

EST-M960 MANUAL

E-STAR ELECTRONIC CO. LTD.

TECHNICAL DESCRIPTION

EST-M960 MONO PLUG & PLAY PCB

The EST-M960 is a transmitter/receiver/loop antenna combination and Plug & Play system. You are no longer required to change any jumpers or DIP switch setting on each circuit board to allow multiple units to operate in close proximity to each other.

Most of jumpers and switches will be done automatically by "software", therefor EST-M960 become a **"Plug & Play"** system. All you have to do in most cases, it is to fit the antenna, and plug the power on. It's done.

ATLC - The ATLC function provide an **A**utomatic **T**ransmit **L**evel **C**ontrol to avoid the system deactivating some labels. As a tag is brought close to the antenna, MCU will decrease the voltage witch supply to TX circuit according to the tag signal strength.

The voltage will return automatically when the tag is moved away from the antenna.

FS -The **F**requency **S**elect function reduces the receiver bandwidth to exclude processing of any information received from the upper and lower frequency bands. When this function is active, tags can vary in frequency above and below 8.1MHz.

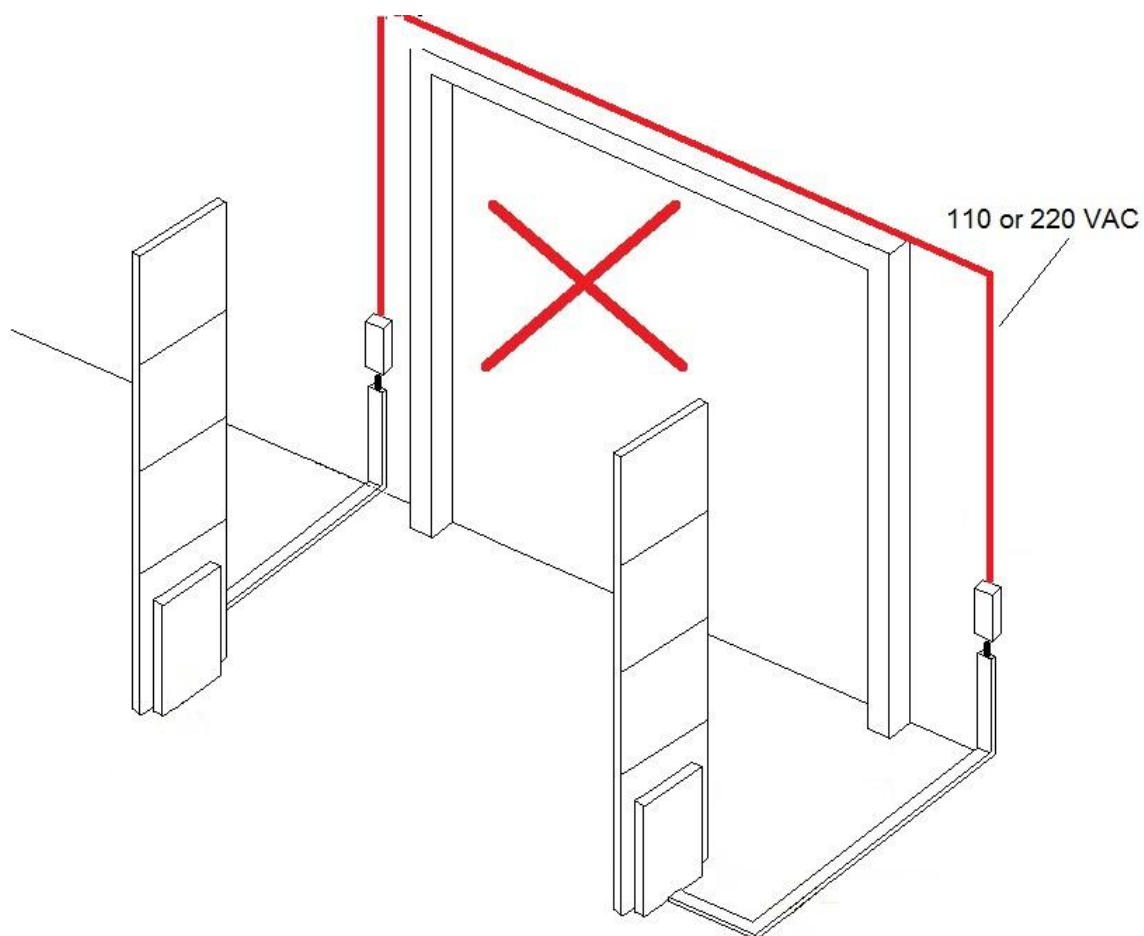
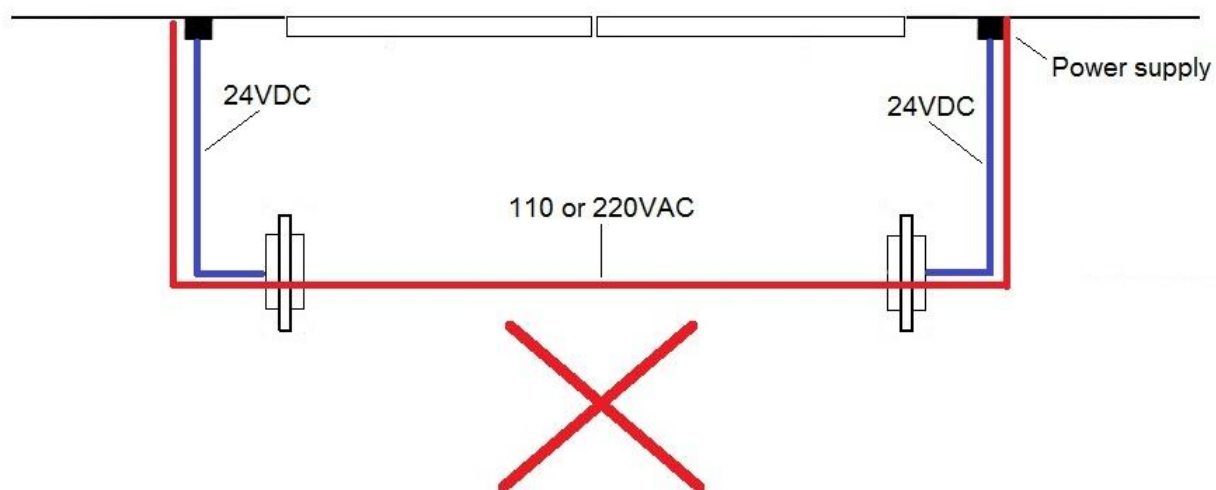
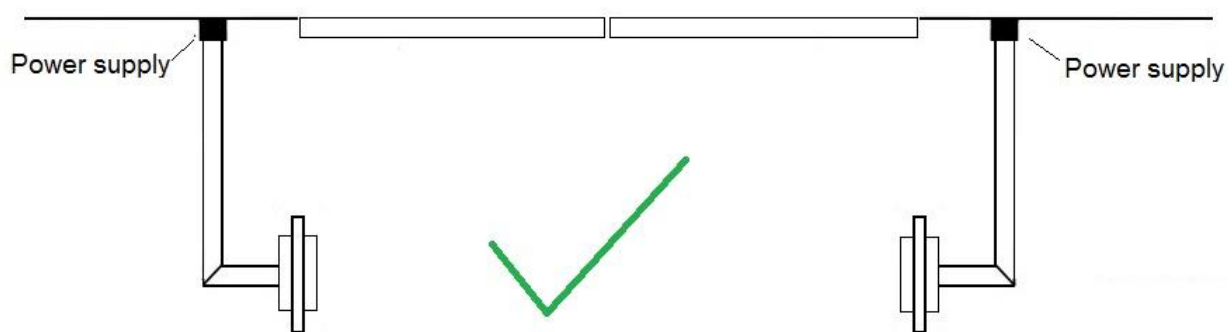
This function also helps to reduces false alarm.

ARC - The **A**utomatic **R**esonance **C**ontrol circuit will reduce the system sensitivity automatically when the tagged merchandise is placed too close to the system or an external condition that rings at a frequency within the transmitted signal band.

