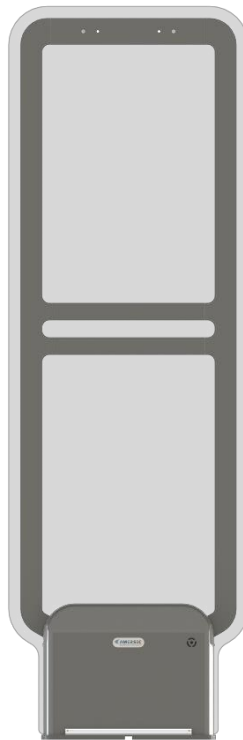




TECHNICAL USER MANUAL

AM ACE System

for small exits and cash desks



TECHNICAL MANUAL – AM ACE
Confidential and proprietary information, for internal use only

1.1 BASIC INSTALLATION GUIDE

This section outlines the basic step-by-step processes for installing the AMERSEC® AM ACE system. More details can be found in further sections of the User Manual.

1.1 Required Materials

- 1 to 3 pedestals
- mains power cable (supplied with system)
- stranded 10-core cable for RX pedestals - 3m cables supplied with RX pedestals
- USB Hardware Key with telephone cable (RJ14 + RJ12 connectors)
- Laptop with Windows XP or later and AM ACE Application installed
- #4 hex screwdriver
- RJ50 crimping tool (not included) – for RX cables
- extra RJ50 plugs (not included) – for RX cables
- insulated needle-nose pliers (for changing jumpers if re-tuning is required)

1.2 Powering the ACE System

The ACE system is connected to mains with a standard IEC power cord. If a longer cable is required, a standard extension cable is recommended.

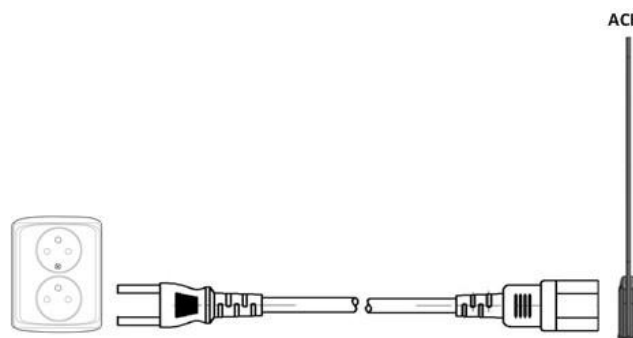


Figure 1 - ACE Power



Connect the power cord to the ACE system BEFORE you connect to the mains power outlet! DO NOT disconnect the power cord from the ACE system while the other end is still connected to the mains power outlet!

The toroidal transformer in the ACE system can be wired for 115V or 230V supply inputs. For 230V, connect the RED wire to the “TR-9” terminal, and for 115V, connect the BLACK wire to the “TR-9” terminal. The BLUE wire will remain connected either way.

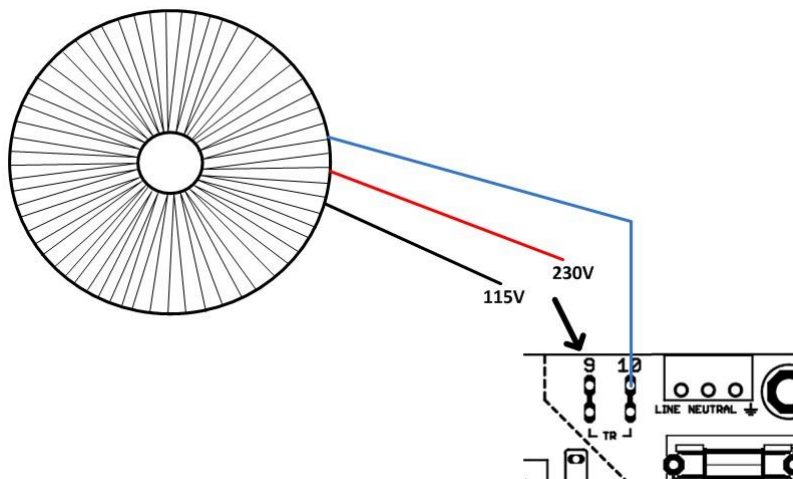


Figure 2 - ACE Transformer Wiring

1.3 Connect ACE to PC



Requires Windows XP or later

- Install software and then connect the USB Hardware Key to the PC and the ACE. The white telephone cable which is connected to the ACE has RJ14 + RJ12 connectors (4/6). Do NOT use the RJ12 + RJ12 cable (4/4).

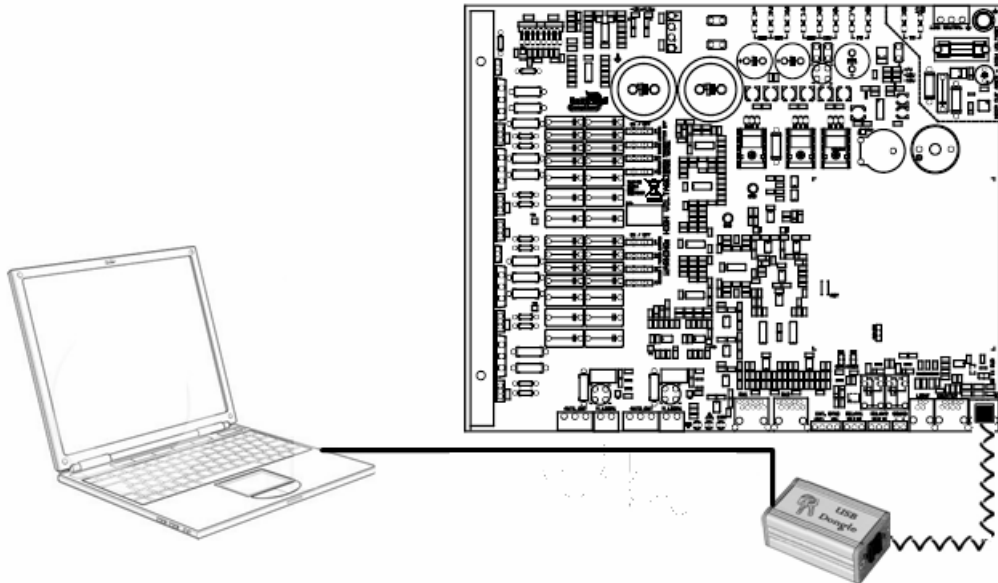


Figure 3 - ACE to PC Connection with Hardware Key

- The Hardware Key is used as a USB converter, and for security. Only 1 key is needed for each technician, it is NOT left at the installation with the system.
- Open the AM ACE Application AFTER the hardware driver is finished installing. Make sure the system is powered ON.

