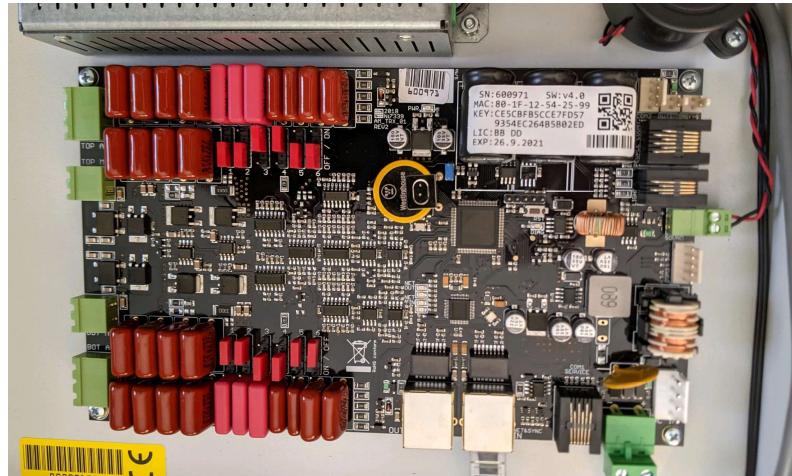


# SAM-F TRX FLOOR SYSTEM ACOUSTO-MAGNETIC DIGITAL SECURITY SYSTEM

CONTROLTEK<sup>®</sup>  
SOLUTIONS THAT PROTECT. PEOPLE THAT DELIVER.

TYPE: INSTALLATION GUIDE OVERVIEW



Version 07\_22



## OVERVIEW:

### INSTALLATION AND SERVICE

This setup and service guide describes how to install, service and troubleshoot AM floor digital security system that works on frequency 58.2 kHz.

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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!** Do not disconnect the power supply wires and connectors from the control unit unless power has been switched off.

 **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

The AM Floor System is a floor-mounted anti-theft system that can protect an entrance measuring up to 6 feet wide and maximum 4 feet high detection. It is ideal for stores with minimal entrance space and where antennas are not practical to use. It offers quick and simple synchronization and can be remotely monitored and maintained over the Internet with network connection. It also has a built-in interference detection, and an oscilloscope function that help the install Engineer fully optimize the device operation. The system has 2 alarm relay outputs that can be connected to another device to trigger an event. Optional equipment like the Bluetooth module can help the Engineer adjust the system with ease without wired connection while a Smart pager can alert the store personnel of any alarms via one of 2 preprogrammed strings of messages.

## 3. PRE-INSTALL TASKS

### FLOOR SYSTEM PLACEMENT

- If possible, keep the AM floor digital security system at least 150cm / 5ft. away from noise sources such as computers monitors, TV's, printers, switching power supplies, and fluorescent lights.



**NOTE:** If it is not possible to put antenna further from fluorescent lights, they can be replaced by LED light bulbs. Replacement is very easy and also LED lights are more economical way and do not bring any interference to security system.

- Try to avoid interference from security shutters like the kind that roll down from the ceiling.
- Metal reinforcements (rebar or wire mesh) in the floor reduce the transmitting power and thereby decrease the detection parameters. Due this must be antenna placed at least 5 cm / 2 in from any metal parts in the floor.

### INSTALLATION EQUIPMENT OF ONE ENTRANCE WITH ONE CONTROL UNIT

- 1x PSU power cord
- 1x Floor antenna
- 1x AM TRX controller
- tools needed for mounting antenna system into the floor (floor saw, hammer drill, crosshead and slotted screwdrivers, wire strippers, safety pliers etc.)

### FOR ADVANCED SETUP YOU WILL NEED

- Laptop with Windows® XP, Windows® Vista, Windows® 7, Windows® 8 or Windows® 10 operating system software
- CONTROLTEK HW key (USB Dongle) including USB and interconnection cables
- Installed service configurator software

### BEFORE INSTALLATION

- Make sure that electrical distribution to power the system is a dedicated line with an isolated ground.
- It is recommended to arrange installation with neighboring stores for eventual synchronization of AM systems.
- Installers should revise the installation site for possible conditions that could decrease performance of security system.
- If possible, store should deliver specifications, plans or drawings to prepare and arrange the necessary steps for installation.

