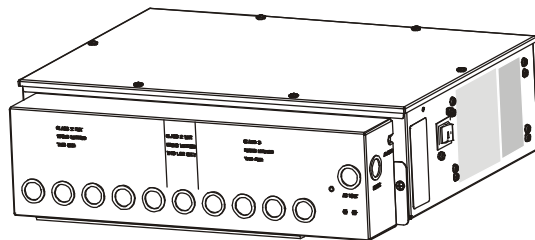


AMS-9040 Controller

Installation and Service Guide



ZE9040, ZE9040-68K

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To the Installer

The AMS-9040 detection system consists of a ZE9040 controller and the following antennas:

Non-European Installation

Antenna Type	
Digital Euro Pro-Max 4	AMS-3003 System
Digital Pro-Max 4	AMS-3004 System
Digital Door-Max 4	AMS-3010 System
Digital Floor-Max 4	AMS-3030 System
AMS-3000 System	AMS-3031 System

European Installation

Antenna Type
Digital Euro Pro-Max 4
Digital Pro-Max 4
Digital Door-Max 4
Digital Floor-Max 4



CAUTION: Ultra•Loop antennas cannot be installed with the AMS-9040 controller in EU countries.

This installation and service guide explains how to install, setup, and service the AMS-9040 controller.

Parts required to install this system are:

- AMS-9040 Controller
- Digital AM intelligent antennas (various)
- AMS-9040 Service Configurator Software.

Other documents that may be required for installation are:

- AMS-9040 Detection System Planning Guide, 8200-0367-01
- Antenna Installation Guide (various)
- AMS-9040 Controller Key Switch, 8200-0367-04
- AMS-9040/Digital 216 Controller Air Handling Kit, 8000-2693-11.



Regulatory Restriction: In certain countries, there may be installation restrictions on the antennas. See antenna installation guides for restrictions, if any.

Intended Use: Only install this device as described in this guide.

Declaration of Conformity: If this product was installed in a European Union or European Free Trade Association member state, give the Declaration of Conformity included with this product to the manager or user. By law, this information must be provided to the user.

- Because customer requirements dictate the placement of system components, your Sensormatic representative will supply this information separately.
- Because of the number of antennas and accessories that can connect to this controller, methodically install this system to avoid problems. See "System Setup" in this guide for guidance on how to setup antennas.
- Never restart or boot up a computer connected to an active controller. Doing so disables the mouse function on the computer.

About the Product

The four-channel AMS-9040 controller is part of an EAS detector used to detect EAS tags/labels at store exit(s).

Controller Features

- Inputs for up to eight intelligent or non-intelligent antennas (four of which can be transceivers), up to four auxiliary receiver antennas, and up to four noise coils. Antenna coils can be set for phase flipping (default), aiding, or figure-8 operation.

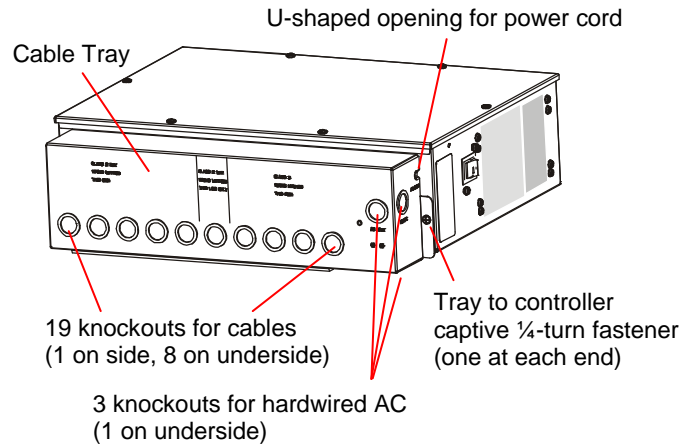
Note: Phase flipping is unavailable when noise coils are used.

- The controller is set up using a laptop computer and AMS-9040 service configurator software.
- Controller-assisted tuning of intelligent antennas.
- Wireless synchronization device such as a Sensormatic Sync Link can be used.
- Up to two remote alarms and two beacon lamps can be powered and controlled.
- Up to four externally-powered alarm devices such as security cameras can be triggered.
- Sensormatic alarm management or **people counting** device can be powered and controlled.
- Hardwired sync and transmit inhibit function connections.
- RS-232 (for local diagnostics) and RS-485 (for remote diagnostics) support.

Installation Features

- Sits on a shelf or attaches to a wall or ceiling using a cable tray/mounting bracket assembly. The assembly secures to the controller using two captive ¼-turn fasteners.
- Has 19 knockouts in the cable tray used to receive exposed cables or cables in conduit. Knockouts are available for Class 2 wiring from low voltage devices, Class 2 “wet” wiring from an alarm management device, and Class 3 wiring from transmit antennas.

Three knockouts in the tray receive an exposed ac cable or cable in conduit. A U-shaped opening in the side of the tray allows access for a power cord, if used.



Basic Operation and Setup

The controller deters theft by activating an alarm when it detects the unique response of an active Ultra•Max hard plastic tag or disposable label.

To detect a tag:

- Antenna(s) connected to the controller emit a magnetic field close to the tag/label's natural frequency causing it to vibrate or “ring” at the frequency of the field. When the field is removed, energy in the tag/label dissipates causing an exponential ring down.
- The controller processes signal inputs picked up by the antennas to determine if they are indicative of a tag/label signal.
- If a tag/label signal is detected, the controller activates audio-visual indicators on each antenna that picked up the signal and externally-powered alarm devices, if used.

AMS-9040 configurator software enables the field technician to:

- Map antennas and alarms to a doorway or aisle
- Adjust the system
- Synchronize the controller to other EAS systems using the ac line, Sync Link device, or wired synchronization
- Monitor and adjust for noise interference and use of a 58kHz jammer device
- Initiate a “Tag-to-Close” function, when applicable for intelligent antennas
- Download software application updates
- Monitor internal temperature of the controller
- Perform diagnostic tests and read error codes.

Device Connections

Connector pin assignments are listed on pages 4 and 5. Connectors available are as follows:

Transceiver antenna	4
Antenna communication*	4
General-purpose connections for auxiliary receive antennas and/or noise coils**	4
Remote alarm	2
Beacon lamp	2
Relay	4
Alarm management device (UltraLink)	1
RS-485	1
Wired Tx sync	1
Tx inhibit	1
Wireless ac synchronization (Sync Link)	1
Service	1

* Each connector supports a Tx/Rx antenna and Aux antenna, which can share the connector.

** Only Coil 1 inputs support noise coils.

Transceiver (Tx/Rx) Antenna and Antenna Communication Connections

Transceiver antenna connectors and antenna communication connectors support the following Tx/Rx antennas:

- Digital Door-Max™*
- Digital Floor-Max®*
- Digital Pro-Max® Family*
- Digital Euro Pro-Max*
- Ultra•Loop Family
- AMS-3030 and AMS-3031.

* Controller-assisted tuning applies. See page 7.

Transceiver connectors (P1, P24, P4, P35). Four connectors support Tx/Rx antennas designated A, B, C, and D.

- Tx/Rx A connects to connector P1.
- Tx/Rx B connects to connector P24.
- Tx/Rx C connects to connector P4.
- Tx/Rx D connects to connector P35.

Antenna communication connectors (P5, P25, P6, P36). Four connectors support controller-assisted tuning of digital antennas.

- Tx/Rx A / Aux A connects to connector P5.
- Tx/Rx B / Aux B connects to connector P25.
- Tx/Rx C / Aux C connects to connector P6.
- Tx/Rx D / Aux D connects to connector P36.

General-Purpose Auxiliary Connections (P27, P29, P31, P33)

Four connectors accept up to four receive antennas with their top coils using the Coil 1 connections and their bottom coils using the Coil 2 connections.