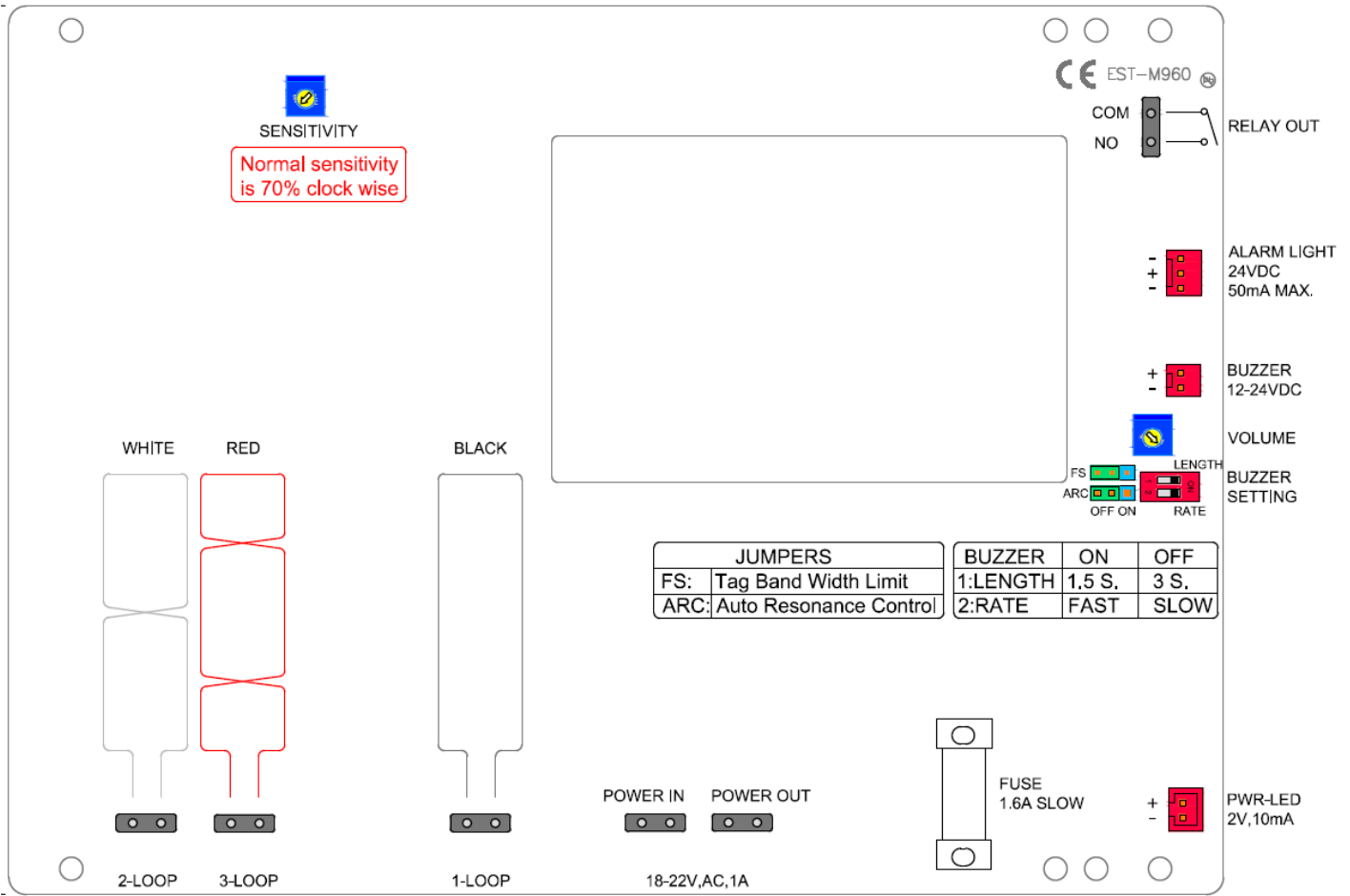
This process will takes about 10 seconds to over 1.5minutes, depending upon the strength of the external resonance.

PFA - The **P**ower **F**ailure **A**larm circuit will trigger the sound alarm when the system is powered down to indicate the power-lost condition

ANTENNA CABLING



WIRE CONNECTIONS



- POWER IN -

Input power to this connector from power supply. EST-M960 allows 18-22VAC or 24VDC input. An 18-22V AC Transformer is recommended.