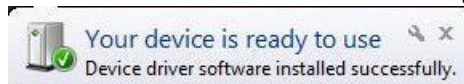


Figure 4 - Hardware Driver Finished

- Select "Serial" communication.

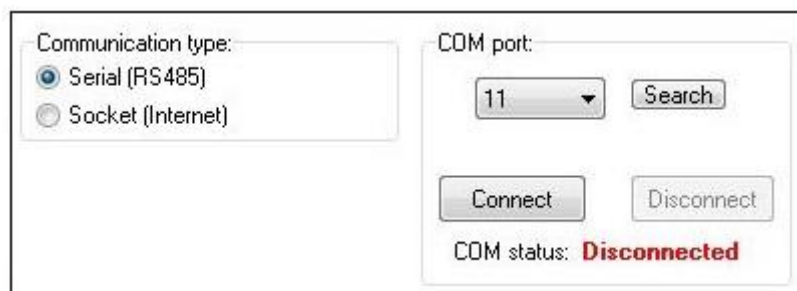


Figure 5 - AM Connection

- The system will scan the COM ports on the computer. Select the correct COM port and press "Connect"
- If you are unable to connect to the scanned COM port, you can manually find the correct COM port on your PC
 - Select Start -> Run -> devmgmt.msc -> OK



Figure 6 - Open Device Manager

- When Device Manager is open, navigate to Ports (COM & LPT). The Hardware Key will be displayed as “USB Serial Port (COMX)”. Select this port in the AM ACE Application and press “Connect”

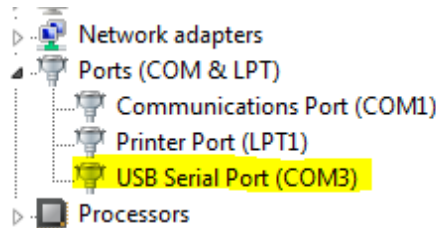


Figure 7 - Manually Find COM Port

1.4 Software Setup

When you have successfully connected to the AM ACE and have all pedestals connected, you can begin adjustment of the system. Settings are saved immediately to the system after pressing the appropriate button (Set, Apply, Checkbox, etc.) near the setting. When entering a number value, press the “**ENTER**” key to confirm the setting and save it to the system!

- On the **CONFIG** page, select the configuration which matches your pedestal setup. It is important that any additional RX pedestals are connected to the same port number as is shown in the configuration diagrams!
- On the **RX** page, start with the following settings:
 - Gain = 8
 - Preset Environment = Environment 2
 - Criteria 1 SET value = 300 for O-loop and 150 for 8-loop
 - Before making any more adjustments, move to the **SYNC** page
- On the **SYNC** page, synchronize with any surrounding AM systems
 - Your system (blue pulses) should be aligned with any other AM systems (shown as red pulses). The **RIGHT** sides of the pulses are most important for alignment!
- Go back to the **RX** page and adjust according to the environment
 - Try to set Gain so that Tag & Bckg levels are green or yellow
 - Criteria 1 – SNR is the signal-to-noise ratio threshold and will have a large effect on sensitivity and false alarm elimination. Reduce the SET values to increase sensitivity
 - Criteria 2-4 can be adjusted with sliders or turned off completely
 - For extremely hostile environments, use Filter #2. Noise will be reduced, but detection will also decrease
 - For high interference, it is possible to reduce the width of the RX window. This will reduce the interference and/or make it possible to fit your RX reception in between other pulses.
- Go to the **TX** page and use the following settings:
 - TX Power = 150
 - It is best to set the TX Power so that the Top and Bottom loops are evenly matched and within the green or yellow areas.
 - Sweep = Disabled
- Go to the **ALARMS** page and turn on the appropriate alarms for your pedestals
 - Click on the box(es) to turn ON alarms – they will be green when alarm is turned on

- If the system will be connected to StoreMonitor, go to the **RTC** page
 - Synchronize the Date/Time with your PC

2.1 PEDESTAL CONFIGURATION & CABLING

This section describes how to set up the ACE pedestals in the correct configuration, including any additional options, and the cabling which is required.



ACE systems are ideally used for small exits (3 or less pedestals) or for cash desk installations.

2.1 Types of Pedestals

Amersec offers two types of AM ACE pedestals, **ACE** (also called the Master pedestal) or **ACE RX** (just called RX)

- **ACE = Master antenna**
- **ACE RX = Receiver antenna** – identical to ACE Master but with RX electronics only. Must be connected to an ACE Master

Up to 2 RX pedestals can be connected to the ACE.

- **All possible pedestal configurations are shown in the ACE Application on the Config page**
- If you have trouble with high interference, try to configure the ACE Master as a TX antenna and place it nearest the source of interference. The interference will affect Mono and RX pedestals, but it will not affect a Transmitter!

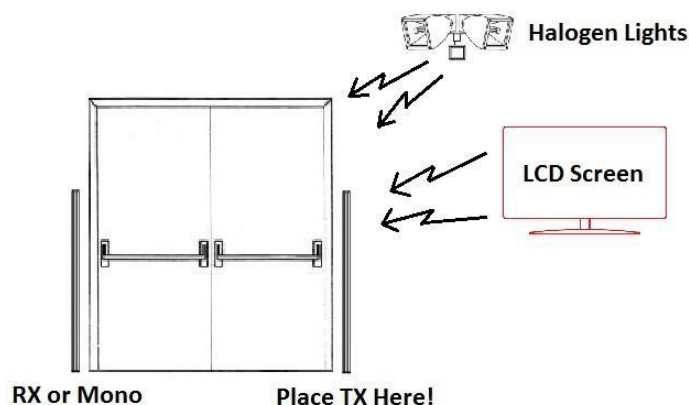


Figure 8 - Interference Configuration



Mono or RX pedestals should be placed at least 2 meters away from LCD screens, depending on the size of the screen!