## 4. SPECIFICATIONS

### 4.1 ELECTRICAL

POWER INPUT	100-120VAC or 220-240VAC @ 50-60Hz
INPUT POWER	100w
MAXIMUM CURRENT DRAW	0,5A
OPERATING FREQUENCY	center frequency 57,850 kHz ( $\pm 750$ Hz)
TRANSMITTED PULSE WIDTH	1600 Msec
FUSES	Power Input: T1L250V – 1A Slow, 250V
OPERATING TEMPERATURE	0-50°C
RELATIVE HUMIDITY	0-90% noncondensing
COMMUNICATION PORT	RS232 Serial

### 4.2 MECHANICAL

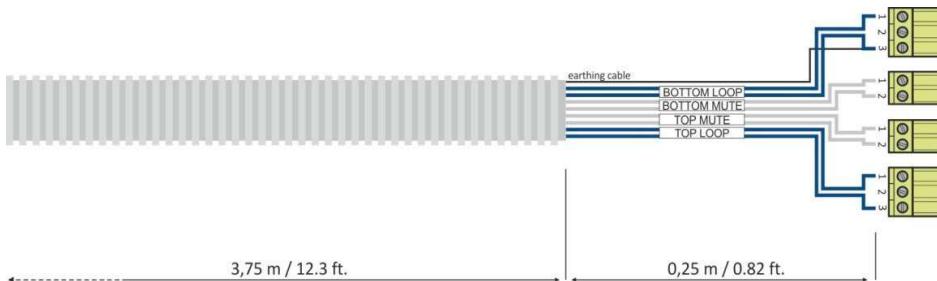
CONTROL UNIT	
Height	11.4 in.
Width	9 in.
Depth	2 in.
Weight	3.7 lb.
FLOOR ANTENNA – PREFABRICATED UNIT	
Height	1770 mm / 65.3 in.
Width	800 mm / 31.5 in.
Depth	30 mm / 1.2 in.
Weight	5,0 kg / 10.0 lb

## 5. MOUNTING AM FLOOR SYSTEM WITH PREFABRICATED ANTENNA

### ANTENNA INSTALLATION AND PLACEMENT

- Width of exit/entrance is up to 1,8 m / 6.0 ft.
- Prefabricated floor antenna contains protection pipe that leads interconnection cables from floor antenna loops to the CONTROL UNIT INTERFACE.
- Make sure that antennas are not in close proximity to noise sources as computers monitors, TV's, switching power supplies and merchandise displays.

### ANTENNA CABLES



- Floor antenna loop cables length are maximum 4,0 m / 13.1ft.

Pic. 1 - Connection diagram of floor antenna loop cables

**NOTE:** Floor antenna cable leading through protection pipe that is 7,75m / 12.23 ft. long. When you shorten the cables, always leave 0,25m / 0.85 ft. space without protection pipe for ability to connect the cables into the floor box.

The system operates using resonant frequencies. Mechanical and electrical devices or metal objects too close to the antenna 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.

Find the right place for placement of the floor antenna. It is important to situate the antenna away from influences that can cause unwanted interference (LCD monitors, switching power supplies, electricity power lines etc.).

#### **INSTALLATION OF AM CONTROL UNIT**

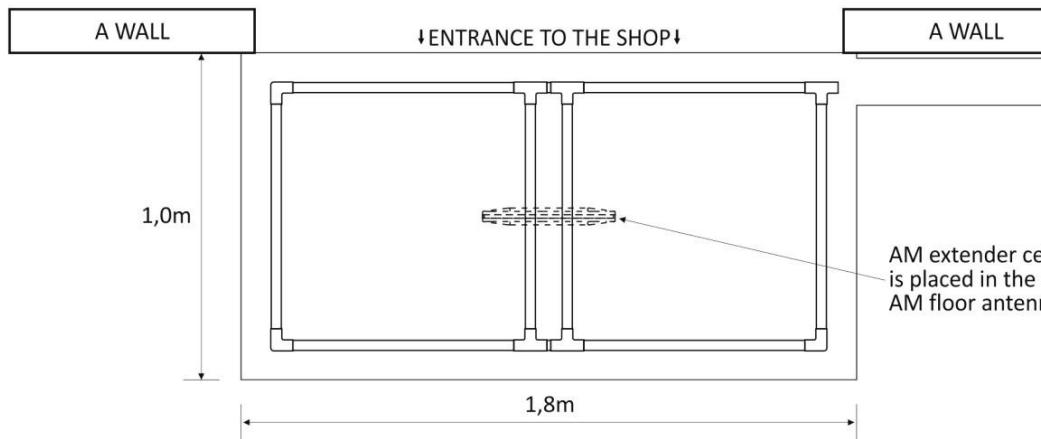
- Select the location of TRX AM control unit, for example it can be hidden in the ceiling/in the wall etc.
- At the same time note that control unit must reach the floor antenna (not to exceed 20ft long). Ensure that the TRX controller power cord can reach a power outlet which shall be a dedicated line with an isolated ground.

