Evolve F10

Installation Manual

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Checkpoint®

EVOLVE F10 Installation Manual

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For use with the Checkpoint EVOLVE F10 Systems.

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Copyright and Warranty Information

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EVOLVE F10 Installation Manual, version 00

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00	Preliminary Release	11/29/2012	Ron Decker, Joseph Galanti, Greg Plizak

Statements

- The device(s) may only be used for the intended purpose designed by for the manufacturer.
- Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.
- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.
- Repairs may only be executed by the manufacturer.
- Installation, operation, and maintenance procedures should only be carried out by qualified personnel.
- Use of the device and its installation must be in accordance with national legal requirements and local electrical codes.
- When working on devices the valid safety regulations must be observed.
- Before touching the device, the power supply must always be interrupted. Make sure that the device is without voltage by measuring. The fading of an operation control (LED) is not an indicator for an interrupted power supply or the device being out of voltage!
- The installer or licensed electrician must follow all NEC and local codes.
- All wires routed in the floor per article 725 must be Class 2 and be UL Listed. UL Recognized AWM may be employed, provided it is enclosed in Conduit or ENT.
- The F10 is not to be installed in Wet Locations. For indoor use only.
- Checkpoint is not responsible for or warrant any repairs or rework to the flooring during or after the installation of the antenna.

Guide Conventions

Document conventions are described below:


This is a Warning icon. When it appears, it indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.


Caution: This is a Caution icon. When it appears, it indicates a potentially hazardous situation which if not avoided, could result in property damage or malfunction of equipment.


Note: This is a Tip icon. When it appears, the corresponding text indicates a helpful note or tip when using the feature.

For all measurements:

- To meet both CE and FCC requirements, all measurements will be listed in the following format: Metric [Imperial], for example: 46cm [18in] or 0.9m [3ft].
- Where non-S.I. units are applicable, such as 6’ x 4’ or 3/16”, the format in this case is Unit (metric).

Where on-screen computer instructions are given:

Button Name - This describes a button or an on-screen command or drop-down selection.

For example, the <DONE> button is represented in this document as **Done**.

Key Name - This describes a keystroke on a keyboard. For example, **Ctrl** represents the control key.

Important Information to our Users in North America
FCC Regulatory Compliance Statement

Checkpoint Systems, Inc., offers Electronic Article Surveillance (EAS) or Radio Frequency Identification Products that have been FCC certified or verified to 47 CFR Part 15 Subparts B/C. Appropriately, one of the following labels will apply to the approval:

NOTE: This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- OR -

> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) including this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation, which may include intermittent decreases in detection and/or intermittent increases in alarm activity.

Industry Canada Regulatory Compliance Statement

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter (IC: 3356B-F20) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Operation is subject to the following two conditions:

(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Industrie Canada

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio (IC: 3356B-F20) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Le fonctionnement de l' appareil est soumis aux deux conditions suivantes:

(1) Cet appareil ne doit pas perturber les communications radio, et
(2) cet appareil doit supporter toute perturbation, y compris les perturbations qui pourraient provoquer son dysfonctionnement.

Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisis de façon que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas celle nécessaire pour une communication réussie.

Equipment Safety Compliance Statement

Checkpoint Systems' EAS or Radio Frequency Identification products have been designed to be safe during normal use and, where applicable, certain components of the system or accessory sub-assemblies have been certified, listed or recognized in accordance with one or more of the following Safety standards: UL 1012, UL 1037, UL 1310, UL 60950-1, CSA C22.2 No. 205, CSA C22.2 No. 220, CSA C22.2 No. 223, CSA C22.2 No. 60950-1. Additional approvals may be pending.

WARNING: Changes or modifications to Checkpoint's EAS or Radio Frequency Identification (RFID) equipment not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner.

Important Information to our Users in Europe
CE Regulatory Compliance Statement

Where applicable, Checkpoint Systems, Inc. offers certain Electronic Article Surveillance (EAS) products that have CE Declarations of Conformity according to R&TTE Directive 99/5/EC, EMC Directive 2004/108/EC, and Low Voltage Directive 2006/95/EC.

CE

System Electromagnetic Compatibility (EMC) has been tested and notified through Spectrum Management Authorities if necessary, using accredited laboratories, whereby, conformity is declared by voluntarily accepted European Telecommunications Standards Institute (ETSI) standards EN 301489-1 and EN 300330-2.

NOTE: Certain Electronic Article Surveillance (EAS) equipment have been tested and found to conform with the CE emission and immunity requirement in Europe. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Under unusual circumstances, interference from external sources may degrade the system performance, which may include intermittent decreases in detection and/or intermittent increases in alarm activity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment experiences frequent interference from external sources or does cause harmful interference to radio communications reception, which can be determined by turning the equipment off and on, please contact a Checkpoint Systems representative for further assistance.

Equipment Safety Compliance Statement

Checkpoint Systems Electronic Article Surveillance products have been designed to be safe during normal use and, where applicable, certain components of the system or accessory sub-assemblies have been declared safe according to the European Low Voltage Directive (LVD) by being certified, listed, or recognized in accordance with one or more of the following European safety standards; EN 60950-1, EN 50364, EN 60742.

WARNING: Changes or modifications to Electronic Article Surveillance equipment not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner additional approvals may be pending.

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CHAPTER

1

INTRODUCTION

Background

Many retailers are now requiring invisible EAS Systems. The F10 system is Checkpoint's latest invisible EAS offering. This product features a unique shielded antenna design based on the previously released, S10 product. This technology minimizes the impact of in floor noise sources that plagued previous floor systems.

Offering better immunity to noise, Next Gen Liberty (NGL) TR4215 Electronics are utilized for F10 systems. It is anticipated that the next generation of Evolve electronics will eventually replace the NGL electronics for the F10 system; thus the name "Evolve F10." At this time, this installation manual reflects installation and tuning for the NGL electronics only.

This manual instructs in the planning, installation and configuration of the EVOLVE F10 System.

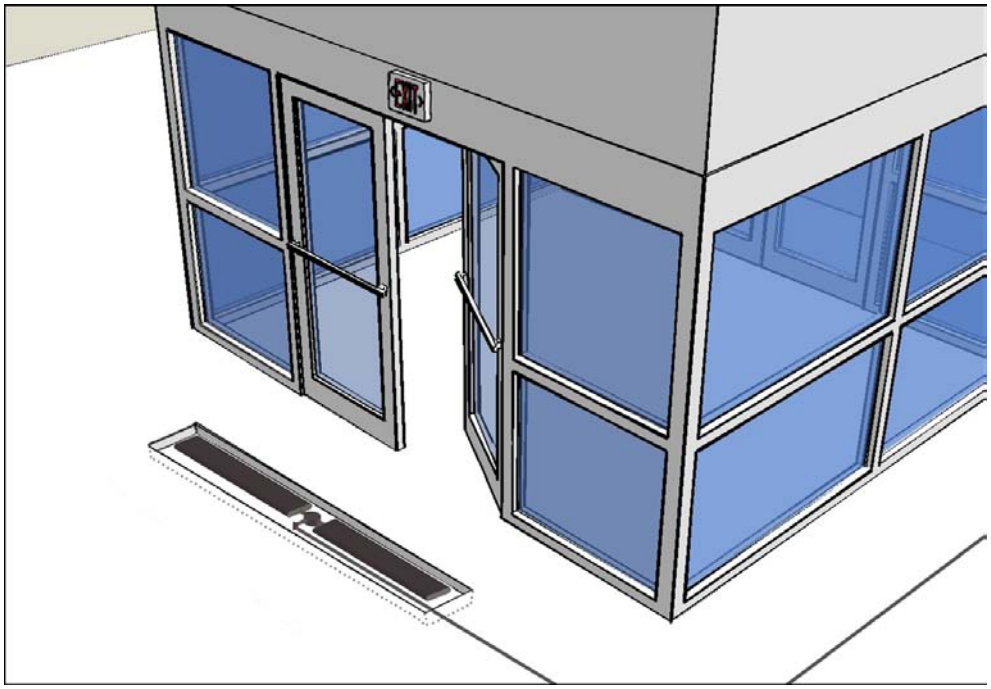


Figure 1.1 F10 System Introduction (F10, 2 meter installation shown)

Overview

This chapter explains F10 system hardware. This general information is useful for initial planning and training purposes.

1. **Hardware:** Shows hardware components including the antenna assembly and electronics.
2. **System Diagrams:** Shows overall design and component layout of the F10 system.

F10 System Hardware

The F10 system is designed to be installed in the floor and provide an invisible EAS system. The basic design is a 1 meter antenna assembly. Each antenna features multiple shielded coils. A single assembly or two (2) units can be connected to a single Impedance Matching Board.

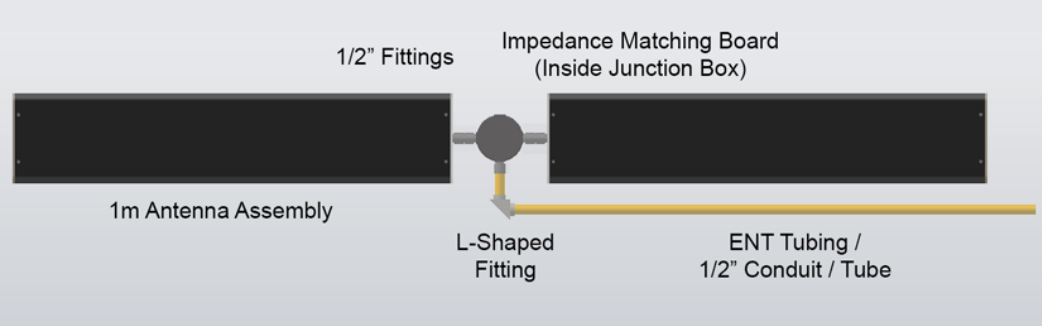


Figure 1.2 F10 Hardware

Figure 1.3 TR4215 Electronics Enclosure

The F10 system consists of a transceiver-based system using pulse/listen technology, allowing them to work in a single antenna configuration. In the same way that the NLG FX2012 system works, F10 antennas connect to a remote electronics enclosure via a coax cable.

The antenna is wired directly to an Impedance Matching Board, another component that is installed in the floor (i.e. buried along with the antenna). The Impedance Matching Board provides the link between the antenna wiring and coax cable that connects to the remotely located electronics enclosure. Typical EAS peripherals are able to be incorporated.

The electronics enclosure is designed to ensure proper ventilation in a non-condensing 0-40^{O}C environment. The wiring for the electronics system is a low-voltage, limited-energy system (operating at 24VDC or less). All wiring must conform to applicable wiring codes.

The F10, 2 meter kit includes one (1) Impedance Matching Board for connecting the two (2) antennas to a single Electronics Enclosure via two (2) coax cables routed through a single piece of conduit. The power supply unit (not shown) is the standard +24VDC unit (refer to Appendix A: Power Supply).

System Diagrams

The F10 system uses an antenna assembly comprised of wire coils wrapped around ferrite material tiles. Antennas are enclosed in PVC casings for strength and protection from environmental factors. Figures 1.4 and 1.5 show common installation coverage widths: 2m and 3m [6 and 9ft respectively].

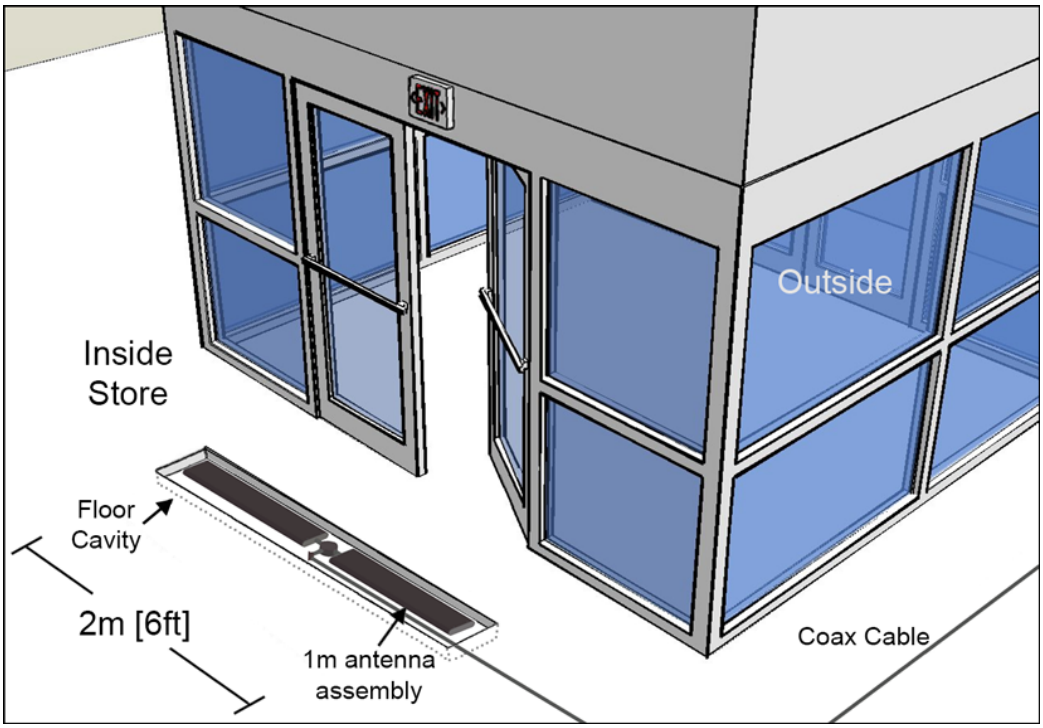


Figure 1.4 Typical F10, 2 Meter Installation

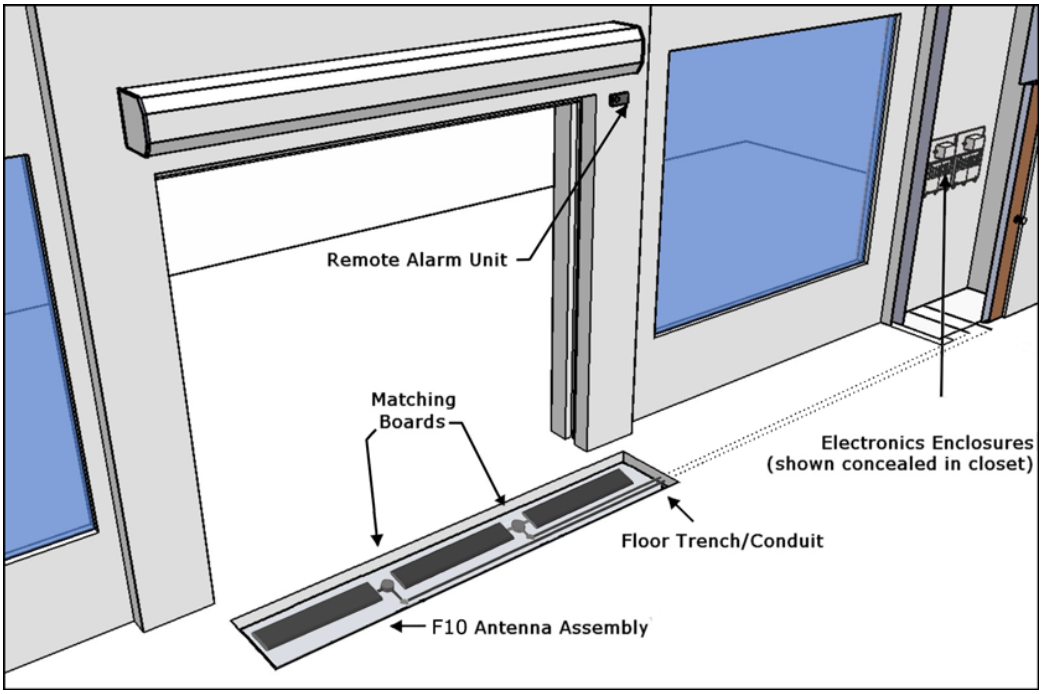


Figure 1.5 3m [9ft] Installation Layout with Component Names

Grouping Multiple Antennas

Larger aisles are able to be covered using a Sync configuration. Aisle widths of any 1m increment are possible. The 3m configuration features an F10, 2 meter system and a single 1 meter system. Similarly, the 5m layout features two (2) F10, 2 meter systems and the standard F10 antenna.

Multiple electronics enclosures and power supplies are required, in this case, and the system electronics must be configured for operation as a single unit. Refer to the "Wiring Between Systems for Sync" section.

Multiple floor trenches are cut with each length of ENT tubing (conduit) spaced 5.1 cm [2in] from the next closest to reduce RF interference.

Although grouping multiple installation kits together is possible, it requires approval from Checkpoint's Product Management. Feasibility is confirmed during the initial planning stage known as the "Site Survey." If the Site Survey was already performed and at present you are prepared with installation-specific details, please skip to Chapter 3: Physical Installation.

2 x 1 Meter Configuration

When necessary, two (2) standard F10, 1meter systems are connected to the same electronics enclosure in a 2 x 1 meter configuration. The common application of the F10, 2 x 1 meter configuration is in a grocery store or large department store. This setup allows EAS coverage of many store checkout aisles, as well as single-door entrance / exit layouts. Each 1m antenna assembly is fitted with a Matching Board. The layout minimizes the total number of electronics enclosures needed when multiple F10 systems are used.

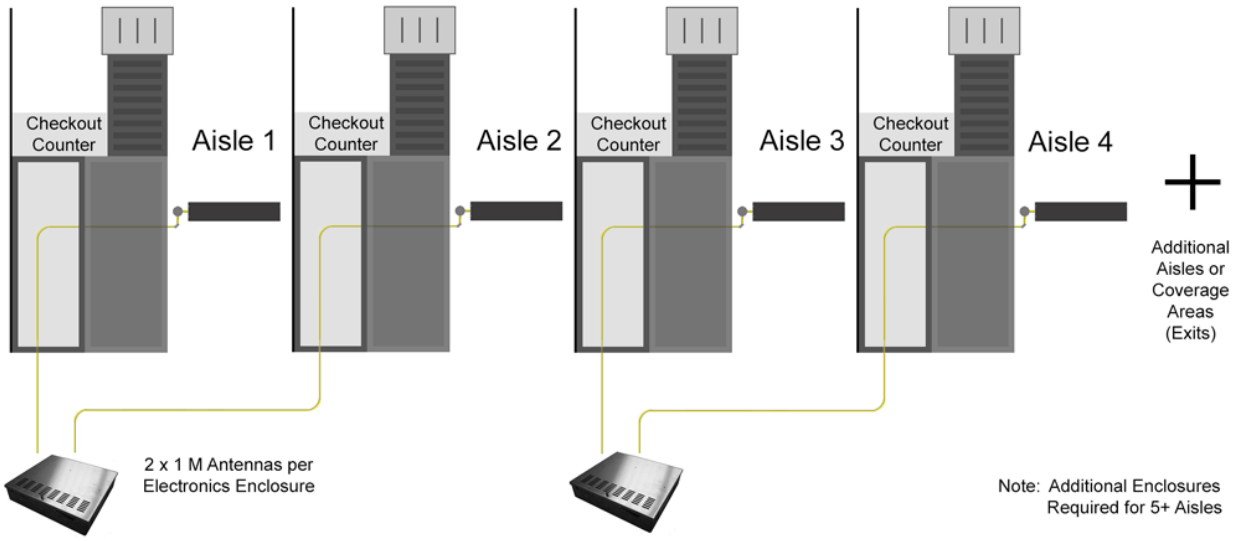


Figure 1.6 F10, 2 x 1 Meter System Diagram

CHAPTER

2

SITE SURVEY

Overview

Checkpoint Field Service personnel visit the location to perform a site survey before installation. The initial planning stage is the appropriate time to determine site suitability, where the antenna loops will be located (for maximum EAS protection) and the type of systems to be installed.

