



Model Railroad Accessory Module (AM-1b)

User Manual

Ring Engineering Inc.
(219) 322-0279
www.RingEngineering.com

Revision 2.01

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-1 is an Accessory Module that you can add to your model railroad layout to control turnouts (Switch Tracks) and other products by using a RailPro controller such as the HC-1 handheld controller with color touchscreen.

Introduction.....	2
Warnings.....	3
Direct Radio.....	3
Installation.....	3
Passwords.....	9
Adjustments.....	9
Advanced Adjustments.....	10
Feedback Wiring.....	10
Status Indicator Light.....	11
Reset Switch.....	11
Terminal Connections.....	11
Warranty	12
FCC Statement	12

Notification: Ring Engineering believes that our AM-1 module is compatible with most HO Scale turnouts. However, it is not practical for Ring Engineering to test our module with all available turnouts. Further, we cannot control the manufacturing or specification changes from other manufacturers. It is your responsibility to determine if our module is suitable for your application. Ring Engineering is not responsible for any damage that may occur to your equipment from using our AM-1 module.

Warnings

-  **WARNING:** This product is not recommended for persons under fourteen (14) years of age.
-  **WARNING:** Only connect a Ring Engineering approved power supply to the proper power input connections. Maximum voltage is 16 Volts DC. A power supply with excessive voltage or improper voltage can cause a fire. You can use the output of a DCC booster if it has 3 amps or more of current capability and the DCC system only consists of the signal specified in NMRA standards.
-  **WARNING:** Only connect products that can handle the voltage of the power supply that is connected. Connecting products that are not rated for at least the voltage of the connected power supply may cause a fire.
-  **WARNING:** Improperly connected products may cause a fire.
-  **WARNING:** Never connect AC power supplies to the AM-1.
-  **WARNING:** The output for motors is high frequency pulse width modulation to control speed. Some motors can overheat and may become a fire hazard. Be sure any motor you connect to the module is safe for pulse width modulation speed control.
-  **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:** Temperature: Operating 32F to 80F, Storage 0F - 110F
-  **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. Direct Radio is a custom designed RF transceiver to allow this product to have high-speed, two-way communication that is very easy to setup and use.

Installation

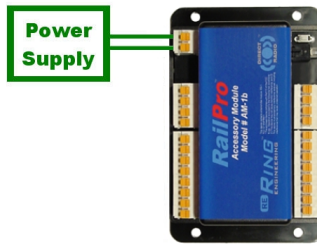
Step 1 – Mount your AM-1

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



Step 2 – Connect the Power

Be sure the power supply you are going to connect to the AM-1 is turned off. Then connect power supply to the “Power In” terminals labeled ‘P1’ and ‘P2’ with 16-gauge wire.



Only connect a Ring Engineering approved power supply to the proper power input connections such as the PWR-56. Maximum voltage is 16 Volts DC. A power supply with excessive voltage or improper voltage can cause a fire.

Never connect an AC power supply to the AM-1.

You can use the output of a DCC booster if it has 3 amps or more of current capability and the DCC system only consists of the signal specified in NMRA standards.

NOTE: The AM-1 is not polarity sensitive. You can connect either power supply wire to the ‘P1’ or ‘P2’ connectors.

The AM-1 is equipped with spring-loaded terminals for fast and secure connections that do not require a tool. To connect a wire to the AM-1 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

IMPORTANT: Be sure to save the settings after you select the proper type of switch.

Step 5 – Connect the Switches



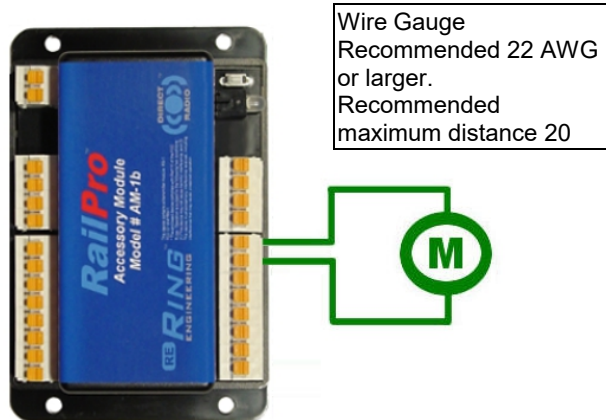
Be sure the power is turned off before connecting any wires to the AM-1.

There are three sections below showing how to connect three different types of switches: Type 1 Motor Operated (slow motion switches) Type 2 Snap 3-Wire, and Type 3 Snap 2 wire. Only one type of switch can be wired to an AM-1. See the section below for the type of switches you will be connecting.