- POWER OUT -

Used for output power to another EST-M960 board or background LED. For multiple antenna install, power supply should provide enough current for all boards which is parallel connection. For example, two EST-M960 boards needs $2 \times 1000\text{mA} = 2000\text{mA}$ current.

- RX 2-LOOP

Used for connecting "2-loop" RX coil.

- RX 3-LOOP

Used for connecting "3-loop" RX coil.

- TX 1-LOOP

Used for connecting "1-loop" TX coil.

- ALARM LIGHT

Used for connecting an alarm lamp or remote 24V buzzer. Maximum 24V 60mA

- RELAY

A normal open switch for camera trigger, etc.

The maximum current for this relay is 2A, 30V, DC or AC.

ADJUSTMENTS

The adjustment of EST-M960 is very easy. There are only two potentiometers on PCB. These adjustments are **SENS.** (Sensitivity) and **VOLUME** (Buzzer Volume). Both of these adjustments will increase the effect on the system when turned to the right (clockwise).

SENSITIVITY

The **SENS.** adjustment varies the gain or sensitivity of the PCB. Hold the label or tag in a side carry at the desired detection distance, and then turn SENS. clockwise until detection is made.

MAXIMUM SENSITIVITY

For a better detection when the system is installed at an environment without interference, or when the ARC function is activated, EST-M960 provides a two times sensitivity.

But the normal system sensitivity is about 50-70% of full sensitivity, 70% is ideal.

Excessive sensitivity will cause false alarm.

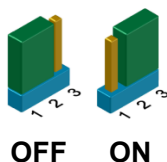
VOLUME

The **VOLUME** potentiometer varies the volume of the sonalert or alarm sounder for the desired effect. Turning this adjustment to the right (clockwise) will increase the volume of the sounder.

EST-M960 is also providing a Power Failure Alarm function. If the VOLUME potentiometer is setting to maximum (full clock wise), a sustained alarm will be triggered immediately when the input power is lost, this alarm will continue (about 3 second) until the electrical energy stored in the capacitor C114 is exhausted.

JUMPER AND DIP SWITCH

JUMPER KEY:



JUMPER - FS (Frequency Select)

Active this function by set the jumper to ON position (Pin 2-3). Default setting is OFF.

FS function is also a way to reduce false alarm.

FS reduces the receiver bandwidth to exclude processing of any information received from the upper and lower frequency bands. Unlike **ARC**, the receiver sensitivity is not reduced except in these bands. Tag detection will not normally be affected. While it may be tempting to setting the FS on as a protective measure, it must be remembered that tags can vary in frequency above and below 8.1 MHz, if any tag frequency approaches the band edges, detection will be reduced. While the normal 2 spread of tag frequencies is rather narrow, tags that are nearer the band edges may detect normally with **FS** deactivated (FS jumper OFF) but exhibit a shorter detection range if the **FS** jumper is ON.

JUMPER - ARC (Auto Resonance Control)

Sometimes the system may alarm because of a resonance caused by either tagged merchandise being placed too close to the system or by an external condition that rings at a frequency within the transmitted signal band. While it is easy to move tagged merchandise beyond the detection area, external conditions may be intermittent or not easily found and corrected. The **ARC** circuitry helps in minimizing these effects. **ARC** is normally disabled. It may be activated by setting the jumper to on position (pin 2-3). Activating **ARC** will cause the system to behave differently than when it is disabled. **ARC** will reduce the system sensitivity to a point where the offending resonance will no longer alarm the system. This will take from 10 seconds (approx.) to over 1.5 minutes, depending upon the strength of the external resonance. A small resonance will take the smallest amount of time and a large resonance will take the most amount of time. The system will still work after **ARC** is activated, but will only respond to tags that present a greater signal level than the resonance. This means that the system detection distance will be reduced. Note that a large resonance may reduce the detection distance significantly. If the external resonance is removed, the system will recover and return to its normal sensitivity. Recovery time is approximately the same as activation time. Transitional resonances or tags will have little or no effect on system sensitivity. However, since the **ARC** function is controlled by external conditions, *best sensitivity will usually occur when ARC is disabled (jumper off, pin 1-2).*

DIP SWITCH #1 & #2 - ALARM SETTING (BUZZER & LAMP)

Switch #1 used to select the alarm length.

