

8.2 MHz TRX AFT v5.5

Operating Manual



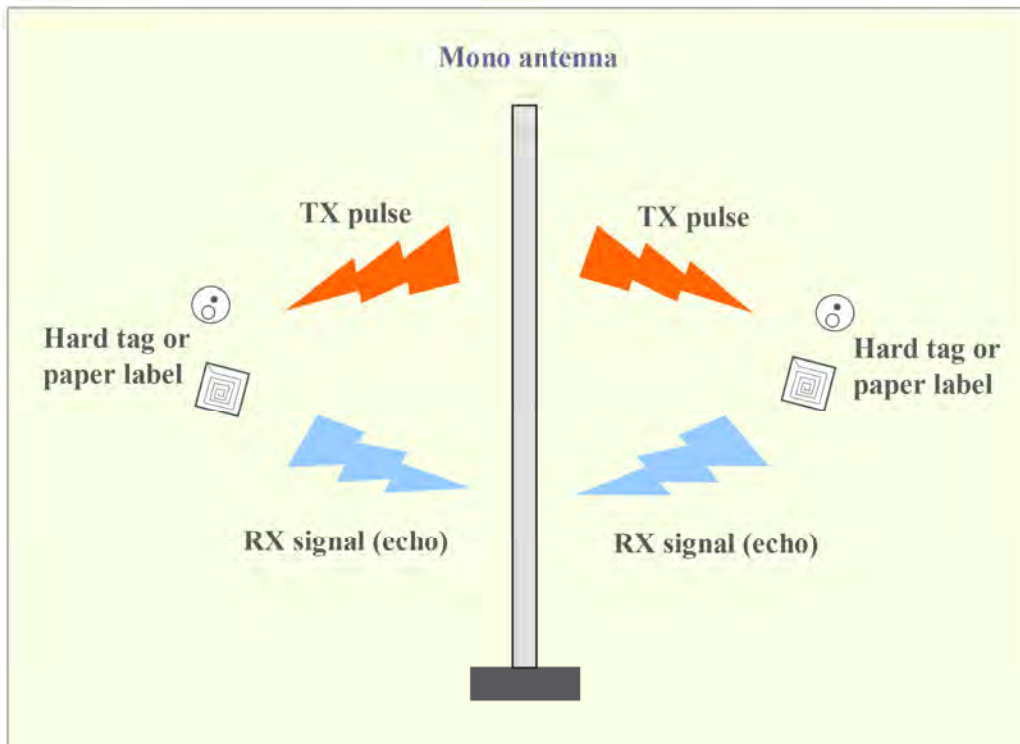
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1. GENERAL DESCRIPTION OF THE 8.2 MHZ MONO SYSTEM

Shopguard's 8.2 MHz asynchronous mode TRX-system is a mono-system.

The wiring of both the transmitter and the receiver antennas are inside in the same antenna-frame. The system is impulse-duty, which means that it emits an impulse burst to the surrounding field forcing the tag's oscillating circuit to generate an "echo". The receiver part of the antenna detects this "echo" and in case of a tag's presence, it generates an alarm. In every cycle the system checks the 8.2 MHz frequency-range with 16 different frequency-packages. With its advanced digital noise filter, the system can detect tags even if the intensity of the tag-signal is considerably low. You can see the working principle of the mono-system as shown below:



The system is working in asynchronous mode. It means it does not synchronize itself to anything. You have to use alternating (AC) current (PSU type: 18V AC, 700mA). Each antenna needs to use one PSU. Do not use one PSU for more than one antenna!

Our current antennas which could be purchased as TRX antennas:

- Twilight
- Zento
- Juniorguard

2. DESCRIPTION OF SHOPGUARD'S ASYNCHRONOUS MODE

TRX Controls

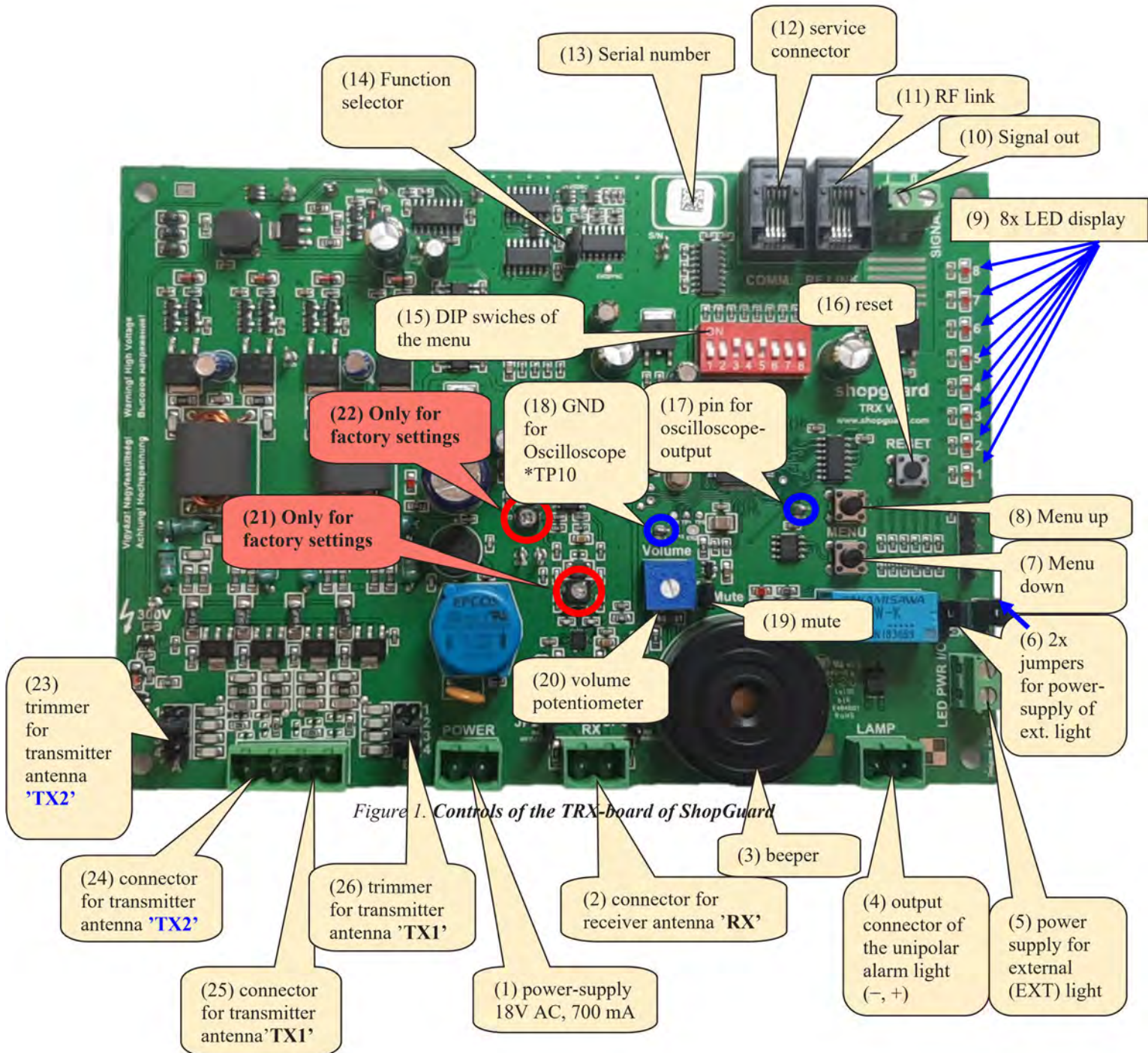


Figure 1. Controls of the TRX-board of ShopGuard

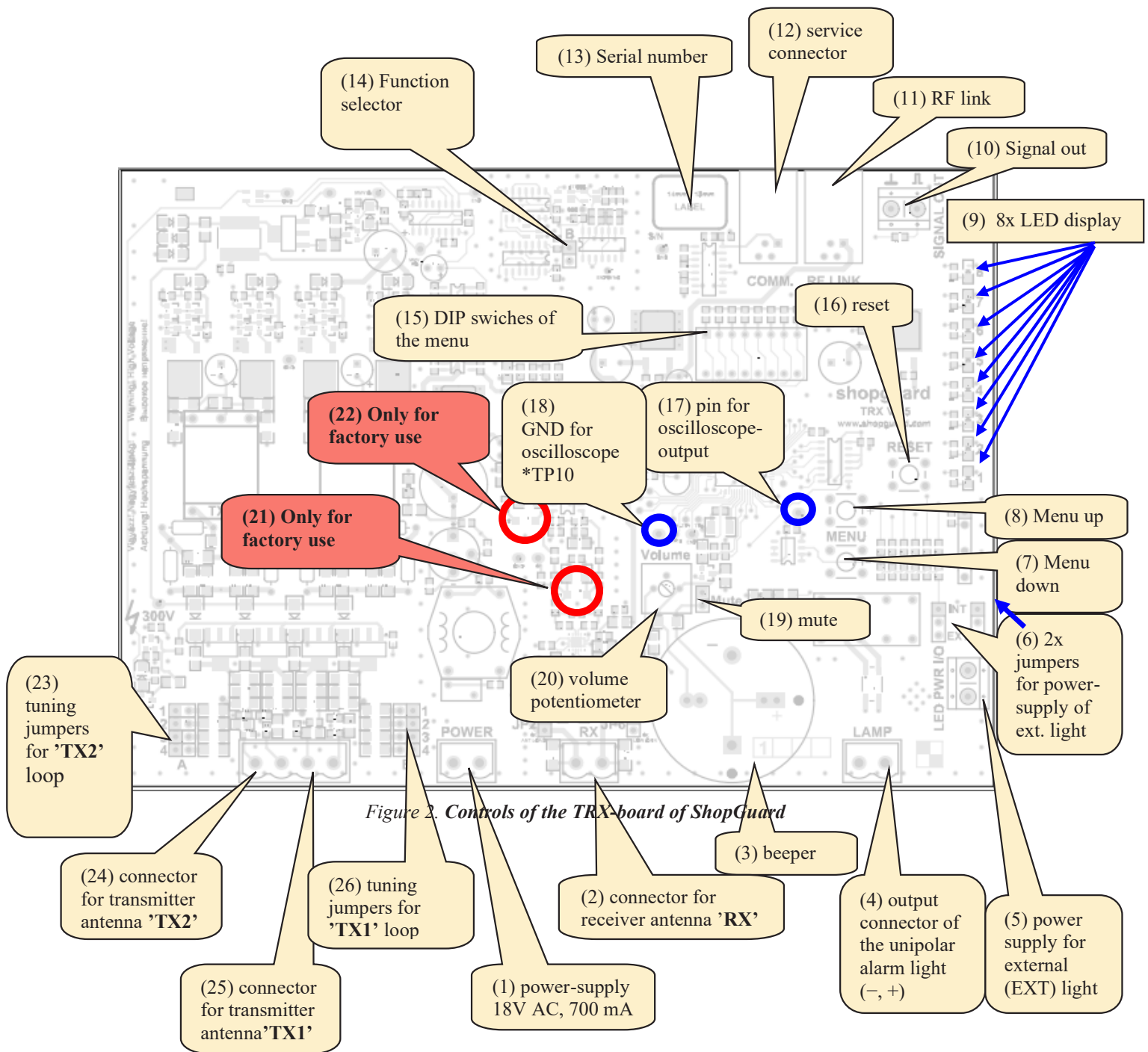


Figure 2. Controls of the TRX-board of ShopGuard

2.1 Function of the controls

1. **Power supply:** 18V AC, 700 mA
2. **Connector for receiver antenna 'RX':** Wire of the receiver loop connects here.
3. **Beeper:** it makes the audible alarm. The way of alarming can be changed.
4. **output connector of the unipolar alarm light:** output connector of the polarized alarm light signal
5. **power supply for external (EXT) light:** max. DC 50V; max. load: 30 mA; by default it is not necessary to use this function
6. **power supply switch for (EXT) light:** two jumpers with two positions; default position → INT available positions: INT, EXT. EXT needs a special 3 way jumper to connect all 3 pins.
7. **MENU Down:** You can navigate downwards through the menu with this button.
8. **MENU Up:** You can navigate upwards through the menu with this button.
9. **8x LED-display:** Displays the actual menu, and the settings of the parameters, ambient features, tag level, etc. depending on the selected function.
10. **Signal out:** Sends a signal to the alarm transmitter when there is an alarm.
11. **RF link:** Connection for radio frequency transmitter called RF link. Could be used for remote settings, remote maintenance, remote monitoring, collection of statistics, etc.
12. **Service connector:** this is used to contact the board to a pc with a service cable to use the TRX service software.
13. **Serial number:** The serial number of the TRX board is found here on the board.
14. **Function selector:** Switches between original operation (JP OFF), and AFT mode (JP ON)
15. **DIP switches of the menu system:** Select functions of the menu using these switches
16. **Reset button:** restart the board.
17. **Oscilloscope-output:** pin for oscilloscope output
18. **GND for Oscilloscope * TP10**
19. **Mute jumper:** JP OFF: the beeper is turned off. JP ON: the beeper is active

20. Volume potentiometer: the volume of the beeper can be adjusted with this.

21. Trimmer: Only for factory use!

22. Trimmer: Only for factory use!



23. Tuning jumpers for “TX2” loop: Use these jumpers to tune the board to the antenna.

See the table of settings at the end of this document.

24. Connector for transmitter antenna “TX2”: The transmitter loop of a 2 loop TRX antenna is connected here when using the original function ((14)Function selector jumper OFF). The “O” loop is connected here when using AFT function and a 3 loop antenna.

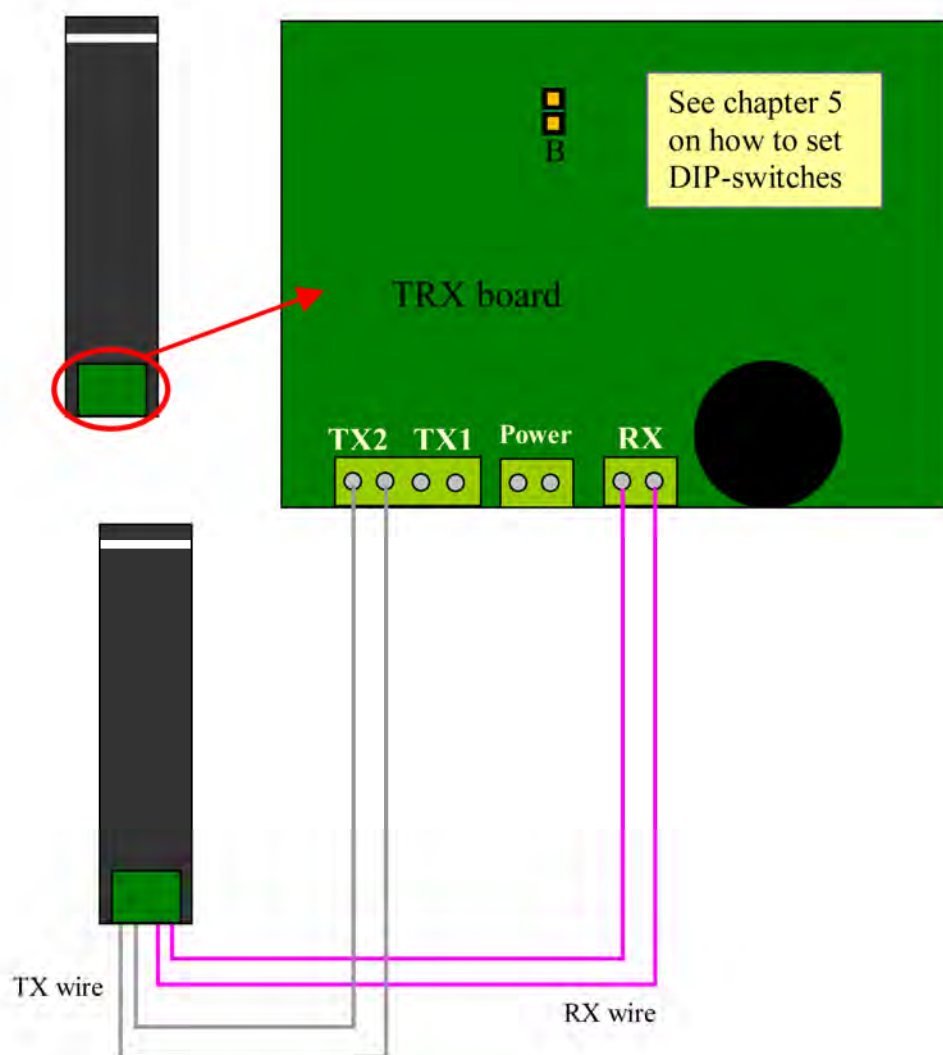
25. Connector for transmitter antenna “TX1”: Connect the second transmitter loop of a 3 loop TRX antenna here.

26. Tuning jumpers for “TX1” loop: Use these jumpers to tune the board to the antenna. See the table of settings at the end of this document.

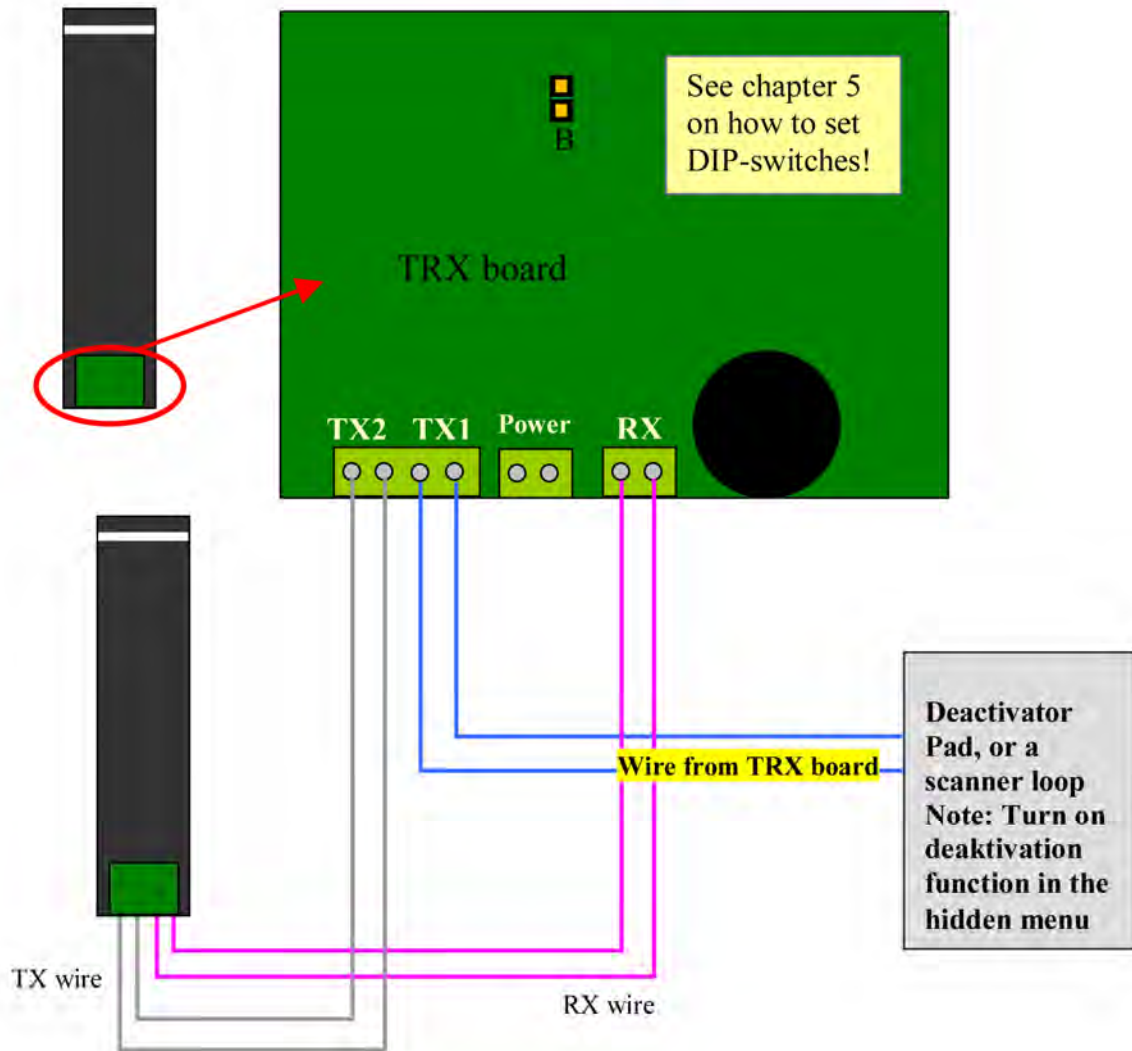
3. INSTALLATION EXAMPLES

3.1 Installation of TRX-system

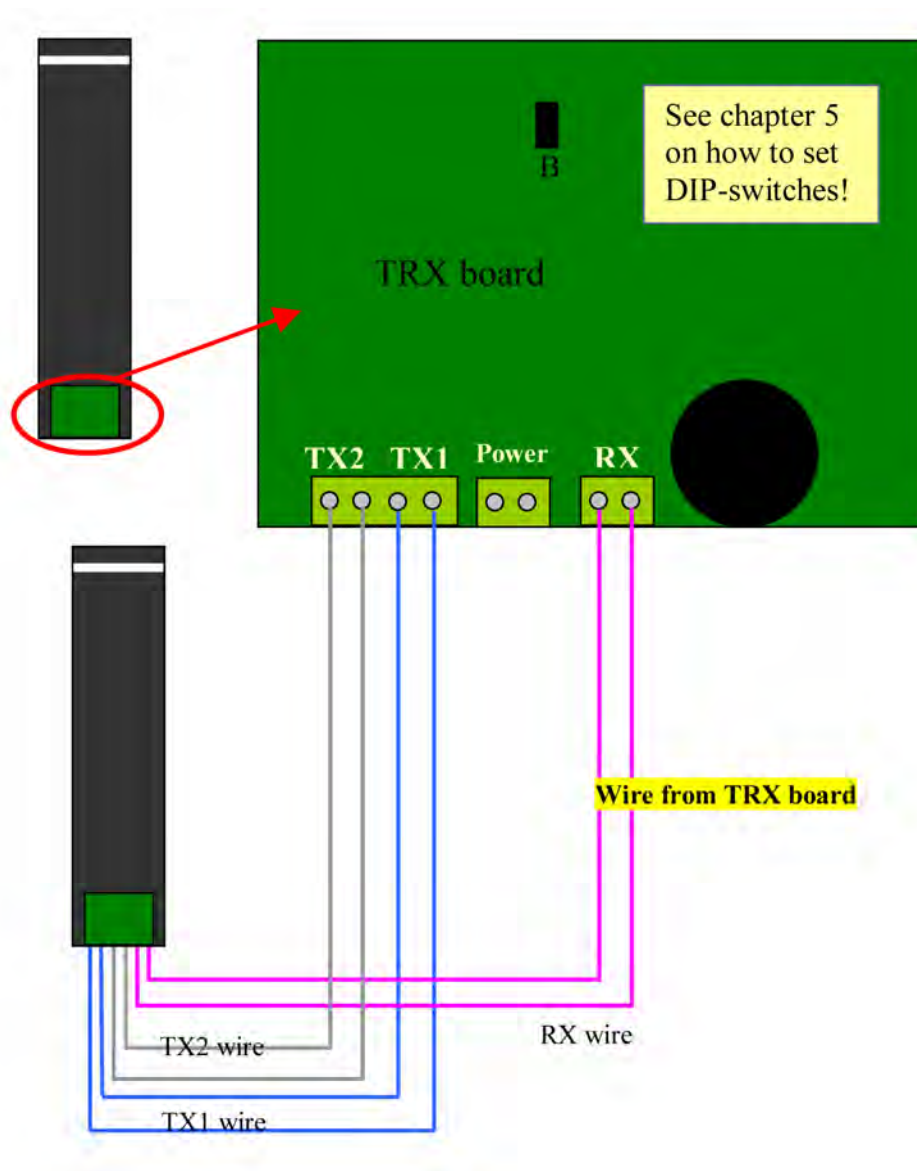
3.1.1 TRX 2 loop antenna



3.1.2 TRX 2 loop antenna with deactivator pad



3.1.3 TRX 3 loop AFT antenna



3.2 The setting-procedure of the TRX-antenna's (TX1) deactivator function

1. Set DIP-switch 1...8 → OFF.
2. To enter into the hidden menu use the following instruction:
 - Press on the menu-down button.
 - While you keep on pushing the menu down button you have to press once on the reset button.
 - Release the Reset button.
 - You should hear a sound feedback from the beeper. (In case no sound check the beeper or repeat the process)
 - Release the menu-down button.



3. Set DIP 7 → ON.
4. Turn on the function of deactivation by pressing once on the menu up (+) button (all of the LEDs of the display will be lit).
5. Set DIP 7 → OFF. **This will save your changes, into the operating memory.**
6. Press the Reset button to restart the system.
7. Set the DIP-switches for the parameters and for the mode of operation of your TRX-board according to the features of your system. See chapter 5!

Important note:

In case you connected a deactivator pad or a loop of a scanner to „TX1” connector the deactivation function in the hidden menu must be activated.

4. OPERATION OF THE BOARD

After turning the system on, all the LEDs flare up 3 times. After that a light-spot runs through the 8 LED display. Right after the top LED starts lighting continuously, the system gives a beep and the antenna steps into the compensation phase. It takes approximately 10 seconds when the system finishes the compensation period and the top LED turns off. During this 10 sec. -interval the antennas with light function light up in the colour of alarm, while the device performs an electromagnetic test of the surrounding area. It means that the system testing the environment and adjusting itself to ambient features including tags, noise, etc. After this 10 second period the light of the antenna changes to stand-by, which depending on the antenna type is either no light or a different coloured light compared to the alarm.

While the system is testing the environment do not show any label or tag to the system. With all testing wait until the antenna finishes this calibration process. In case a tag is introduced to the antenna during the calibration period the system will compensate it as an ambient feature and will not work optimally.

The antenna runs this calibration process every time when it is powered, or “reset” button is pressed, or there is a permanent change in the environment that affects its performance.

5. SETTING THE MODE OF OPERATION AND THE PARAMETERS

DIP 1 → **Local control**: When this is turned ON, functions 2 to 5 can only be set by the dip switches and not through the SG TRX software.

DIP 2 → **NO FUNCTION**

DIP 3 → ON: **Label protection mode**: Use this setting when the store is using deactivating labels, the antenna in case of detection decreases output power to prevent deactivation of the labels.

DIP 3 → OFF: **Stable RF**: use this setting when the store is using hard tags only. The antenna never decreases output power.

DIP 4 and **DIP 5** → **Set the signal processing time of the PCB-board**

These DIP switches are responsible for the same function. Using the combinations of ON/OFF positions of these DIP switches, it is possible to change the speed of the detection.

The suggested factory default settings are:

	DIP 4→ OFF	DIP 5→ OFF	300msec
Other available values:	DIP 4→ ON	DIP 5→ OFF	200msec
	DIP 4→ OFF	DIP 5→ ON	400msec
	DIP 4→ ON	DIP 5→ ON	500msec

Pease note: If the signal-processing time is shorter, the sensitivity of the system against surrounding RF disturbances is bigger.

DIP 6 → ON: **Sweep range width**: the parameter can be set by a scale of 255 steps between the values of 8.2 MHz $\pm$ 0%... $\pm$ 10%. The display usage and type of the menu is the same as discussed above. It's useful to reset this parameter in case of an adjacent and operating sweep antenna system.

DIP 7 → ON: **Setting the pulse-speed of the alarm sound**: the pulse-speed can be set by a scale of 255 steps between the values of 0.1...0.5 sec. The display usage and type of the menu is the same as discussed above.

DIP 8 → **Setting the sampling phase-shift**: it sets the value of the time-shift between the start of a transmission-package and the sampling-process. The parameter can be set by a scale of 255 steps between the values of 0...20 with a circulating type menu button. **Changing of the parameter value of this DIP switch affects the sensitivity of the antenna.** Note that, this effect could also decreasing RF working mode in a large way. **Default value: middle position. (4 LEDs are illuminating).**

Note: The parameter values of the different menu functions can be seen on the LED display. You can set the value of the parameter corresponding to the position of the DIP-menu system's switches. On entering this menu the LED displays the value of the current parameter of the chosen menu function in a proportional resolution, so the place-value of every LED equals 32

steps. The exit from this menu saves the value of the corresponding parameter into the device's memory automatically.

You can restore the values of the parameters to the **preset 'factory setting'** at any time by using the following button-combination:

- Turn off DIP switches (1..8)
- Press on the menu-up (+) button
- While you keep on pushing menu up button, press once on the reset button.
- Release the reset button.
- You should hear a double beep sound feedback
- Then release the menu-up button.
- Press the reset button.
- The 'factory setting' of the parameters provides the values that are regarded as the basic values for an average-noise environment.
- In case you need turn on DIP 3.

6. USAGE OF THE MENU

After turning it on - if none of the parameter-setting DIP-switches are active - the system starts working in a normal menu-system mode. While in normal mode, by the usage of the menu buttons you can reach the following four menu functions:

MENU 1 - TAG display:

the LED-row displays the changing of the signal level induced by the presence of a tag (It is possible to use an oscilloscope, connecting it onto the pin of the oscilloscope output!).

MENU 2 - Noise level display:

the same as described above, but in this case the LED-row shows the changes in the noise level. (It is possible to use an oscilloscope, connecting it onto the pin of the oscilloscope output!)

MENU 3 – Display for Field-intensity:

it displays the presence of some active RF radiation in the field (the lower is the level of the displayed transmissions, the higher is the sensitivity of our system → the value around '0' is optimal) [By using this menu you can also check if there's any other sweeping system working nearby.](#)

MENU 4 - Alarm frequency distribution of tags:

you can verify if the quality of the TRX-board is suitably correlating to the frequency of a known value reference-tag, or conversely, you can check the alarm-frequency-precision of a paper label or a tag.

Every single press on the menu button will shift one menu function up- or downwards, depending on the button's direction. While the button is pressed down the LED display shows which menu function will become active after it is released.

When pressing "up" in menu 4 the board changes to menu 1 and when pressing "down" in menu 1 the board changes to menu 4.

7. HIDDEN MENU

The functions described below can be accessed and set much more conveniently by using the Shopguard connection cable and the SG TRX sw!

The hidden menu can be reached by using a special button-combination.

To enter into the hidden menu follow these steps:

1. First you have to turn off every DIP switch (1...8);
2. Press on the menu-down button.
3. While you keep on pushing the menu down button you have to press once on the reset button.
4. Release the Reset button.
5. You should hear a sound feedback from the beeper. (In case no sound check the beeper)
6. Release the menu-down button.



Turn on DIP switch and set up (with menu up or menu down button) the parameter value.

7. When you set up the required parameter Turn off DIP switch.
8. Press reset button to restart the system.

7.1 FUNCTIONS OF DIP SWITCHES IN THE HIDDEN MENU

1. TX1 reception:

Has to be turned OFF for standard function of the antennas. Both original and AFT mode. It is OFF when the value is set to "1" in the software or all LEDs are lit (local setting)

2. Setting the period of the light signal:

It is possible to change the period of the light signal. It means, when the system starts alarming, and after a few seconds the audio signal stops, the light signal could be flashing for a longer time. With the LEDs it is easy to set up the available values. One LED is nearly equal with 2 sec. Based on this the maximum length of the light signal could be 16 sec. during an alarm.

3. Compensation due to the noise change:

Antenna automatically adjusting itself to the noise level of the environment during the compensation phase. It is possible to increase or decrease this parameter value and overwrite the automatically set up value with “menu up” or “menu down” button.

4. Compensation due to the RF field change:

When the RF field changes are very dynamic and these changes hit the defined limit the antenna starts to compensate automatically. Use the “menu up” or “menu down” button to modify the value of the compensation of the RF field change. (Factory default: 3 LED lighting; Press “menu up” button, and adjust the antenna to bigger RF field changes or press “menu down” button, to adjust the antenna to smaller changes.

5. TX power settings (Decreasing the distance of tag detection):

Use this option to decrease the transmission power. When 5 LED illuminating (Factory default), the power of the Transmitter antenna is the strongest. To decrease the power of the transmitted signal, press “menu down” button. Use the LED scale in the range of 1-5. When 1 LED is illuminating, the antenna operates with the minimum power.

6. ON - Setting for deactivation "loud" ...:

This function can be reached after the pre-selection of „Deactivating function turned on” (7.).

There are two values of the display. All or none of the LEDs are illuminated. If all the LEDs are illuminating the parameter is active, so in case of an unsuccessful deactivation, it indicates the tag’s presence on the PAD with a fast beeping sound. It is twice as fast as the regular alarm sound. None of the LEDs are illuminated, the deactivation works in a silenced mode. Pressing once the “menu up” or “menu down” button turns this function on/off.

7. ON - Setting for deactivating function:

There are two values of the display. All or none of the LEDs are illuminated. If all LEDs are illuminating the parameter is active, so the connector ‘TX1’ has the function for deactivation, else (none of the LEDs are illuminated) the system works in normal mode. Pressing once the “menu up” or “menu down” button turns this function on/off.

8. ON - Setting for receiver sensitivity:

You can set the sensitivity of the receiver in 255 steps. The menu has circle type navigation. When having reached its end, it starts over again.

8. FACTORS TO BE CONSIDERED DURING INSTALLATION

In this chapter we list some environmental conditions that can disturb the proper operation of the system. Please consider these factors during installation:

- The distance from electronic cash registers, and computer displays (and from other digitally operated equipment) should be at least 70-75 cm
- Cables carrying pulse signals (e.g. cables connecting the keyboard to the alarm central, cables connecting to regulators of air condition systems) should run at least ~70 cm from the antenna
- Cables of power line equipment (230 V / 400 V) must not run parallel (vertically) with the antenna body within ~1.5 m
- Power cables should not run in the basement between the antennas
- The distance between metallic objects, mirrors and the antenna should be at least 30-40cm
- Moving grids, shades, automatic doors must not be placed within ~0.5 m (1m is recommended) of the antenna
- At switching-on (and permanently in case of faulty ignition circuit), high voltage advertising lights and any kind of gas-discharge tubes (c.g. halide lamps) produce a noise with many harmonics that reduces the system's functionality
- The cable of the deactivation pad must not run in parallel with the system's power cable
- No labels should be placed near-by or on the power cable
- No labels should be placed beside the antennas, within the range of 1.5 – 2 x the detection distance
- If possible, the antennas should not be placed beside metallic or metal bearing columns
- The TRX antenna must be placed as far from the noise sources as only possible.

Make sure that most of these factors are considered during the installation. The system may work properly even if a few of these recommendations are not followed. The risk of false alarms and detection-distance-loss increases, however, with each factor left unconsidered.

9. REGULATORY INFORMATION

10.1 FCC and IC Compliance Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

- 1) This device may not cause interference.
- 2) This device must accept any interference, including interference that may cause undesired operation of the device.

10.2 FCC Information to the User

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

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



Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. To ensure compliance with FCC regulations, use only the shielded interface cables provided with the product, or additional specified components or accessories that can be used with the installation of this product.

10. Innovation, Science and Economic Development Canada (ISED) Notices

This device contains licence-exempt transmitter(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

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

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

11. FCC LABEL

GLOBAL
SECURITY SOLUTIONS

MODEL: FS-715

FCC ID: 2BRCDP0200502X

IC: 34662-P0200502X

HVIN: P0200502X

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.

FCC ID
Location



12. TUNING SETTINGS FOR DIFFERENT ANTENNA BODIES

Antenna	Jumper			
	bal links left Loop „O”	jobb rechts right Loop „8”		

1	Twight Light AFT Large	1		1	
		2	xx	2	xx
		3		3	xx
		4		4	

2	Zento 150 Light	1		1	
		2		2	
		3	xx	3	xx
		4		4	

3	Zento 150 Large	1		1	
		2		2	
		3	xx	3	xx
		4		4	

4	Zento 150 Normal (2 loop)	1	xx	1	Not used. Remove JP „B”. Single phase operation.
		2	xx	2	
		3	xx	3	
		4		4	

5	Zento 170 Large	1		1	
		2		2	
		3	xx	3	
		4		4	

6	Zento 170 Slim	1		1	xx
		2		2	
		3	xx	3	xx
		4		4	

7	Thick shielded	1		1	
		2		2	
		3	xx	3	xx
		4	xx	4	xx

8	Zento 150 Normal with loop holding pins	1		1	
		2		2	
		3		3	
		4	xx	4	xx

9	Zento 170 Slim shielded	1		1	
		2		2	xx
		3		3	xx
		4	xx	4	

10	Junior Guard	1	xx	1	Not used. Remove JP „B”. Single phase operation.
		2	xx	2	
		3	xx	3	
		4		4	