



Model Railroad Accessory Module (AM-2S)

User Manual

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Revision 1.00

Introduction









Thank you for purchasing this Ring Engineering product. We take pride in the products that we produce and hope you find this product to be a great addition to your model railroad layout.

Please read all warnings and instructions before installation and use. For the latest information including the latest revision of this manual please visit our Internet site at www.RingEngineering.com.

The AM-2S is an Accessory Module that you can add to your model railroad layout to control accessories like Turntables, Swing Bridges, Oil Pumps, Control lights in buildings / houses etc. You can add sounds and actions to things like farms and passenger stations and much more! You can use the AM-2S to control motors, lights, and play sounds by using a RailPro controller such as the HC-3 handheld controller with color touch screen. You can use the Ring Engineering RailPro Assistant Software to load projects Ring Engineering provides or even build custom projects for your AM-2S! You can add your own picture and include custom logic to add some intelligence to your projects too!

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Warnings

-  **WARNING:** This product is not recommended for persons under fourteen (14) years of age.
-  **WARNING:** Only power with a Ring Engineering PWR-56 Power Supply. A power supply with excessive voltage or improper voltage can cause a fire.
-  **WARNING:** Connecting improper electrical devices to the AM-2S (such as devices with a low voltage, current, or power rating) may cause a fire. The output for motors is high frequency pulse width modulation to control speed.
-  **WARNING:** Some motors can overheat and may become a fire hazard. Be sure the motor you connect to the module is safe for pulse width modulation speed control.
-  **WARNING:** Temperature: Operating 32F to 80F, Storage 0F - 110F
-  **WARNING:** There are no user serviceable parts inside. Return to Ring Engineering for repair.
-  **WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
-  **WARNING:** Operate and store in dry environment only. Relative Humidity: Operating 20% to 90% non-condensing, Storage 10% to 95% non-condensing



Direct Radio

This product is equipped with Direct Radio+NET. Direct Radio+NET is a custom designed RF transceiver to allow this product to have high-speed, two-way networking communication that is very easy to setup and use.

Installation

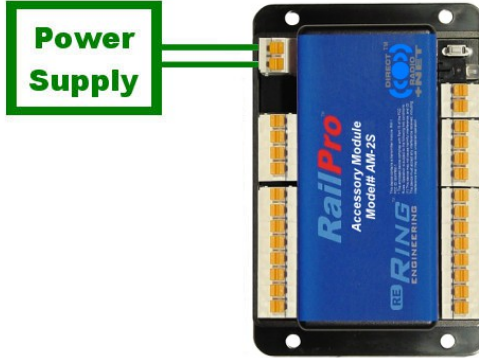
Step 1 – Mount your AM-2S

Position the AM-2S near the products that you plan to wire to the AM-2S under your layout. Use at least 2 screws and mount the AM-2S. If only using two screws, be sure the screws are located in opposite corners. The red arrows in figure 1 below identify mounting holes.



Step 2 – Connect the Power

Be sure the power supply you are going to connect to the AM-2S is turned off. Then connect power supply to the “Power In” terminals labeled ‘P1’ and ‘P2’ with 16-gauge wire.



Only power with a RailPro PWR-56 Power Supply. A power supply with excessive voltage or improper voltage can cause a fire or cause other operational problems.

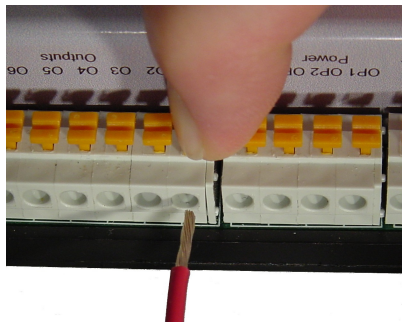
NOTE: The AM-2S is not polarity sensitive. You can connect either power supply wire to the ‘P1’ or ‘P2’ connectors.

The AM-2S is equipped with spring-loaded terminals for fast and secure connections that do not require a tool. To connect a wire to the terminals, first strip 3/8 of an inch (about 2/3 the length of the terminal block) of insulation off the wire. Then press the orange push button over the contact that you want to connect a wire to. Insert the wire into the round hole under the orange push button. Be sure the wire goes all the way to the back of the terminal block while holding down on the orange push button. When you feel the wire touch the back of the terminal block, release the orange button to secure the wire into the terminal block. Give the wire a tug to be sure it is securely connected.

Wire Gauge

Minimum #30

Maximum #16



Step 3 – “Find Product” on your Controlling Device

Power up the AM-2S and press the “Find Product” button on your controlling device such as the HC-3 handheld controller. If you look in the Accessories Page you will see a new picture of a AM-2S.



Step 4 – Load a Project File to the AM-2S

Use the RailPro Assistant Software to either load an existing project (like a Turntable project) or create a new custom project for the AM-2S. Follow the directions in the RailPro Assistant Software User Manual to create and load a project to the AM-2S.

IMPORTANT: You can load a project file created for AM-1S. AM-1S and AM-2S have the same Input and Output configuration.

