
		<b>Always On</b> Broken Expander

The *DECODE* LED flashes to show that the Expander is active and listening. If it is not flashing, check to make sure that power is supplied to the Expander.

The *VALID* LED shows the status of the **successful** number of signal decoding attempts of the 900 MHz radio receiver on the Expander. This LED should flash each time the receiver successfully decodes an incoming signal from an Inovonics transmitter that was programmed into the system. When a transmitter sends an alarm or check-in signal, *VALID* should start flashing.

<i>VALID</i> Status		
	<b>Always Off</b>	<b>Flashing</b>
Probable Causes of Problem:	No power to Expander Broken or unprogrammed transmitter(s) Broken Expander	Normal (when a transmitter is activated or checkin gin)
		<b>Always On</b> Transmitter programming problem Broken Expander

### Troubleshooting with the Cover Off

All three diagnostic LEDs visible with the cover on are also visible with the cover off. Therefore, all troubleshooting techniques discussed in the previous section also apply to this section.

Additional diagnostic LEDs are visible with the Expander cover off. These are the LEDs used for transmitter programming. They can be used to troubleshoot problems with individual transmitters by allowing the installer to check how it was programmed.

To check how a transmitter was programmed, do the following:

1. Locate the transmitter's *reset* pushbutton. (Refer to the transmitter's user manual.)
2. Press the transmitter's *reset* pushbutton one time and note which programming LEDs light. (The lighted LEDs will stay on for a few seconds.) If the wrong LEDs light up, the transmitter had been misprogrammed.  
(Note that if the *SELECTED* LED located beneath the DIP switches is on, this only indicates that the transmitter was programmed with one or more custom options. The current positions of the DIP switches will not necessarily indicate which options were selected.)

# Warranty & Disclaimer

Inovonics Wireless 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 twenty-four (24) months from the date of manufacture. Within the warranty period Inovonics will repair or replace, at its option, all or any part of the warranted product. Inovonics will not be responsible for dismantling and/or reinstallation charges. To exercise the warranty, the User ("User", "Installer" or "Consumer") must 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, 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.

The User recognizes that a properly installed and maintained security system may only reduce the risk of events such as burglary, robbery, personal injury and fire. It does not insure or guarantee that there will be no death, personal damage and/or damage to property as a result. **Inovonics does not claim that the Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection.**

**Inovonics shall have no liability for any death, injury or damage, however incurred, based on a claim that Inovonics Products failed to function.** However, if Inovonics is held liable, directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, Inovonics' maximum liability will not in any case exceed the purchase price of the Product, which will be fixed as liquidated damages and not as a penalty, and will be the complete and exclusive remedy against Inovonics.



**Warning: The User should follow all installation, operation and maintenance instructions.** The User is strongly advised to conduct Product and systems tests at least once each week. Changes in environmental conditions, electric or electronic disruptions and tampering, may cause the Product to not perform as expected.



**Warning: Inovonics warrants its Product to the User.** The User is responsible for exercising all due prudence and taking necessary precautions for the safety and protection of lives and property wherever Inovonics Products are installed. Inovonics strongly advises the User to program Products to be supervised whenever used in applications affecting life safety. Users are warned that unsupervised devices are subject to undetected failure due to malfunction, battery failure, tampering, or changes in environment.