





9450 Duolink Exit Alarm Receiver

Installation Guide





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Warnings / Cautions / Compliance

It is important for your facility to implement and enforce the following WARNINGS and CAUTIONS in order to keep all equipment functioning properly. Disregarding the information and instructions in this document is considered abnormal use and may result in injury or system failure.

Warnings



ACCESSORIES (SUPPLIES)—To ensure resident safety and proper operation of equipment, use only parts and accessories manufactured or recommended by RF Technologies, Inc. Parts and accessories not manufactured or recommended by RF Technologies, Inc. may not meet the requirements of the applicable safety and performance standards.

Failure to use the components and supplies specified by RF Technologies, Inc. may result in equipment and/or system failure.

EXPLOSION HAZARD—These devices should not be used in the presence of flammable gas mixtures. It should also not be used in oxygen enriched atmospheres.

INSTALLATION AND CONFIGURATION—It is the responsibility of the facility to follow the installation instructions carefully, as outlined in the applicable system guides, and to use the components and supplies specified by RF Technologies, Inc. for all installations.

Failure to use the components and supplies specified by RF Technologies, Inc. may result in equipment and/or system failure.

INSTRUCTIONS FOR SET UP AND USE—It is the responsibility of the facility to follow the instructions for set up and use carefully, as outlined in this manual, and to use the components and supplies specified by RF Technologies, Inc. for set up and use. Do not attempt to use extension cords or other equipment not supplied by RF Technologies, Inc.

Failure to use the components and supplies specified by RF Technologies, Inc. may result in equipment and/or system failure.

STATIC DISCHARGE—Do not touch the conductor portion of any conductor or port. Damage to the device may result.

SYSTEM WIRING—All permanent supply connections must be done in accordance with National Electric Code, NFPA 70.

SYSTEM INSPECTION—It is the responsibility of the facility to establish and facilitate a regular inspection schedule for your system. RF Technologies, Inc. recommends quarterly inspections of your system for safety and performance by a qualified RF Technologies, Inc. representative.

To arrange for a quarterly inspection by RF Technologies, Inc., call our Technical Support Department at (800)-669-9946 or (262) 790-1771.

Failure to provide regular inspection of these products may result in equipment and/or system failure.

SYSTEM MAINTENANCE AND TESTING—It is the responsibility of the facility to establish and facilitate a regular maintenance schedule for your system, as outlined in the applicable system guides. This includes regular inspection, testing, and cleaning. RF Technologies, Inc. recommends monthly maintenance and testing of your system. It is also recommended that your facility keep records of maintenance and test completions.

Failure to provide regular maintenance and testing of these products may result in equipment and/or system failure.

USER TRAINING—Only users who have received adequate training on the use of the system, as outlined in this manual, should use the system. It is the responsibility of the facility to ensure all users have been trained.

Failure to adequately train employees may cause system failure due to user error. In addition, incorrect use of the equipment may also result in system failure.

Cautions



WORN OR DAMAGED PARTS—If the control unit pads or cables are worn or damaged, you must have the product serviced. For more information, see the section entitled "Service and Return."

DISPOSAL—At the end of their service life the products described in this manual, as well as accessories (i.e. lithium batteries, banding material, disposable pads, etc.), must be disposed of in compliance with all applicable federal, state and local guidelines regulating the disposal of products containing potential environmental contaminants. Dispose of the packaging material by observing the applicable waste control regulations.

RESIDENT GENERATED ALARMS—Do not rely exclusively on resident generated alarms for resident care and safety. The alarm function of equipment in the possession of residents must be verified periodically and regular resident surveillance is recommended.

RESIDENT MONITORING—The most reliable method of resident monitoring combines close personal surveillance with correct operation of monitoring equipment. It is the responsibility of the facility to periodically check on residents in possession of RF Technologies, Inc.'s equipment (i.e. Pendants, Pull Cords, Control Units) to mitigate risk of inappropriate use of equipment or strangulation and stumbling hazards from cables and cords.

PRODUCT WARRANTIES—Failure to follow the Warnings and Cautions in this guide voids any and all Product Warranties.

