

EN4216MR 16 Zone Multi-Condition Receiver with Relay Outputs

Installation and Operation Manual

1 Overview

The EN4216MR receiver allows you to add up to 16 transmitters and five outputs to any application, and includes a housing tamper for increased tamper security.

The following add-on receivers are available from Inovonics:

Receiver	Alarm Output Relays	Fault Relays	Transmitters Supported
EN4204R	4	1	4
EN4216MR	5	1*	16
EN4232MR	11	1*	32

* At least one relay must be used for faults to ensure the system is supervised. More than one relay may be used, but that will deduct from the number of alarm output relays.

1.1 Installing an Inovonics Security System

An EchoStream survey kit must be used to establish a UL system. The EchoStream survey kit measures the signal strength of high-power repeater and sensor messages to help optimize your EchoStream system.

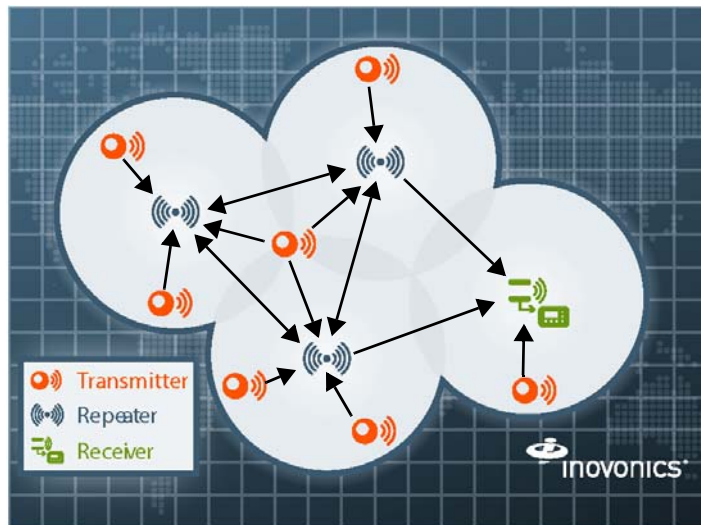


Figure 1 Sample EchoStream system

The EchoStream survey kit provides you with two signal strength measurements: signal level and signal margin.

Signal level

The signal level is the measurement of the overall decibel level of the message.

Signal margin

The signal margin is the measurement of the decibel level of the message, minus the decibel level of any interfering signals. Inovonics Wireless equipment should be placed within a facility such that all end-devices produce signal margin readings of at least 4 decibels.

Both the signal level and signal margin are measured in decibels. Because signal strength and signal margin are measured on a logarithmic scale, the difference between a decibel level of 3 (Weak) and a decibel level of 4 (Good) is a much larger difference than it would be on a linear scale.

Note: For more information about the EchoStream survey kit, see the *EN7017 Survey Kit and App Installation and Site Survey Instructions*.

Caution: The EchoStream system should be tested regularly to ensure operation. To test: place the system in test mode, activate an end device, and ensure an appropriate response.

1.2 RF Signal Propagation

While wood, drywall and glass usually let the RF signals pass, some materials may inhibit or attenuate radio frequency (RF) signal propagation by blocking, reflecting, deflecting or absorbing RF signals.

Consider anything between transmitters and repeaters and/or the receiver. Is there concrete and steel construction? Are there earthen berms or hills? Are there a lot of trees? Devices should be mounted such that they are least affected by these elements.

For best results, transmitters and repeaters should be mounted at the optimal height to achieve line of sight to repeaters and/or the receiver. Usually this means they will be mounted as high as possible.