Switch #2 used to select the alarm rate.

| SWITCH | ON | OFF |
|-------------|-------------|-----------|
| S1 - LENGTH | 1.5 sec.* | 3 sec. |
| S2 - RATE | Quick Beep* | Slow Beep |

THE DEFAULT SETTING FOR BOTH SWITCHES ARE ON.

MULTIPLE SYSTEM INSTALLATION RULE

POWER LINE CABLING

False alarm due to conducted noise on the power lines can be avoided if the power lines are filtered every 4-6 meters and use twin-core shielded cable.

This is done already on EST-M960. But the power line between the antennas is no longer than 6 meters (8.2 MHz). Additional filter boards must be use if the length of the power cable between the antennas is longer than 6 meters.

EST-M960 uses a built-in filter, but it only protect the electronics its self. It does not contribute to the filtering of the power output.

MULTIPLE SYSTEM SYNCHRONIZATION

The EST-M960 software now **automatically** selects the "EST-M960" synchro timing.

That means you are no longer required to change the timing jumper on each EST-M960 PCB or connect synchro cable to allow multiple systems to operate in close proximity to each other.

Auto timing program allows maximum 63 EST-M960 operate together **without** requiring them to be slaved to or synchronized to each other.

SAME FREQUENCY INTERFERENCE

EST-M960 is now operating in a higher noise environment without reducing the detection range. It is possible to reduce interfere from other swept system or deactivator.

BASIC TROUBLESHOOTING

INTERFERENCE DETERMINE

The EST-M960 is effected by the same environmental interference that affects the swept 8.2 MHz system. However, with the EST-M960, it is possible to determine if resonance or high noise causes the problem. Interference and resonances should be located and eliminated or removed as would be done with a swept RF system.

If you are experiencing the false alarm.

Pull out the TX 1-loop connector temporary to stop the transmit signal.

If the false alarm **remains the same**, then the interference is caused by broad band noise. Other swept systems, neon signs, VAC powered LED lamp, etc.

If the false alarm **reduces** significantly, then interference is caused by a resonance, metallic masses, steel frames of doors, etc.

Read Interference sources below to get more details to locate and eliminated the problem.

INTERFERENCE SOURCES

Mains power generates interferences because of numerous parallel connected appliances and devices (motors, spot lights, fluorescent lighting, etc.) and therefore, a dedicated line shall be provided directly from the switching board. This line shall be installed by an approved installer.

A number of switching power supplies as used for example, in Electronic Information Systems (EIS) operate at a harmonic frequency similar to that of the EAS system and may cause system jamming. Therefore, under no circumstances should the power supply unit be connected to a line backed up by an Uninterrupted Power Supply (UPS) (rectified current).

Metallic masses generate interference because of system absorbed and reverberated electromagnetic waves.

Avoid installing antennas too close to such metallic masses while keeping to a minimum distance of 40 cm away from antenna.

In case of implementing problems because of the site configuration, perform testing in order to determine the best location.

The behaviors of metal frames or guide bars sometimes like resonance circuits tuned to the system frequency.

Install antennas remotely from these structures or fit bonding braids in order to cancel resonance phenomena.

Steel frames of doors sometimes behave in the same manner. Install antennas remotely from such structures or fit shunts or bonding braids in order to cancel resonance phenomena.