Bio-Incompatibility Notice

Do not use Pendants with people that have sensitivities or allergies to device materials. The device materials include Acrylonitrile butadiene styrene (ABS), Silicon, Rubber, and Neoprene.

Warnings /	Cautions /	Compliance
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Preface

Overview

This guide provides detailed information about installing the components, wiring the DuoLink to the exit controller, testing for RF interference, and component specifications.

The 9450 DuoLink Exit Alarm Receiver is a component of the Exit Alarm System which is part of the overall 9450 System. The 9450 System monitors doors, elevators, hallways, and stairwells, to assist staff in monitoring patients in a facility. A small transmitter is placed on the ankle or the wrist of a patient. If a transmitter is detected in an Exit Alarm Zone, an alarm sounds at the exit. Depending on which equipment is installed, the 9450 System can automatically lock doors, deactivate elevators, and activate remote cameras.



WARNING: The 9450 System is designed and intended to work in conjunction with a facility's overall patient security program, including reasonable operating policies and procedures. The 9450 System, by itself, cannot prevent the mismatch, abduction or elopement of patients.

Intended Audience

The 9450 DuoLink Exit Alarm Receiver Installation Guide is intended for those who install and configure the Exit Alarm System.

Additional Documentation

Documentation for your system is available in Portable Document Format (PDF) on the System Documentation CD-ROM. Please contact your RF Technologies sales representative for replacement CD-ROMs.

Contact Information

For more information about RF Technologies, Inc. products, go to www.rft.com.

For technical support, contact the Technical Support Team at (800) 669-9946 or (262) 790-1771.

For questions or comments about the System Documentation, contact the RF Technologies Technical Publications team at technologies@rft.com.

Product Warranty

Product Warranty information can be found on the System Documentation CD or with your original system proposal and invoice.

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Chapter 1 – Installation

Introduction

DuoLinks are small, unobtrusive devices, placed on or near a door frame and they interface directly with a Exit Controller to form an Exit Alarm Zone. They receive Radio Frequency (RF) signals from infant, patient, and adult transmitters within a monitored zone, and send the signals to the Exit Controller, which in turn triggers the alarm process. The DuoLink can be configured to receive either 66 KHz or 262 KHz signals. Its operating frequency must match the operating frequency of the transmitters specified for the facility.

DuoLinks are designed to be mounted with just two screws. Placement of DuoLinks can be critical depending on the width of the door or zone to be monitored, and the levels of electronic, electrical, and electromagnetic interference that can be present.

Display





When installing product, you must follow standard accepted safety practices such as wearing safety glasses.

Before cutting openings or drilling holes through walls, you must verify that you will not strike any wiring or plumbing.

Setting Frequency

Use the following steps to select the correct frequency for the DuoLink. The frequency for the DuoLink MUST match that of the transmitters that are used with the system.

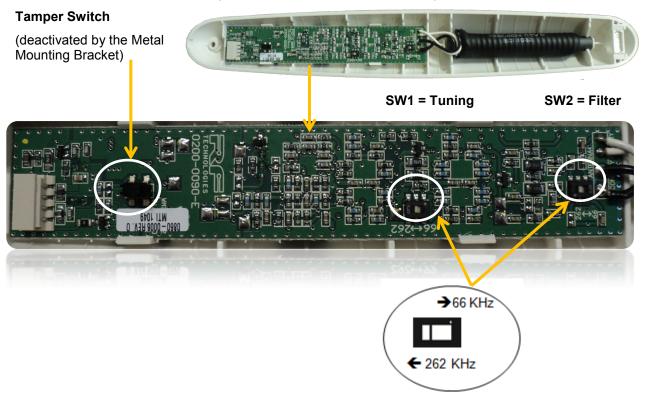
NOTE: The DuoLink can only be configured to operate at one frequency.



WARNING: The factory default setting for the DuoLink is 262 KHz. If the system has been configured to operate at the 66 KHz frequency, the two switches inside of the DuoLink will need to be changed to receive 66 KHz transmitters. Failure to match the frequency will cause the system to not operate correctly and an elopement could occur.