Antenna Distance from Interfering Elements

Nearby elements and underlying flooring materials may cause interfering effects. Therefore, antenna placement must be carefully evaluated *before* installation. Your goal is to identify a location where ambient noise and environmental factors do not degrade system performance.

For repeatability, all measurements are given at baseline (i.e. using a standard tag type).

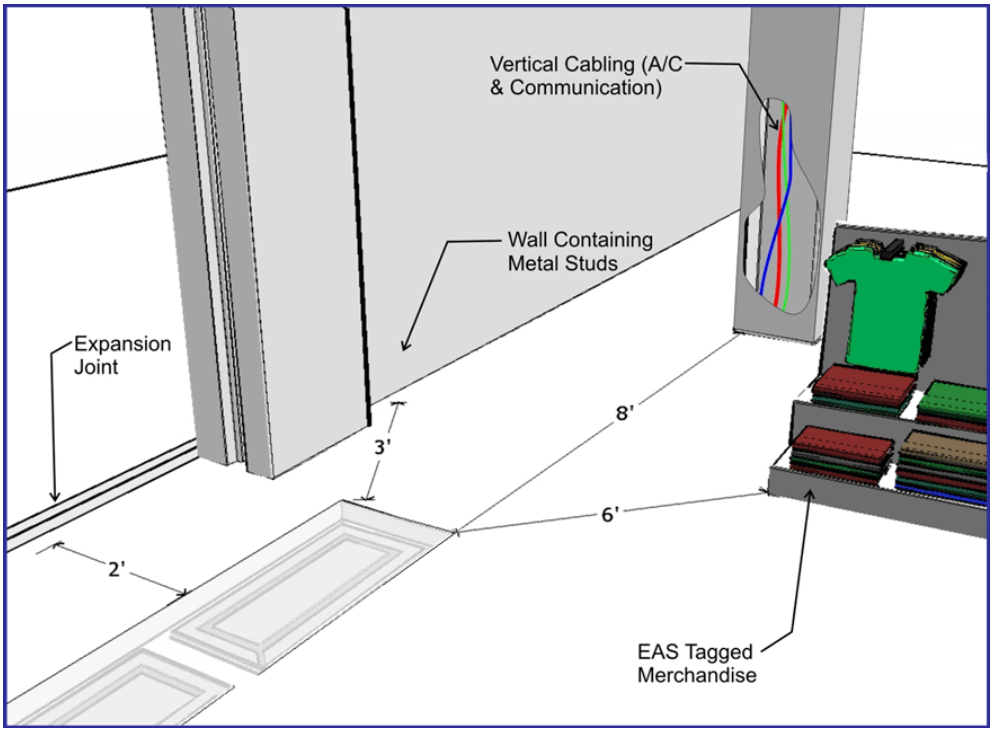


Figure 2.1 Distances from Interfering Elements

Common interfering elements and their minimum distances from F10 Antennas are listed below:

- **Expansion Joints:** The minimum distance from an expansion joint is **0.6 m [2 ft].**
- **Vertical Cabling:** The minimum distance from vertical cabling is **2.4 m [8 ft].**
- **Metal Wall Studs:** The minimum distance from a metal wall stud is **0.9 m [3 ft].**
- **Sliding Doors (Metal):** The minimum distance from a metal sliding door is **1.2 m [4 ft].**
- **Tagged Merchandise:** The minimum distance from tagged merchandise is **1.8 m [6 ft].**
- **Inward and Outward Swinging Doors (Metal):** The minimum distance from either a manual- or automatic-swinging metal door frame is **0.6 m [2 ft].**

Although this last type of door is not shown in the figure, the fact that swinging metal doors can swing *toward* the antenna loop must be taken into account (see below).

Note: The antenna must not be located below the door (or too near the door) when fully opened. Locate the F10 antenna components *beyond* the door – with a minimum clearance gap of 0.6m [24in].

Other Checkpoint equipment could interfere with the F10 system or vice se versa (refer to Appendix C: Interactions for recommended separation distances).

System Performance Considerations

Nearby wiring and lighting, as well as floor construction, may affect performance. With RF interference that is too severe and cannot be alleviated, the site may not be suitable for any installations.

The detection field is not uniform (refer to Appendix D: Detection Performance for diagrams). Each of the following alters F10 system performance:

- **Spacing** between the antenna and steel deck in the floor can affect performance, but it has been observed that an increase in detection can occur when the F10 system is placed on any metal flooring.
- **Floor structure** may cause detection variation for the F10 system.
- **Antenna configuration** will cause an expected (known) change in detection heights and a unique coverage pattern. Refer to Appendix D: Detection Performance for detail.
- **Signal strength** - The plots in the appendix have a defined height at **TX = 31** (the maximum). If TX is less than 31, detection heights will decrease.

Determining the Electronics Location

During the site survey, evaluate the store's layout to learn what options are available for locating the electronics enclosure and power supply. The electronics and power supply may be placed close together, although this is not required. Both units may be placed under a cashwrap counter, under shelving, above a drop ceiling (see special requirements), or in a utility closet.

The updated power supply can be installed in the plenum (i.e., above a drop ceiling or in HVAC areas), but this requires a conversion kit (refer to Appendix A: Power Supply for complete details). If necessary, the electronics enclosure can be located in the plenum – and as long as the power supply is located outside of the plenum – no conversion kit is required.

Note: Since the "Hood Kit" (CKP P/N: 7367100) must be ordered separately, determine whether or not one is needed now.

Caution: If using the conversion kit, the power supply must be installed by a licensed electrician.

Electronics Enclosure Placement Requirements

- Locate the electronics enclosure no further than 12.2m (40 linear-feet) or 15.2m (50 cable-feet) from the antenna(s) to allow for bends in the conduit run.
- If wall-mounting is ideal, mount the electronics enclosure approximately 1.8m [6ft] above the floor to reduce RF-interaction with wiring in either the ceiling or the floor.

Electronics mounted to the ceiling can potentially have a high RF-interaction with the surrounding environment (e.g., metal rafters or power cables), and therefore, may not perform optimally here. Observe locations of active noise sources including deactivators.

Environmental Considerations

F10 systems are only approved for indoor installations only. For a first floor (ground level) installation where the slab will be on grade (i.e., directly above the natural ground), we recommend the concrete be poured above a vapor barrier to prevent moisture from rising.

The store's architect will recommend the maximum permissible loading in the floor area where F10 antennas are physically installed. The architect must consider such factors as anticipated traffic over the floor and the material characteristics of the flooring (if covered by concrete).

The guidelines included in this guide assume installation into concrete (typical), but the antennas may be placed directly on concrete if flooring, such as finished hardwood, laminate, tile or stone, conceals the system below. If a wooden floor is placed on top of the system, the weight of the floor should not rest on the antenna(s). Moreover, with all installations, the concrete and other materials above the antenna(s) cannot be metallic. For example, wire mesh cannot be used for reinforcement above the concrete. Metallic walk-off mats should not be placed above the system.

Note: Tile grout and mortar used to fill antenna trenches MUST BE non-metallic and non-magnetic grout.

Another environmental consideration is a metal security gate. For installations where the drop down or sliding gate could cause a phantom alarming issue, a Badge Board II (CKP P/N 7528451) and a Gate Inhibit Switch (CKP P/N 7140188) should be installed. Discuss with Product Management and customers.

As for the electronics, typical indoor conditions must be met. Operating temperature is 0°C to +40°C [32° to 104°F]. Permissible humidity range is 10 to 75%.

Site Survey Conclusion

Overall, the site survey is an opportunity to gather details and share information required for the proper installation workflow. Before leaving the test site, the location of the electronics enclosure, floor cuts (trenches or “channels”), and/or conduit runs (see note) should be documented.

Using the information in the following chapter, draw up a plan with exact dimensions. In addition to floor cuts, the power outlet locations (or hardwire into electrical for plenum installation) should be planned. Coordinating with site contractors facilitates easier installation.

Note: For the F10 System, it is required that the coax cable is ran through ENT Tubing (conduit). Communicate with the contractor (and/or store personnel) before concrete has been poured. This crucial action will allow the coax cable to be easily routed through the conduit.

Caution: Ensure wire run does not exceed the maximum distance to the electronics’ planned location.

CHAPTER

3

PHYSICAL INSTALLATION

Chapter Outline

This chapter offers diagrams and lists steps for physical installation of the major system hardware:

1. **Requirements:** Lists the tool and part requirements for a typical installation.
2. **Installation Outline:** Lists all of the basic installation steps as a sequence.
3. **Cut Diagrams:** How to plan/make cuts for proper installation of the antenna assembly, Impedance matching board, and plan/route the wiring of the coax cable.
4. **Mounting the Electronics:** How to install the electronics enclosure and power supply.

Requirements

Tools

The following tools may be required for F10 system installations:

- Arrow T-25 Staple Gun
- Diagonal wire cutter
- Hammer drill with 3/16” and 1/2” bits
- Extension cord
- Tape Measure
- Hammer
- Marker, Black Felt
- Ratchet driver with 9/16” socket
- Screwdrivers: mini, regular and #2 Phillips
- Hacksaw
- Utility knife
- Wire Snake
- Wire Strippers
- Wrench, combination end 9/16”
- Checkpoint Systems Field Service Diagnostic Management Software (DMS version 1.8.31 or later version) installed on a laptop with the appropriate cables.

Parts

Quantity will vary according to system type.

- 18 AWG 2-conductor (STP) Power
- 22 AWG 4-conductor (STP) (5594) Sync
- PVC cement
- *DekDuct (wire chase)
- *Wiremold (1500 or 2600 series)
- *Wiremold anchor bolts

Note: *Wire routing methods will vary by installation.

Note: Complete parts lists with OEM Part Numbers are included in Appendix B: Part Lists.

Installation Outline

Follow this sequence to successfully install the components and validate system operation:

1. Determine optimal antenna placement:
   a. Perform a site survey now, or
   b. Use the results of a previous survey.
2. Determine power supply requirements and the ideal location for system electronics.
3. Physically install the antenna(s).
4. Route/connect the antenna (coax cable) and applicable wiring (sync, alarm, power).
5. Install the peripherals and wire the device(s) to the electronics enclosure.
6. Configure the system using DMS.
7. Perform system specific tuning (test jump positions).

Antenna Installation

Antenna installation and tuning is performed by trained Checkpoint personnel. You have already determined the system model(s) and number of assemblies for install, or you recently received this key information from a prior survey. If you are unsure of any specifics, contact Checkpoint Project Management. Install the antenna(s) in the proper location(s) discovered during the site survey.

During Construction

If the floor has not been poured yet, a pre-fabricated trough can be constructed. Refer to Figures 3.3 and 3.4. In the event of a new construction, please convey the following information to the site contractors (construction team's foreman) or the manager responsible for pouring the concrete:

- Location where antenna (s) will be placed; define a reference point (such as a door frame).
- The exact dimensions of antenna(s); provide the appropriate Floor Cut diagram(s).
- The depth, length and pathway of the 1/2" ENT Tubing (conduit), if installed ahead of time; depth of the trench for routing the cable is 3.8cm [1.5in] deep.

After Construction

For sites where floor cuts must be made, convey the following instructions to the installing technician. Communicate all known specifics to the installer, referring to the diagram(s). Be sure to convey plans and instructions for the correct system type. Only provide the floor layout(s) for required antenna configuration(s). If using a chisel, rough / uneven floor cuts may occur. Flatten the bottom surface on which the antenna rests with either leveling sand or a layer of concrete fill.

⚠ Caution: Prevent uneven stress on the fragile electronic components inside the assembly by ensuring the floor trough is smooth and level. Fill in uneven areas or gaps with leveling sand or concrete filler.

F10, 1 Meter and 2 Meter Floor Cuts

Installing the F10 antenna assembly in an existing store requires a trough to be cut in the floor. If the site is under construction, it is easier to mold the system into the floor (explained above). These diagrams include details on the size of the trough cuts required for each configuration.

✎ Note: Figures are Not Drawn to Scale

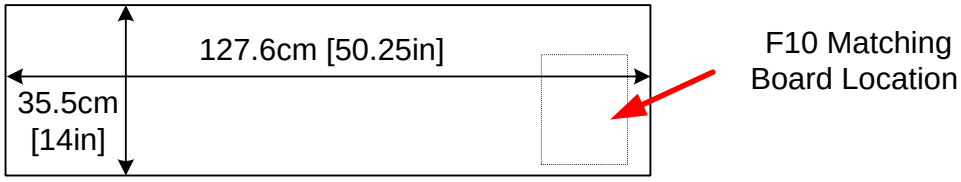


Figure 3.1 Top View of F10, 1 Meter Floor Cut

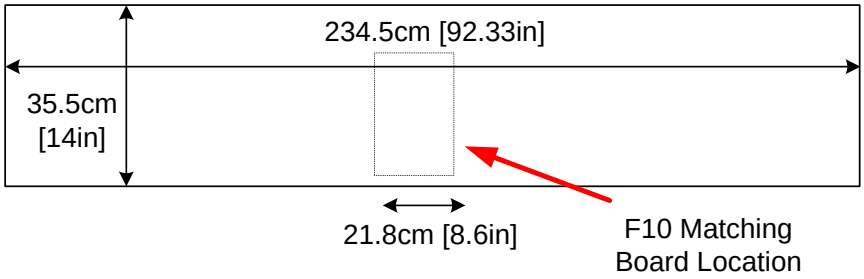


Figure 3.2 Top View of F10, 2 Meter Floor Cut

Figure 3.3 Trough for the 2 Meter assembly

Floor Cut Depth

F10, 1 meter and 2 meter Antennas are identical, so the trough's floor cut depth (height) is always consistent. Recommended depth is 7.6cm [3in] for optimum structural integrity. This allows approximately 3.75cm [1.5in] of concrete top fill covering each antenna (as shown in Figure 3.3).

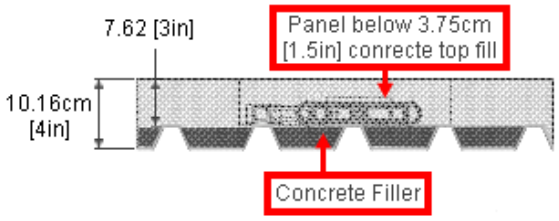


Figure 3.3 Side View of Trough

Figure 3.4 Antenna Installed (not buried until after testing)

In scenarios where the flooring does NOT physically allow such depth, it is acceptable to cover the antenna assembly with less than 1.5 inches of concrete fill. Although it is uncommon, when covering with tile or wood flooring, the system can be installed flush to the concrete's surface.

Figure 3.5 Flush Depth

Note: If installing in a location that violates the recommended 7.6cm [3in] depth specification, inform Checkpoint Project Management.

Common Wider Floor Cuts

It is possible to create a wider system by combing either of the smaller two floor kits (refer to Figures 3.1 and 3.2 above). For example, to cover a 3m mall opening, a 1m and 2m kit are ordered. Figure 3.6 below shows exact dimensions of the trough (floor cuts) when the F10, 1 meter and 2 meter systems are combined. Figure 3.7 shows two (2) F10, 2 meter systems installed side-by-side.

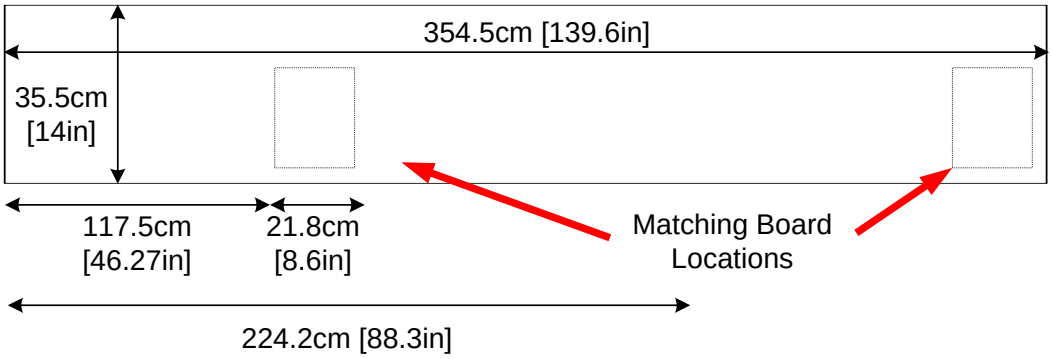


Figure 3.6 2m and 1m System for 3m Opening

Note: Figures are Not Drawn to Scale

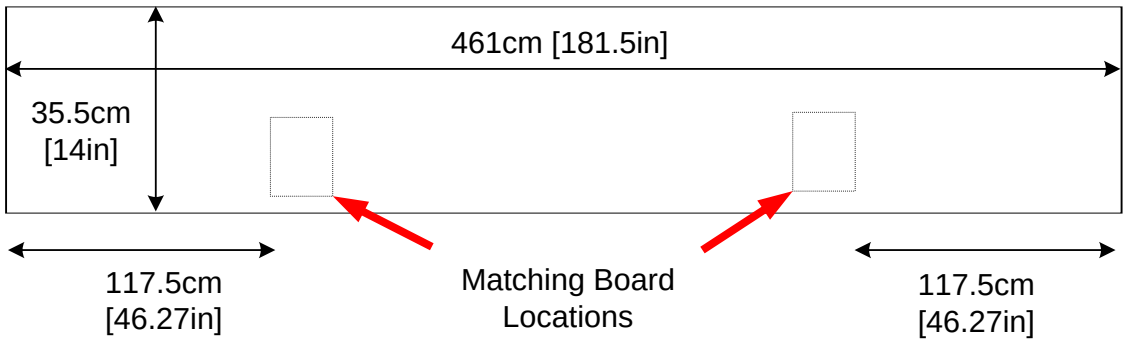


Figure 3.7 Side-by-Side 2m Systems for 4m Opening

Note: The Impedance Matching Board placement for the F10, 2 meter system is between the assemblies. For the F10, 1 meter system, board placement is beside the antenna assembly. The ENT Tubing (with coax cable) can be routed in any direction from antenna to electronics. A minimum spacing of 2" between the antenna and tubing is required.

Mounting the Electronics Enclosure

Detailed instructions for mounting the Electronics Enclosure are below. Before installing the enclosure, review the following requirements and if necessary, consult the Site Survey results.

It is suggested if the location is difficult to access, wire the system before mounting, but keep the power supply unplugged until finished wiring all peripherals and mounting the support brackets.

The electronics enclosure must be located no further than 12.2 linear-meters [40 linear-feet] from the antenna(s) to allow for bends in the 15.2 cable meters run [50 cable feet]. The enclosure, which weighs 5.17kg [11.4lbs], has keyhole slots at its edges to facilitate wall-mounting, but the enclosure must have 2.5cm [1 in] clearance on all sides. Do not mount the electronics enclosure beneath potential water sources (e.g. a sprinkler or pipe).

It is suggested to locate the enclosure directly above (or nearest to) the conduit's endpoint, so the length of exposed coax cable is minimal. Limiting exposed cable prevents RF interference, but do not cut the coax cable (refer to the "Placement" section in Chapter 4: Wiring).

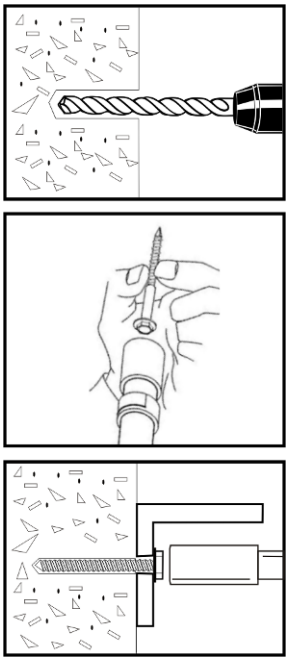
Using the included ENT Tubing (flexible conduit is supplied in the kit), route the cable from the matching board to the arrival point near the electronics enclosure.