The general-purpose auxiliary connectors support the following receiver antennas:

- Ranger Antennas (ZKRANGER-1 and ZKRANGER-3)
- SkyMax Antennas
- Satellite Antennas
- Auxiliary Floor Loop Antennas (ZSLOOP-AUX)

Noise coils can also share these connectors, with each coil using the top coil (Coil 1) connection. If connecting a noise coil and a receive antenna into the same connector, the top and bottom coils of the receive antenna must share the Coil 2 connection (done in the field by the technician switching the antenna wire connections). Thus phase flipping is unavailable when noise coils are used.

Antennas/coils connected to auxiliary inputs are designated Aux A, B, C, and D. These connectors default to Rx function with no auto detection.

- Aux Antenna/Coil A connects to connector P27.
- Aux Antenna/Coil B connects to connector P29.
- Aux Antenna/Coil C connects to connector P31.
- Aux Antenna/Coil D connects to connector P33.

ABOUT NOISE COILS: A noise coil is used to cancel noise interfering with detector operation.

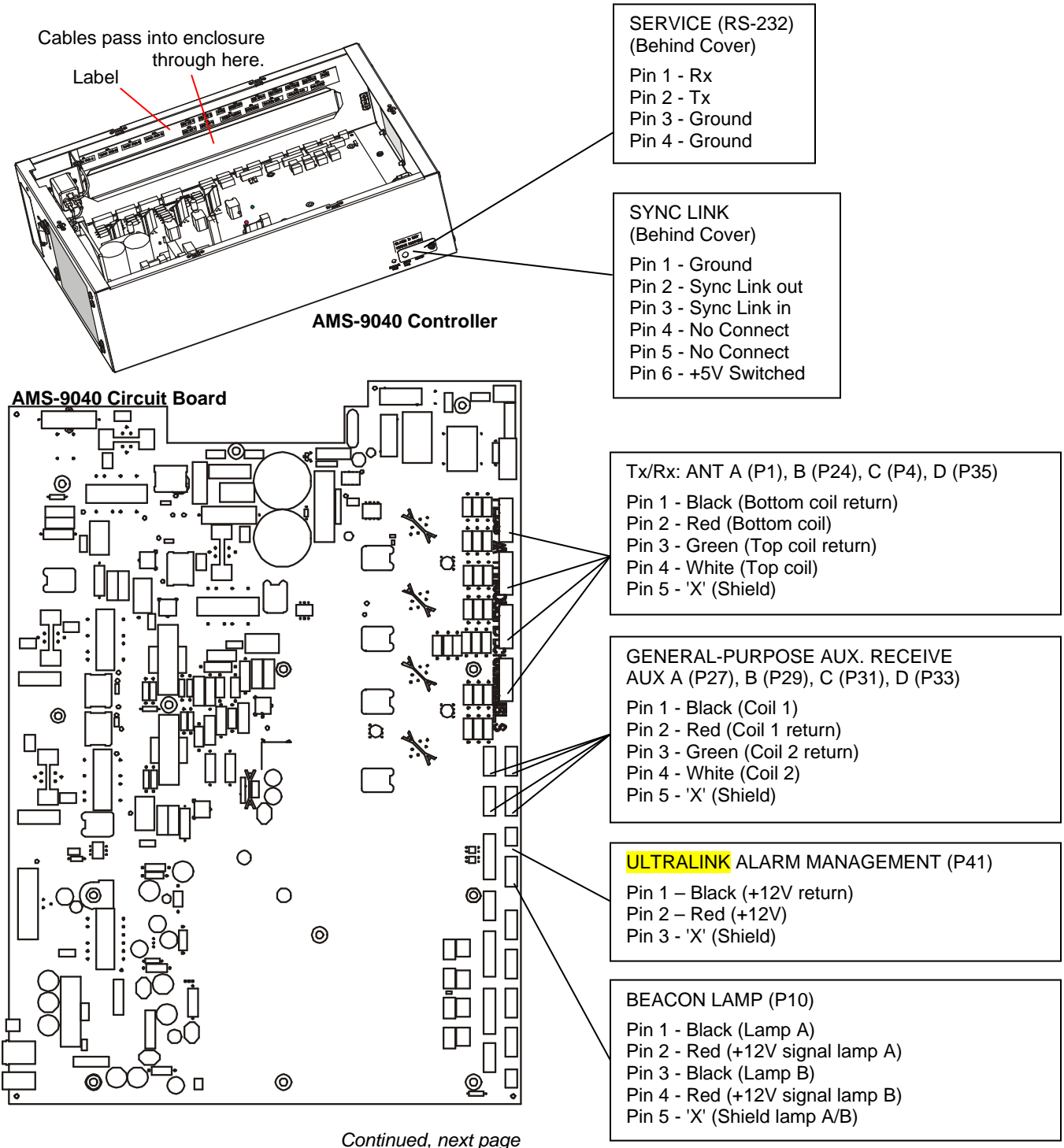
- Discrete noise coils (such as a Ranger antenna or the top coil of a pedestal antenna such as a Digital Pro-Max) only connect to the Coil 1 input.
- To accept a noise coil, the auxiliary input must be in noise canceling mode set using service configurator software. Save adjustments to default settings if they are to be used on the next power cycle or system reset.
- Move the noise coil around while monitoring power levels on a laptop computer to find where noise cancellation is best. This is where the coil should be installed.
- The location for the noise coil must be practical as well as yield satisfactory results.

Remote Alarm Connections (P7)

This connector can power and control up to two remote alarms, such as a ZC30 or ZC35.

