Technical Manual AM Systems

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1 Terms and abbreviations

This chapter describes the terms and abbreviations used in this document.

Term	Abbreviation	Explanation
(Hard) Tag	Tag	Passive component, equipped with a lock to allow attachment to garments, which can be detected by the receiver.
(Paper) Label	Label	Passive component, usually equipped with glue on one side to allow attaching the label to any object, which can be detected by the receiver.
Antenna	ANT	The mechanical structure (which usually consists of a frame, wires and electronic PCB) to allow proper detection of tags and labels. Also referred to as: pedestal, barrier.
Burst Frequency	Fb	The operating frequency of the TRX.
Device Explorer	Device Explorer	Cross Point Device Explorer Software tool for adjustment of Cross Point devices that are connected to the Cross Point Field Bus structure (RS-485).
EAS	EAS	Electronic Article Surveillance
Foiled Twisted Pair	FTP	The FTP cable is surrounded by an outer foil shield.
I/O	I/O	Digital Input/Output
Printed Circuit Board	PCB	The electronic board.
Radio Frequency	RF	Electronic signals generated by a transmitter and detected by a receiver.
Receiver	RX	Electronic device capable of receiving AM signals.
Transceiver	TRX	Electronic device capable of transmitting and receiving AM signals, sharing the same electronic circuitry and housing. Also referred to as mono-antenna.
Unshielded Twisted Pair	UTP	Common network cable.

2 Introduction

The products mentioned in this manual are Electronic Article Surveillance (EAS) systems based on Acoustic Magnetic (AM) technology operating at 58 kHz.

They are manufactured by

Cross Point B.V.
Waanderweg 12
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The Netherlands
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www.crosspoint.nl

2.1 Available AM systems

This technical manual applies to the following AM systems:

- MAXUS AM50 Mono
- MAXUS AM50 Receiver
- MAXUS AM50 Mono Advertising
- MAXUS AM50 Receiver Advertising
- STYLUS AM30 Mono
- STYLUS AM30 Receiver
- FORTUS AM40 Mono
- FORTUS AM40 Receiver
- NEXUS AM30 Mono
- NEXUS AM30 Receiver
- MODUS AM30 Mono
- MODUS AM30 Receiver

All examples in this manual are based on the NEXUS AM30 Mono and NEXUS AM30 Receiver with integrated visitor counters. For antenna models without integrated visitor counters, various shown features will not be applicable. See section 2.4 for further model-based restrictions.

2.2 Field Bus Network structure

Both transceiver and receiver are interconnected through CAT5 wiring and can be connected to a host (e.g. a CrossCONNECT Access Point or a computer) and communicate with this host using the Cross Point Field Bus Protocol.

This allows retrieval of device information and various settings to be made through use of the software.

All this functionality is described further on in this manual.

2.3 Visitor counting

Visitor counting for an aisle is possible when bi-directional IR-based visitor counter modules are integrated in the transceiver and receiver antennas.

In a three antenna system two aisles can be defined because the visitor counter receiver and transmitter work in both directions.

The capabilities of an EAS system with visitor counter modules are much richer than a system without visitor counter modules. Partly this extra functionality can be used by using the AM systems as an autonomous system, but most extra functionality can be added by connecting it to a CrossCONNECT Access Point.

Some of the extra functionality is listed below.

- Automatic antenna arrangement

- Possibility to count customers per aisle and to determine the direction of movement (in or out of the shop)

- Showing the importance of the alarm (is a customer moving in or out during the alarm)

- Detecting undefined alarms

- Pinpoint the exact aisle where the alarm occurred

- Generate reports on visitor counts and alarm counts

- Doorbell function for incoming and/or outgoing customers

2.4 Restrictions and limitations

The following restrictions and limitations must be considered:

2.4.1 AM systems versus RF systems

It is **not** allowed to connect AM systems together with RF systems to the same Field Bus!

Pins 3 and 6 on BUS A and BUS B of the AM transceiver and receiver boards are not interconnected. They are used for communication between the AM transceiver and the AM receiver.

On RF systems, pins 3 and 6 are used for synchronization purposes between the RF transmitter and the RF receiver, which is based on a completely different signal.

Connecting AM and RF systems to the same Field Bus will result in bad performance and synchronization and must be avoided!

2.4.2 Model restrictions

The model restrictions are listed below:

Lights only

The lights only model does **not** contain any visitor counters, but does contain LED indicators, which results in the following limitations:

- No visitor counting, doorbell or auto antenna arrangement
- No distinction between incoming and outgoing alarms

If all of the above mentioned features are required then the model with integrated visitor counters must be used.

This manual covers the complete functionality of the NEXUS AM30. Keeping the above mentioned model restrictions in mind, sections related to visitor counting and/or alarm indication must be ignored when models without integrated visitor counters are used.

2.4.3 Software restrictions

The AM systems can be tuned with Cross Point's Device Explorer software.

During first-time setup of Device Explorer you are required to specify your Cross Point Cloud credentials in order to be able to use the Device Explorer software. If you do not have an account yet then contact your company's administrator or Cross Point to obtain one.

2.4.4 Detection distances

The specified detection distances are maximum values. Dependent of environmental noise, these maximum values might not be achieved and aisle widths need to be reduced to obtain good system performance. See chapter 3 for more details on potential noise sources and installation guidelines.

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3 General AM and EAS issues

This chapter covers the various issues related to Acoustic Magnetic systems and Electronic Article Surveillance systems in general, like:

- Noise sources
- Installation guidelines

3.1 Noise sources

Listed below are various noise sources that might affect the performance of any EAS system. It is strongly advised to either eliminate these noise sources (as far as possible) or maintain the largest possible distance to these noise sources.

The following devices can create or absorb AM noise signals which can reduce the performance of an EAS system:

- AM systems installed in other shops (even if they are installed up to 100m or more away from your store).
- Any electronic device that operates around 58kHz or produces harmonic frequencies around 58kHz.
- An active laptop. The back light in the screen can create a lot of noise which is detected by the EAS system and can reduce the performance dramatically. Make sure to keep laptop computers at least 3 meters away from the antennas.
- (Moving) Objects containing metal, like sliding and revolving doors, elevators, escalators, roller shutters, frames, etc.
- Electronic devices, like computers, laptop screens, LCD screens, cash registers, engines, transformers, etc.
- Vertically positioned power cables, both low voltage and high voltage.
- Lights (flashing, fluorescent, halogen, gas-de-charge, etc.)
- Metal scan systems installed in close vicinity. Cross Point's Metal Scan operates around 19kHz in channel 0 and has a second harmonic frequency around 58kHz.

3.2 Installation guidelines

Listed below are EAS installation guidelines to ensure a proper installed and functioning system. Not following these guidelines might result in less performance of the EAS system.

1. Check the shop entrance/exit carefully for possible noise sources prior to installation. If possible noise sources are found then try to eliminate these sources or pick the best position for the EAS system where the influence of these noise sources will be minimized.

2. If possible, connect a TRX or a set of antennas (1 TRX and 1 RX) and put them in the required position in the entrance/exit **without** drilling holes in the floor and bolting the antennas down. Switch the system on and test the performance. In this way the noise level and system sensitivity can be determined and if necessary (in case of high noise or poor sensitivity) the system can be moved to find a better position.

3. Always install the TRX antenna on that side where the highest noise is or where the highest noise can be expected.

4. Install the power supply for the EAS system at least 1m away from the antennas. If the power supply needs to be installed further away from the system make sure to extend the secondary power cable using a proper cable with the same dimensions (3 x 1mm^2) and specifications as the original cable (preferably the exact same cable). Extending the power cable with a cable with different dimensions and specifications might result in less performance of the AM system.

5. Avoid unnecessary long cables. Run the power supply cables in a direct line to the EAS antennas. Never run power supply cables vertically up the wall within one meter distance of the antennas (never around the entrance/exit doorframe).

6. By default the shielding of shielded cables is not connected to the electronic boards or antenna frames if not stated otherwise in the Connections chapter of this manual. Only in case of high noise and bad performance it is advised to experiment with connecting the shielding to see if these connections will improve the performance.

7. Do not connect more than 1 transceiver antenna to 1 power supply.

8. Metal framed doors may never swing between the EAS antennas, as this will distort the energy field of the system in such a way that it might result in high noise, poor detection and potential false alarms.

9. Do not connect unshielded and untwisted cables to the I/O's as this might affect the performance of the EAS system in a negative way.

10. Do not attach any equipment or devices to the antenna frames.

11. Take into account that when using a laptop within two meters of the antennas, the laptop or its power supply might create noise signals. Use a longer cable to create more distance between the laptop and the EAS system.

12. Use chemical anchors to mount the antennas firmly to the floor. Do not use screws and plastic plugs, as this usually results in the antennas getting loose and instable.

13. Do not install TRX and RX antennas with less than 50cm distance between them as this will have a negative effect on the performance.

14. Where possible, use conduits to run the cables through. Make sure to use conduits with a large enough diameter. In some situations you might need to run 3 cables through the conduit. The power supply cable is ø8mm and the average FTP cable is ø6mm. When for example 2 power supply cables and 1 FTP cable need to be run through one conduit, then this conduit must have a diameter of at least 25mm.

15. A cable tester is required. The various devices are interconnected through FTP cables. Make sure to test the cables prior to plugging them into the RJ-45 connectors on the devices, especially if you're not using pre-assembled cables!

16. It is recommended to use steel anchors (e.g. SPIT EPOMAX resin with zinc coated steel rods) to mount the antenna to the floor. Do not use screws and plugs, as this will not keep the antenna properly fixated to the floor, resulting in tilting antennas and potential loss of performance.

4 Equipment and tools

The following equipment and tools are advised to use when installing and tuning the AM system.

4.1 General installation tools

The general tools required for installation of an EAS system (drills, screwdrivers, cutters, etc.) are not described in detail.

4.2 Laptop computer

To properly adjust the AM system through Cross Point's software, it is strongly recommended to use a laptop computer.

A laptop will put you in full control of all AM system settings and features.

The following minimal requirements are set for the laptop:

- Intel 1.3GHz or faster processor
- Microsoft Windows Vista with Service Pack 2 (32 bit and 64 bit)
- Microsoft Windows 7 or 8 with Service Pack 1 (32 bit and 64 bit)
- Microsoft .NET Framework 3.5 Service Pack 1
- 512MB of RAM (1024MB recommended)
- 50MB of available hard-disk space for Device Explorer
- Minimal screen resolution 1024x768 (recommended 1600x1200)
- Video hardware acceleration

4.3 Software

The various transceivers and receivers are interconnected through the **Cross Point Field Bus** (see chapter 6.3, page 17 for further details on the Field bus structure).

To be able to adjust and configure the various devices, **Cross Point Device Explorer** is required.

Please refer to the *Cross Point Device Explorer User Manual* for further details on all features and usage of this software.

5 AM operating principle

The AM system operates on the pulse-listening principle. Using the zero crossing of the 50Hz mains frequency as a trigger, a short burst of 58kHz signal is transmitted and a receiver window is 'opened' after the transmission burst has stopped.

If a tag was present within detection range during the transmission burst, the resonance of this tag will be detected in the receiver window and an alarm will be triggered.

A single 50Hz mains frequency cycle is dived into three phases; phase A, B and C. Each phase covers 1/3 of the 50Hz cycle duration.

A noise reference window is opened to detect the environmental noise. This signal is compared with the signal received in the receiver window and allows the software to properly distinguish a tag signal from a noise signal.

Figure 1 shows the AM operating principle (at 50Hz, with a default delay of 200µs) during one 50Hz cycle.
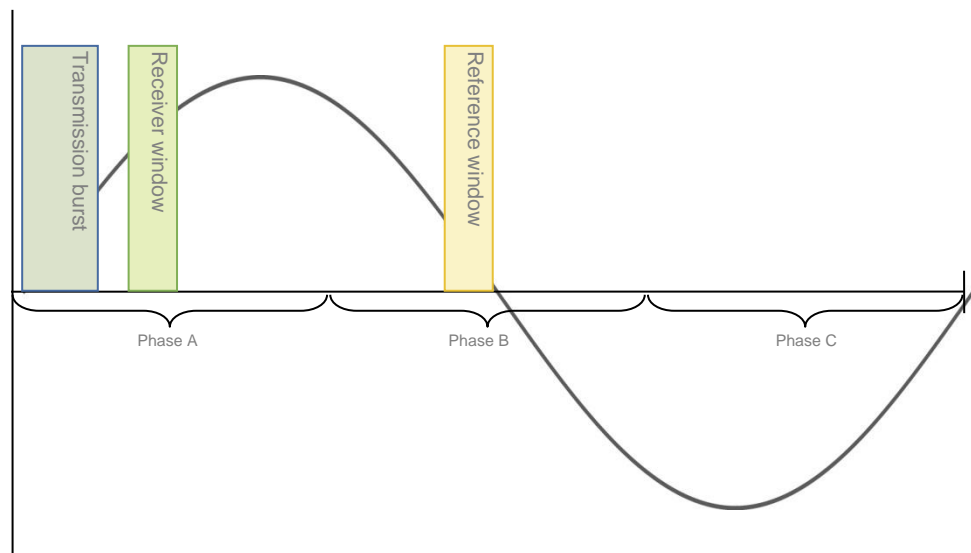

Figure 1: AM operating principle

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5.1   Synchronization principle

When multiple AM systems are installed in each other's vicinity, it's very important to properly synchronize the transmission burst and receiver windows for all systems involved. If systems are not properly synchronized they will create false alarms and poor detection! Keep in mind that AM signals, when compared to other EAS technologies, can "travel" quite far (up to 100m or more) because of their longer wavelength.

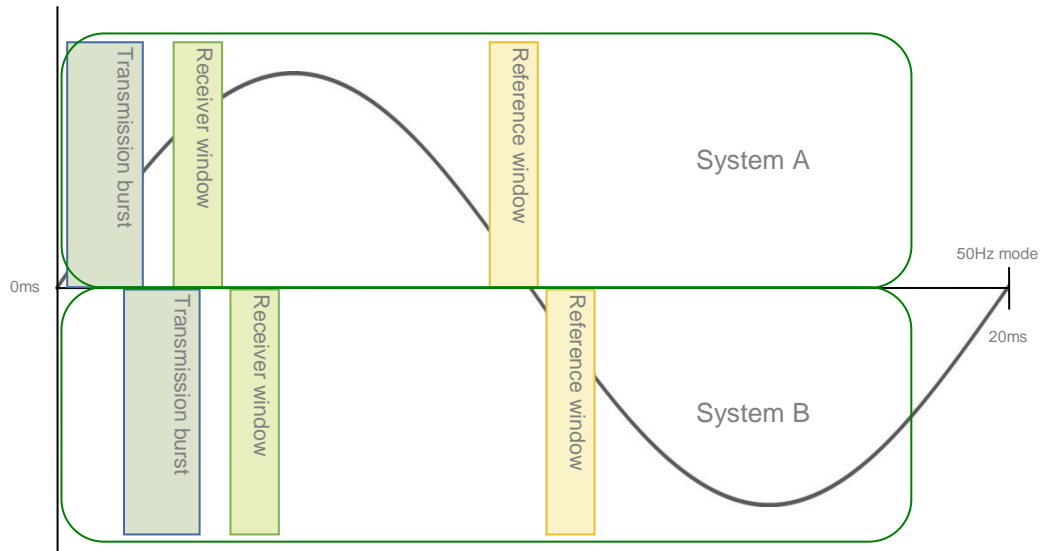**Figure 2** shows two AM systems that are not properly synchronized.

Figure 2: Two AM systems NOT synchronized

The transmission burst of system B starts later than the burst of system A, resulting in the fact that system A is receiving the transmission burst of system B in its receiver window. This might create false alarms and poor detection on system A, where system B will function properly as the transmission burst of system A is not affecting the receiver window of system B.

This problem can be solved by making sure that both systems transmit and receive at the same moment, which can be realized by changing the delay time for one of the two systems.

Example:

System A has currently a delay time of 0.2ms and system B a delay time of 1.4ms. The delay time of system B needs to be corrected to the delay time of system A (or vice versa), so their mutual transmission burst and detection windows will overlap each other (see Figure 3). This will result in both systems working properly without interference (see Figure 4).
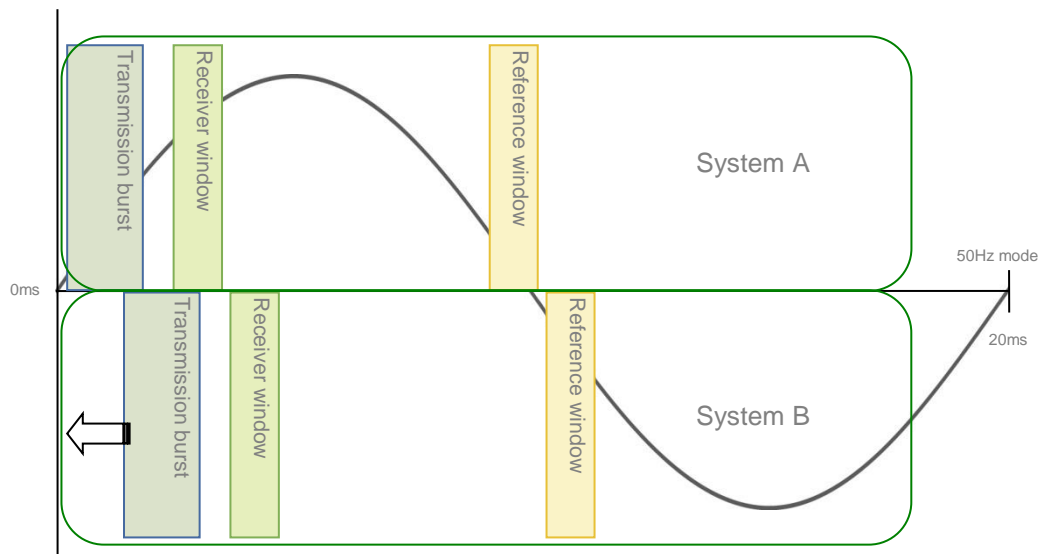
Figure 3: Correcting the delay time of system B

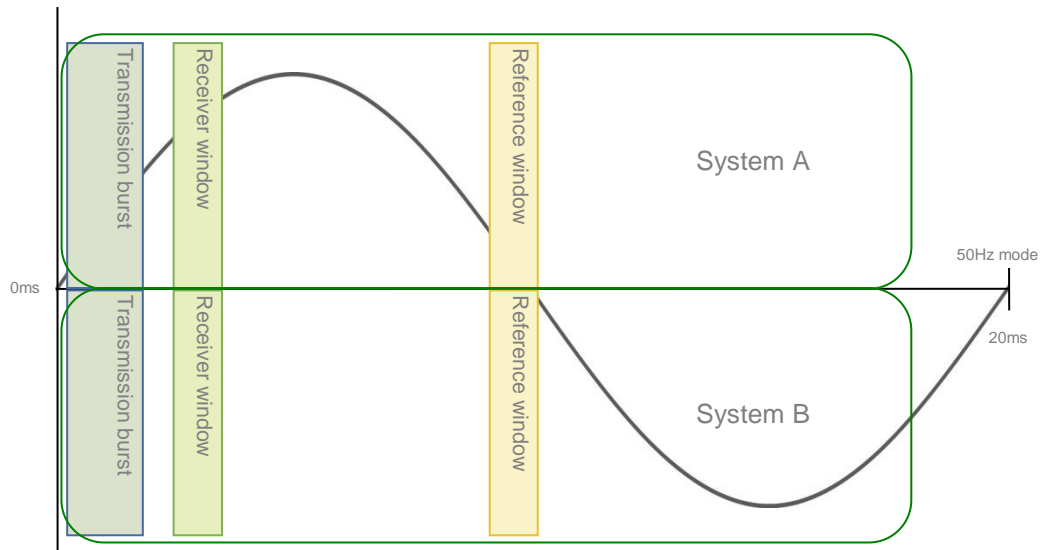Figure 4 shows two AM systems that are properly synchronized.

Figure 4: Two AM systems properly synchronized

The synchronization can be performed by making use of Cross Point's software. The exact synchronization procedures are described in chapter 8.7.5.2.

6 Connections

In the following chapters the connections between the TRX board, RX board and Controller are described.

Furthermore the Printed Circuit Boards (PCB) and the manual adjustments are explained.

6.1 "A" and "B" side of the antenna

The antenna has a front side (A) and a back side (B). These sides are indicated on the visitor counter in the top/middle of the antenna.

The A-side is the side on which the electronic boards can be accessed.

When using the visitor counter (see also chapter 6.12 (page 34)) try to put all antenna's in the AB-AB pattern, i.e. all antennas should be placed in the same way.
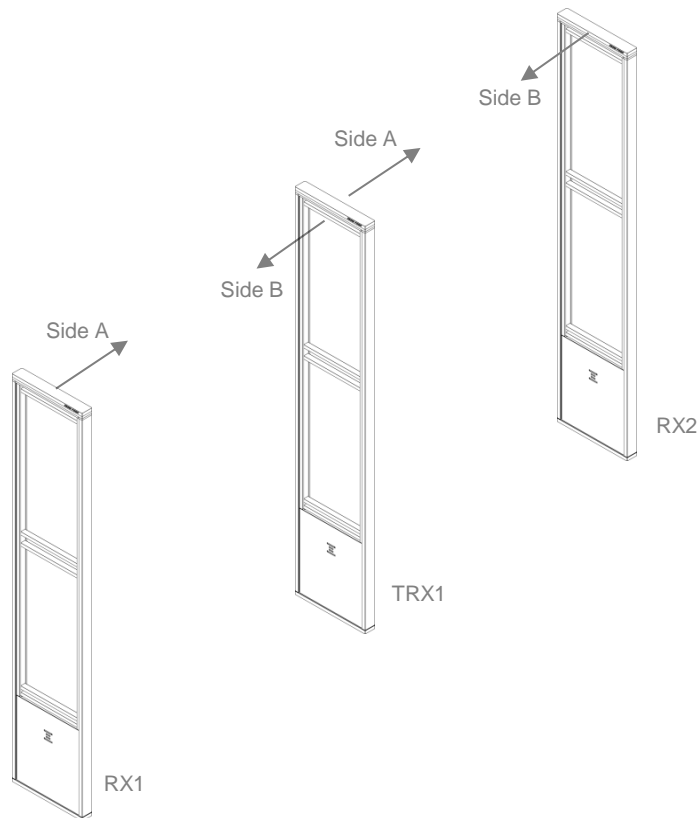
Figure 5: Antenna AB-AB pattern

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6.2   How to access the electronic boards

In order to be able to access the electronic board, the top of the antenna needs to be removed as well as the Plexiglas plate(s) and the metal front cover. Follow the next procedure carefully to do this.

1. Put your left hand on top of the top part

2. Put your right hand around the antenna frame on the right side of the antenna
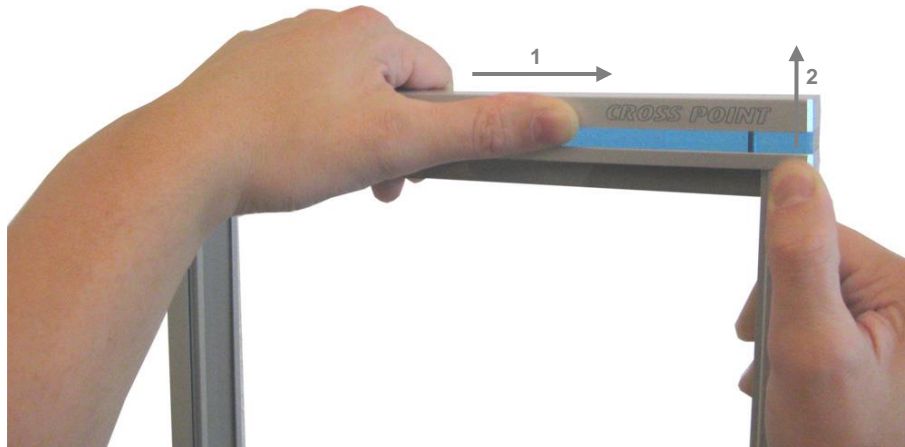
3. While pushing the top part to the right with your left hand (1), push the top part up upwards with the thumb of your right hand (2). This will unlock the magnets and the 'click' locking mechanism and the top part can be removed
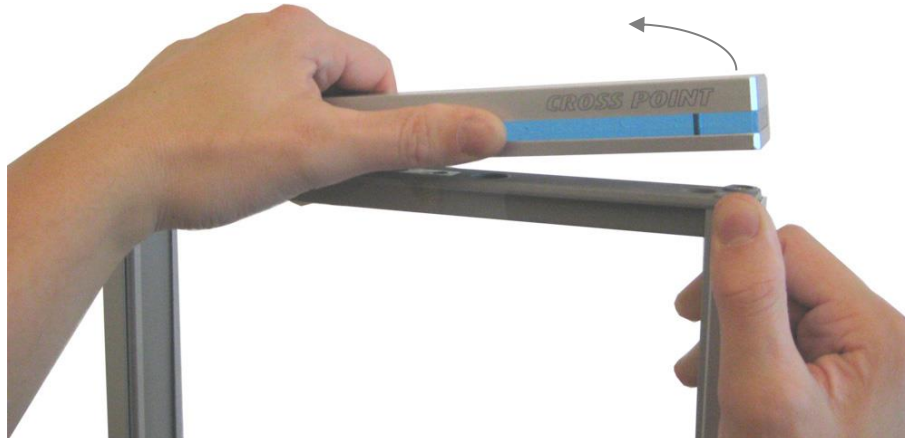
4. Slide the Plexiglas plate on side A of the antenna upwards. Out of safety reasons is it strongly advised to remove this Plexiglas plate completely when servicing the electronics. When this is not possible make sure the Plexiglas plate is supported properly after it is moved upwards, to prevent it from falling down and causing an injury.

5. Unlock the screws in the front cover (side A)

6. Remove the front cover

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6.3 Field Bus connections

The TRX and RX antennas are interconnected through the Field Bus by using preferably FTP cables, because FTP has an advantage to eliminate noise because of the extra shielding.

> ⚠️ **The Cross Point Field Bus requires the devices to be connected in a "daisy chain" connection. A "star" network is not allowed and will result in poor communication between the devices and the host computer or controller!**

Each device (TRX PCB and RX PCB) has a unique address. This address is factory set and cannot be changed. A PC/laptop enables local maintenance of the TRX and RX boards by using the Device Explorer software.

When the Field Bus is connected to the Access Point and the Access Point is connected to a Local Area Network (LAN), local servicing and data retrieval is possible. When an Internet connection is available, the Access Point can also be connected to the Internet, which enables service and data retrieval from any remote location over the Internet.

6.3.1 Bus connections with laptop

Figure 6 shows the Field Bus structure between the various antennas.

Connecting the Field Bus to a laptop (through an Access Point), allows on-site maintenance through the Device Explorer software.

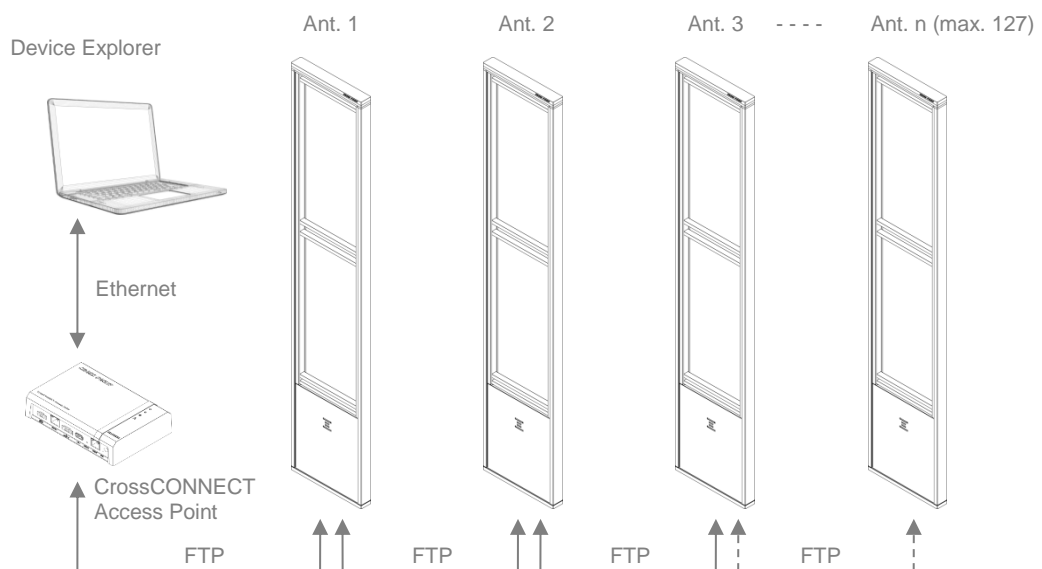See chapter 0 for further information on how to use the Device Explorer software.

Figure 6: Field Bus structure

6.4   Field Bus termination

For the Field Bus to operate properly the bus needs to be terminated on the first device and the last device in the bus.

When an antenna is either the first or the last device in the Field Bus, then the bus needs to be terminated on that device.

In the example in **Figure 7** the bus needs to be terminated on the Access Point (which is automatically done by the Access Point itself) and on RX2.
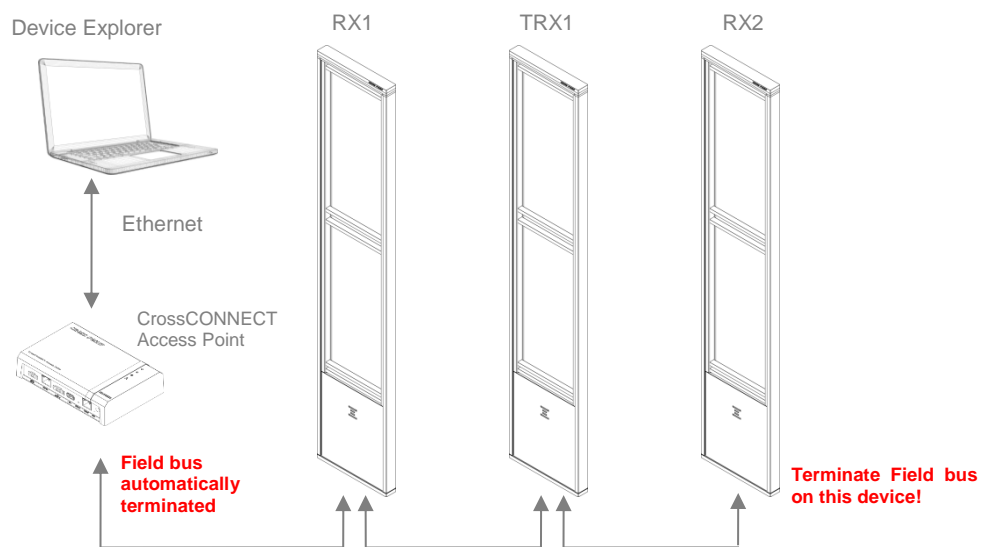

Figure 7: Field Bus termination example

6.4.1   TRX bus termination

Switch TERM to ON to terminate the bus on the TRX.

6.4.2   RX bus termination

Switch TERM (SW1) to ON to terminate the bus on the RX.

6.5   Power supply unit AM systems

The next sections contain information on power supply for AM systems. Please read the supplied information carefully prior to connecting the power supply, as it contains important information on proper usage of the power supply unit.
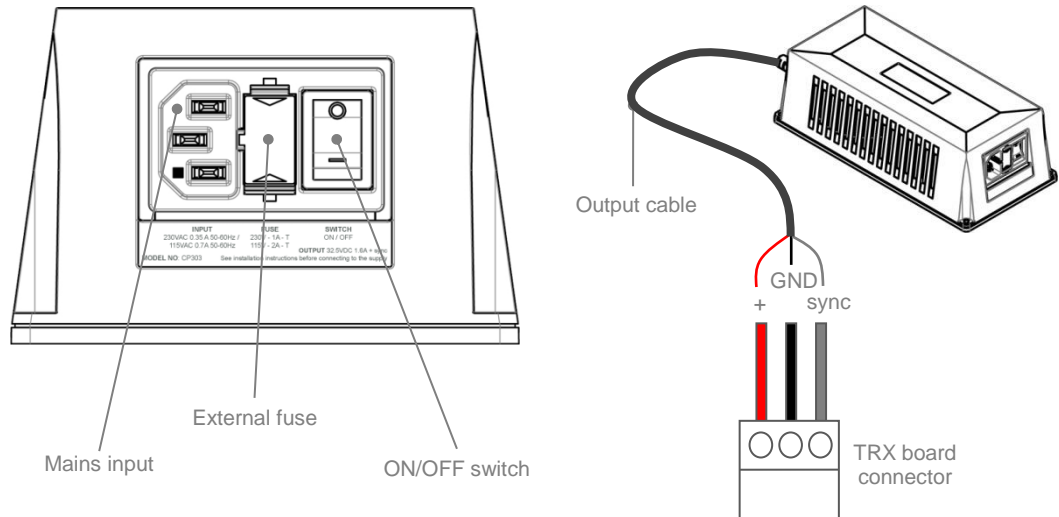

Figure 8: AM power supply unit

Table 1 shows the color schemes for the output cable.

Wire coloring variations for output cable

32.5VDC	Red
GND	Black
SYNC	Grey

Table 1: Output cable color scheme

> **The mains socket-outlet shall be installed near the power supply unit and shall be easy accessible.**

6.6 Power supply specifications

Table 2 shows the specifications of the AM Power Supply.

Technical specifications	
Dimensions (L x W x H)	227 x 108 x 71 mm
Weight	2.1 kg
Input voltage, frequency & current	230VAC 50-60Hz 500mA **or** 115VAC 50-60Hz 1A
Mains inlet type	Fused AC IEC with ON/OFF switch
Mains lead	Euro Schuko to IEC, 1.5m length
Output	32.5VDC 1.6A + synchronization signal
Output cable	$3x1mm^2$, fixed, 5m length. This cable can be extended to 15m using a $3x1mm^2$ cable or thicker.
Temperature range	$0 – 50^{o}C$
External fuse Replace when changing mains voltage!	230VAC – 1A slow 115VAC – 2A slow

Table 2: AM Power supply specifications

6.7 Switching to a different mains voltage

The power supply supports 2 mains voltages; 230VAC (default setting) and 115VAC.

By default the power supply is set to 230VAC mains input, but if required, the mains input can be switched to 115VAC. Follow the next steps to switch to a different mains voltage:

1. Disconnect from mains power and carefully open the power supply housing
2. Locate the internal switch and switch it to the required position
3. Replace the external fuse with the correct value (see Table 2)
4. Carefully close the power supply housing

6.8 Power supply restrictions

This power supply has the following restrictions which must be respected carefully in order to warrant the safety of the product and user:

- Only to be used in combination with AM systems
- For indoor use only
- Disconnect from mains power before opening the housing
- Do not cover the ventilation holes of the housing

- Leave at least 10cm of free space around the PSU for ventilation purposes

- Allow for free air flow around the PSU

- Local laws and regulations must be respected when installing and servicing this device

- Minimum distance between PSU and AM system is 1m.

> ⚠ **It is prohibited to connect more than one TRX to a power supply. Use a separate power supply for each TRX antenna!**

Keeping the power supply principle in mind, the following power supply connections are recommended:

6.8.1 Power supply for a single system (mono)

In a single antenna system setup (1 or multiple transceivers), a power supply must be connected to each individual TRX antenna. It is not possible to connect more than one TRX to one power supply.
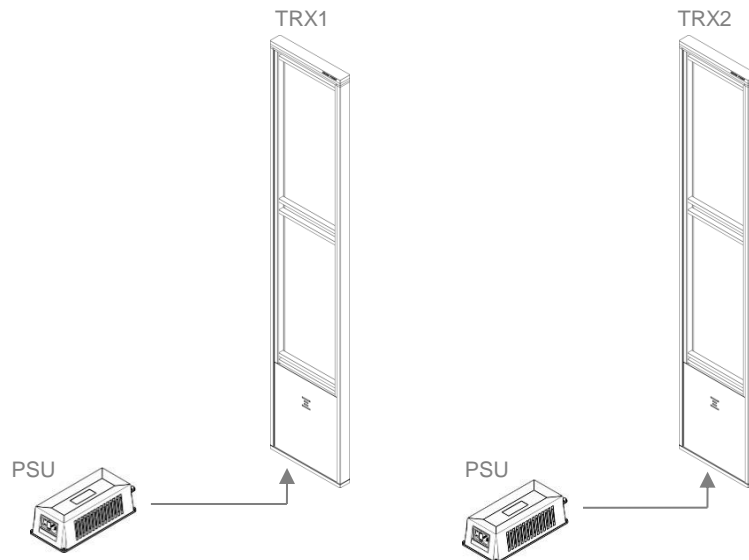

Figure 9: Power supply connection: Single and multiple mono antennas

6.8.2 Power supply for a dual system

In a dual antenna system setup (1 TRX and 1 RX), a power supply must be connected to each individual TRX antenna. It is not possible to connect more than one TRX to one power supply.
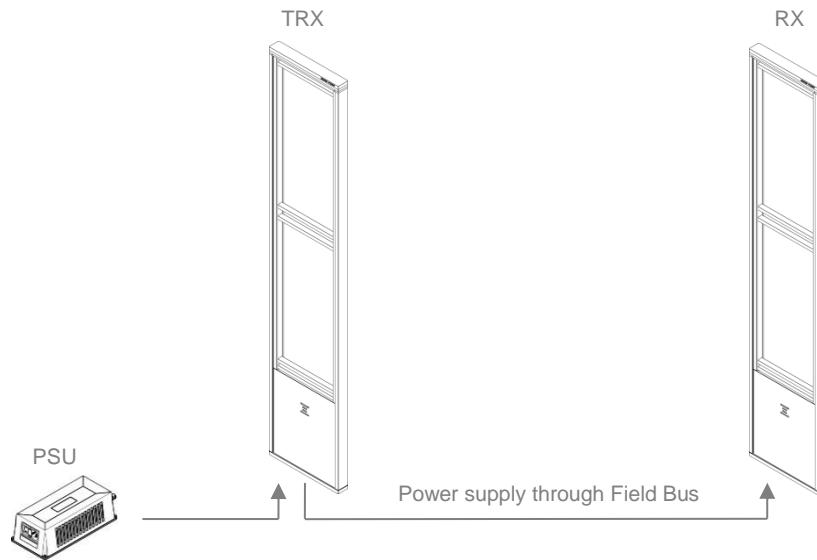
CROSS POINT

TRX   RX

PSU

Power supply through Field Bus

Figure 10: Power supply connection: Dual antenna system

6.8.3   Power supply for a triple system

In a triple antenna system setup (1 TRX and 2 RX), a power supply must be connected to each individual TRX antenna. It is not possible to connect more than one TRX to one power supply.
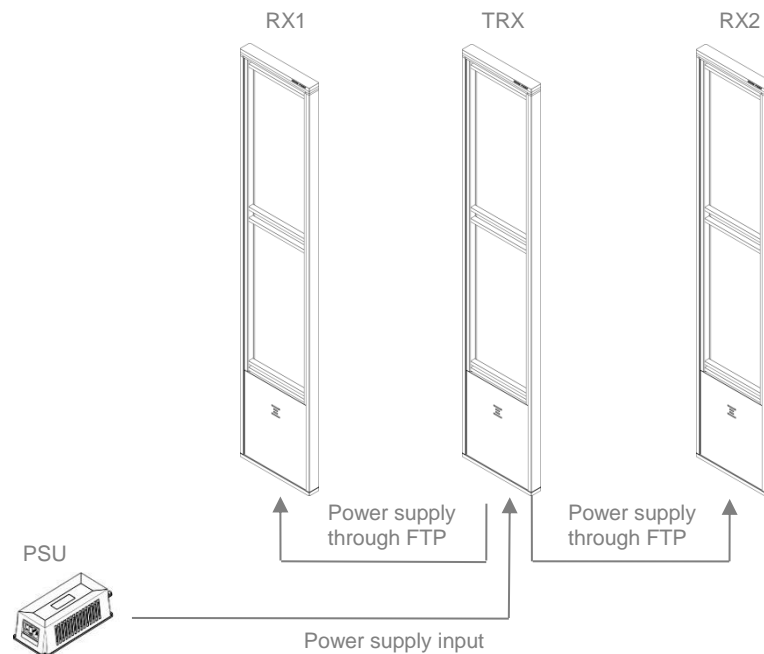
RX1   TRX   RX2

PSU

Power supply
through FTP

Power supply
through FTP

Power supply input

Figure 11: Power supply connection: Triple antenna system

6.8.4　Power supply for large system setup

Figure 12 shows an example for 5 antenna power supply. Each additional TRX antenna has to be powered with a separate power supply.
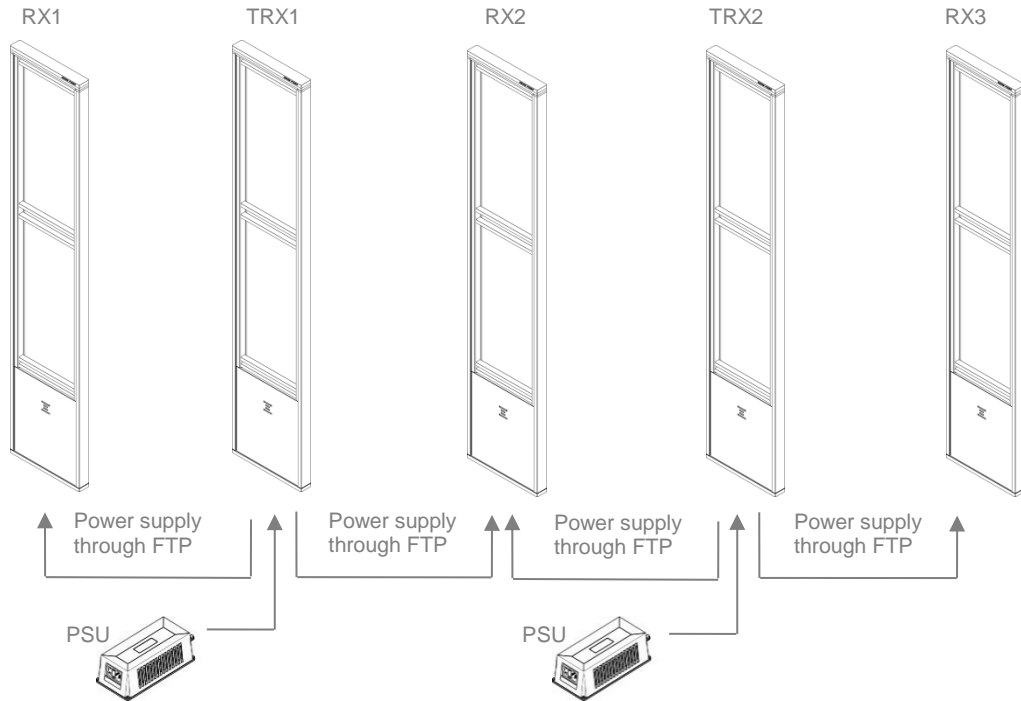

Figure 12: Power supply connections for more than 3 antennas

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6.9 Antenna wiring

The AM TRX and RX antennas are configured with two identical antenna coil assemblies, one in the top and the second in the bottom of the antenna. Each coil assembly consists of two multi-turn coils (red wire and black wire in the top, green wire and white wire in the bottom).
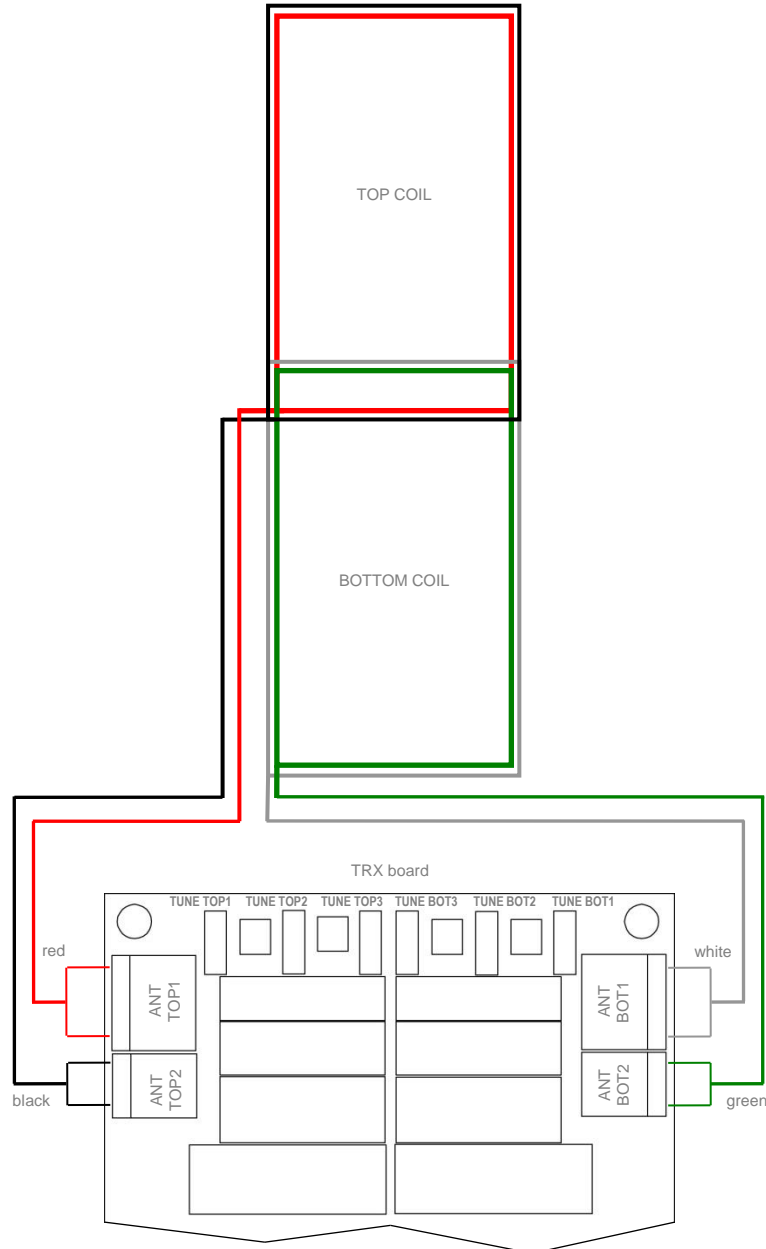
TOP COIL

BOTTOM COIL

TRX board

TUNE TOP1 TUNE TOP2 TUNE TOP3 TUNE BOT3 TUNE BOT2 TUNE BOT1

red

ANT TOP1

white

ANT BOT1

black

ANT TOP2

green

ANT BOT2

Figure 13: TRX antenna wiring

6.10   The AM Transceiver (TRX)

The AM TRX is a fully digital AM transmitter and receiver, designed to operate at 58 kHz and has the following features:

- Center frequency of 58kHz

- Real-time clock

- Date/time stamped events are stored in onboard memory and can be retrieved through software

- External interfaces;
    - push buttons
    - buzzer
    - relay
    - LED's
    - tamper contact

- Visitor counter connection

- Internet connectivity, allowing remote servicing and data retrieval through use of the CrossCONNECT Access Point.

6.10.1   AM Transceiver Printed Circuit Board

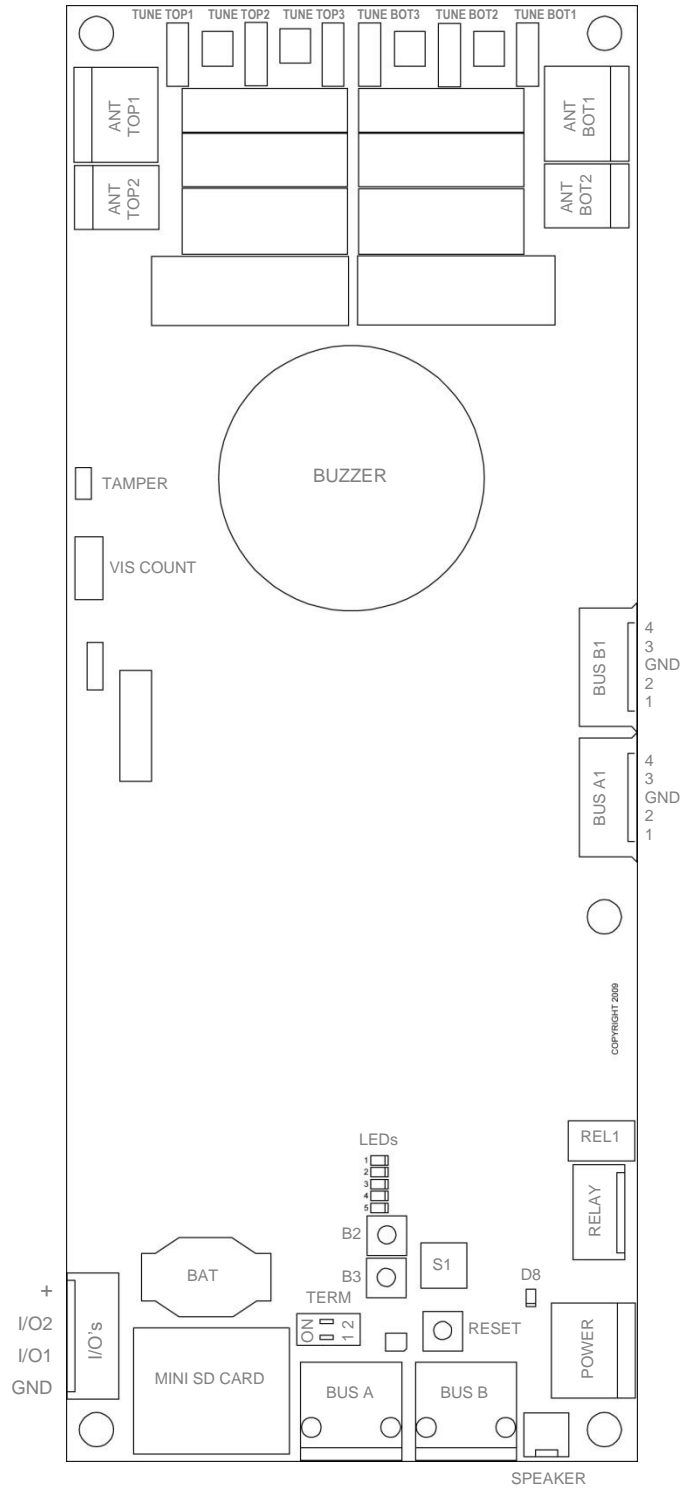**Figure 14** shows the TRX PCB and its available components.

Figure 14: The AM TRX Printed Circuit Board

6.10.1.1 TRX PCB Components

Table 3 shows the AM TRX components and a description of their function.

Component	Function
ANT BOT1	Bottom transmitter/receiver antenna loop
ANT BOT2	Bottom signal suppression loop
ANT TOP1	Top transmitter/receiver antenna loop
ANT TOP2	Top signal suppression loop
B2	Push button
B3	Push button
BAT	Backup battery for internal clock.
BL1	LED indicator. Blinks during start-up of the TRX board and in case the TRX board has no connection with a host when connected to the Field Bus. Lights up continuously when a connection with a host has been established.
BUS A	Field Bus A connector for RJ45 connection. Allows the board to be connected in the Field Bus structure.
BUS A1	Analogue connection to the receiver. Relates to BUS A connector.
BUS B	Field Bus B connector for RJ45 connection. Allows the board to be connected in the Field Bus structure.
BUS B1	Analogue connection to the receiver. Relates to BUS B connector.
BUZZER	On-board buzzer for alarm notifications
D8	LED indicator. Lights up when a power supply is connected and switched on.
I/O's	Programmable input/output. Allows connection of external devices like camera's, push buttons, buzzers, etc.
LEDs	LED array, indicates various system settings.

MINI SD CARD	Mini SD card slot. An SD card containing special audio notification messages can be inserted. For future use.
POWER	External power supply input connector.
REL1	The actual relay.
RELAY	The external connection for relay REL1. Normally Open (NO), Common (COM) and Normally Closed (NC) potential free contacts are available to connect external devices like camera's, buzzers, etc.
	Relay max. rating: 30VDC/1A
RESET	Reset button. Pressing this button will result in a software reset of this board without interrupting the Field Bus.
S1	Rotary switch for selecting one of the following options:
	0. Default active
	1. Test mode
	All other positions of this rotary switch are not used.
SPEAKER	External loudspeaker connection. Allows audio files to be played (only in combination with the mini SD card).
TAMPER	External tamper connector.
	Allows connection of a mechanical switch to detect unauthorized opening of the antenna housing.
	NOTE: Not implemented yet in the antenna housing.
TERM	Field Bus termination switch.
	The Field Bus needs to be terminated properly to avoid signal reflections which can cause bad communication. The first and last device in the Field Bus structure need to terminate the bus. Switch to ON if this TRX is the first or last device in the Field Bus.
TUNE BOT1 TUNE BOT2 TUNE BOT3	Pluggable bridge positions to tune the TRX transmitter bottom antenna loop signal to maximum value
TUNE TOP1 TUNE TOP2 TUNE TOP3	Pluggable bridge positions to tune the TRX transmitter top antenna loop signal to maximum value

VIS COUNT	Visitor counter connector.
	Connect the wire to the visitor counter to this connector.

Table 3: The AM TRX components

6.10.2   Transceiver - receiver cable connections

When an AM receiver is combined with an AM transceiver, the receiver must be connected to the transceiver with the receiver cable. **Figure 15** shows the transceiver to receiver cable connections.
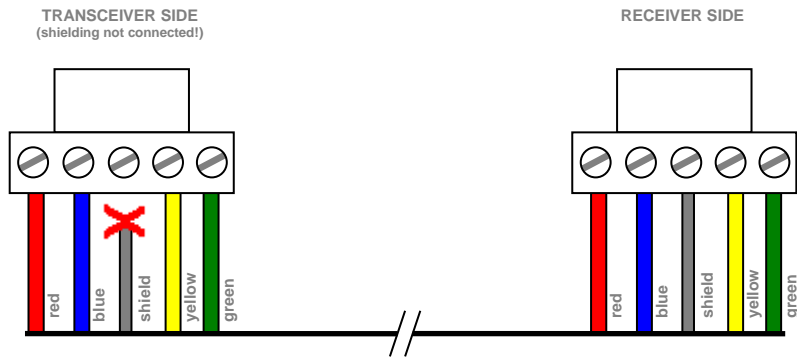

Figure 15: Receiver cable connections

> ⚠ **Make sure that the shielding of the wire is only connected on the receiver side, NOT on the transceiver side!**

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6.10.3   I/O connections

The AM TRX board is equipped with two I/O's which can be used for connecting a pushbutton (Forced Alarm option) or as output for other external devices (e.g. camera).

To avoid interference, caused by the wires which will be connected to any of the I/O's, it is very important to only connect the wires to the I/O connector contacts.

Do not connect any of the wires directly to a GND contact on the TRX board or on the power supply! Use the "GND" connector to connect to the ground.

The I/Os have a current limit of 70mA. Do not connect devices to the I/Os that draw more than 70mA, else the I/O drivers will get damaged!

Figure 16 shows the proper way to connect a "Forced Alarm" pushbutton between "I/O1" and "+".
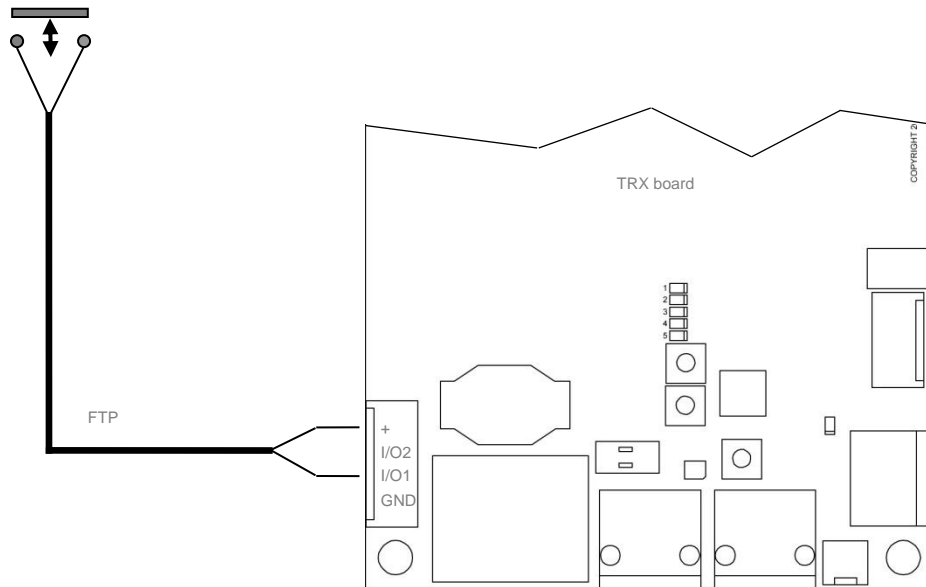
Figure 16: Proper I/O connections

6.11   The AM Receiver (RX)

The AM Receiver can be connected to the AM Transceiver to enhance the detection range. All information and events are stored on the transceiver, not on the receiver board itself.

6.11.1   AM Receiver Printed Circuit Board
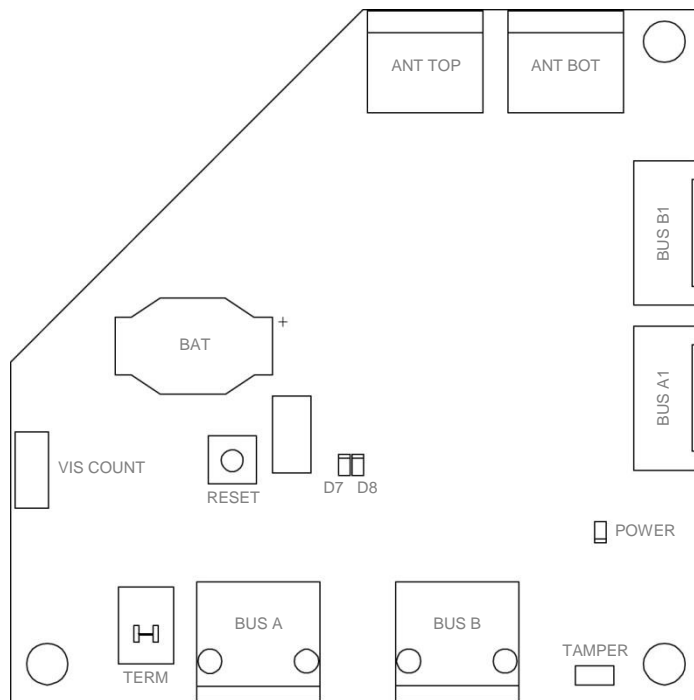
Figure 17 shows the RX PCB and its available components.

Figure 17: The AM RX Printed Circuit Board

6.11.1.1   RX PCB Components

Table 4 shows the AM RX components and a description of their function.

Component	Function
ANT BOT	Bottom receiver antenna loop
ANT TOP	Top receiver antenna loop
BAT	Backup battery for internal clock.

BUS A	Field Bus A connector for RJ45 connection. Allows the board to be connected in the Field Bus structure.
BUS A1	Analogue connection to the transceiver.
BUS B	Field Bus B connector for RJ45 connection. Allows the board to be connected in the Field Bus structure.
BUS B1	Analogue connection to the transceiver.
D7	Red LED. ON (blinking) when the receiver is in bootloader mode (e.g., during firmware upload). OFF during normal operation.
D8	Green LED. ON indicates a connection with a host computer/controller. OFF indicates that the connection with the host is lost.
POWER	LED indicator. Lights up when power supply is received through the Field Bus.
RESET	Reset button. Pressing this button will result in a software reset of this board without interrupting the Field Bus.
TAMPER	External tamper connector. Allows connection of a mechanical switch to detect unauthorized opening of the antenna housing. **NOTE**: Not implemented yet in the antenna housing.
TERM	Field Bus termination switch. The Field Bus needs to be terminated properly to avoid signal reflections which can cause bad communication. The first and last device in the Field Bus structure need to terminate the bus. Switch to ON if this RX is the first or last device in the Field Bus.
VIS COUNT	Visitor counter connector. Connect the wire to the visitor counter to this connector.

Table 4: The AM RX components

> **Pins 3 and 6 of RJ-45 connector BUS A are not connected to pins 3 and 6 on RJ-45 connector BUS B. Unlike the RF systems, pins 3 and 6 are not used as synchronization wires, but for communication between the transceiver and receiver.**
>
> **For this reason it is not allowed to connect RF and AM systems on the same Field Bus!**

6.12   The visitor counter

The AM models can be equipped with a visitor counter. This counter allows counting of visitors as well as determining the movement direction of a person who generated an alarm.

Both TRX and RX antennas can therefore be equipped with a visitor counter PCB. The TRX antenna holds the RX visitor counter PCB (IR-RX) and the RX antenna holds the TX visitor counter PCB (IR-TX).
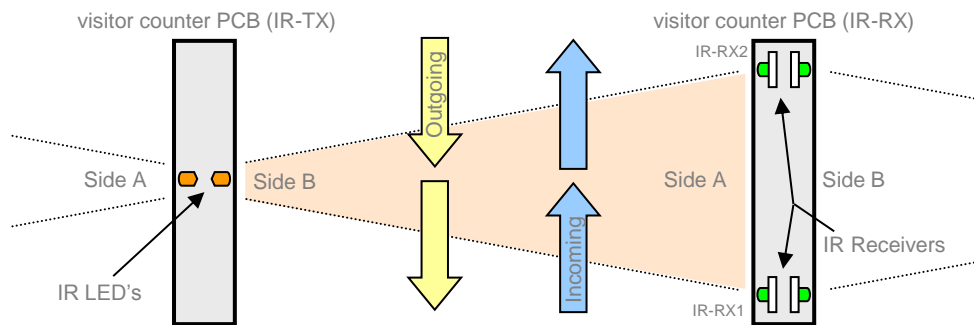
Figure 18 shows the visitor counter principle.

Figure 18: Top view of the visitor counter principle

The IR LED on side B of the RX antenna transmits an infra-red signal, which is received by both IR receivers on side A of the TRX. When the infra-red signal is interrupted by a person walking in (incoming), first IR-RX1 will receive no signal and then IR-RX2 will receive no signal. In this way the visitor counter registers the movement direction. The same principle is used for outgoing persons.

As shown in the above figure, each visitor counter PCB has an A and B side. The transmitter IR-LED's and the IR receivers can be switched on or off per side. This is necessary for each first and last antenna in a row. For example, if the system in the above figure consists just of two antennas, then the visitor counter side B of the transceiver antenna and side A of the receiver antenna must be switched off. The Device Explorer software will automatically activate the visitor counters dependent of the antenna lay-out.

It is possible to increase the intensity of the IR-LED's. This can be useful in bright and sunny environments, to ensure proper functioning of the visitor counter.

For the visitor counter to operate properly the minimum distance between the transceiver and receiver is 0.5m. The maximum distance is 3m (per aisle).

6.13 Various connections

For proper operation of the AM system, it is very important to interconnect the transceivers and receivers in the correct way. This chapter shows and explains these various connections.

6.13.1 Single antenna system (no aisle)

The AM system can be used as a single antenna system (mono). When **no** receivers are connected to the transceiver, the transceiver will automatically function as a mono antenna system. Visitor counting is not possible.
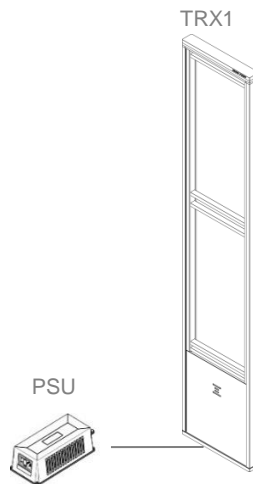
Figure 19: Single antenna system

6.13.1.1 Multiple transceivers

In case only transceivers are used, the transceivers can either be used as complete stand-alone antennas, or they can be interconnected with FTP cables to create the Field Bus. Connecting the Field Bus to a computer or controller will allow central (remote) maintenance and reports to be generated. Visitor counting is not possible.
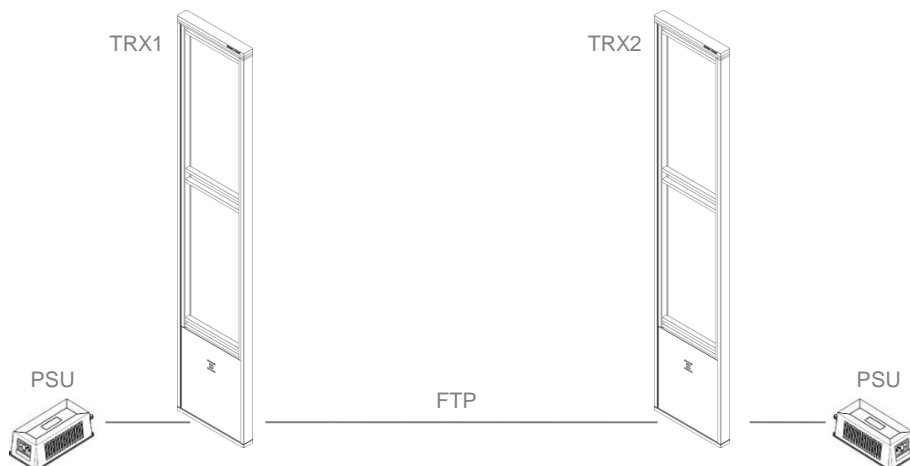
Figure 20: Transceivers only with FTP connection

6.13.2 Dual antenna system (single aisle)

In case receivers are connected to the transceiver it is of great importance to connect the FTP and analogue connection cables to the proper connectors on the TRX and RX boards.

Figure 21 shows the connections for a dual system (TRX + RX).
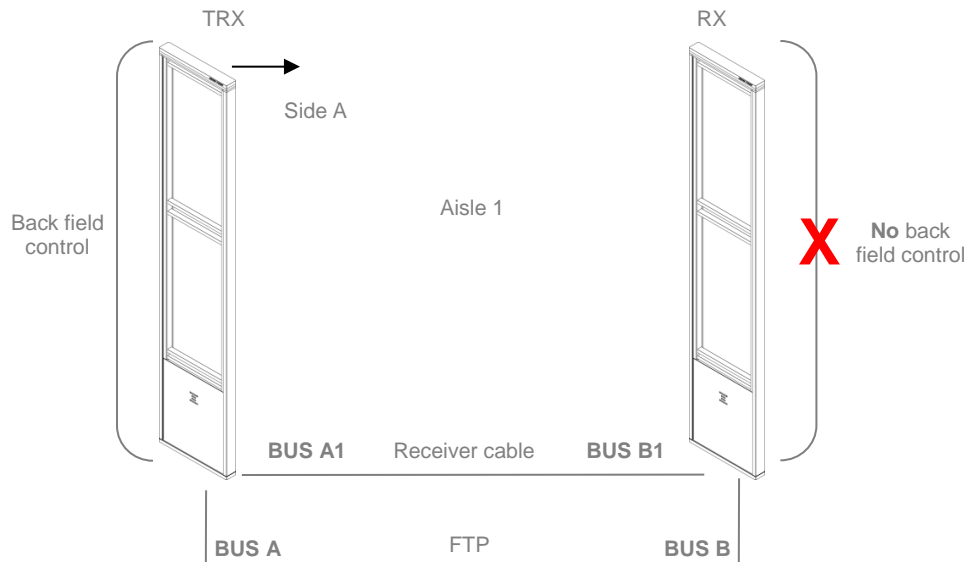
Figure 21: Dual antenna system connections

6.13.2.1 Backfield control

When only one receiver antenna is connected to a transceiver and this receiver is connected to Bus A of the transceiver, then the detection of the B-side of the transceiver can be reduced if required. This is called 'Back field control'.

When enabled, back field control makes it possible to reduce the back field detection of the TRX antenna by switching of its internal receiver circuit. The TRX antenna will then act as a transmitter only and detection is on the RX antenna only, resulting in a concentrated detection area between the antennas.

⚠️ **Backfield control is only possible on a transceiver, not on a receiver!**

How to enable/disable back field detection is described in chapter 0.

Power supply connections are not shown in the image but are described in 6.5.

6.13.3 Triple antenna system (double aisle)

In case receivers are connected to the transceiver it is of great importance to connect the FTP and analogue connection cables to the proper connectors on the TRX and RX boards. Figure 22 shows the connections for a triple system (RX + TRX + RX).
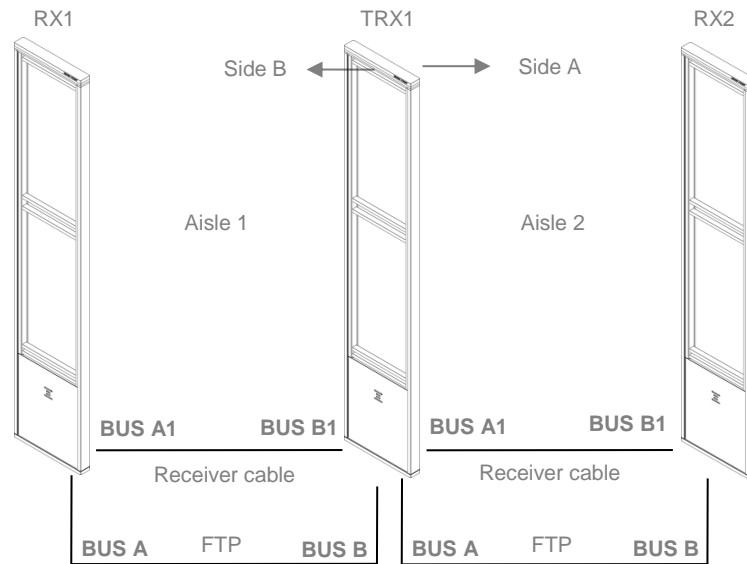

Figure 22: Triple antenna system connections

In this system setup it is important that the FTP cable is connected to the proper bus to allow for the receiver lights to light up in case of an alarm. The receiver FTP cable has to be inserted into the transceiver board with reference to the side (A or B) of the transceiver on which the particular receiver is installed.

Figure 22 shows receiver RX1 installed on the backside (side B) of transceiver TRX1. The FTP cable for RX1 then needs to be plugged into the BUS B connector of TRX1. RX2 is installed in front (side A) of TRX1 and the FTP cable for RX2 thus needs to be plugged into the BUS A connector of TRX1.

Power supply connections are not shown in the image but are described in chapter 6.5.

CROSS POINT

6.13.4 Quad antenna system (triple aisle)

In case four or more AM antennas need to be installed as one complete system, all antennas need to be connected as shown in **Figure 23**.
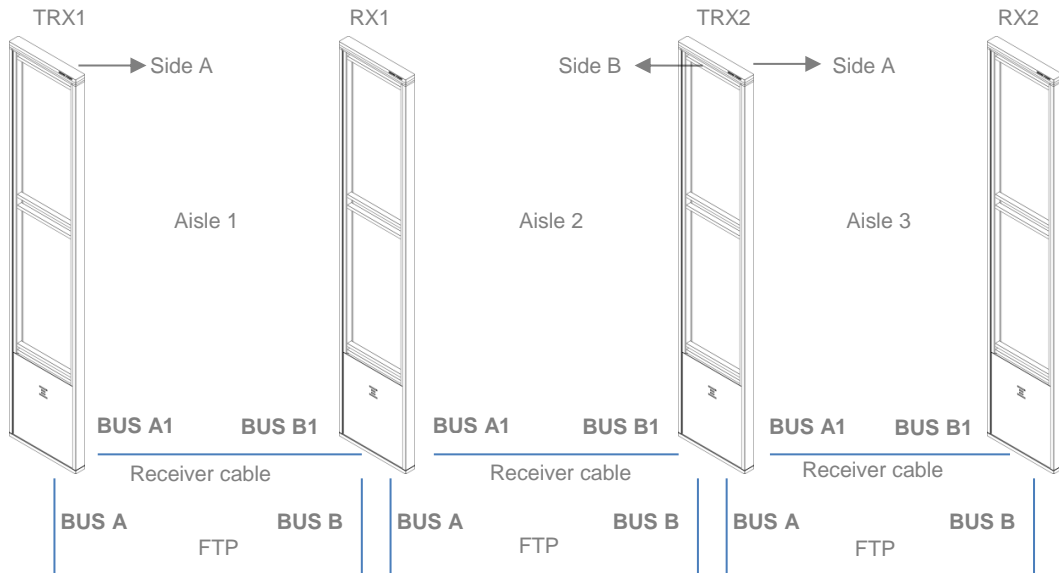
Figure 23: Quad antenna system

When a receiver is installed between two transceivers (RX1 in the above example), then this receiver needs to be connected to both transceivers through the analogue receiver cables to make this receiver detect tags in both aisle 2 and aisle 3.

Backfield control is possible on those transceivers that are the first and/or last antenna of the row and the receiver is connected to BUS A of the transceiver. In this case the backfield detection of TRX1 can be either enabled or disabled. Backfield control on TRX2 is not possible, since this antenna is installed between two receivers.

If no detection is required in aisle 2, then the receiver cable between TRX2 and RX1 can be disconnected. Backfield control on TRX1 and TRX2 will then be possible, if required.

Power supply connections are not shown in the image but are described in chapter 6.5.

6.13.5 Large systems

Large systems (more than 4 antennas) need to be installed as described in the previous section. If one complete Field Bus is required then all antennas need to be interconnected with FTP cable.

7 Configuration

This chapter describes the recommended adjustment procedure for the AM transceiver and receiver.

7.1 General connections

- Refer to chapter 3.1 (page 9) for noise sources and installation guidelines.
- Position the antenna(s) at the required location.
- Connect the power supply to the power input of the TRX board
- Connect the FTP cable between the RX and TRX board (in case of a multiple antenna setup)
- Connect the receiver cable between the RX and TRX board (in case of a multiple antenna setup)
- Switch on the power supply → the power LED's on both the TRX and RX will light up.
- Wait for about 10 seconds for the system to start up.

7.2 TRX configuration settings

Although the TRX comes pre-configured with factory settings, it can be necessary to fine-tune this board for best performance in your specific environment.

The TRX can be configured through the Field Bus using a host computer and the Cross Point Device Explorer software.

7.3 TRX configuration – Device Explorer

Please refer to chapter 8.7.5.1 for further details on how to configure the TRX using the Device Explorer software.

8 Cross Point Device Explorer

This chapter covers the AM transceiver and receiver settings in combination with the Cross Point Device Explorer software.

Please refer to chapter 2.2 for details on the Field Bus structure.

For the Cross Point Device Explorer installation procedure and other general settings we refer to the **Cross Point Device Explorer User Manual** (download available at www.crosspoint.nl).

> ⚠️ **Make sure to keep your laptop at least 3m away from the antennas. The back light of the laptop screen can create a lot of noise and might reduce the performance of the system!**

8.1 Starting the Device Explorer

After having installed the Cross Point Device Explorer, go to

Start > All programs > Cross Point > Device Explorer

(or your, during installation specified, destination folder) to start the Device Explorer.

8.2 Logon to Device Explorer

After starting the Device Explorer, you will be prompted to enter your username and password that allow you to use the Device Explorer.
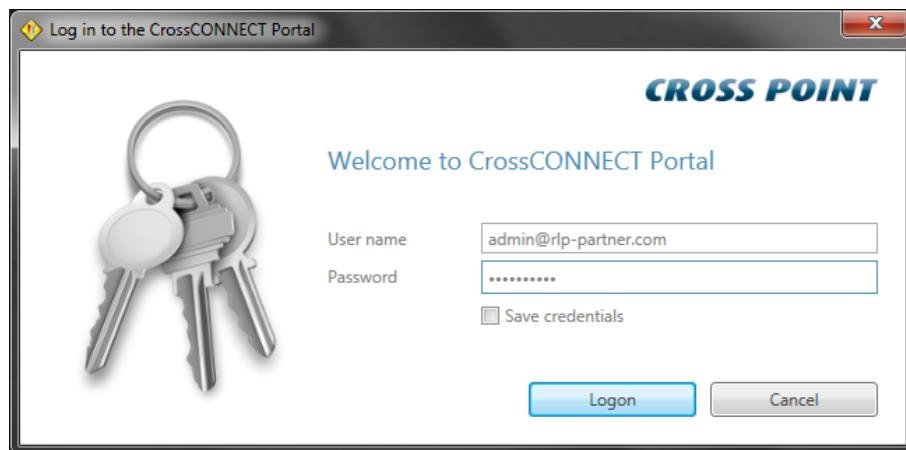
Figure 24: Logon to Device Explorer

These credentials have been supplied to you by Cross Point or a partner of Cross Point.

Tick the "Save credentials" checkbox if you want to use the specified logon credentials each time you start the Device Explorer.

Enter your credentials and click the Logon button to continue.

CROSS POINT

8.3   Store overview

When the Device Explorer is started and you have successfully logged-on, the Store overview screen opens.

All Access Points that are available for you are shown in this screen.
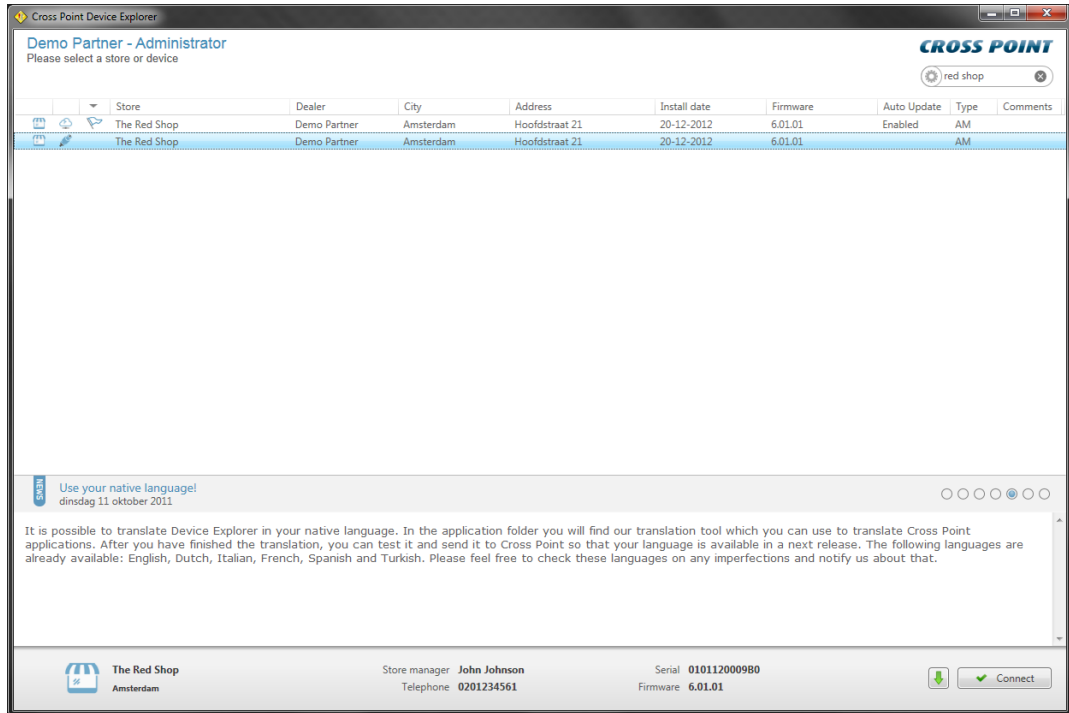
Figure 25: Store overview

Select the required store from the Store overview screen through a double click on the store to be able to perform local or remote service to the AM systems that are installed in the selected store.

The next chapters will cover the specific transceiver and receiver properties and settings.

Please refer to the Cross Point Device Explorer User Manual for more information on how to change settings for the Access Point itself.

8.4   Dashboard

After a successful logon to the selected Access Point, the Dashboard for this Access Point appears.

In case there are no devices connected yet to the Access Point, the Dashboard will show the "No devices found" message. See Figure 26.

If there are any devices connected to the Access Point, but no entrances have been created yet, the Dashboard will show the details as displayed in Figure 27.

In case devices are connected and entrances have been created, the Dashboard will display details similar to those in Figure 28.
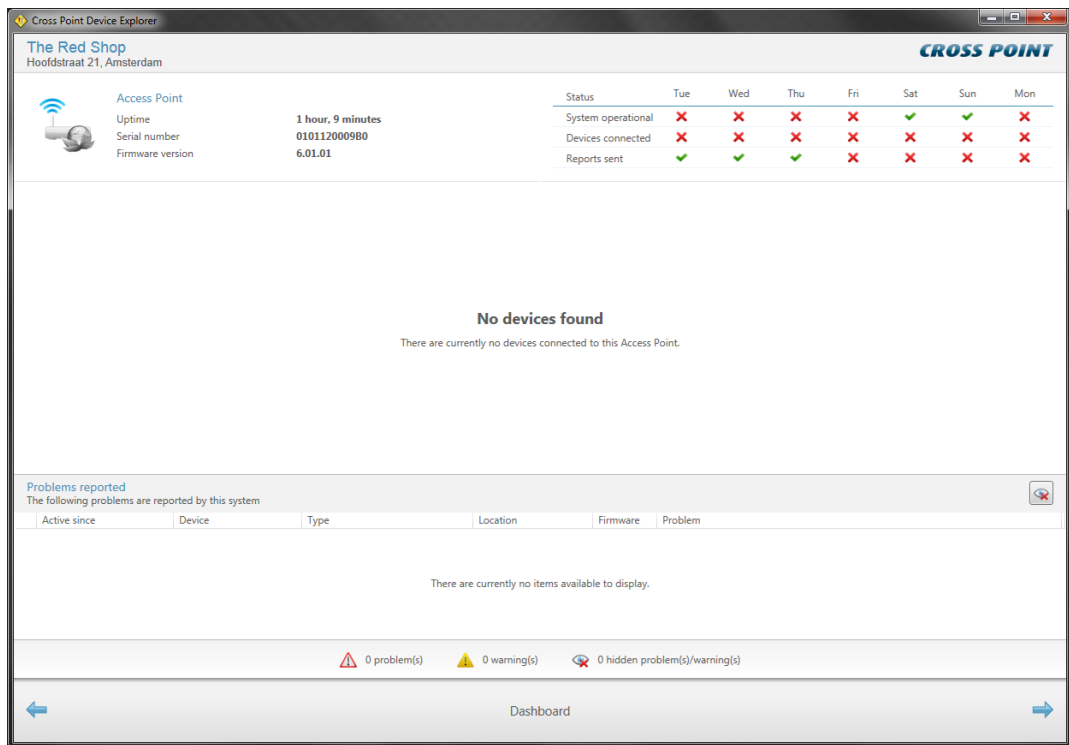
Figure 26: Dashboard – No devices found
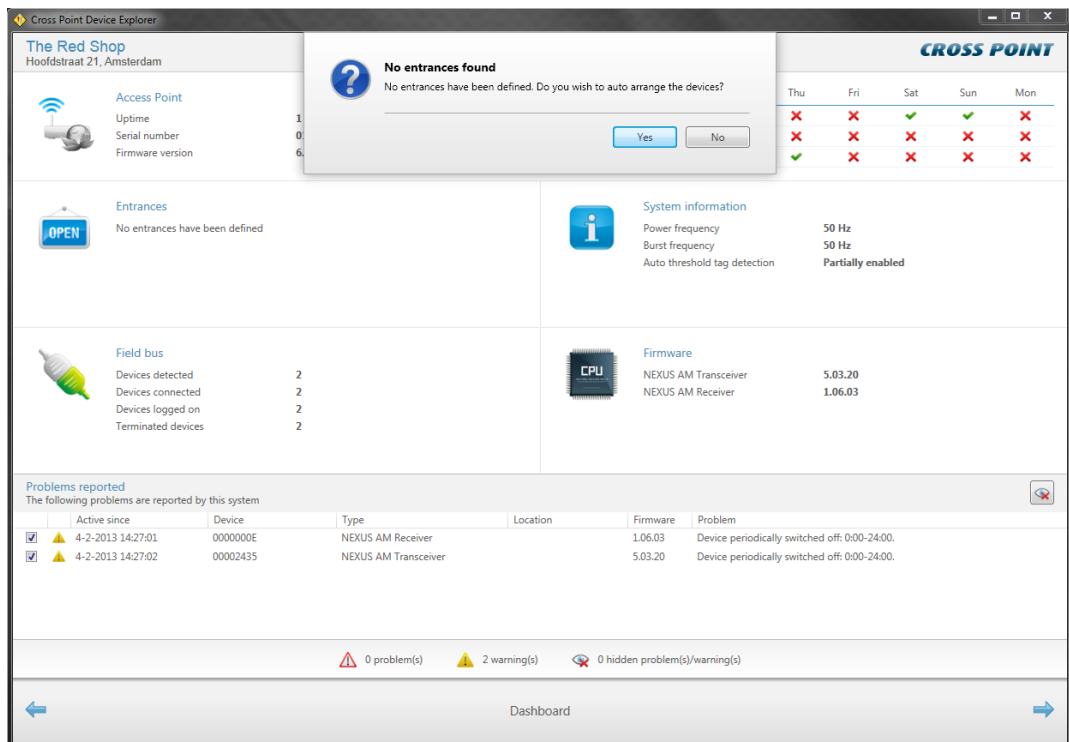
Figure 27: Dashboard – Devices found, no entrances found
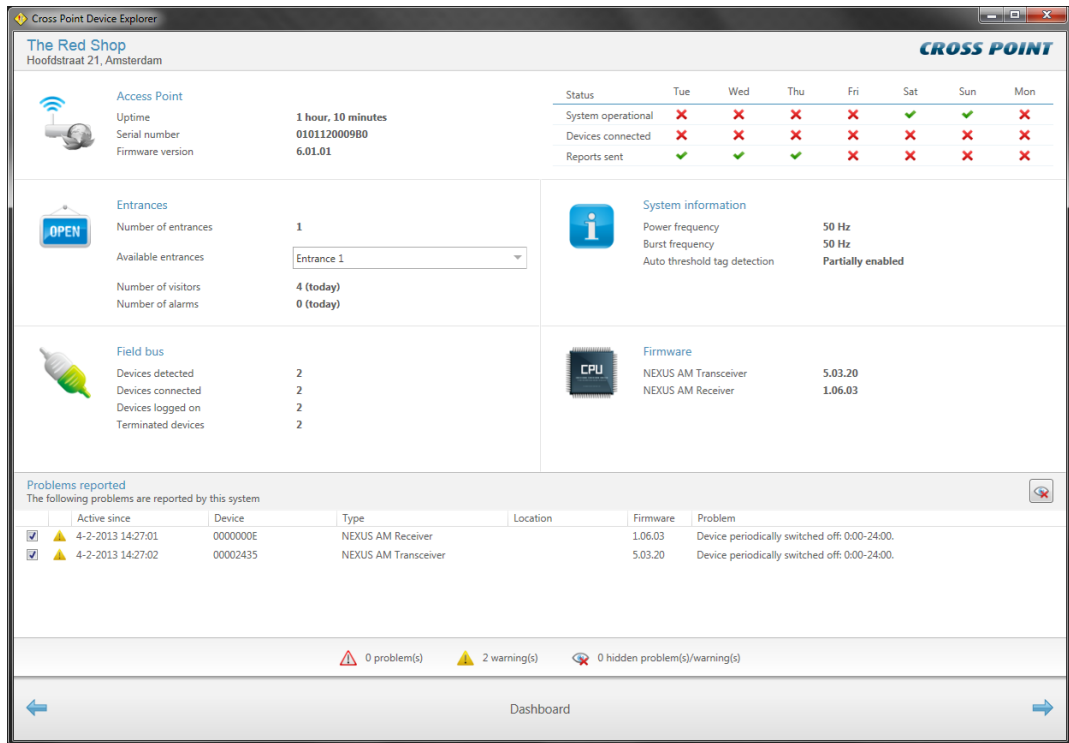
Figure 28: Dashboard – Devices and entrances found

8.5 Logon to the connected devices

The AM devices are secured against unauthorized access by means of a special code, the Installer Access code.

The Access Point logs-on to the devices using the Installer Access code. The Installer Access code is automatically derived from your company´s dealer code and cannot be customized anymore.

The Field Bus section shows if the logon to all detected devices was successful.

Figure 29: Dashboard – Fieldbus section - Logon status

CROSS POINT

8.6 Creating entrances

If entrances have not yet been created and the Device Explorer shows the screen as displayed in Figure 27, you can just click the Yes button to start the automatic antenna arrangement on the Access Point.

Once the antenna arrangement procedure has finished, the Entrances section in the Dashboard will show the number of entrances that were created, each individually selectable entrance and the number of visitors and alarms for the selected entrance.
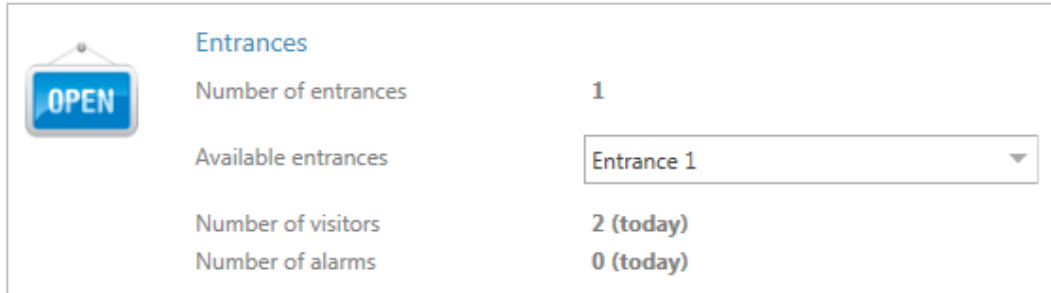
Figure 30: Dashboard – Entrances section

AM systems with integrated visitor counters can be arranged automatically using the visitor counter sensors of each antenna. AM systems without integrated visitor counters will be arranged in a "Best guess" entrance. This best guess situation may not represent the actual system's layout, in which case you will have to manually adjust the position of these antennas.

Click on the Entrances section of the Dashboard to go to the Entrances page to start configuring the created entrance(s).

8.7 Configuring entrances

When the Entrances section is clicked in the Dashboard, the Entrances page is shown.
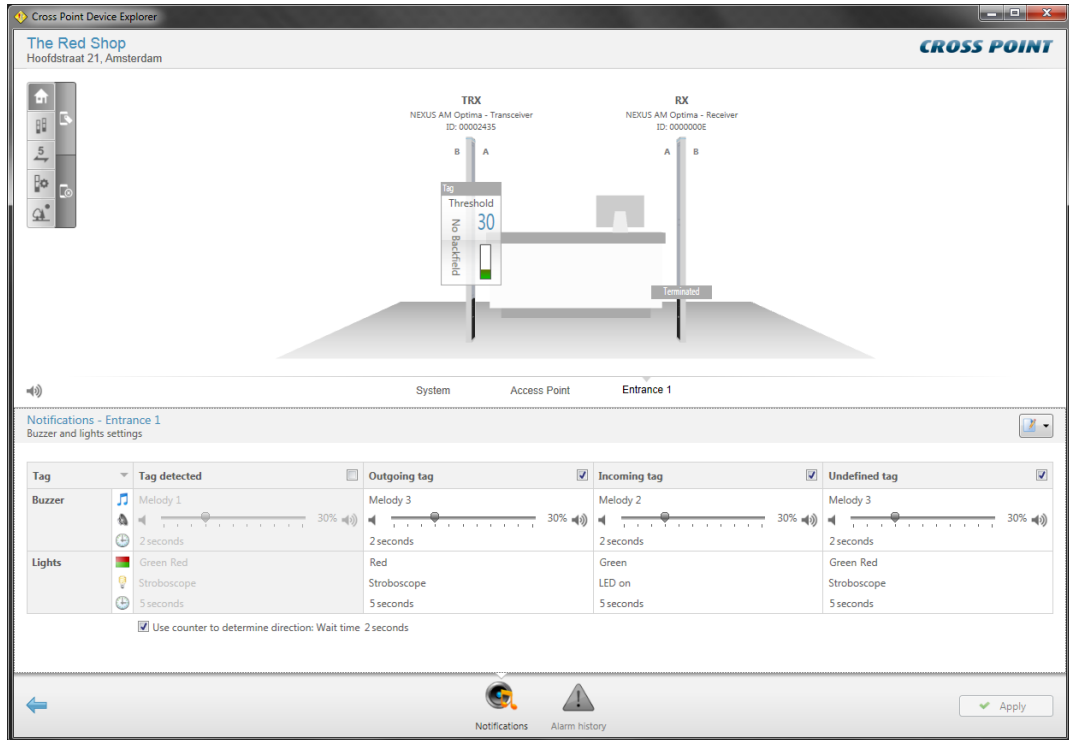
Figure 31: Entrances

The Entrances page is divided in 2 parts:

8.7.1 Entrances - Top part

The top part of the Entrances page consists of the following section:
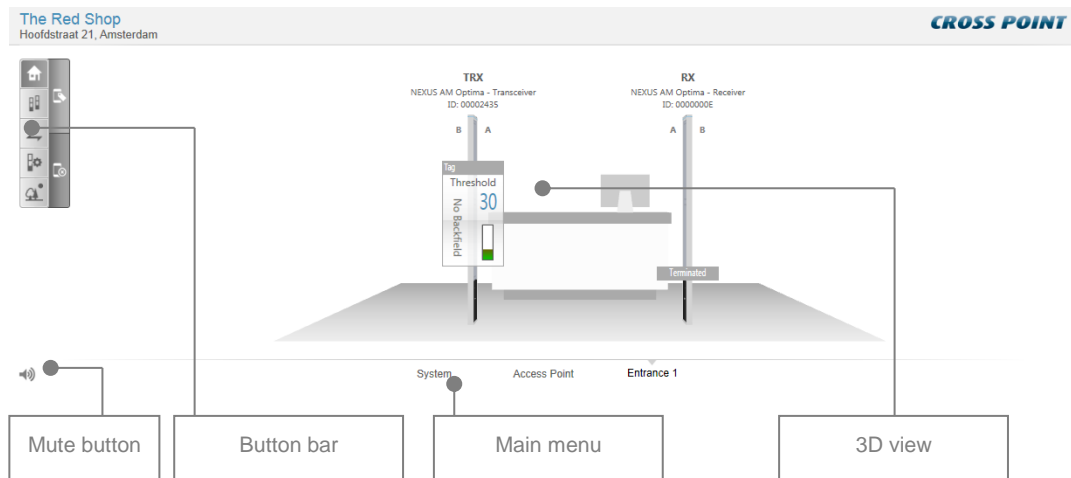
Figure 32: Entrances – Top part

The **Mute** button 🔊 enables you to switch off all buzzers on all devices at once. This is useful when you are configuring the system and don't want any loud alarms.

8.7.2   Main menu

The Main menu lets you quickly navigate to the other available sections of the Device Explorer:

- **System** – refer to paragraph 8.8 for further details
- **Access Point** – refer to the Cross Point Device Explorer manual for further details

8.7.3   3D antenna view

The 3D view shows the AM antennas that have been either automatically arranged or manually inserted in the selected entrance.

When entering the Entrance page, the Normal view is activated by default and various options for the selected entrance are available through the Entrance button bar. Dependent of the selected button, the sub-buttons on the right of the Button bar will vary. Paragraph 8.9 explains the various buttons available in the button bar.

8.7.3.1   Normal view

Click this button to return to the normal 3D front view.
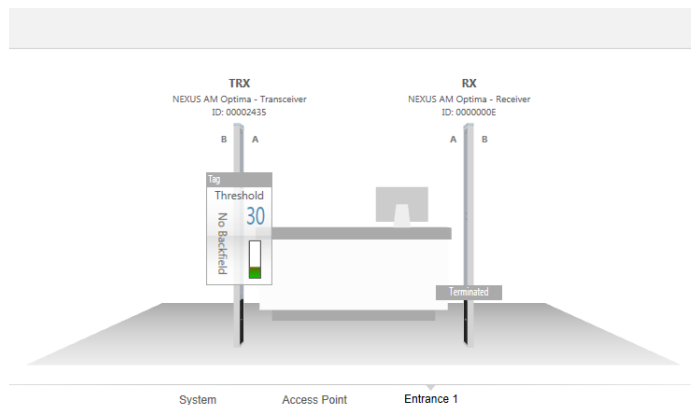
Figure 33: Normal view

8.7.3.2   Perspective view

Click this button to change the 3D view into a perspective view, to be able to quickly navigate to a specific aisle or antenna, especially useful for large installations.
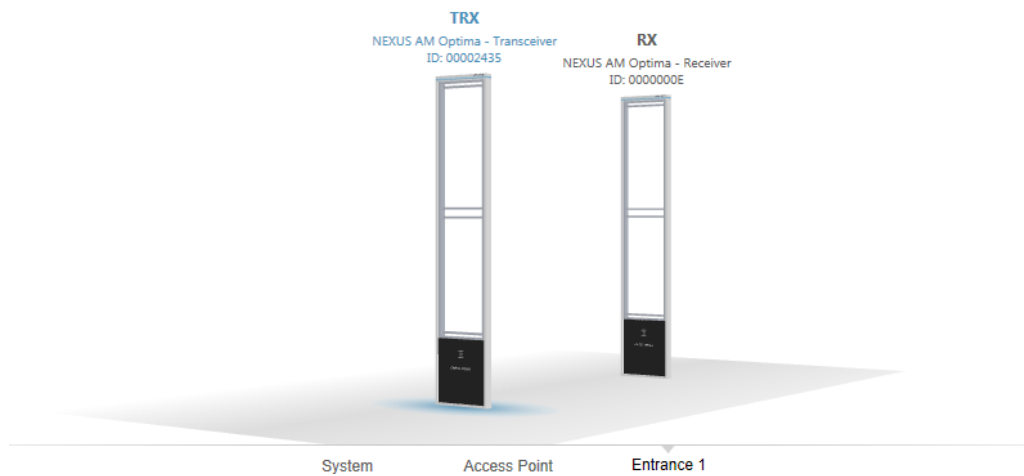
CROSS POINT

Figure 34: Perspective view

8.7.3.3   Counting view

Click this button to change the 3D view to helicopter view and see the number of visitors or alarms per aisle.
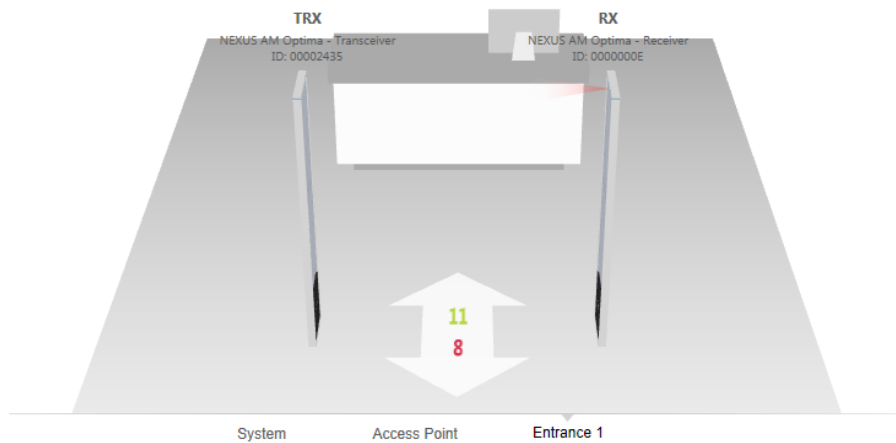

Figure 35: Counting view - Visitors

The visitors counting view is only available for AM systems with integrated visitor counters.

The green number indicates the number of visitors that have entered the store through that aisle. The red number indicates the number of visitors that have left the store through that aisle.

8.7.3.4 Entrance arrange view

Click this button if you want to make any changes to the antenna arrangement or other entrance and antenna related properties.
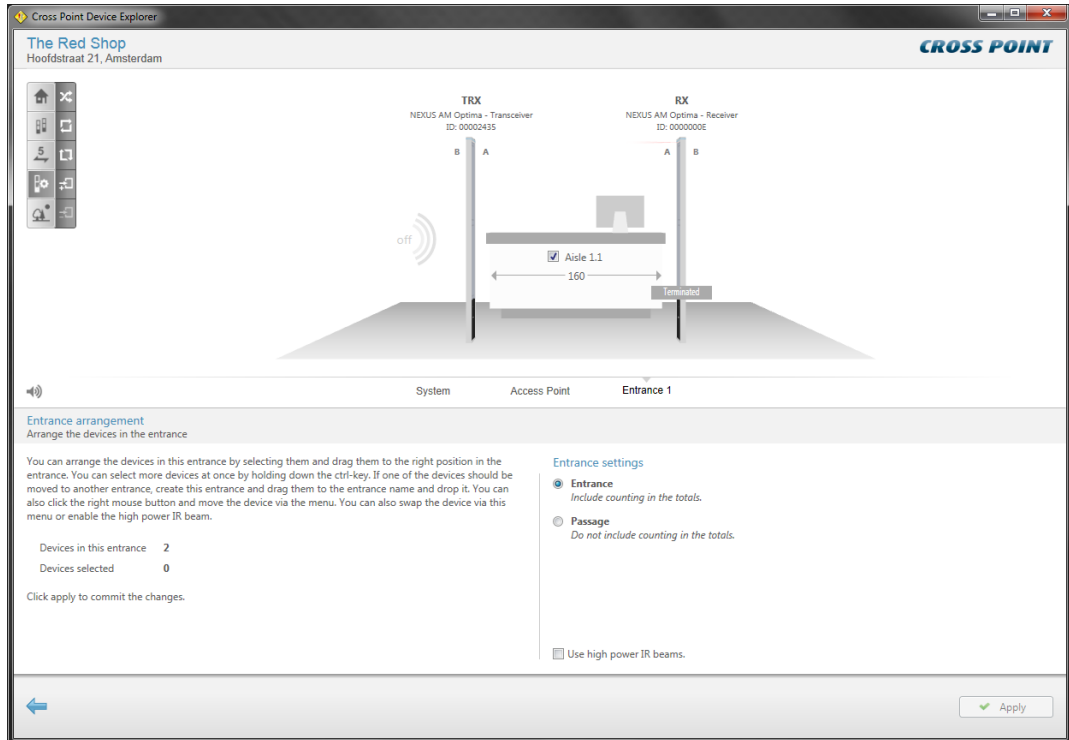
Figure 36: Entrance arrangement mode

In the Main menu, an extra entrance named "Unarranged" appears. If any antennas could not be automatically arranged or extra antennas are added after automatic antenna arrangement was performed, these antennas are automatically added to the Unarranged entrance.

You can now either start the automatic antenna arrangement by clicking the **Automatically arrange all antennas** button in the button bar or drag & drop antennas manually from the Unarranged entrance into the appropriate entrance.

Antennas can be picked up by clicking on the antenna image and moving the antenna while keeping your left mouse button pressed. Move the antenna over the name of the destination entrance and you will see the plus-sign ⊕ appear. To place the antenna in that entrance, just release the left louse button.

In the same way, antennas can also be swapped to another position within the same entrance. Visitor counters will be enabled or disabled automatically dependent of the position of the moved antenna in relation to the other antennas.

To select and move multiple antennas at once, keep the Ctrl button on your keyboard pressed while selecting the required antennas. After selecting all antennas, release the Ctrl key and drag & drop the antennas in the desired entrance.

In case antenna positions collide with the actual connection of the antennas (A- and B-sides), a notification panel for each antenna will appear indicating the potential error.

Each antenna can be inverted by a right mouse click on the antenna and enabling or disabling the option "A & B swapped".

The names of the antennas, aisles and entrances can be changed by clicking on the name and entering the new name. Just click somewhere outside of the text input field to apply the new value.

The aisle width for each aisle can be specified. By default the value is set to 160cm, but can be changed to the actual value by clicking on the aisle width en entering the correct value. In case all aisles in this entrance have the same aisle width, just enter the value for one aisle and then click the chain button ⊙⊙ to change all aisles to the same aisle width.

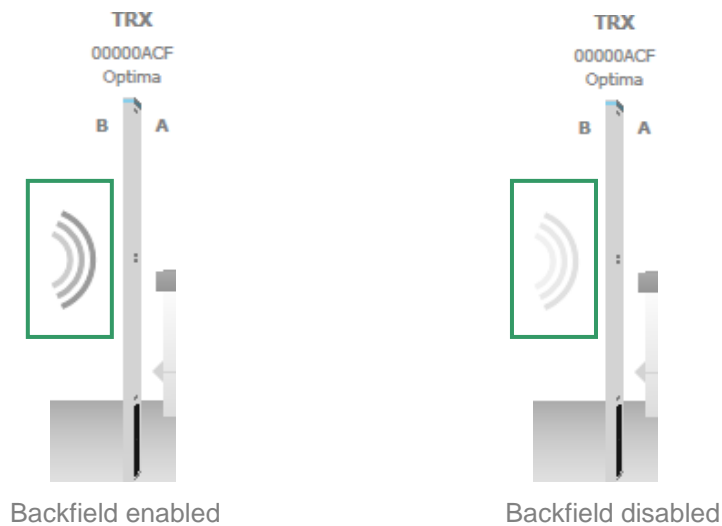The backfield of a AM transceiver can be enabled or disabled by clicking on the waves at the backside of the transceiver.

Backfield enabled   Backfield disabled

Figure 37: Enabling or disabling backfield detection

8.7.3.4.1 Entrance or passage?

When the entrance is set as an 'entrance', visitor counting numbers will be added to the total number of visitors included in the visitor counting report. Select the option 'Passage' in case the visitor counting numbers of this specific entrance should not be added to the total visitor counting.

8.7.3.5 Reverse view direction

By default the 3D-view shows the entrance from the outside looking into the store. This view can be reversed (looking outside from within the store) by clicking the Reverse view button. This does not change the actual counting direction!
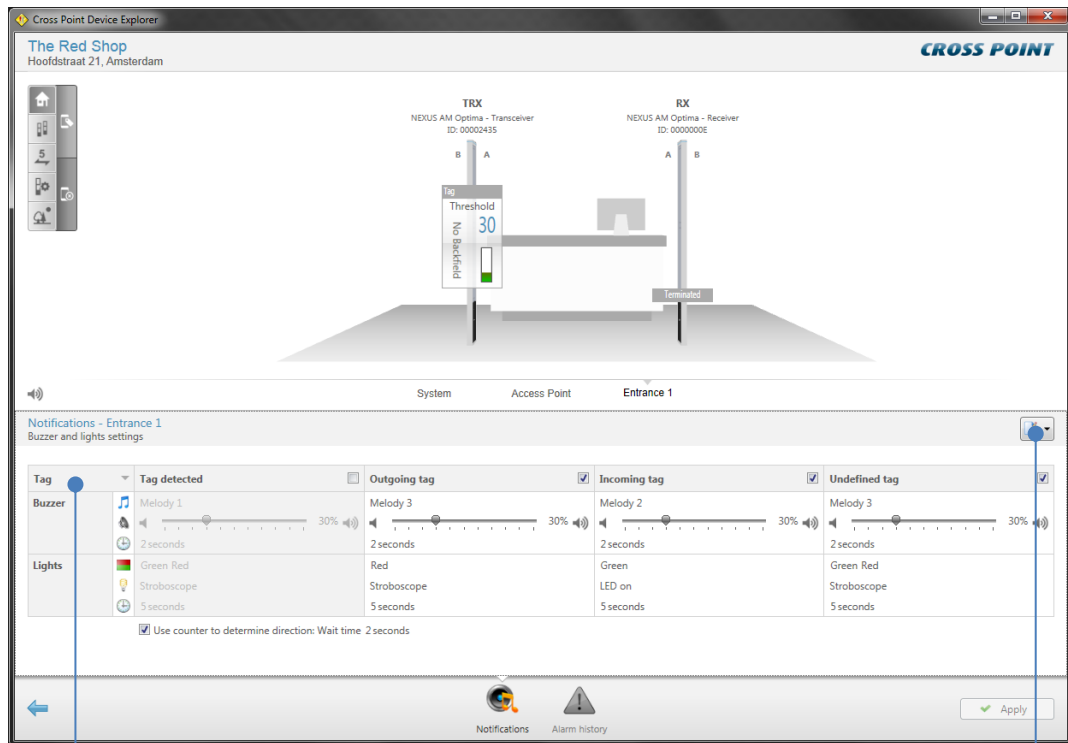
8.7.4 Entrances – selected entrance

When an entrance is selected in the Main menu and the Home button in the button bar is pressed, the bottom part of the screen will show the following tabs:

8.7.4.1 Notifications

In case of an alarm situation, notifications will be used to draw attention and to present information about the type of alarm.

Notifications can be set for each entrance individually, when different notifications per entrance are required, or you can set the notifications for all entrances at once. To do this, go to **System** and specify the required notification settings. See section 8.8 for more details.

Select notification type here   Pre-defined notifications

Figure 38: Entrance notification settings

> ⚠️ **Entrance notification settings apply to all antennas that are part of the selected entrance. It is not possible to create different individual notification settings within the same entrance!**

The following notification types can be selected by clicking on the cell in the top left corner of the notifications table:

- Alarms
- Metal
- Visitors
- Other

8.7.4.1.1   Alarms

Notification	Explanation
Tag detected	This notification can be used as a 'pre-alarm' feature when the option "Use visitor counter to distinguish in- and outgoing alarms" has been enabled. In case the option "Use visitor counter to distinguish in- and outgoing alarms" is disabled (so no detection of incoming and outgoing alarms), this notification must be used as the general alarm setting.
Outgoing*	Notification setting for outgoing alarms*
Incoming*	Notification setting for incoming alarms*
Undefined/Ghost*	Notification setting for alarms where the direction could not be determined*

Table 5: Alarm notifications

* depends on setting "Use counter to determine direction"

8.7.4.1.2   Visitors

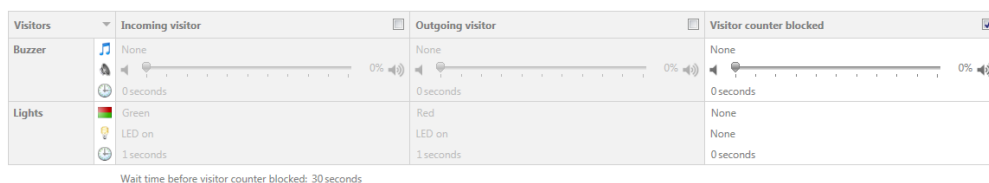| Notification	Explanation
Incoming visitor	When a visitor enters the store, a 'door bell' notification can be triggered to notify employees in the store that a visitor has just entered the store.
Outgoing visitor	When a visitor leaves the store, a 'door bell' notification can be triggered to notify employees in the store that a visitor just left the store.
Visitor counter blocked	When the infra-red beam of the visitor counter is blocked for a specific minimum amount of time (default 30 seconds), a counter blocked notification can be triggered to notify visitors and employees in the store that there is an aisle blockage. NOTE: The wait time before visitor counter blocked can be adjusted to another value if required. Just specify a value between 1 and 3600 seconds.

Visitors		Incoming visitor	☐	Outgoing visitor	☐	Visitor counter blocked	☑
Buzzer	♪	None		None		None	
	🔊	0%		0%		0%	
	⏱	0 seconds		0 seconds		0 seconds	
Lights	🟥	Green		Red		None	
	💡	LED on		LED on		None	
	⏱	1 seconds		1 seconds		0 seconds	

Wait time before visitor counter blocked: 30 seconds

Table 6: Visitor counter notifications

8.7.4.1.3   Other notifications

Notification	Explanation
Default notification	Enable this notification if you want to visualize that the antenna is switched on. For example the green LED can be switched on infinite to show the visitor that the system is active.
Tamper alarm	When a tamper sensor is connected to the transceiver board, a notification can be triggered when the cover of the antenna is removed without authorization.
Detection disabled	Tag detection can be temporarily disabled (through one of the available I/O's). Set this notification to indicate when tag detection has been disabled.
System jammed	Set this notification to notify store employees in case the system is being jammed with a jamming device or as a result of another high noise source.

Table 7: Other notifications

8.7.4.1.4   Saving notification settings

Notification settings can be saved for usage in other entrances or stores. Click the **Load and save notifications** button and select the option 'Save notifications' from the menu and the Save notifications dialog opens.
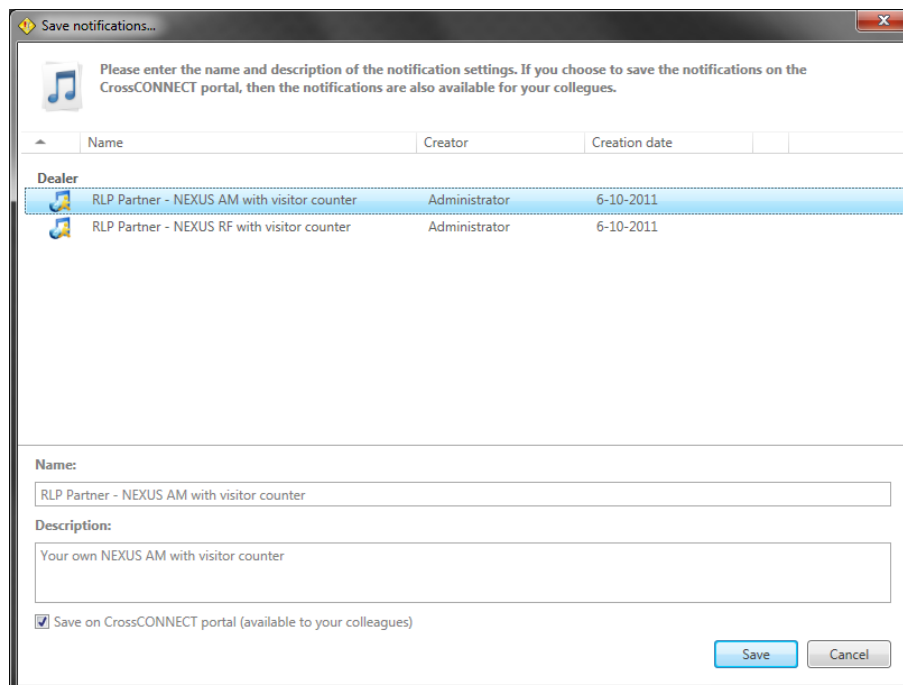
Figure 39: Save notifications

A list with pre-defined notifications that have previously been saved appears. Select one from the list to overwrite the selected pre-defined notification, or enter a new name and description for the new notification.

If you have an active internet connection, you can also tick the checkbox in front of the option 'Save on server' to store this new pre-defined notification centrally, so it is also available for your colleagues.

Click the Save button to store the notification.

Select a notification and click the **Delete** button ✖ to delete a pre-defined notification.

8.7.4.1.5 Loading pre-defined notifications

Pre-defined notification settings can be loaded again by clicking the **Load and save notifications** button, selecting the option 'Load notifications' from the menu and the Load notifications dialog opens.
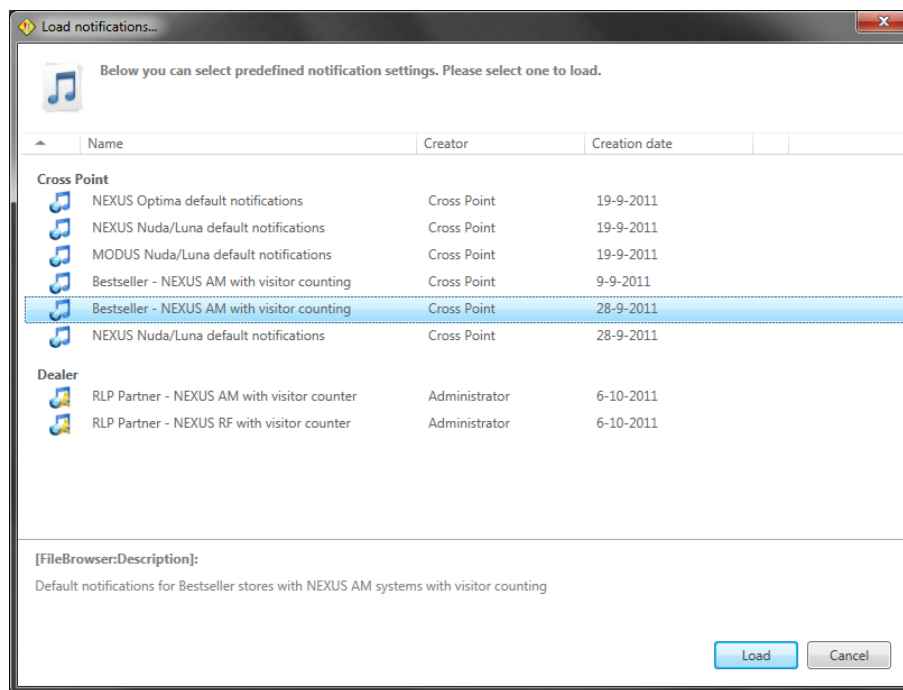
Figure 40: Load notifications

A list with pre-defined notifications that have previously been saved appears. Select the required notification and click the **Load** button to load the pre-defined notification settings.

Select a notification and click the **Delete** button ✖ to delete a pre-defined notification..

8.7.4.2 Alarm history

The Alarm history screen shows a list of the tags that have been detected on all antennas in this entrance.
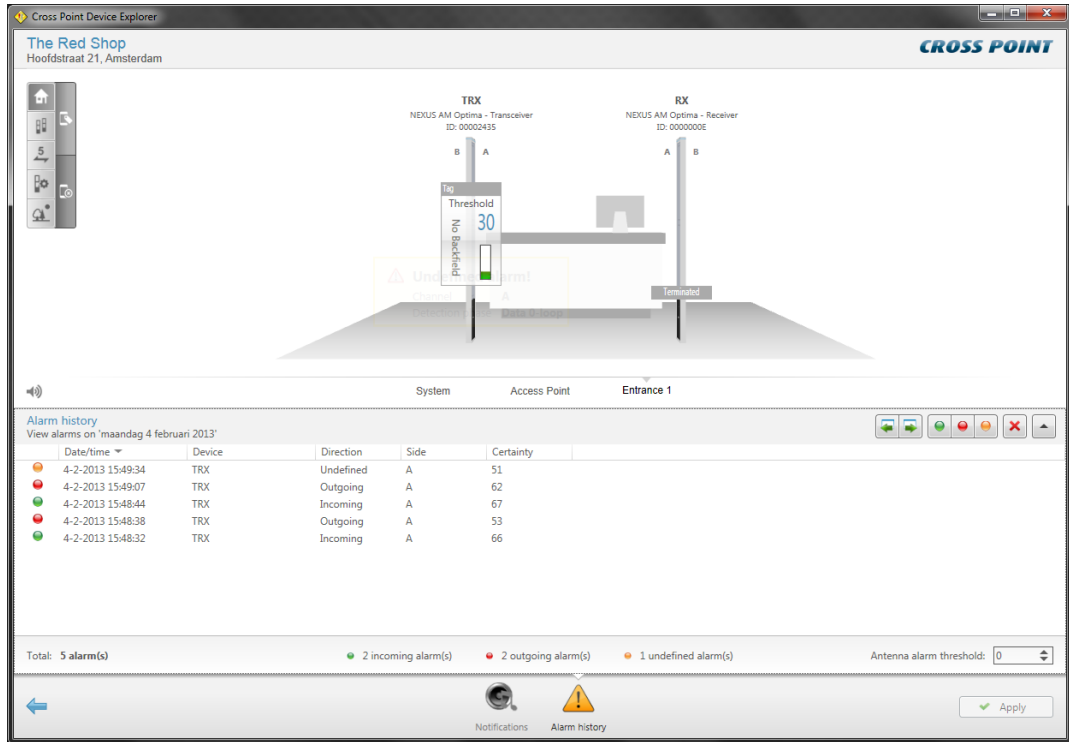
Figure 41: Alarm history

Dependent of the notification settings, the incoming ●, outgoing ● and undefined ● alarms can be distinguished by means of their individually colored icons.

By default all types of alarms are displayed, but pressing one or more of the filter buttons ● ● ● will show or hide the selected alarms.

Click the Delete button ✖ to delete all alarms in the list and to permanently remove them from all the connected antennas in this entrance.

All alarms are date & time stamped, so it's easy to find out when they occurred.

For AM systems a maximum of 338 alarms can be stored in the memory of each AM TRX board. When the memory is full, the oldest alarm will be replaced with the newest alarm (FIFO principle). It is possible to view the alarm history per day for a maximum of the last 30 days or less, in case the maximum number of alarms has been reached within 30 days.

Just click the Previous/Next day buttons ◀ ▶ to scroll through the alarm history.

8.7.5 Entrances – selected antenna

If you click on a TRX or RX antenna in the 3D-view, some individual antenna settings can be configured.

8.7.5.1 Transceiver (TRX) settings

When a TRX antenna is selected in the 3D-view, the following tabs will appear at the bottom of the screen:

8.7.5.1.1 Scope view

The Scope view screen shows the signal that is received by the receiver part of the transceiver and/or separate receiver(s) that might be connected to the transceiver.
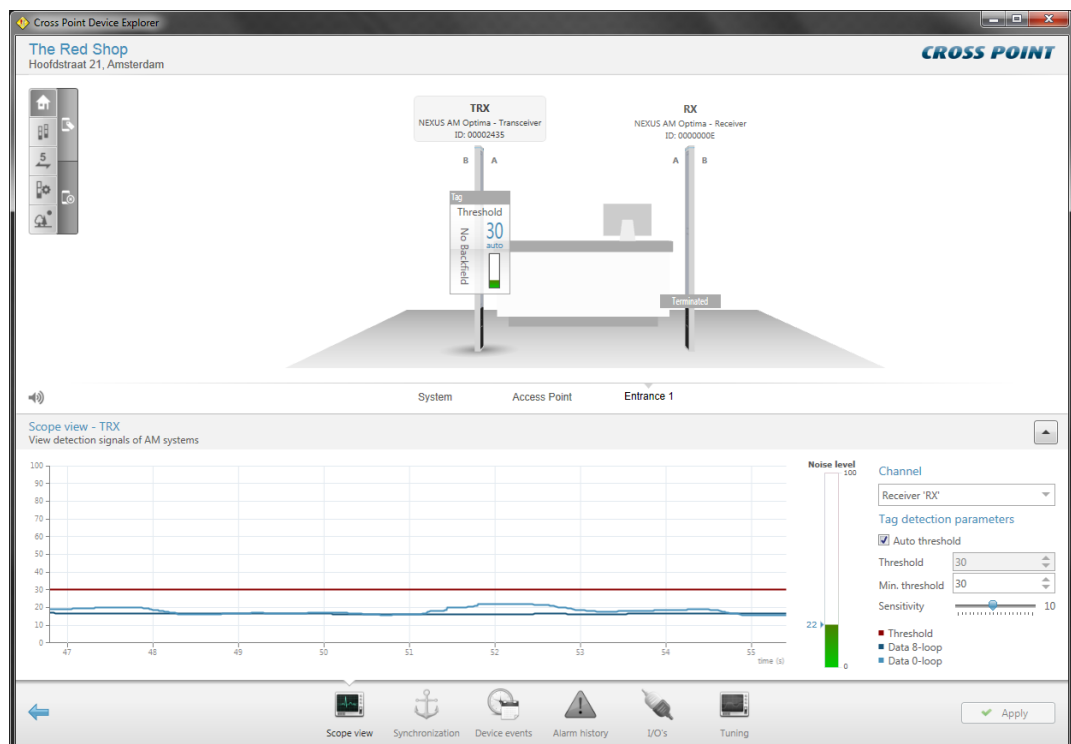

Figure 42: Scope view

Dependent of the number of connected receivers and whether the backfield of the transceiver is on or off, the Channel dropdown box lets you select the device that you want to work on

The Scope view itself shows the signals that are being detected on the antenna's 0-loop and 8-loop configuration (blue lines).

The red line is the threshold level. The threshold level actually determines the sensitivity of the transceiver/receiver. A low threshold level creates a high sensitivity, where a high threshold level results in low sensitivity.

When a signal (blue line) rises above the threshold level (red line), the alarm will be triggered.

The threshold level can be adjusted in two ways; automatically or manually

Automatic threshold level adjustment

Tick the Automatic threshold checkbox to activate automatic threshold level adjustment. Depending on the environmental noise levels, the transceiver will automatically and continuously adjust its threshold level higher than the noise levels.

The Minimum threshold option will prevent the threshold level from getting too low, potentially making the system too sensitive.

Manual threshold level adjustment

Un-tick the Automatic threshold checkbox to activate manual threshold level adjustment. By entering a value manually or by pushing the up or down arrows, the required threshold level can be set. Alternatively, the slider next to the scope view can be moved up or down to set the required level.

Sensitivity

The sensitivity slider can be used to decrease or increase the total sensitivity of the antenna. The default value is 10 and you can increase the sensitivity to 20, or decrease it to 1.

Noise

The noise level indicator shows a value between zero and one hundred, which represents the amount of noise that's being detected by this receiver. A high noise level will result in reduced detection, which means that specified detection distances might not be achieved. To improve this situation the noise source(s) must be located and removed. If removal of the noise source is not possible, the aisle width between the antennas needs to be reduced, which means that the transceiver and receiver antennas need to be installed closer to each other.

> **Never adjust the antenna too sensitive, as this will result in false alarms! Remove the noise sources that interfere with the system or move the antennas as far as possible away from noise sources.**

8.7.5.2 Synchronization AM

When multiple AM systems are installed in relative close vicinity of each other, it is of extreme high importance that the transmission bursts of all transmitters (transceivers) occur at the same moment. To be able to view and change the position of these transmission bursts, the Synchronization screen is available.

> **When the Synchronization screen is open, the transmission burst of this transceiver is disabled. As a result of this, the transceiver and connected receiver(s) will not detect any tags! Make sure to leave this screen to enable detection of tags again.**

When the transmission bursts are not synchronized properly, false alarms and reduced sensitivity will be the result. The Synchronization screen will show exactly if and where other system transmission bursts are detected.

Figure 43 shows an example of faulty synchronization. Our system's transmission burst (Burst window 1, indicated as a vertical orange bar) is at a different moment in time than the other system's transmission burst, which is on its turn causing interference in our system's detection window.
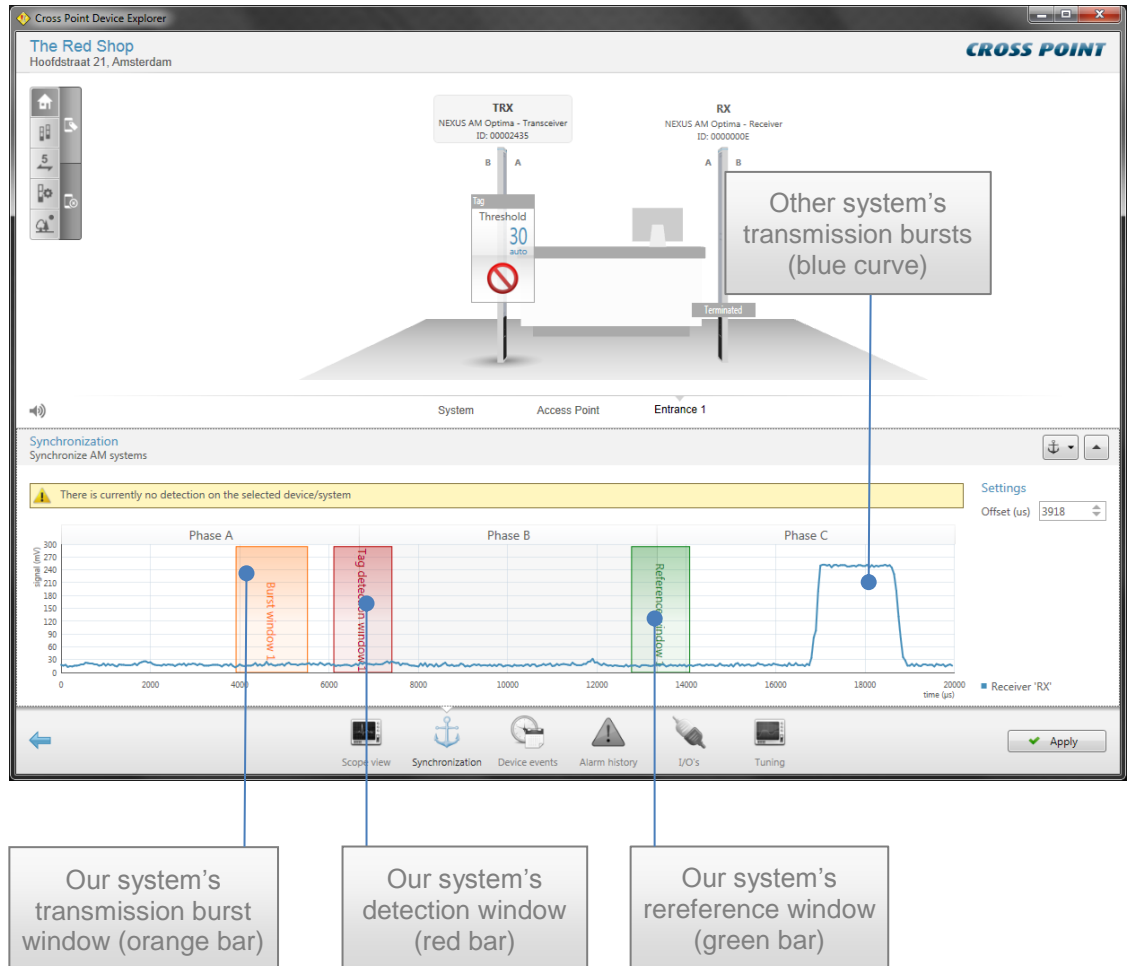

Figure 43: AM synchronization – wrong adjustment

CROSS POINT

We now have two ways of synchronizing the systems; manually or automatically.

Manual synchronization

By default the transmission burst can be synchronized manually by dragging and moving the burst throughout the complete 20ms time base.

Just hover the mouse cursor over our transmission burst (the cursor will change to a horizontal double arrow) and press down your left mouse button. While keeping the mouse button pressed, move the transmission burst and position it on top of the other system's transmission burst. Together with moving the transmission burst, also the receiver and reference windows will move automatically since they have a fixed reference to the transmission burst.

⚓ ▾ Automatic synchronization

It is also possible to let the software detect the best position for the transmission burst. Just click the Automatic Sync button and within 10 to 15 seconds the software will have determined the best burst offset position.
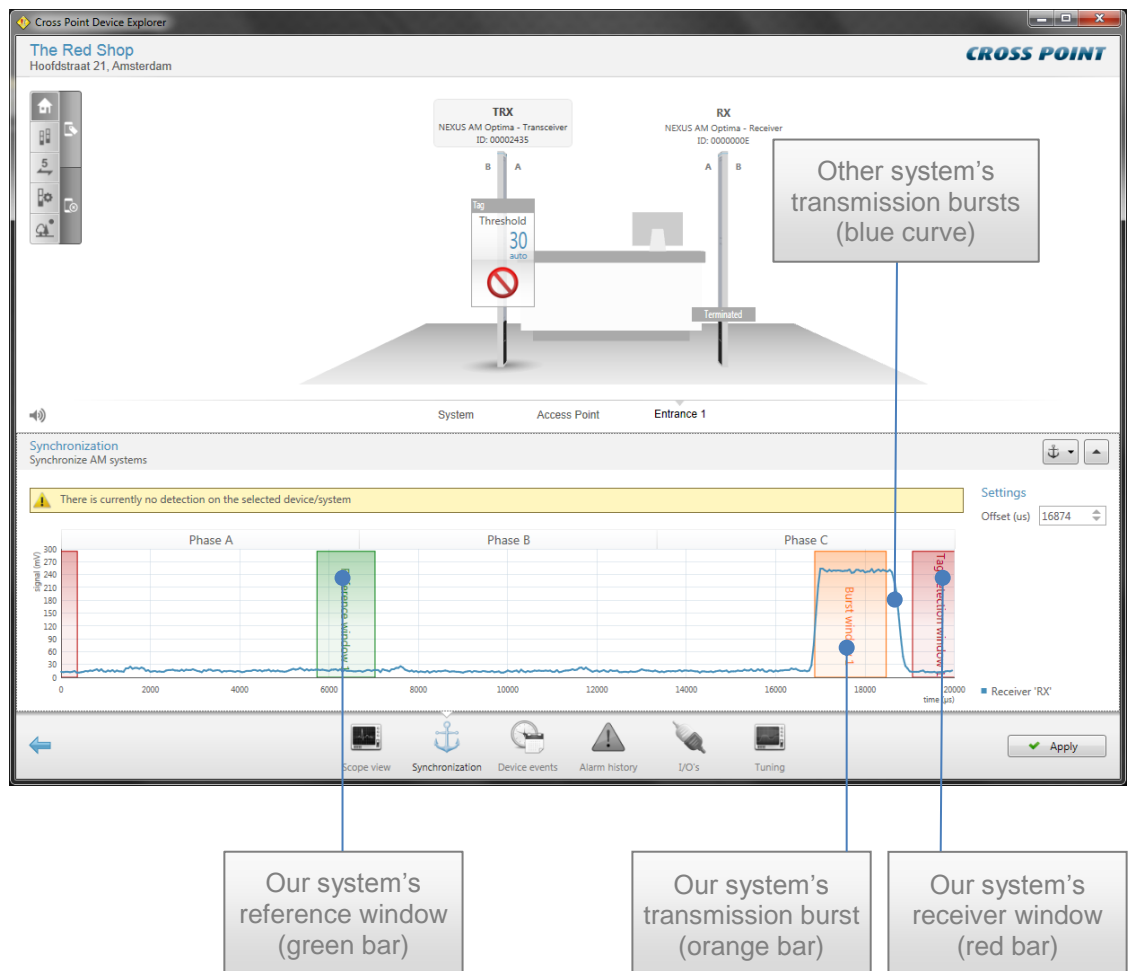
Figure 44: Synchronization AM – correct adjustment

Figure 44 shows our system being properly synchronized with the other system's transmission burst. Our transmission burst is on top of the other system's transmission burst and both our receiver and reference windows are not on top of any other transmission bursts.

CROSS POINT

8.7.5.2.1 Temporarily disabling other device bursts

When you start synchronizing entrance(s), start by selecting the Synchronization page of the first device. It is very useful to switch the transmission bursts of all other entrances off, so you can determine if there are any other AM systems in the area, to which you must synchronize your system.

To switch the transmission bursts of the other devices off, select the Automatic synchronization button ⚓ ▾ to unfold a list of all other available devices.

Click on the green checkmark ✔ in front of the device name to disable the transmission burst of that device. The disabled icon 🚫 will appear, indicating the transmission burst for that device is switched off. Click this icon again to switch the burst on again.

When you leave the Synchronization page, all disabled devices will automatically start bursting again.

8.7.5.2.2 Alarm history

The Alarm history screen shows a list of the tags that have been detected on the selected antenna.
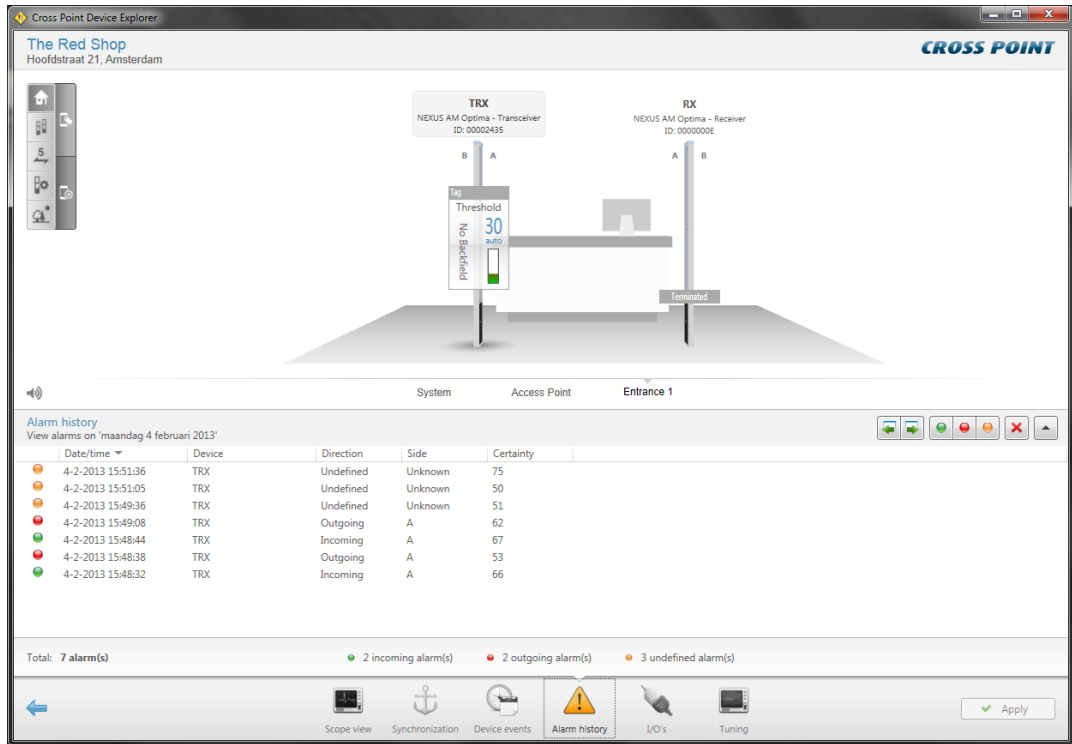
Figure 45: Alarm history

Dependent of the notification settings, the incoming 🟢, outgoing 🔴 and undefined 🟠 alarms can be distinguished by means of their individually colored icons.

By default all types of alarms are displayed, but pressing one or more of the filter buttons 🟢 🔴 🟠 will show or hide the selected alarms.

Click the Delete button ❌ to delete all alarms in the list and to permanently remove them from all the connected antennas in this entrance.

All alarms are date & time stamped, so it's easy to find out when they occurred.

For AM systems a maximum of 338 alarms can be stored in the memory of each AM TRX board. When the memory is full, the oldest alarm will be replaced with the newest alarm (FIFO principle). It is possible to view the alarm history per day for a maximum of the last 30 days or less, in case the maximum number of alarms has been reached within 30 days.

Just click the Previous/Next day buttons ⬅️➡️ to scroll through the alarm history.

CROSS POINT

8.7.5.2.3 Notifications – I/O settings

Next to the audio and visual alarm notifications, as described in section 8.7.4.1, also a relay and a maximum of 2 I/O's can be programmed to activate any external device (camera, external buzzer, etc.) during an alarm situation.

These notification settings have to be programmed on each individual antenna, since the relay and I/O's are antenna specific. Any externally connected device needs to be physically connected to the antenna.
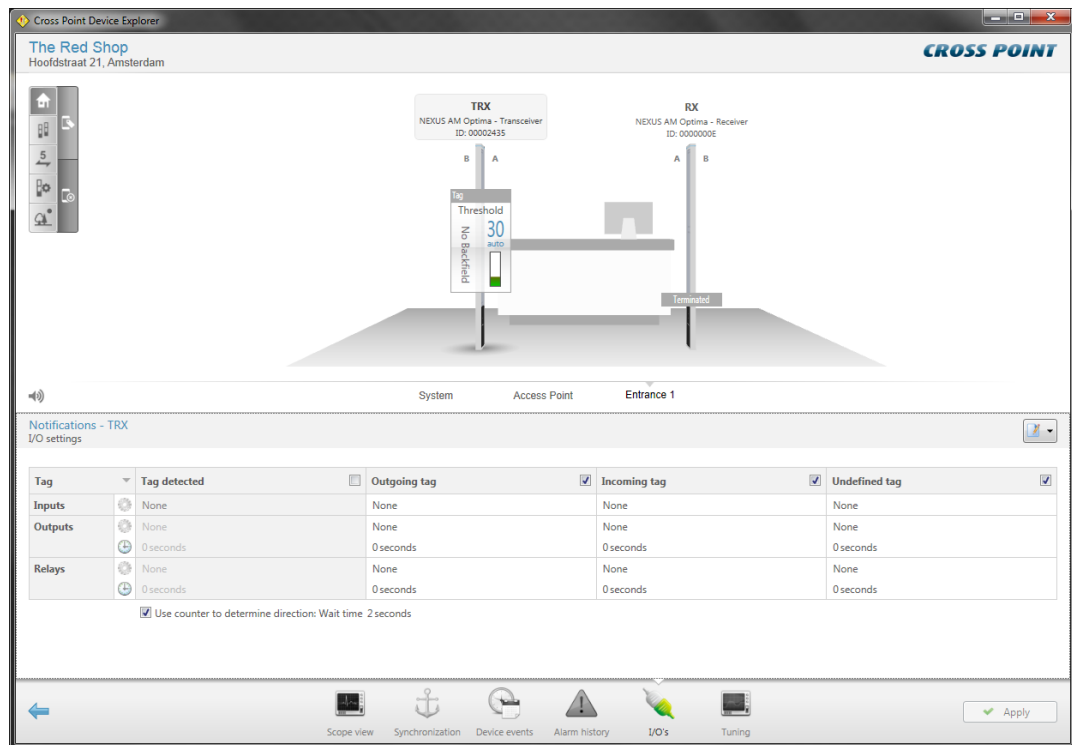
Figure 46: Notifications – I/O settings

⚠️ **Relay and I/O notification settings apply only to an individual antenna!**

The following notification types can be selected by clicking on the cell in the top left corner of the notifications table:

- Alarms
- Metal
- Visitors
- Other

Refer to section 8.7.4.1 to view all available notification types.

8.7.5.2.4 **Tuning AM**

The AM transceiver is performing at its best when maximum power is being transmitted at 58kHz. The Tuning screen shows a graphical display of the top and bottom antenna loop tuning and their associated power.
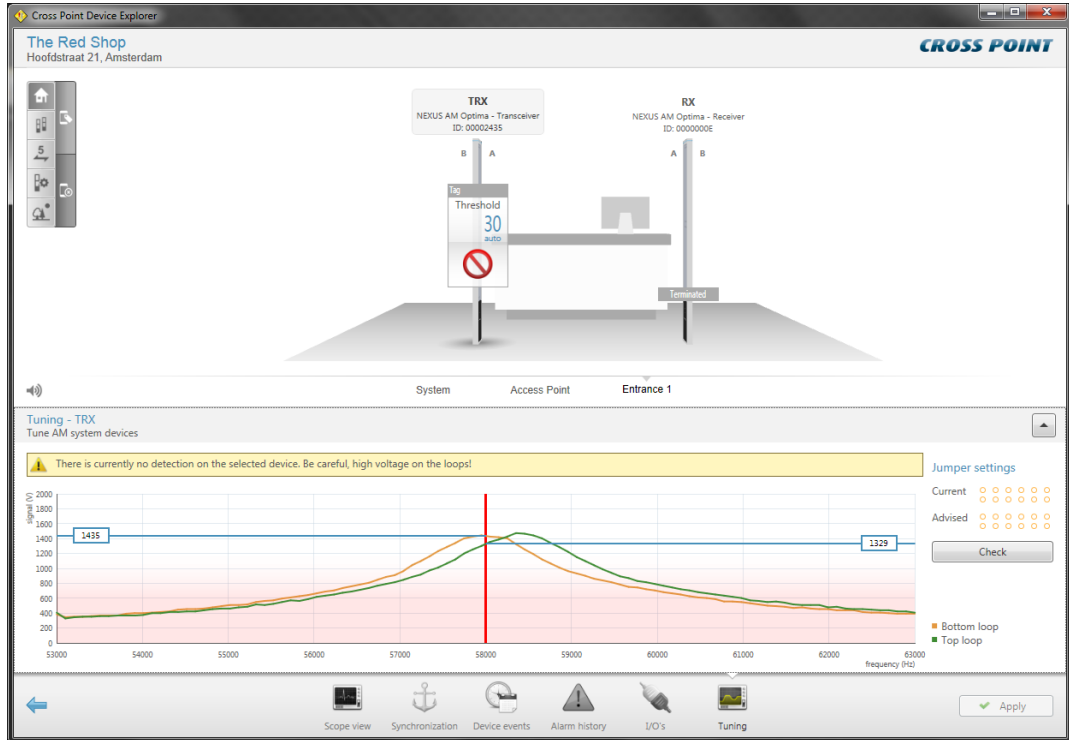
Figure 47: Tuning AM

By changing the positions of the antenna jumpers on the transceiver board, you can find the positions for both loops where they have the highest voltage output at 58kHz (the vertical red line). The spot where the curves cross the red line is the actual transmitted power. A higher output will increase the performance of the AM system, where a lower output will result in less performance.

Make combinations of transceiver jumpers TUNE TOP1, TUNE TOP2, TUNE TOP3 to achieve the highest voltage for the top antenna loop and do the same for the bottom antenna loop using jumpers TUNE BOT1, TUNE BOT2 and TUNE BOT3.
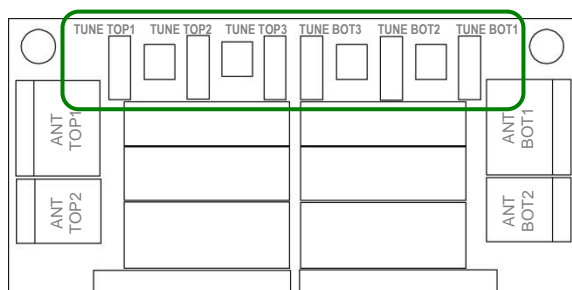
Figure 48: Transceiver board antenna tuning jumpers

Antenna tuning assistant

It can also be useful to use the Jumper settings assistant to determine the best jumper positions. Just click the positions of the jumpers in the Current image to indicate the current position of the jumpers on the board. Then click the Check button and the Advised image will show the advised jumper settings for optimal performance.

Jumper settings

Current

Advised

Check

1) Click on the jumpers to indicate your current setting

2) Press the **Check** button

3) The advised jumper setting will be shown

Figure 49: Tuning assistant example

> ⚠ **Be aware of the high antenna voltages! Switch the power supply to the transceiver board off before tuning. Do not touch the backside of the transceiver board or the metal tuning jumper pins when the board is powered, as this might result in you receiving an electrical shock!**

Tolerances in the components of the transceiver board make it possible that the actual antenna jumper settings are different for each transceiver board and therefore the above image might differ for each transceiver board.

> ⚠ **When the Tuning screen is open, detection of tags is disabled. Make sure to switch to another screen if you want to test the detection performance!**

8.7.5.3   Receiver (RX) settings

When an RX antenna is selected in the 3D-view, the following message appears:
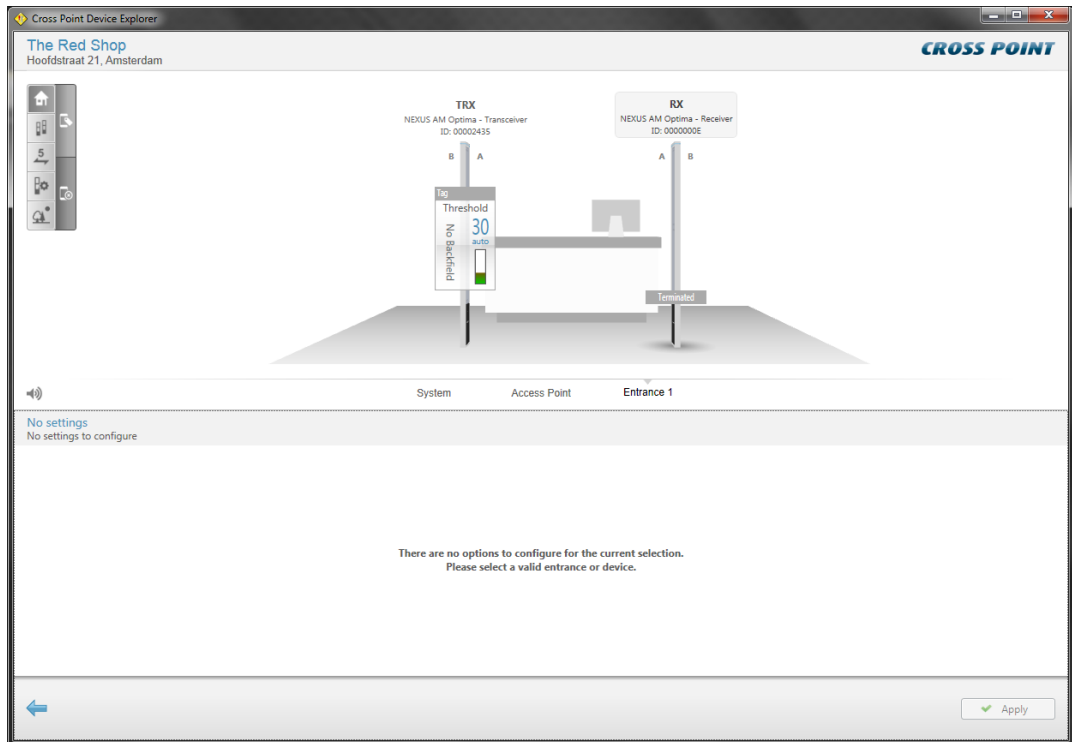
Figure 50: Receiver selection

The message indicates that there are no options to configure for the selected device.

8.8 System

Clicking the System hyperlink in the Main menu or clicking the System information section in the dashboard will open the System information screen.
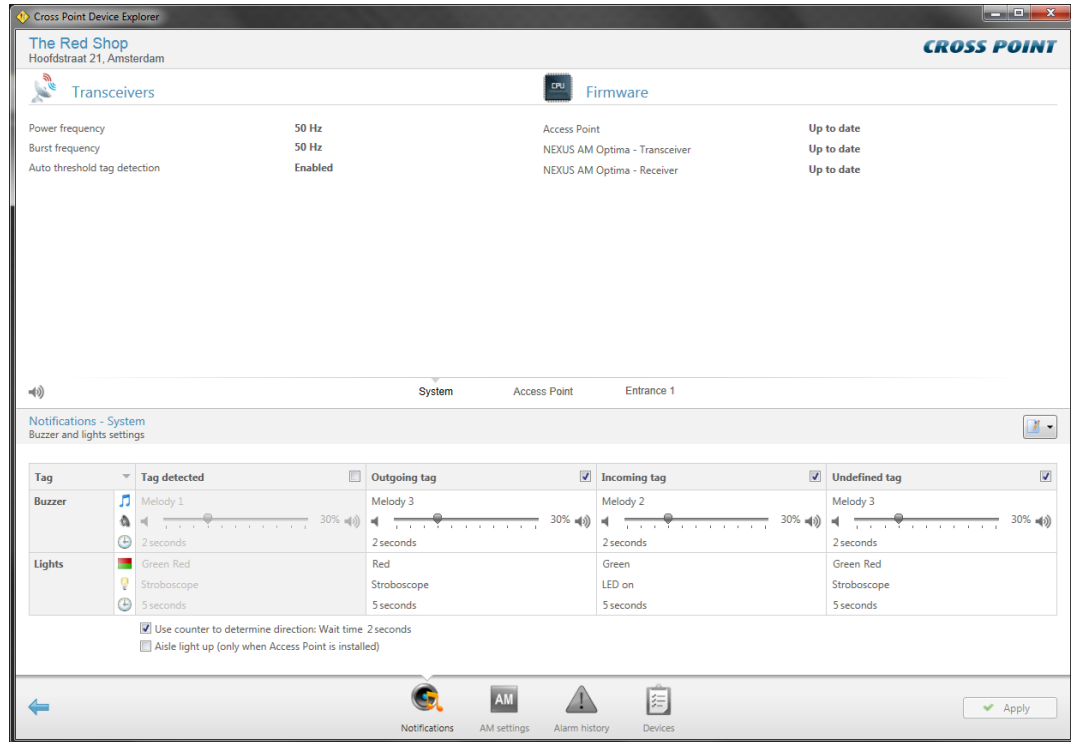

Figure 51: System information & notifications

The top-part of this screen shows information about the connected transceiver(s) and whether the firmware of all connected devices is up-to-date. The bottom part shows 3 tabs:

8.8.1 Notifications

In case of an alarm situation, notifications will be used to draw attention and to present information about the type of alarm.

Notifications can be set for all entrances at once by configuring the notifications in this System screen. In case different notifications per entrance are required, select the entrance and specify the required notification settings at entrance level. See section 8.7.4 for more details.

> ⚠️ **Notification settings, which are configured in this System screen, will be applied system-wide, which means to all devices connected to this Access Point. Any notification settings that have been configured for a specific entrance will be overwritten with the values that are specified in this System screen!**

Refer to section 8.7.4.1 for more details on the available notification settings.

CROSS POINT

8.8.2   AM settings

The AM settings screen allows specific AM settings to be changed.
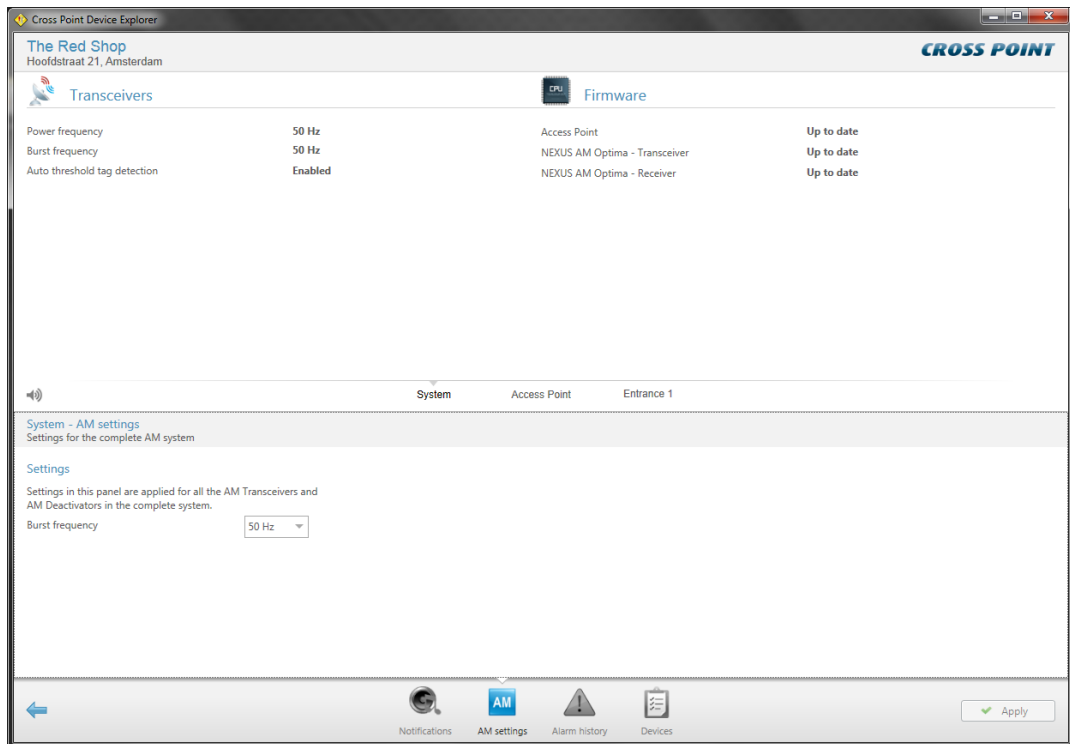
Figure 52: AM settings

The Burst frequency setting defines how many times per second a transmission burst is send. The available options are:

@50Hz power frequency	@60Hz power frequency
37.5Hz, 50Hz (default), 75Hz and 150Hz	45Hz, 60Hz (default), 90Hz and 180Hz

> The burst frequency setting is a system wide setting, which will be applied for all connected AM devices. It is not possible to set different burst frequencies for different entrances.

CROSS POINT

8.8.3 Alarm history

The system's Alarm history screen shows a list of the tags that have been detected on the **entire** system (all antennas in all entrances). The information is retrieved from the antennas when you enter this screen, so it may take some time before the information is visible.
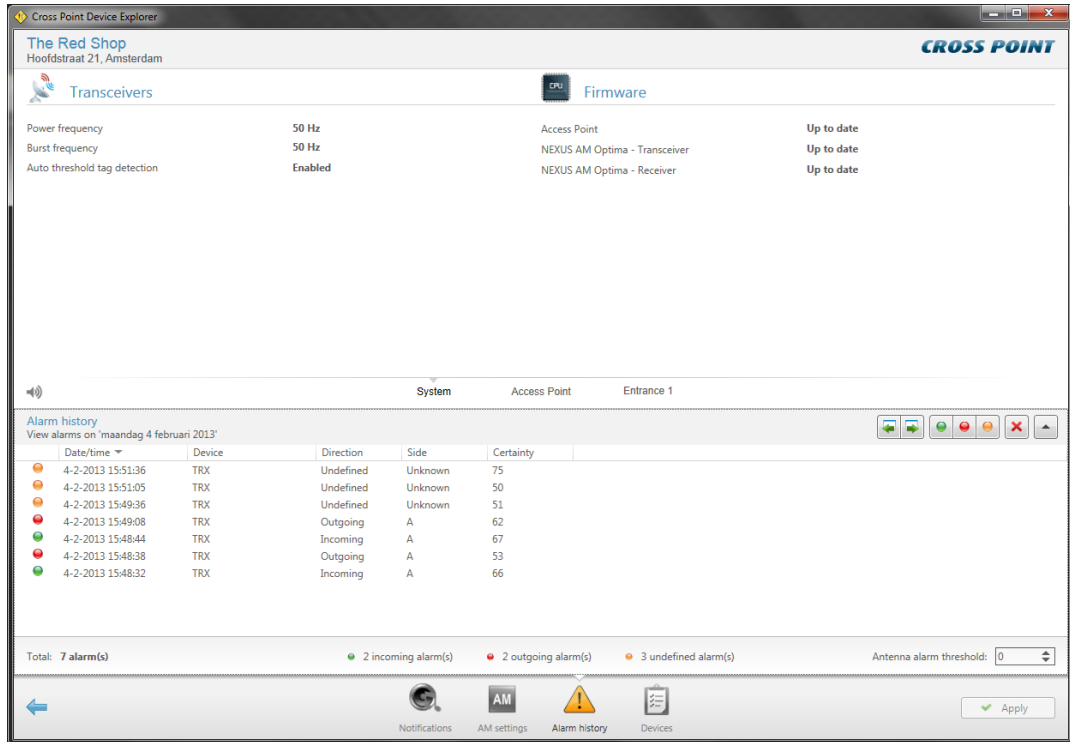
Figure 53: System – Alarm history

Dependent of the notification settings, the incoming 🟢, outgoing 🔴 and undefined 🟠 alarms can be distinguished by means of their individually colored icons.

By default all types of alarms are displayed, but pressing one or more of the filter buttons 🟢🔴🟠 will show or hide the selected alarms.

Click the Delete button ❌ to delete all alarms in the list and to permanently remove them from all the connected antennas in this entrance.

All alarms are date & time stamped, so it's easy to find out when they occurred.

For AM systems a maximum of 338 alarms can be stored in the memory of each AM TRX board. When the memory is full, the oldest alarm will be replaced with the newest alarm (FIFO principle). It is possible to view the alarm history per day for a maximum of the last 30 days or less, in case the maximum number of alarms has been reached within 30 days.

Just click the Previous/Next day buttons 🔙🔜 to scroll through the alarm history.

8.8.4 Devices

The Devices screen shows a list of all connected devices, their firmware status and some system settings.
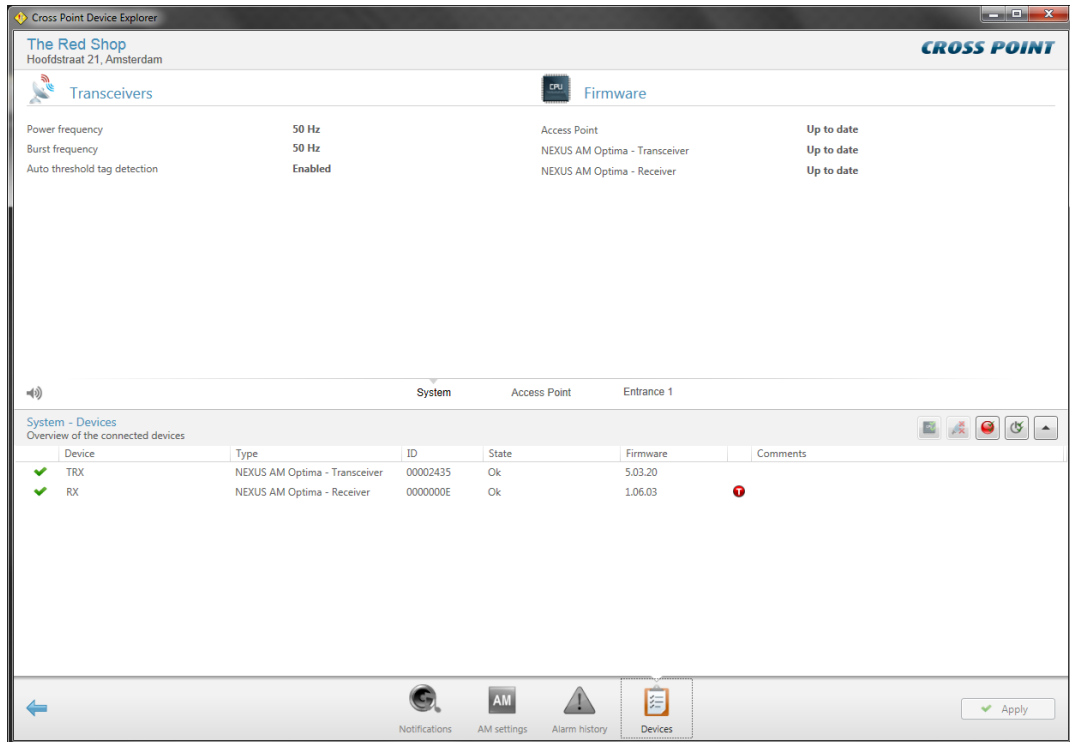

Figure 54: System – Devices

In the Devices list it is possible to:

- View the firmware version of each connected device
- Upload new device firmware
- Locate an individual device or all devices at once
- Reset an individual device or all devices at once
- Remove disconnected device(s)

Just hover over a device and the **Locate** 🔍 and **Reset** ⏻ buttons will appear.

8.8.4.1 Locating a device

Press the **Locate** button 🔍 once to activate the buzzer and LEDs on the selected device. The Locate icon will start blinking and will keep on blinking. Press the Locate button again to stop locating the selected device.

8.8.4.2 Resetting a device

Press the **Reset** button ⏻ to reset only the selected device.

8.8.4.3 Uploading new firmware

In case new firmware is available, you can automatically upgrade all devices of the same type by pressing the **Update all** button 🔽.

8.8.4.4 Removing disconnected devices

All devices that have the disconnected status can be removed permanently by pressing the **Remove disconnected devices** button .

8.8.4.5 Turning all LEDs on/off

The LEDs on all connected devices can be switched on at once by pressing the **Turn all LEDs on** button . This is useful to check whether all devices are connected, especially in large installation. Press this button again to switch all LEDs off again.

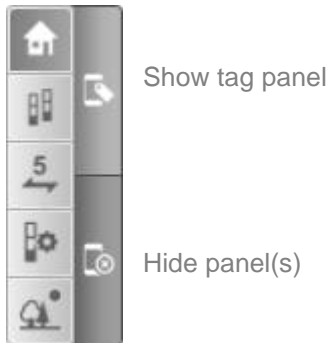#### 8.8.4.6 Resetting all connected devices

Press the **Reset all** button to reset all connected devices at once.

8.9 Device Explorer Button Bar

This section covers the functionality of the button bar. Dependent of the selected button bar button, a set of sub-buttons can appear.

8.10 Home view

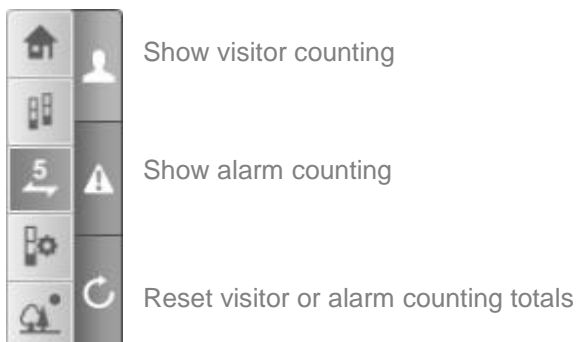| Bar	Sub button function
	Show tag panel
	Hide panel(s)

8.11 Perspective view

Bar	Sub button function
	<no sub buttons>
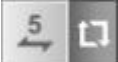
8.12 Counting view

Bar	Sub button function
	Show visitor counting
	Show alarm counting
	Reset visitor or alarm counting totals

8.13 Entrance view

Bar	Sub button function
	Start automatic antenna arrangement
	Mirror the devices in this entrance
	Reverse visitor counting direction for all devices in this entrance
	Add a new entrance
	Remove an empty entrance

8.14 Toggle view direction

Bar	Button function
	Toggle view direction (looking into the store or looking out of the store)

9 Regulatory information

FCC WARNING

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC WARNING

This device complies with Industry Canada's license-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de license. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage readioélectrique subi, même si brouillage est susceptible d'en compromettre le fonctionnement.