Following are some typical obstacles to RF signal propagation:

Material	Affect	Recommendation
Metal construction, including ductwork; pipes; studs; stucco, plaster or concrete with wire mesh; satellite dishes, metal-lined rooms such as walk-in coolers or freezers; metal siding, safes, etc.	Can reflect, absorb and/or disrupt RF signals.	Perform a site survey using an Inovonics wireless survey kit to verify the RF signal is acceptable, and, when necessary, to determine where to locate repeaters.
Completely enclosed metal boxes/enclosures.	Can restrict RF signals.	
Solar panels, cinder block walls, windows with built-in solar tinting.	Can absorb and/or reflect RF signals.	
Vegetation.	Can attenuate RF signals. The RF environment can alter as trees shed or sprout leaves.	Add repeaters as issues arise.
Automobile and truck traffic.	Can disrupt RF signals.	Mount Inovonics devices at a height sufficient to achieve line of sight above traffic.

1.3 Inovonics Contact Information

For product and installation videos visit us at www.inovonics.com/videos or use the QR code below.



If you have any problems with this procedure, contact Inovonics technical services:

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

1.4 EN4216MR Front Panel

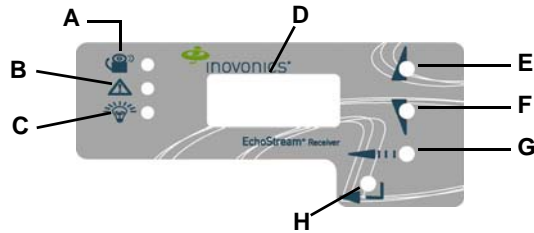


Figure 2 Receiver front panel
A Output LED **B** Fault LED **C** Power LED
D LCD display **E** Up button **F** Down button
G Back button **H** Enter button

Output LED: Lights when any transmitter output is active.
Fault LED: Lights when any transmitter is sending a fault condition.
Power LED: Lit when receiving power.
LCD Display: Shows status, event log and programming information.
Decode LED: Flashes when any recognizable transmission is received. This LED is only visible when the cover is removed.
Up button: Scrolls the display up.
Down button: Scrolls the display down.
Back button: Returns display to the previous menu, or when pressed in the main menu options, returns the unit to normal operating mode. When entering information in the display, returns to the last character entered.
Enter button: Selects the currently displayed menu item. If in normal operating mode, sets the unit to menu mode.
Reset button: Clears the current status for all points and resets all outputs and LEDs. Records a receiver reset entry in the event log and resets the supervision window timers. This button is only accessible when the cover is removed.

1.5 EN4216MR Internal Components

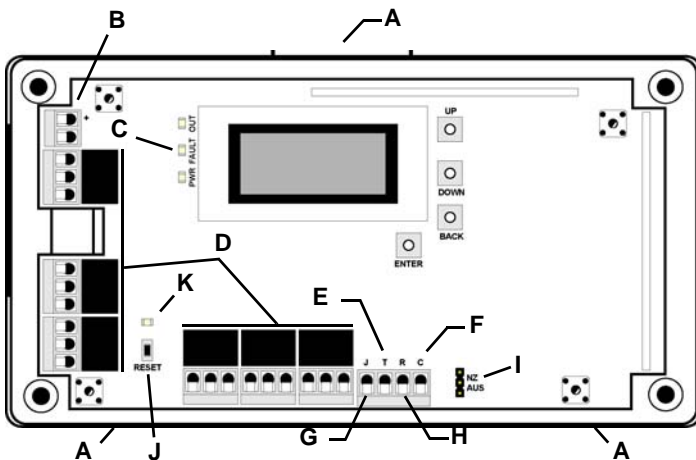


Figure 3 EN4216MR internal components
A Housing release tabs **B** Power connections **C** Operation LEDs
D Relay outputs **E** Tamper output **F** Receiver power loss output
G Jam output **H** Reset input **I** Frequency band selection pins
J Reset button **K** Decode LED

1.6 What's in the Carton

- Two drywall anchors.
- Two mounting screws.
- Two pieces of double-sided mounting tape.
- One selection jumper.

2 Installation and Startup

2.1 Installation Notes

- These products are designed to be maintained by professional security technicians.
- Products are tested for indoor use.

