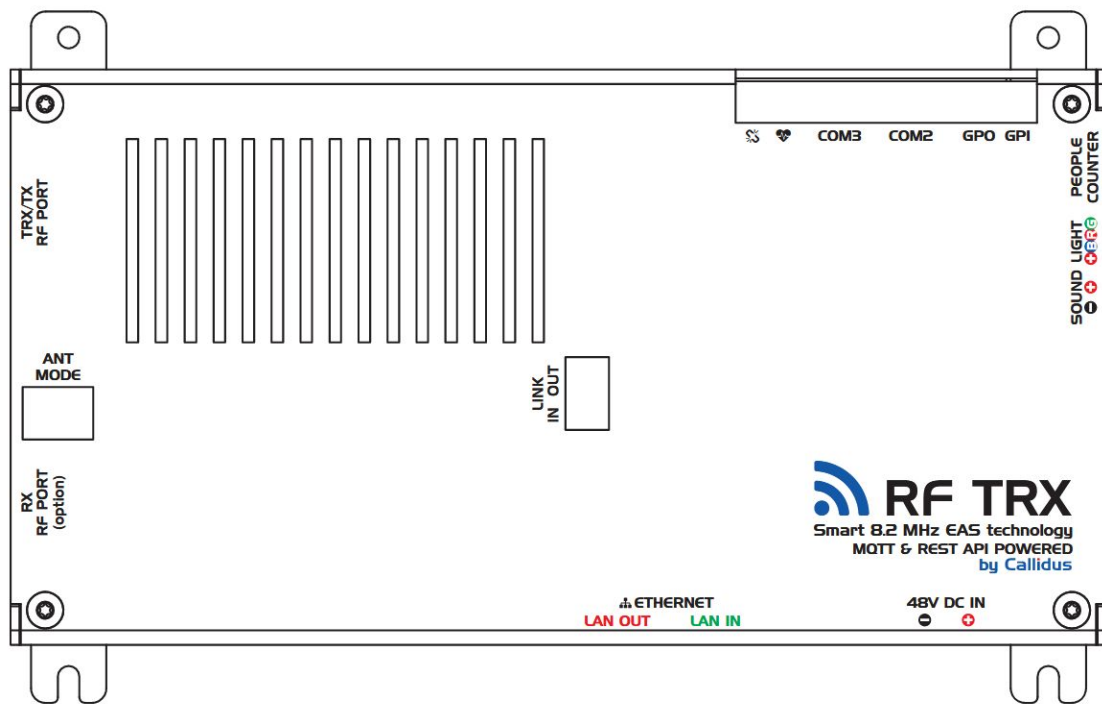


RF TRX 8,2MHz

DIGITAL SECURITY SYSTEM

(RF_TRX_8,2MHz_FW_v0.9)

TYPE: INSTALLATION AND SERVICE GUIDE



Version 1.4
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INSTALLATION AND SERVICE

This setup and service guide describes how to tune service and troubleshoot RF TRX security system that works on frequency 8.2MHz.

DIGITAL SECURITY SYSTEM FEATURES

- Remote maintenance and diagnostics
- ShopMonitor Lite, RestAPI, MQTT connectivity
- Optional Detacher detection
- Advertisement space

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1. OPERATION GUIDELINES



CAUTION! Before operating this device, all operating technicians should study this manual and device technical data to understand and follow the safety instructions. Keep these instructions with the device for further reference. If you have any questions, contact your device representative or distributor.



CAUTION! This is Class A product. In a domestic environment, this product may cause high-frequency interference. In this case, it may require the user to take appropriate precautions.



PRODUCT CLASS 2 equipment is tested as Product Class 1 with two representative antennas supplied with the equipment. The two antennas shall meet the manufacturer's design rules published in the equipment manual and shall have maximum and minimum loop area respectively. Both antennas shall have the maximum magnetic dipole moment as declared by the manufacturer.

2. BASIC INFORMATION

Powerful RF (Radio-Frequency) TRX system designed to operate as a strong and reliable single pedestal with excellent detection of adhesive labels. This line of systems is ideal for supermarkets and hypermarkets where the RF TRX pedestal can be placed to cover two checkout exits.

The modern aluminium frame design of the pedestal, with space for advertisement banners, is aesthetically appealing yet durable enough to withstand a high traffic environment. Possibility of non-visible system is easy with acrylic pedestals, where you need as non-visible pedestals as possible with excellent design.

System can be also connected to the ShopMonitor cloud. Or you can use RestAPI, MQTT for real-time visualisation of all data from system (Alarms, people counter etc.).

3. PRE-INSTALL TASKS

RF TRX SYSTEM PLACEMENT

- Try to avoid installing any electrical wiring within 1m and parallel to the system as well as vertical power poles from floor to ceiling.
- Avoid having tagged merchandise within 2m of the system.
- When possible the antenna should not be installed closer than 1m from any electrical devices (neon lights, telephones, computers...)
- The system should be installed at least 0.9m from the exit door. This will greatly reduce the possibility of resonance caused by moving metal door frames and door security systems. If the doors swing inward, the door arc must not come closer than 0.3m from the antenna. (This applies only to metal frame doors)
- Avoid installing the system too close to any TX transmitter of a Tx-Rx system. Reasonable and still acceptable distance is 10m but we recommend to perform a test because some Tx-Rx systems are „friendlier than others“.
- If you install multiple systems in a store (even two or three), synchronize systems using a proper LAN UTP cable. It will guarantee problem-free operation at no extra costs.



NOTE: Minimum 2m distance apply even for tagged merchandise with RF hard tags / sticker labels. Shorter distance can lead to false alarms or decrease in performance.

INSTALLATION EQUIPMENT OF SYSTEM IN ONE ENTRANCE – TWO PEDESTALS

- 1x Power supply 36-48V DC
- 2x Digital Security system pedestals with RF TRX el. boards
- Screws for mounting vertical holding part (type depends on material for mounting) or double-sided M3 adhesive tape
- Tools needed for mounting of pedestals and basic settings (driller, crosshead and slotted screwdrivers, wire strippers, safety pliers, crimping pliers etc.)

FOR ADVANCED SETUP YOU WILL NEED

- Laptop with Windows® 7 or newer operating system
- Web-browser and connection to the local network
- Hardware dongle for setting of system with installed SmartEAS application

4. SPECIFICATIONS

4.1 ELECTRICAL

POWER INPUT	36-48V DC
CURRENT DRAW	Max. 15W
OPERATING FREQUENCY	8,2 MHz +- 300KHz
OPERATING TEMPERATURE	0-50°C
RELATIVE HUMIDITY	0-90% noncondensing
COMMUNICATION PORT	RS232 Serial, LAN

The protective element of overload is located on the electronic board and also in the PSU.

5. MOUNTING SECURITY SYSTEM - SINGLE ENTRANCE



NOTE: It is recommended to provisionally place the pedestals in place where will be the installation, to only test environmental conditions.

PEDESTALS INSTALLATION AND PLACEMENT

The system operates using resonant frequencies. Mechanical and electrical devices or metal objects too close to the antennas can occasionally induce a spurious resonance or a noise causing a system malfunction. For this reason the system should be installed in an area as free as reasonably possible of these items.

- Before you drill holes into the floor it is recommended to place pedestal without mounting, connect with power supply and try detection properties. If you discover any problems, try to find the place where the pedestal will work best (try to rotate with pedestal or move pedestal closer/far away from exit/entrance doors). Mind the interference from pedestals in neighbouring shops or close installation between RF TRX and RF Deactivator. Distance between RF TRX pedestal and S1000 RF Deactivator is minimum 120cm (4ft). For this installation you need to modify S1000 RF Deactivator (S1000 RF Deactivator manual).
- Another important issue is wiring direction of cable from power supply. Ideally there are used to be conduit (goose-necks) under the floor, on which are pedestals placed on and through which the power supply cable are routed. In other cases are power supply cables routed in the sealing spares of tiles, under the carpet or run in wiring raceway up to the pedestal.
- The power cord connection must be easily accessible on either the power outlet or the PSU side.
- Ensure power to the system is not connected on the same phase as other devices that may cause electrical interference (fans, printers, computers, monitors, and cash registers). We recommended a separate power supply line that comes directly from the fuse box with less than ½ volt between neutral and ground. The pedestals must be powered from an outlet connected via a circuit breaker of adequate rating, which must be part of the electrical installation of the building in which the device is located.
- Large metal items or metal door frame bring noise into the system and they are acting as large antennas. This brings interference into the pedestal, which causes poor detection and false alarms.
- The system should be installed at least 90cm / 2-2.3 ft. from exit door. This will greatly reduce the possibility of resonance caused by moving metal doorframes and other door security systems. If door swings inward, the door arc should not come closer than 30cm / 1 ft. to the pedestal.

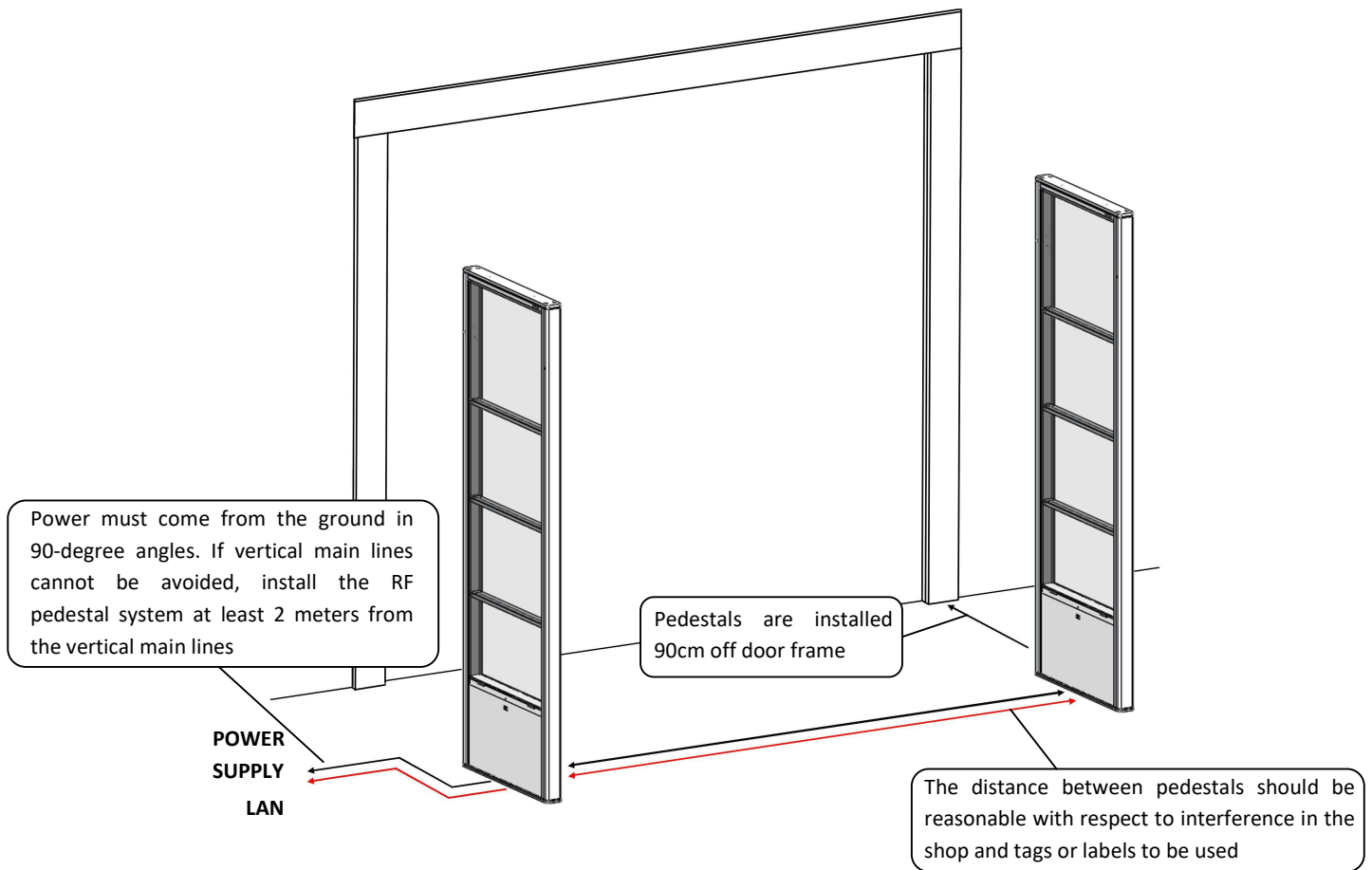
NOTE: Before the installation, it is advised to gain information on the flooring that is below the antenna. If a dry-walk floor mat is used, it might have metal components that influence RF detection performance. In that case a cut needs to be made in the floor mat to break conduction between the metal components in the mat and the antenna.

CABLE SPECIFICATION – ETHERNET CABLE

The system only works reliable when the following unshielded twisted pair UTP cable is used:

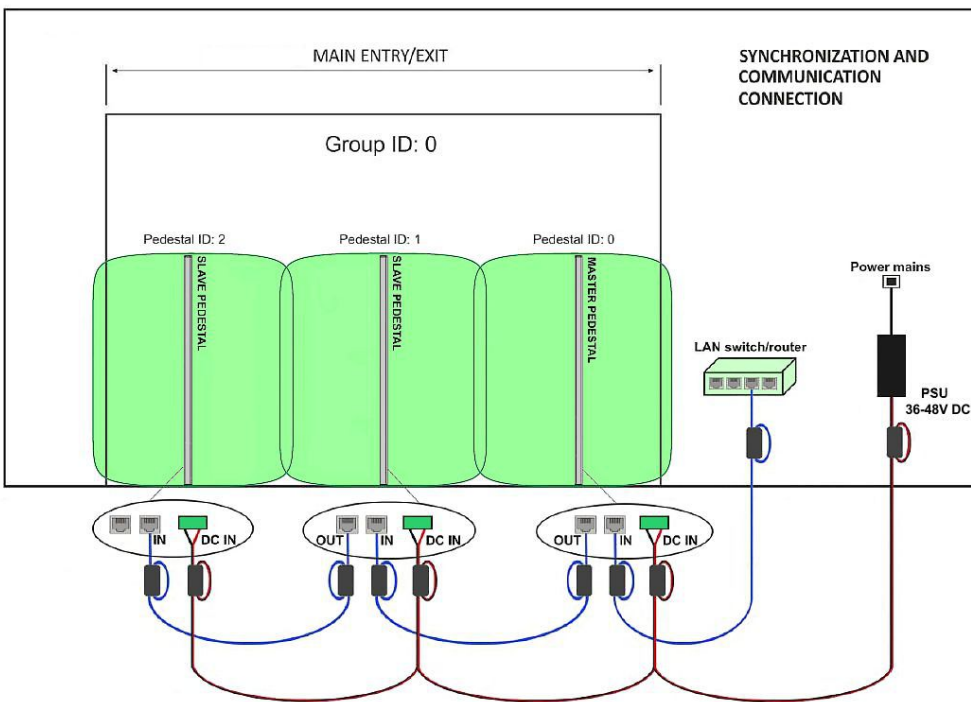
- Cat5e with stranded copper or solid copper core, with minimal 24AWG (0,51mm) core diameter. The maximum cable length for Cat5e is 75 meters / 250 ft.

It is possible to use your own connectors. Make sure that the connectors are suitable for the cable and the right crimping tool for the connector that is used. Follow the recommendations of the cable manufacturer. Local regulations may dictate the use of a specific cable type or rating.



PEDESTAL

RF TRX pedestal is a transceiver pedestal that contains RF TRX el. board. Pedestal is manage both receiving and transmitting procedures also with sound, light alarm and people counter feature. System allows you to connect as many pedestals as possible in one entrance. When you are using more than one pedestal (2, 3, 4, 5, etc.) it is necessary to interconnect electronic board inside pedestals with LAN cable due to synchronization with regard to master and slave pedestals. For remote connection or visualisation is necessary to connect whole system to the store router/server and to the internet.



At the picture on the left you can see correct connection schematic of power supply and synchronization (Master, Slaves).

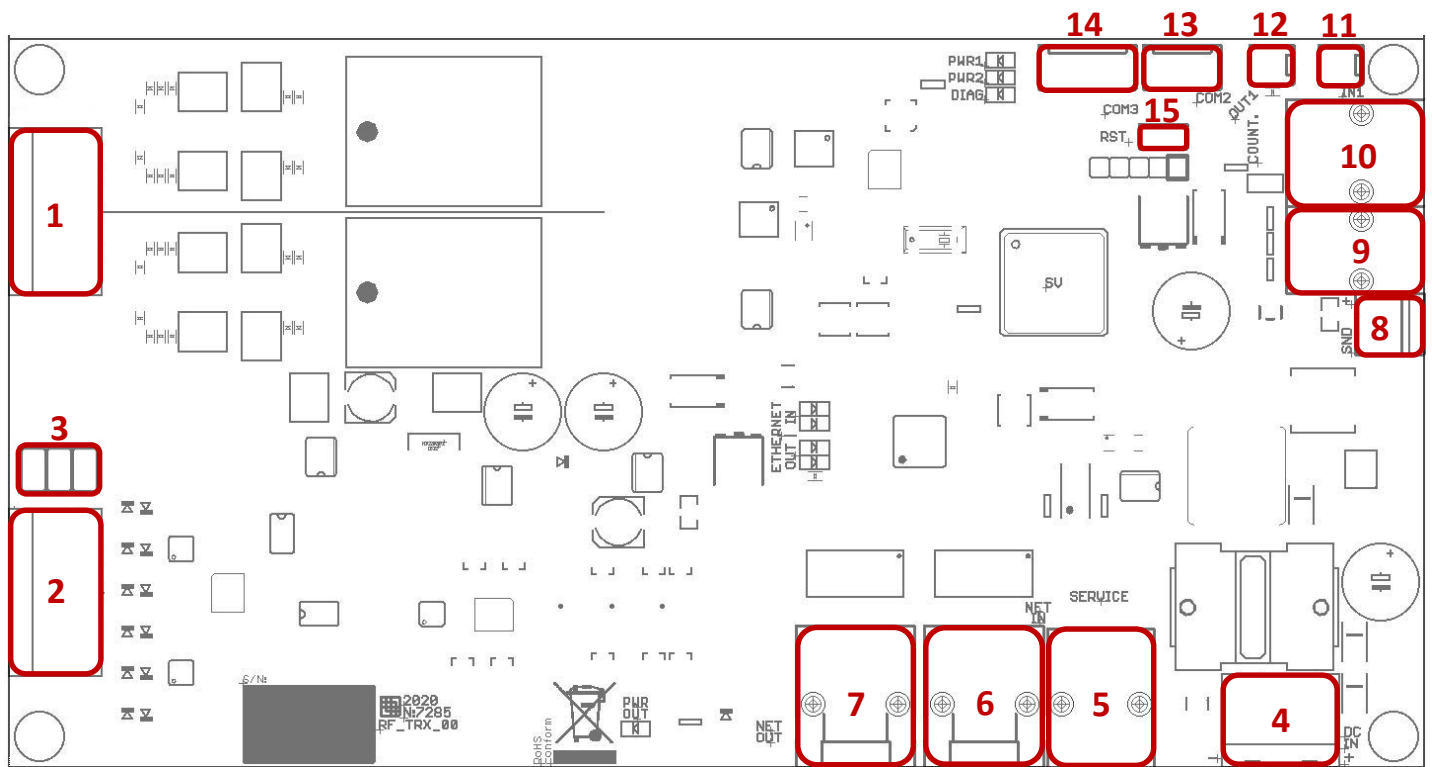
When this setting is correct, detection distance over whole Entry/Exit is as on the picture - depends on used Labels/Tags, width of the Entrance/Exit and detection distance of used pedestals (detection distance in the datasheet).

Number of pedestals in one entrance depends on width of Entrance/Exit, used Tags/Labels and detection distance of used pedestals.

One PSU can power 3 pedestals max!

WARNING - RISK OF ELECTRIC SHOCK! Always turn off the device before you connect the cables.

6. ELECTRONIC BOARD RF TRX 8,2MHz



1. **RF TRX/TX ANTENNA** - Antenna connector for TRX/TX antenna loops. **!Do not disconnect/reconnect the cables in terminal!**
2. **RF RX ANTENNA** - Antenna connector for receiving only antenna – receive passive antenna (optional).
3. **ANT MODE** - jumpers for tuning of pedestals when using different antenna modes (Default or Receiving only passive antenna)
4. **DC IN** - Connector for power supply DC 36-48V.



NOTE: Do not connect more than three pedestals (el. boards) on one power supply.

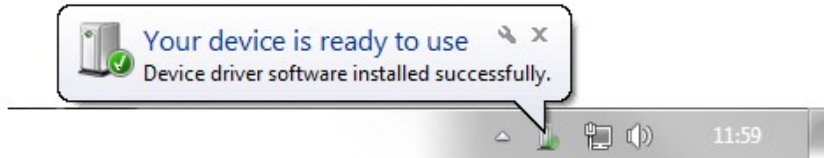
5. **SERVICE** - RS232 communication link for configuration of the control unit. Connect your service laptop via HW key.
6. **NET IN** - Connector for LAN cable input.
7. **NET OUT** - Connector for LAN cable output.
8. **SOUND** - Terminal for sound alarm output. Alarm volume is adjusted in the settings application (SmartEAS v1).
9. **LIGHT** - Connector for light alarm output. Alarm colour is adjusted in the settings application (SmartEAS v1).
10. **PEOPLE COUNTER** - Connector for people counter sensors.
11. **IN1** - universal binary input
12. **OUT1** - universal output (open collector)
13. **COM2** - communication port output COM2
14. **COM3** - communication port output COM3
15. **RST** - reset button

7. EL. BOARD SETTING CONNECTION – SMARTEAS APPLICATION

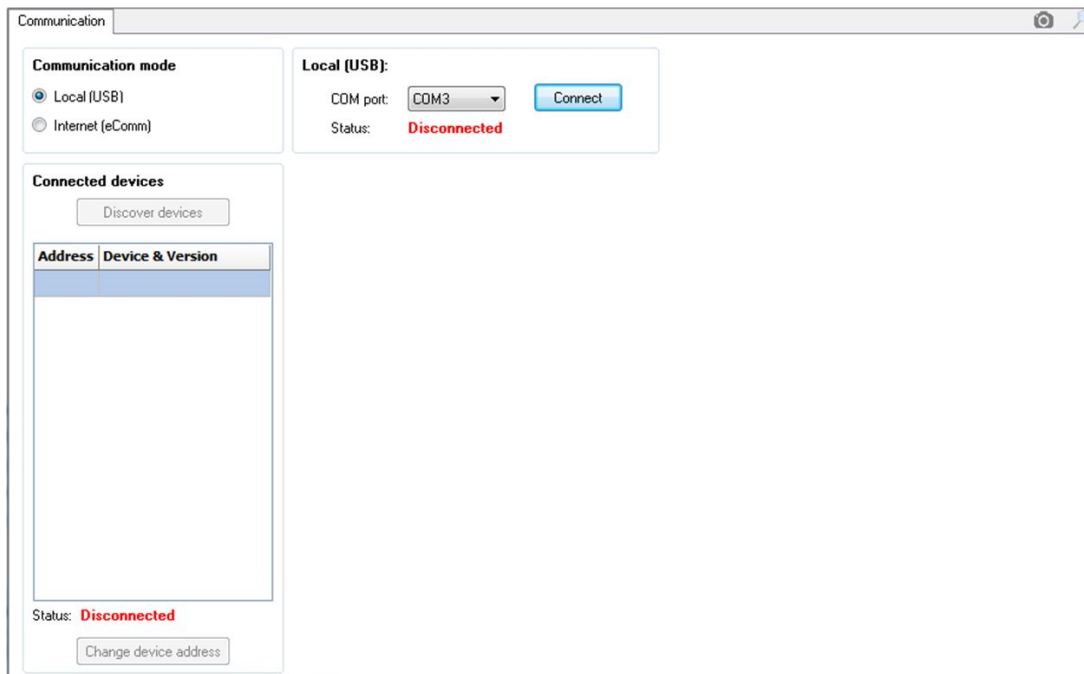
RF TRX el. board is configured and tuned completely by software. The latest version of software should be installed before connecting to the receiver electronic board. The receiver el. board is connected to the PC/laptop with a USB Hardware Key which is required for security purposes.

7.1 CONNECTING TO SMARTEAS APPLICATION

The hardware key is connected to the 6-pin RS232 serial connector on the control unit and then to an available USB port on the PC/laptop. The hardware key is only for use by installers and technicians. Only 1 hardware key is needed for each technician. It is not left at the store with the system.



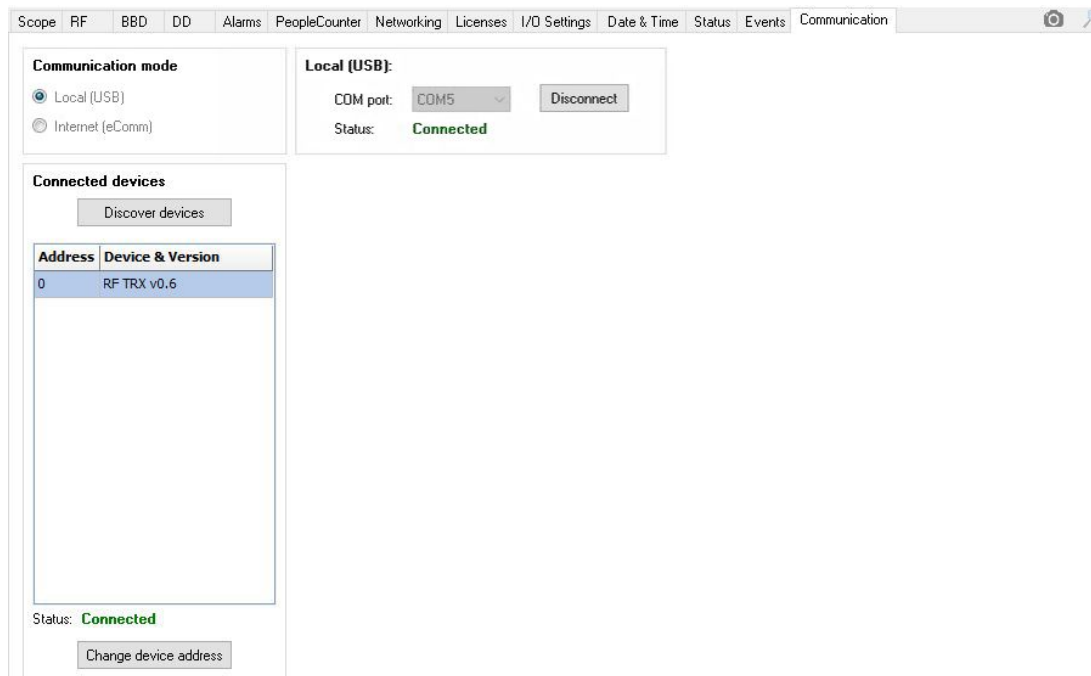
- The hardware key must be connected and the el. board powered ON before opening the SmartEAS software.
- Before opening the software, wait until the PC indicates that “new hardware is installed and is ready for use.” This will be especially important when using a new hardware key or new software version.
- Open the application and a start-up screen looks like this:



- Local (USB) connection through the correct “COM port”.

When you are unable connect to the device, please check:

- Correctly connected to the device with proper cables (6-pin RJ-10 connector from HW Dongle to the RF TRX board)
- RF TRX device is powered with proper voltage (Power LED is light)
- You have selected proper COM port in the application – Check in “Device Manager/Ports/USB Serial port (COMxx)”
- Try to disconnect HW Dongle from the USB port, wait for about 10s and back connect HW Dongle to the USB port (or try different USB port). Then you need to restart opened SmartEAS application. Between closing and opening of SmartEAS application, wait for about 5-10s.
- Once the connection is successful, the application window looks like on the picture below.

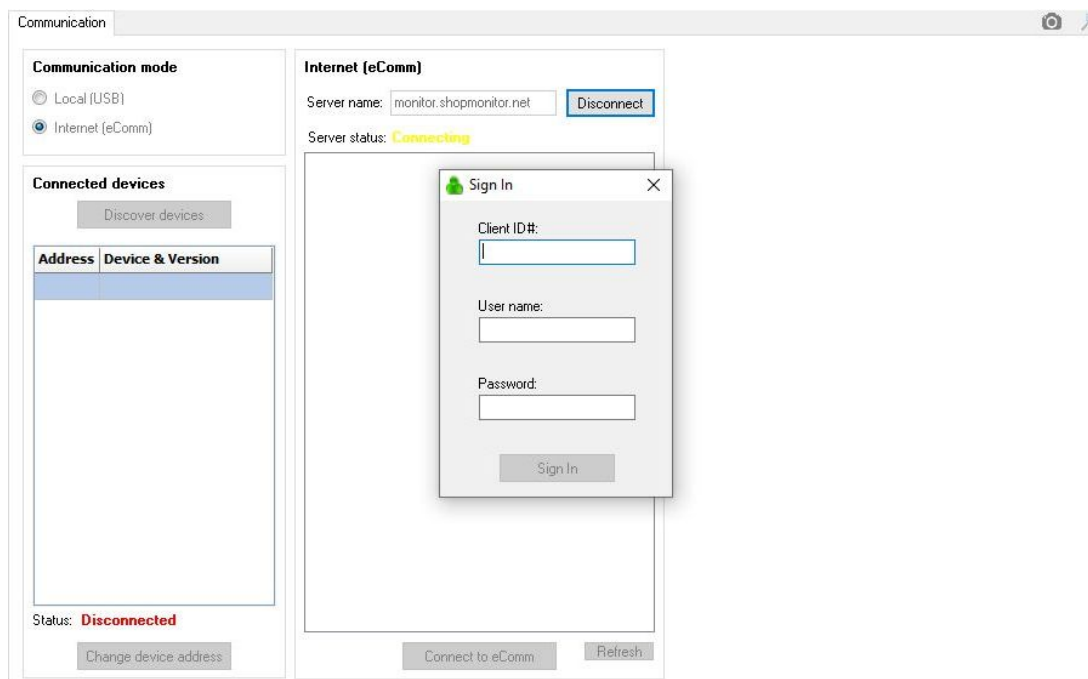


Now you can configure the connected devices as needed. Here, however, it is important to note:

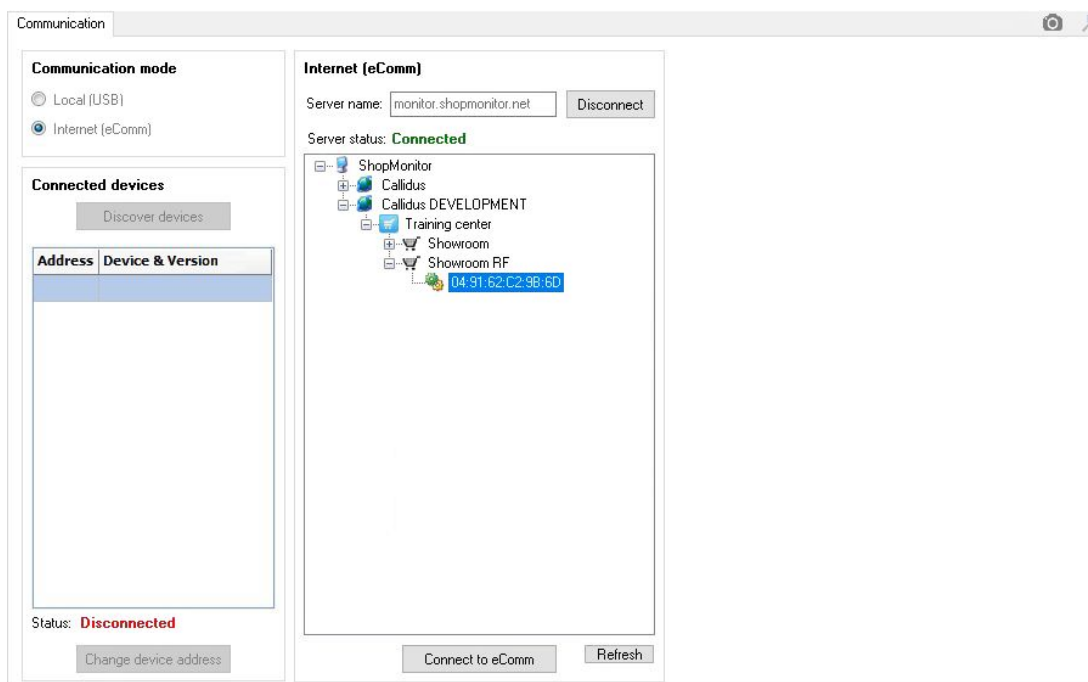
- All configuration changes at the installation site need to be done very carefully. Incorrect settings can create poor detection of this system or all other systems in the same group.
- Very important is to set proper GROUP ID and PEDESTAL ID to prevent IP collision.
- After successful configuration of GROUP ID and PEDESTAL ID of all devices, you can connect to the Master and will see all “Connected devices” in this GROUP. In this moment you can reconnect between devices very fast and also clone of parameters from Master to the Slaves pedestals will be possible (you can clone setting of Sound and Light alarms, People-counting etc.).

7.1.2 REMOTE CONNECTING – INTERNET (ECOMM)

For remote connection must be device connected to the internet. To the device, you can connect directly – typing IP address of this device or you can connect via Shopmonitor server.



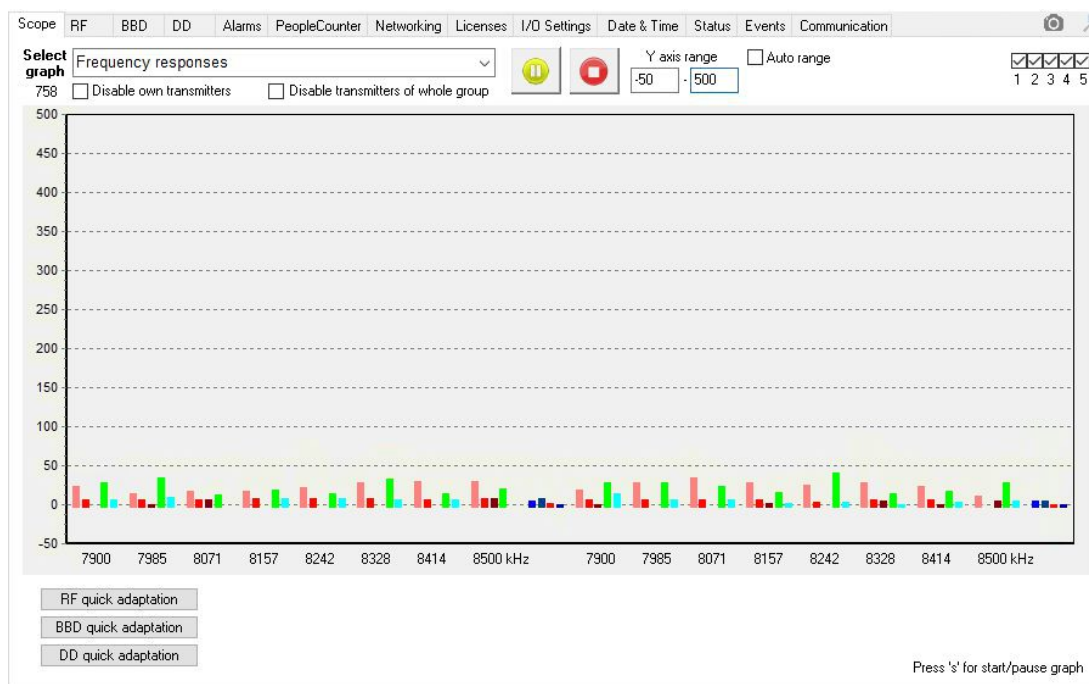
If your device is registered in the Shopmonitor, you will see this device in the list of all devices (MAC address of this device) after you will be successfully connected to the server. When you are successfully connected, at the Server status will be “Connected”.



Now you can select your device registered in the Shopmonitor server (MAC address as on picture above) and double click on this device, what you want to remotely manage. Then you will be connected to this device remotely.

7.2 SCOPE

Scope bookmark is useful for diagnostic of detected signals over whole receiving spectrum. You can select some different graphs for diagnostics. For proper diagnostics you need to select graph and then click on the start (or press “s”). In this moment will graph show you received data.



- Select graph – there you can select different graphs for diagnostic.

You can select these types of graphs: “frequency response” and “SNR evaluation history”.

Frequency response graph show you actual data of receiving signals from all frequencies (8 frequencies) and of both receiving loops.

- Disable own transmitters – it disable or enable both loop transmitters of this connected device
- Disable transmitters of whole group – it will disable or enable all transmitters in the same group ID of connected devices.



Allow continuous scanning.



Stop continuous scanning and clear the screen.




Pause continuous scanning on the last measured sample.

- Y axis range – choice of the y-axis scale on the graph, for automatic matching use “Auto range” option

- RF quick adaptation – start of quick adaptation of RF system receiver

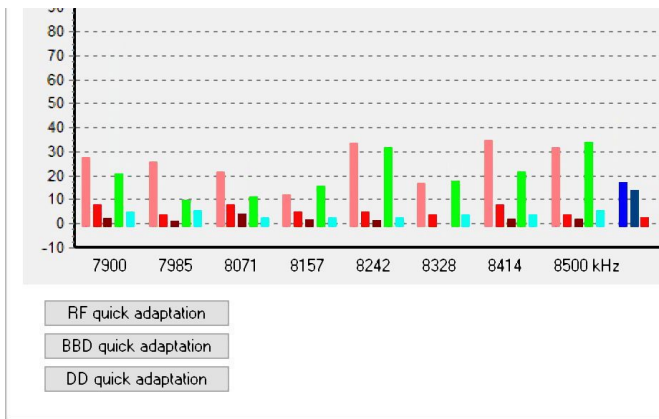
- BBD quick adaptation – start of quick adaptation of BBD system receiver

- DD quick adaptation – start of quick adaptation of DD system receiver

-  Frequency response can be modified with this selection – you can choose what data will be visible in graph

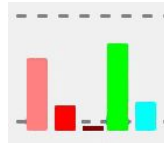
7.2.1 FREQUENCY RESPONSE

This graph can show you actual filtered, non-filtered data of TAG or BACK window. You can see on what frequency is some noise or where on frequency is some tag too close etc.



On the graph you will see two groups every with 8 frequencies. So totally on the graph you will see 16 groups of signals.

On every frequency are 5 different data with different colours.



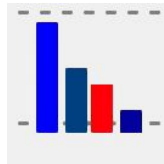
Pink colour – non-filtered data of TAG signal.

Red colour – filtered data of TAG signal.

Brown colour – final signal of TAG data - BACK data.

Green colour – non-filtered data of BACK signal.

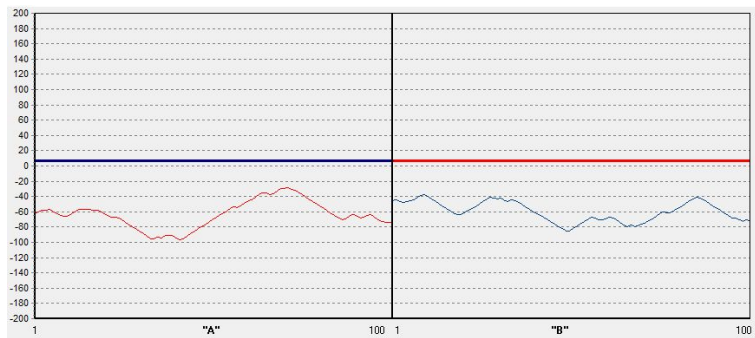
Cyan colour – filtered data of BACK signal.



At the end of every group you can see actual maximum of every filtered TAG (Light blue) and BACK (Dark blue), difference of TAG/BACK (Red) and filtered difference of TAG/BACK (Blue). For visualisation, the filtered TAG/BACK difference can be set to the square or it can be set as the product of two adjacent frequencies.

7.2.2 SNR EVALUATION HISTORY

This graph shows you history of final signal with setting of threshold. Signals are for both receiving channels. It can help you easily analyse correct setting of detection compare to the local noise.



When signal pass over pre-set threshold, it will alarm depending on alarm criteria (pre-alarms, validations, etc.).

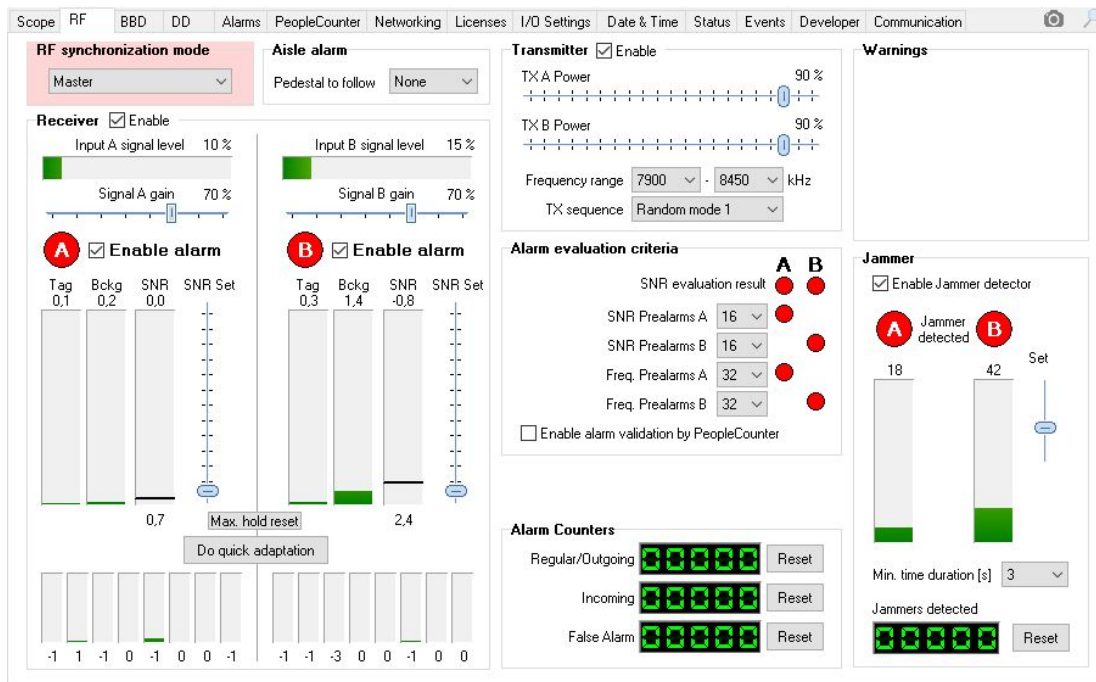
Thick Blue line in channel "A" – pre-set threshold for "A"

Slim Red line in channel "A" – history of final signal "A"

Thick Red line in channel "B" – pre-set threshold for "B"

Slim Blue line in channel "B" – history of final signal "B"

RF screen is main screen for setting of RF technology in the RF TRX system. You can set there transmitting power, frequency bandwidth, TX sequence, receiving gain, alarm criteria etc. Faulty or unprofessional adjustment can degrade detection distance or increase number of false alarms.

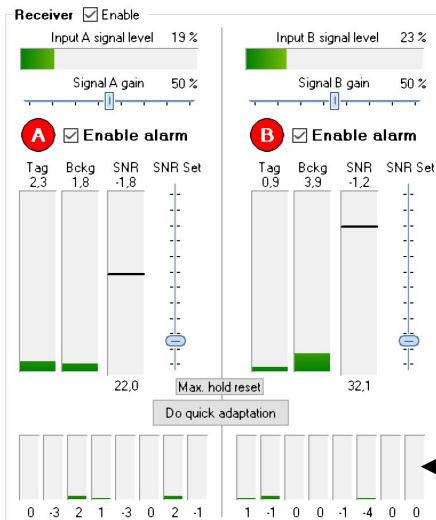


RF synchronization mode – way of synchronize the transceiver. Following options are available:

Master – the device works independently and can control devices of "Slave" type.

Slave – the device is controlled from a "master" device. Synchronization pulses come from Data IN and system waits for this pulses. If not detect pulses from Master pedestal or previous Slave pedestals, system stop to transmit and detect.

Aisle alarm – choice of following neighbour RF alarm to None, Previous, Next or Both pedestals. When RF alarm is created and Aisle alarm is set to Next/Previous or Both, alarm is send to the next/previous or both pedestals for alarming together at the same time. Default value is None – created alarm is not send to previous or next pedestal so only this one pedestal, where alarm was created is alarming.



Receiver – you can enable or disable receiver. When you disable receiver, system will be only transmitting - when you have 2 pedestals and first pedestal will have disable receiver and second pedestal will have disabled transmitter, it will be same configuration used for DUAL system (system with reduced backfield).

Input A/B signal level – actual level of input signal (optimal is 20-30%)

Signal A/B gain – setting of input signal level (default is 70%)

Enable alarm – enable or disable alarm

SNR Set – setting of threshold for actual SNR level (signal over threshold will alarm in depending on alarm criteria)

Max. hold reset – reset setup of index in SNR column, that represents highest reachable level of signal from the latest reset. It is useful for SNR Set setup

Do quick adaptation - makes a quick adaptation of the RF receiver (both channels)

← SNR value of every frequency at A or B channels – can be useful to check tag resonance

Transmitter – you can enable or disable transmitter. When you installed only single pedestal and you disable transmitter, system will not detect labels/tags. In 2 pedestal configuration you can disable transmitter on one pedestal and on second pedestal you need to have enabled transmitter only. In this moment system will detect labels primary between pedestals (DUAL system).

Frequency range – transmitting frequency range, where labels/tags are tuned from factory. When change frequency range, automatically 8 frequencies will be set to this new frequency range. Default frequency range is from 7900 to 8450.

TX power – transmitting power of RF system. Default and optimal value at 90% is for best detection. Increasing of transmitting power can help to detection in some critical noise environment but also will increase heating of final transmitting stage. We do not recommend changing of transmitting power.

TX sequence – there are two variants of TX sequence – Random mode 1 and Random mode 2. In multi-pedestal configuration in one entrance must be this TX sequence set in all pedestals the same.

Alarm evaluation criteria

		A	B
SNR evaluation result		●	●
SNR Prealarms A	16	●	●
SNR Prealarms B	16	●	●
Freq. Prealarms A	32	●	●
Freq. Prealarms B	32	●	●

Enable alarm validation by PeopleCounter

Alarm evaluation criteria – criteria for every receiving channel. Prealarms are the number of consecutive labels detection required to trigger the alarm. There you can set two different prealarms – SNR prealarms and Frequency prealarms. For SNR prealarms, the alarm is triggered after the 16 label detection over preset threshold. For Freq. prealarms, the alarm is triggered after 32 label detection on the same frequency. Both criteria of SNR and Freq. prealarms must be met for publication of alarm. Criteria can be increased to higher or lower number of prealarms. If you decrease the prealarms, system will be very slightly faster but not robust to any false alarms (use in very low noise environment). If you increase

the number of prealarms, system can be slightly slower but more immune to some shooting noise. Increasing of prealarms can help reduce false alarms.

Enable alarm validation by PeopleCounter – you can enable or disable alarm validation by PeopleCounter. If this feature is not enabled, each detected tag is alarmed (sound, light). If this feature is enabled, an alarm is announced if the alarm is confirmed by passing around the pedestal at the time set after the tag is detected. The correct setting of the customer's counter is the condition of the correct function. Then three types of alarms are distinguished according to the direction of the passage: outgoing, incoming and false alarm, which are not confirmed by passage. For each type of alarm, different signalization can be set (light, piezo). More setting you can find at the page 14.

Alarm counter – RF alarm counter with possibility of zero reset.

Warnings – a place for possible alerts (Tag too close, etc.).

Jammer

Enable Jammer detector

A Jammer detected B

16 21 Set

Min. time duration [s] 3

Jammers detected 0000 Reset

Jammer – indication of an RF system jammer. Bar graphs show the level of detected jamming signal for individual receiver loop configurations ("A" and "B"). LEDs A and B lit red if the jammer was not found, green when the jammer is nearby.

Enable jammer detector – allows the presence of a jammer to be evaluated.

Set – is used to set the threshold from which the jammer is indicated.

Min. time duration – is used to set how long the interfering signal must be present to call "Jammer Alarm".

Jammers detected – jammer detector counter. Reset value using the "Reset" button.

In this window you can set the Magnetic Detacher Detector function. For proper working you need to have installed DD board in the pedestal and properly set in I/O setting – port COM3.

You need to have also valid license for setting of DD sensors.



Enable detector - enabling/disabling of the function.

The detector detects a change of mag. three-axis fields (X, Y and Z), signal detection and alarm setting are shown separately and can be set separately for each axis.

Signal - the value of the detected signal. On the graph, the largest detected signal is shown in the black line. You can reset this black line and start to measure maximum from zero again (Max hold reset)

Detect - setting the value after which an alarm is triggered (threshold for alarm).

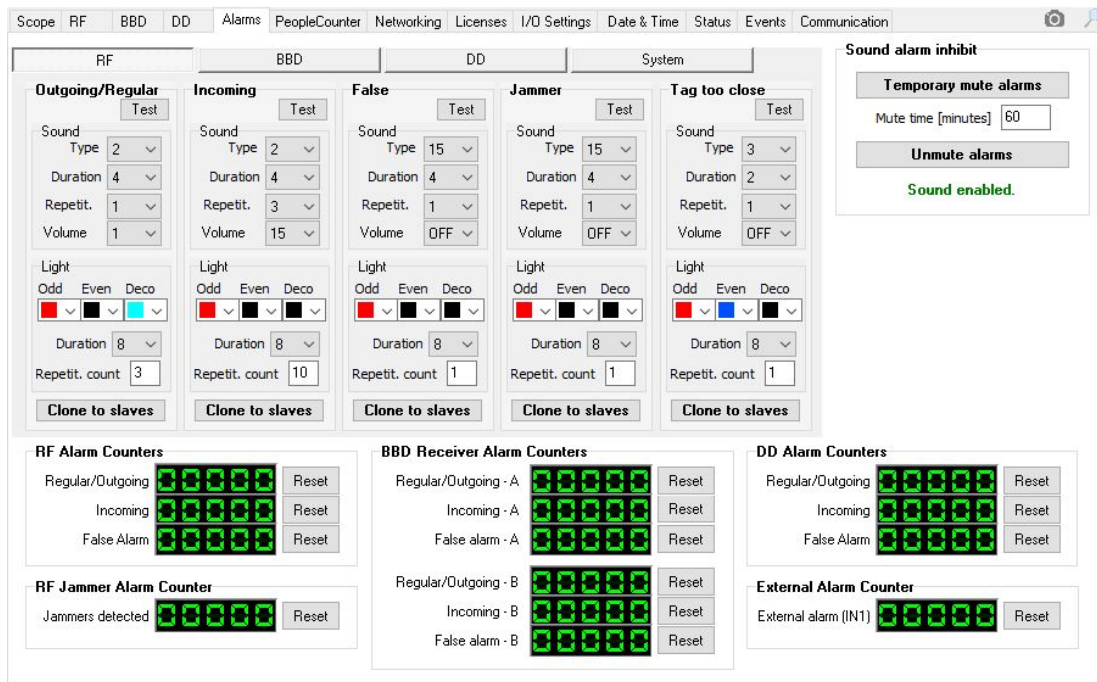
Do quick adaptation - makes a quick adaptation of the detector.

Enable alarm validation by People counter - detector alarms can be validated by people counter and can be differently displayed according to the direction of exit (outgoing, incoming, false) (see Alarms window). If alarm validation is not enabled, each alarm is counted using the "Regular" counter.

Pedestal impact detector - the device can detect bumps and shocks and their strength. If the "Detect" value is exceeded, an alarm is triggered and an event occurs (Event window).

7.5 ALARMS

Setting of visual and acoustic signalizations for all kind of alarms.



The setting of acoustic and visual settings for all alarms is unified. The user selects the group of alarms that needs to be set (RF, DD and System) and then sets the alarm parameters. In the picture you can see setting the alarm for the RF detector. You can set alarm parameters for the following types here: Outgoing / Regular, Incoming, False and Jammers. Setting of other alarms (metal detector, magnet detector, and system status indication "System") is the same.

Test - testing the selected setting.

Sound: Type - following options are available: OFF - Disable buzzer, 1 - One short beep, 2 - One long beep, 3 - S.O.S., 4 - Two long beeps, 5 - Three long beeps, 6 - Four long beeps, 7 - 16 - for future use (One short beep).

Duration – duration speed of selected type of sound (1x is slower - 16x is faster).

Repetit. – Number of repetition of selected type of sound (1-255).

Volume – volume setup. OFF - Disable buzzer. Range for 3 types of buzzer volume.

Light: Odd, Even, Deco - Range for 7 different types of colours. When you set Odd colour only the alarm will blink with this colour. When you set Even colour too, the alarm will blink alternately between Odd and Even colour. Deco colour will stay selected light after alarm.

Example: red/blue blinking – set "Odd" to red, "Even" to blue and "Deco" to black. Red blinking only – set "Odd" to red, "Even" to black and "Deco" to black

Duration – duration speed of selected type of light alarm (1x is slower - 16x is faster).

Repetit. count – Number of repetition of selected type of light alarm (1-255).

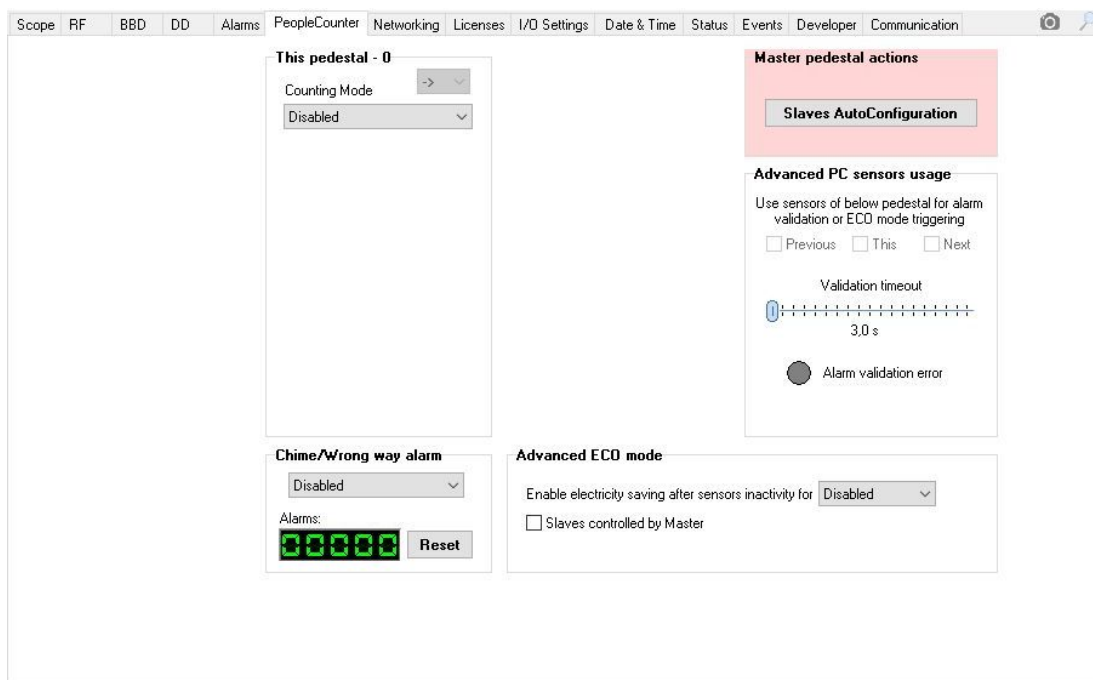
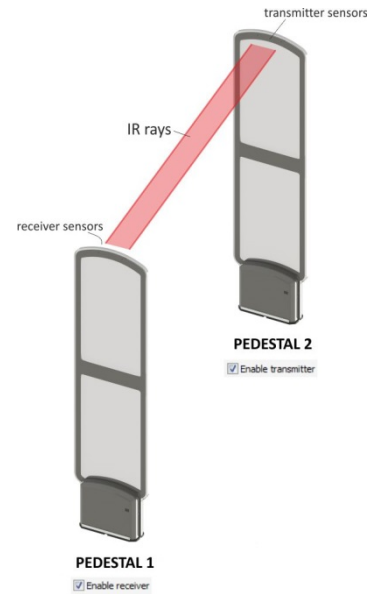
Clone to slaves - the device set as "Master" will enable the alarm setting to be sent to all systems of the same group that are set as "Slave"

7.6 PEOPLE COUNTERS

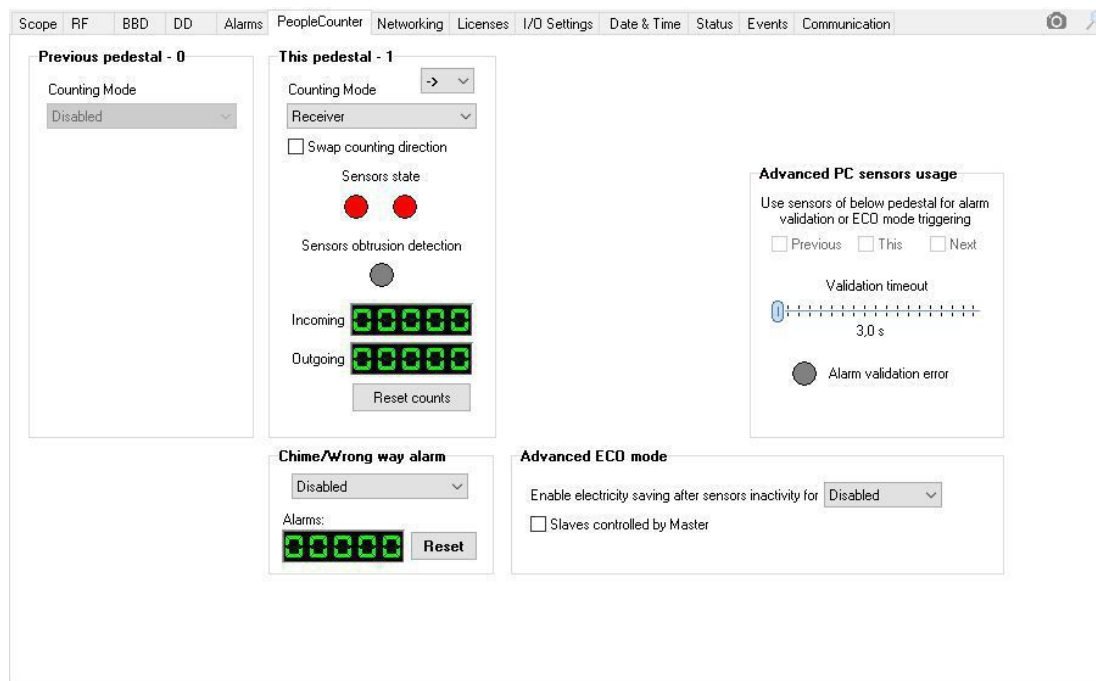
Setting up of the PeopleCounter: **Caution!** The PeopleCounter (PC) is only available if at least two (dual system) or more antennas are installed. A prerequisite for proper PC operation is that all antennas are installed in the same direction (el. boards are placed from the same side). Of course, Group ID and Pedestal ID must be set correctly in the Networking folder.

The standard installation is the side view of the antennas, the Master antenna is the left most one (Pedestal ID 0) and other Slave pedestals are placed to the right (Pedestal ID 1 – n). This arrangement makes it easier for us to check the correct PC settings.

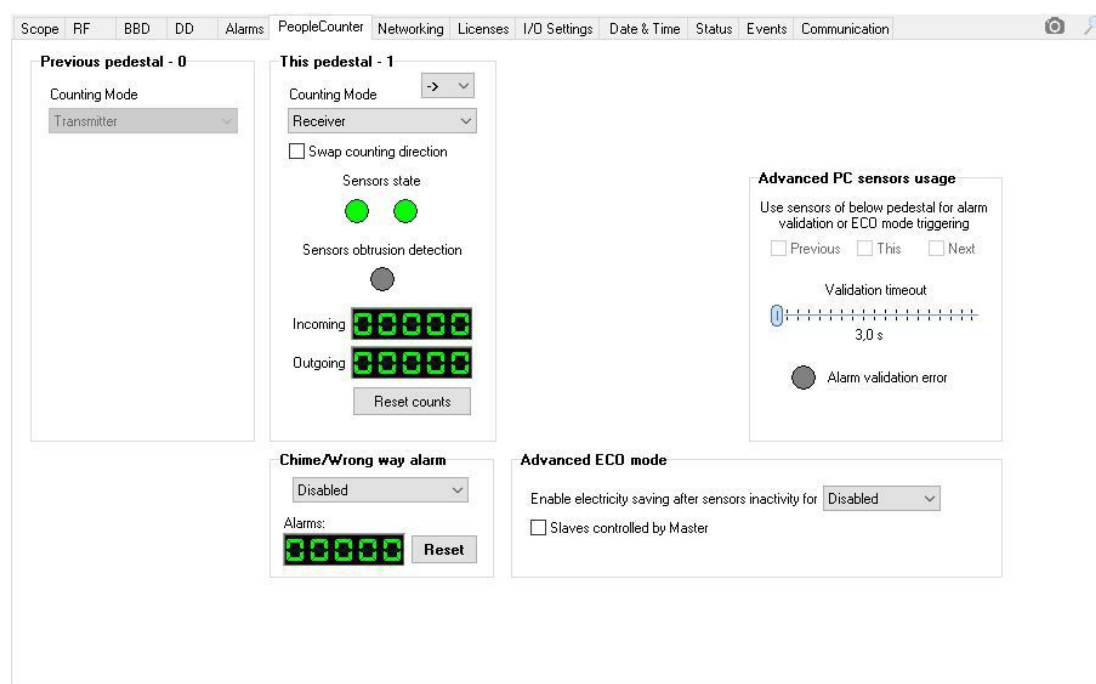
At first we will set the Master antenna, due to the following one, works as Transmitter or Receiver (it can be found out in the documentation of the particular antenna type how the transmitting or receiving diodes of the PeopleCounter system are oriented due to placement of electronic boards).



If, in our example, the master is set, so that the following antenna is a receiver, after selecting the Counting mode – Receiver, the screen looks like this:



Red LEDs indicate that the transmitter does not light to the receiving sensors. The Slaves AutoConfiguration option automatically selects all the following Slave antennas to the correct Counting Mode. If no using the Slaves AutoConfiguration option, it is necessary to set each Slave system manually.



If everything is well installed, the LED is green; the status of previous antenna can be seen in the Previous pedestal window – in this case that the Transmitter is set. Passing through the antenna will shade the sensors, the Sensor state will blink red and the counter will increment, depending on the direction of passage.

Set of communications parameters between system and remote controls and between the systems themselves.

The screenshot shows the configuration interface for a ShopMonitor system. The 'Networking' tab is active, displaying various settings:

- Networking status:** Network SWITCH ports: P1 DOWN, P2 UP; Pedestal BUS status: DK; MAC address: 80:1F:12:54:94:2D; IP address: 192.168.1.234; Netmask: 255.255.254.0; Gateway: 192.168.0.1; Primary DNS: 192.168.0.1; Secondary DNS: 0.0.0.0; RemoteAccess Server IP: 193.165.214.84; RemoteAccess Conn.: Connected; RemoteConn. Ping: 15 s; Cloud/Mon. Server IP: 192.168.1.1; Cloud conn. state: Done, idle; MQTT Server IP: 0.0.0.0; MQTT conn. state: Not connected; MQTT last action state: 0; MQTT status ping: 0 s.
- Pedestal BUS settings:** Group ID: 22; Pedestal ID: 1; Start automatic configuration button.
- IP settings:** NETBIOS/Device discovery name: RF_TRX_54942D; Enable DHCP client/AutoIP: checked; IP address: 192.168.0.22; Netmask: 255.255.255.0; Gateway: 192.168.0.1; Primary DNS: 192.168.0.1; Secondary DNS: 192.168.0.1.
- Cloud connection:** Enable remote access: checked; Remote access server (Name/IP): monitor.shopmonitor.net; Port: 9761; Enable Cloud synchronization: checked; Synchronization interval: immediately; Enable Date&Time synchronization: checked; Monitoring/Cloud server (Name/IP): 192.168.1.1; Port: 80.
- MQTT IOT:** Enable MQTT client: unchecked; MQTT server (Name/IP): mqtt.shopmonitor.net; Port: 1883; Username: user; Password: *****; Base topic path (without slash at end): monitoring/eas; Allow remote configuration: unchecked.
- Web API access:** Enable Web API access: unchecked; API key: 0000000.
- WebInterface Access control:** User password: 12345678; User can reset counters and mute alarms: unchecked; Admin password: *****.

Very important is to set correctly IP address of system. IP address can obtain from DHCP server or manual mode.

If you do not have connected system to the local network and to the internet, you need to set-up network setting manually. Setting of IP address (Manually or from DHCP) is important, if you need to clone setting from master to all slaves, set RF system as Master/Slaves, share alarms on all pedestals or you can use Pager transmitter and share alarms from all pedestals to the pagers, etc. At the picture on the right side, you can see manually setting of network (in the yellow, you need to confirm it by ENTER) and at the end of setting in Network bookmark, you need to click on the "Apply configuration changes".

When you set-up IP address by manually (example 10.100.10.1), last digits in the group of IP address (1) corresponds to the MASTER. All other pedestals – SLAVES will continue in this IP address (10.100.10.2, 10.100.10.3, etc.) for better identify of pedestal numbers. For all SLAVES you need to change only IP address. Gateway, Primary DNS and Secondary DNS will be same for all pedestals.

Networking status - status of all parameters in network

Pedestal bus settings - basic set up for communication of individual el. boards between each other. El. boards, connected in a group, exchange amount of necessary data during operation. The following is considered to be one group of el. boards: master el. board and all slave el. boards connected to the master one by the synchronization cable.

Group ID - all el. boards in a group must have the same group number set up.

Pedestal ID - each el. board in a same group must have different Pedestal ID number. The Pedestal ID setting applies to this: Master always has the Pedestal ID set to 0. The first connected slave has Pedestal ID set to 1, second slave to 2, etc.

API access – right now not in use. Prepare for future

IP setting - setting necessary for correct communication. Setting can be obtained automatically using „Obtain configuration from DHCP server“ option, otherwise it needs to be set manually.

Cloud connection - enabling remote access to the device. If it is enabled, the „Remote access server name / ID“ must be filled in correctly.

Enable cloud synchronization - system can send to server data of events/alarms in time period.

Enable date/time synchronization - Automatic date/time synchronization available only with ShopMonitor Lite.

This screenshot shows a portion of the network configuration interface with manual settings highlighted in yellow:

- Obtain configuration from DHCP server
- IP address: 10.100.10.1; Netmask: 255.255.255.0
- Gateway: 10.100.10.1
- Primary DNS: 10.100.10.1; Secondary DNS: 10.100.10.1
- Cloud connection:
 - Enable remote access
 - Remote access server (Name/IP): monitor.shopmonitor.net; Port: 9761
 - Enable Cloud synchronization
 - Synchronization interval: 1 min

Access control – user and admin passwords for control from web browser

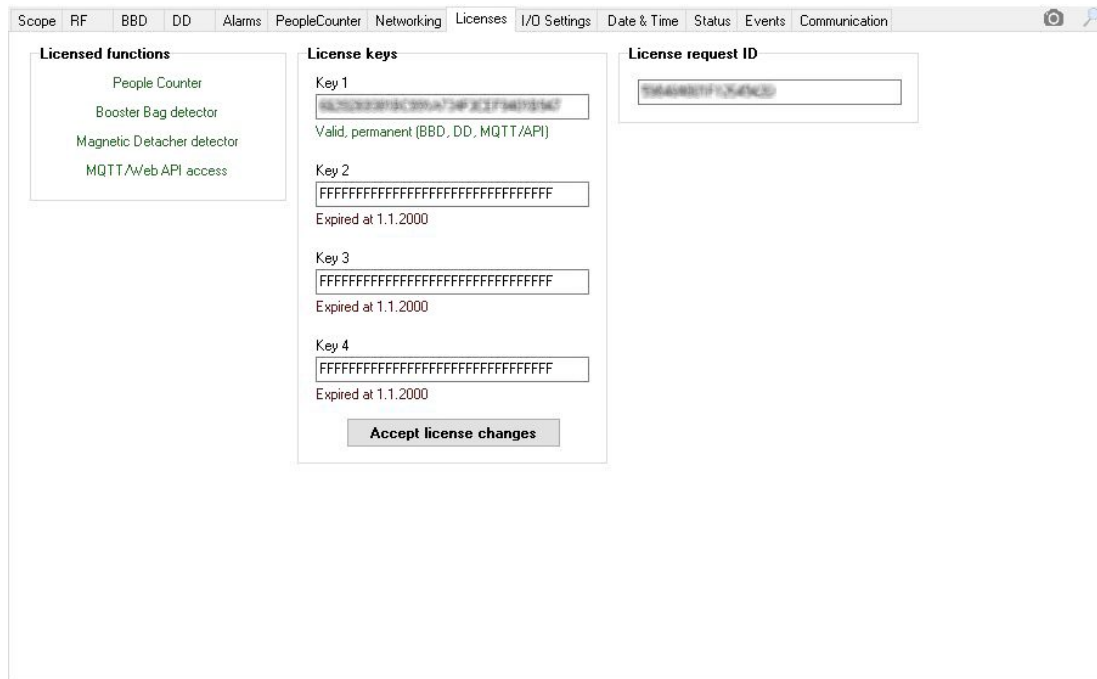
Apply configuration changes – confirm and save changes. If any parameter was changed, you need to apply changes.

MQTT IOT – enabling MQTT client on the board. Be careful to fill correct MQTT Server name, login information etc.

Web API access – Enabling Web API access. When Enable – correct API key is needed.

7.8 LICENCES

Considering there are many available features, the el. boards RF TRX is controlled by a system of licence keys. The licence key indicates which features are enabled and for how long time.



Following features are available in system: basic function of RF labels detection is always available. Additional features are Booster bag detector, Magnetic detacher detector and Network API access. The additional functions can be enabled permanently or temporarily.

Licensed functions – list of currently enabled features. Allowed functions are marked in green.

License keys – One el. board may have multiple licence keys allocated. Here is a list of licence keys that indicate the enabled features and validity dates.

License request ID – the numeric code to be sent to the vendor when requesting a change of licence (change or the scope of allowed functions, change or validity). This code is unique and is not transferable from board to the board.

Example of request for the licence change: RF TRX el. board with basic licence (RF detector enabled only, disabled booster bag detector, Magnet detector and network API access) need to be expanded with the Booster Bag detector feature. The user will send the number from the „Licence request ID“ together with the extension request to the vendor. The vendor will then generate a license key and send it to the user. The user enters the license key to a free field (Key 1, 2, 3 or 4) and clicks on the „Accept licence changes“ button.

In this window it is possible to set function of communication channels and universal input and output (actually visible Port COM2 – Paging TX mode).

The screenshot shows the 'I/O Settings' window with several configuration panels:

- Port COM2 configuration:** Paging TX mode (dropdown), Device address: 252, Set button.
- Port COM3 configuration:** Not used (dropdown), Device address: 252, Set button.
- Input IN1 configuration - MASTER:** Not used (dropdown), Negative (radio), Positive (radio).
- Output OUT1 configuration:** Not used (dropdown), Negative (radio), Positive (radio).

Below these panels is a table for 'Paging messages' with columns for 'Enabled events', 'Address', 'Message text', and 'Test' buttons.

Enabled events	Address	Message text (char % will be replaced by aisle or pedestal number)	Test
<input type="checkbox"/> AM outgoing/regular alarm	1234565	Security tag detected on pedestal %!	Test
<input type="checkbox"/> AM incoming alarm	1234565	Security tag detected on pedestal % when customer came!	Test
<input type="checkbox"/> AM false alarm	1234565	Security tag detected on pedestal % without customer presence!	Test
<input type="checkbox"/> AM Jammer detected	1234565	Security system Jammer detected on pedestal %!	Test
<input type="checkbox"/> AM Tag too close	1234565	Please check for security tags close to pedestal %.	Test
<input type="checkbox"/> BB outgoing/regular alarm	1234565	Booster bag detected in aisle %!	Test
<input type="checkbox"/> BB incoming alarm	1234565	Booster bag detected in aisle % when customer came!	Test
<input type="checkbox"/> BB false alarm	1234565	Booster bag detected in aisle % without customer presence!	Test
<input type="checkbox"/> DD outgoing/regular alarm	1234565	Tag detacher detected on pedestal %!	Test
<input type="checkbox"/> DD incoming alarm	1234565	Tag detacher detected on pedestal % when customer came!	Test
<input type="checkbox"/> DD false alarm	1234565	Tag detacher detected on pedestal % without customer presence!	Test
<input type="checkbox"/> External alarm	1234565	External alarm/RFID alarm triggered on pedestal %!	Test
<input type="checkbox"/> Chime/wrong way	1234565	Chime/Wrong way going customer in aisle %.	Test
<input type="checkbox"/> HW error	1234565	HW error occurred on pedestal %.	Test
<input type="checkbox"/> PeopleCount. sensors obstruction	1234565	People counting sensors obstruction detected in aisle %.	Test

On the right side, there are sections for 'SmartPager transmitter settings' (Transmitter: Transmitting power, Max RSSI level, Delay at high RSSI) and 'Paging receiver internal time' (Automatic time synchronization, CapCode 8 Address, Synchronization period).

Port Com2 configuration – port for communication with pager.

Port Com3 configuration – port for communication with external magnet sensors.

Input IN1 configuration – the binary contact type input can be used for External Alarm Input or for manual switching to standby mode (System Enable Key). Read more about standby mode in DATE/TIME chapter.

Output OUT1 Configuration – open collector output. The output can be used as another external alarm indication or for identification of operating time of opening hours.

After successful set of “port Com configuration” or “Input/Output configuration” will be possible this port extra configure.

If you select Pager transmitter at the “Port COM2 configuration”, there is extra configuration. You can configure messages of pager and address of these messages.

Paging messages – there you can select, what messages can be sent to the pager receiver. Also must correspond correct address of pager transmitter and pager receiver. Message text is received on the pager – can be modified to your text.

SmartPager transmitter settings – there is setting of pager transmitter

- Transmitter – set level of transmitting power when you need cover bigger area, RSSI level when noisy area.
- Hardware inputs – set input type (NO or NC) and delay
- Paging receiver internal time – synchronization of internal date/time of pager receiver. Manual or automatic synchronization (period of automatic synchronization) can be selected

7.10 DATE & TIME

RTC is a clock in the board (integrated circuit) that keeps track of the current time. These settings are mainly for people counters data, events and correct Opening hours control.

Scope RF BBD DD Alarms PeopleCounter Networking Licenses I/O Settings Date & Time Status Events Communication

RTC time: **2.8.2021 13:08:17 Monday** Time zone: UTC+02:00

PC time: **2.8.2021 13:08:17 Monday**

RTC calibration offset(second per day) +10s -10s

Use DST (Daylight Saving Time) **On** DST status: **adjusted**

DST settings

DST adjust begin		DST adjust end	
Month	March	Month	October
Time	02:00	Time	03:00
<input type="radio"/> Date	1	<input type="radio"/> Date	1
<input checked="" type="radio"/> Day	Sunday	<input checked="" type="radio"/> Day	Sunday
Week	Last	Week	Last

Off Electricity saving based on store opening hours

Slaves controlled by Master

Time zone - select the time zone of the installation site.

Synchronize with PC - You can synchronize the time with PC by clicking on button.

Use DST - Enables the automatic change of summer/winter time.

Electricity saving based on store openings hours - Sets the opening hours of every day, which allows you programmable "Green mode" where the system can be set to turn on only during business hours to help conserve energy.

Setting of opening hours - *Example:* Picture below shows setting of two days. Saturday, when it is closed all day, the transmitters will be disabled. In Friday is open for 13 hours (from 7AM till 8PM). Besides this time (from 8:01PM to 6:59AM) will be the transmitter disabled.

Friday	<input type="radio"/> Closed	<input type="radio"/> Open	<input checked="" type="radio"/> Open from	<input type="text" value="07:00"/>	to	<input type="text" value="20:00"/>
Saturday	<input checked="" type="radio"/> Closed	<input type="radio"/> Open	<input type="radio"/> Open from	<input type="text" value="00:00"/>	to	<input type="text" value="23:59"/>

7.11 STATUS

This window displays system status information. Data are important for identifying and troubleshooting during putting into operation or during repairs.

The screenshot shows a software interface with a menu bar at the top containing: Scope, RF, BBD, DD, Alarms, PeopleCounter, Networking, Licenses, I/O Settings, Date & Time, Status, Events, and Communication. The 'Status' tab is active. Below the menu bar, there are three input fields: 'Firmware version' with the value 'v0.6', 'Hardware ID' with the value '000000588563', and 'Library version' with the value '006590 (0.6)'. The main area is divided into several sections: 'Status HW' and 'Status SW' each containing a list of status indicators with circular icons; 'PSU voltage' (37,13 V), 'TX temperature' (89,8 °C), 'CPU temperature' (80,5 °C), and 'Backup battery voltage' (3,25 V) each with a numerical value and a unit; and four buttons: 'Test EEPROM', 'Restore configuration', 'Backup configuration', and 'Enter BootLoader mode'. At the bottom right, there is a 'Reset to defaults' button.

Firmware version, Hardware ID and Library Version - serves to accurate identification of the system.

Status HW - indication of problems that may have a serious impact on the overall functionality of the system. If there is some problem, the red signal lights up.

EEPROM1 error - data in EEPROM1 are incorrect (faulty EEPROM or communication with it)

EEPROM2 error - data in EEPROM2 are incorrect (faulty EEPROM or communication with it)

Missing synchronization pulses – synchronization pulses from power mains or master are not received. System is stopped.

RTC fault – error in communication with RTC or incorrect data from RTC (faulty RTC or communication with it, system does not have correct system time, saved time data are incorrect)

Backup battery voltage low – low power of backup battery (less then 2.5V) – if the system is disconnected from the power supply, there is a risk of losing system time.

IP configuration error – problem with IP address. Not configured or same IP in the network.

Firmware cycle error – internal software error

PSU voltage below 29V – the power supply voltage is below the level required for proper system operation (low power supply voltage or power failure)

Missing signal of BBD A – the metal detector has no signal from the corresponding transmitter A loop (ready for future).

Missing signal of BBD B – the metal detector has no signal from the corresponding transmitter B loop (ready for future).

COM2/Paging TX error – COM2 port failure

COM3 error – COM3 port failure

Pedestal ID collision – at the installation site, multiple el. boards have the same ID – communication is impossible

Status SW – an indication of important system operation states. In the case of detection, the red signal lights up.

RF Quick adaptation – quick adaptation of RF labels detection is in progress. Quick adaptation takes several seconds and is triggered by a large change of the detection conditions (e.g. transmitter switches on/off, changed synchronization settings, etc.). Detection of the system is suppressed during the quick adaptation.

BBD Quick adaptation – quick adaptation of booster bag detector is in progress. Quick adaptation takes several seconds and is triggered by a large change of the detection conditions (e.g. transmitter switch on/off. Change synchronization settings, etc.). Detection of the system is suppressed during the quick adaptation.

DD Quick adaptation – quick adaptation of magnetic detector is in progress. Quick adaptation takes several seconds and is triggered by a large change of the detection conditions (large changes of the magnetic field around the system etc.). Detection of the system is suppressed during the quick adaptation.

Tag too close – system is detect the RF tag in the detection field for a long time (forgotten label). During the Tag too close indication, RF detection may be reduced.

Sensor 1 State – people counter No. 1 sensor status (free / shaded)

Sensor 2 State – people counter No. 2 sensor status (free / shaded)

Sensors obstruction – people counter sensors permanently shaded – counting and alarms validation is not working

External alarm – on external port IN1 is detected external alarm

Jammer – detection of interference around the system (possible presence of an RF jammer nearby)

Alarm validation error – improper configuration of people counter and validation request are set. Example: alarms validation for booster bag detector is requested but people counter is not allowed (window PeopleCounter – Counting mode is disabled).

Store is closed/Key disabled – system is in the "out of opening hours" state - RTC window or detection is disabled by external input (IO Settings - Input1 window). Detection is suppressed.

Slaves controlled by Master – slave is not controlled by Master. Lost connection between Master - Slave.

Transmitters disabled – the RF transmitter is in OFF state, detection is not possible for single pedestal installation.

Alarm validation setting error – improper setting of Alarm validation causes malfunction of RF evaluation.

Ongoing HPF adaptation – very quick adaptation after Tag alarm

Alarms temporary muted – indication of muted alarms for pre-defined time (default value is 60 minutes)

PSU voltage – current value of the power supply voltage

TX temperature - current temperature of transmitter

CPU temperature – current temperature of CPU

Backup battery voltage - voltage of the RTC backup battery, the value should be higher than 2.5 V

Restore configuration – allows you to restore the previously saved system configuration.

Backup configuration – allows you to save the current system configuration to the file.

Enter BootLoader mode - el. board RF TRX will switch to the firmware upgrade mode.

Reset to defaults – factory values setting

7.12 EVENTS

If your system have any occasionally trouble or false alarms, check how many times or in what time this trouble was created. You can download Events from the memory and check these data. You can remotely sent this data to your server or you can monthly export this data to CSV or JSON. There is also possibility to download only new events in memory if you download some data before.

Selection of events can be done with **all available** or **custom selection** by type of events and from Date range.

Maximum events in the memory is 1600, after that the older events will be rewrite by new events (FIFO).

The screenshot displays the 'Events' tab in a software application. The interface includes a menu bar at the top with options like 'Scope', 'RF', 'BBD', 'DD', 'Alarms', 'PeopleCounter', 'Networking', 'Licenses', 'I/O Settings', 'Date & Time', 'Status', 'Events', and 'Communication'. Below the menu, there's a 'Select device' dropdown set to '000000598563'. The main area features a table with columns 'DateTime /', 'Type', 'Data1', and 'Data2'. Two rows of events are visible, both dated '2021-08-02' and of type 'HW reset - user'. To the left of the table, there's a 'Download events' button and radio buttons for 'All available', 'Only new', and 'Only [25] last'. To the right, there's an 'Events and date range selection' panel with a list of event types (e.g., 'Tag alarms - Regular/Outgoing', 'BBD alarms - Regular/Outgoing') and a 'Date range' selector set to '3. 8.2017' to '2. 8.2021'. At the bottom, there are buttons for 'Check all', 'Uncheck all', 'Show required data', 'Export to CSV', and 'Export to JSON', along with search and highlight options.

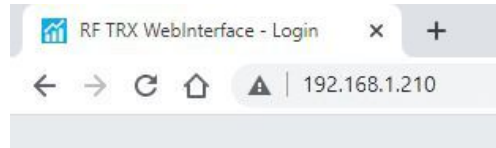
DateTime /	Type	Data1	Data2
2021-08-02 11:10:00	HW reset - user	1	
2021-08-02 11:05:00	HW reset - user	1	

If your device is connected to the internet and data from device are send to the server (alarms, people counter, etc), after device successfully send data to server, counter of Events in memory will show zero events. It means that data was successfully sent to the server.

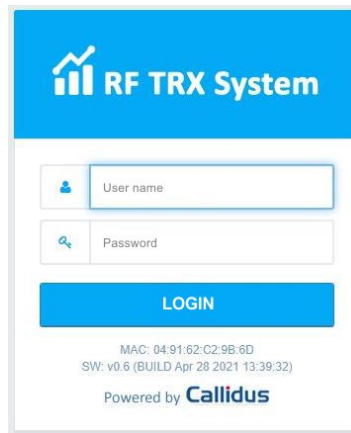
8. EL. BOARD SETTING CONNECTION - WEB BROWSER CONNECTION

To the RF TRX board you can connect via WEB-Browser. For successful connection, you must be connected in the same LAN network as RF TRX board and you need to know IP address of RF TRX connected to the store LAN network. This IP address is obtain from DHCP and you need to find this device in the connected network. To find RF TRX device in the network can easily help any external software or IT store division.

To the Web-browser you need to type IP address of device and confirm.

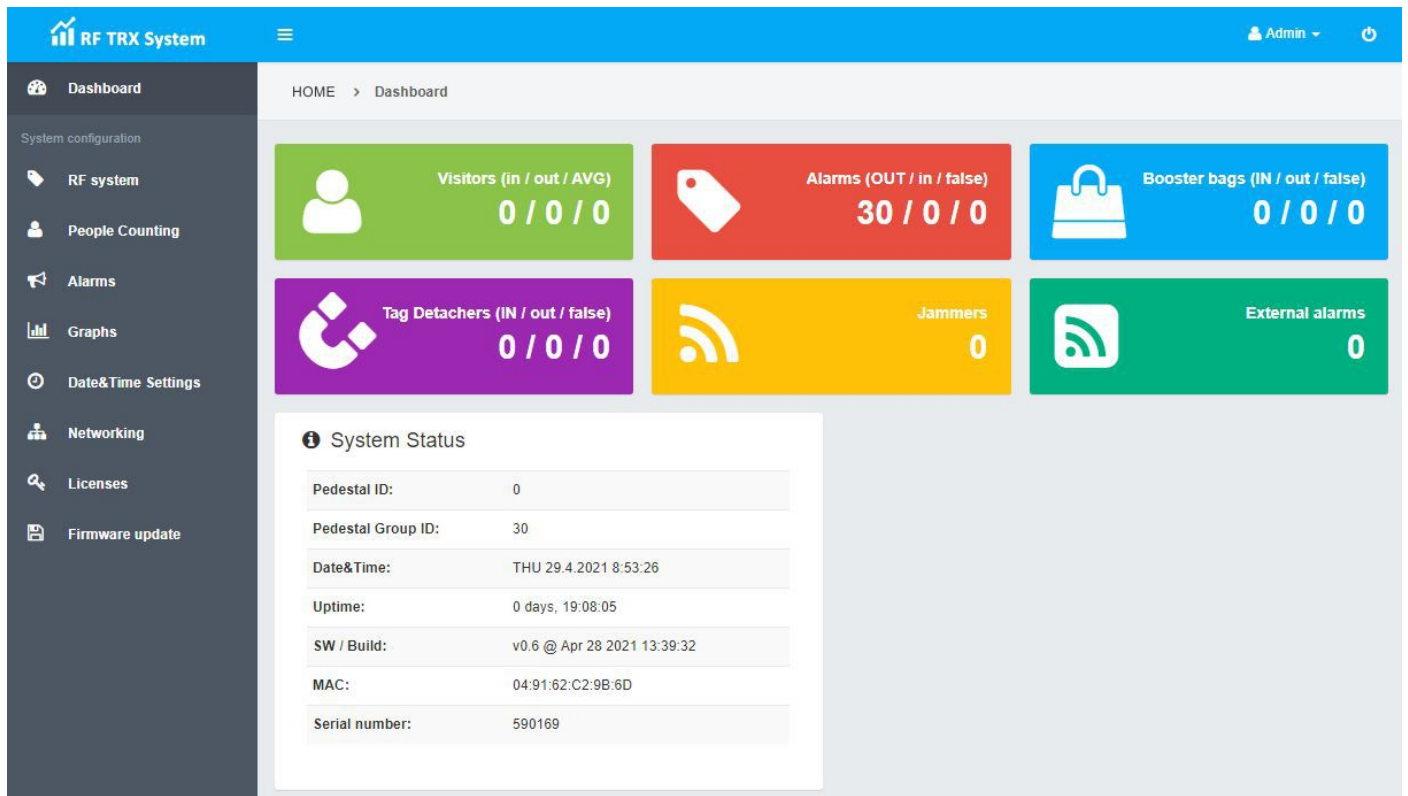


Then you will see login window (picture below). There you need to login with your User name and password.

A screenshot of the RF TRX System login interface. At the top, there is a blue header with a bar chart icon and the text "RF TRX System". Below the header, there are two input fields: "User name" with a person icon and "Password" with a magnifying glass icon. A blue "LOGIN" button is positioned below the password field. At the bottom of the form, the following information is displayed: "MAC: 04:91:62:C2:9B:6D", "SW: v0.6 (BUILD Apr 28 2021 13:39:32)", and "Powered by Callidus".

8.1 DASHBOARD

After successful login to the RF TRX pedestal, you will see main page – Dashboard. There you can find complete information about Alarms, People-counter and System status.



- Visitors – data from people-counter. IN – incoming, OUT – outgoing, AVG – average.
- Alarms – counter of detected tags. OUT – outgoing or regular, IN – incoming, FALSE – false alarm. Counting of outgoing, incoming and false alarms can be possible only with enabled verification of alarms by people counter.
- Booster bags – counter of booster bag alarms. IN – incoming, OUT – outgoing, FALSE – false alarm. Counting of outgoing, incoming and false alarms can be possible only with enabled verification of alarms by people counter.
- Tag Detachers – counter of Tag Detacher alarms. IN – incoming, OUT – outgoing, FALSE – false alarm. Counting of outgoing, incoming and false alarms can be possible only with enabled verification of alarms by people counter.
- Jammers – counter of Jammer alarms. When system is disturbed with any external signal to get system into non-detection status, system detects this as Jammer and also alarm of Light and sound can be set.

8.2 RF SYSTEM

The screenshot displays the RF TRX System configuration page. It is divided into several sections:

- Transmitter:** Includes a 'Transmission enabled' checkbox, sliders for TX A Power (90%) and TX B Power (90%), a frequency range slider (7900 kHz - 8450 kHz), and dropdowns for TX sequence (Random mode 1) and Sync. mode (Master). A 'Save settings' button is present.
- Receiver:** Includes a 'Receivers enabled' checkbox, sliders for RX A Input level (30), RX A Gain (70%), RX B Input level (22), and RX B Gain (70%). It features 'Do adaptation' and 'Save settings' buttons.
- Evaluation criteria:** Contains input fields for RX A SNR prealarm (16), RX B SNR prealarm (16), RX A freq prealarm (32), and RX B freq prealarm (32). A checkbox for 'Validate using people counter' and a 'Save settings' button are also shown.
- Receiver A channels:** A grid of 8 channels (CH1-CH8) with SNR thresholds. CH1 is set to 20, while others are 0. A 'Set SNR' button is at the bottom.
- Receiver B channels:** A similar grid of 8 channels, all with SNR thresholds set to 0. A 'Set SNR' button is at the bottom.
- Status:** A table showing hardware (HW) and software (SW) status for various components like BIT0, BIT1, etc., with green circles indicating operational status.

8.2.1 TRANSMITTER

In the transmitter you can set transmitting power, frequency range of transmitter, transmitting sequence and synchronization mode. Transmitter is transmitting short pulses at pre-set frequency range or at only one frequency (depends on setting of transmitter).

!! When you change any value in the transmitter, for applying you need to Save setting!!

This panel shows the 'Transmitter' settings. It includes a checked 'Transmission enabled' checkbox, sliders for TX A Power (90%) and TX B Power (90%), a frequency range slider (7900 kHz - 8450 kHz), and dropdowns for TX sequence (Random mode 1) and Sync. mode (Master). A green 'Save settings' button is located at the bottom right.

Transmission enabled – enabled or disabled transmission.

TX Power – default value is 90%. This is optimum setting of transmitting signal. Increasing of this value did not much help of detecting tags, but can increase heating of the mainboard. Decrease of this value will reduce detection distance.

Freq. range – default value is from 7900-8450 kHz. Default value is optimal for most of the tags, primary for paper labels. If you are using hard tags, you can decrease this frequency range. Or you can set to higher or lower frequency range, if most of the tags are tuned to the top or bottom frequencies.

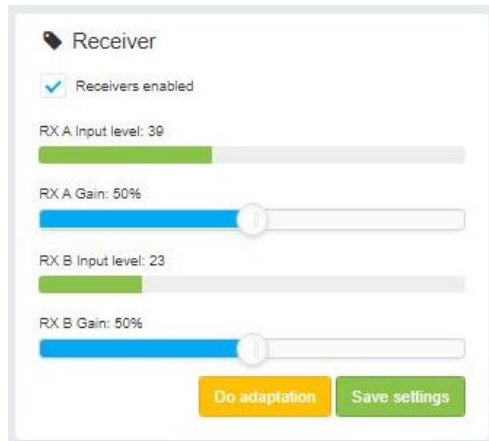
TX sequence – There are two different random modes – Random 1 and Random 2. It can help in some case with false alarms to change Random mode.

Sync. mode – Default value is Master. You can change RF TRX board works in Master/Slave mode. Master sent synchronization data to Slave. Slave is receiving synchronization pulses from Master (Slave is controlled by Master for transmitting).

8.2.2 RECEIVER

In the receiver you can set RX gain or disable receiver. Also you can see actual input level at both channels. After every transmitting pulses receiver receive signals from Tag/Label.

!! When you change any value in the Receiver, for applying you need to Save setting!!



Receivers enabled – enabled or disabled reception.

RX A/B Input level – actual value of input level. Lower value means lower noise received and better detection can be achieved.

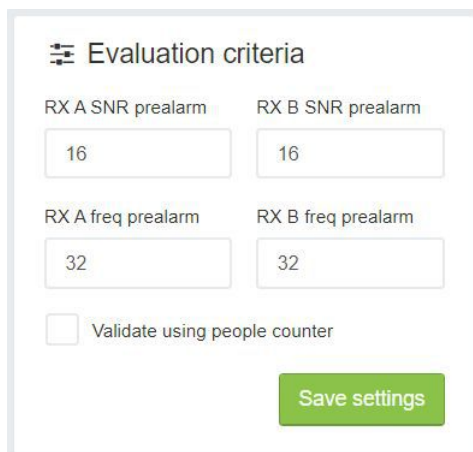
RX A/B Gain – default value is 70%. You can increase or decrease receiver gain. When very low noise is detected, you can increase RX GAIN to achieve better detection. But in most cases default value is optimum value.

Do adaptation – in the system is automatic adaptation implemented, but when you need to do manual adaptation – click on “Do adaptation”. System will do adaptation to interference signals (signalization in SW status).

8.2.3 RECEIVER EVALUATION CRITERIA

Evaluation criteria are used to eliminate possible false alarms in noisy environment. For elimination of false alarms, you can use more number of pre-alarms or you can use Validation of alarms with people counter.

!! When you change any value in the Evaluation criteria, for applying you need to Save setting!!



RX A/B SNR prealarm – number of detected tag over preset threshold. Be careful with increasing of pre-alarms, because very high number of pre-alarms can reduce speed of detection (higher number of pre-alarms = slower detection).

RX A/B freq prealarm – number of detected tag on one frequency. This prealarm can successfully reduce false alarms from received shooting noise. Be careful with increasing of pre-alarms, because very high number of pre-alarms can reduce speed of detection (higher number of pre-alarms = slower detection).

Validate using people counter – announced alarm wait for confirmation from people counter. Types of validated alarms are: OUT (detected tag and people pass the IR sensor in direction from the store), IN (detected tag and people pass the IR sensors in direction to the store), FALSE (detected tag and none signal from IR sensors)

8.2.4 RECEIVER CHANNELS

Receiving channels at every frequency from frequency range pre-set in Transmitter. Receiving frequencies are automatically adjusted when change frequency range. Setting of SNR threshold is for reduction of false alarms. Higher level of SNR threshold = lower level of false alarms and slightly decrease of detection distance.

!! When you change SNR threshold value in the Receiver A/B channels, for applying you need to Set SNR!!

Receiver A channels

SNR threshold	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
5	7900 kHz	7985 kHz	8071 kHz	8157 kHz	8242 kHz	8328 kHz	8414 kHz	8500 kHz
5	0	0	0	1	0	4	0	0

Receiver B channels

SNR threshold	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
5	7900 kHz	7985 kHz	8071 kHz	8157 kHz	8242 kHz	8328 kHz	8414 kHz	8500 kHz
5	0	0	0	0	0	0	0	1

8.2.5 STATUS

Status

Status HW		Status SW	
BIT0	●	RF ADPT	●
BIT1	●	BBD ADPT	●
EE1 ERR	●	DD ADPT	●
EE2 ERR	●	Tag too close	●
BIT4	●	PC S2	●
Sync ERR	●	PC S1	●
RTC ERR	●	PC ERR	●
BAT ERR	●	Ext Alm	●
IP ERR	●	Jammer	●
FW ERR	●	Val. ERR	●
PSU ERR	●	Store Closed	●
BIT11	●	Ctrl by Master	●
BIT12	●	TX Disabled	●
COM2 ERR	●	Val. Sett. ERR	●
COM3 ERR	●	HPF ADPT	●
Ped ID ERR	●	Alm Muted	●

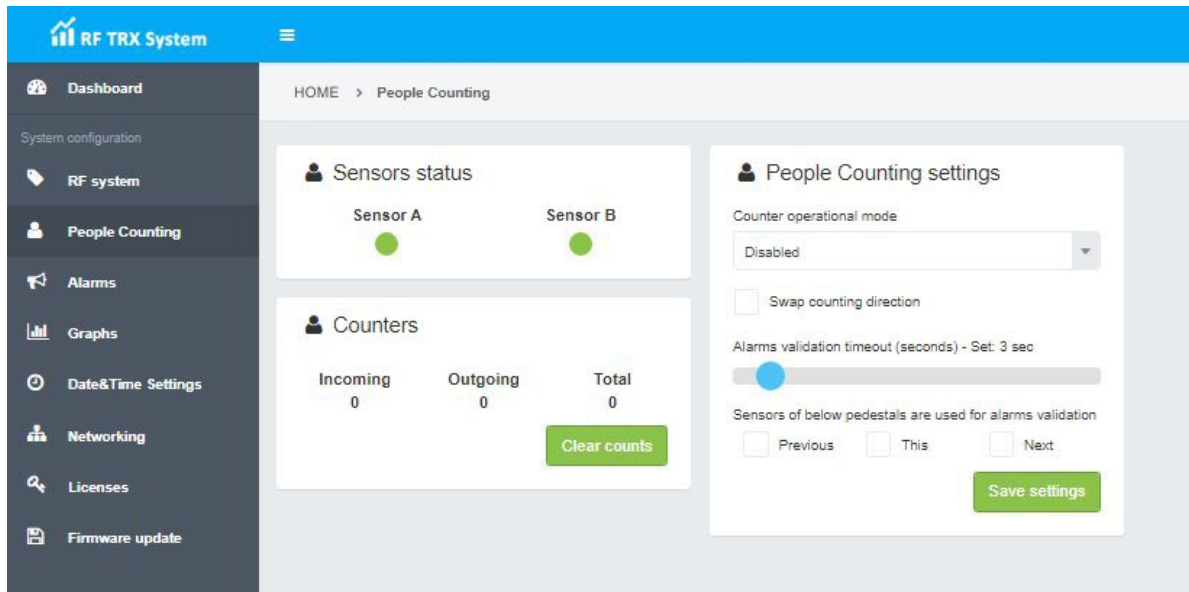
Status helps to identify any problem or unexpected system behaviour.

There are two different status – HW and SW status.

HW status – hardware “electronic board” problem (RTC, Batt, PSU, Pedestal ID etc.).

SW status – software problem or information (adaptation, Tag too close, People counter, Jammer, TX disabled etc.).

Status is very helpful if the system is not working correctly and can identify very quickly some of the problem.



!! When you change any value in the People Counting settings, for applying you need to Save settings!!

RF TRX system is capable to count incoming/outgoing peoples to/from the store. For use this feature, you need to have installed minimum 2 pedestals.

For example: First pedestal can be set as Transmitter of IR signal and second antenna will be set as Receiver of IR signals.

Very important is **Sensor status**, what need to be at green status, if receiver is capable to see transmitter (Normal working condition). When one or both of sensors are in red, it means that transmitter IR led is not working or receiving IR led are not connected properly or between transmitter IR led and receiver IR led is person or some device (antenna sleeve) – IR receiver not see IR transmitter signal.

Counters – counting of incoming or outgoing peoples. After successful installation, you can Clear counts to start of counting peoples from zero. Total means that it is average number between incoming and outgoing peoples.

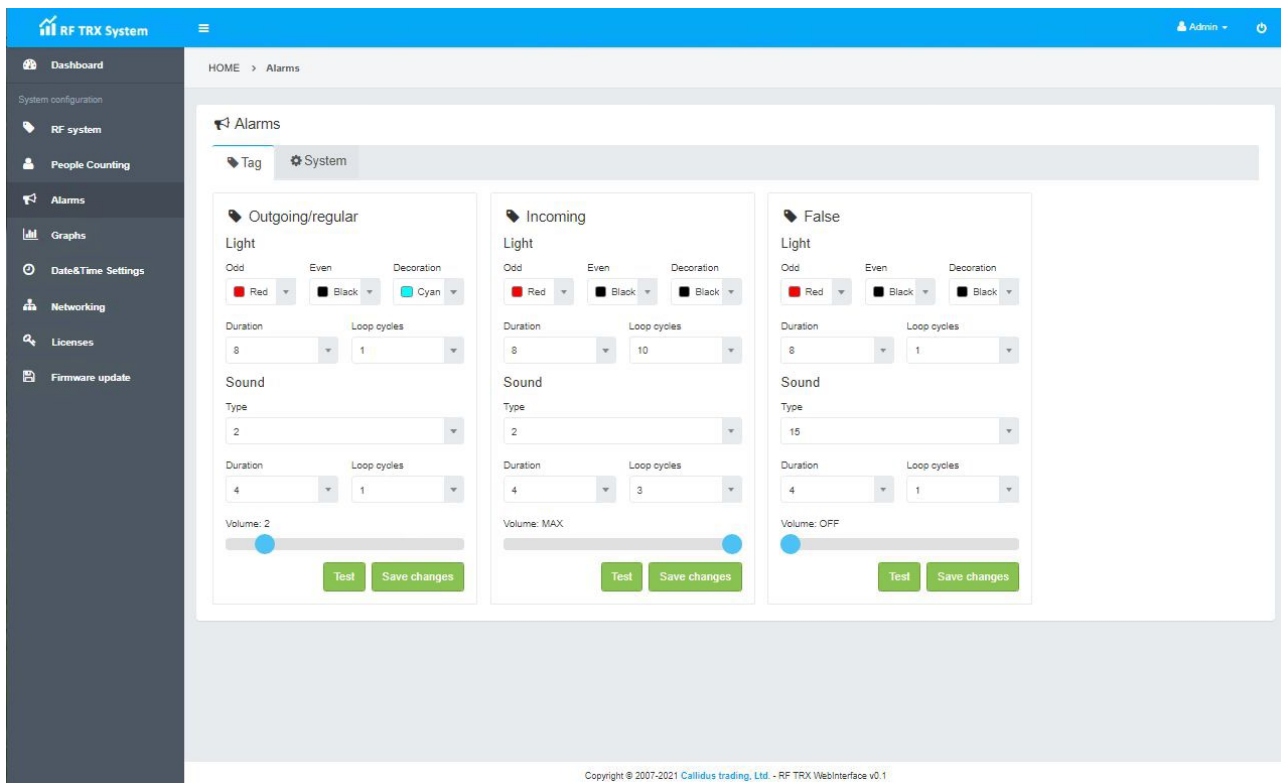
People Counting settings – There you can set people counting, default is disabled in Counter operation mode. In this mode you can set also only receiver, only transmitter or Receiver + Transmitter. Receiver + Transmitter need to be set, when you have minimum 3 pedestals and this setting will be for central pedestal (on one side it is transmitting and on the other side it is receiving signals).

Swap counting direction – when you have wrong direction (incoming peoples counting as outgoing), you can change to enabled.

Alarms validation timeout – this function is working, when you have enabled alarm validation in the RF system bookmark/evaluation criteria. There you can set time, how long system is waiting after the alarm for status from people counter (incoming or outgoing). When this pre-set time is gone and still no receive data from people counter, alarm is set as FALSE.

You can also use validation for your near pedestals (previous or next) or also to this pedestal. It depends on the people counter sensors and how pedestals are installed. For example: this pedestal has pre-set transmitting IR led so you need to have data from previous or next pedestals to validation of alarms.

8.4 ALARMS



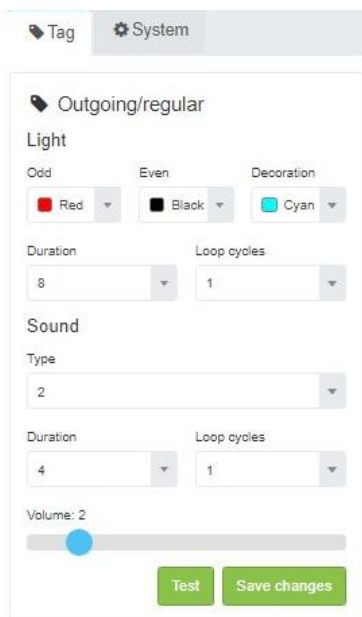
Copyright © 2007-2021 Callidus trading, Ltd. - RF TRX Webinterface v0.1

At this Alarms bookmark you can set all Tag alarms and also System alarms (not available for now).

You can set different types of Tag alarms: Outgoing/regular, Incoming and False.

Light alarm use RGB led so you can set a lot of colour variation from white through red, green, blue and all of their combination. You can also use black colour when you did not use any colour.

!! When you change value in the Alarm settings, for applying you need to Save settings for every type of alarm what you change!!



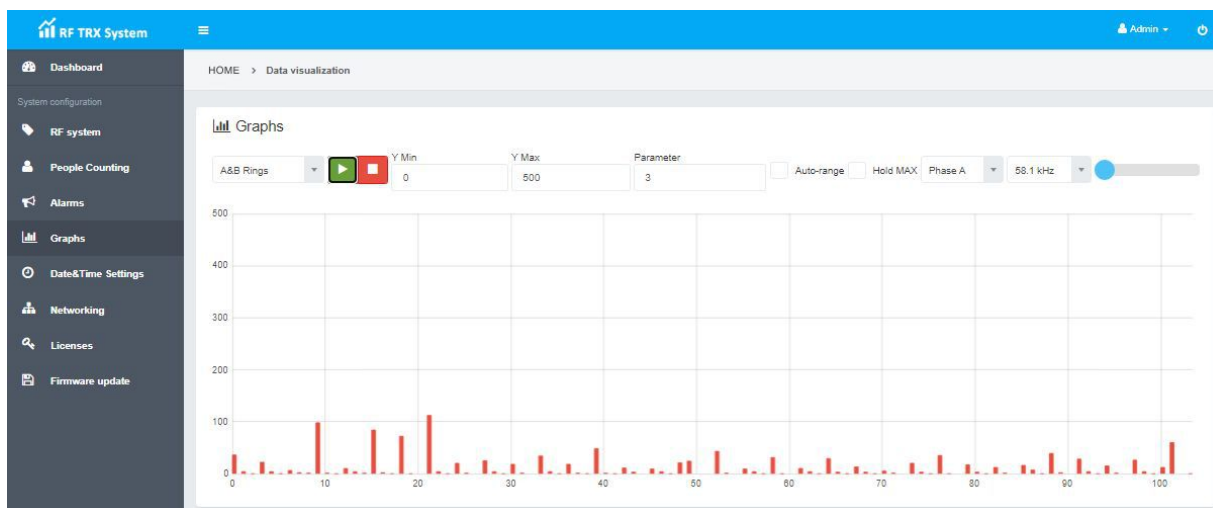
Light – you can set different colour for alarm. Odd and even are changeable during alarm. So you can change during alarm blue and red colour to simulate Police alarm light. When you are using Odd and Even same colour, it will be only this static colour during alarm. Decoration colour is automatically set after light alarm is finished. When no decoration colour selected, after alarm there will be no light from RGB light.

You can also set Duration and Loop cycles – with this parameters you can set length of light alarm and how many times it will be repeated.

Sound – there are different types of sounds, so you can set your preferred type of sound alarm. You can also set Duration and Loop cycles – with this parameters you can set length of acoustic alarm and how many times it will be repeated. Also you can set volume of this acoustic alarm.

You can also click on the “Test” button to check pre-set light and acoustic alarm.

8.5 GRAPHS



In the graphs, you can detect any non-standard behaviour of the system as false alarms, non-detection (weak detection) etc. This page is still under construction.

8.6 DATE&TIME SETTINGS

Synchronization of Date and Time with computer can be set from this page, click on button “Synchronize with computer”. You can pre-set automatic synchronization with remote server from Networking configuration.

On the page you can also set correction of RTC drifting. Difference is set for daily drifting. Best way to correct setting of correction is synchronize board with your computer and after 24H you will see difference in seconds. So this difference you need to set in RTC drift correction.

When in your country is used DST (Daylight Saving Time), you can set in what date/time is DST active.

!! When you change value in the Date&Time settings, for applying you need to Save settings for any changes!!

8.7 NETWORKING

In the “Networking” bookmark you can configure all of networking setting including cloud connection, MQTT IOT and REST API etc.

!! When you change value in the Networking settings, for applying you need to Save settings for any changes!!
Very important is also need to Apply all saved configuration changes!!!

8.7.1 NETWORKING STATUS

LAN switch – status of connected LAN cables in the connector.
Pedestal BUS – status of configured Pedestals Group and Pedestals ID
Remote access – remote access possible or not possible.
Cloud upload – status of configured and connected device to cloud server
MQTT access – status of configured and connected device to MQTT
MAC – MAC address of device
IP address – actually configured IP address of device
Netmask – actually configured Netmask address of device
Gateway – actually configured Gateway address of device
Primary DNS – actually configured Primary DNS address of device
Secondary DNS – actually configured Secondary DNS address of device
NTP – actually configured NTP address of device

8.7.2 PEDESTAL BUS SETTINGS

← Pedestal BUS settings

Group ID Pedestal ID

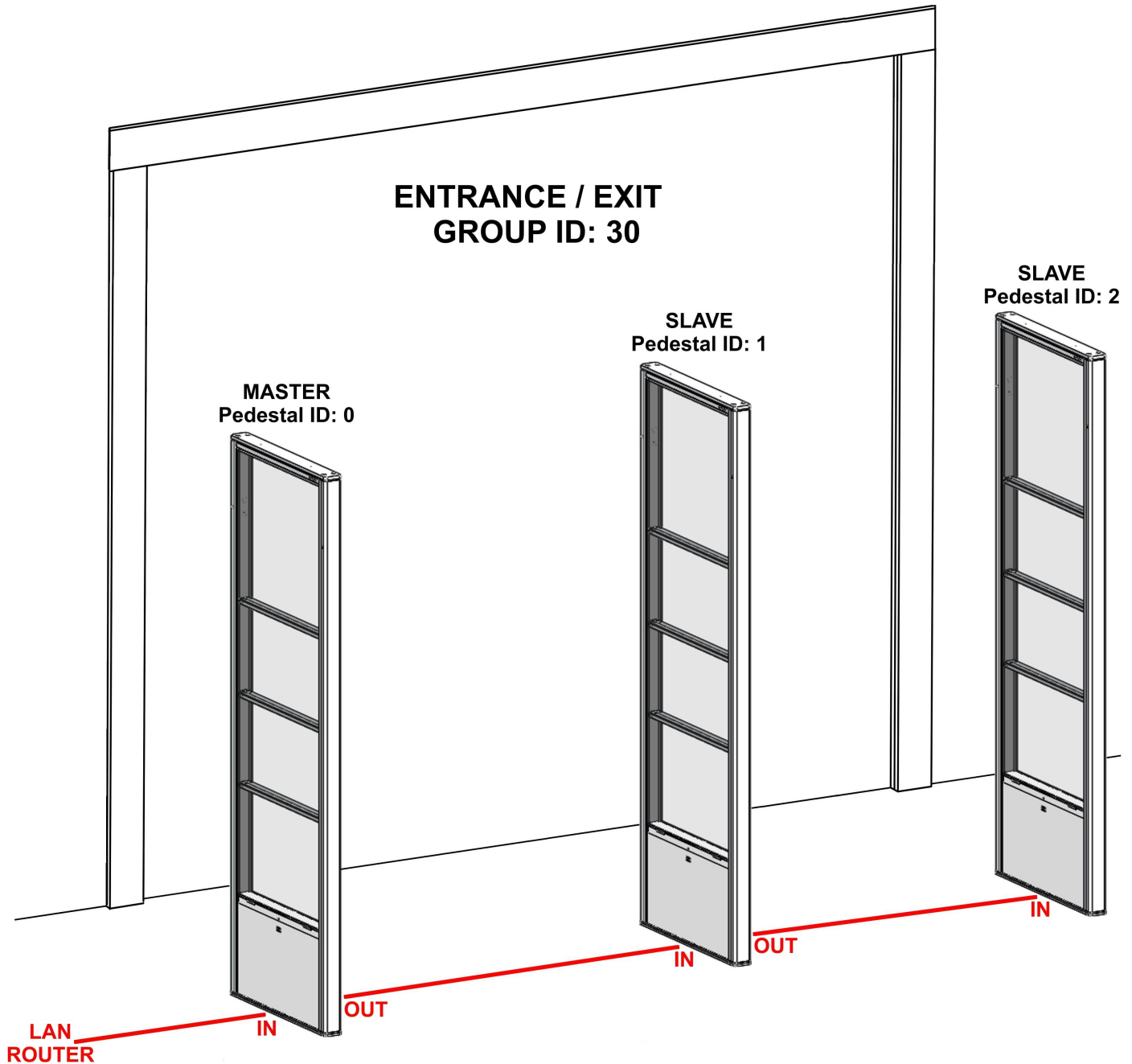
Save settings

Configuration of Pedestal Group and Pedestal ID.

Every pedestal installed in the same entrance need to have same pedestals group for proper configuration and correct working.

Master pedestal in the group need to start with Pedestal ID=0. Every other pedestals in the group need to have same Group ID and continuous pedestal ID.

Master set to 0, first slave set to 1, second slave set to 2, etc. Please check at the picture below.



8.7.3 IP SETTINGS

IP settings

NETBIOS/Device discovery name
RF_TRX_C29B6D

Obtain configuration from DHCP server

IP address: 10.27.166.233 Netmask: 255.255.255.0

Gateway: 192.168.0.1

Primary DNS: 192.168.0.1 Secondary DNS: 192.168.0.1

Save settings

Configuration of network address.

NETBIOS – Name of device. Default is RF_TRX_(last digits of MAC address)

IP setting can be set manually or automatically from DHCP server. You can Enable/Disable **Obtain configuration from DHCP server**.

When it is Enabled (set automatically), IP address, Netmask, Gateway and DNS servers are configured from DHCP server automatically after you connect to LAN network.

When it is Disabled (set Manually) you need to set all configuration manually, data will provide you IT division of store.

!! When you change value in the IP settings, for saving you need push button **Save settings for any changes!! For applying this change, you need to push button **Apply all saved configuration changes**.**

8.7.4 CLOUD CONNECTION

Cloud connection

Enable remote access

Remote access server (Name/IP): monitor.shopmonitor.net Port: 9761

Enable Cloud synchronization

Cloud synchronization interval: Immediately

Enable Date&Time synchronization

Monitoring/Cloud server (Name/IP): 192.168.0.103 Port: 80

Save settings

Cloud connection is used for remote access to configure device or for Cloud synchronization with server (events synchronization etc.).

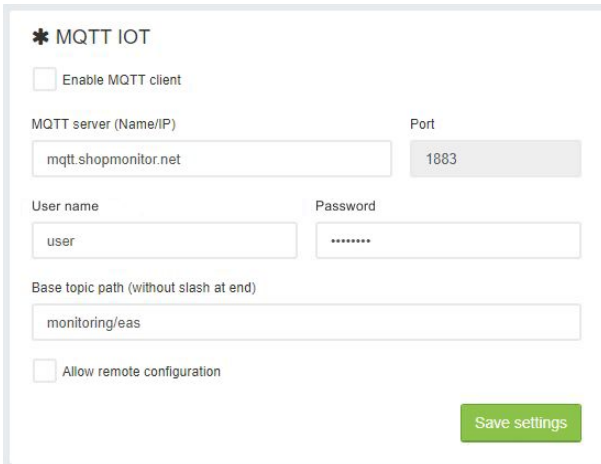
You can **enable remote access** or disable. You can also set different remote access server (Name or IP).

Enable Cloud synchronization with period of synchronization interval can be set for immediately or 15sec, 30sec, 1min 5min.

Enable Date&Time synchronization can be Enable or Disable. You can set synchronization server Name/IP address for automatic synchronization if enabled. When it is Disable, you can manually synchronize in Date&Time setting dashboard.

!! When you change value in the Cloud connection, for saving you need push button **Save settings for any changes!! For applying this change, you need to push button **Apply all saved configuration changes**.**

8.7.5 MQTT IOT



The screenshot shows a configuration panel titled '* MQTT IOT'. It contains the following elements:

- An unchecked checkbox labeled 'Enable MQTT client'.
- Two input fields: 'MQTT server (Name/IP)' with the value 'mqtt.shopmonitor.net' and 'Port' with the value '1883'.
- Two input fields: 'User name' with the value 'user' and 'Password' with masked characters '.....'.
- An input field for 'Base topic path (without slash at end)' with the value 'monitoring/eas'.
- An unchecked checkbox labeled 'Allow remote configuration'.
- A green 'Save settings' button at the bottom right.

The Message Queuing Telemetry Transport (MQTT) is a lightweight, publish-subscribe network protocol that transports messages between devices.

You can disable or enable MQTT client.

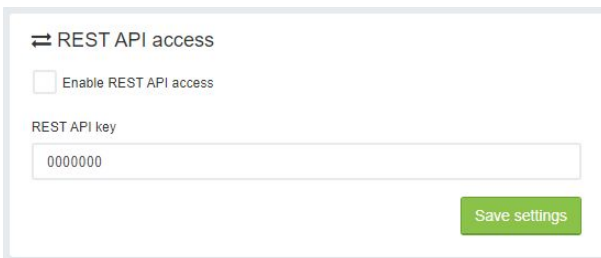
If you enable MQTT client, you need to have specify your MQTT server and user name and password.

Also specify your Base topic path for correct message receiving.

There is also possibility for remote configuration of MQTT when you enable Allow remote configuration.

!! When you change value in the MQTT IOT, for saving you need push button **Save settings for any changes!! For applying this change, you need to push button **Apply all saved configuration changes**.**

8.7.6 REST API



The screenshot shows a configuration panel titled 'REST API access'. It contains the following elements:

- An unchecked checkbox labeled 'Enable REST API access'.
- An input field for 'REST API key' with the value '0000000'.
- A green 'Save settings' button at the bottom right.

Representational state transfer (**REST**) is a software architectural style which uses a subset of HTTP. It is commonly used to create interactive applications that use Web services.

In computing, an application programming interface (**API**) is an interface that defines interactions between multiple software applications or mixed hardware-software intermediaries.

!! When you change value in the REST API access, for saving you need push button **Save settings for any changes!! For applying this change, you need to push button **Apply all saved configuration changes**.**

8.8 LICENCES

The screenshot displays the 'Licenses' configuration page in the RF TRX System. The interface includes a sidebar with navigation options: Dashboard, RF system, People Counting, Alarms, Graphs, Date&Time Settings, Networking, Licenses, and Firmware update. The main content area is divided into three sections:

- Licensed functions:** A list of functions and their status: People Counting (Available), Booster Bags detection (Available), Detachers detection (Available), and MQTT/REST API access (Available).
- Licensing status:** A table showing the status of four keys: KEY 1 (Valid/Permanent), KEY 2 (Invalid/Temporary/1.1.2000), KEY 3 (Invalid/Temporary/1.1.2000), and KEY 4 (Invalid/Temporary/1.1.2000).
- License keys management:** A section for entering license keys. It contains four input fields labeled KEY 1 through KEY 4. KEY 1 contains the value '0837EA596DDD30AD7D0527D4B60D5CA0', while KEY 2, KEY 3, and KEY 4 are filled with 'F'. A 'Save and use licenses' button is located at the bottom right of this section.

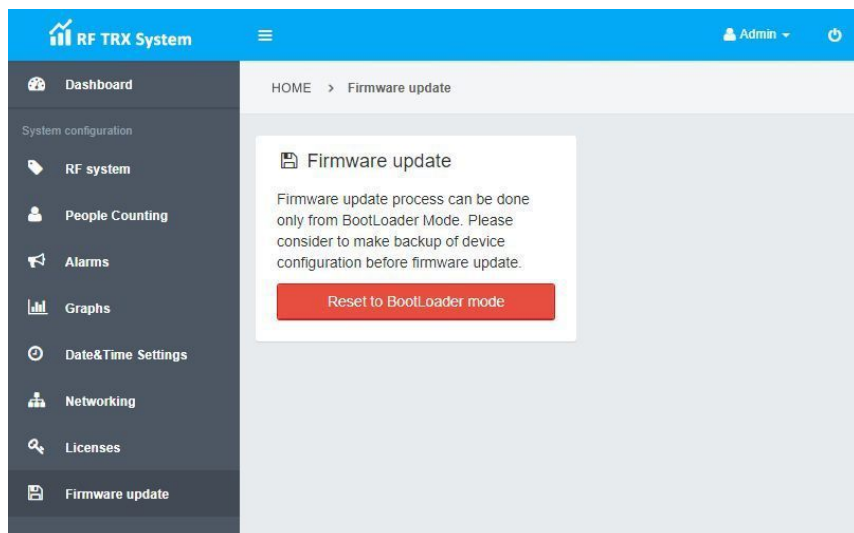
Licences are used for enabling some function of the system. In default setting is enabled function of RF detection and People counting.

Licenses for additional features can be added during ordering of pedestals with RF TRX board.

Licenses can be upgrade later on customer request and if pedestal can allow this extension (detacher, booster bag, MQTT/RESP API).

When you can upgrade later after installation of pedestal, you need to send Serial number to servis@callidus.cz

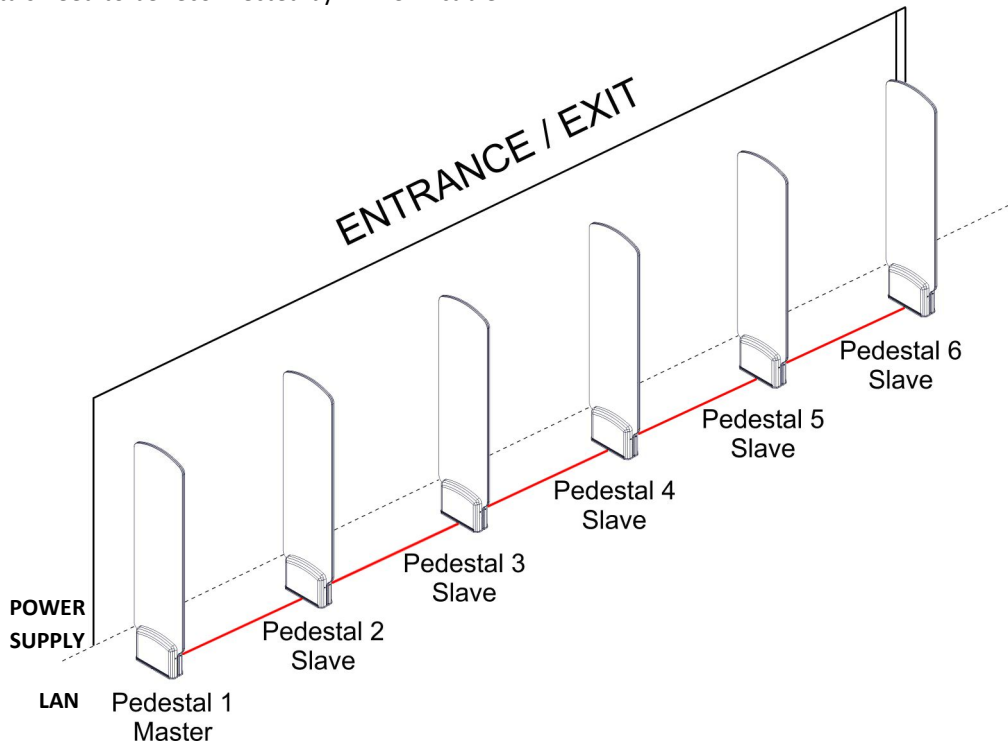
8.9 FIRMWARE UPDATE



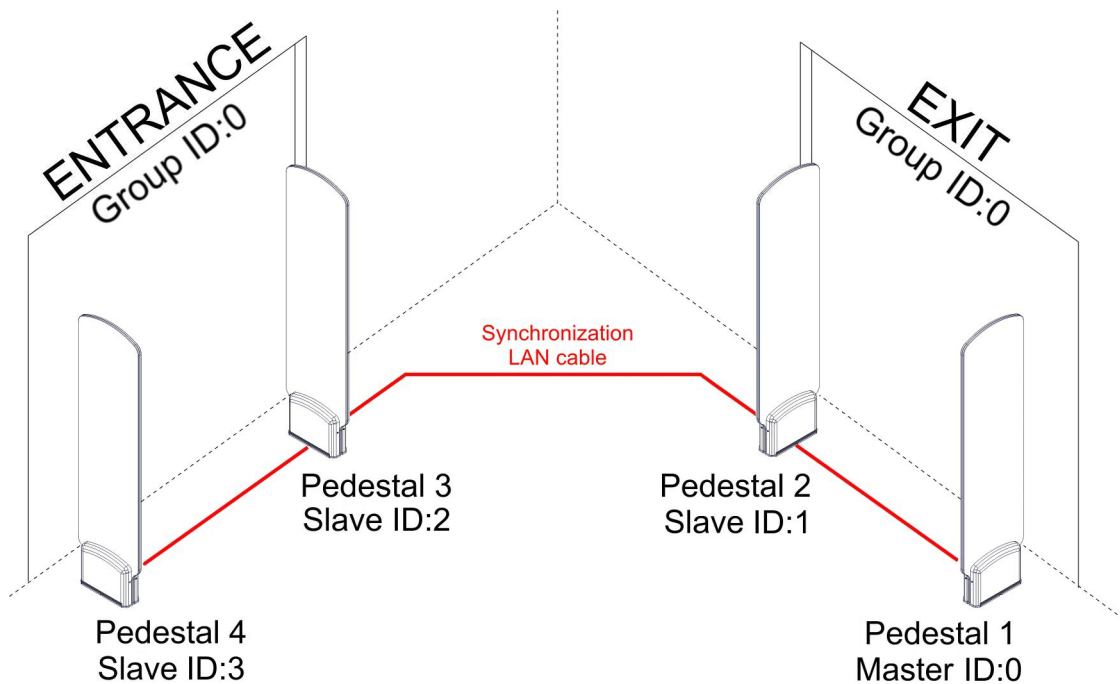
In the **Firmware update** bookmark, you can upgrade version of the control unit. When you have updating file save on your computer, you can click on “Reset to BootLoader mode” button and device will reset to BootLoader mode. When device is switched to the BootLoader mode, LED light of Alarm will continuously blink in blue colour: One long and three short blinks. After then you can continue in flashing to the new firmware version.

9. TIPS & TRICKS

If you have installed more pedestals in one entrance, best solution is to use first pedestal as master and rest of the pedestals as slaves. All pedestals need to be reconnected by LAN UTP cable.



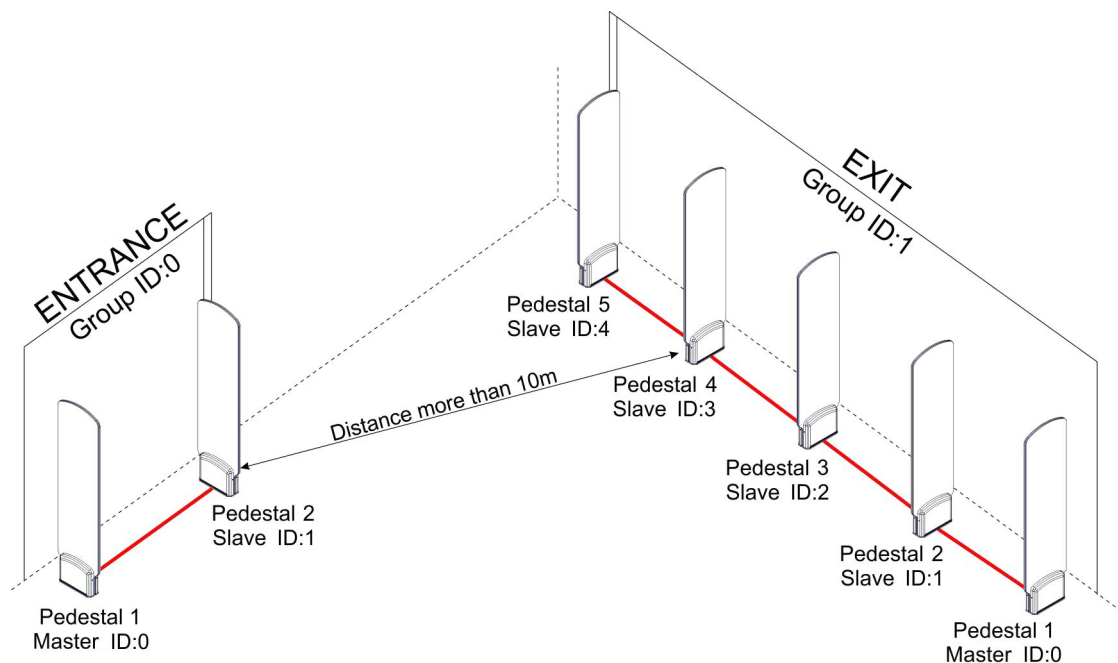
If you have separate Entrance and Exit, you need to synchronize by LAN cable, if distance between Entrance and Exit is less than 10 meters between closer pedestals.



When this distance is more than 10m and you have high quantity of pedestals in Entrance and/or at Exit, you can set Master pedestal in Entrance and another Master in the Exit. For Entrance and Exit in this moment you need to set different Group ID. For every Master you start with Pedestal ID:0 in every group.

This installation is possible in the big SuperMarkets, where are Entrance and Exit far away from each to other (more than 10m).

Best way is to test it with two pedestals which they will be closer to each other (in the picture this will be pedestal 2 of group 0 and Pedestal 5 of group 1). It must work clear without any interaction between. If you find interaction (false alarms, lower detection, etc.) you need to reconnect groups with LAN cable as on the previous example (picture above).



10. DECLARATION

10.1 EQUIPMENT MODIFICATION CAUTION

Equipment changes or modifications not expressly approved by manufacturer, the party responsible for FCC &/or CE compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

10.2 LIMITATION OF LIABILITY

Circumstances may arise where because of a default on manufacturer part or other liability is, you are entitled to recover damages from manufacturer. In each such instance, regardless of the basis on which you are entitled to claim damages from manufacturer, manufacturer is liable for no more than damages for bodily injury (including death) and damage to real property and tangible personal property; or any other actual and direct damages resulted from omission or failure of performing legal duties under this Warranty Statement, up to the listed contract price of each product.

Manufacturer will only be responsible for or indemnify you loss, damages or claims based in contract, tort or infringement under this Warranty Statement.

This limit also applies to manufacturer's suppliers and its reseller. It is the maximum for which manufacturer, its suppliers, and you reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS MANUFACTURER LIABLE FOR ANY OF THE FOLLOWING: (1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES; (2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR (3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF MANUFACTURER, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY.

11. NOTES