Step 5 – Connect the Electronics to be controlled



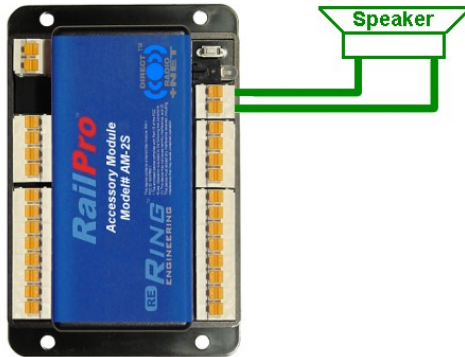
Be sure the power is turned off before connecting or disconnecting any wires.

After the electronics are connected and a project file is loaded your AM-2S is ready to use!

AM-2S Wiring

Below is wiring information for Inputs and Outputs. Please keep in mind that the AM-2S number of inputs, light outputs, number motors that can be controlled is dictated by the IO configuration you choose when you create the Custom Accessory Project File in the RailPro Assistant Software. Even though the AM-2S has eight outputs that can power motors, there needs to be an IO configuration available that supports that output configuration. For example, one RailPro Assistant software configuration configures the AM-2S eight outputs O1-O8 for two motor outputs, and four light outputs. With this configuration you can only power two motors (not four). But you get to power two motors with O1-O4 and the other four outputs are used for lights (O5-O8). So please see the RailPro Assistant Software for what IO configurations currently exist.

Wire a Speaker



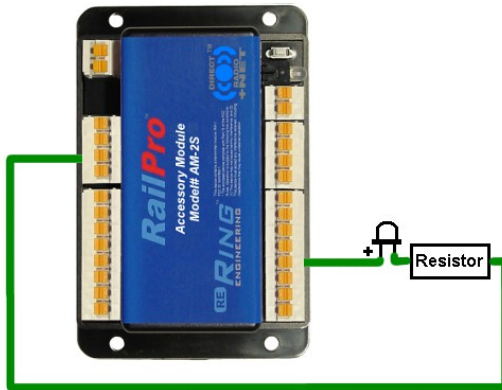
Switch	Terminals
Speaker 1	S1
Speaker 2	S2

IMPORTANT: Speaker can be from 4 to 16 ohms. AM-2S can drive up to 7 Watts of power into a 8 ohm speaker. The AM-2S will drive up to 13 Watts of power into a 4 ohm speaker.

TIP: You can parallel two 8 ohm speakers to provide a 4 ohm load to the AM-2S.

TIP: AM-2S can easily power most book shelf and even full size stereo speakers for thunderous sound!

Wire LEDs



(Only 'Light 5' connection shown)

You can connect up to 8 lights to the sourcing outputs on the AM-2S.
Connection terminals for all lights to the sourcing outputs.

Switch	Terminals
Light 1	O1
Light 2	O2
Light 3	O3
Light 4	O4
Light 5	O5
Light 6	O6
Light 7	O7
Light 8	O8



Using LED's without resistors can damage the LED's! Use 1k Ohm 1/4 W for 15mA or 750 Ohm 1/2W for 20mA.



If you use the wrong resistor, it is possible to generate enough heat to ignite flammable material, and cause a fire.

IMPORTANT: The sourcing outputs of the AM-2S (O1 - O8) output 14 volts and the return must be wired to the C1 (common) connection.

IMPORTANT: The maximum allowed current for outputs O1 - O8 is 400mA per point continuous and 400mA continuous for all points combined. Some acceptable examples would include: 1) Two 200mA loads run at the same time or 2) Four 400mA loads but only one run at a time.

IMPORTANT: Since O1 - O8 are sourcing outputs, the positive side of the LED must be connected toward the output terminal and not toward the common terminal. If a LED is wired backward it will not light up.

Wire Light Bulbs



(Only 'Light 5' connection shown)

You can connect up to 8 lights to the sourcing outputs on the AM-2S. Connection terminals for all lights to the sourcing outputs are displayed below.

Switch	Terminals
Light 1	O1
Light 2	O2
Light 3	O3
Light 4	O4
Light 5	O5
Light 6	O6
Light 7	O7
Light 8	O8



Be sure any light connected to a AM-2S can withstand 14 volts.

IMPORTANT: The sourcing outputs of the AM-2S (O1 - O8) output 14 volts and the return must be wired to the C1 (common) connection.

IMPORTANT: The maximum allowed current for outputs O1-O8 is 400mA per point continuous and 400mA continuous for all points combined. Some acceptable examples would include: 1) Two 200mA loads run at the same time or 2) Four 400mA loads but only one run at a time.

Wire Motors



(Only 'Motor 1' connection shown)

You can connect up to 4 motors to the AM-2S.
Connection terminals for all motors are displayed below.

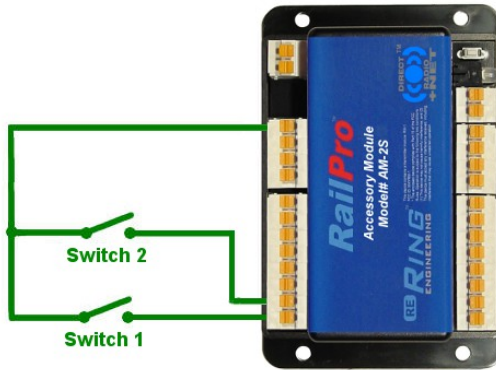
Switch	Terminals	
Motor 1	O1	O2
Motor 2	O3	O4
Motor 3	O5	O6
Motor 4	O7	O8



Be sure any motor connected to a AM-2S can withstand 14 volts and will not over heat while being speed controlled with high frequency pulse width modulation.

IMPORTANT: The motor should have stall currents of 1 Amp or less. The maximum allowed current for outputs O1-O8 is 400mA per point continuous and 400mA continuous for all points combined. Some acceptable examples would include: 1) Two 200mA motors run at the same time or 2) Four 400mA motors but only one run at a time.

Wire Inputs



(Only 'Input 1' and 'Input 2' connections are shown).

You can connect up to 8 Inputs to the AM-2S.
See below for the proper terminals to connect the 8 Inputs to.

Switch	Terminals
Input 1	IO1
Input 2	IO2
Input 3	IO3
Input 4	IO4
Input 5	IO5
Input 6	IO6
Input 7	IO7
Input 8	IO8

IMPORTANT: When one of the Reference Signals (R1 or R2) is connected to the input, the input will be read as ON in the Project Program.

The input switches can be push buttons, toggle switches, reed switches, proximity switches etc.

Adjustments

Name

The reason to give your AM-2S a name is so you can tell it apart from another AM-2S. If you had two or more AM-2S's and did not name them, it would be difficult to tell which one you are going to control when you touch the picture of a AM-2S on your controlling device. You can give the AM-2S any name that you would like.

Password

You can set a password in your AM-2S. When shipped from the factory, your AM-2S's password is blank. When the password is blank, any RailPro controlling device can detect and control your AM-2S. Since RailPro uses Direct Radio, it is possible to detect and control your AM-2S from over 100 ft away. In other words, it is possible for your neighbor to control your AM-2S. However, if you put a password into your AM-2S, then your neighbor will not be able to detect or control your AM-2S.

TIP: It is ok to give each RailPro accessory module the same password.

Sound Volume

Press the Sound Volume Control and turn the knob on the controlling device such as the HC-3 to increase or decrease the volume.

TIP: The Volume control is real time! You can start the sounds playing then as you turn the volume control you will hear the volume level change!

Status Indicator Light

The indicator light will be green when the AM-2S is powered up and ready to be controlled. The indicator light is yellow while it is powering up. You will need to wait for the indicator light to turn green before using the AM-2S. The indicator light will turn red if the AM-2S has faulted.

TIP: If the status indicator light is red, go to the control page, then touch the warning triangle to take you to the information page. On the information page you will see text that describes the fault. Touch the fault text and you will see a list of possible causes and corrective action to fix the fault.

Reset Switch

The Reset Switch will cause the AM-2S to reset. The reset switch should not be used for normal operation. The reset switch can be used in place of cycling power to reset an unknown password. When a controlling device asks you to cycle the power on the product to reset the password, you can simply press the reset switch instead of disconnecting the power wires.

Terminal Connections

Terminal	Description
P1-P2	Power Inputs
S1 - S2	Speaker Connections
V1	+5 Volts power supply
C1	Common
R1 – R2	Reference Signal for use with inputs IO1 – IO8
IO1 – IO8	Programmable Input or Output Pins (Sinking Outputs - connects to common)
O1 – O8	Output Pins. (Sourcing outputs - Provides +14 Volts power)
OP1 – OP4	+ Voltage Source (Connected to Power Supply Voltage)

Warranty

Limited One Year Warranty

Ring Engineering, Inc. (Ring Engineering) warrants that for a period of one year from the date of purchase, this product will be free from defects in material and workmanship. Ring Engineering, at its option, will repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with new or remanufactured product or component. If the product is no longer available, replacement may be made with a similar product of equal or greater value. This is your exclusive warranty.

This warranty is valid for the original retail purchaser from the date of initial retail purchase and is not transferable. Ring Engineering dealers, distributors, or retail stores selling Ring Engineering products do not have the right to alter, modify, or any way change the terms and conditions of this warranty.

The warranty does not cover normal wear of parts or damage resulting from negligent misuse of the product. Further, the warranty does not cover Acts of God, such as fire, flood, hurricanes, and tornadoes.

Ring Engineering shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty or condition. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty. Ring Engineering disclaims all other warranties or conditions, express or implied statutory or otherwise. Some states or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

This warranty is void if there was an attempt to repair the product, or the product was repaired by non-authorized Ring Engineering personnel.

To obtain warranty service contact Ring Engineering at:
Email: info@ringengineering.com
or Phone (219) 322-0279
to get a return authorization and return instructions.

If your Ring Engineering product is not covered by warranty, or has been damaged, an estimate of repair costs or replacement costs will be provided to you for approval prior to servicing or replacement.

FCC Statement

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

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