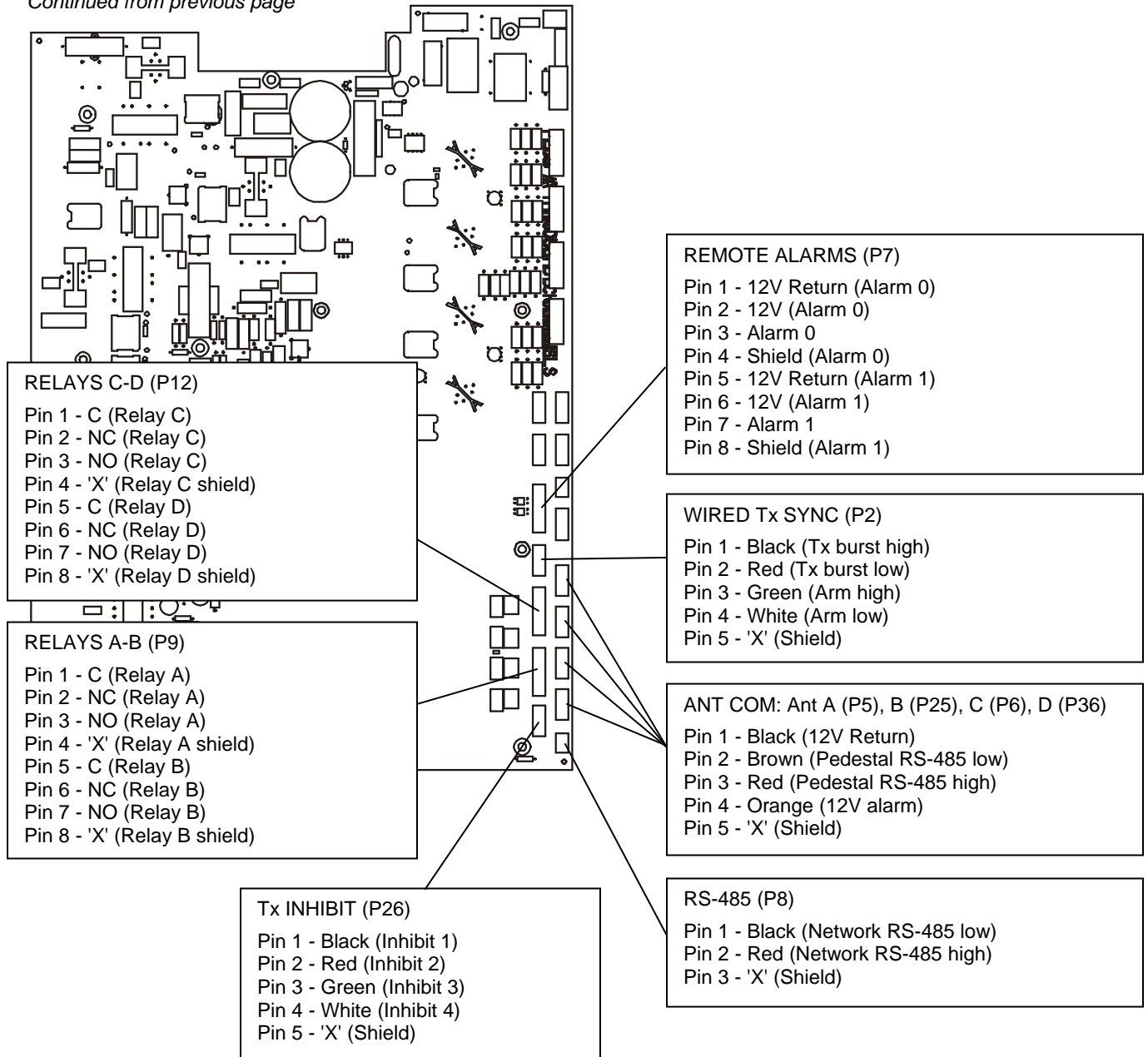
Continued on page 6

A label inside the controller identifies connectors.



Continued, next page

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Beacon Lamp Connections (P10)

This connector controls up to two beacon lamps, and supplies up to 12V at 1A to power each lamp.

Relay Connections (P9, P12)

The controller has four double-pole, double-throw (DPDT) relays, each configurable using service configurator software.

- These relays trigger devices such as externally powered remote alarms and beacon lamps, time lapse VCRs, and security cameras, with one device per detection zone.
- Each relay connector accepts three wires and a shield. Cable shields share one pin on the connector.

Alarm Management Connection (P41)

Connector P41 powers an UltraLink alarm management device.

RS-485 Connection (P8)

This connector supports RS-485 communication for remote diagnostics.

Wired Tx Sync Connection (P2)

This connector is used to wire two or more AMS-9040 controllers together to synchronize them to avoid cross interference.

Note: The controller also provides for a slower sequencer level synchronization to allow two Digital Floor-Max antennas to be placed next to each other when driven by different controllers.

Wireless AC Sync Connection (On Controller)

Protected by a cover plate, this connector:

- Receives a cable from a Sync Link device which, when connected, is used as the timing reference for system functions instead of ac synchronization. See “Automatic AC Line Synchronization” on page 7. Also, see Appendix A.
- Can also be used instead to transmit the timing reference.

RS-232 Service Connection (On Controller)

Protected by a cover plate, the RJ-22 connector receives the cable from a laptop computer that is used to locally setup and diagnose the detection system.

Ped (Tx) Inhibit Connection (P26)

This connector has transmit inhibit pins (1, 2, 3, 4). Each pin turns off antenna transmitter(s) assigned to it using service configurator software.

Installation Features

Installation features are as follows:

- Automatic detect and setup functions
- Controller-assisted antenna tuning
- Transmitter current control
- Shelf, wall, or ceiling mounting.

Automatic Detect and Setup Functions

Device Detect. The controller automatically detects digital AM antennas when they are connected to the controller and the controller is powered on. Once detected, the controller sets non-loop antennas as transceivers and loop systems as transmit only and sets their operating sequence as shown in the table below.

ANTENNA	SEQUENCE
Digital Pro-Max	Simultaneous–Alternating*
Digital Door-Max	Simultaneous–Alternating*
Digital Euro Pro-Max	Simultaneous–Alternating*
Digital Floor-Max	Alternating only. Maximum repetition rate is 45Hz.
AMS-3000	Simultaneous for single antennas, Alternating for 2.
AMS-3003	Simultaneous for single antennas, Alternating for 2.
AMS-3004	Simultaneous for single antennas, Alternating for 2.
AMS-3010	Simultaneous
AMS-3030/3031	Simultaneous for 1 or 2 antennas, Alternating for 3 or 4 antennas
Unknown	Alternating only. Maximum repetition rate is 45Hz (60Hz), or 37.5Hz (50Hz).**

* Simultaneous-alternating means the controller transmits on two antennas simultaneously and then transmits on a second pair, if they exist.

** When an antenna without device identification is detected, the repetition rate does not exceed this value due to the voltage rating on Floor-Max antennas.

The controller also detects a Sync Link device, when connected. See page 6.

Automatic ac line synchronization. To avoid interference from nearby EAS detectors, upon power up or system reset, the controller automatically adjusts its:

- Operation to the ac input's frequency and voltage.
- Ac-timed transmit and receive functions to that of nearby EAS transmitters, if detected.

Auto sync status is displayed on the service configurator.

Note: If a Sync Link device is connected to the controller, the controller uses its signal as the timing reference instead. The service configurator indicates that Sync Link is active.

See additional information in “Appendix A”.

Controller-Assisted Antenna Tuning

A series of LEDs on the tuning circuit board of a digital AM antenna indicate where its tuning jumpers are to be placed for optimum antenna performance. The table below lists the antennas that support controller-assisted tuning. For specific information, see the installation guide supplied with the antenna.

ANTENNA
Digital Pro-Max 4
Digital Door-Max 4
Digital Euro Pro-Max 4
Digital Floor-Max 4

Transmitter Current Control

The controller allows transmit current to be adjusted as required for the region of use.

- The controller checks current in each transmitter and the antenna coil configuration: phase flipping, aiding, or figure-8.
- If transmit current in any antenna becomes excessive, a signal is sent to the system's software. The controller also shuts down the transmitter for one second then resumes operation.
- Maximum operating current for each coil configuration is as follows:

	Aiding	Figure 8
Non-European	16A	16A
Europe when using vertical antennas (except Germany)	N/A	12A
Europe when using pairs of Floor-Max antennas	16A	16A
Germany	N/A	10A

Mounting the Controller



Do not mount controller with its fan or cable tray face up.

Using the cable tray/mounting bracket assembly supplied, the controller can be mounted as follows:

- On a shelf.
- On a wall. If required, the extension bracket provided can be used to enable mounting screws to thread into wall studs. DO NOT mount the controller with its fan facing up!
- To a ceiling. Plywood whose surface is larger than the mounting bracket is first secured to the ceiling structure that holds the drywall. The bracket then attaches to the plywood.

Service Features

Service features are as follows:

- Laptop computer service configurator
- Internal diagnostics
- LED status indicator
- Remote diagnostics via Ethernet or RS-485 network. Ethernet requires the use of an external converter.

Service Configurator Software

Operating software required: Windows® 95, Windows 98, Windows NT, Windows 2000, or Windows XP.

Service configurator software installed in a laptop computer is required to setup and troubleshoot the controller. The configurator is used to:

- Set antenna coil configuration as aiding or figure-8
- Customize detection for each antenna
- Monitor transmit and noise levels from each antenna
- Monitor transmit current through each antenna
- Customize alarm setup
- Turn off transmitters
- Monitor temperature inside the controller
- Download new software features/updates to flash memory
- Reset the controller after a software download
- View a system error report

- Separate a problem into one of three categories: controller, environment, or the device connected to the controller, such as antennas or remote alarms.

Note: If default settings are changed, you do not need to turn the controller off and on to store them.

Internal Protection and Diagnostics

In addition to what the service configurator displays, the controller has the following:

- Runaway software protection.
- Board diagnostics.

LED System Status Indicator

An LED system status indicator on the controller indicates the following:

- Green flashing (system on and okay)
- Yellow flashing (performance downgraded; service recommended)
- Yellow or red flashing in a particular sequence (fault detected, call for service).

The number of yellow or red flashes identifies a digit in a two-digit alert code (for example, four flashes is the number four). The start of an alert code is indicated by a long LED interval. Then the first digit of the code occurs, followed by a short delay, followed by the second digit.

Alert codes are listed on page 17.

Remote Diagnostics

Remote diagnostics enables use of a computer at a remote location to troubleshoot problems and change controller parameters.

- The controller must connect to a properly programmed modem and telephone line, or to an Ethernet or RS-485 network.
- An external adapter is required.

Modem connections are described on page 19.

Installation Requirements

Installer/Contractor

- Have electrical work comply with the latest national electrical code, national fire code, and all applicable local codes and ordinances.
- Coordinate work with other trades to avoid interference.
- Verify existing site conditions and coordinate with the owner's representative and appropriate utilities as required.
- Obtain copies of all related plans, specifications, shop drawings and addenda to schedule and coordinate related work.
- Thoroughly review the project to ensure that all work meets or exceeds the above requirements. Bring alleged discrepancies to the attention of Sensormatic Electronics.

If Using Conduit

- In the cable tray part of the cable tray/mounting bracket assembly, there are three 16mm ($\frac{1}{2}$ in) or 21mm ($\frac{3}{4}$ in) knockouts for hardwired ac power and nineteen 16mm ($\frac{1}{2}$ in) or 21mm ($\frac{3}{4}$ in) knockouts for antenna and other cables.
- Select knockouts closest to cable connectors.
- DO NOT route more cables through conduit than regulation allows.

Power Connections

Ac power connects to the controller using a power cord or hardwired cable. Power source can be 100-120Vac or 200-240Vac. Controller automatically senses the voltage so no jumper settings are required.



WARNING—RISK OF ELECTRIC SHOCK! The ac power cord could be carrying 120Vac or 240Vac.



CAUTION: When using a power cord, install a socket-outlet near the controller in an easily accessible location.

Für Installationen mit einem Stromkabel muß die Steckdose an einem Standort installiert werden, welcher einfachen Zugang erlaubt.



CAUTION: A 10A, 2-pole, ganged disconnect device, which also provides short circuit and overload protection, and has a minimum 3mm open circuit clearance, in accordance with the National Electric Code and applicable local codes must be installed by a licensed electrician at a location readily accessible to the equipment.

Ein 10A, 2-poliges, gekoppeltes Ausschaltgerät, welches auch über einen Kurzschluß- sowie Überbelastungsschutz verfügt, und einen minimum 3mm offenen Schaltabstand aufweist, nach Übereinstimmung mit den Nationalen Elektrischen Regelungen sowie lokalen Regeln, muß an einem Standort installiert werden, welcher einfachen Zugang zum Gerät erlaubt.

Mounting Limitations

- The wall must support 29.2kg (64.6 lbs) or four times the weight of the controller assembly.
- When wall mounting, if holes in the controller's cable tray/mounting bracket assembly do not align with wall studs, use the extension bracket supplied to achieve alignment.
- Do not mount controller with its fan or cable tray face up.
- Maximum cable length between antennas and controller is 15.2m (50ft). Longer cables can reduce performance and operating current.



WARNING! Do not install this product where highly combustible or explosive products are stored or used.



WARNING—RISK OF ELECTRIC SHOCK! During installation, if the antenna must be left unattended, turn off power or cover high voltage components to prevent unauthorized access to hazardous voltages.

Additional Equipment Required

- Intelligent or non-intelligent antennas (installation instructions supplied with antenna)
- Hard tag (non-deactivateable Ultra•Max tag) and Ultra•Max low energy labels
- Laptop computer with Windows® 95, 98, NT, 2000, or XP operating software
- RS-232 Ultra•Max programming cable
- Service configurator software.

People with Implanted Medical Devices

Although this anti-theft system complies with all applicable safety standards, place the system in such a way that customers:

- do not linger near or lean on its antenna(s) while making their purchase
- are only directly in front of the antenna(s) while exiting the checkout area.

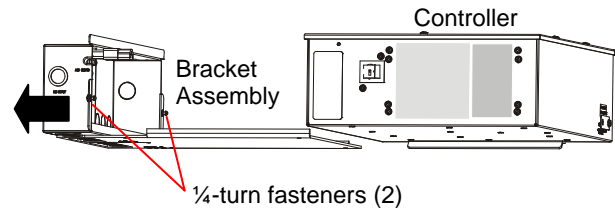
Kits and Parts Required

Bracket, extension	1	0500-9792-01
Tray, cable	1	0404-0175-02

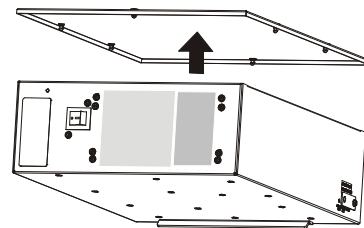
Installation Procedure

This section describes installation procedures for when the controller is to rest on a shelf, or attach to a wall or ceiling.

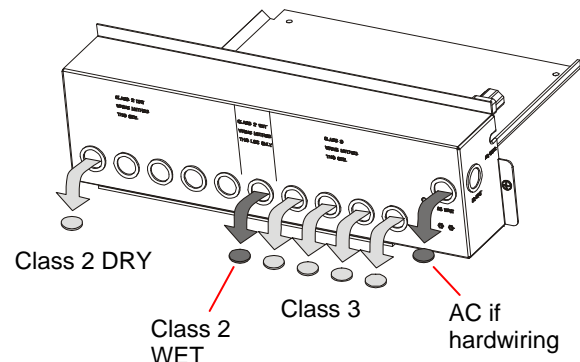
1. Remove the cover from the top of the controller. Then detach the cable tray/mounting bracket assembly from the controller. Two captive $\frac{1}{4}$ -turn fasteners secure the assembly.



2. Loosen six captive screws and remove the cover from the controller.



3. Remove knockouts closest to connectors they are associated with.
 - Only remove knockouts from the ac connection area if the controller is to be hardwired to ac.
 - Observe requirements for Class 2 “dry” (for low voltage devices such as remote alarms), Class 2 “wet” for Class 2 devices that may go somewhere other than indoors (for example, an outdoor beacon), and Class 3 wiring. For example, antenna Tx/Rx cables must go in a Class 3 opening but antenna Comm cables must go in Class 2.



4. **If using cable clamps:** Thread a clamp into each hole used. Run cables (except power) through clamps leaving about 30cm (1ft) of excess cable on the other side. Tighten clamps.

If using conduit: Attach conduit to the cable tray and run cables to the controller.

5. Mount the cable tray/mounting bracket assembly to a vertical surface, ceiling, or shelf.

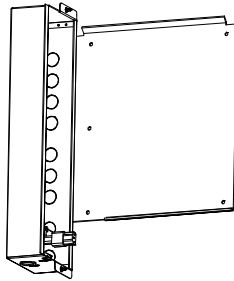
Vertical Surface



WARNING! Only mount the cable tray face down, or to the left as shown.

The wall must support at least 29.2kg (64.6 lbs). Use appropriate anchors.

Mounting holes must align with two wall studs. If not, use the extension bracket supplied.

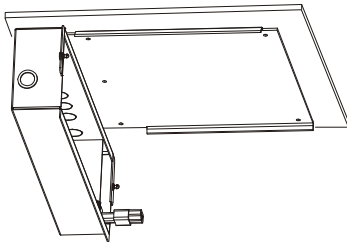


Ceiling

Mount the assembly directly to cement, or first mount plywood larger than the surface area of the bracket to a ceiling structure above the ceiling, then mount the cable tray/mounting bracket assembly to the plywood.