#### **FLOOR ANTENNA AND TRX CONTROLLER FOR FLOOR ANTENNA INSTALLATION AND PLACEMENT**

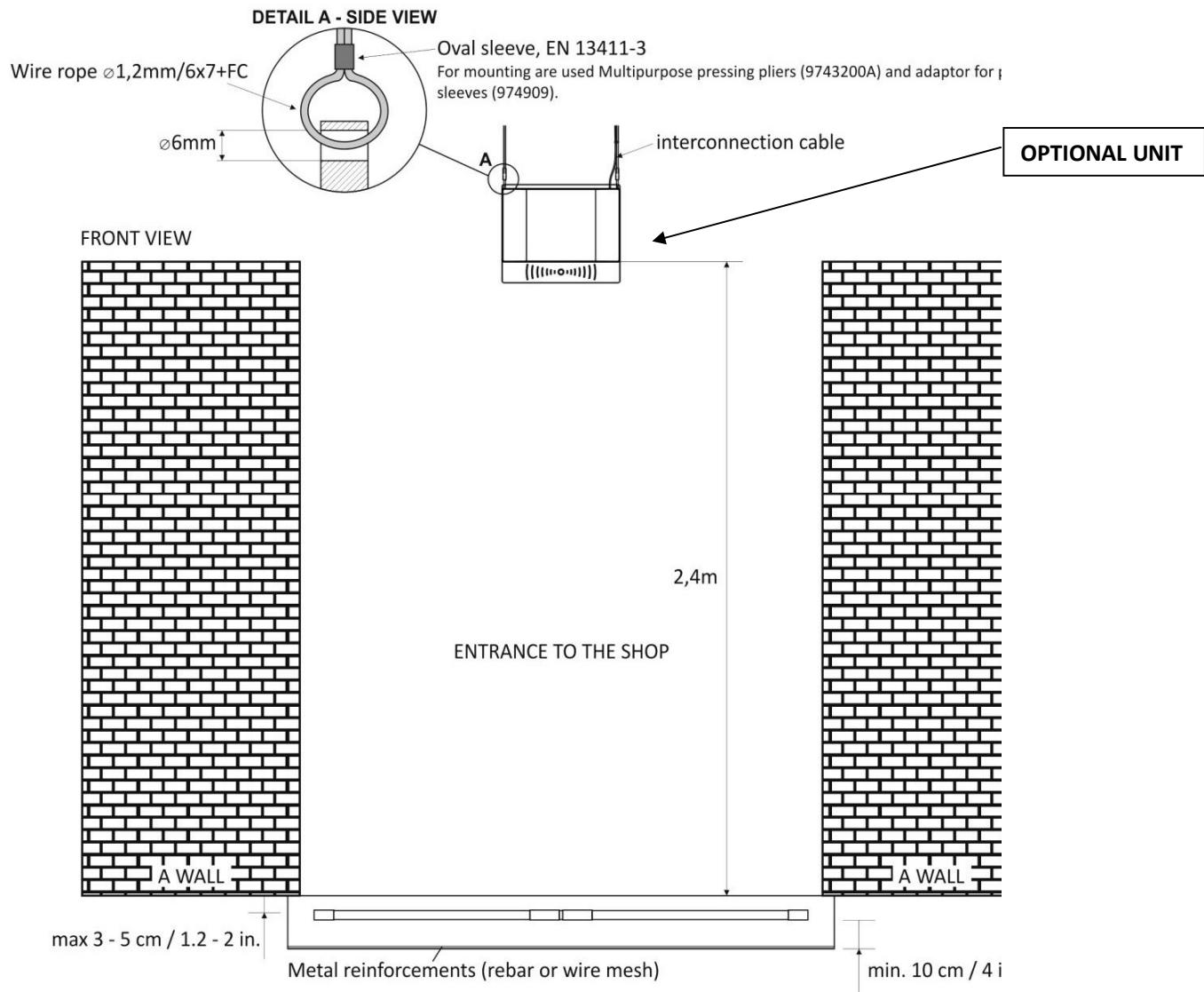
The electronic board for floor antenna is enclosed in a metal cover that contains a PIEZO sounder for alarm signaling. Inside the controller is the board that interconnects the floor antenna and contains capacitors to tune the antenna. Capacitance is modified by adjusting jumpers on the board to tune the antenna into resonance and maximize the detection levels. The floor antenna is placed in the entrance floor to the store and when somebody passes the entrance with an active AM soft label or AM hard tag, the PIEZO in the controller activates and sounds an alarm according to the settings in the application.