Installation procedures are listed for each type of material on which the enclosure can be installed:

- ***Wood Surface***,
- ***Drywall***, and
- ***Concrete.***

Wood Surface Installation

For mounting to wood, use a #7 x ½" (0.38cm x 1.3cm) hex head screw (CKP P/N 7939172).



1. Using the proper diameter bit, drill a hole into the base material to a depth of at least 0.6cm [1/4"] deeper than the embedment required. Blow the hole clean of dust and other material.

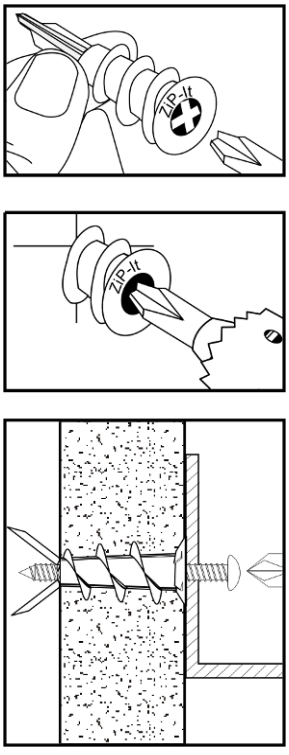
2. Select the installation tool and drive socket to be used. Insert the head of the screw into the hex head socket driver.

3. Place the point of the screw through the fixture into the pre-drilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment.

Figure 3.8 Wood Surface Installation

Drywall Surface Installation

For mounting to drywall, use a #8 x 1" (0.42cm x 2.5cm) panhead screw (CKP P/N 7308823), which is a Power Fastener Zip-it (P/N 02348).



1. Insert either # 2 or # 3 Phillips driver bit into the recess of the ZiP-It anchor head. Use a manual screwdriver or a low-rpm battery-powered electric screw gun.

2. Push the ZiP-It anchor into the surface of the wallboard until the two cutting blades penetrate the surface. Using gentle forward pressure, rotate the ZiP-It until the collar sets flush to the surface of the wall.

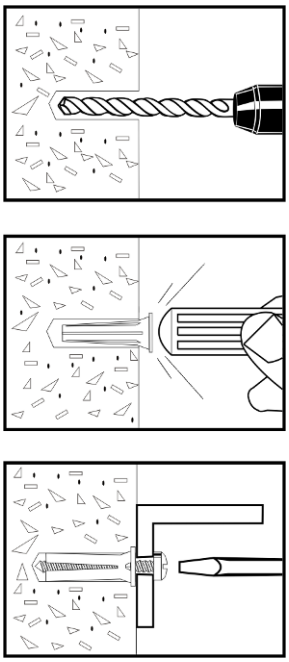
3. Put the fixture in place, insert screw and tighten until it feels secure. As the screw is threaded into the nylon versions, the point will expand resulting in increased load capacity in thicker wallboard.

   Note: When using an electric screw gun for application, set clutch and use a slow speed (do not exceed approximately 300-400 RPM).

Figure 3.9 Drywall Installation

Concrete Surface Installation

For mounting to concrete, use a 5/16” lead anchor and a #12 x 1 ½” panhead screw (CKP P/N 366291). Lead anchor (0.79cm) is a Power Fastener (P/N 09439). Screw is 0.55cm x 3.8cm.



1. Drill a hole into the base material to the depth required. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.

2. Blow the hole clean of dust and other material. Insert the anchor into the hole until the flange is seated flush with the surface of the base material.

3. Position the fixture. Insert the screw tip through the fixture into the anchor and tighten.

Figure 3.10 Concrete Installation

Mounting the Power Supply

The power supply should be mounted near the electronics enclosure, or in a remote location, when available space is limited. If the power supply is installed above a drop ceiling, the Conversion Kit is required (see below). For the unit’s weight and dimensions, refer to Appendix A: Power Supply.

GS-599ES(R) Installation

Hold the unit in place and mark the screw hole locations. Secure the power supply in its location in the same manner as before (refer to the “Mounting the Electronics Enclosure” section).

GS-599MC-KIT(R) Installation

Refer to Appendix A: GS-599MC-KIT(R) for the complete hood kit instructions.

Finishing Installation

Wiring the electronics, and configuring and tuning the antennas must occur before finishing the physical installation. Proceed to Chapters 4, 5 and 6, complete the setup and validation, and then return to this section when ready to finish the physical installation.

Filling Trenches

The floor cuts or cavities are filled with concrete mortar, grout, and/or sealants during this final step, ensuring the antenna locations are not visible. It is crucial that the grout be non-metallic and non-magnetic. Occasionally (F10 system below wooden flooring), the antenna system is not covered by Checkpoint personnel, as it will later be covered with flooring. Protect, as necessary.

The F10 system has been tested and is approved to be used with the following concrete repair mortars and mixes:

1. Ardex TRM – Transportation Repair Mortar

2. QUIKRETE® Concrete Mix (No. 1101)

3. QUIKRETE® Fast-Setting Concrete Mix (No. 1004)

Note: Detection performance of the system may be temporarily affected by the water content in the repair mortar. As the mortar mix cures, detection performance improves.

CHAPTER

4

WIRING

Overview

This chapter instructs on the wiring of the entire floor system. There is a progression from the antenna to the electronics enclosure and common peripherals. Chapter 4: Wiring concludes with the DC power supply connections and system sync (optional) wiring schemes for multi-antenna configurations (i.e., when two or more electronics enclosures are synced – to operate as a unit).

⚠ CAUTION: This system uses TR4215[†] electronics with firmware version 4.00 or higher. It is critical to note that only TR4215 electronics can be used in conjunction with this system.

DMS version 1.8.31 or later must be used to configure the system after wiring is complete (refer to Chapter 5: F10 System Configuration via DMS).

The outline below is a sequence of the F10, 1 and 2 meter system wiring procedures:

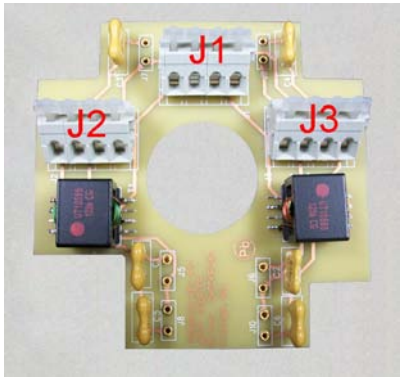
1. Antenna Wiring
    a. Components and Placement
    b. Wiring the F10, 1 and 2 meter Antennas to the Impedance Matching Board
2. Electronics Chassis
    a. Coax cable Wiring to the Coax Adapter Board
    b. Remote Voice Alarm Group Wiring
    c. Alarm Post Wiring
    d. DC Power Supply Wiring
    e. Sync Cable and Power Wiring

Antenna Wiring

Wiring Components

The components involved in Antenna Wiring and Coax Cable routing are shown below.

Note: The Impedance Matching Board (right) only fits in the junction box in one position. Do NOT it force into place.



Placement

Unpack the antenna(s). Each antenna has four (4) colored wires that stick out from an end.

1. Apply the rubber o-ring over the threads of the ½" inch male fitting. Do NOT apply PVC cement. Feed the antenna wires through the male fitting, then tighten. Screw one (1) fitting in per antenna until rubber o-ring is compressed.
2. Position the antenna(s) in the floor trough, carefully lowering each into place.
3. Install the 1/2" ENT tubing (conduit). The tubing must cover the entire coax cable run from the electronics to the antennas. Cut the tubing as required.

4. Route the coax cable from the Electronics Enclosure to the floor trough. Do not cut the cable yet, but note that excess will be removed after the true length is determined.

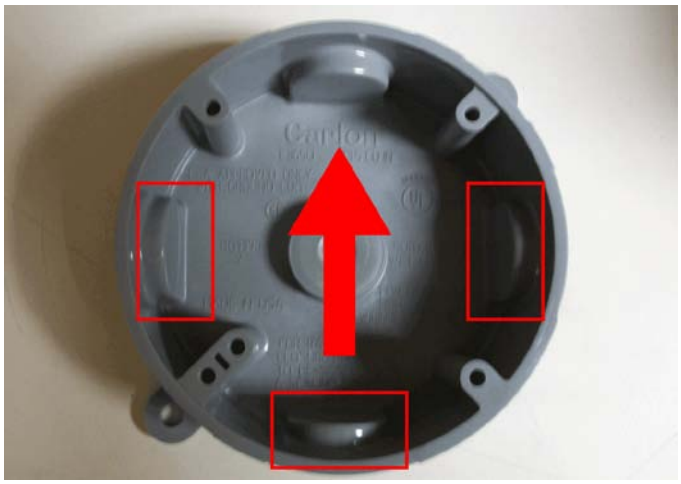
⚠ Caution: Cable must not be cut shorter than 30'.

5. Unpack the remaining system components including the Junction Box, lid, Impedance Matching Board, PVC fittings and ferrite cores.

Wiring the F10, 2 Meter System

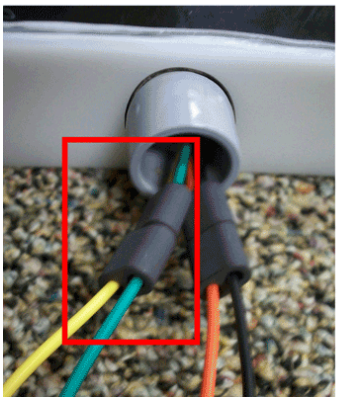
Perform the following to wire the F10, 2 meter system to the Impedance Matching Board.

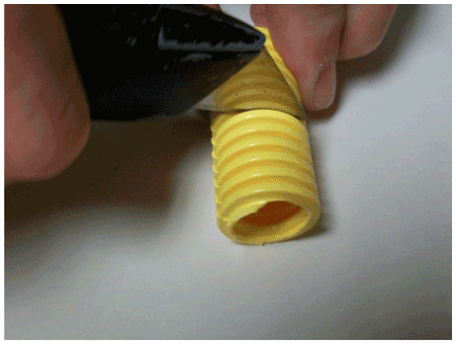
1. Identify the "top" of the Junction Box (with the Carlon® logo facing up) and position the box as shown. Remove the left, right and bottom knockouts from the Junction Box. Use a hammer and a large screwdriver as shown.



⚠ Caution: Ensure the correct knockouts (3 sides shown) are removed for the 2 meter system (only 2 for 1 meter system). Since the 2 meter uses both TX1 and TX2 sets of input connectors, set up is different.

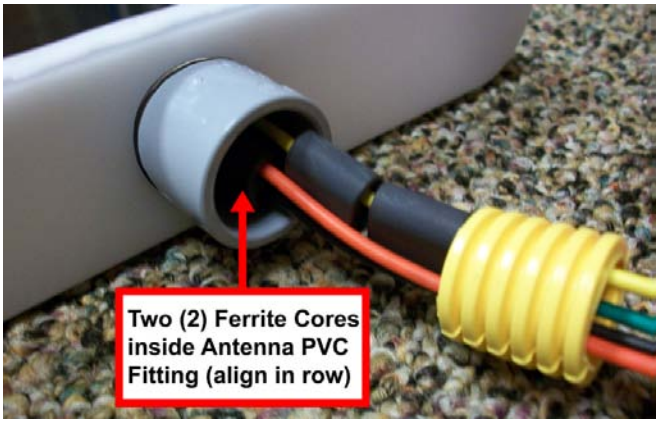
2. Apply the rubber o-ring over the threads of the ½" inch male fitting. Do NOT apply PVC cement. Screw the fitting into the opening where the knockout was located until rubber o-ring is compressed. Repeat for the other locations; tighten three (3) fittings in total.
3. Identify the colored antennas wires. Twist together loose strands of any frayed wire.
4. Select any four (4) small ferrite cores (CKP P/N 7221412).
5. Group the Yellow and Green wires together. Thread each individual lead through the same opening in each of two (2) Ferrite cores. Repeat for the set of Red and Black wires as shown.
6. Using a utility knife (shown at far right), cut two (2) pieces of conduit with six (6) rings for each (approximately 2.54cm [1in] in length). Cut a third piece approx. 7.5cm [3in] long. This section connects at the L-shaped fitting (see Step 10).





7. Align the four (4) ferrite cores in a row; they fit when staggered (i.e., positioned end-to-end). Thread the antenna wires through the piece of conduit. Push two (2) of the Ferrite cores into the antenna fitting. Apply PVC cement to the outside surface of the tubing, then push hard on the tubing, securing it to the antenna fitting.

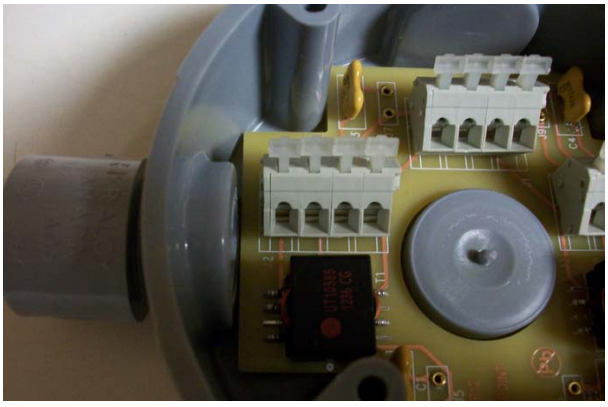
Note: Follow PVC cement instructions for proper surface preparation and use.



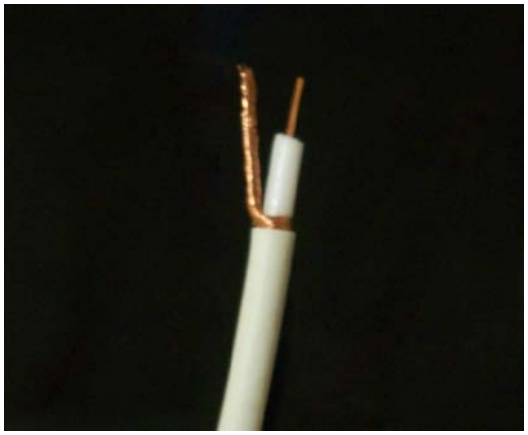
8. Apply PVC cement to the exposed piece of tubing. While holding the antenna in place, push the Junction Box in until the fittings touch and form a tight seal.

9. Repeat this process for the other 1m antenna assembly. Refer to Steps 3 - 4 and 6 - 8.

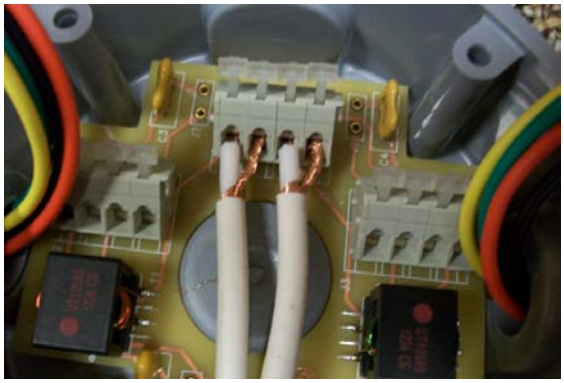
Note: The four (4) antenna wires are later attached to the left side connector shown below. Attach the coax cables first to provide better access and ensure no wires come loose.



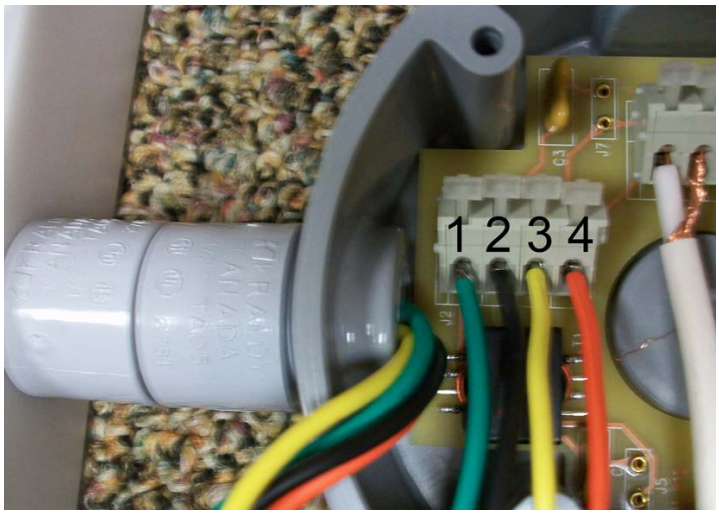
10. Route the coax cable through the L-shaped fitting and 3 inch piece Tubing (cut to length). After antenna placement is finalized, apply PVC cement and secure the section of Tubing.
11. To prepare the coax cable, strip the outer insulator, then twist the conductor into a wire lead.



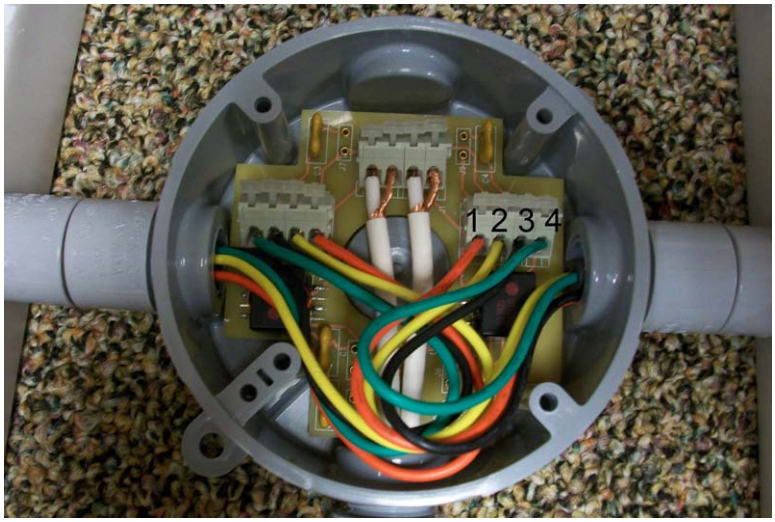
12. Next, cut the inner insulator flush with the outer and strip ¼ inch of the sheathing around the inner conductor (above right). Ensure that conductors are short enough to prevent touching.
13. Using a small screwdriver, gently hold the connectors open and then insert the coax wire leads. Repeat for the second coax cable. Ensure that both inner and outer conductors match.



14. Make the antenna wiring connections to the matching board as shown (or refer to Table 4.1).



15. The right side antenna is wired in reverse. Red connects to pin 1, yellow to pin 2, etc.



Side	Pin Number	Antenna Wiring
Antenna 1 (Left)	J2-1	**Green**
	J2-2	**Black**
	J2-3	**Yellow**
	J2-4	**Red**
Antenna 2 (Right)	J2-1	**Red**
	J2-2	**Yellow**
	J2-3	**Black**
	J2-4	**Green**

Table 4.1 F20 Antenna Wire Pinout

16. Verify the correct pin-out using the above table.

Note: Before closing the lid, it is necessary to first evaluate system performance. Refer to Evaluate Jumper Positions.

17. Ensure that all the connections are secure (gently pull on the leads at the connection point to the circuit board). Carefully position the wires inside, then close the Junction Box lid (tighten all 4 screws). Be careful not to tear or twist the foam gasket on the lid when tightening the screws.

Note: In instances where multiple electronics and coax cables are used, ensure that floor trenches or conduits are spaced 5cm [approx. 2in] apart.

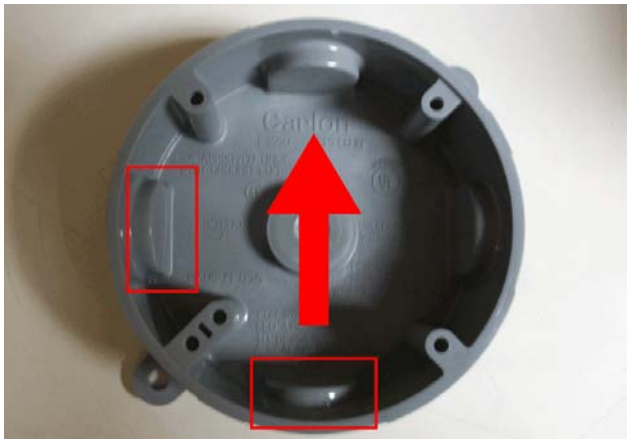
Wiring the F10, 1 Meter System

The procedure for wiring the F10, 1 meter system is consistent with the 2 meter procedure with two (2) important differences. First, preparing the junction box; second, wiring the matching board.