2.2 Cable Requirements

Required* Tools:

- RJ-50 Crimping Tool
- RJ-50 plugs



*Only if you need to cut/reconnect any cables

RX cable = RJ50 connectors with STRAIGHT connection (same colors on both ends). 3m of 10-core flex cable is supplied with each RX pedestal.

2.3 One-Pedestal Configuration



Figure 9 – Mono Configuration

- ACE Application **Config = 0**
- Additional Options
 - Remote Tuning & StoreMonitor EAS statistics: requires eComm Module with internet connection

2.4 Two-Pedestal Configuration

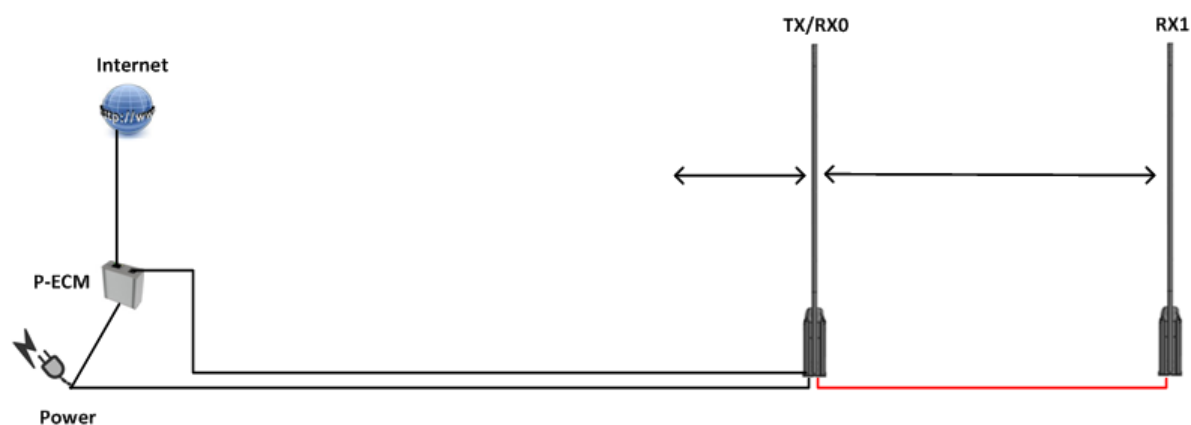


Figure 10 – Mono-RX Configuration

- ACE Application **Config = 1**
- Additional Options
 - Remote Tuning & StoreMonitor EAS statistics: requires eComm Module with internet connection
- It is possible to switch to a TX-RX Configuration (thereby reducing the backfield on the Mono) by setting Config = 2

2.5 Three-Pedestal Configuration

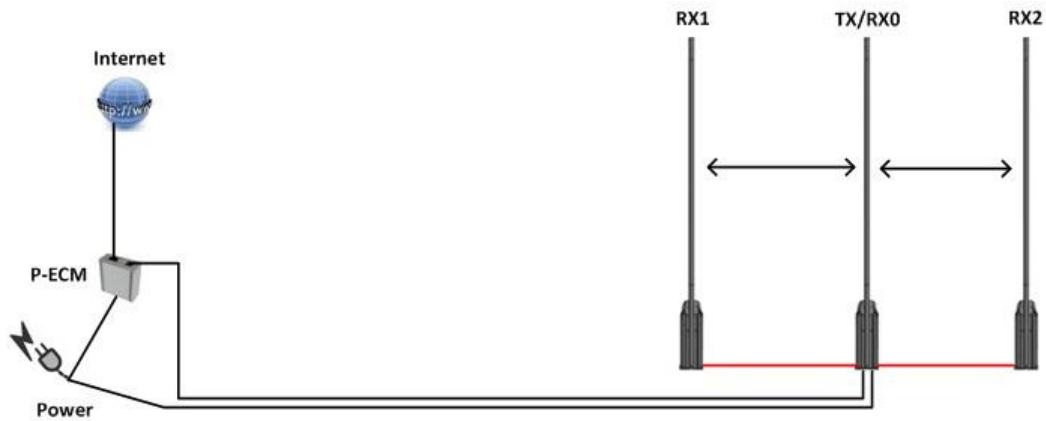


Figure 11 - Mono-RX-Mono Configuration

- ACE Application **Config = 3**
- Additional Options
 - Remote Tuning & StoreMonitor EAS statistics: requires eComm Module with internet connection
- **It is possible to switch to an RX-TX-RX Configuration by setting Config = 4. Not recommended**

3.1 ACE APPLICATION SOFTWARE SETTINGS

3.1 Configuration

Before making any system settings, select the correct configuration of antennas that you have connected. After selecting the correct configuration, press **Set Config**.