NOTE: Ring Engineering highly recommends using motor operated switches instead of snap type switches. Snap type switches can take 100 times the power needed to operate a switch compared to a motor operated switch.

Switch Type 1- Connect Motor Operated (slow motion switches)

Connect Motor operated switches as shown in figure 9.



(Only 'Switch 1' connections are shown)

You can connect up to 4 motor operated switches to the AM-1. See table 1 below for the proper terminals to connect the 4 switches to.

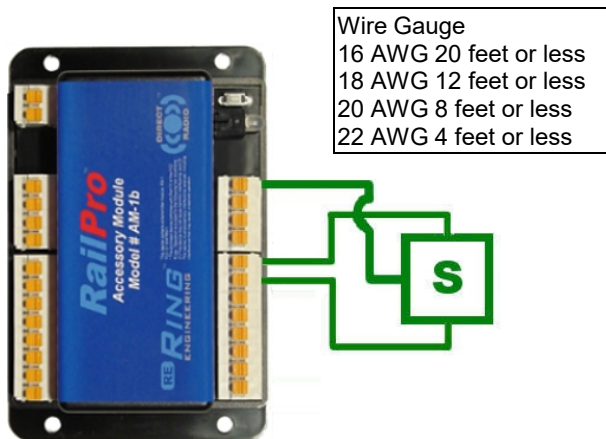
Switch	Terminals	
Switch 1	O1	O2
Switch 2	O3	O4
Switch 3	O5	O6
Switch 4	O7	O8

Table 1

NOTE: If the switch is displayed in the turn position on the screen and the switch being controlled is in the straight position (operating backward) then reverse the wiring on that switch to correct the problem. For example if Switch 2 is operating backward, change wire from O3 to O4 position and wire from O4 to O3 position.

Switch Type 2 - Connect 3-Wire Snap Switches

Connect 3-wire snap switches as shown in figure 10.



(Only 'Switch 1' connections are shown)

You can connect up to four 3-wire snap switches to the AM-1. See table 2 below for the proper terminals to connect the 4 switches.

Switch	Terminals		
Switch 1	OP1	O1	O2
Switch 2	OP2	O3	O4
Switch 3	OP3	O5	O6
Switch 4	OP4	O7	O8

Table 2



Be sure the coil center tap wire is connected to the terminals labeled OP1 – OP4. Be sure the two non-center tap wires are connected to the terminals labeled O1 – O8. Only Outputs O1 – O8 have redundant power cutout to be sure sustained voltage is not applied to snap switches.



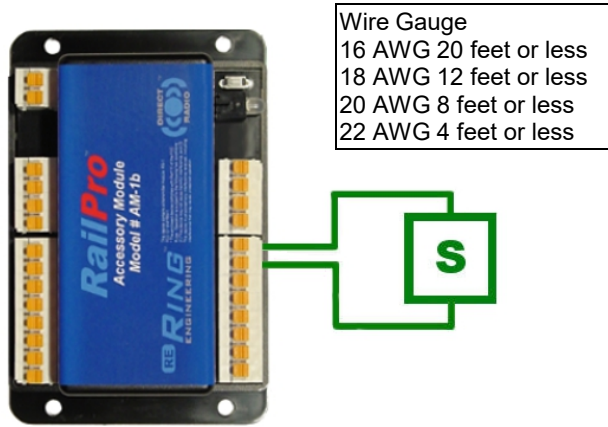
Snap switch resistance measured from the center wire to either other wire must be between 3.6 and 20 Ohms. Never use a switch with more than 20 ohms unless it can have power applied continuously without damage.

NOTE: If the switch is displayed in the turn position on the screen and the switch being controlled is in the straight position (operating backward) then reverse the wiring on that switch to correct the problem. For example if Switch 2 is operating backward, change wire from O3 to O4 position and wire from O4 to O3 position.

TIP: If you are not sure which wire is the center wire you can contact the switch manufacturer and ask them. Or you can use an electrical multimeter to find out. The two wires that read the highest resistances are not the center tap wire. A resistance measurement from the center tap to either of the two end wires should measure about half of the resistance as the resistance from one end wire to the other.

Switch Type 3 - Connect 2-Wire Snap Switches

Connect 2-wire snap switches as shown in figure 11.



(Only 'Switch 1' connections are shown)

You can connect up to four 2 wire snap switches to the AM-1. See table 3 below for the proper terminals to connect the 4 switches to.

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

Table 3



Be sure the wires are connected to the terminals labeled O1 – O8. Only Outputs O1 – O8 have redundant power cutout to be sure sustained voltage is not applied to snap switches.



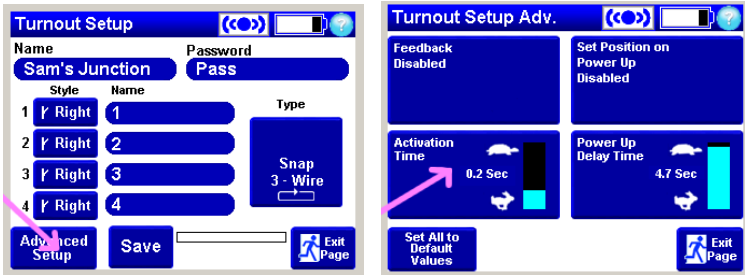
Snap switch resistance must be between 3.6 and 20 Ohms. Never use a switch with more than 20 ohms unless it can have power applied continuously without damage.

NOTE: If the switch is displayed in the turn position on the screen and the switch being controlled is in the straight position (operating backward) then reverse the wiring on that switch to correct the problem. For example if Switch 2 is operating backward, change wire from O3 to O4 position and wire from O4 to O3 position.

Step 6 – Adjust AM-1 for best operation

The Activation Time adjustment sets the time the AM-1 will send power to the turnout to get the turnout to change positions. It is important that you adjust the Activation Time to only power the turnout just long enough to make the turnout move to a position dependably.

Operate a switch and notice if the switch makes a complete move from the turned position to the straight position and vice versa. If the switch does not make it all the way to the intended position, increase the Activation Time until it does. If the switch makes it all the way to the intended position, then decrease the Activation Time until it no longer makes the position. Then increase Activation Time a little so that each move to a position happens dependably. To adjust the Activation Time, on the controlling device go into the Adjustments for the AM-1, then go to the Advanced Setup.



Your AM-1 is now ready to use!

Passwords

You can set a password in your AM-1. Further, it is recommended that you set a password in your AM-1 right after you receive it. When shipped from the factory, your AM-1's password is blank. When the password is blank, any RailPro controlling device can detect and control your AM-1. Since RailPro uses Direct Radio, it is possible to detect and control your AM-1 from over 100 ft away. In other words, it is possible for your neighbor to control your AM-1. However, if you put a password into your AM-1, then your neighbor will not be able to detect or control your AM-1.

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

Adjustments

Name

The reason to give your AM-1 a name is so you can tell it apart from another AM-1. If you had two or more AM-1'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-1 on your controlling device. You can give the AM-1 any name that you would like.

Password

It is recommended that you give your AM-1 a password. Please read the Password section for more information.

Turnout Type

There are three different types of turnouts the AM-1 can control: Type 1 Motor Operated (slow motion switches), Type 2 Snap 3-Wire, and Type 3 Snap 2 wire. Only one type of turnout can be wired to an AM-1.

Turnout Style

The turnout style allows you to choose a picture of a turnout like the one you are connecting to the AM-1 such as right hand or left hand turnout.

Turnout Name

You can give any name you would like to each of the four turnouts so you can easily identify them for operation.

Advanced Adjustments

Feedback Enable

The controlling device can display the switch position. It can use time to show the position or it can show the position based upon actual wired feedback signals.

Activation Time

The Activation Time adjustment sets the time the AM-1 will send power to the turnout to get the turnout to change positions.

Set Position on Power Up

If this option is enabled, the AM-1 will wait for the Power Up Delay Time then set the position of each switch to the last commanded position before the power was turned off.

Power Up Delay Time

Is the amount of time the AM-1 will wait before it sets the positions of each switch after a power on. This is only used if the Set Position on Power Up is enabled. This is used so in a large system that all the turnouts do not try to move at the same time during power up. If all the turnouts moved at the same time, the power supply could be overloaded.

Feedback Wiring

Auxiliary contacts on the turnouts can be used to feedback actual switch positions so the controlling device's screen can show the actual position. One side of each switch must be connected to the R1 or R2 reference voltage terminals. The other side needs to be connected to the proper input as shown in table 4. The switches need to be of type 'normally open,' and close when the proper switch position is achieved.



(Only 'Switch 1' connections are shown)

Switch	Straight	Turn
Switch 1	IO1	IO2
Switch 2	IO3	IO4
Switch 3	IO5	IO6
Switch 4	IO7	IO8

Table 4

Status Indicator Light

The indicator light will be green when the AM-1 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-1. The indicator light will turn red if the AM-1 has faulted.

Reset Switch

Will cause the AM-1 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
V1	+5 Volts power supply
C1	Common
R1 – R2	Reference Signal for use with inputs IO1 – IO8
IO1 – IO8	Programmable Input or Output Pins (Turnout Feedback Inputs)
O1 – O8	Output Pins. Connections for Turnouts.
OP1 – OP4	+ Voltage Source (Connected 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.