WARNING! The ceiling must support at least 29.2kg (64.6 lbs).

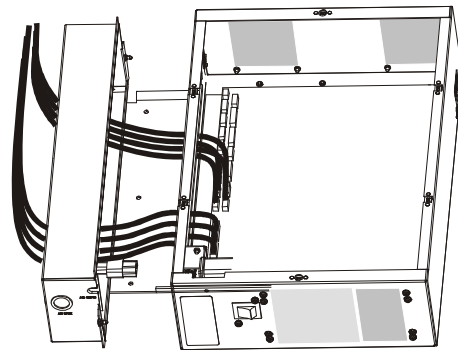


Shelf

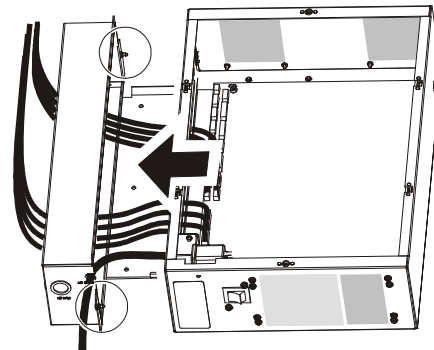


6. Mount the controller partially onto the mounting bracket and connect cables.

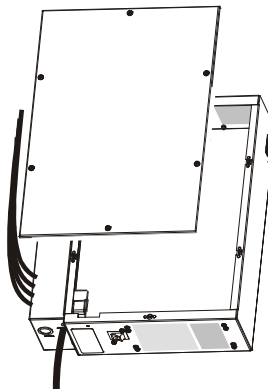
- Attach connectors supplied to the cables.
- Route cables through the rectangular opening in the controller housing.
- Referring to the diagrams on pages 4 and 5, plug the cables into the appropriate color-coded circuit board connectors:



7. Connect ac power (see page 12).
8. Slide the controller completely onto the cable tray/mounting bracket assembly and secure using the two ¼-turn fasteners.



9. Re-attach the cover to the top of the controller and secure using the six captive screws.



AC Hookup

Ac power connects to the controller using a power cord or hardwired cable.

- The power source can be 100-120Vac or 200-240Vac.
- The controller automatically senses the voltage so no jumper settings are required.



WARNING—RISK OF ELECTRIC SHOCK! The ac power cord may carry 120Vac or 240Vac.



CAUTION: When using a power cord, a socket-outlet must be installed near the controller and in an easily accessible location.

Für Installationen mit einem Stromkabel muß die Steckdose an einem Standort installiert werden, welcher einfachen Zugang erlaubt.



CAUTION: A 10A, 2-pole, ganged disconnect device, which also provides short circuit and overload protection, and has a minimum 3mm open circuit clearance, in accordance with the National Electric Code and applicable local codes must be installed by a licensed electrician at a location readily accessible to the equipment.

Ein 10A, 2-poliges, gekoppeltes Ausschaltgerät, welches auch über einen Kurzschluß- sowie Überbelastungsschutz verfügt, und einen minimum 3mm offenen Schaltabstand aufweist, nach Übereinstimmung mit den Nationalen Elektrischen Regelungen sowie lokalen Regeln, muß an einem Standort installiert werden, welcher einfachen Zugang zum Gerät erlaubt.

Power Cord

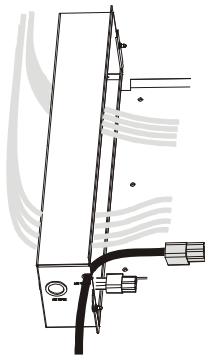
Referring to the figure below:

1. Choose a power cord for the country of use. Power cords come in .9m (3ft), 2.7m (9ft), 3.7m (12ft), and 4.6m (15ft) lengths.
2. Route the power cord through the slot in the cable tray.

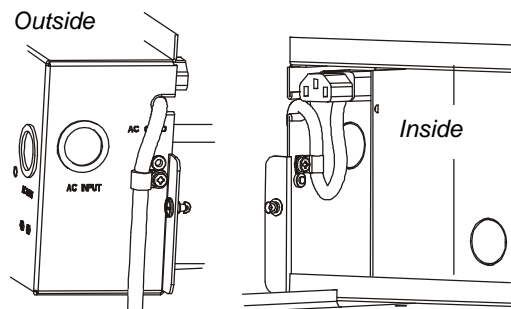


CAUTION: DO NOT remove the three knockouts used to access the ac connection area.

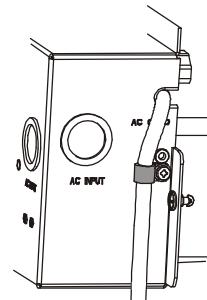
CAUTION: DO NOT use the plug intended for hardwiring.



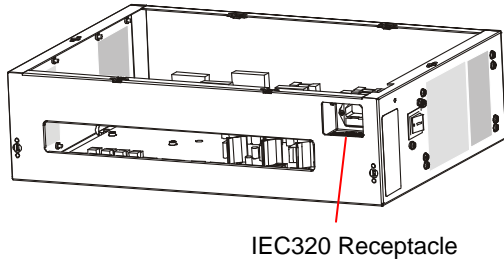
3. Apply strain relief to the power cord according to the country of use. For USA and Europe, use a white cable clamp on both the inside and outside of the cable tray.



For Japan, use a black cable clamp only on the outside of the tray.



4. Plug the cord into the IEC320 receptacle in the controller housing.



5. Plug the power cord into the ac outlet. The controller automatically senses the voltage (100-120Vac or 200-240Vac). No adjustments are required.
6. Return to the installation procedure.

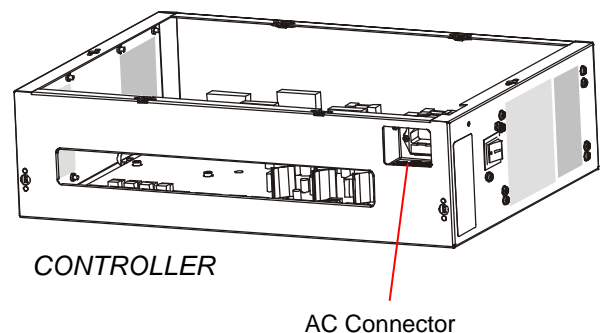
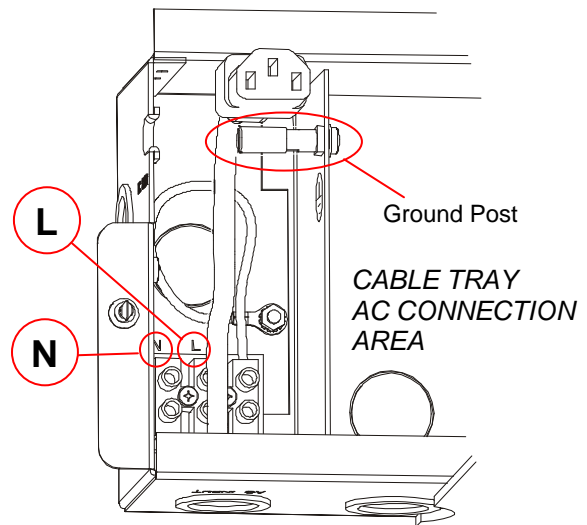
Hardwired Cable



CAUTION: Use only copper wire.

Referring to the figure below:

1. Remove one of the three knockouts accessing the ac connection area in the cable tray. Thread a cable clamp into the hole.
2. Route the ac cable through a cable clamp, leaving about 15.2cm (6in) out the other side. Tighten the clamp around the cable.
3. Expose about 5cm (2in) of insulated wires: hot, common, and ground.
4. Using a screwdriver, connect ac wires to the two-pin connector: white wire to N (neutral); black wire to L (line). Connect the green wire to the ground post on the cable tray.
5. Plug the short power cord into the IEC320 receptacle in the controller housing.
6. Return to the installation procedure.

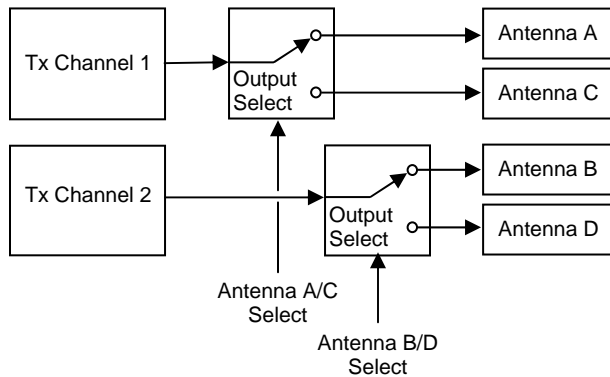


System Setup

The AMS-9040 controller requires field personnel to setup the controller for the environment. For a successful installation, follow the two rules below:

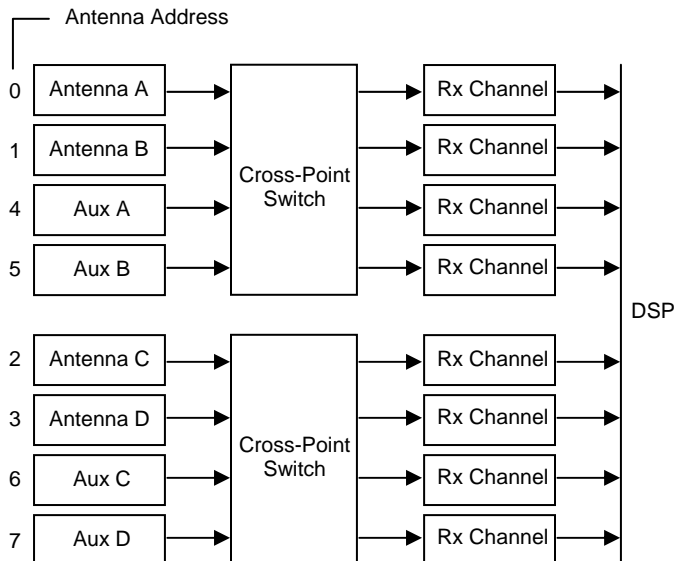
Rule 1: Each channel transmits through one Tx/Rx antenna at a time. As shown below, if two Tx/Rx antennas must transmit simultaneously, they can do so when connected to channels A and B, A and D, C and B, or C and D.

Transmitter Multiplexing



Rule 2: As shown below, each input on the controller has an address associated with it; Ant. A has address 0; Ant. B has address 1, and so on up to address 7. For the controller to operate properly, each intelligent Tx/Rx antenna must be set to match the address of the input it is plugged in to.

Receiver Multiplexing



PROCEDURE

1. Ensure the controller is off.
2. Connect antenna Tx/Rx cables to the controller according to how the antennas are intended to perform. If the antenna is intelligent, set the rotary switch on its cap board to match the address on the controller for the Rx input. See examples below for how to connect antennas for typical installations.

- Two doorways each have a pair of intelligent Tx/Rx antennas and each pair is to transmit simultaneously.

Doorway 1

Connector on Controller	Address
Tx/Rx A	0
Tx/Rx B	1

Doorway 2

Connector on Controller	Address
Tx/Rx C	2
Tx/Rx D	3

- Two doorways each have three intelligent Tx/Rx antennas. The center antenna is to transmit and receive and the outboard pedestals are to receive only (split system).

Doorway 1

Connector on Controller	Address
Rx Aux A	4
Tx/Rx A	0
Rx Aux B	5

Doorway 2

Connector on Controller	Address
Rx Aux C	6
Tx/Rx B	1
Rx Aux D	7

- Two intelligent Tx/Rx antennas at the sides of a doorway with two Floor-Max antennas between them (combo system).

Antenna Type	Connector on Controller	Address
Tx/Rx	Tx/Rx A	0
Floor-Max	Tx/Rx B	1
Floor-Max	Tx/Rx C	2
Tx/Rx	Tx/Rx D	3

- One doorway has two intelligent antennas; one transmits, the other receives.

Connector on Controller	Address
Tx/Rx A	0
Rx Aux A	4

3. Connect the communication cable from each intelligent Tx/Rx antenna to the communication connector associated with that antenna.

4. Turn on the laptop computer and bring up the AMS-9040 service configurator.

Note: For an explanation of settings and how to use the configurator, click the *Help* button on the configurator.

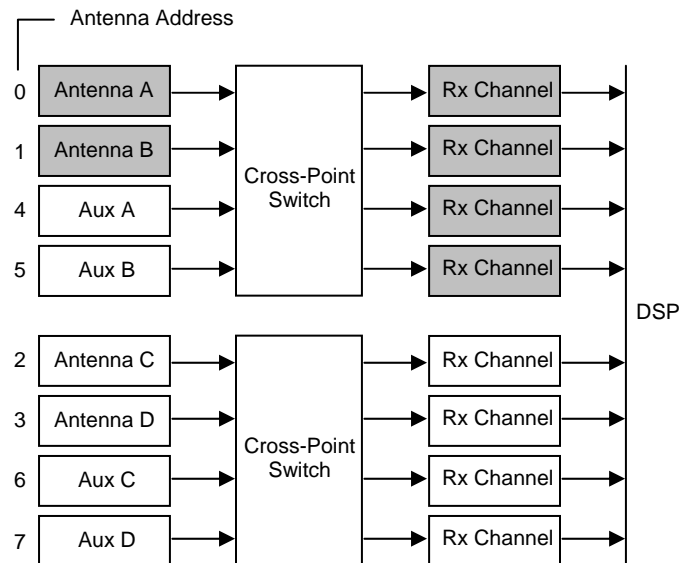
IMPORTANT! Ensure the controller is off. Never restart or boot up a computer connected to an active controller. Doing so disables the mouse function on the computer.

5. Turn on the controller and connect the laptop computer to the service port.
6. Using the “Setup” page on the configurator:
 - a. Check that the antenna inventory matches antennas physically installed. If not, check antenna connections to the controller and their associated address settings.
 - b. Choose “Auto Detection” and/or “European System”. “Auto Detection” enables the controller to setup a default zone mapping window whenever the controller is turned on. This function turns off whenever a change is made to zone mapping to prevent resetting the controller to defaults when power is cycled. “European System” sets parameters to meet European emissions standards.
 - c. Click on the “Zone Mapping” button to bring up the “Zone Mapping” window on the service configurator. Then assign antennas, alarms, and relays to doorways and zones.
 - d. Setup parameters for lamps, audio, relays, remote alarms and beacon lamps.
7. Using the “Tx Configuration” page, set Tx current for each transmitter and enable/disable transmitters, if necessary.
8. Pass an active security tag by each antenna to verify antenna performance. Refer to *Help* if monitoring or adjustments are necessary.

Redistributing the Load

The AMS-9040 system typically handles receiver multiplexing by assigning each antenna connected to the controller to a receiver channel. There are eight receive channels for up to eight antennas.

However, when the Coils 1-2 (separate coils) or Nulling option is selected, each antenna now requires two receive channels. If for example, a two pedestal system connected on channels A and B requires four receive channels, then no additional receive coils (such as noise coils) are available for Aux A and Aux B.



A way around this is to redistribute the load. This is done by connecting the channel B antenna to channel C instead. This way inputs for auxiliary coils remain available.

Special Rules for Floor Antennas

Floor-Max Antennas

Follow these five rules for Floor-Max antennas:

Rule 1: In Europe, two Floor-Max antennas must transmit simultaneously. When on the configurator, “European System” is selected on the “Setup” page, simultaneous operation is automatically selected.