- Instead of three (3) of the knockouts being removed, only two (2) are removed (see below)
- Antenna wiring is different; only one (1) coax cable is utilized, however, both connectors (left and right) on the Impedance Matching Board are used (see Table 4.2 for F10 system).

Varied Procedure Steps

1. Identify the "top" of the Junction Box (with the Carlon® logo facing up) and position the box as shown. Instead of removing both sides, remove ONLY one (1) knockout from the Junction Box (side closer to antenna) and the bottom knockout. Use a hammer and a large screwdriver.



Note: You may remove the left or right, but ONLY one (1) side knockout is removed.

2. Only one (1) small piece of conduit needs to be cut.
3. Perform Steps 2 – 10, but skip Step 8 and unnecessary actions (related to the second antenna).
4. Prepare one (1) coax cable for the 1 meter system. Wire the coax cable leads to Pins 1 and 2 (left side) on the top connector.
5. Connect the antenna wires according to Table 4.2 below.

Side	Pin Number	Antenna Wiring
Antenna 1 (Left)	**J2-1**	**Green**
	J2-2	N/A
	J2-3	**Yellow**
	J2-4	N/A
Antenna 1 (Right)	**J3-1**	**Black**
	J3-2	N/A
	J3-3	**Red**
	J3-4	N/A

Table 4.2 F10 Antenna Wire Pinout

Adjusting Jumper Settings

The default jumper settings for the F10, 2 meter system are OUT for J5 - J10.

The settings are adjusted for the F10, 1 meter system. Insert the red J5 and J6 jumpers.

Note: Later on, after the system is initially configured, each of the jumper positions are tested in order to optimize the tuning of the F10 antenna. Refer to Evaluate Jumper Positions and complete the test.

Wiring the 2 x 1 Meter System

For the 2 x 1 meter configuration, the wiring to each antenna is consistent with the F10, 1 meter procedure. The main difference is there are two (2) coax cables routed to the electronics enclosure. Route each coax cable separately through two different pieces of ENT Tubing. The lengths of coax cable are connected to the two (2) male connectors on the A1116 Coax Adapter Board.

Note: In instances where multiple electronics and coax cables are used, ensure that floor trenches or conduits are spaced 5cm [approx. 2in] apart.

Overview

Electronic interfaces / connections to the TR4215 reader board are shown below. This section describes how to wire all cables and make the appropriate connections at the Electronics Enclosure.

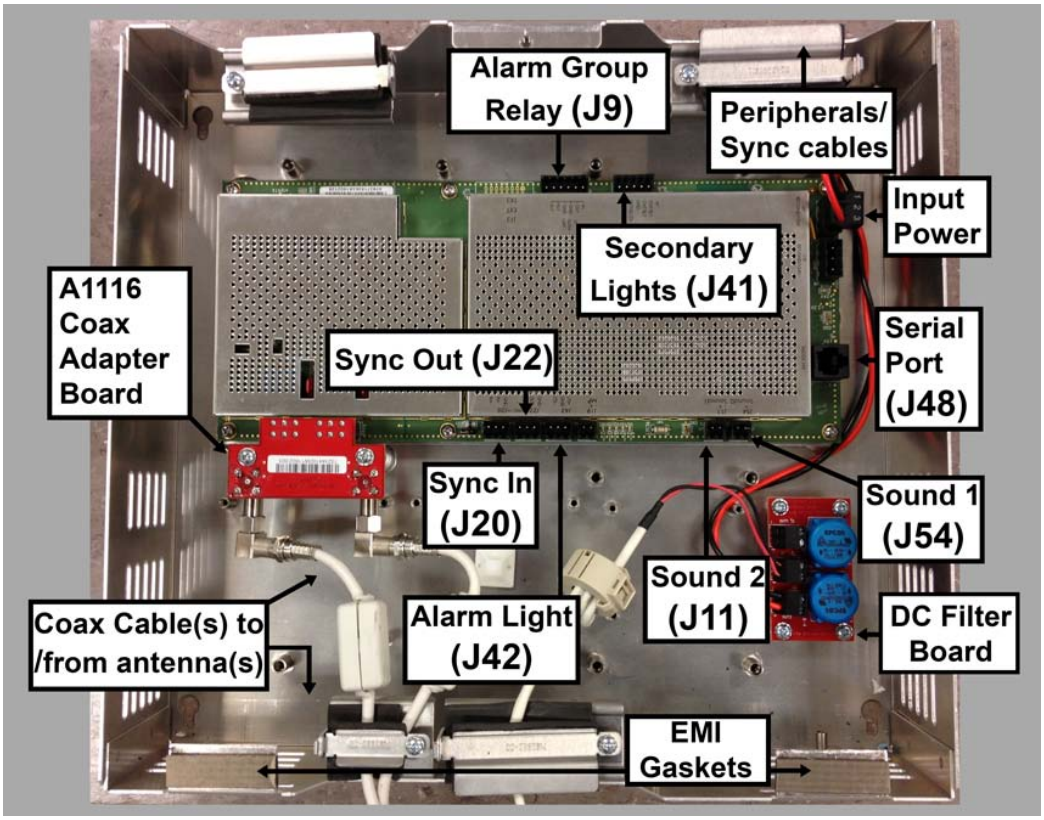
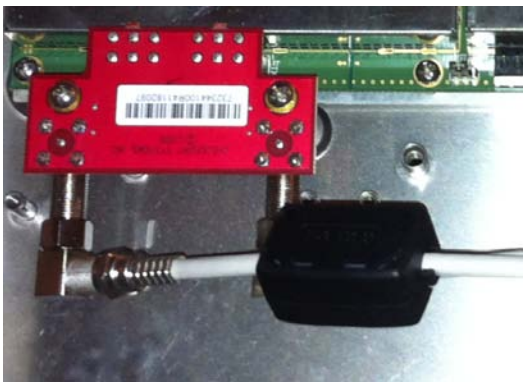


Figure 4.1 TR4215 Board with all interfaces labeled

Coax Cable / A1116 Wiring

The A1116 Coax Adapter Board connects to the F10 antenna via 15m [50ft] coax cable(s).

1. Connect the coax cable to the A1116 adapter board, then clip the Ferrite core (CKP P/N 7784420) over the cable(s).



Note: Ensure that the two (2) output jumpers are in the Remote Position. J37 and J38 on the TR4215 board are located just above the A1116 Adapter Board.

Remote Voice Alarm

1. Connect the remote voice alarm wiring as shown below (or refer to Table 4.3).

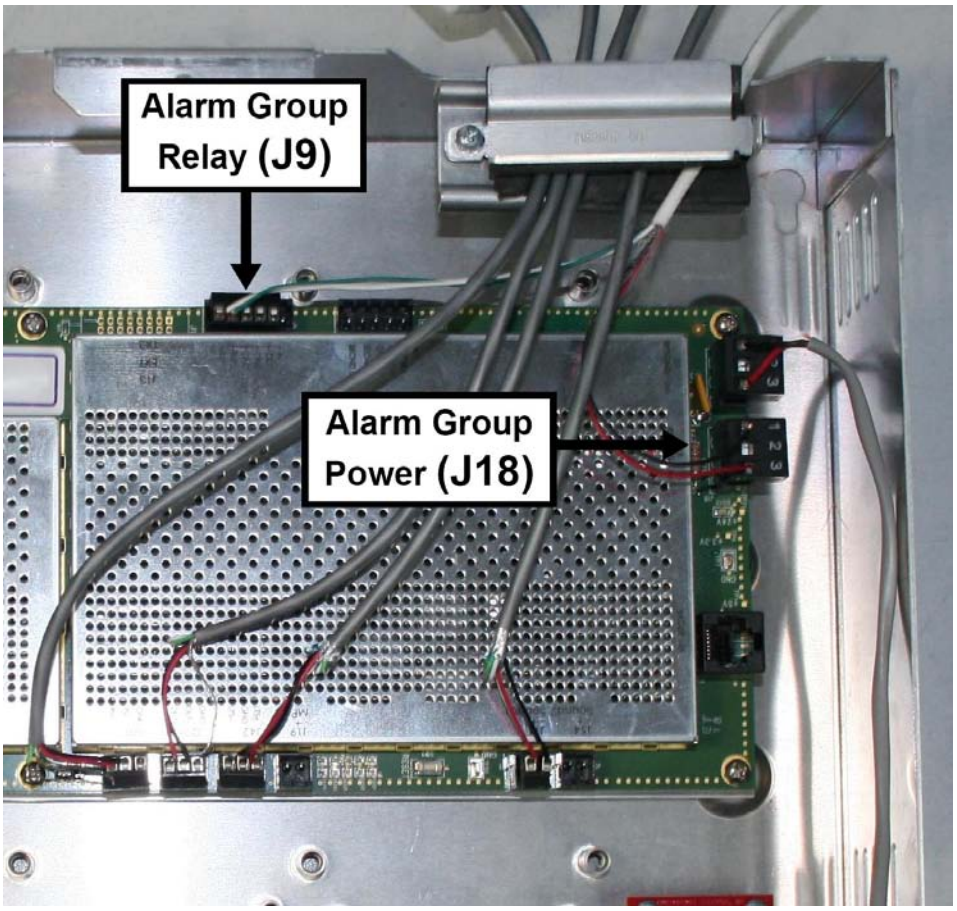


Figure 4.2 Electronics Wiring: Alarm Group Relay

Note: Sync connections are shown. Not all systems will be synced.

Remote Voice Alarm / Alarm Counter	
Wire Color	**TR4215 Connections**
WHITE (RLY)	J9-5
GREEN (RLY)	J9-6
RED (+24V DC)	J18-3
BLACK (Ground)	J18-1

Table 4.3 Alarm Group Wiring Connections

2. Install the device and complete wiring at the peripheral device(s).
   Refer to the peripheral's Installation Instructions.

Alarm Post Wiring

1. Connect the alarm post wiring as shown below (or refer to Table 4.4).

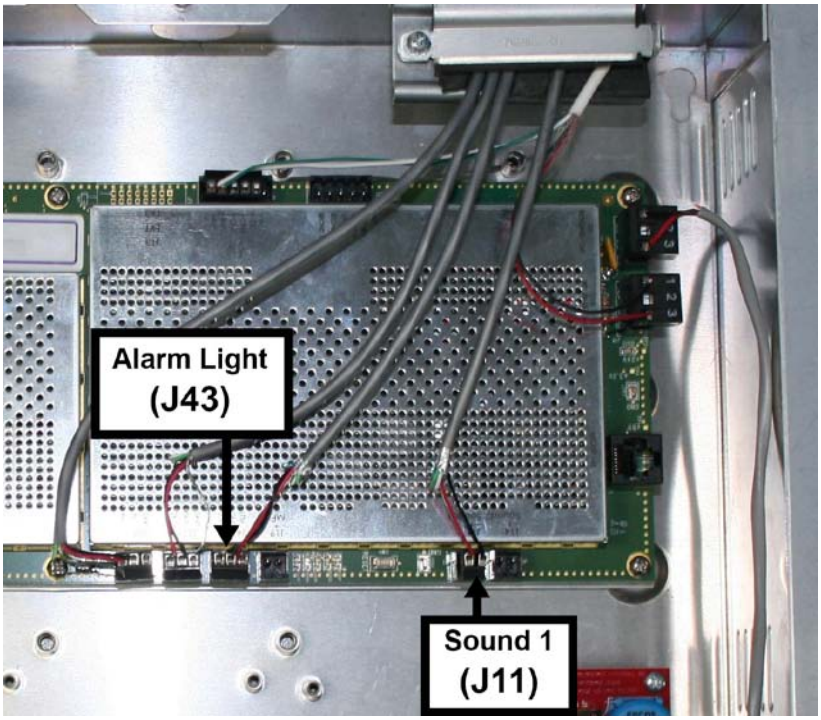


Figure 4.3 Alarm Post and Sound Wiring

Note: Sync connections are shown. Not all systems will be synced.

2. Install the device and complete wiring at the peripheral device(s).
   Refer to the peripheral's Installation Instructions.

Alarm Post Wiring	
Wire Color	**TR4215 Connections**
RED (Light +)	J43
BLACK (Light –)	J43
RED (Sounder +)	J11
BLACK (Sounder –)	J11

Table 4.4 Alarm Post Wiring Connections

24VDC Power Supply Wiring

Below are instructions for wiring the 24VDC power supply to the TR4215 board's DC Input Filter.

1. Cut the MC Armored cable (or generic AWG18 plenum-rated power cable) to length.
2. Strip the 2 (two) leads exposing about 0.6 cm [0.25 in] of the conductors.
3. Apply a Ferrite Core (CKP P/N 7284760) on the power wire near the DC Filter board; complete 3 loops.
4. Apply the Ferrite Core (CKP P/N 7284760) to the AC power cord.

Figure 14.4 AC Power Cord Ferrite

5. Connect the leads to the DC inputs as shown (or refer to Table 5.5 below).

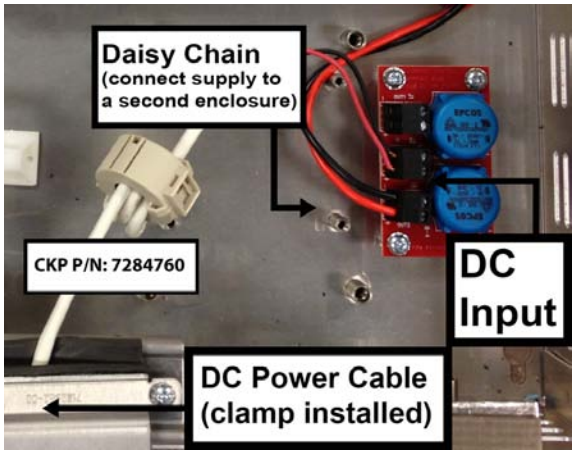


Figure 4.5 Power Supply connections (for a Single-Antenna System)

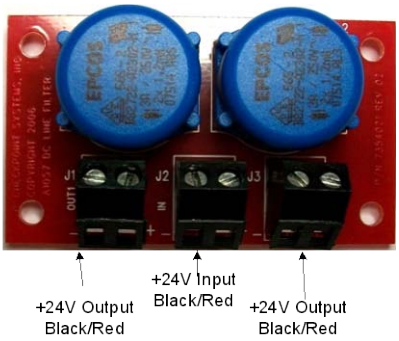


Figure 4.6 DC Power Filter (Parallel outputs on left and right)

Wire Color	Description
Black	GND
Red	+24 V

Table 4.5: Power Cable Wiring Connections

Wiring Between F10 Systems for Sync

Where multiple-antennas are installed, a secondary electronics enclosure is connected to a primary via a sync cable. The RF Sync cable is installed prior to configuration. Use 22 AWG 4-conductor (STP) (5594) cable for sync cable. Parallel or "Daisy Chain" wiring configuration allows a single power supply to operate both units. Use 18AWG plenum-rated cable for the power connection.

⚠ Caution: If there are more than two (2) electronics enclosures, additional power supplies are required.

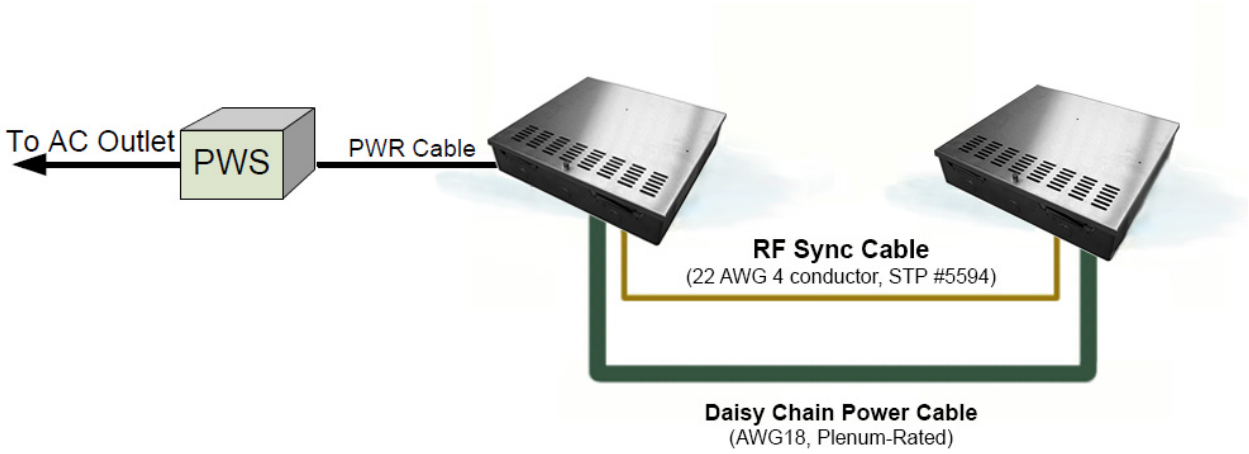
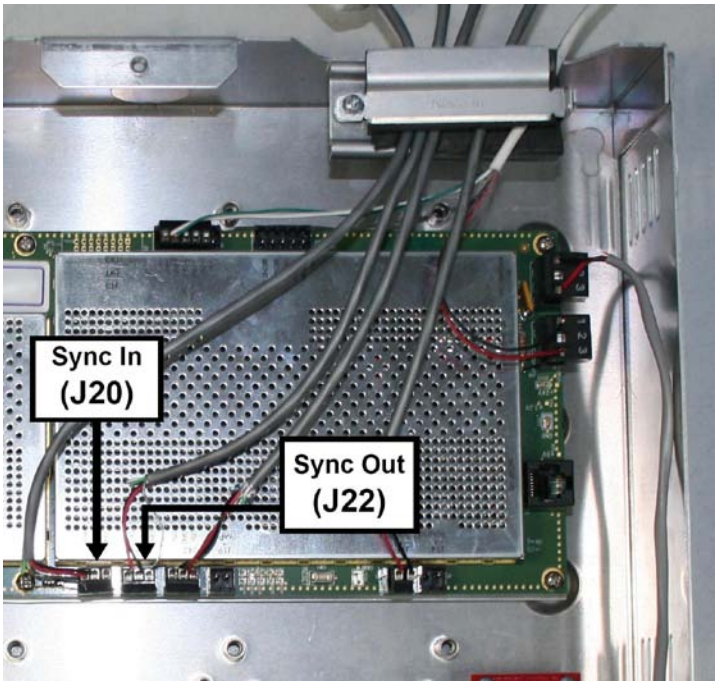


Figure 4.7 Multi-Antenna Systems

Sync Cable and Power Supply Wiring

1. Connect the Sync output cable to terminal (J22) to Sync Input terminal (J20) on the secondary electronics unit.

Figure 4.8 Sync In / Out Terminals



✎ Note: This would be a combined system (with both IN and OUT connections made).

Sync Input/Output Connections		
Wire Color	**Description**	**TR4215 Connections**
White	SYNC -	J20/J22-1
Green	SYNC +	J20/J22-2
Black & Drain	GND	J20/J22-3

Table 4.6 Sync Input/Output Wiring Connections

2. Prepare the short length of power cable and connect via Daisy Chain to the second electronics enclosure's DC +24V Input. Use MC Armored or generic AWG18 plenum-rated power cable.

Wiring peripherals

Use the appropriate installation manual for wiring to the peripheral devices.

For wiring and configuring the Wireless Voice Alarm, refer to the Installation Instructions:

EAS Audible Alarm/Alarm Counter (CKP P/N 7186802)

For hardwiring the EAS Voice Alarm/Counter peripheral, refer to Section 3.1, "Wiring the liberty PX," of the Installation Instructions (CKP P/N 7226881).