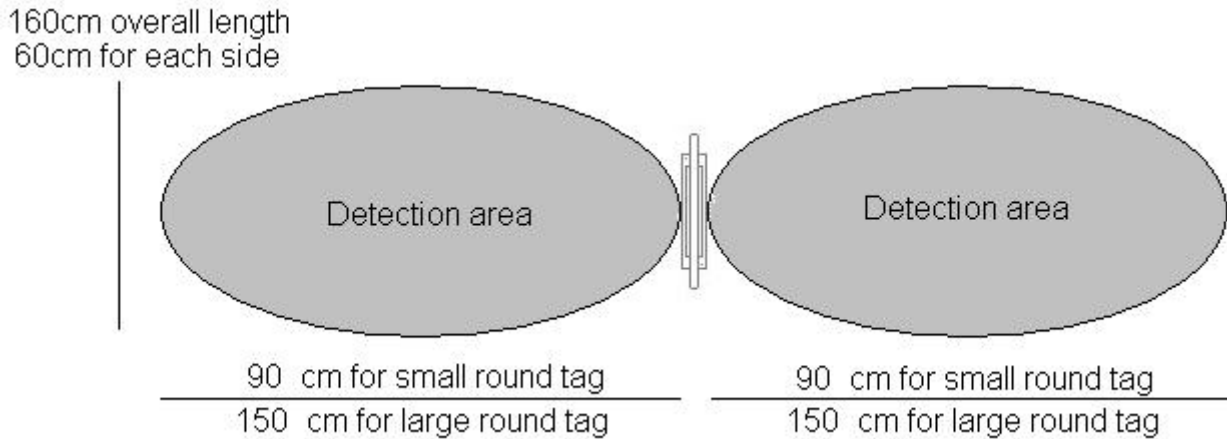
Position the system away from steel frame doors, then open and close doors and check the system state.

Defective fluorescent lighting, e.g. neon type, generates interference because of permanent DC energizing on switching on. Please feel free to have this type of lighting switched off and compare

results with the system. Some transformers use in this type of lighting appliances may be defective and cause similar interference.

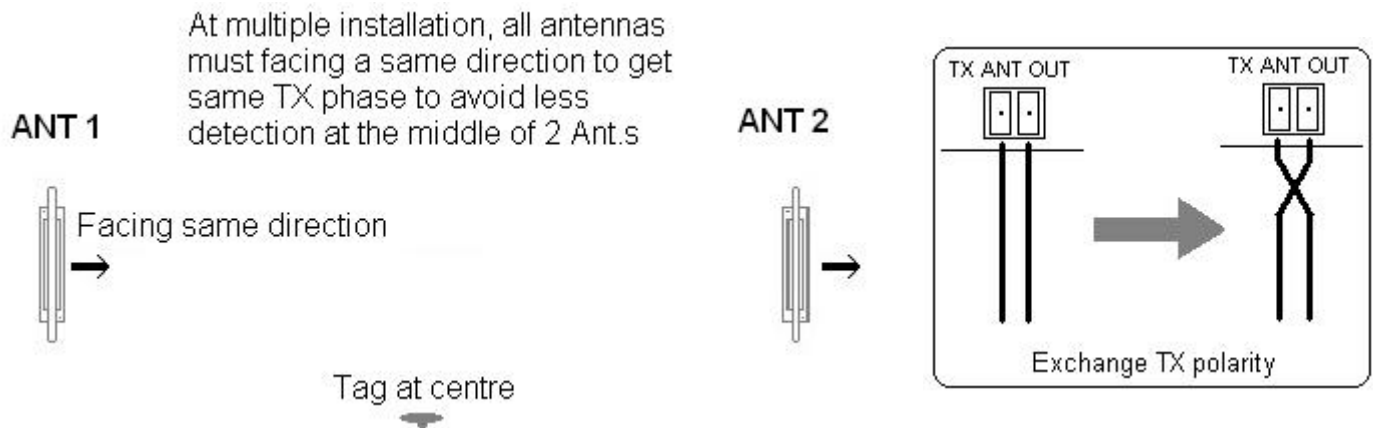
All electromagnetic filed generating appliances typically incorporate transformers, motors or mobile magnets, including: fluorescent neon tubes, halogen quartz bulbs, cashiers conveyor belts, etc. Power leads may also be a cause for interference. Prevent antennas from standing too close to electrical leads. Move antennas and perform various tests to assess the best location.

FALSE ALARM BY MODEL AT DISPLAY WINDOW



Never put a show model with tags inside detection area. Sometimes it may not cause false alarm immediately, but it increase system noise cause system unstable. System may false alarm when a customer close to the antenna without a tag at all, this is because human body will amplify tag signal..

DETECTION DEAD ZONE



If the detection is low at the middle of two antennas, try to exchange one of the TX coil polarity to get correct TX phase and test again by a same tag at same position.