To select the frequency:

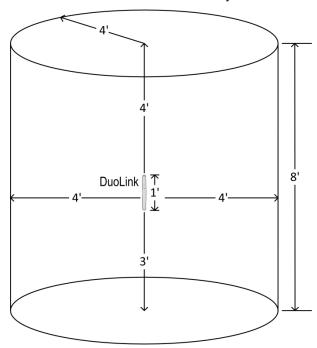
1. Verify that the unit is set to the right frequency by observing the position of SW1 and SW2 (one switch determines the proper filtering and the other switch tunes the antenna). Both must be in the correct position in order for the DuoLink to operate.



- 2. The unit is set to 66 KHz when both the SW1 and SW2 switches are positioned towards the antenna coil assembly (right in Figure above).
- 3. The unit is set to 262 KHz when both the SW1 and SW2 switches are positioned away from the antenna coil assembly (left in Figure above).

Identifying Potential Interference

View the receive area around each DuoLink as a cylinder. Keep all interference sources outside of this cylinder.



Common sources of interference include TVs, computer monitors, electric motors, electrical distribution panels, and some pagers. These types of devices must be at least ten (10) feet away from the DuoLink, even through walls and ceilings. Other sources of interference include:

- Some newer electric washers and dryers
- Electrical panels and fire alarm panels
- Time clock systems
- Certain types of fluorescent lights with electronic ballasts
- Some elevators
- Light dimmers



CAUTION: All DuoLinks must be tested prior to use to verify proper operation. Failure to test the DuoLinks before use can result in system failure and/or an abduction or elopement. In addition, failure to test DuoLinks voids the RF Technologies Product Warranty.

Determining Location

For optimal location, use the following steps to assess the relative noise in the environment so that a proper mounting location for the DuoLink may be chosen. The purpose of this assessment is to make minor adjustments to the standard mounting configuration in order to achieve an appropriate location for the DuoLink where its Signal LED indicates minimal activity with no transmitters in range.

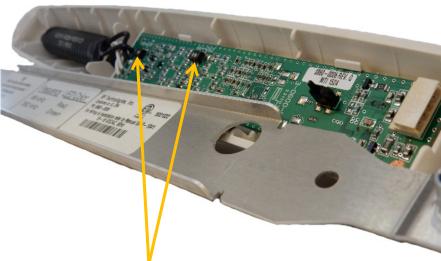
The designed range is 4 feet. The adjustable range surrounding the antenna location is up to an 8 feet radius, depending on the RF environment.



NOTE: The following steps are to be performed as a temporary setup. The final mounting location is not known until the following steps have been completed.

To determine the location:

 Use a 5/64" Allen wrench to remove the metal mounting bracket from the back of DuoLink



- 2. Set the frequency switches to match the operating frequency of the transmitters specified for the facility (66 KHz or 262 KHz). Both switches (SW1 and SW2) need to be set and in the same direction
- 3. Terminate the DuoLink to the exit controller as per wiring diagram (see chapter 2)



4. Replace the metal mounting bracket



WARNING: The metal mounting bracket is integral to the tuning of the DuoLink's antenna. It must be installed on the DuoLink to get adequate range performance AND to allow the exit controller to communicate with the DuoLink. Any modifications made to the mounting bracket will adversely affect the DuoLink's performance and could cause an abduction or an elopement to occur.

- Make sure the exit controller has been properly mounted and the power is turned on
- 6. Hold the DuoLink in its approximate final mounting location. Turn the 20-turn Gain Control clockwise until the LED first starts to blink. Once the LED begins to blink, turn the Gain Control counter-clockwise one full rotation (back 360°). NOTE: Turning the Gain Control clockwise increases the sensitivity, turning it counter-clockwise decreases the sensitivity.
- 7. Confirm the range and coverage using the DuoLink and a transmitter, ensuring the area is covered properly while at the same time not covering more than what is needed



WARNING: Some door receiver locations are relatively free of the typical RF noise levels that are found at normal mounting locations in facilities. For these locations, adjusting the door receiver gain control with the standard tuning procedure (see step 6 above) can result in too much gain.