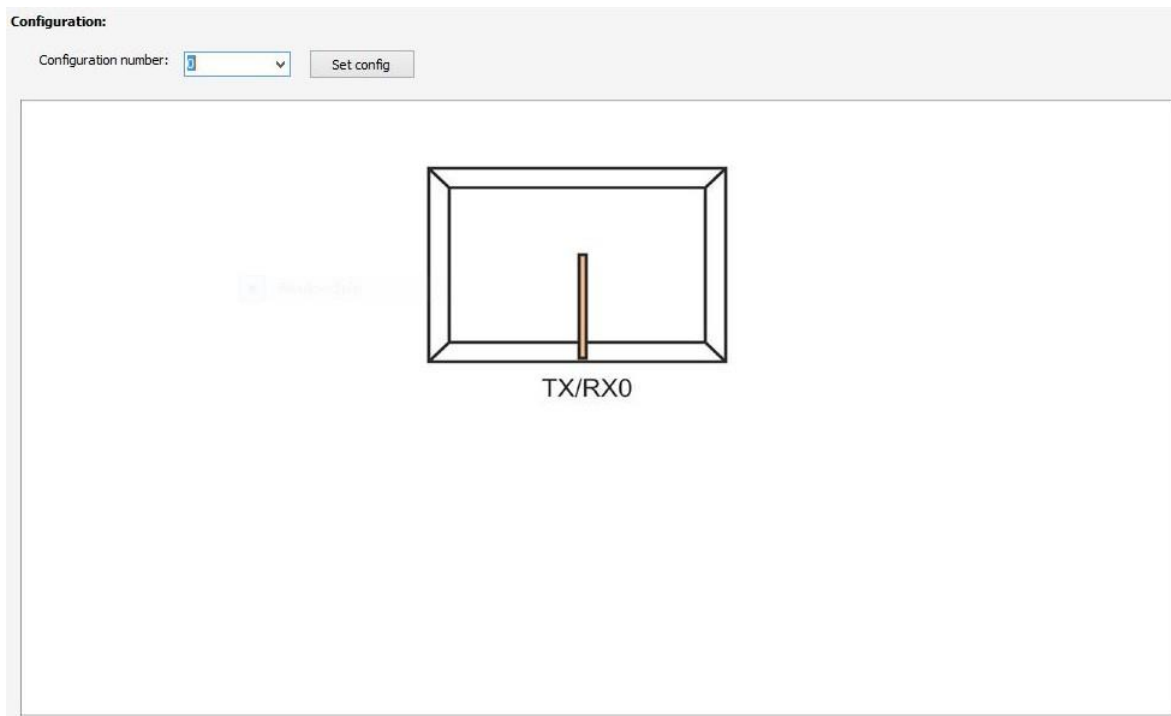


Figure 12 - Config 0: Single Pedestal Mono

3.2 Sync Page & Synchronization

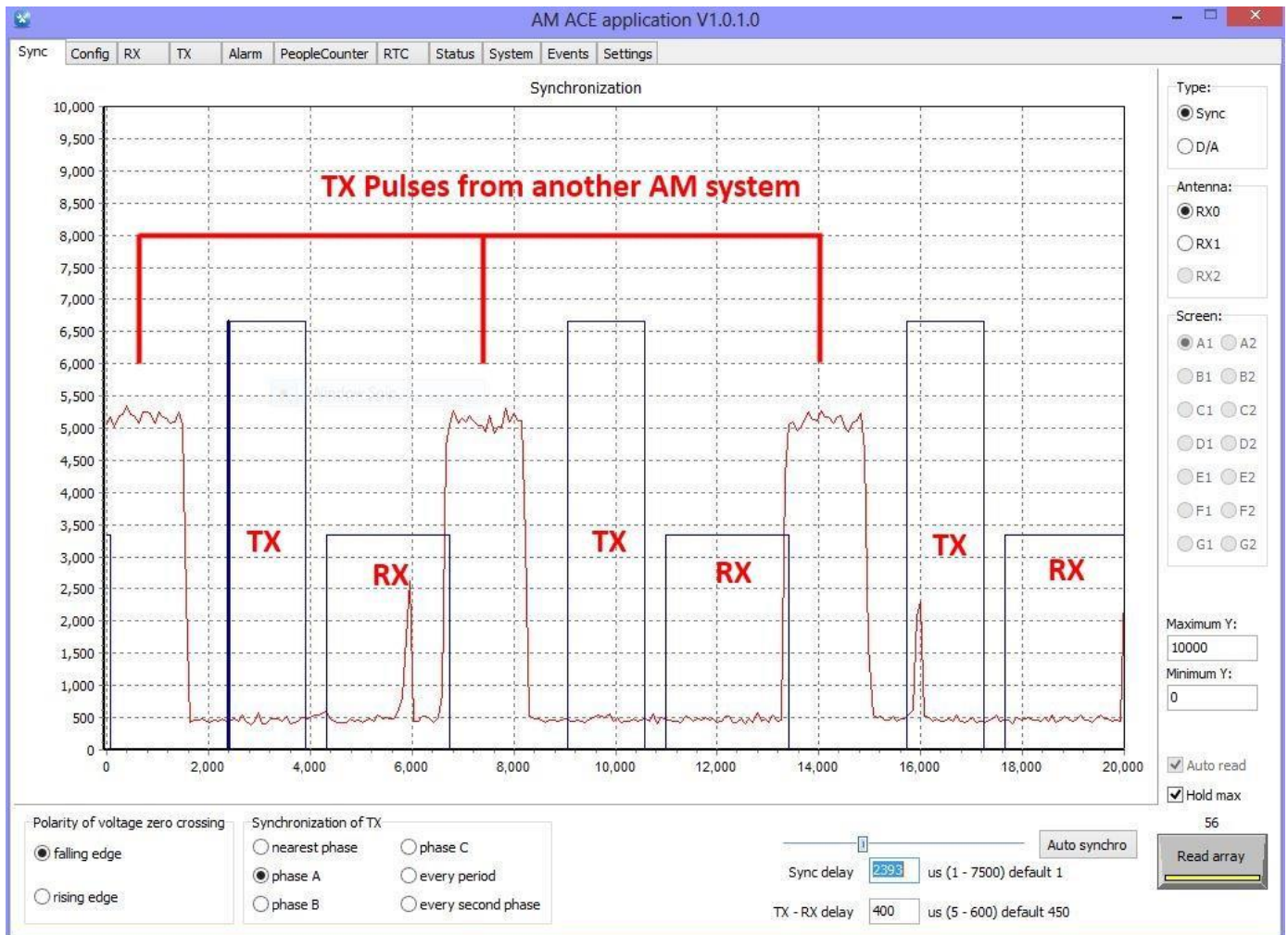


Figure 13 - Sync Page with Un-Synchronized System



The Sync Page is the most important page in the software. It allows you to easily synchronize with other AM systems, which is **REQUIRED** for all AM systems!