Rule 2: When two Floor-Max antennas are used in a single doorway, both cap boards must share a single box, and a single key switch must control both antennas. The switch must connect to the lowest letter antenna. For example, two Floor-Max antennas (A and C) are in the same doorway. Connect the switch to A.

Rule 3: When three Floor-Max antennas are used in a single doorway, cap boards for antennas A and B must share a single box, and a single key switch must control both antennas. The switch must connect to the lowest letter antenna. For example, for Floor-Max antennas (A and B), connect the key switch to A. The cap board for antenna C will be in a box by itself with its own switch.

Rule 4: When four Floor-Max antennas are used in a single doorway, cap boards for antennas A and B must share a single box, and cap boards for antennas C and D must share a single box. Two key switches, one per box, are used with each switch connected to the lowest letter antenna. Switch 1 controls antennas A and B and must connect to antenna A. Switch 2 controls antennas C and D and must connect to antenna C.

AMS-3030 and AMS-3031 Floor Antennas

Follow these rules for AMS-3030 and AMS-3031 Floor antennas that have a key switch installed:

Rule 1: When two Floor antennas are used in a single doorway, both cap boards must share a single box, and a single key switch must control both antennas. The switch must connect to the lowest letter antenna. For example, two Floor antennas (A and C) are in the same doorway. Connect the switch to A.

Rule 2: When three Floor antennas are used in a single doorway, cap boards for antennas A and B must share a single box, and a single key switch must control both antennas. The switch must connect to the lowest letter antenna. For example, for Floor antennas (A and B), connect the key switch to A. The cap board for antenna C will be in a box by itself with its own switch.

Rule 3: When four Floor antennas are used in a single doorway, cap boards for antennas A and B must share a single box, and cap boards for antennas C and D must share a single box. Two key switches, one per box, are used with each switch connected to the lowest letter antenna. Switch 1 controls antennas A and B and must connect to antenna A. Switch 2 controls antennas C and D and must connect to antenna C.

Troubleshooting

System Status Alert Codes

The Status LED on the controller displays system status alert codes (also called error codes). When an alert code occurs, the LED changes color and pattern. Red is used for serious alerts while yellow is used for those less serious.

- The number of yellow or red flashes identifies a digit in a two-digit alert code (for example, four flashes is the number four). The start of an alert code is indicated by a long LED interval. Then the first digit of a two-digit error code occurs, followed by a short delay, followed by the second digit.
- See the table opposite for the significance of the alert code. Most alert codes are automatically resolved.
- Some codes can only be accessed using the service configurator. They are not displayed by the Status LED.
- Except for fatal errors, alert codes are lost when the controller is reset. Code storage has a time stamp in days, hours, minutes, seconds, and milliseconds of when the system alert occurred.

The following critical faults are backed with hardware support and provide the necessary action when encountered.

- Current fault 1 per channel
- Fan fault
- Ambient temperature fault
- Primary current fault
- Secondary current fault
- Last resort current fault to maintain Class 2 wiring requirements.

Alert codes repeat until the condition is resolved or a timer resets the system.

Alert Codes

Alert Code	Significance	
11	Illegal Instruction	Return controller
12	Unimplemented Interrupt	Return controller
13	NVM Write Failed	Return controller
14	Invalid Device	Return controller
15	Sequence Table Error	Return controller
16	Out of Memory	Return controller
17	Undecided: No Split	Return controller
18	Watchdog: Task Reset	Return controller
21	Ant A Software Current Fault	Recoverable
22	Ant B Software Current Fault	Recoverable
23	Ant C Software Current Fault	Recoverable
24	Ant D Software Current Fault	Recoverable
25	Hardware Current Fault	Recoverable
26	Ant A Current Sense Fault	Recoverable
27	Ant B Current Sense Fault	Recoverable
28	Ant C Current Sense Fault	Recoverable
29	Ant D Current Sense Fault	Recoverable
31	Tuning Antenna A	Recoverable
32	Tuning Antenna B	Recoverable
33	Tuning Antenna C	Recoverable
34	Tuning Antenna D	Recoverable
35	Sequence table Mismatch	Recoverable
42	Wired Sync: Missing Signal	Recoverable
43	Temperature Fault	Recoverable
44	Software Temperature Fault	Recoverable
45	PWM Fault	Return controller
46	Fan Fault	Recoverable
49	Real time Error	Return controller
51	Auto Setup Owner Timeout	Recoverable
52	Auto Setup Release w/o Lock	Recoverable
54	Auto Setup Mailbox Full	Recoverable
58	Auto Setup Illegal Owner	Recoverable
61	Detector Overrun	Recoverable
62	Alarm Mailbox Full	Recoverable
63	Host Comm Mailbox Full	Recoverable
64	Sequence Mailbox Full	Recoverable
71	No Reference	Recoverable
77	NVM Checksum	Recoverable
78	NVM Set Defaults	Recoverable
79	NVM Rev. Change	Recoverable

Controller-Assisted Tuning cannot be Performed

If controller-assisted tuning cannot be performed, a message indicating the cause is posted on the service configurator. Instances the software recognizes are:

- Tx set to off in the service configurator
- Tx inhibit active
- Auto line delay not ready
- Key switch turned to off (locked).

Another possible cause of controller-assisted tuning failures is a mismatch between the address switch on the antenna cap board and the antenna connector on the AMS-9040 (for example, setting the address switch on the antenna cap board to 3 when the antenna Tx/Rx cable is connected to the first connector). Controller-assisted tuning will not work but no error message will be displayed.

Once the CE has turned the transmitter on, controller-assisted tuning can be performed.

Local Diagnostics

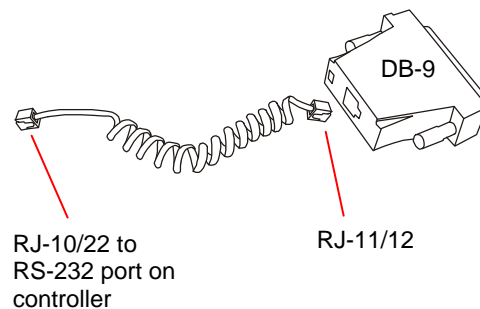
You can troubleshoot and change controller parameters using your laptop computer and AMS-9040 service configurator software.

The following hardware is required:

- Service cable with a male RJ-10/22 phone connector on one end and a male RJ-11/12 connector on the other
- DB-9-to-RJ-11/12 connector.