- All products should be manually tested weekly.

2.2 Power Cabling

Caution: Incorrect connections may cause damage to the unit.

Before beginning startup, you will need to connect power to the receiver. To connect power to the receiver:

1. Use a small screwdriver to press the housing release tabs on the top or bottom of the receiver; separate the housing.
2. Connect power cabling to the Vs (+) and GND (-) connections.
 - Power source should be 11-14 VDC. Power supply must be unswitched, uninterrupted, and regulated.
 - Use 18 - 22 gauge wire for all cabling, and ensure torque on the screw terminals does not exceed 7 inch-pounds.
 - For UL installations, wire lengths must not exceed 300 feet.

2.3 Connect Input/Output Cabling

3. Connect cabling to the receiver power loss output. Must be configured for UL installations.
 - The receiver power loss output is a normally closed (N/C) open collector output that opens when the receiver loses power.
4. Connect cabling to the tamper output. Must be configured for UL installations.
 - The tamper output is a normally open (N/O) open collector output that reports receiver case tamper to an external device.
5. Connect cabling to the jam output. Must be configured for UL installations.
 - The jam output is a normally closed (N/C) open collector output that opens when noise thresholds on all receive channels remain above a predetermined value for 10 seconds. The jam output is set to the follower output type.
6. Connect a momentary switch to the reset input and ground (Figure 4, "EN4216MR terminals"). Must be configured for UL installations.
 - The reset input circuit permits installation of a remote momentary normally open (N/O) switch to clear faults, unlatch outputs, and reset the receiver to a normal state.
7. Connect cabling to the output terminals. Must be configured for UL installations.
 - The EN4216MR provides six Form-C relays.

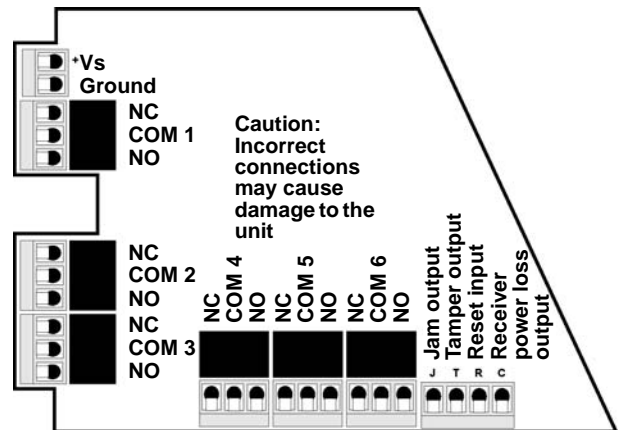


Figure 4 EN4216MR terminals

2.4 Select the Frequency Band

EchoStream devices are able to use a range of radio frequencies, and must be configured for your geographic area. This device ships with a default frequency range of 902-928 MHz for use in North America. If you are using the device in North America, skip to section 2.5, "Mount the Receiver"; if you are using the device in Australia or New Zealand, you will need to configure it.

8. Place a selection jumper on the appropriate frequency band selection pins.
 - Place the jumper on the top two pins, marked NZ, to set the frequency range to 921-928 MHz for New Zealand.
 - Place the jumper on the bottom two pins, marked AUS, to set the frequency range to 915-928 MHz for Australia.

Note: Only devices set for North America are configured for UL installations.

9. Cycle power source to reset.

2.5 Mount the Receiver

Caution: Mount the receiver in a location removed from metal. Metal objects (duct work, wire mesh screens, boxes) will reduce RF range.

Note: For UL listed systems containing a UL hold-up switch, the EN4216MR must be located within three feet of a system keypad in a location out of sight from the protected premise.

Note: For UL installations, the EN4216MR must be in the same room as the control panel.

- 10. Use the provided anchors and screws to mount the receiver in a location accessible for future maintenance.
- 11. Perform a walk test, activating each transmitter assigned to the receiver and ensuring a good signal.