The Sync Page also allows you to view all other signals in the environment, which is very helpful for troubleshooting interference. The **BLUE** rectangles are a **REPRESENTATION** of **YOUR** system. The **RED** signal is **EVERYTHING** else in the environment, including **OTHER AM** systems.

To synchronize, move the Sync Delay slider so that your TX pulses (blue) are on top of the red pulses from the other AM system. It is most important to align the **RIGHT** sides (falling edges) of the pulses. This will introduce a time delay to your system so that it always pulses at the same time as the other system(s).

Alternatively, you can press the **"Auto synchro"** button, which will calculate the time delay and move it for you. This is a one-time calculation – it does not mean that the system will continuously auto synchronize if something changes!

You may also enter the time delay (Sync delay) as a number and then press the **"Enter"** key to save the value to the system. If you have **MULTIPLE** systems in the same store or nearby, it is best to manually enter the **SAME** number on all systems for optimal synchronization. That is assuming that the power phasing is the same on all systems.

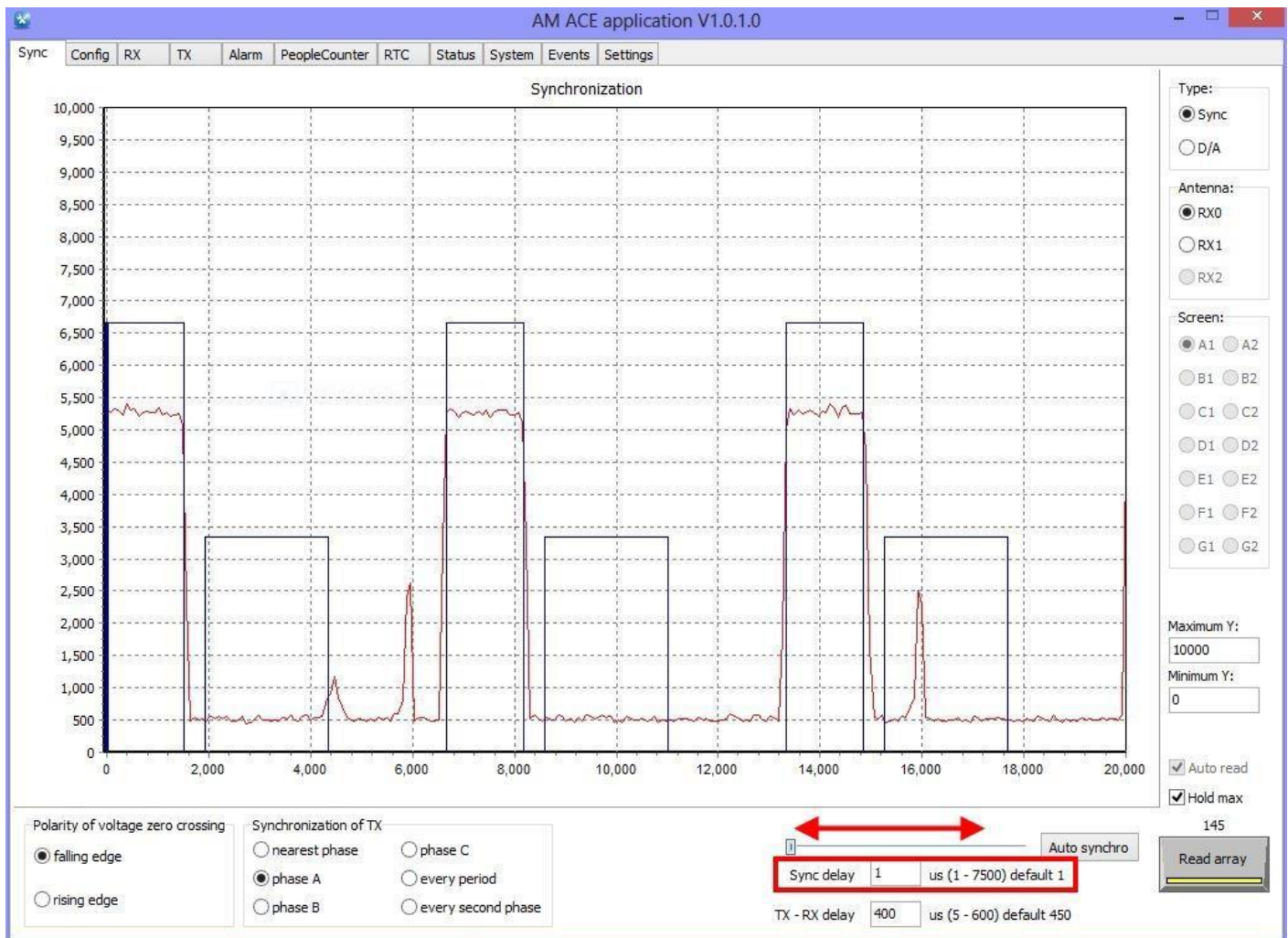


Figure 14 - Properly Synchronized System

Polarity of Voltage Zero Crossing: changes the phase by 180° - same as reversing the Live/Neutral wires on the mains power

Synchronization of TX: selects which phase is used for the synchro calculations

Synchro Settings: synchronize your system by moving the slider, or manually entering a number, or pressing the “Auto synchro” button (does not continuously synchronize – it is a 1-time calculation)

TX-RX Delay: changes the time delay between the TX pulse and the RX window. This is an important setting for avoiding resonance and ringdown (leftover TX signal which appears in the RX window as a tag – causes false alarms – the TX signal is usually from your own system but can also come from nearby systems). To avoid ringdown, either decrease TX Power or increase TX-RX delay.

Read Array: scan the environment with your RX1 pedestal by selecting “Auto read” and “Hold max” and then pressing the “Read Array” button

Axis Scale: change the y-axis scale on the graph to zoom in or out depending on the size of the signal

Type: by default, the Sync page will display all signals detected in the environment. For more detailed viewing of signals, select “D/A”. You can now view different signals for each antenna – basically just more details than what is displayed on the RX page.