CHAPTER

5

F10 SYSTEM CONFIGURATION VIA DMS

Overview

This chapter reviews the configuration steps for the F10 system using DMS. There are slight differences between the 1m and 2m systems. Antenna tuning is covered in Chapter 6: F10 Tuning. Please follow the tuning guide to optimize system performance after configuring the F10 system.

Note: Please use DMS version 1.8.31 or later. TR4215 firmware version must be 4.00 or later.

System Setup Using DMS

The DMS setup procedure varies between the two overall system configurations:

- Single-Electronics System (i.e. only one or two antenna assemblies) and
- Multi-Electronics System (more than two antennas must be synced when less than 12m [40ft] apart).

Note: 12m [40ft] is the minimum distance where a sync cable is not required between two (2) separate single-electronics systems, but this should be taken on a case by case basis. See Appendix C for minimum distances to avoid interactions.

The instructions below emphasize which parameters should be setup for the TR4215 board. In either case, setup is similar but an extra step is needed for Multi-Antenna configuration. A basic knowledge of the DMS tool is assumed.

Note: Refer to the Field Service Diagnostic Management User's Guide for general help using the DMS tool.

Single-Electronic System Setup

The basic setup process consists of following steps:

1. Make a new DMS connection.
2. Configure the electronic(s) for Detector mode.
3. Set up alarm responses based on customer needs.

Make a New DMS Connection

1. Connect the service PC laptop to the J48 serial port on the TR4215 board.
2. Launch the DMS program (version 1.8.31 or later) and enter your login information.
3. Make a new Connection for connecting to the TR4215 board. Be sure to select "*(Direct) Serial*" for the Type and "*Evolve*" as the Device.

   Unlike previous Liberty Systems, NGL does not use the "*TR4024/26*" Device Connection. Figure 5-1 shows the "Add Connection" window with the appropriate NGL settings.

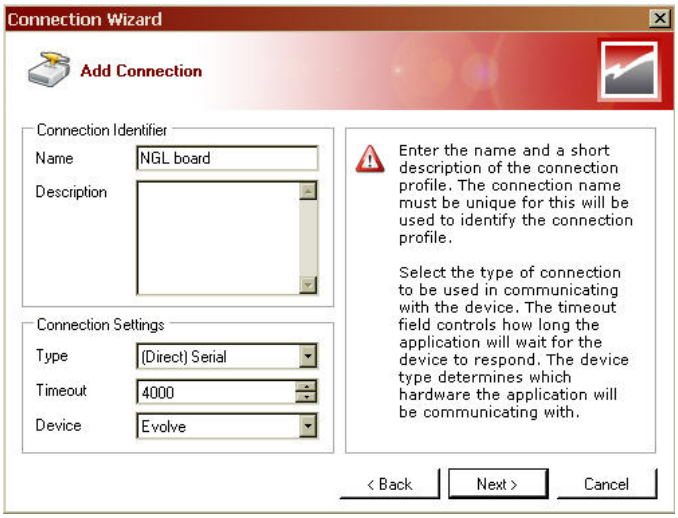


Figure 5.1 New Connection Setup

4. Click **Next**, a serial port selection window appears. Fill in the COM port parameters and then click **Next.** The final connection summary window appears.
5. Click **Finish** to complete the new connection setup. A new icon titled "NGL board" appears in the DMS Connections window (shown in Figure 5-2).

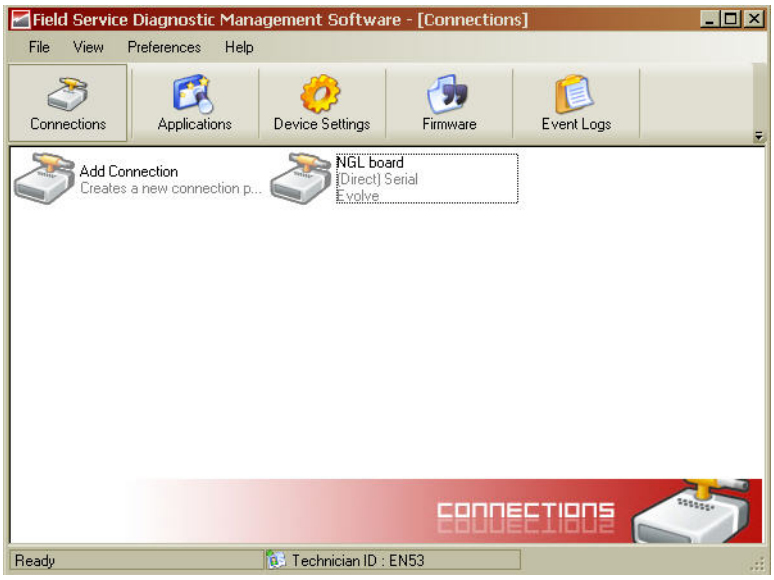


Figure 5.2 NGL board Added as a New Connection

Configure to ECO Mode

1. Using the DMS tool, connect to the TR4215 board. Figure 5-3 shows the opening screen with the Network view expanded to show all devices.

Figure 5.3 DMS Network and Task Manager View

2. Navigate to the **Switch Settings** window (click **Configure Settings**, shown above).
3. Under the **Detection** Tab, fill in the following parameters:

- *RF Group Address*: choose an Address between 1 and 6. The address should match any other reader.
- *Sync Mode*: set to "ECO Mode" for the F10, 1 meter system or 2 x 1m system. For the 2 meter system, set the sync mode to “Detector” or “Primary Non ECO.”
- *TX Control*: set to Enabled, Mode 2.

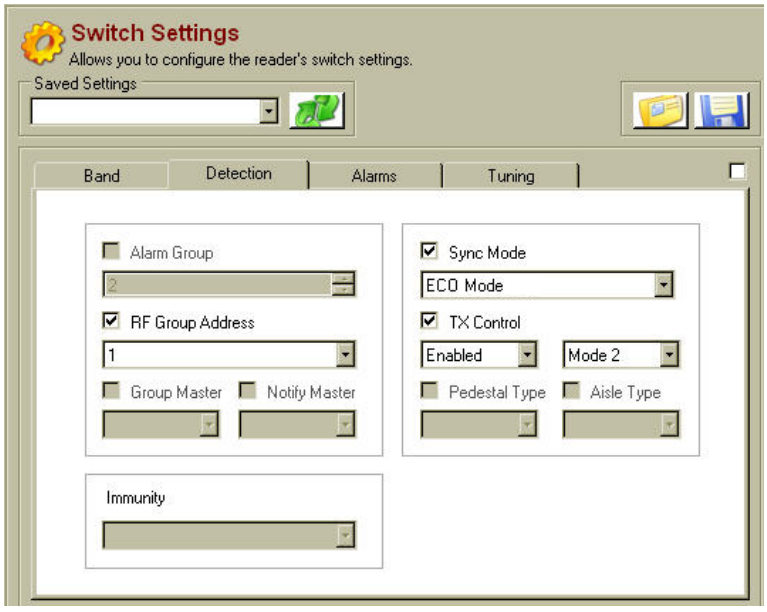


Figure 5.4 Detection Tab, Switch Setting Parameters

4. Click **Apply**.
5. Under the **Tuning** Tab, fill in the following parameters:
    - *Sampling Holdoff*: Set to **13**.
6. Click **Apply**.

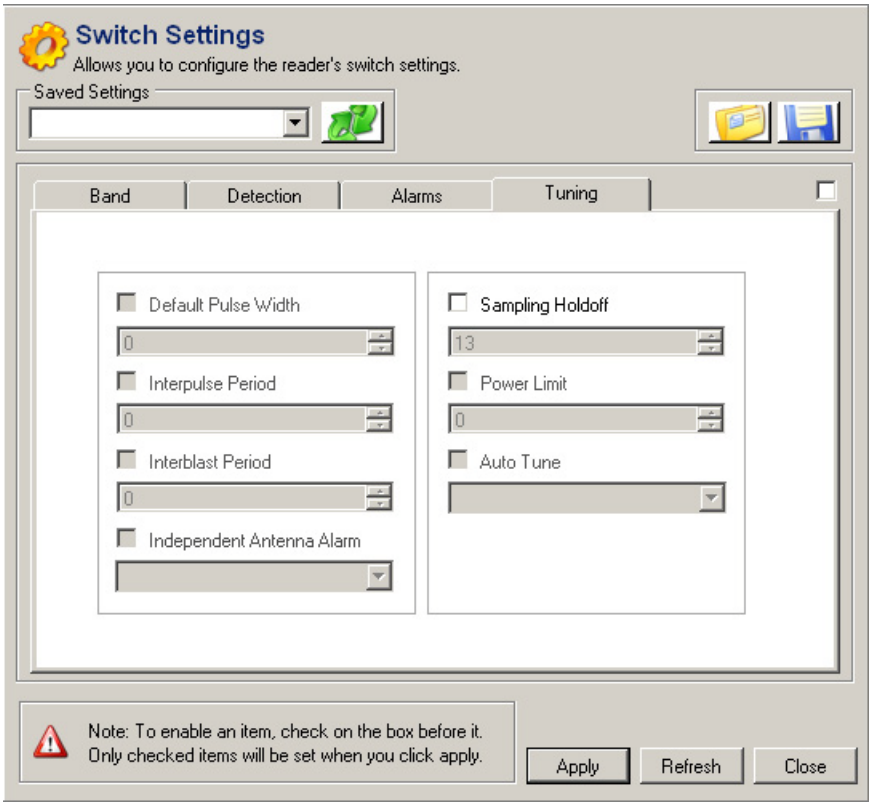


Figure 5.5 Tuning Tab, Switch Setting Parameters

7. Under the **Band** Tab, fill in the following parameters:
    - *Frequency Band*: Set to the application required by the customer. For more information about the choices, refer to the "Application-Based Detection Modes" section.
    - *Edge Blanking*: Set to 0-15.
    - *Master/Submaster*: Set to "Master" for any Single-System.

Note: If configuring a Multi-Electronic System, later refer to "Multi-Electronic Systems (Sync Configuration)".

- *Q Band Detection*: Choose a setting based on the type of tags used by the customer (Hard tag, 410, etc.).
- *Threshold Adjust*: Set to either 16 or 0.

8. Click **Apply**.

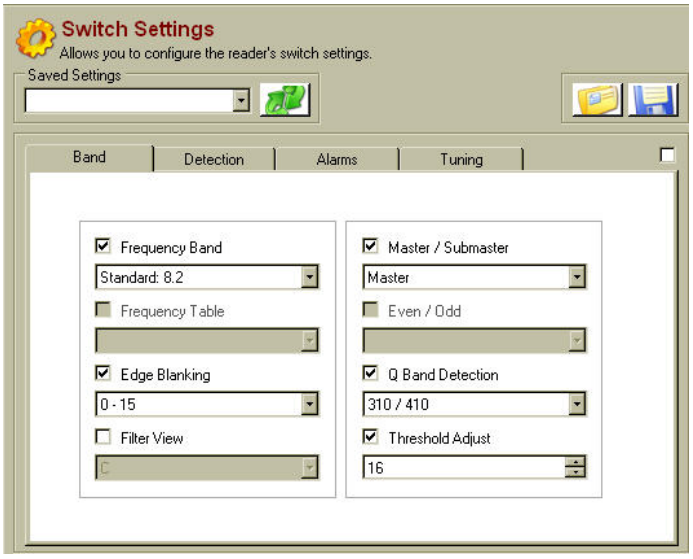


Figure 5.6 Band Tab, Switch Setting Parameters

9. Navigate to the **Antenna Settings** window.
10. Under each Antenna Tab, fill in the following parameters:
    - *Antenna Type*: Set to Detector.
    - *Jammer Threshold*: Set to 0.
    - *TX Maximum*: Set to 31.

Note: The FCC requirement is TX=31 (same parameters as CE).

    - *RX Gain*: Set to 31.
    - *RX Hardware Gain*: Set to 31.
    - *Port Control*: Check RX, TX and Port. Do not check AGC.
11. Click **Apply**.

Figure 5.7 Antenna Settings

Note: If this is a single antenna configuration, click Antenna 2 tab, then set TX Maximum Power to 0 to turn off the Transmitter.

Multi-Electronic Systems (Sync Configuration)

1. Repeat Steps 1-11 above (switch serial port connection to the other board). For the second electronics system, set to **Submaster** on the Band tab.
2. Repeat with additional TR4215 boards until all units are configured for sync operation.

Application-Based Detection Modes

This section details the steps and options for device configuration with respect to specialized application and SAM settings. The Evolve Firmware 4.0 supports both single- and dual-tag detection modes. These modes allow the system to look for two different tag frequencies while providing customized alarms for each

This section describes:

- Application mode concept and how it replaces earlier frequency band settings
- Extended alarming capability based on alarm severity levels
- Smart Alarm Management (SAM)

The framework for this capability is a new Application-based configuration model introduced with Evolve Waimea firmware. The approach is a change from previous Liberty versions and will be described in detail in the following paragraphs. With the new approach, an application is selected rather than a specific frequency band.

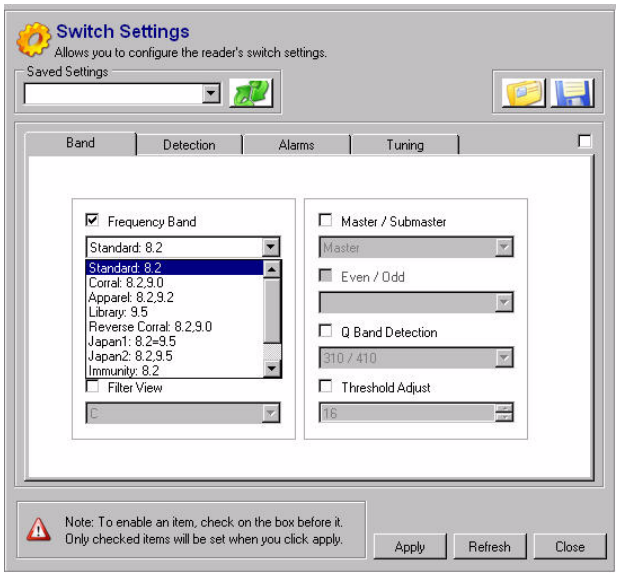


Figure 5.8 Switch Settings Frequency Bands

Currently there are 10 supported tag / frequency bands, some supporting dual-tag detection while the traditional applications still support a single tag. In the case where an application supports two tags, there is a primary tag and a secondary tag. The primary tag is most common (typically 8.2 MHz) and the secondary tag is typically used for higher priority items or higher-cost items. In the dropdown menu, the application name includes the center frequency for the supported tag(s).

Standard: 8.2 and Library: 9.5

These are the standard applications and remain unchanged from the previous version of the firmware. Each application uses a tag that falls within a single contiguous RF frequency range.

- Standard: 8.2 is the most common and most generic application.
- Library: 9.5 mode is used primarily in libraries.

Corral: 8.2, 9.0

This application is used in Toys-R-Us stores where the 8.2 MHz tags are placed on general merchandise throughout the store and 9.0 MHz tags are placed on electronics located in a special "Corral" area in the store.

Reverse Corral: 8.2, 9.0

This is used in Barnes & Noble and is similar to the Toys-R-Us implementation but the tag frequencies are reversed. The 9.0 MHz tags are used for books throughout the store and the 8.2 MHz tags are used on other merchandise located in a "Corral" area.

Apparel: 8.2, 9.2

This application is used for stores where two levels of alarms are required to differentiate between two priorities of merchandise. The system response is different (different light patterns or colors, different sound patterns or voice alarm message) for each of the two tag types. The idea is to bring special attention to the pedestal if the higher priority tag is detected.


Note: Previously, this was known as the "9.0 tag band" or "Kohls."

Pharma: 8.2, 7.2

This application is used primarily in stores containing a pharmacy. By design, this application has a very low false alarm rate for the 7.2 MHz tag.

RazorKeeper: 8.2, 7.2

This application is similar in use to the Apparel application but uses the 8.2 MHz and 7.2 MHz tags. The 7.2 MHz tags are placed inside razor keeper boxes and when detected cause an alarm response that differs from the 8.2 MHz tag response (different light and sound patterns and/or specialized voice message).

Immunity: 8.2

This application is similar to the Standard: 8.2 application in that only the 8.2 MHz tag is detected. The unique feature of the Immunity: 8.2 application is that it is much more resistant to false alarms caused by merchandise than the Standard: 8.2 application. This application is especially useful in hardware stores where a large percentage of the merchandise is known to cause false alarms. If false alarming due to merchandise is not a severe problem, it is better to use the Standard: 8.2 application because it will detect 8.2MHz tags over a larger frequency range than the Immunity: 8.2 application. Tags which vary in range +/- 3% or more from the center frequency of 8.2 MHz may not be detected in the Immunity: 8.2 application.

Japan I: 8.2=9.5 and Japan II: 8.2, 9.5

These applications detect both the 8.2 and 9.5 tags with the same priority. In the Japan I application, detection of either tag causes an identical alarm response (and is logged identically). In the Japan II application, each tag causes a different alarm response (and is logged separately). This application is being used to support a transition from predominantly 9.5 MHz tags on merchandise to 8.2 MHz tags. These specialized applications are intended to aid in a smooth transition during the change-over period.

Alarm Severity

Alarm severity levels are assigned to particular tag / frequency bands based on different priority or severity requirements (according to customer needs). This approach bases the alarm response on the severity level of the alarm, rather than the frequency of the tag.

A total of four (4) levels of Alarm Severity are supported: Low, Medium, High, and Critical. Default alarm responses for each severity level are explained below. However, specifics such as lighting patterns and audible alarms can be customized using Smart Alarm Management (SAM) (refer to "Configuring SAM (Smart Alarm Management)").

Alarm Severity= Low: An alarm with a low severity is considered informational only. The alarm will be logged in the event history as "Low." No other alarm response (no lights, no sounder, no output trigger, etc.) is associated with this level.

Alarm Severity = Medium: An alarm with a medium severity is a "standard" alarm. Lights and Sounder are activated. The relay associated with a group alarm (voice alarm) is also activated. This is the alarm level typically assigned to 8.2 MHz tags. An alarm event logged as "Medium" appears in the Event History display.

Alarm Severity = High: An alarm with a high severity is typically of higher priority than the medium alarm. Default behavior is a different light or sound pattern from the medium alarm (set up in DMS) so that it may be differentiated from a medium priority alarm. The relay associated with the group alarm (voice alarm) is activated for this alarm. An alarm event logged as "High" appears in the Event History display.

Alarm Severity = Critical: An alarm with a critical severity the highest priority alarm and is typically a covert or silent alarm. Default behavior is no light, no sound response and no group alarm (voice alarm) trigger. Specialized Alarm behavior, if desired, must be set up in SAM. An alarm event logged as "Critical" appears in the Event History display.

Note: The behavior specified here for alarm severity of High or Critical is slightly different than the behavior for the Evolve family because NGL does not have the Relay1 or Relay 2 dry contact relays that were previously used for the Video relay.

Table 5.1 (on the following page) shows the Applications that are currently supported along with the tag frequencies detected and the alarm severity assigned to each of the tag frequencies. In the table "M" represents Medium Severity, "H" represents High Severity, and "C" represents Critical Severity. There is no application that currently uses the Low Alarm Severity level.

	Tag Frequency	Alarm Severity	Tag Frequency	Alarm Severity
Frequency Band	**Primary**		**Secondary**	
Standard: 8.2	8.2	M	-	-
Library: 9.5	9.5	M	-	-
Immunity: 8.2	8.2	M	-	-
Corral: 8.2, 9.0	8.2	M	9.0	H
Rev Corral: 9.0, 8.2	9.0	M	8.2	H
Apparel: 8.2, 9.2	8.2	M	9.2	H
Japan1: 8.2=9.5	8.2	M	9.5	M
Japan2: 8.2, 9.5	8.2	M	9.5	H
Pharma: 8.2, 7.2	8.2	M	7.2	C
RazorKeeper: 8.2, 7.2	8.2	M	7.2	H

Table 5.1 Alarm Priority Descriptions

Configuring SAM (Smart Alarm Management)

This chapter details the steps and options for configuration of the Smart Alarm Management (SAM) system in DMS.