- Locate the controller for the floor antenna as close as possible to the floor antenna.
- Locate the floor antenna in the middle of entrance.
- Back cover of controller contains four holes for mounting on the wall (use respective screws and wall plugs according to type of material).
- Run the Antenna wires to the controller via an approved wire chase.

TOP VIEW



**NOTE:** AM extender ceiling antenna contains receiver electronic board (loopamp02) that controls light and sound alarm interconnected with AM control unit usually hidden in the ceiling.



[Pic. 4 - Cutting the floor scheme for floor system - single antenna](#)

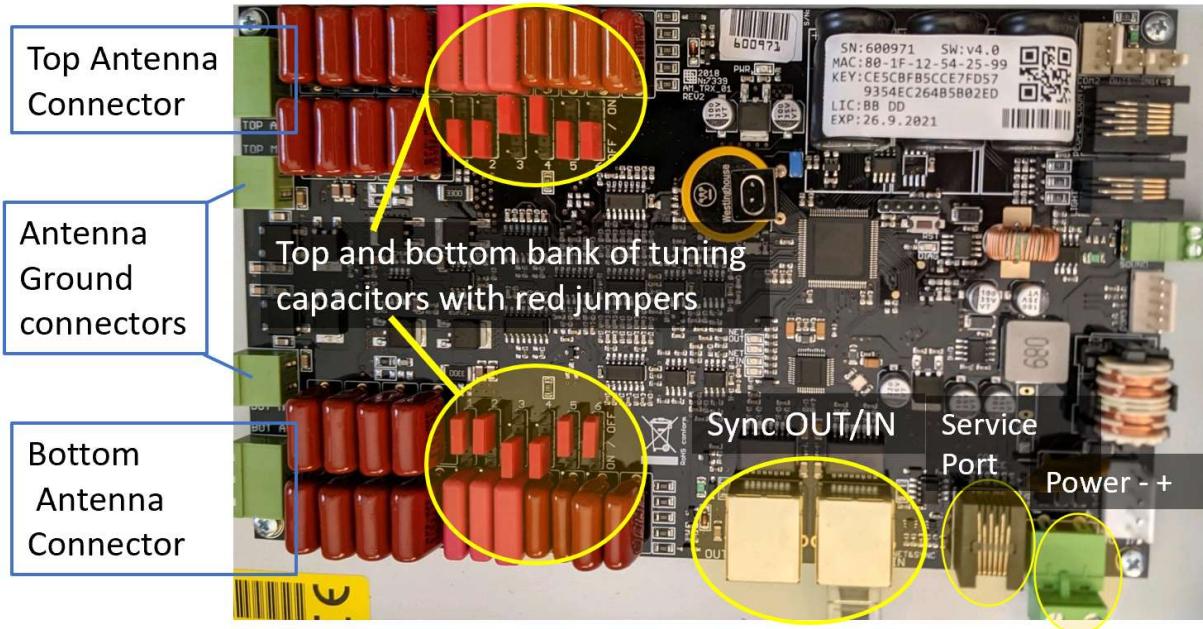


**NOTE:** Minimal distance 2 cm /  $\frac{1}{4}$  in applies only when the floor contains metal reinforcements (rebar or wire mesh). In any other circumstances can be floor antenna placed directly on the floor with minimum 5 cm / 2 in. deep in the floor.