3.3 RX Page

AM ACE application V1.0.1.0

Sync Config RX TX Alarm PeopleCounter RTC Status System Events Settings

RX0

Gain: 8

LO HI

Criteria: 0 1 2 3 4 Alarm

Criterium 1 - SNR:

	Max	Set
0	3703	300
8	792	150

Reset

Tag 0 44 ☒

Bckg 0 32 ☒

Tag 8 22 ☒

Bckg 8 27 ☒

Level input 96

Detected frequency kHz

57 kHz 58 kHz 59 kHz

Pedestal quick adaptation

Criteria - Enable/Disable

Less sensitive More sensitive

☒ Criterion 2 - Tag phase 0 10

☒ Criterion 3 - Tag difference 0 10

☐ Criterion 4 - Tag deviation 0 10

Preset environment:

Environment 1

Environment 2

Environment 3

Pre-alarm

1 2

RX filter type:

1 2

RX window width

Narrow Wide

1 5

DSP gain

Low High

1 5

Figure 15 - Receiver Settings

The RX page is used to set the sensitivity of the system. As a starting point, set the **GAIN** between 6-8 and set the Preset Environment to Environment 2. Then adjust the **GAIN** and **SNR SET VALUE** based on detection and interference levels (false alarms). The four Criteria can be used to fine-tuning the sensitivity without changing the overall signal level (Gain).

RX windows are displayed according to the selected configuration on the Config page.

Gain: amplitude of the detected signal. Signals from tags as well as interference signals will be increased/decreased by changing this value.

Criteria LEDs: indicates which criteria are TRUE (green) or FALSE (red). When all criteria are TRUE (green) for either O-loop or 8-loop, then the system will alarm. It is normal that these will be flashing randomly, which is caused by interference signals. Use these indications to determine which criteria(s) should be changed for optimum performance.

SNR Setting: criteria 1 setting for signal-to-noise ratio (alarm threshold). Based on detection and false alarm rates, decrease the SET value for more sensitivity, or increase the SET value for less sensitivity. To see the MAX signal levels in the environment, press the "Reset" button but do not place a tag near the system. This will display the maximum signal level without tags. The SET value should be higher than the MAX signal. After entering a number, press the "Enter" key to save it to the system.

Signal Levels: displays the signals in the environment. Do not be too concerned with Level Input – the most important are the Tag and Background levels. The O-loop signals should always be HIGHER than the 8-loop signals. If not, reverse the wires on ONE of the loops.

For best performance, the Tag and Bckg levels should be green or yellow. If they are red, try to reduce GAIN and make sure your system is properly synchronized. The O-loop or 8-loop can be disabled by un-checking the box beside the indicators.

Detected Frequency: shows the detected frequency. Really only useful if something is nearby transmitting 58kHz or you have resonance problems. Tags are detected too quickly for this to be a useful indication for tags/labels.

Pedestal Quick Adaptation: the system will automatically adjust some filter settings based on environment. This button is used ONLY when testing as after some time the system will reduce sensitivity from multiple testing of the tags. This “resets” the system back to current environment conditions.

Criteria Settings: fine-tuning of criteria settings for more advanced setting of the system. Can be used to make the system more/less sensitive without changing the overall signal (Gain). Use the criteria LED indication to help you with these settings. Some criteria can be disabled by un-checking the box beside the criteria.

Preset Environment: automatically changes the criteria for common presets. Does not change Gain

Pre-Alarm: specifies how many times a tag must be detected before an alarm occurs. Recommended to use 1

RX Filter Type: filter #2 can be used in extremely hostile environments. Extra filters are added which reduces interference levels. However, detection will be affected so it is recommended to use filter #1 if at all possible

DSP Gain: changes the software digital gain applied to the signal. Use only in the situation that the signal level is so low that the system is not able to calculate values for detection

RX Window Width: changes the length of time that the system is receiving signals from the environment.

3.4 TX Page

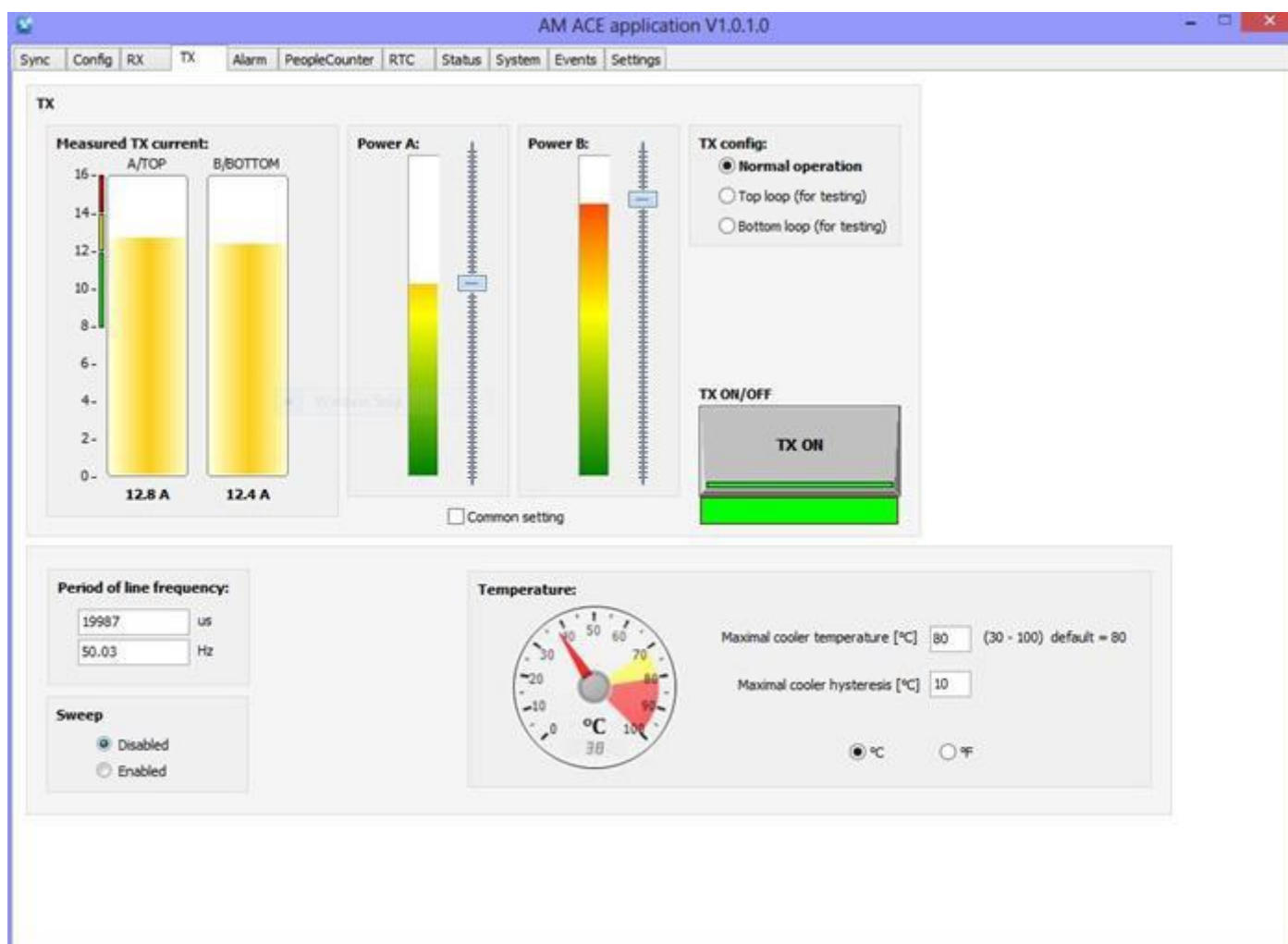


Figure 16 – Transmitter Settings

TX Power A & B: recommended setting is so that the Measured Current is within the green or yellow levels. For wide distances this can be increased, but make sure that ringdown does not occur. If so, then TX power must be decreased or TX-RX delay (Sync page) increased.

TX Config: used only for tuning of the TX jumpers. The top and bottom loops should transmit a similar MEASURED POWER. If not, or if Measured Power is low (less than 4A) then the antenna may need to be re-tuned.

Temperature Settings: specifies the temperature at which the transmitters will turn OFF to avoid overheating. When the system cools down, they will turn back on and resume normal operation.

3.5 Alarms Page

The screenshot displays the 'Alarm' tab of the AM ACE application. The 'Configuration table' shows a grid for RX0, RX1, RX2, PIEZO, RELE1, and RELE2. The 'Relay 1' and 'Relay 2' sections allow setting switch-on times and response filtering. The 'Test alarm' section includes buttons for RX0, RX1, RX2, Jammer, Secondary, and HW error. The 'Counters' section shows digital displays for RX0, RX1, RX2, Jammer, and Hardware reset alarms. The 'Sound volume' section features sliders for RX0, RX1, and RX2. The bottom section provides detailed configuration for each alarm type, including Sound (Type, Speed, Repetition rate) and Light (Type, Speed, Repetition rate) settings, as well as Piezo settings for RX0, RX1, RX2, Secondary, and HW error.

Figure 17 - Alarm Settings

Configuration Table: grid for turning on/off alarms. Alarms which are turned on are represented by a green box, while jammer alarms are represented by a red box. Click on each box to turn it on/off. In the above figure, when the RX0 pedestal detects a tag, it will turn on the alarm on RX0.

Relay Switch-On Time: specifies the time (in seconds) that the external relays will switch on.

Test Alarms: test each alarm using the current settings

Alarm Settings: each alarm can be configured using the SOUND and LIGHT settings. Common settings are as follows:

1. Sound (Type, Speed, Rate)
 - a. Default = 1,15,3
 - b. Modulated = 2,15,3
 - c. Beeping = 3,15,1

d. Loudest available = 1,1,3 (make sure Volume trimpot on RX Preamp is at maximum)

2. Light (Type, Speed, Rate)
 - a. Default = 1,11,5
 - b. White = 2,1,20
 - c. Red = 7,1,20
 - d. Green = 8,1,20
 - e. Blue = 9,1,20

Static Response Filtering: specifies if the system will filter out resonance signals during an alarm. Recommended is enabled.

Evaluation: recommended is non-stop. Not used at this time.

Secondary Alarm: recommended is OFF. Not used at this time.

Piezo Type: specifies the type of piezo modulation which is on the ACE PCB at the bottom of the pedestal. This does NOT change the standard alarm sound which is at the top of the pedestal!

4.1 REMOTE SERVICE / ECOMM CONNECTION

If Remote Service or People Counting will be used, it is necessary to connect an eComm Module to the system. The eComm Module should be pre-configured before going to the installation site. For further information not found below regarding configuring or connecting the eComm Module, refer to the *eComm Module User Manual*.

4.1 Connecting an ACE System to an eComm

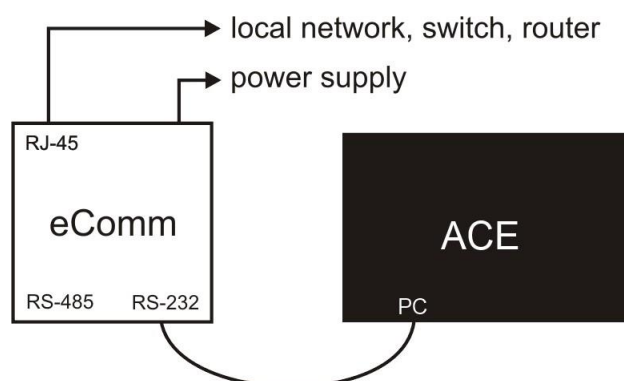


Figure 18 - eComm Connection to a Single ACE

Connect the ACE to the eComm with the RJ14 + RJ12 (4/6) phone cable. You can leave the address of the system as default (255). Only the Master ACE pedestal is connected. The RX pedestals will communicate their information to the master through the RX cable.