Note: For information on installation and use of the DMS system, refer to the Field Service Diagnostic Management User's Guide.

Navigating to the SAM Screen

1. DMS should still be connected to the desired TR4215 reader.
2. Navigate to the **Access** screen (shown in Figure 5.9), which describes the current settings for the antenna(s) in the group.

Note: Although previous Liberty systems required the "TR4024/26" Device setting in the DMS Connection Settings window, NGL uses the "Evolve" Device connection.

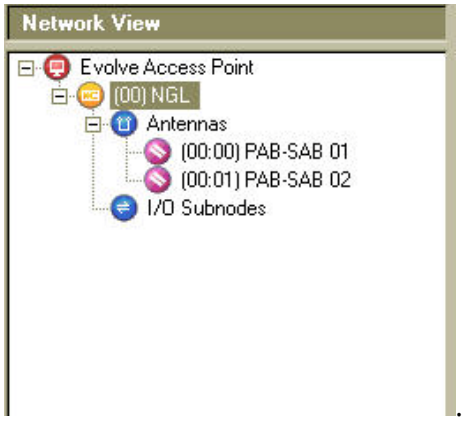


Figure 5.9 Network View of Antenna Settings

Note: Detector 1 and Detector 2 (friendly name of antenna) will be shown instead of PAB-SAB.

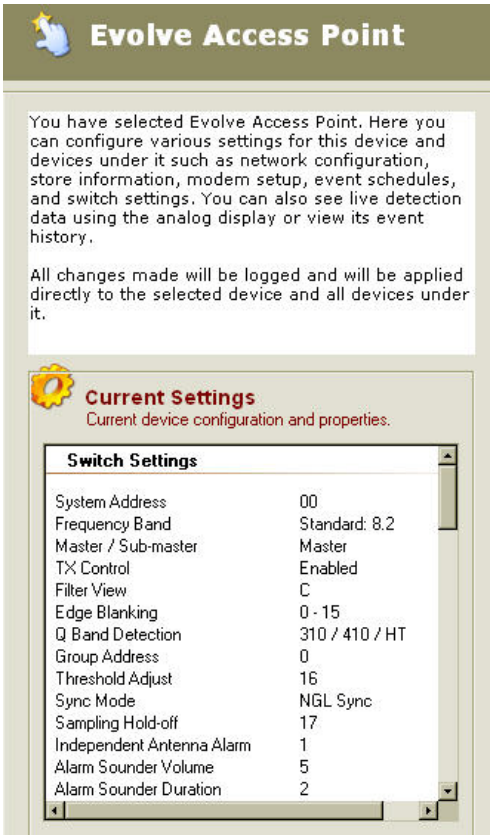


Figure 5.10 Current Antenna Settings

3. Navigate to the SAM screen by either clicking the **SAM icon** on the toolbar (shown in Figure 5.11 below) after selecting **Configure > Smart Alarm Management**, or by pressing **F9** (shown in Figure 5.12).

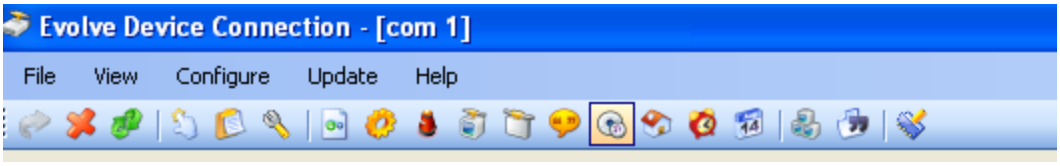


Figure 5.11 DMS Toolbar with SAM Icon Highlighted

Figure 5.12 Configure Menu in the DMS System

4. After the SAM screen (shown below) appears, the device is ready for configuration.

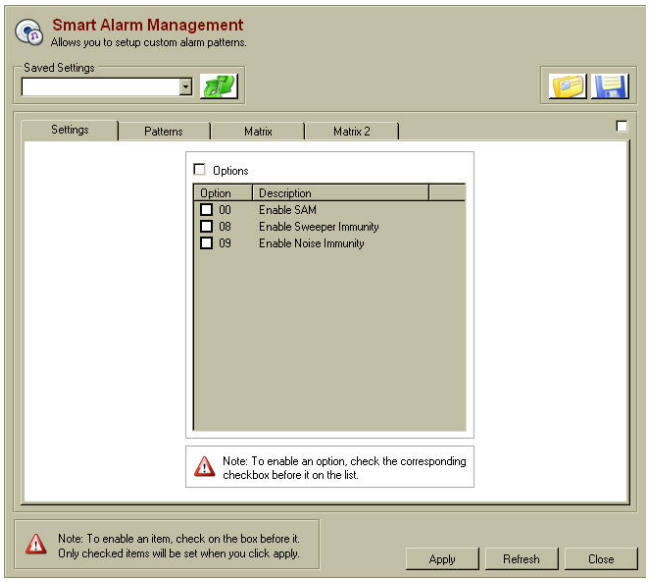


Figure 5.13 SAM Screen

Note: The pre-production version of the firmware only has the "Enable SAM" option available and not the other two.

Below are on details all of the available options (if using a feature, select the applicable checkbox):

- **Enable SAM:** This option button allows SAM to be Enabled (checked) or Disabled (unchecked).
- **Enable Sweeper Immunity:** Select this option if a sweeper is nearby and affecting the board's detection. During installation leave this option off until the system is tuned so that that DMS A view will accurately show any interfering noise characteristics. Once the system has been tuned, this option can be set.
- **Enable Noise Immunity:** Select this option if there is Environmental noise causing false alarms. This option will decrease the sensitivity of the system in order to reduce the false alarms.

Note: To enable an item, check the box before it. Only checked items will be set when Apply is clicked.

5. Select the **Options** check box, then click Option **00** to enable SAM.

6. If the environmental conditions require, select options 08 or 09. Refer to Chapter 6: F10 Tuning in order to determine if either or both of these options should be selected.

   a. After selecting the required options, click **Apply** to enable the features.

   b. A prompt appears that confirms that the smart alarm parameters were successfully set. Click **OK**; this completes the configuration of this portion of SAM.

Changing the Patterns

The second tab within the SAM screen is "Patterns." Custom alarm events are configured here.

7. Select the **Alarm Patterns** checkbox to enable the pattern options. There are five (5) configurable parameters designed to meet the customer's alarm response requirements:

   - Alarm: choose from light or sounder alarms.
   - Priority: choose from a high or low priority signal.
   - Beep Pattern: choose from a short, medium, long, steady, quick, very short, 2-beep, 3-beep, 4-beep, silent, *L (one short beep, one long beep), **L (two short beeps and one long beep) beep pattern.
   - Duration: choose how long (in seconds) the alarm either lights or sounds for each alarm event.
   - Intensity: select the intensity (volume - sound) of an alarm event.

Note: If the alarm duration is set to 31, the pedestal will alarm continuously.

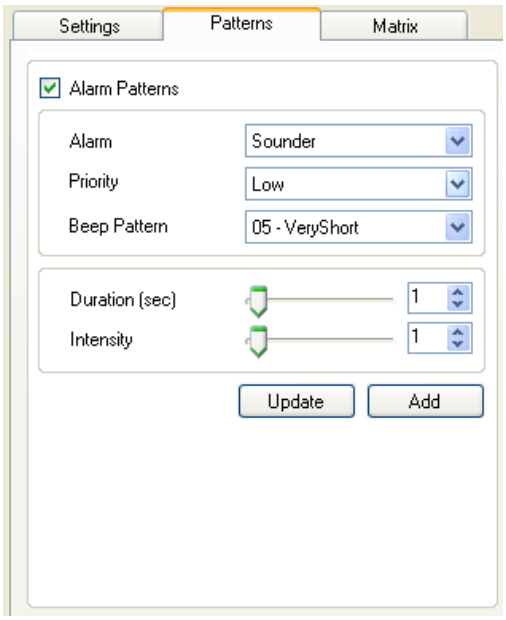


Figure 5.14 Alarm Patterns Enabled

8. At the bottom of the Patterns tab are the Update and Add buttons used to configure Patterns. If Add is chosen, the new alarm pattern appears in the list of existing alarm pattern (Light and Sounder) as shown in Figure 5.15 below.

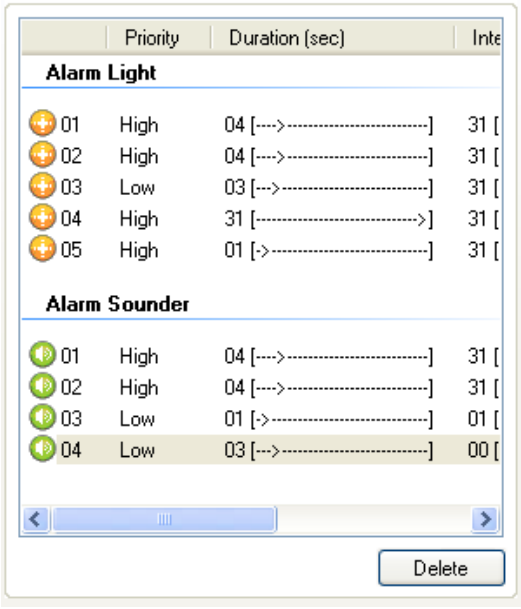


Figure 5.15 Previously Established Alarm Patterns

9. To Add, select the desired settings from the pattern settings created (refer to Step 15). After the alarm pattern settings are entered according to the customer's specifications, add this specific alarm pattern as a new alarm by clicking Add.
10. To Update, click and highlight the existing alarm pattern (that needs to be overwritten), then select the desired settings and click **Update**.

Note: If Update is chosen, this overwrites the existing alarm pattern to the new parameters.

Note: An alarm pattern may also be deleted at any time. Highlight the incorrect setting and click **Delete**.

Changing the Matrix

Alarm patterns are matched to antenna triggers via the Matrix tab. In the case of synced systems, there will be two Matrix Tabs: "Matrix" and "Matrix 2". The two Matrix tabs allow the user to specify different behavior (light or sound) for the systems individually.

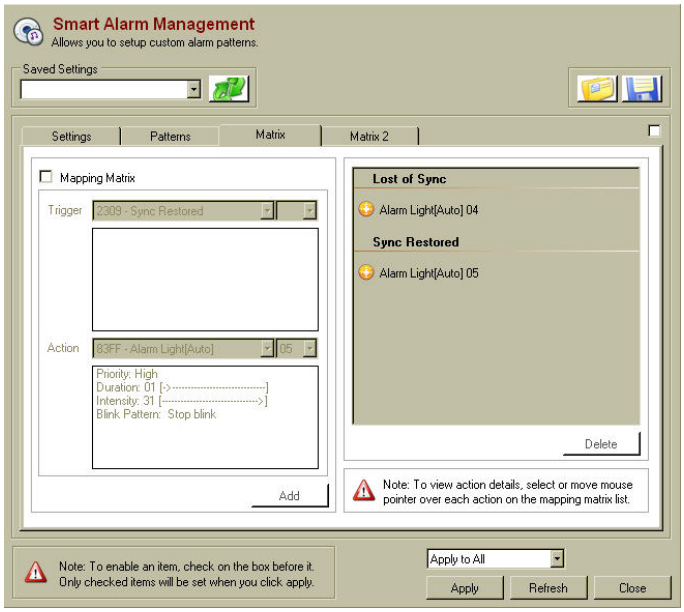


Figure 5.16 Matrix Tab

11. To activate the Mapping Matrix menu, select the **Mapping Matrix** checkbox.
    a. From the "Trigger" drop down menu, select the event code to be altered or set.
    b. From the "Action" drop down menus, choose from a sounder alarm pattern, a light alarm pattern, no action, or output subnode.
    c. Once the alarm pattern has been selected, choose from the different custom patterns established in the previous step (Patterns tab), which are numbered to the right.
12. To finish coupling the selected alarm trigger with the custom alarm pattern, click **Add**. The trigger appears in the right side window, where all of the alarm triggers and their alarm response patterns are listed.

Note: As before, an alarm trigger and subsequent response can be removed by clicking **Delete**.

Note: Selecting 00 in the drop down box will use the Light or Sounder settings that are under the Alarms tab in the Switch settings menu.

Updating the System

Once the system is properly configured, click the **Apply** button. This loads all the new alarm settings, patterns, and matrices into the F10 system, updating it.

CHAPTER

6

TUNING PROCEDURES (1M AND 2M VARY)

Overview

This chapter describes the procedures required to properly tune the F10 system. It provides details on identifying and measuring ambient noise levels. Before continuing, it should be stated that the best way to remedy resonance is correcting the environment. The Impedance Matching Board for the F10 system features jumpers that change capacitance and affect antenna tuning. Testing occurs to optimize system performance. Refer to Appendix D: Detection Performance.

TR4215 Features

The TR4215 board utilizes advanced DSP (digital signal processor) to automatically subtract stationary resonances seen by the antennas. The center frequency and bandwidth adjustments are preset for Standard 8.2 MHz operation. If the system is required to detect a different frequency tag, the bandwidth select range must be adjusted by the CSE (installer).

The TR4215 is different from previous pulse-listen transceivers as it does not use jumpers, DIP switches, or potentiometers to modify its configuration. However, there are jumpers used to set the basic frequency tuning (8.2 vs. 9.0) for the transmitter output and another to terminate the RS-485 (for the sync connection). Refer to the Chapter 4: Coax Adapter Board Wiring section.

Basic Tuning Methods Using DMS

All operating parameters for the TR4215 are controlled by Diagnostic Manager Software (DMS). DMS diagnostic tools allow the CSE to identify and measure ambient noise levels, resonances and other sources of environmental interference.

1. Connect the service PC laptop to the J48 serial port on the TR4215 board.
2. Launch the DMS program (version 1.8.31 or later) and enter your login information.

Note: For detailed information, refer to the Field Service Diagnostic Management User's Guide.

DMS is used to identify and correct noise and resonance. Often it takes a combination of the following analog solutions to optimize performance:

- reducing power on the transmit antennas (TX1 and/or TX2);

- reducing the baseband gain during software processing (RX1 and/or RX2);
- reducing the hardware gain (RX1 Hardware/RX2 Hardware); and
- adjusting the receiver sampling hold off.

Digital readouts allow different points within the signal processing chain to be displayed through the "C" view, or Set Filter Parameter Selection, which is a passive setting. This particular tool is used only after first attempting to correct the environment.

Front end gain (RF section) is reduced when a sweeper or other external noise sources are very close to the pedestal and the RX1 and RX2 adjustments do not lower the emission seen in the Set Filter Parameter Selection.

RX1 and RX2 Hardware gain adjustment allows a variable setting of the front end gain replacing the gain jumper. There is also a soft LED for each receiver, RX1 and RX2, to indicate saturation in the front end. Between the RX Hardware gain adjustment and the soft LED, the CSE attempts to find the point of saturation.

There are also internal noise problems (e.g., ringing) caused by board and antenna matching issues. If the issue results from a low resonance close to the operating frequency range, this may be resolved by increasing the gap (Sampling Holdoff) between transmit and receive cycles.

Note: For theory of operation and other detailed information on the different control settings, refer to the NGL Installation Manual (CKP P/N 7360602).

The TR4215 board does not support inter-pedestal, Ethernet or modem functionality. Therefore, settings for these features are not included in this document.

Noise Sources

There are generally two different types of noise sources our systems can encounter; asynchronous and synchronous.

Asynchronous noise is random in nature and is found throughout the frame (signal and noise channel) when certain devices are in close proximally. These sources may reduce detection and in some cases, cause phantom alarms. **Asynchronous noise sources** could be any of the following:

1. CW Sweeper – These devices sweep throughout the detection band, degrading detection performance, while causing false alarms. They usually have a constant linear sweep rate (100Hz to 200Hz) with a certain high and low frequency range and a constant signal level.
2. Spiky Noise – This is usually from automatic door motors, (broken) lighting ballasts and other pulse/listen systems that are not synchronized with the F10 system.

Synchronous noise is associated with items in close proximally to our system which resonate during our transmission cycle and appear as a tag (with ring side down) to the detection system. These present more of a false alarm threat when compared to asynchronous noise, especially if the item is moving. They could also affect detection because of the complex mixing of the intended tag signal and offending resonance. **Synchronous noise sources** could be any of the following:

1. Automatic Door Frames – In some cases metal doors will resonate and cause an emission much like a tag ring down. When the door opens and closes, the background subtraction (recall DMS) feature could be defeated, thus causing persistent false/phantom alarms.
2. Racks – Metal clothing racks will exhibit the same effects as door frames. When a rack is moved, false alarms may occur.

Be aware that metal structures near the system may cause similar issues. Other sources of this type noise could be merchandise close to, or passing through, our pedestals. In most cases merchandise is most difficult to identify, because these items are meant to pass through the alarm region.

Overall, the idea is to reduce the affects of the noise above by either reducing the noise at the source or desensitizing our system to the source of noise. The following sections explain the appropriate tuning procedure(s) when a given type of noise is present.

Note: During installation leave the Sam Option "Enable Sweeper Immunity" off until the system is tuned so that DMS A view accurately shows any interfering noise characteristics. After the system is tuned, this option can be turned on.

Analog View

DMS offers a display that shows real-time data to assist the technician in adjusting the Reader for optimal performance. Analog View is best for observing short duration noise, as well as stationary environmental resonances.

For multi-antenna systems, signals from primary and secondary antennas are displayed on the left and right. In the Analog View, four (4) different points within the signal processing chain can be viewed. The Filter View switch controls which level of signal processing is displayed.

Typical Tuning Procedure

Since no real-world environment is free of random noise and resonances, tuning may be required.

This may involve adjusting TX Power, RX Gain and RX Hardware gain for the system antennas in the following order:

3. Adjust TX Power for the antennas according to the regulation maximum. For best performance, TX Power should be set equal for both pedestals.
4. Flip to View D and adjust RX Gain individually for each pedestal, until the noise floor disappears under the Analog View.
5. Flip to View C and adjust RX Gain individually for each antenna until empty spots occur (see notches in graph), indicating disappearance of background resonances. Because of the natural resonance for the TR4215, the view should look like Figure 6.1. The RX Hardware gain usually does not need to be adjusted (and remains set at 31).

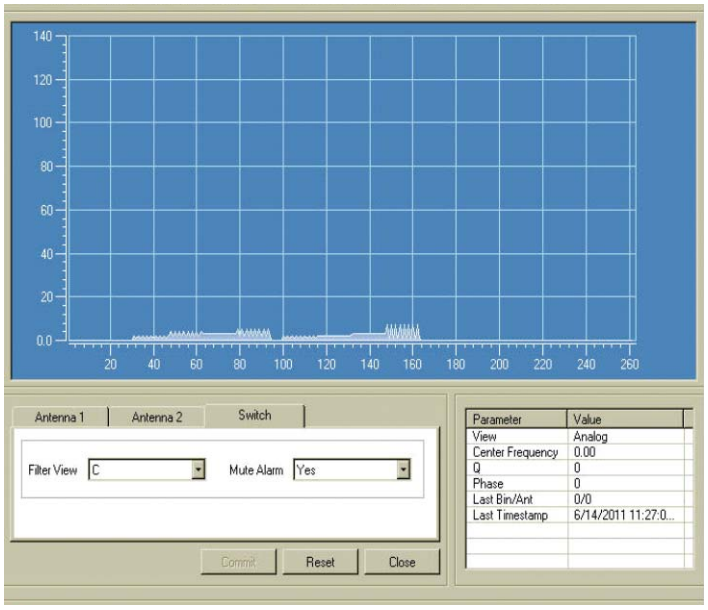


Figure 6.1 Typical Tuning on Filter C View

Note: The TR4215 board exhibits some natural internal resonance around 8 MHz which does not need to be tuned out. Because the signal is internal and the fact the Analog View is now multiplied by two (2), the typical tuning curve looks like the above.