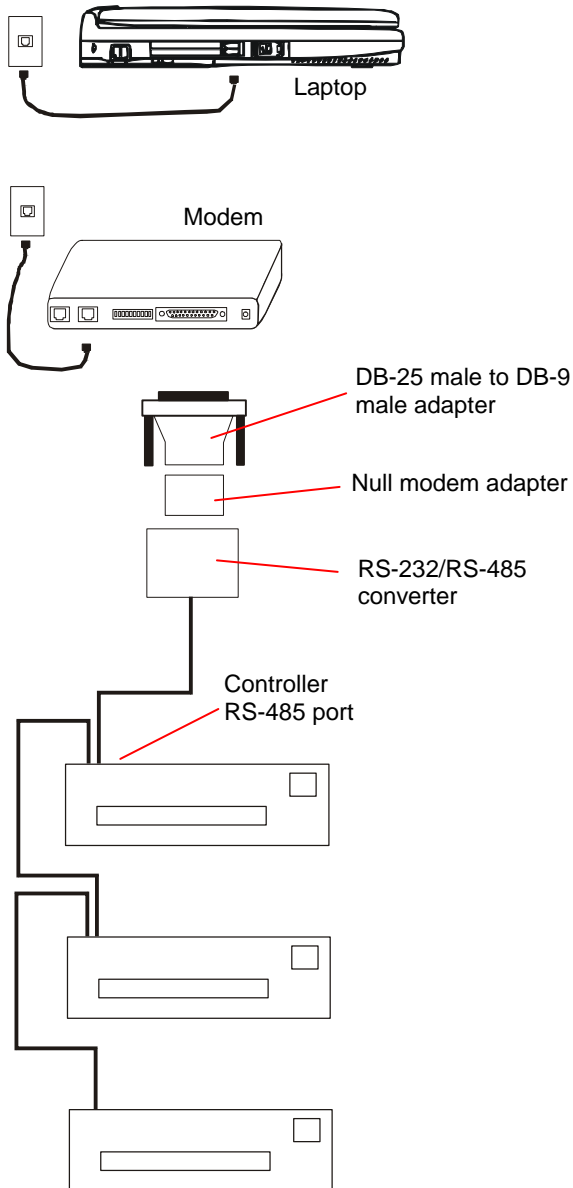
How to Connect Cables

1. Connect the DB-9-to-RJ-11/12 connector to the DB-9 serial port on your laptop computer. Only pins 2, 3, and 5 are used.
2. Connect the RJ-11/12 connector of the service cable to the DB-9 connector and the RJ-10/22 connector on its other end to the RS-232 service port (RJ-10/22) on the controller.



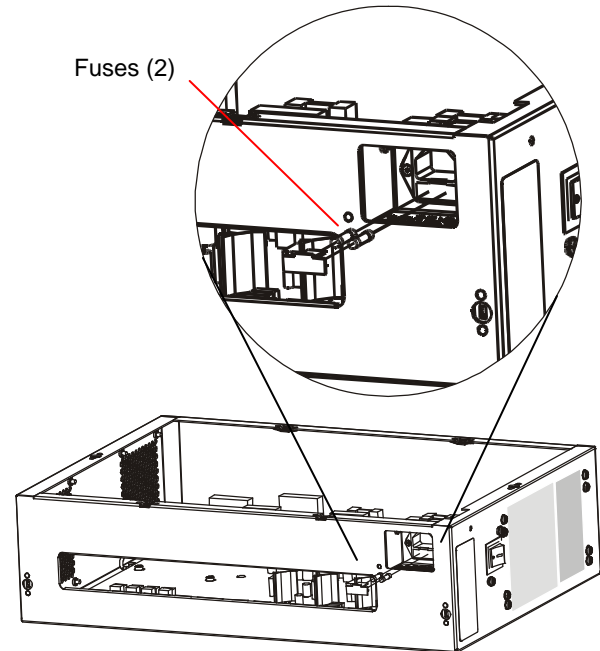
Remote Diagnostics

The AMS-9040 controller enables you to use an RS-485 network to troubleshoot and adjust the controller from a remote site. To connect to the network, connect the laptop, modem and accessories as shown below.



Fuse Replacement

The controller contains two 5A, 250V, slow-blow fuses. To replace the fuse(s) in the controller, do the following:



1. Detach the controller from the cable tray. Two screws secure the tray, one on each side.
2. On the controller, pry the rectangular cover plate from the IEC320 receptacle using a small slotted screwdriver. Two spring-loaded fuses should pop out.
3. Replace the blown fuse (or fuses) with 5A, 250V slow-blow fuses (P/N 5111-0028-11).
4. Re-attach the cover plate to the receptacle.
5. Re-attach the controller to the cable tray using the two screws previously removed.

Specifications

Electrical

Power Supply

Primary input100-120Vac or
200-240Vac @ 50–60Hz

Primary power fuse5A, 250V, slo-blow,
hi-breaking

Current draw4.0Arms @ 120Vac

Input power<400W

Transmitter

Operating frequency58kHz (±200Hz)
(ZE9040)
68kHz (±200Hz)
(ZE9040-68K)

Transmit burst duration1.6ms

Transmit current maximum16A peak

Burst Repetition Rate:

Based on 50Hz ac75Hz or 37.5Hz

Based on 60Hz ac90Hz or 45Hz

Receiver

Center frequency58kHz (ZE9040)
68kHz (ZE9040-68K)

Receive coil resistance1.6 ohms (±5%)

Alarm

Alarm relay output.....DPDT contacts

Contact switching current1.0A max.

Contact switching voltage28V max.

Lamp/Audio duration.....1–30 sec.
(1 sec. increments)

Environmental

Ambient temperature..... 0°C to 50°C
(32°F to 122°F)

Relative humidity..... 0 to 90%
non-condensing

Mechanical

Length 50.8cm (20in)

Width with bracket..... 43.4cm (17.1in)

Width without bracket..... 32.2cm (14.3in)

Height..... 15cm (5.9in)

Weight..... 7.3kg (16.1lbs.)

Declarations

Regulatory Compliance



Regulatory ID List

Product Name	Regulatory ID
AMS-9040 controller	AMS-9040
Remote alarm	EC76x
Message unit	MC76x
AMS-3000	AMS-3000 CB
AMS-3003	AMS-3003 CB
Digital EuroPro-Max	AMS-1030
Digital Pro-Max	UM ADS-PMP
Digital Floor-Max	AMS-2001
Digital Door-Max	UM ADS-DMP
Ranger antenna	UM UPFAF
Sky•Max® antenna	UM SKYMAX
Satellite antenna	UM POST-M
AMS-3004	AMS-3004
AMS-3010	AMS-3010
AMS-3030/3031	AMS-3030 AMS-3031 AMS-3031T UM ADS-FMCB
Auxiliary Floor Loop	ZSLOOP-AUX

EMC.....	47 CFR, Part 15 EN 300330-1 EN 300330-2 EN 301489-3 EN 301489-1 RSS210
Safety	UL 60950-1 CSA C22.2.60950-1 EN 60950-1

FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area. This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

EQUIPMENT MODIFICATION CAUTION: Equipment changes or modifications not expressly approved by Sensormatic Electronics Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

Other Declarations

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RWH 03/2008

Appendix A: Auto Synchronization

Auto synchronization occurs during power up or system reset. Auto sync can have four different outcomes depending on whether nearby EAS transmitters are detected, they are properly aligned to the ac-derived timing of the controller, or too much ambient noise exists.

No transmitters detected. During initialization, the controller determines if EAS transmitters are nearby. If none are found, transmitter delay is set to zero if this is the initial power on, or set to the value stored in the controller if this is not the initial power on. The service configurator displays "No Signal" and normal operation proceeds.

Transmitters detected:

- *Transmitters detected and aligned.* During initialization, the controller determines if EAS transmitters are nearby. If transmitters are found, and are correctly aligned, the transmitter delay is calculated and stored in the controller for reference. The service configurator displays "Locked" and normal operation proceeds.
- *Transmitters detected and not aligned.* During initialization, the controller determines if EAS transmitters are nearby. If transmitters are found, but are not aligned, the transmitter delay is set to zero if this is the first power on of the controller, or set according to the value stored the controller and the service configurator displays "Too Many Signals". The controller operates normally; however, the status LED on the controller flashes yellow to indicate system performance might be downgraded.

Too much ambient noise. During initialization, the controller determines if EAS transmitters are nearby. If ambient noise prevents the location other transmitters and if this is the first power on of the controller, the transmitter delay is set to zero. If this is not the first power on of the controller, the zero crossing delay stored in the controller is used and the service configurator displays "Too Much Noise". The controller operates normally; however, the status LED on the controller flashes yellow to indicate system performance might be downgraded.

Note: The controller stores the zero crossing delay for the instance when, during subsequent power cycles, the controller could not determine a reliable lock. Instead of using zero for the delay, the controller uses the stored zero crossing delay.

Sync Link Detection. If a Sync Link device is connected to the Sync link port, the controller switches over to using the Sync Link signal as the timing reference. The service configurator indicates that the Sync Link is active.