4.2 Remote Service Connection

- To access your ACE system via Remote Service, connect your Hardware Key to your PC (for security only) and open the corresponding ACE Application
- Select “Internet (eComm)” connection
- Enter your StoreMonitor credentials
- Browse to the Location where you placed the eComm and press “Connect”
- If there are more than 1 devices connected to the eComm, select the desired system. You will now have access to all settings

5.1 EXTERNAL RELAYS

There are 2 external relays available on the ACE. They are dry-contact (non-powered) relays. Maximum connected load is 2A.

Each relay has a normally-open (NO) and normally-closed (NC) contact. Any alarm or device can be connected to the relays, provided they are connected to their own power supply. Common devices triggered by the ACE external relays are sirens, lights, CCTV, wireless pagers, etc. A common wiring diagram for connecting an external alarm is shown below.

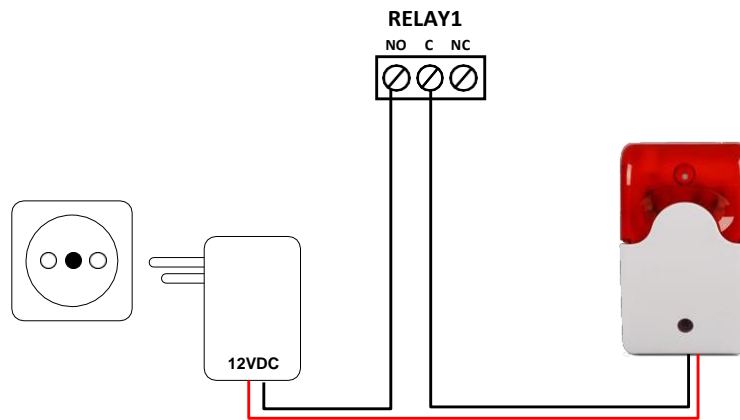


Figure 20 - External Alarm Wiring Diagram

6.1 TROUBLESHOOTING

6.1 THE SYSTEM IS BEEPING CONSTANTLY AFTER BEING POWERED ON

This indicates an error – the most common is that the system cannot find the “zero-crossing” of the mains frequency. Try the following steps:

- Disconnect all cables and restart the system
- Try connecting it to a different mains outlet – a dedicated power source is recommended
- Open the pedestal – make sure that all power LEDs are ON and all wires/cables connected well
- Try connecting to the software – if possible, reset to default values (Settings page)
- Make sure that the Neutral-Earth voltage is no more than 5V. Ideally it should be 0V.

6.2 I HAVE NO DETECTION

Usually you will have at least a small amount of detection even if the environment is extremely noisy. This is assuming you have 0% detection. If the alarm counter is counting alarms:

- Make sure your alarms are turned on – Alarm page
- Make sure the alarm cable is not disconnected from the top of the pedestal

If the alarm counter is NOT counting alarms:

- Check your TX Measured Power – if it is very low check TX cables, TX tuning, and make sure loop wires are connected well
- Check Hardware Status LEDs, EEPROM, and RAM in the application

6.3 MY RX INDICATES “PEDESTAL ERROR”

- Verify that your Config setting is correct
- This can indicate a broken cable – test with a known good cable
- Test the antenna on a different RX port – if working the other RX port may be defective
- If available, test a different antenna with the same cable and same port – if working the RX Preamplifier may be defective

- If the Pedestal Error is intermittent, this can indicate high noise/interference on the RX cable which is affecting the communication signal. If the problem is bad enough to affect detection of the system, it may be necessary to use a heavier shielded cable or move the cable to a different position

6.4 I HAVE POOR DETECTION

This is usually caused by either not setting the system sensitive enough, or high interference affecting the system. For higher sensitivity:

- Increase RX Gain
- Decrease the *SET* value for Criteria 1 – SNR. It is usually sufficient to decrease the O loop value
- Increase criteria 2-4
- Increase TX Power – be careful not to set TX Power too high as the system may start to resonate.
- Use RX Filter Type 1

If interference is high:

- Decrease RX Gain and try to make the detection acceptable by increasing the sensitivity of the Criteria
- Change RX Window Width to minimum
- User RX Filter Type 2
- Move the antennas closer together

7.1 TECHNICAL SPECIFICATIONS & FEATURES

Features

- Excellent detection of AM DR labels and hard tags
- All electronics integrated inside of pedestals
- Digital Signal Processing (DSP)
- Software tuneable
- Integrated jamming detection
- Choice of RGB alarm light color and behavior
- Integrated digital oscilloscope for advanced diagnostics
- Advanced, customizable filters for false-alarm elimination
- 2 programmable DT contact relays for connecting additional alarm circuits

Technical Specifications

Power Input:	100-120VAC or 220-240VAC @ 50-60Hz
Power Consumption:	150W max
	50-60W standard operation
Transformer Output Voltages:	31VAC, 15VAC, 6VAC
Operating Frequency:	58kHz
Sweep Frequency Range:	57.8kHz – 58.2kHz
Transmitted Pulse Width:	1200 - 1600 µsec
Repetition Rate:	75Hz
Fuse	T1L250V – 1A Slow, 250V
Operating Temperature:	0-50°C
Pedestal Alarm Audible Level:	90dB

8.0 DECLARATION

Operate the system only as described in these operating instructions. Damage to hardware due to improper use will result in loss of warranty.



WARNING! Do not open the antenna or touch the electronic boards while system is powered on. **RISK OF ELECTRIC SHOCK!**



CAUTION! When connecting or disconnecting cables make sure transmitters are switched off or power to system is off.



CAUTION! Switch off power when servicing the ACE System hardware

This product conforms with the requirements of the following harmonized standards for electromagnetic compatibility:

- EN 55022: 2006 + A1: 2007;
- EN 61000-3-2: 2006 + A1: 2009+A2: 2009;
- EN 61000-3-3: 2008;
- ETSI EN 300 330-1 V1.7.1: 2010
- ETSI EN 300 330-2 V1.3.1: 2006;
- ETSI EN 301 489-1 V1.8.1: 2008;
- ETSI EN 301 489-3 V1.4.1: 2003.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