Evaluate Jumper Positions

System Specific Procedures

These procedures are specific to the particular model system being installed. Ensure the correct procedure(s) are followed (i.e. run the correct test for either the 1 meter or 2 meter system).

For 2 Meter System

With the jumpers in the default position (OUT), assess detection height. If the detection performance is ideal (i.e., alarm occurs at heights meeting or exceeding specifications listed), there is no need to test the other jumper positions. If performance is less than ideal, insert the red jumpers in positions J5 and J6. Repeat testing (flat carry). The detection test should be performed using a 410EP tag (Super Hard Gen2 and Mini Hard tags are also acceptable). Test the maximum detection at middle point (flat carry) by walking across the antenna at various heights and listening to the alarm.

Note: During the detection performance test, the antenna should be disconnected from the DMS tool, as computer connection can sometimes degrade the performance.

Next, compare measured to detection performance (alarm success rate at a given height) with the jumpers in positions J7 and J9. Finally, test performance with jumpers in positions J8 and J10. Leave jumpers in position for maximum detection.

After finalizing the jumper settings, connect DMS tool and check the Analog C view. Make sure there is no excessive resonance (no more than 10 in the C view). If the resonance level is high, then increase the Sample Hold Off up to 22 until the resonance level is reduced to less than 10.

For single 1 Meter or 2 x 1 Meter System

With the jumpers in the default position (J5 and J6 are both IN), assess detection height. If the detection performance is ideal (i.e., alarm occurs at heights meeting or exceeding specifications listed), there is no need to test the other jumper positions. If performance is less than ideal, move the jumper positions from J5 and J6 to J7 and J9. Repeat testing (flat carry). The detection test should be performed using a 410EP tag (Super Hard Gen2 and Mini Hard tags are also acceptable). Test the detection at middle point by walking across the antenna at various heights and listening to the alarm.

Note: During the detection performance test, the antenna should be disconnected from the DMS tool, as computer connection can sometimes degrade the performance.

Next, move the jumpers to positions J8 and J10 and repeat the performance test. Leave jumpers in position for maximum detection.

After finalizing the jumper settings, connect DMS tool and check the Analog C view. Make sure there is no excessive resonance (no more than 10 in the C view). If the resonance level is high, then increase the Sample Hold Off up to 22 until the resonance level is reduced to less than 10.

Configuring the System for Asynchronous Noise

Filter View A shows excessive ‘spiky’ noise, which can also occur from a sweeper. This results in poor tag detection as the output filter display (Filter View 'D') will bounce as much as ½ a division.

Figure 6.2 shows the Analog View (Filter View A) displaying the noise. This view is directly from the output of the ADC and is controlled only by the hardware gain (RF gain). Gain for filter views C and D are also control by the RX gain (software gain). This is important because if the system is saturated before the signal is processed (before the ADC, but after the hardware receiver), the RF gain will need to be reduced. For cases when the TX control is disabled (customers using non-deactivatable tags), the RF gain should be reduced until the Saturation Indicator LED is not lit. This graph shows the Analog View with a sweeper 8 feet away from the submaster electronics.

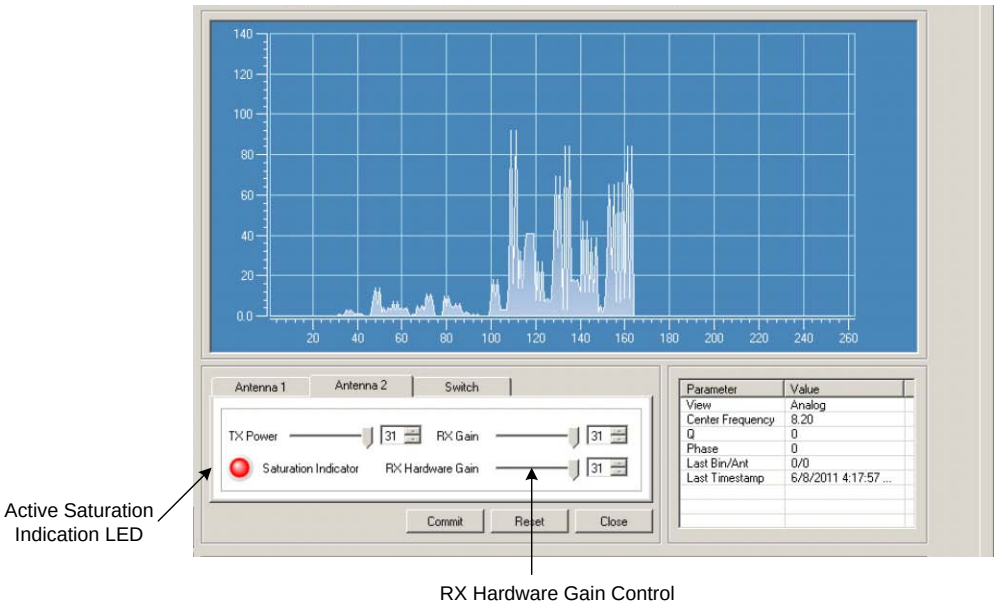


Figure 6.2 Noise on Filter A View RX and RX Hardware Gain @ 31

If the TX Control is enabled, using the Saturation Indicator is not enough – additional RF gain reduction could be necessary. To reduce the RF gain and attempt to resolve such a condition, follow the steps below.

1. Observe the signal level (being shown in Filter View A) for about 15-30 seconds and make a note of the highest level (peak response) during this period.
2. Reduce the RF gain until the peak response is only about one division. Below is a picture after the adjustment.

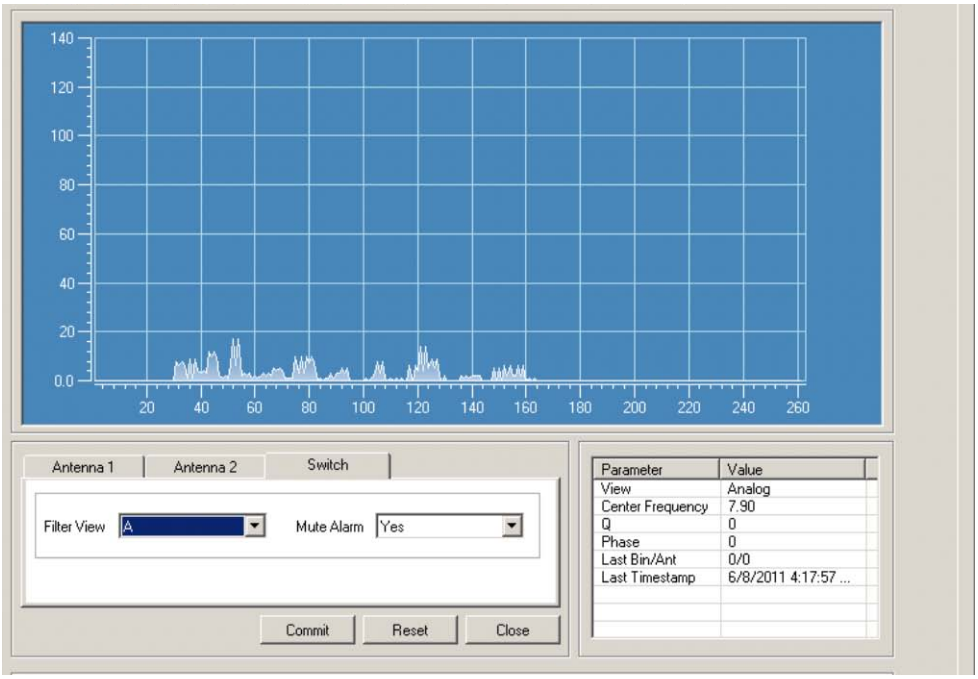


Figure 6.3 Noise on Filter View A – Results After RF Gain Tuning

3. After the RF gain is adjusted, observe Filter View D for about 15-30 seconds and note the peak response during this period. Below is a picture before adjusting the RX gain.

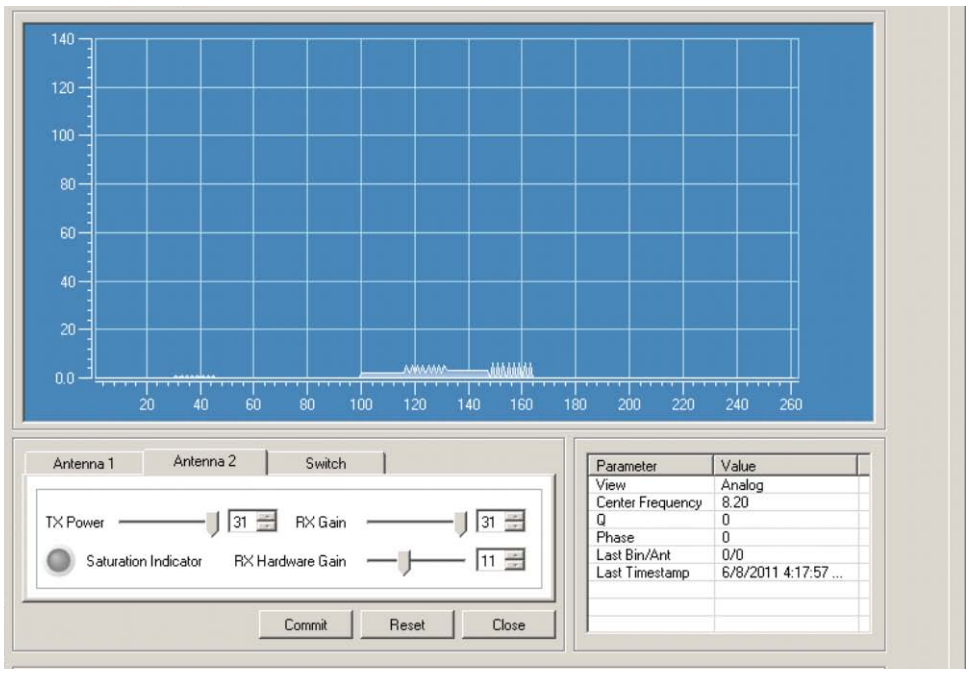


Figure 6.4 Noise on Filter View D – Graph Before RX Gain Tuning

4. Adjust RX gain (software gain) until the Noise begins to peak into the Analog View D. Figure 6.5 below shows a properly tuned system.

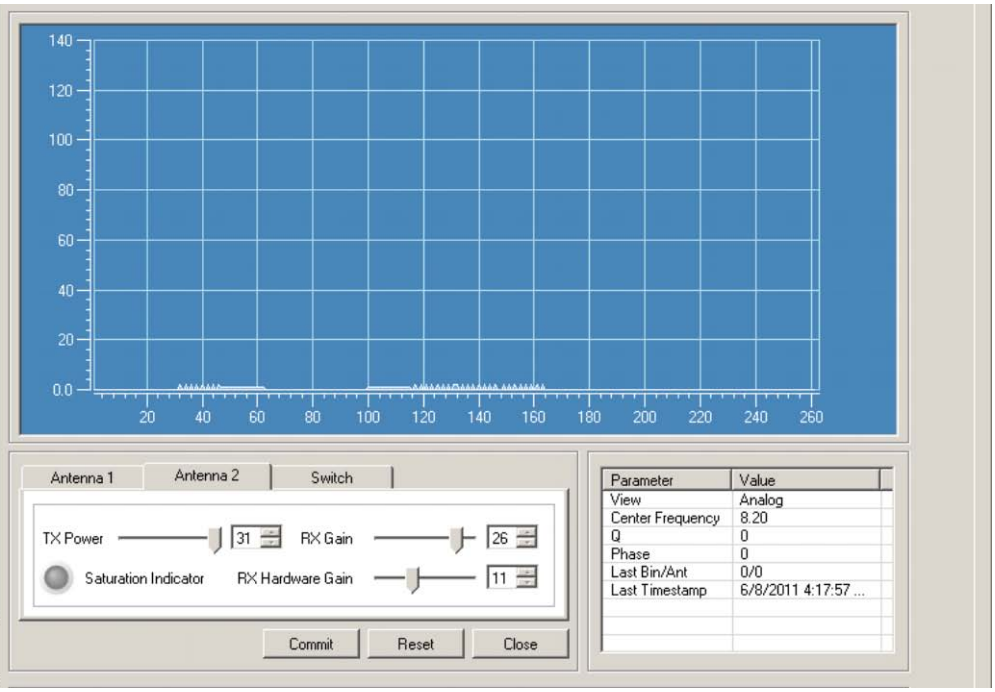


Figure 6.5 Noise on Filter View D – Graph After RX Gain Tuning

⚠ Caution: In the presence of small resonances, this "spiky noise" will cause the system to false alarm. Do not leave the system with this level of noise. The receiver gain must be set such that Filter View D is nearly 'flat'.

Resonance Sources

A resonance is typically defined as a stationary signal in this FM band. When in the presence of noise, a resonance may be 'buried.' By definition, Checkpoint tags are resonances (resonant circuits). The system alarms on resonant circuits on the pre-selected frequency. Once the receiver is set to acceptable levels of noise, the system must be adjusted to eliminate resonances in the environment.

The two types of resonances are **environmental item** and **stationary** resonances, described below:

- Environmental item resonances are items that can be moved. Examples of environmental item resonances that must be eliminated include coils of wire, racks, wiring (Christmas lights) and, of course, tagged merchandise. Environmental item resonances must be eliminated prior to final setup.
- Stationary resonances are resonances that cannot be moved or resolved. These include: door frames, checkout counters, and metal framed walls.

Remedying Resonances

If stationary and/or environmental items resonances, the transmitter power should be adjusted down to acceptable levels in Filter View 'C'. Figure 6.6 shows the reduction in transmitter power from TX@31 to TX@29 in Filter View 'C' will result in acceptable levels to detect tags.

✎ Note: The FCC requirement is TX=31 (same as CE).

Figure 6.6 shows an unresolved low level resonance, which would be likely to cause false alarms. Figure 6.7 shows the same resonance after reducing the TX level.

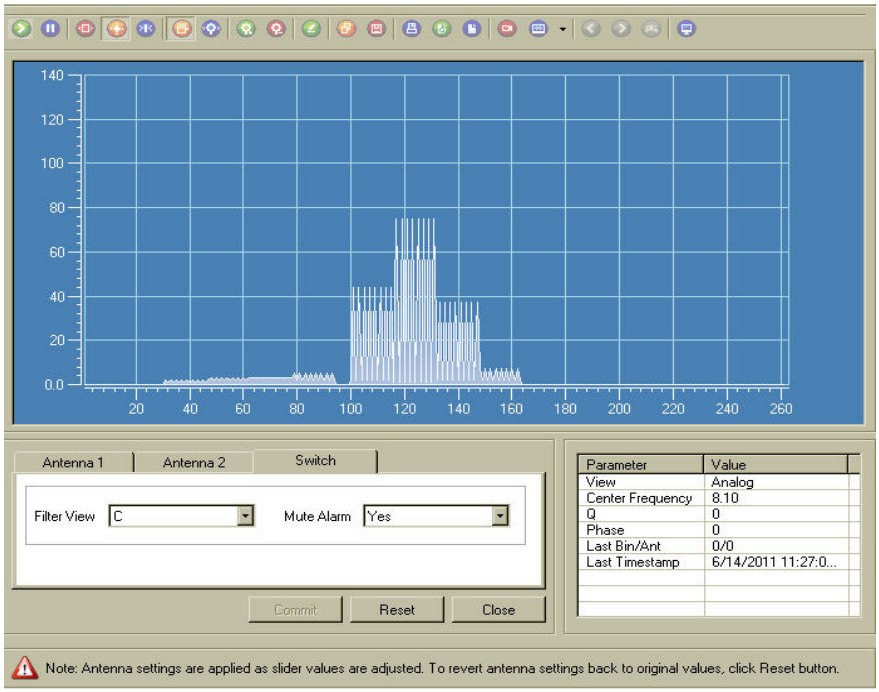


Figure 6.6 Unacceptable low level resonance, Filter View 'C' TX Power @31

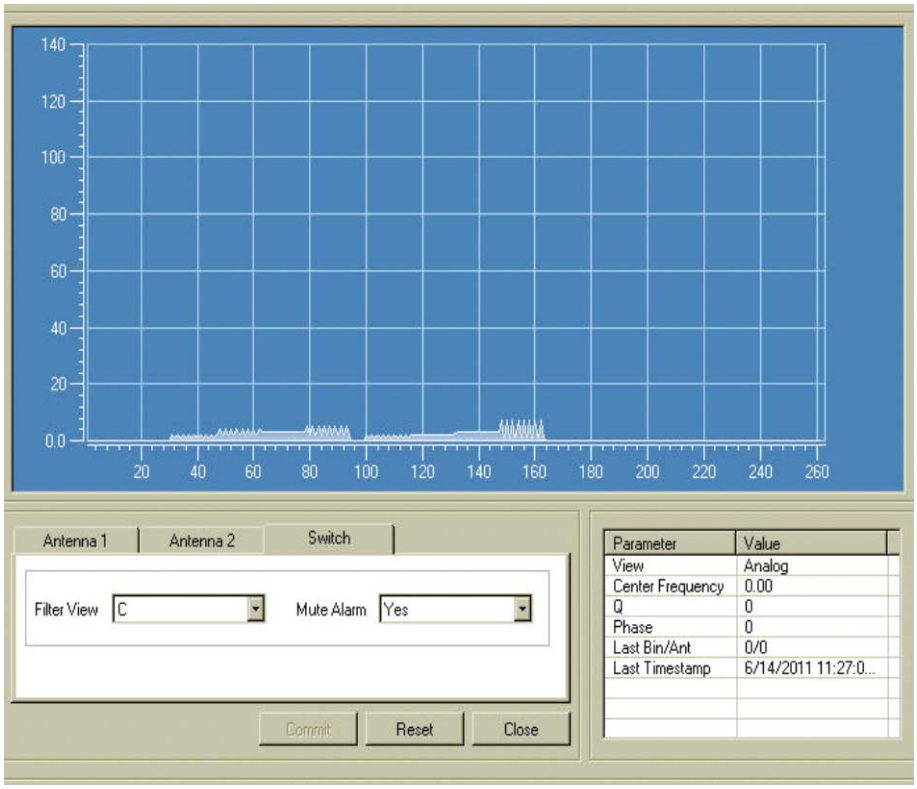


Figure 6.7 Acceptable low level resonance, Filter View 'C'

Note: If the environmental resonances (if any) can be identified and physically removed, then the RX Gain can be set higher for better detection.

Note: The TR4215 board exhibits some natural internal resonance around 8 MHz which does not need to be tuned out. Because the signal is internal and the fact the Analog View is now multiplied by 2, the typical tuning should look like the figure 46.

Jammer Indication

Recently our customers have become concerned about different jammer devices blinding our systems by reducing detection and allowing tagged merchandise to become undetectable. For this reason a jammer indication feature was created to allow the customer to track these devices.

The Jammer Indication feature is enabled when the Jammer Threshold switch is set to anything other than 0. However, a limitation of the feature is false indications when a sweeper is in close proximally. It becomes obvious after enabling the feature. If present, the feature cannot be used.

In a clean environment, the Jammer Threshold is typically set for 11 (for both master and submaster antennas).

Data Retrieval

TR4215 functionality allows the CSE to access and retrieve data stored internally.

Event History

The only way to retrieve data from a TR4215 board is to connect to the serial port (J48) using the DMS tool. Using the DMS application, display the Event History and (optionally) save the event history as a .csv file. Change the file extension to ".csv" so it is saved in CSV format.

For complete details on accessing the Event History, refer to the Field Service Diagnostic Management User's Guide.

Snap Shot feature

For detailed information about using the DMS tool to access the Event History and obtain a snapshot view of the selected alarm (from the last 10 alarm events), also refer to the guide.