## 6. ROUTING THE CABLES

Once all the equipment has been mounted, you can route the antenna loop cables, of the prefab antenna, to the controller.

- a.** Route the 4m (13ft) antenna loop cables through the floor to the TRX floor antenna controller. Floor antenna loops cables are marked with shrink tubes. Connect the cables according to diagram below:
- b.** Top loop also contains earthing cable (ground) that is connected into pin 3.



### Pic. 5 - Connection scheme

**NOTE:** When you need to shorten the antenna loop cables make sure that you mark each and every cable properly so you can differentiate them from each other and connect them correctly after shortening. Earthing cable is always connected in top loop connector (third pin, please see diagram below). We recommended leave 25cm / 9.8in. without protection pipe (see Pic. 1 - Connection diagram of floor antenna cables).

## 7. WIRING THE CABLES



**WARNING - RISK OF ELECTRIC SHOCK!** Turn off the AM control unit before you connect the cables to it.



Pic. 6 – Power Supply

Wire	CABLE	CONNECTOR ON CONTROL UNIT
Custom Floor antenna	14 AWG Direct Burial	TOP ANT (Pins 1 and 3)
External Network	Ethernet (Cat5/6)	IN on Power Supply
NET&SYNC IN	Ethernet (Cat5/6) built into controller	OUT on First System Power Supply (provided)
Power	18 AWG 2 conductor, Twisted Pair	DC IN - +

## 7a. WIRING THE CABLES – Custom Antenna

**WARNING - RISK OF ELECTRIC SHOCK!** Turn off the AM control unit before you connect the cables to it.

A Custom Antenna can be utilized in place of the prefabricated unit. This allows the CONTROLTEK AM Floor System to be installed in an existing store environment with the antenna cabling to be inserted into a saw cut in the concrete. The saw cut dimensions are typically **½ inch wide by 1 inch deep**.

The cable must be:

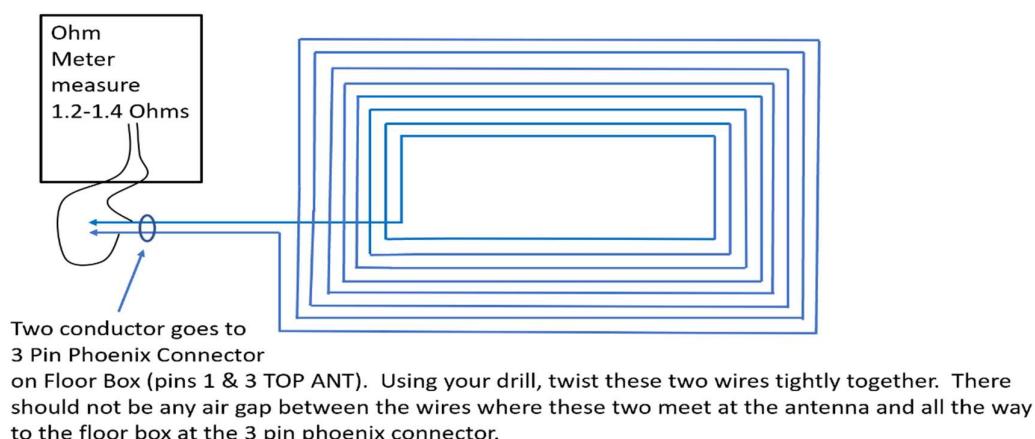
- a. THWN Rated
- b. 14 Gauge
- c. Stranded not Solid conductors

The custom antenna is inserted into a trench in the concrete (see photo below). Floor cut dimensions are 5 feet wide by 20 inches deep. Measure 6 to 10 inches off of door frame for the first cut.



This single-loop design brings conductors together to form a multi-layer antenna for optimum sensor tag detection. Before connecting to the TRX Controller, the **two** conductors are extended for the direct connection to either the Top Loop or Bottom Loop section of the circuit board in the controller.