3 Point Setup and Registration

Each transmitter must setup and registered to a point. Once registered, the transmitters alarm(s) will be mapped to the appropriate alarm output(s).

Following are the transmitters supported by the EN4216MR:

Table 1: EN4216MR Supported Transmitters

Transmitter	Alarm 1	Alarm 2	Alarm 3	Alarm 4
EN1210*	Terminal block			
EN1210W*	Terminal block	Reed switch		
EN1212*	Terminal block 1	Terminal block 2		
EN1215EOL	Terminal block			
EN1215WEOL	Terminal block	Reed switch		
EN1216*	Terminal block 1	Terminal block 2		
EN1223S*	Button			
EN1223D	Both buttons			
EN1224*	Button 1	Button 2	Button 3	Button 4
EN1233/5S*	Button			
EN1235SF	Button			
EN1233/5D*	Both buttons			
EN1235DF	Both buttons			
EN1236D*	Left button	Right button	Both buttons	
EN1238D*	Either button	Both buttons		
EN1241-60*	Activity			
EN1242	Smoke			
EN1244	Smoke			
EN1247*	Glass break			

Table 1: EN4216MR Supported Transmitters

Transmitter	Alarm 1	Alarm 2	Alarm 3	Alarm 4
EN1249	Bill trap			
EN1252*	Terminal block 1	Terminal block 2		
EN1260*	Motion			
EN1261HT	Motion			
EN1262*	Motion			
EN1265*	Motion			
EN1751*	Detects water	Temp. too high	Temp too low	

* Device not UL certified.

Table 2: Default Trouble Condition Programming

Output/Relay	Condition
6	Tamper
6	Low Battery
6	Supervision Loss/Inactive
See Figure 4, "EN4216MR terminals" on page 2.	Line Power Loss

3.1 Program a Point

1. From the EN4216MR start screen, press the enter button to access the receiver's three main menu options.
2. Use the up and down buttons to navigate to the install & service menu; press the enter button.
3. Enter your password to access the install & service menus.
4. Following the instructions in section 4.5.1, "Setup Point" on page 4.

4 EN4216MR 16 Zone Multi-Condition Receiver with Relay Outputs Operation and Point Setup Screens

4.1 Menu Tree

POINT STATUS, see 4.3, "Point Status" on page 4.

EVENT LOG, see 4.4, "Event Log" on page 4.

INSTALL & SERVICE, 4.5, "Install & Service" on page 4.

 SETUP POINT, see 4.5.1, "Setup Point" on page 4.

 POINT #

 SUPERVISION TIME

 SECURITY/REPEATER

 ALARM INPUTS

 ALARM OUT

 ALARM OUTPUT TYPE

 INACTIVE OUT/TYPE

 TAMPER OUT/TYPE

 LOW BATTERY OUT/TYPE

 TEXT

 REGISTER

REGISTER TRANSMITTER, see 4.5.2, "Register Transmitter" on page 5.

DELETE POINT, see 4.5.3, "Delete Point" on page 5.

SIGNAL STRENGTH, see 4.5.4, "Signal Strength" on page 5.

CHANGE PASSWORD, see 4.5.5, "Change Password" on page 5.

FACTORY CONFIG, see 4.5.6, "Factory Config" on page 5.

4.2 EN4216MR Start Screen

The EN4216MR start screen displays alarm and fault information on the LCD display. Points in alarm are displayed as "Alarm", with the point number following. If more than one point is in alarm, the display scrolls through each point. If a point has more than one alarm, the display scrolls through each alarm. Fault conditions are indicated by "Fault" in the LCD display if there is no alarm already displayed, and point numbers are not displayed.

Alarms and faults will only display briefly when the alarm or fault is first received, and then the start screen will return to a ready condition. For detailed alarm and fault information, see section 4.3, "Point Status" on page 4.

4.3 Point Status

The point status menu allows you to view detailed alarm and fault information. Point status information is available without entering a password.

To access the point status menu:

1. From the EN4216MR start screen, press the enter button to access the receiver's three main menus. "Point Status" displays.
2. Press the enter to display point status details.
3. Use the up/down buttons to scroll through the points; press the enter button again to view the outputs the displayed conditions are mapped to.
 - Point status flags are defined as follows: A = Alarm (transmitter only); T = Tamper; B = Low Battery; L = AC loss (repeater only); I = Inactive.

Note: If "--" displays, the displayed condition has been mapped to a null output.

4.4 Event Log

The event log displays the last 50 events that have occurred, whether they be alarms, or tamper or inactive faults. Event log information is available without a password.

1. From the EN4216MR start screen, press enter.
2. Use the up or down buttons to navigate to "Event Log"; press the enter button.
3. Use the up/down buttons to scroll through events.
4. When viewing transmitter events, press enter to see the output the events map to.

Note: No output will be displayed if the event is mapped to a null output.

4.5 Install & Service

Note: The default password is 3446.

The install & service menu is used to reset factory configuration, change password, view signal strength, delete points, register transmitters, and setup points for any of the programmed points.

To access the install & service menu:

1. From the EN4216MR start screen, press the enter button to access the receiver's three main menu options.
2. Use the up and down buttons to navigate to the install & service menu; press the enter button.
3. Enter a password to access install & service menus.

4.5.1 Setup Point

1. From the install & service menu, press enter at the "Setup Point" prompt.
 2. Use the up/down buttons to scroll through point numbers; press the enter button to select a point.
 - "Tx Registr'd" displays if a transmitter or repeater is currently registered to this point; "Tx Not Registr'd" displays if no transmitter is registered to this point.
 3. Press enter to continue.
- Supervision Time: Sets a time limit on missing transmitters.
- The valid range is 0 to 99 hours. The default is 60 minutes. Selecting 0 turns off supervision.

Caution: Turning off supervision can jeopardize the integrity of your system. Inovonics does not recommend turning off supervision. For supervision to function correctly, the supervision time must be set for an interval greater than the transmitter check-in time.

- a. Use the up and down buttons to adjust the supervision time; press the enter button to select.

b. Use the up and down buttons to toggle between "Hrs" (hours) and "Min" (minutes); press the enter button to select.

Select Security/Repeater: Configures point's alarm and alert messages as either a repeater or a security transmitter.

- a. Use the up and down buttons to choose "Select Security" for a transmitter or "Select Repeater" for a repeater; press the enter button to select.

1-4 Alarm Inputs: Allows security transmitters with multiple alarm conditions to be assigned a separate output and output type for each individual condition. For more information, see Table 1, "EN4216MR Supported Transmitters".

- a. Use the up and down buttons to navigate the number of alarm inputs for the transmitter; press the enter to select.

Alarm Out: Maps the security transmitter's alarm condition(s) to relay outputs.

- a. Use the up/down buttons to scroll through the output numbers. Choosing "--" will disable alarm output.

- b. Press Enter to select the output to use for the alarm condition.

Alarm Output Type: Selects the output type for the alarm condition. The default is follower.

- a. Use the up/down buttons to scroll through the output type options in Table 3; press the enter button to select the desired output option:

Table 3: Output Type Options

Output Type	Description
Follower	The output reflects the transmitter's alarm status.
Latching	The output turns on when activated and remains on until the receiver is reset.
Toggle	The output changes state each time the device sends a new activation. Press the enter button to select. "Inactive" displays when selected. Inactive time prevents output chatter. The valid range is 2.0 to 99.5 seconds, in 0.5 second increments. Use the up and down buttons to navigate.
Momentary	Momentary: The output turns on for the programmed duration, then turns off, regardless of the device status. Press the enter button to select. "Moment" displays when selected. This sets the time that the output will stay activated. The valid range 0.5 to 99.5 seconds, in 0.5 second increments. Use the up and down buttons to navigate.

Inactive Out: Maps transmitter/repeater inactivity fault output.

- a. Use the up/down buttons to scroll through the output numbers. Choosing "--" will disable inactivity reporting.

Inactive Output Type: Selects the output type for the inactive condition.

- a. Use the up/down buttons to scroll through the output type options in Table 3; press the enter button to select the desired output option:

Tamper Out: Maps transmitter/repeater tamper fault output.

- a. Use the up/down buttons to scroll through the output numbers. Choosing "--" will disable tamper output.

Tamper Output Type: Selects the output type for the tamper condition.

- a. Use the up/down buttons to scroll through the output type options in Table 3; press the enter button to select the desired output option.

Low Batt Out: Maps transmitter/repeater low battery fault output.

- a. Use the up/down buttons to scroll through the output numbers. Choosing "--" will disable low battery output.

Low Battery Output Type: Selects the output type for the low battery condition.

- a. Use the up/down buttons to scroll through the output type options in Table 3; press the enter button to select the desired output option:

Line Power Loss Out: Maps repeater line power loss fault output.

- a. Use the up/down buttons to scroll through the output numbers. Choosing "--" will disable line power loss output.

Line Power Loss Output Type: Selects the output type for the line power loss condition.

- a. Use the up/down buttons to adjust the supervision time; press the enter button to select.

- a. Use the up/down buttons to scroll through the output type options in Table 3; press the enter button to select the desired output option:
Text: Enter eight-character descriptive text for the transmitter/repeater
- a. Use up/down buttons to scroll through the alphanumeric characters; press enter to select and advance to the next character. To select a space, press enter without selecting a digit.

Note: If you do not use all eight characters, you must enter spaces to the end of the line.

- b. When finished, press enter again to complete selection.
Register Transmitter: The register transmitter option allows you to register a transmitter or repeater to the programmed point.
- a. Use the up and down buttons to toggle between “N” for no and “Y” for yes to choose whether or not you wish to register a transmitter/repeater to the point; press enter to select.
- b. Press the transmitter/repeater’s reset button at the “Reset Xmitter” prompt.
- c. When “Tx Reg’d” displays, press enter to finish and advance to the next point.
- d. When all transmitters have been registered, press reset on the receiver to clear faults.

Note: A transmitter/repeater can be registered to the point at a later time using the “Register Xmitter” prompt in the install & service menu.

4.5.2 Register Transmitter

The register xmitter option allows you to register a transmitter or repeater.

- From the install & service menu, use the up and down buttons to navigate to the “Register Xmitter” prompt; press the enter button.
- Use the up and down buttons to choose the point to which you want to register the transmitter/repeater.
- Use the up and down buttons to toggle between “N” for no and “Y” for yes to choose whether or not you wish to register a transmitter/repeater to the point; press enter to select.
- Press the transmitter/repeater’s reset button at the “Reset Xmitter” prompt.

4.5.3 Delete Point

The DELETE POINT option allows you to delete transmitter registration information from all registered points, or from a specific point. Programmed point information is not deleted; just the registration identification number associated with the transmitters or repeaters. To delete points:

- From the install & service menu, use the up and down buttons to navigate to the “Delete Point” prompt; press the enter button.
- The “Delete All?” prompt displays. Use the up and down buttons to choose “N” for no or “Y” for yes; press enter to select.
- If you selected no, the “Delete Point” prompt displays. Use the up and down buttons to choose a point to delete; press enter to select.
- Press the enter button. If there is more than one registered point, then pressing the enter button returns to point selection for deletion; if there are no more registered points, the display returns to the install & service menu.

4.5.4 Signal Strength

The SIGNAL STRENGTH option is used to measure signal strength and troubleshoot installation problems.

- At the “Signal Strength” prompt, press enter.
 - The first programmed point displays, along with a signal quality of good, weak or no sig.

Note: The point must have an active transmitter associated with it to display signal strength.

- Use the up/down buttons to scroll through the registered transmitters.
- Press enter to view level (LV) and margin (MA).
 - Level indicates the overall signal strength; margin indicates the signal strength minus the background noise.

Note: Inovonics recommends a level of 10 for most installations.

4.5.5 Change Password

Passwords can be up to five digits long. The password is 3446. To change the password:

- From the install & service menu, press enter at the “Change Password” prompt.
- Use the up/down buttons to scroll through the digits; press enter to select and advance to the next digit.

Note: Choosing a null as the password will disable the function, allowing users to perform receiver functions and/or change parameters without a password.

- When finished, press enter again to complete selection.
- When “Password Changed” displays, press enter to return to the install & service menu.

Caution: Store the new password in a secure place. If the new password is lost, you will not be able to access the receiver without restoring it to factory defaults as described in “Factory Config” on page 5.

4.5.6 Factory Config

The factory config option is used to restore the EN4216MR to its factory defaults.

Caution: Choosing factory config will erase all programmed point and output information, as well as the password.

To restore the factory configuration defaults to the EN4216MR:

- From the install & service menu, use the up and down buttons to navigate to the “Factory Config” prompt; press the enter button.
- The “Reset Config” prompt displays. Use the up and down buttons to choose “Y” for yes; press enter to select.
- The “Config Reset” prompt displays; press the enter button to return to the install & service menu.

The receiver can also be brought back to the factory default configuration through a hardware initiated sequence.

- Connect a wire between the reset terminal and the ground terminal.
- While pressing the back button, cycle the power to the unit.
- Release the back button and remove the wire between the reset terminal and ground.
- “Reset Config?” displays; select “Y” and press the enter button.

5 Specifications

Compatible repeater, transmitters: EN5040-T, EN1215EOL, EN1215WEOL, EN1223D, EN1235SF, EN1235DF, EN1244, EN1249, EN1261HT.
Dimensions: 165 mm x 89 mm x 25 mm (6.5" x 3.5" x 1").
Weight: 280 g (.62 lb).
Operating environment: 0°- 60°C (32°- 140°F), 90% relative humidity, non-condensing.
Power requirement: 11 - 14 VDC; 400 mA.
Output specifications: Form C relay 1A @ 28 VDC, 0.5 @ 30 VAC resistive load.
Input specifications: A low is less than .5 V; a high is greater than 2.5 V.
Reset input: Contact closure, momentary low.
Receiver type: Frequency hopping spread spectrum.
Operating frequency: 915-928 MHz (Australia), 921-928 MHz (New Zealand), 902-928 MHz (USA).
Tamper: Type B, fixed device.
Number of points/Transmitters: 16.
Number of outputs: Six Form C relay outputs.
Event history log capacity: 50 events (first-in, first-out replacement).
UL listings: UL 365, UL 636, UL 985, UL 1023, ULC/ORD-C1023-74, UL 1610, UL 1076.

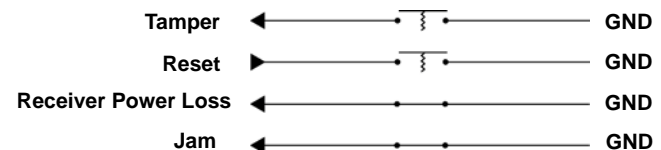


Figure 5 Tamper, reset, arm and receiver operational circuits

6 UL Requirements

- The control panel must be programmed to indicate an alarm if the system is in an armed condition and an RF jamming signal occurs at the receiver.
- The receiver tamper and transmitter tamper cannot be combined in one loop.
- The control unit providing input power to the receiver must not have a range outside of 11-14 VDC.

7 Television and Radio Interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

8 US Patent Numbers

- 7,154,866.
- 7,554,932.
- 7,746,804.
- Other patents pending.