Excessive sensitivity to thunderstorm lightning RF noise, excessive coverage into undesired areas, and over-sensitivity to random occurring RF noise events (such as floor-buffer/polisher, RFI, and false auto-enrolls) can be reduced or eliminated by testing the door receiver setup with a test tag transmitter to confirm that the door receiver has 100% of the needed coverage and not more. If coverage is tested and found to be excessively higher than needed, reduce the door receiver gain control counterclockwise until there is 100% coverage at that location and not more.

- 8. Depending on whether the receiver is to be vertically or horizontally mounted, you must maintain "horizontal" or "vertical" receiver positioning while assessing the relative noise level
- Move the DuoLink around in the desired receiver mounting area in small increments (refer to the mounting configurations on the following pages) to find a location where the signal LED blinks the least
- 10. Mark the spot as it is the quietest radio frequency location and the DuoLink should be mounted in that area for best performance



WARNING: If the DuoLink has to be moved significantly from the recommended mounting location, the source of the noise must first be identified and corrected, and then the location assessment must be performed again.

- 11. Power off the exit controller
- 12. Disconnect the cable from the DuoLink and the exit controller and proceed to mount the DuoLink
- 13. Repeat steps for every DuoLink to be mounted in the Exit Alarm Zone

Mounting

The DuoLink can be mounted in both a single or double door configuration. This section provides detailed instructions about how to mount the DuoLink in both configurations.

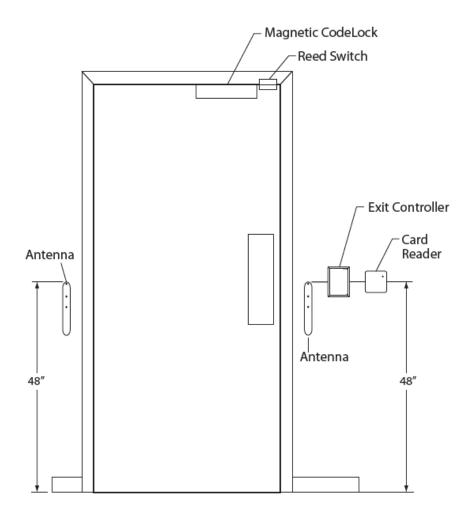
Mounting information to keep in mind:

- All receivers must be screwed to the wall using the metal mounting brackets provided on the back of the receiver. Doublesided tape is not appropriate for this task.
- Do not mount the DuoLink on a metal door frame, unless the optional isolator is used (0120-0062K)
- Antenna should be positioned as close as possible to the door (without mounting on a metal door frame or directly to the door) to minimize the effect of RF noise and to improve the coverage
- It is not recommended to mount the DuoLink directly to the door. Doing so will reduce its service life.
- Observe DuoLink direction (as illustrated)
- Never run wires along the length of the DuoLink
- Dimensions as shown are critical for best performance. If EXACT dimensions cannot be obtained due to architecturally or noise source constraints, at a minimum, the ferrite coils in the DuoLinks must be greater than 1 inch apart and must be perpendicular to each other.

Single Doors

To mount DuoLinks for a single door in a facility with adult transmitters:

- Mount the top of the first receiver approximately 4'0" (according to the location determination assessment) from the floor in a vertical direction on the left side of the door
- 2. Mount the top of the second receiver approximately 4'0" (according to the location determination assessment) on the right side of the door
- 3. Mount the metal mounting bracket first and then mount the plastic assembly to the metal bracket with the supplied hardware

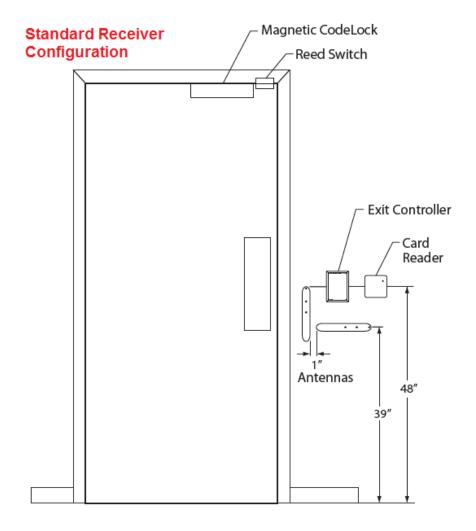


To mount DuoLinks for a single door in a facility with infant and patient transmitters:

Standard Receiver Configuration

If adequate space is available on one side of the doorway, mount the receivers as follows:

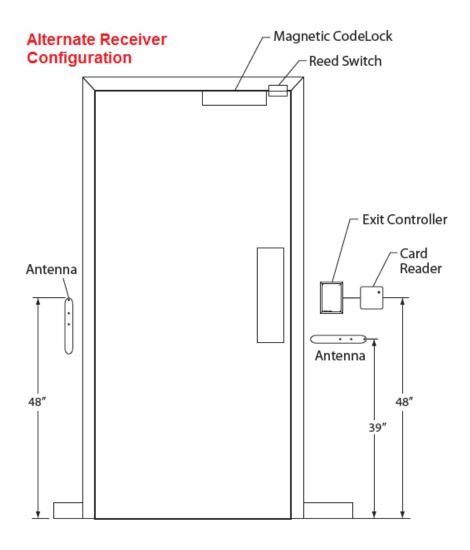
- 1. Mount the top of the first receiver approximately 4'0" (according to the location determination assessement) from the floor in a vertical direction on the side of the door with adequate space
- 2. Mount the top of the second receiver approximately 3'3" (according to the location determination assessment) from the floor in a horizontal direction on the same side of the door. Ensure that the coil of the receiver is pointed at the notches in the vertically mounted receiver.
- 3. Mount the metal mounting bracket first and then mount the plastic assembly to the metal bracket with the supplied hardware



Alternate Receiver Configuration

If adequate space is not available on one side of the doorway, both sides of the doorway will need to be used. Mount the receivers as follows:

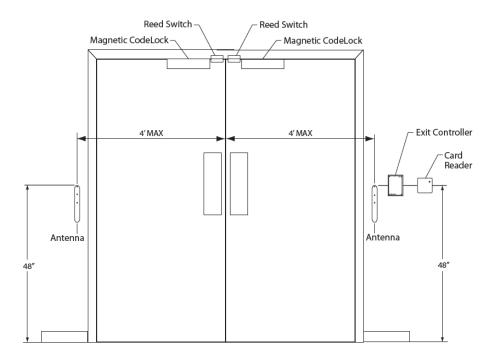
- Mount the top of the first receiver approximately 4'0" (according to the location determination assessment) from the floor in a vertical direction on the left side of the door
- 2. Mount the top of the second receiver approximately 3'3" (according to the location determination assessment) from the floor in a horizontal direction on the right side of the door. Ensure that the coil of the receiver is pointed at the notches in the vertically mounted receiver.
- 3. Mount the metal mounting bracket first and then mount the plastic assembly to the metal bracket with the supplied hardware



Double Doors

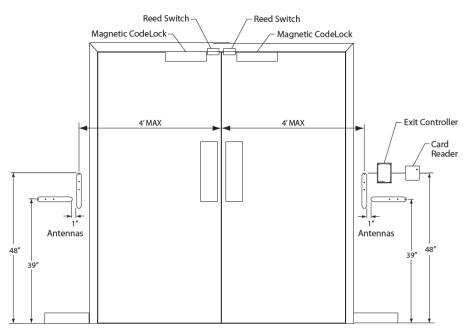
To mount DuoLinks for double doors in a facility with adult transmitters:

- 1. Mount the top of the first DuoLink approximately 4' 0" (according to the location determination assessment) from the floor in a vertical direction on the left side of the doorway
- 2. Mount the top of the second receiver approximately 4'0" (according to the location determination assessment) from the floor in a vertical direction on the right side of the doorway
- 3. Mount the metal mounting bracket first and then mount the plastic assembly to the metal bracket with the supplied hardware



To mount DuoLinks for double doors in a facility with infant and patient transmitters:

- Mount the top of the first DuoLink approximately 4' 0" (according to the location determination assessment) from the floor in a vertical direction on the left side of the doorway
- 2. Mount the top of the second receiver approximately 4'0" (according to the location determination assessment) from the floor in a vertical direction on the right side of the doorway
- 3. Mount the third antenna approximately 3'3" (according to the location determination assessment) from the floor in a horizontal direction on the left side of the doorway. Ensure that the coil of the DuoLink is pointed at the notches in the vertically mounted DuoLink.
- 4. Mount the fourth antenna approximately 3'3" (according to the location determination assessment) from the floor in a horizontal direction on the right side of the doorway. Ensure that the coil of the DuoLink is pointed at the notches in the vertically mounted DuoLink.



Wiring



For additional wiring information, refer to the *Touchpad Exit Controller* Installation Guide (0510-1100).

WARNING: You must verify that the exit controller is OFF before wiring any system components. Failing to do this may result in equipment failure, injury, or death.

To wire the DuoLink to the exit controller:

Using the supplied 30' cable with a 4-pin connector, string the cable in the wall or the raceway (see Mounting Raceway Hardware section for additional details) from the DuoLink to the exit controller with the connector at the DuoLink end.



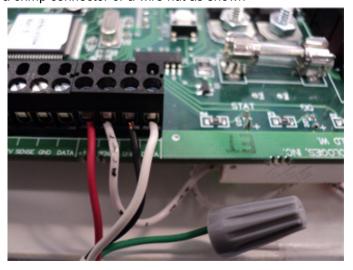
NOTE: Proper precautions should be taken when running the opposite end of the 4-pin connector through the wall.

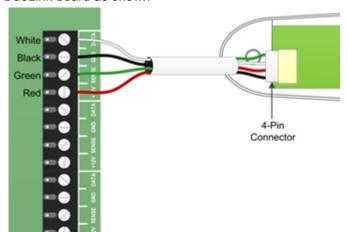
- 2. Cut the wire to a suitable length. Leave 6" of additional cable on the DuoLink end for the antenna housing to swing open (NOTE: Do not coil or store the excess wire inside of the DuoLink)
- 3. Connect each DuoLink directly to one of the four terminals labeled TB6, TB7, TB8 and TB9 on the exit controller.
- 4. Strip and connect the wires according to the following table

DuoLink	Original Wire Color	Current Wire Color
+12V	Orange	Red
SENSE	Blue	Green
GND	White/Orange	Black
DATA	White/Blue	White



This step only applies if wiring to a Delayed Egress Exit Alarm **Controller** - on one of the antenna ports the enclosure tamper reed switch must be connected in series with the Sense signal using either a crimp connector or a wire nut as shown





On the DuoLink end of the wire, plug the 4-pin connector into the DuoLink board as shown

- 7. After each DuoLink has been installed and wired to the exit controller, close the DuoLink by hooking one end of the DuoLink housing onto the metal mounting bracket and swinging the other end into place against the opposite end of the bracket. Once closed, this will deactivate the Tamper Switch.
- Secure the DuoLink housing to the bracket with the included 5/64"
 Allen head screw
- 9. Power the exit controller
- Perform an antenna survey (** 9450 13 1) on the exit controller to register the newly installed configuration



NOTE: You must power on the exit controller and perform an antenna survey after the new DuoLinks have been attached to their brackets in order for them to operate. (For more information about the Antenna Survey, refer to the *Touchpad Exit Controller Installation Guide*, 0510-1100).

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Chapter 2 – Testing

Introduction

The DuoLink's location must be tested for interference and coverage. Located on each DuoLink is a Red or Green LED, depending on the frequency (refer to Figure 1.2 on page 10), that provides a visual aid. When the DuoLink receives any signal in the same frequency range as the transmitter, the LED lights. For the system to operate properly, the LED must be OFF when a transmitter is not present. The system will tolerate a small amount of interference which appears as a dim flash of the LED, but the best performance is achieved when the LED remains OFF.

The DuoLink must be tested and tuned on a regular basis or any time that they indicate noise or that the environment around them has been changed.



NOTE: The Signal LED on the exit controller also shows when interference or a signal is being received. However, this is a composite of all of the antennas. When more than one DuoLink is connected to the exit controller, the DuoLink's LED must be used to determine which DuoLink is receiving the interference or signal.

System Verification

Tuning and Testing the DuoLink

Ideally, the DuoLinks's gain should be adjusted to the setting necessary to supply the desired coverage area. Tuning the gain up can give additional coverage but makes it easier to flood the DuoLink with noise. Tuning the gain down is less likely to flood the DuoLink with noise but may not provide adequate coverage.

Once the system has been tested, you must perform the Antenna Survey (**9450 1301) again.

WARNING: A minimum gain setting is necessary to ensure that the transmitter's signal will be received. If the gain must be adjusted below the minimum setting to receive a "reliable" signal, reorient or relocate the DuoLink. Adjusting the gain below the minimum setting can cause the abduction or elopement of patients/residents and/or system failure.



NOTE: When the exit controller is in test mode (** 9450 88 1), the Red Signal LED should only blink when it decodes the test transmitter and not constantly. If it blinks constantly, there are other transmitters in the monitored zone that must be removed.

If the installation area contains noise, the Yellow Signal LED may blink outside of successful transmitter decodes which is acceptable only if the Exit Alarm System passes the above testing.

If the Yellow Signal LED blinks constantly after attempting the above tuning, the source of the noise must be identified and corrected.

To tune and test the DuoLink:

- 1. Perform the Antenna Survey (**9450 13 1)
- 2. Remove the plug covering the Gain Control
- 3. Using the door antenna screwdriver (0500-0097), turn the Gain Control clockwise until the signal LED on the DuoLink begins to blinks
- 4. Once the LED begins to blink, turn the Gain Control back, counterclockwise one full turn (back 360°)



WARNING: Some door receiver locations are relatively free of the typical RF noise levels that are found at normal mounting locations in facilities. For these locations, adjusting the door receiver gain control with the standard tuning procedure (see step 6 above) can result in too much gain.

Excessive sensitivity to thunderstorm lightning RF noise, excessive coverage into undesired areas, and over-sensitivity to random occurring RF noise events (such as floor-buffer/polisher, RFI, and false auto-enrolls) can be reduced or eliminated by testing the door receiver setup with a test tag transmitter to confirm that the door receiver has 100% of the needed coverage and not more. If coverage is tested and found to be excessively higher than needed, reduce the door receiver gain control counterclockwise until there is 100% coverage at that location and not more.

- 5. Confirm the range and coverage using the DuoLink and a transmitter to ensure the area is covered properly while at the same time not covering more than what is needed. To do this, place the exit controller into Test Mode (** 9450 88 1) and perform the following within 5 minutes, after which point the exit controller will automatically exit Test Mode
 - Approach the DuoLink with a test transmitter at a slow walking pace (approximately 4 feet per second)
 - Verify that the DuoLink begins blinking when the transmitter is within 4 feet
 - Verify that the exit controller successfully decodes the transmitter (indicated by a blink of its red LED) before the transmitter reaches the doorway
- 6. If the above tests fail, the Gain Control must be turned an additional 1/8 turn clockwise, then repeat Step 5
- 7. Repeat these procedures for each additional DuoLink
- 8. With all DuoLinks tuned and connected to the exit controller, open the monitored door(s) or alternatively open the Door In input on the exit controller
- 9. Attempt to egress the covered area from different directions at a fast walking pace (approximately 5-6 feet per second) and verify that the exit controller issues an alarms for every attempt
- 10. If the above test fails, Steps 3-6 will need to be repeated on all **DuoLinks**
- 11. Once the DuoLinks have been tuned and have passed testing, replace the Gain Control plug on each one

Chapter 3 – Mounting Raceway Hardware

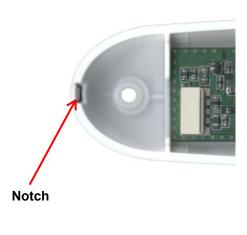
Introduction

When all the DuoLinks have been tuned, tested, and permanently mounted, the next step is to use raceway to conceal any wires that have not been run inside of the wall.

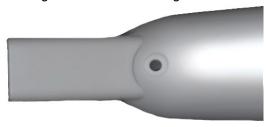
If the Exit Alarm System is surface-mounted, 1/2" x 3/4" PVC raceway is used for containing and concealing wires from the DuoLinks. Six-foot long sections with corners, pieces, and tees are supplied with the purchase of the system. Double-sided tape is on the six-foot long sections for easy installation. Additionally, one six-foot 11/2" x 3/4" section of PVC raceway is supplied for containing wires from the ceiling down to the surface mount box of the TEC.

When using the Antenna Splice Adapter

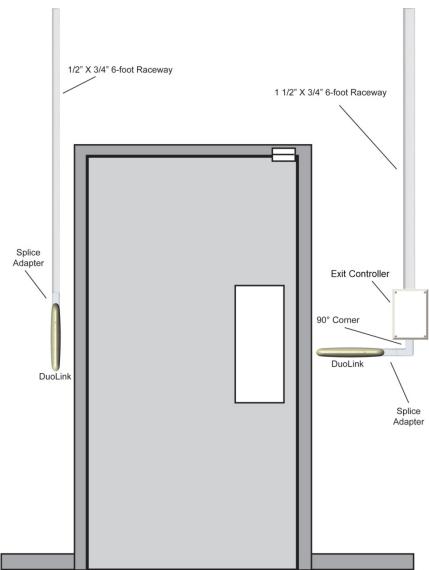
- Cut out the notch located on the inside of the DuoLink's plastic housing
- 2. Run the wires through the notch, being sure to avoid blocking the hole used for securing the metal mounting bracket to the plastic housing



Position the Antenna Splice Adapter at the end used to mount the housing to the metal mounting bracket



Example:



Chapter 4 – Specifications

Introduction

This section contains information on the specifications for the DuoLink Exit Alarm Receiver, including details about the specific requirements and certifications.

DuoLink Receiver		
Dimensions	12.2" L x 1.7" D x 1.3" W	
Weight	5.75 oz	
Color	Off-White	
Composition	Polycarbonate	
Power	12 VDC from the Exit Controller	
Wiring Interface	4-pin locking connector	
Frequency Selection	66 kHz or 262 kHz	
LED Colors	Illuminates red for 66 kHz and green for 262 kHz	
Operating Temperature	32-140°F	
Range	The designed range is 4 feet. The adjustable range surrounding the antenna location is up to an 8 feet radius, depending on the RF environment.	
Certifications	UL Standard 294	
Part Number(s)	9450-0170K	9450 DuoLink Antenna Kit
Additional Part Number(s)	0120-0062K Code Alert Mounting Block & Hardware Kit	

Raceway	6' Raceway (1 1/2" × 3/4") 6' Raceway (1/2" × 3/4")	90° Raceway Corner Raceyway Splice Cover	
Dimensions	6' lengths		
Color	Off-White		
Composition	PVC		
Power	3/4" Low Voltage Surface		
Part Number(s)	0210-0019	Raceway, 2-1-3 Kit (2 Flat 90s, 1T, 3 Splice Clips)	
	0210-0010	Raceway, 3/4" x 6ft	
	0210-0017	Raceway, 1-1/2" x 6ft	
Additional Part Number(s)	0210-0011	Raceway, 3/4", Flat 90 Connector	
	0210-0012	Raceway, 3/4", T Connector	
	0210-0016	Raceway, 3/4" Splice Clip Connector	

Revision History

Revision	Change
Α	Release
В	Removed: ETL information
С	Removed: Erroneous information about connecting DuoLinks one at a time
D	Updated: Document to latest format
	Updated : Combined 0510-1041 (Exit Alarm DuoLink Receiver Door Antenna Install Guide) into this document as they covered the same information
	Added : Warning and test steps about ensuring the area is covered properly while at the same time not covering more than what is needed



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elease Date: 5/2017