8 Loop Floor Antenna Wiring Diagram

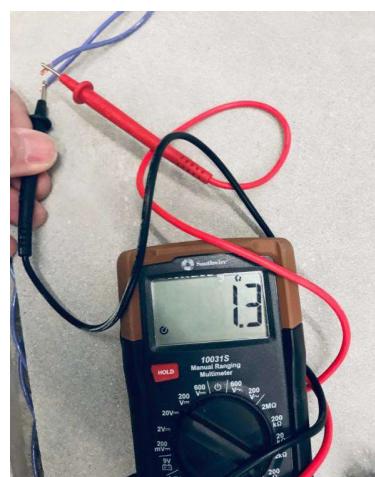


## 7a. WIRING THE CABLES – Custom Antenna, cont.

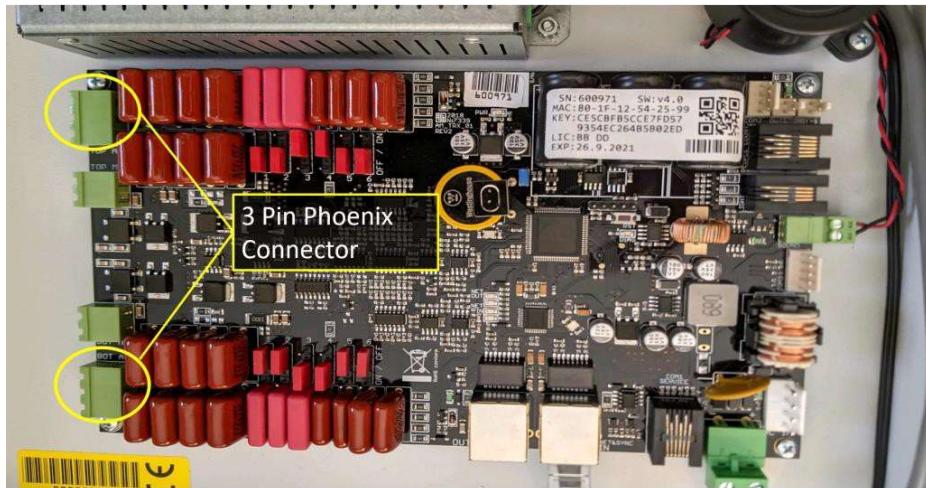
The two conductors from the custom floor antenna will route to the TRX CONTROLLER, with no more than 20 feet of cable length from the junction point of the two conductor cable twist to the controller. This extended, twisted customer antenna cable can be housed in either an adjacent wall or mullion, or ceiling area. Connect the two conductors to either the TOP LOOP or BOTTOM LOOP connection points on the TRX Controller. Sample photos:



Measured Ohms on antenna leads that connect to the Floor box with 3 pin Phoenix connector (outside pins). Ohms should measure between 0.6 and 1.4 (various meter range dependent).



The twisted 14ga wire will connect to EITHER the top loop or bottom loop antenna connector, on pins #1 and #3.



## 8. FLOOR SYSTEM SETTINGS

With the use of jumpers on the board you connect capacitors of various sizes to the antenna loops for tuning into respective operating resonance frequency. Correctly tuned antenna increases the system's detection range, because of higher output power. Tuning is performed manually with the aid of AM application software.



**CAUTION!** Improper settings of capacitors can in extreme cases disable the detection of labels/tags completely.



**NOTE:** Every installation site has different characteristics which can detune the transmitting loop. Tuning is mandatory.

## 9. SAM-F TRX Configuration and Tuning

### I. Wiring to SAM Board at Each Pedestal (if installed in conjunction with the SAM-F System)

Using two conductor 18AWG conductor from the power supply, connect to the two pin DC IN connector (left pin negative; right pin positive) on the pedestal electronics. Each pedestal should have its own power supply.

On the master pedestal (first pedestal from first power supply addressed as Group ID 0, Pedestal ID 0) using Cat5e network wire, connect from the OUT on the power supply to NET&SYNC IN port on the pedestal electronics. Each subsequent pedestal will get a power wire from its own power supply and a network wire from the OUT on the previous pedestal to the IN port and so on to the last pedestal. Each pedestal must have a LAN IN network wire from the previous pedestal. The first pedestal power supply will connect from the IN port to the LAN port of the POE that powers the Shop Monitor Lite device (sample wiring diagram for two pedestal system at the end of this document).