APPENDIX

A

POWER SUPPLY

Power Supply Details

This appendix section covers all available (US and EU) power supplies for the F10 system.

Details

Power supplies have an output of +24 VDC.

Requirements

In the US, if the power supply is to be installed in a plenum (HVAC ventilation) area, the GlobTek GS-599MC-KIT(R) must be installed. In the event of such an installation, the power supply must be hard wired to comply with section 300.22 (C) of the NEC.

Power Supply Used in United States, Canada and Europe

Model

The EVOLVE F10 product line utilizes the following power supply:

1. **GlobTek GS-599ES(R) (CKP P/N: 7116509)**

Note: This model is used for non-plenum installations.

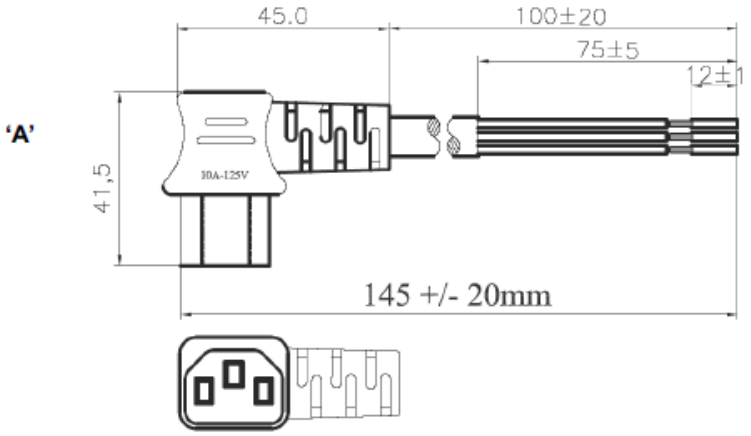
2. **GlobTek GS-599MC-KIT(R) (CKP P/N: 7367100)**
   This kit includes the standard power supply (above) and plenum-rated conversion kit.

PROPRIETARY INFORMATION:	REVISION			
PROPRIETARY OF GLOBTEK, INC. ANY REPRODUCTION, DISCLOSURE OR USE OF THIS DRAWING, IN WHOLE OR IN PART, IS HEREBY PROHIBITED EXCEPT AS SPECIFIED IN WRITING BY GLOBTEK, INC.	REV	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE, RFS.10378, BS	03/05/07	HM
	B	UPDATE MECHANICAL., RFS. 11759, BS	08/14/07	HM

Installation Instructions:

1) Plug short cable, GlobTek P/N 702L1060F6BBB into IEC inlet on the side of the power supply.
2) Prepare an appropriate length of UL-approved MC Armored cable, minimum wire size 18AWG x 2 conductor + ground. A conductor length of 4 inches should extend beyond the armor covering.
3) Connect MC cable, to the cable fitting, Bridgeport P/N 566-DC2, NEER P/N: 49502 or UL approved equivalent, attached to the cover and tighten the two clamp screws per NEC/NEMA requirements (32 in-lbs typical).
4) Attach the conductors of the MC cable to the appropriate conductors of the connection cable using UL-approved wire nuts.
5) Secure the cover to the main power supply unit using four (4) captive screws.

2. INPUT CONNECTOR/ CABLE:



GENERAL SPECIFICATIONS:

RATING:	10A / 125V AC
CABLE TYPE / SIZE:	SJT, # 18 AWG, 3 CONDUCTOR
TEMPERATURE RATING:	60° C MIN.
CONDUCTOR COLORS:	BLACK / WHITE / GREEN
CABLE JACKET COLOR:	BLACK
OVERALL LENGTH (L):	145 ± 20 mm
CABLE OUTER DIAMETER:	7.8 ± 0.2 mm
END 'A' PLUG;	IEC320/C13(LEFT ANGLE CONFIGURATION)
END 'B'	SEE TERMINATION TABLE
APPROVALS CONNECTOR:	UL, CSA OR cUL
APPROVALS CABLE:	UL, CSA OR cUL

CONDUCTOR TERMINATION TABLE:

Wire	Color	ROJ ± 3	RIJ ± 1	Terminal
Neutral	White	75	12	Partial strip (leave slugs on wire)
Line	Black	75	12	Partial strip (leave slugs on wire)
Ground	Green	75	12	Partial strip (leave slugs on wire)

Foot Note:
Globtek Inc. will not be liable for the safety and performance of these power supplies if unauthorized access and repair occurs. End user should consult applicable UL, CSA or EN standards for proper installation instructions

Limitation of Use:
Globtek product are not authorized for use as mission critical components in life support, hazardous environment, nuclear or aircraft applications without prior written approval from the CEO of Globtek Inc.

Contents of this document are subject to change without prior notice

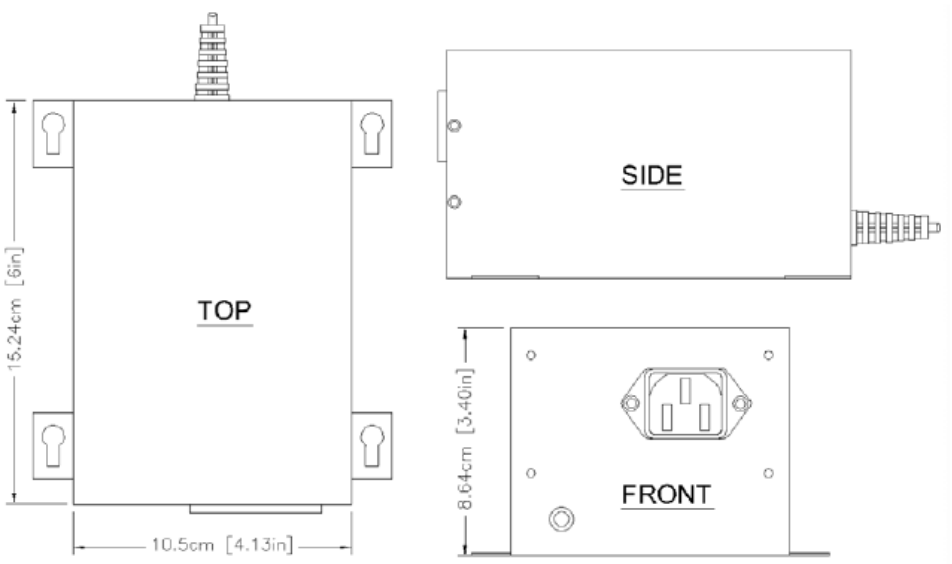
DASH NO.	PART NO	REV.	DESCRIPTION	NOTES
	TABULATION BLOCK			

TOLERANCES:
DECIMALS .xx +/-0.1 .xxx +/-.005 ANGULAR +/- 1°
MILLIMETERS xx +/- 0.3 xxx +/- .013 ANGULAR +/- 1°

GlobTek, Inc. www.globtek.com
186 Veterans Dr. Northvale, NJ 07647
Tel. 201-784-1000 Fax 201.784.0111

DWG TITLE: SWITCHING POWER SUPPLY, 50 WATT, 24V DC @2.1A, METAL DESKTOP, UNIVERSAL INPUT, W/EMI ENHANCEMENT, FOR FAR & NEAR FIELD RAD.

INIT.BY: BS	DATE: 03/05/07				
DRAWN: NF	DATE: 03/05/07	PSCN No.: G, Y	SIZE A	MODEL NO: NOT APPLICABLE	REV. B
APRVD : HM	DATE: 03/05/07	SCALE: NONE		PART NO: **GS-599MC-KIT(R)**	SHEET 1 OF 3



Dimensions

Width: 10.50cm [4.13in]

Length: 15.24cm [6.00in]

Height: 8.64cm [3.40in]

Power Supply Used in Australia

Model:

The power supply used in Australia is the ETE 2.5A model, shown below.

Specifications:

This unit operates at 240V 50Hz .38A; the output voltage remains 24VDC.

Dimensions:

Width:10.5cm

Length 15.7cm

Height: 7.0cm

APPENDIX

B

PARTS LISTS

F10 Parts List

CKP Part #	OEM Part #	Description
7939172	n/a	.38cm x 1.3cm (#7 x ½") hex head screw
7308823	2348	Power Fastener Zip-it with .42cm x 2.5cm (#8 x 1") panhead screw
7366291	9439	Power Fastener .79cm (5/16") lead anchor
7917157	n/a	5.484 mm x 38.1 mm (#12 x 1 ½") panhead screw
7257241	Belden 8723 Consolidated 5594	Approved Sync Cable (only used if syncing multiple electronics enclosures)
Contractor Supplied	VC9984	PVC cement for bonding fittings
Contractor Supplied	TRM, 1101, 1004	Ardex TRM – Transportation Repair Mortar, QUIKRETE® Concrete Mix (No. 1101), QUIKRETE® Fast-Setting Concrete Mix (No. 1004)
Contractor Supplied	n/a	Sand used to level bottom of trough under antenna assembly
Contractor Supplied	n/a	1.25cm [1/2"] ENT Tubing (conduit), contractor supplied. Used to house 15.1m [50ft] coax cable in new installations before slab is poured.

APPENDIX

C

INTERACTIONS

F10 System – Proximity to Deactivation Units

The table below lists minimum distances where Counterpoint IX or D11 Deactivators can be located away from a F10 system antenna.

Deactivators do not affect the F10 system performance.

However, in 4 and 6 Mode, if any F10 system is located inside a 1.8m [6ft] radius from the *deactivator*, false alarms may occur because the deactivator "sees" the system.

It is not possible to slave a deactivator to a system with Strata-based electronics.

Note: The deactivator will intermittently alarm as it sees the F10 pulsing, these alarms will occur on average every 30 seconds.

Distance to F10 System		
MODELS (all with pad)	**Up to 1.8m (6.0')**	**> 1.8m (6.0')**
CP IX/D11 4 Mode	Deactivator Phantoms (*see note*)	**No Interactions**
CP IX/D11 5 Mode	**No Interactions**	**No Interactions**

F10 System – Proximity to Other Systems

Please refer to the table below for details on how close systems can be to one another.

EVOLVE F10	Minimum Separation w/o Slaving	Slave Options
Any pedestal or floor system	12m [40 feet]	Slave
Pillar / Frame	4.6m [15 feet]	None
QS4000XT	4.6m [15 feet]	None
QS2000	4.6m [15 feet]	None
Signature	4.6m [15 feet]	None
Quicksilver	4.6m [15 feet]	None
QS6500	7.6m [25 feet]	None
QS45/55	7.6m [25 feet]	None

APPENDIX

D

DETECTION PERFORMANCE

F10, 2 Meter System

The diagram and corresponding table show the expected FCC and CE detection heights for the F10, 2 meter system, using a 410EP tag in three different orientations (flat, side, and front carry).

Note: These detection heights are specified for a "clean" environment. If noise is present, detection performance will be reduced.

Detection Heights for a 410EP tag with TX = 31 and RX = 31:

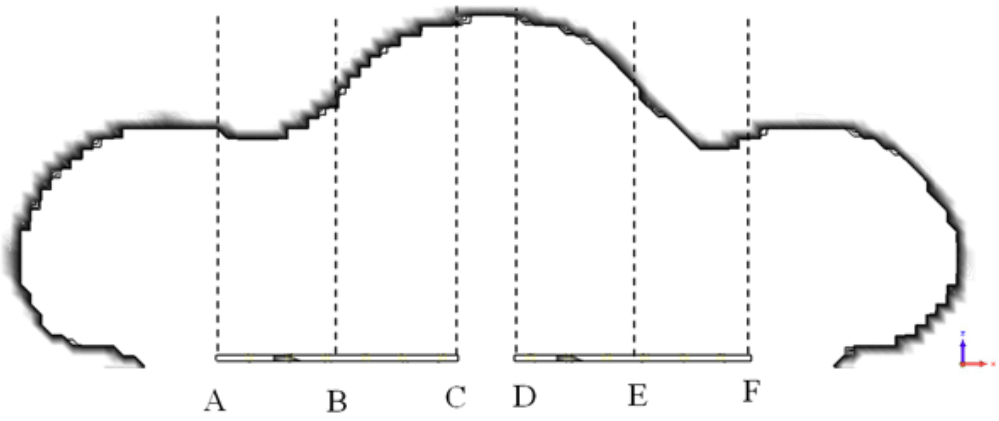
	A (cm)	B (cm)	C (cm)	D (cm)	E (cm)	F (cm)
Flat	100	120	140	140	120	100
Side	110	125	110	110	125	110
Front	85	100	110	110	100	85

Note: Detection heights are measured from the bottom of the antenna assembly, not from the finished floor height. F10 system antennas are buried 7.6cm (3") into the floor.

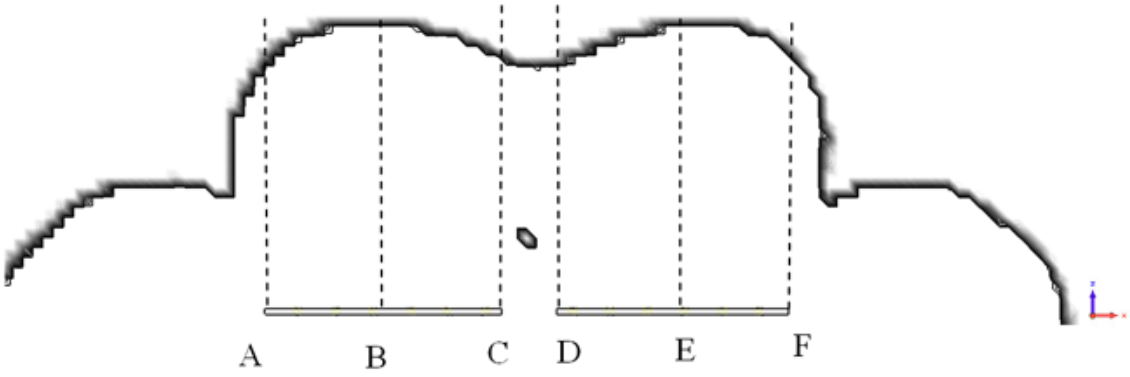
The following **Detection Patterns** are observed for the F10, 2 meter system. Note that the orientation of the tag is important as it alters the expected detection height.

F10, 2 Meter Detection Patterns

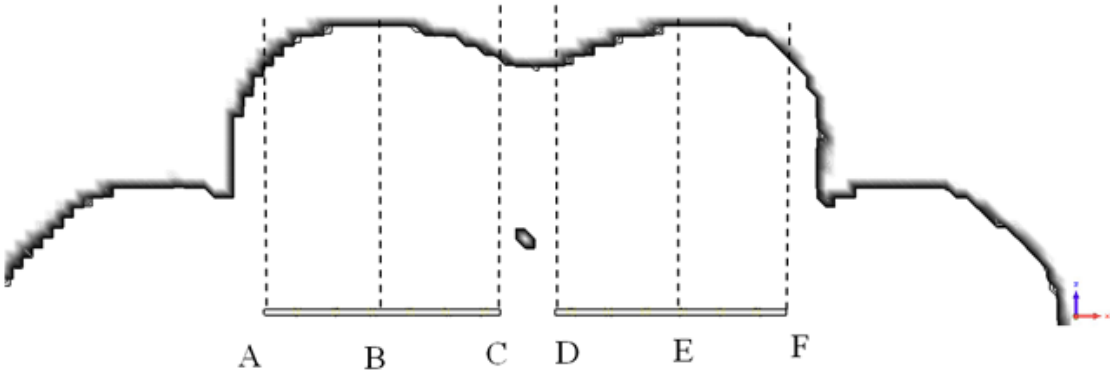
Flat Carry:



Front Carry:



Side Carry:



F10, 1 Meter System

The diagram and corresponding table show the expected FCC and CE detection heights for the F10, 1 meter system, using a 410EP tag in three different orientations (flat, side, and front carry).

✎ Note: These detection heights are specified for a "clean" environment. If noise is present, detection performance will be reduced.

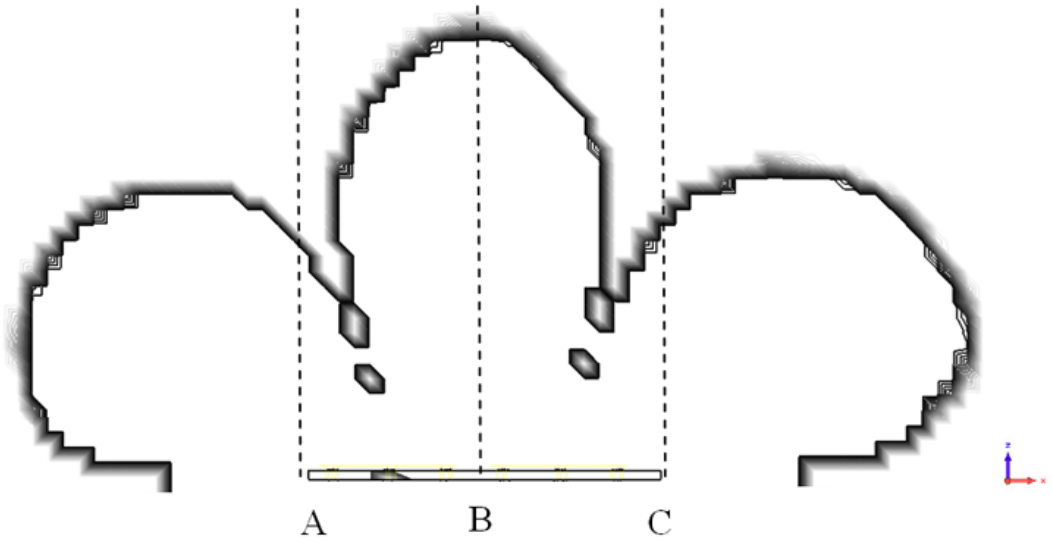
Detection Heights for a 410EP tag with TX = 31 and RX = 31:

	A (cm)	B (cm)	C (cm)
Flat	95	115	95
Side	95	50	95
Front	65	85	65

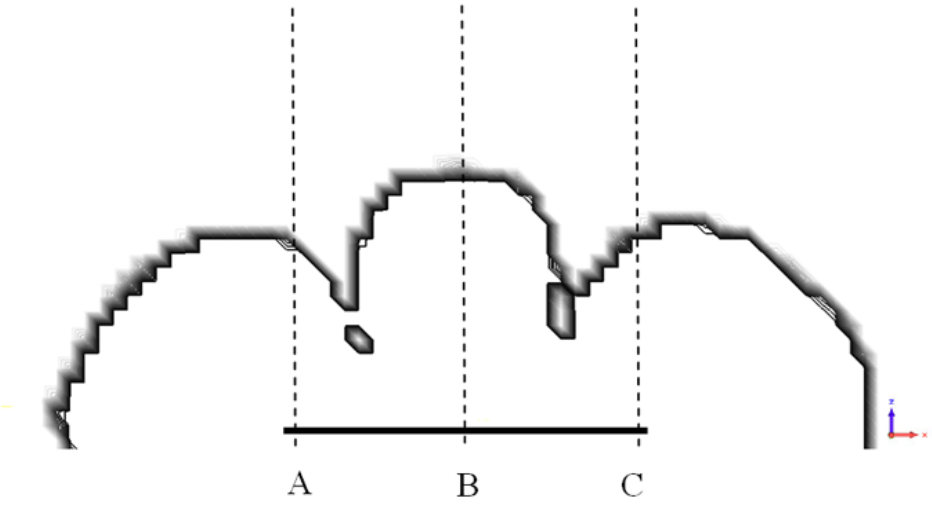
✎ Note: Detection heights are measured from the bottom of the antenna assembly, not from the finished floor height. F10 system antennas are buried 7.6cm (3") into the floor.

The following **Detection Patterns** are observed for the F10, 1 meter system. Note that the orientation of the tag is important as it alters the expected detection height.

Flat Carry:



Front Carry:



Side Carry: