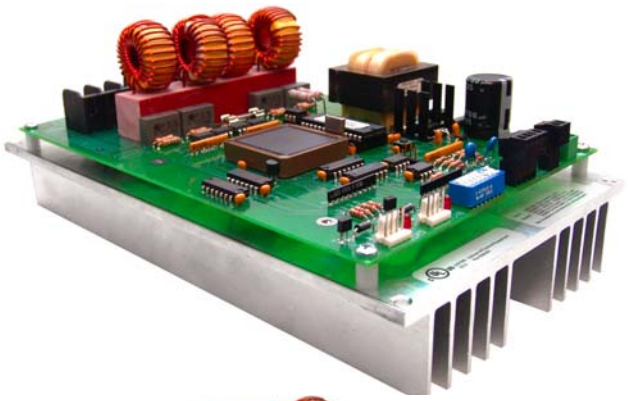
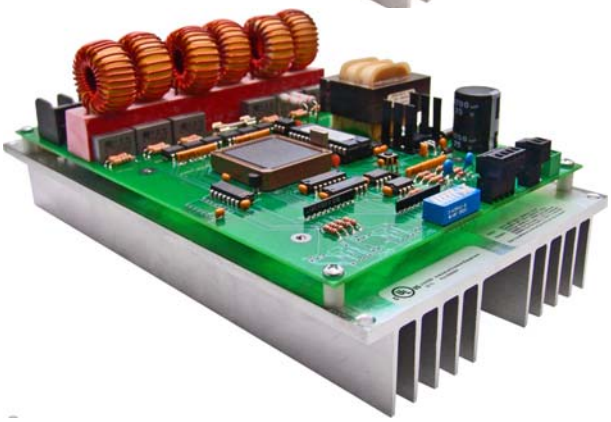
Operation/Reference Guide

# Radia Eclipse Dimmer Modules

RE-DM4
RE-DM6





Lighting Controls

Last Revised: 9/29/2011

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This Limited Warranty and Disclaimer extends only to products purchased directly from AMX or an AMX Authorized Partner which include AMX Dealers, Distributors, VIP's or other AMX authorized entity.

AMX warrants its products to be free of defects in material and workmanship under normal use for three (3) years from the date of purchase, with the following exceptions:

- Electroluminescent and LCD Control Panels are warranted for three (3) years, except for the display and touch overlay components are warranted for a period of one (1) year.
- Disk drive mechanisms, pan/tilt heads, power supplies, and MX Series products are warranted for a period of one (1) year.
- AMX lighting products are guaranteed to switch on and off any load that is properly connected to our lighting products, as long as the AMX lighting products are under warranty. AMX also guarantees the control of dimmable loads that are properly connected to our lighting products. The dimming performance or quality there of is not guaranteed, impart due to the random combinations of dimmers, lamps and ballasts or transformers.
- AMX software is warranted for a period of ninety (90) days.
- Batteries and incandescent lamps are not covered under the warranty.
- AMX AutoPatch Epica, Modula, Modula Series4, Modula CatPro Series and 8Y-3000 product models will be free of defects in materials and manufacture at the time of sale and will remain in good working order for a period of three (3) years following the date of the original sales invoice from AMX. The three-year warranty period will be extended to the life of the product (Limited Lifetime Warranty) if the warranty card is filled out by the dealer and/or end user and returned to AMX so that AMX receives it within thirty (30) days of the installation of equipment but no later than six (6) months from original AMX sales invoice date. The life of the product extends until five (5) years after AMX ceases manufacturing the product model. The Limited Lifetime Warranty applies to products in their original installation only. If a product is moved to a different installation, the Limited Lifetime Warranty will no longer apply, and the product warranty will instead be the three (3) year Limited Warranty.

All products returned to AMX require a Return Material Authorization (RMA) number. The RMA number is obtained from the AMX RMA Department. The RMA number must be clearly marked on the outside of each box. The RMA is valid for a 30-day period. After the 30-day period the RMA will be cancelled. Any shipments received not consistent with the RMA, or after the RMA is cancelled, will be refused. AMX is not responsible for products returned without a valid RMA number.

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This Limited Warranty does not apply to (a) any AMX product that has been modified, altered or repaired by an unauthorized agent or improperly transported, stored, installed, used, or maintained; (b) damage caused by acts of nature, including flood, erosion, or earthquake; (c) damage caused by a sustained low or high voltage situation or by a low or high voltage disturbance, including brownouts, sags, spikes, or power outages; or (d) damage caused by war, vandalism, theft, depletion, or obsolescence.

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# Table of Contents

# Radia Eclipse Dimmer Modules

## Overview

This section provides basic specifications for the RE-DM4 (4-Channel) and RE-DM6 (6-Channel) Integrated Dimmer Modules.

## Radia Eclipse RE-DM4 Dimmer Module

The RE-DM4 (120 VAC: **FG706-01**; 240 VAC: **FG706-02**) controls up to six circuits with four 1200-watt onboard dimmers and two satellite connectors for RDM series dimmer or switch modules.

- The RE-DM4 is designed for use with the RDA series of enclosures in an AMX Lighting™ modular digital dimming system.
- The RE-DM4 is controlled by AxLink or by dry (contact) closures.

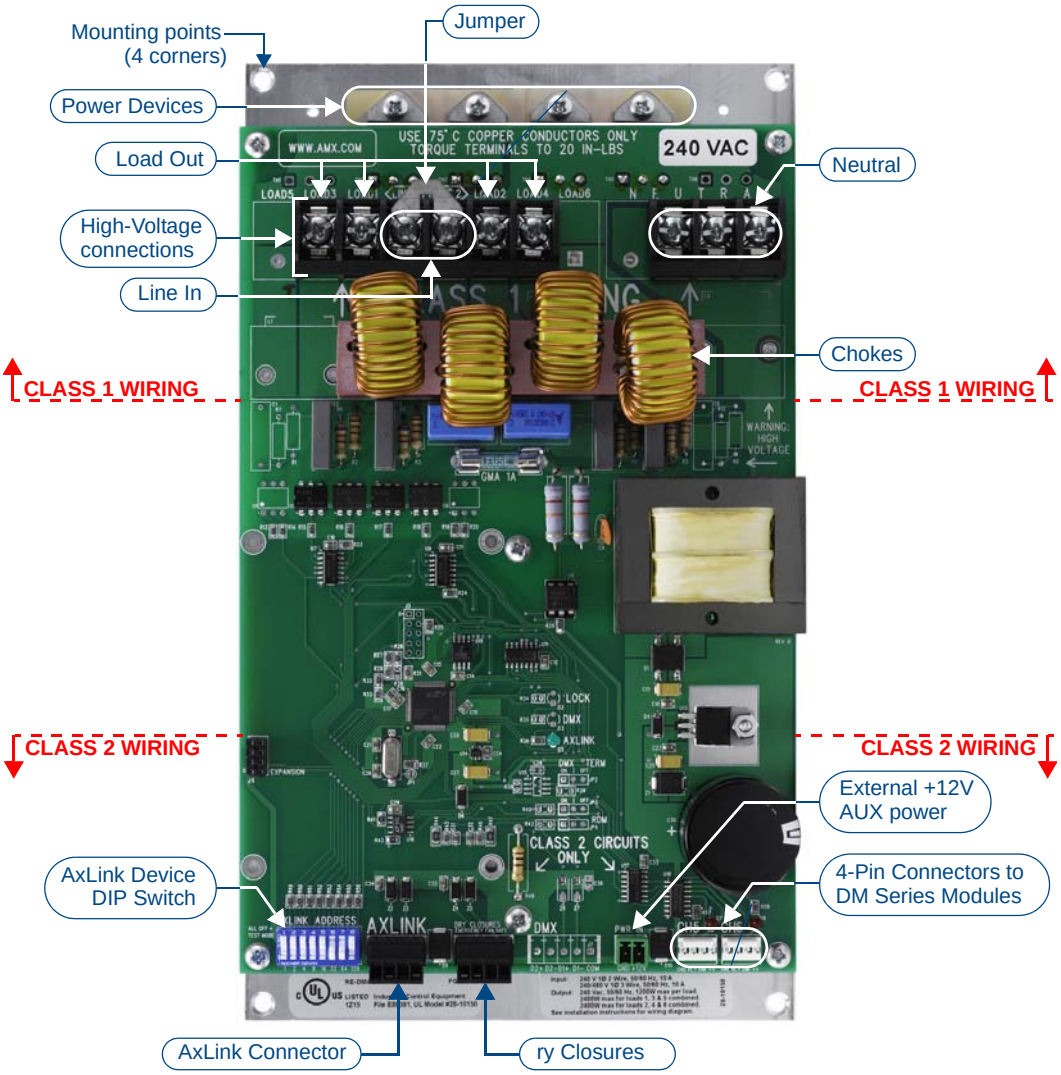


**FIG. 1** RE-DM4 4-channel Integrated Dimmer Module

## RE-DM4 Specifications

| RE-DM4 Specifications | |
|---|---|
| Dimensions (HW) | 5.75" x 10.0" (146.50 mm x 254.00 mm) |
| Line Input | • 120, 240 VAC, single phase, 2W+G, 50/60 Hz, 2400 W, one feed<br>• 120, 120/240, 240 VAC, single phase, 3W+G, 50/60 Hz, 4800 W, dual feed |
| Output | • 1200 W max. per channel @120, 240 VAC<br>• 2400 W max. total, all four channels on with single 2400 W feed<br>• 4800 W max. total, all four channels on with dual 2400 W feeds<br>• Line input #1 goes to dimmer 1 and 3; line input #2 goes to dimmer 2 and 4<br>• All electrical ratings are for continuous duty |
| Wire rating | Use only copper wires rated at 75°C (167°F) min. |
| Torque terminals | To 20 in-lbs (2.3 N/M) |
| Maximum wire size | 10 AWG (4 mm²) |
| Wire stripping length | 0.5" (13 mm) |
| AxLink Port | 4-pin 3.5mm black captive wire connector. AxLink communication signaling with 12VDC power in. |
| Aux Power | 2-pin 3.5mm green captive wire connector. This is a 12VDC power input that supplies additional power to the Radia PCB and connected Radia modules. |
| Dry Contacts | • Emergency fire alarm relay connection - Closed relay activates preset 126. Other control is locked out until relay opens. Supports daisy chaining of up to 20 dimmers for this connection, with a maximum current requirement of 200mA when daisy-chained.<br>• Failsafe connection - Works with a toggle switch - opening the switch triggers preset 128, closing the switch triggers preset 127. Supports daisy chaining of up to 20 dimmers for this connection with a maximum current requirement of 200mA when daisy-chained. |
| BTU/hr | • 300 single feed (2400 W);<br>• 600 dual feed (4800 W) |
| Idle current draw | • 75 mA @ 120 VAC,<br>• 50 mA @ 240 VAC, 100 mA VDC |
| RDM control current | 2 at 200 mA @ 12 VDC with no additional power supply |
| Certifications | • FCC<br>• CE<br>• IEC-60950 Safety<br>• UL North America |
| Operating Temp Range | • 0° to 40°C (32° to 104°F) |
| Included Accessories | • 2 4-pin 3.5mm captive wire connector (**41-5047**)<br>• 4 #8-32x1/2" F-point mounting screws |
| Required Enclosures | • RDA-ENC2 (**FG606-10**)<br>• RDA-ENC4 (**FG606-11**)<br>• RDA-ENC6/6B (**FG606-12/13/15**)<br>• RDA-ENC12B (**FG606-14/16**) |

## Suggested Loads

| Dimmed | Switched |
|---|---|
| Incandescent | Motors |
| Neon, cold-cathode | Fans |

## Caution: Pre-Installation Notes

WARNING

*This unit should be installed only by qualified electrical personnel, and in compliance with all national electrical codes, local codes and ordinances.*
*To prevent possible personal injury or death, disconnect power to the enclosure **at the breaker box** before attempting to work with any AMX Lighting modules.*

- All Class 1 and 2 wiring must be connected to their dedicated terminals.
- Class 1 wiring should be connected through the top of the enclosure, and Class 2 wiring through the bottom.
- Load conductors must be same size as line conductors, regardless of connected load.
- Disconnect power while installing or connecting the unit.
- Keep top and bottom air vents clear at all times, and maintain 12” (30.48 cm) clearance around the top and bottom.
- Test loads for shorts before connecting.
- Class 2 wiring must be rated 300V or higher.
- For indoor use only.
- AC lighting loads only.
- This module may require extra power from the AxLink connection or an external power supply connected to the control card.

## RE-DM4 4-pin module connector (male)

The 4-pin male module connector for the RE-DM4 is illustrated in FIG. 2.

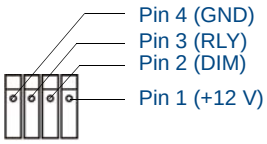


**FIG. 2** 4-pin Male Module Connector for the RE-DM4

## Line-In Connections

- Using two feeds for Line 1 and Line 2 provides two 2400 W inputs.
- With a jumper, Line 1 and Line 2 provides a single 2400 W input.

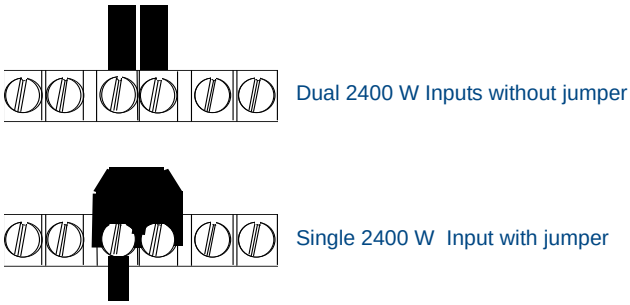


**FIG. 3** Line-In Connections for the RE-DM4

## RE-DM4 Lighting Application Drawings

The RE-DM4 has two preferred lighting application methods, as shown in FIG. 4 and FIG. 5:

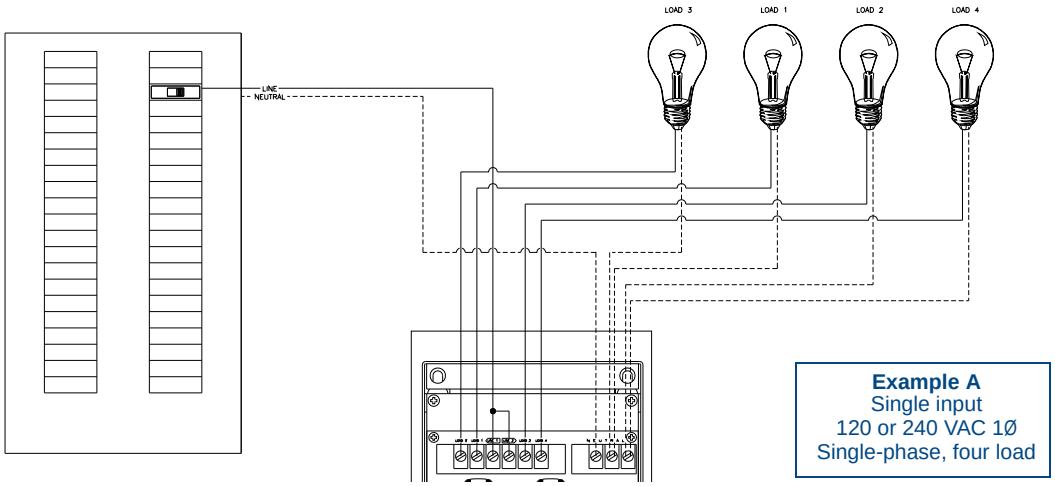


**FIG. 4** Lighting Application for the RE-DM4, Example A

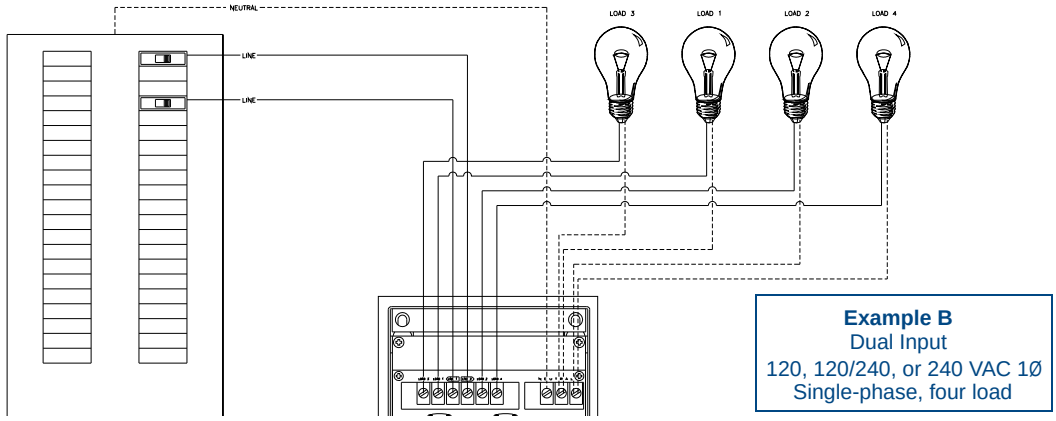


**FIG. 5** Lighting Application for the RE-DM4, Example B

NOTE

*Please refer to the AMX RADIA Lighting Programming* section on page 31 *for more information.*

## Radia Eclipse RE-DM6 Dimmer Module

The RE-DM6 6-Channel Integrated Dimmer Module (120V: **FG706-03**; 240V: **FG706-04**) controls up to six circuits with six 1200-watt onboard dimmers (FIG. 6).

The RE-DM6 is designed for use with the RDA series of enclosures, in an AMX Lighting™ modular digital dimming system. The RE-DM6 is controlled by AxLink or by dry (contact) closures.

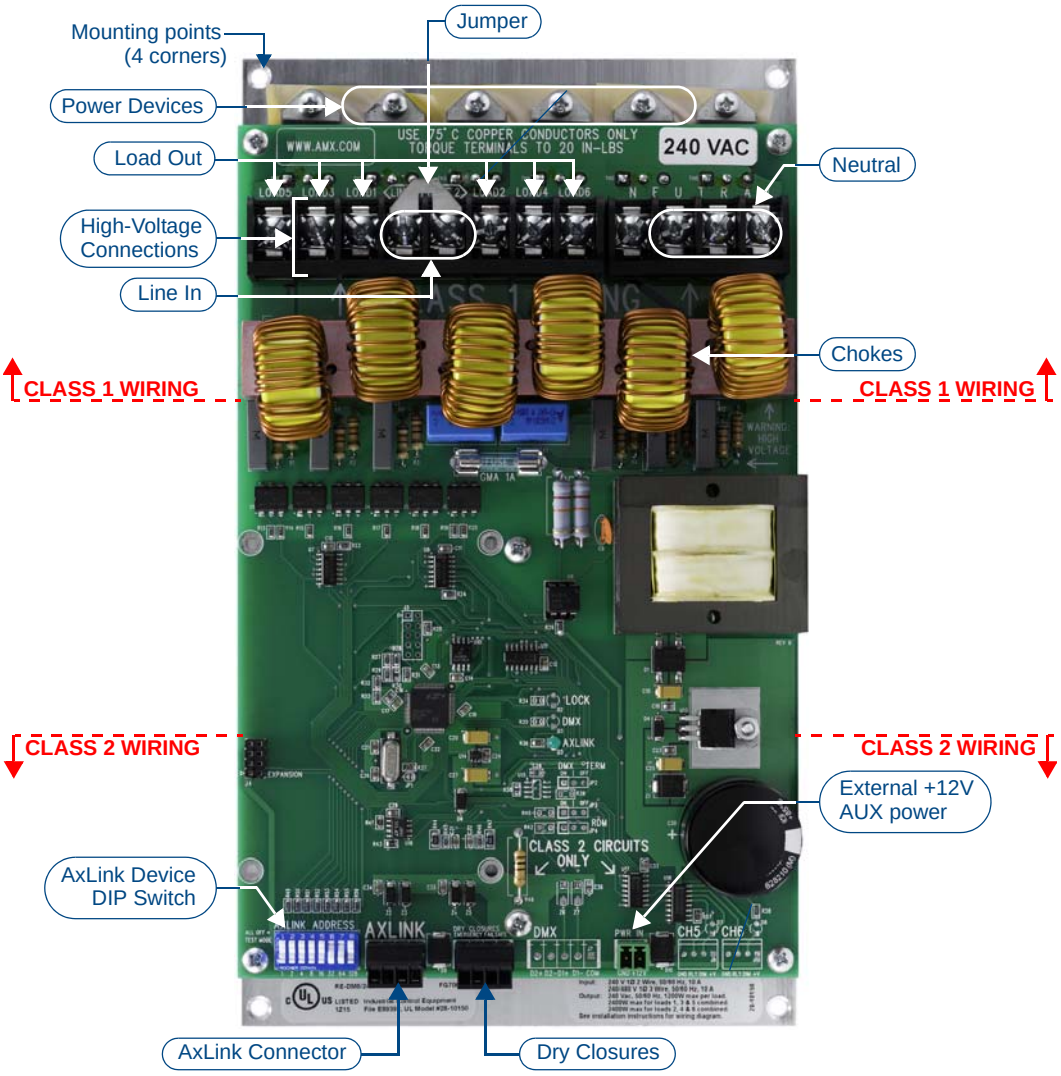


**FIG. 6** RE-DM6 6-channel Integrated Dimmer Module

## RE-DM6 Specifications

| RE-DM6 Specifications | |
|---|---|
| Dimensions (HW) | 5.75" x 10.0" (146.05 mm x 254.00 mm) |
| Weight | 4.5 lbs (2.04 kg) |
| Line input | • 120, 240 VAC, single phase, 2W+G, 50/60 Hz, 2400 W, one feed<br>• 120, 120/240, 240 VAC, single phase, 3W+G, 50/60 Hz, 4800 W, dual feed |
| Output | • 1200 W max. per channel @120, 240 VAC<br>• 2400 W max. total, all 6 channels on with single 2400 W feed<br>• 4800 W max. total, all 6 channels on with dual 2400 W feeds<br>• Line input #1 goes to dimmer 1, 3, and 5; line input #2 goes to dimmer 2, 4 and 6<br>• All electrical ratings are for continuous duty |
| Wire rating | Use only copper wires rated at 75°C (167°F) min. |
| Torque terminals | To 20 in-lbs (2.3 N/M) |
| Maximum wire size | 10 AWG (4 $mm^2$) |
| Wire stripping length | 0.5" (13 mm) |
| AxLink Port | 4-pin 3.5mm green captive wire connector - AxLink communication signaling with 12VDC power in. |
| Aux Power | 2-pin 3.5mm green captive wire connector. This is a 12VDC power input that supplies additional power to the Radia PCB and connected Radia modules. |
| Dry Contacts | • Emergency fire alarm relay connection - Closed relay activates preset 126. Other control is locked out until relay opens. Supports daisy chaining of up to 20 dimmers for this connection, with a maximum current requirement of 200mA when daisy-chained.<br>• Failsafe connection - Works with a toggle switch - opening the switch triggers preset 128, closing the switch triggers preset 127. Supports daisy chaining of up to 20 dimmers for this connection with a maximum current requirement of 200mA when daisy-chained. |
| BTU/hr | 300 single feed (2400 W); 600 dual feed (4800 W) |
| Idle current draw | 75 mA @ 120 VAC, 50 mA @ 240 VAC, 100 mA VDC |
| Certifications | • FCC<br>• CE<br>• IEC-60950 Safety<br>• UL North America |
| Operating Temp Range | 0° to 40°C (32° to 104°F) |
| Included Accessories | • 2 4-pin captive 3.5mm wire connectors (**41-5047**)<br>• 4 #8-32x1/2" F-point mounting screws |
| Required Enclosures: | • RDA-ENC2 (**FG606-10**)<br>• RDA-ENC4 (**FG606-11**)<br>• RDA-ENC6/6B (**FG606-12/13/15**)<br>• RDA-ENC12B (**FG606-14/16**) |

## Suggested Installation Loads

| Dimmed | Switched |
|---|---|
| Incandescent | Motors |
| Neon, cold-cathode | Fans |

## Caution: Pre-Installation Notes

WARNING

*This unit should be installed only by qualified electrical personnel, and in compliance with all national electrical codes, local codes and ordinances.*
*To prevent possible personal injury or death, disconnect power to the enclosure **at the breaker box** before attempting to work with any AMX Lighting modules.*

- All Class 1 and 2 wiring must be connected to their dedicated terminals.
- Class 1 wiring should be connected through the top of the enclosure, and Class 2 wiring through the bottom.
- Load conductors must be same size as line conductors, regardless of connected load.
- Disconnect power while installing or connecting the unit.
- Keep top and bottom air vents clear at all times, and maintain 12” (30.48 cm) clearance around the top and bottom.
- Test loads for shorts before connecting.
- Class 2 wiring must be rated 300V or higher.
- For indoor use only.
- AC lighting loads only.

WARNING

*To prevent possible personal injury or death, disconnect power to the enclosure **at the breaker box** before attempting to install any AMX Lighting modules.*

## Line-In Connections

- Using two feeds for Line 1 and Line 2 provides two 2400 W inputs.
- Jumping Line 1 and Line 2 provides a single 2400 W input (FIG. 7)

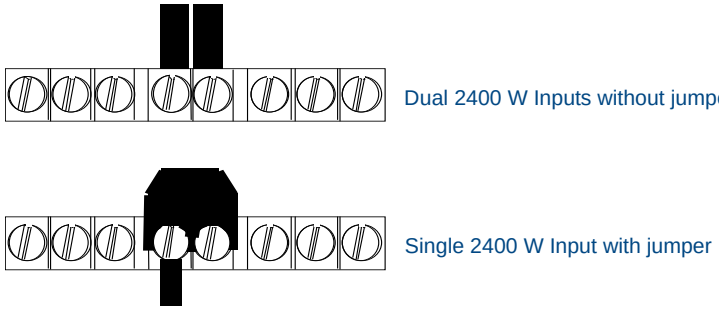


**FIG. 7** Line-In Connections for the RE-DM6

## RE-DM6 Lighting Application Drawings

The RE-DM6 has two preferred lighting application methods, as shown in FIG. 8 and FIG. 9.

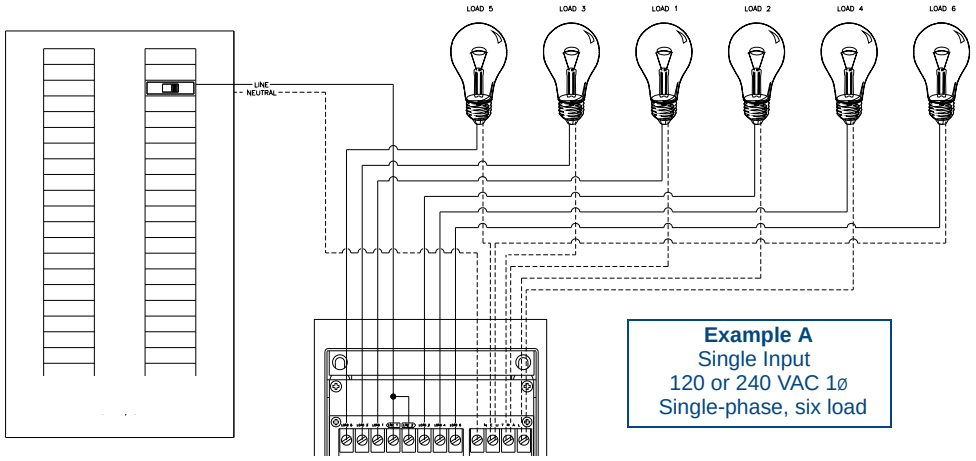


**FIG. 8** Lighting Application for the RE-DM6, Method A

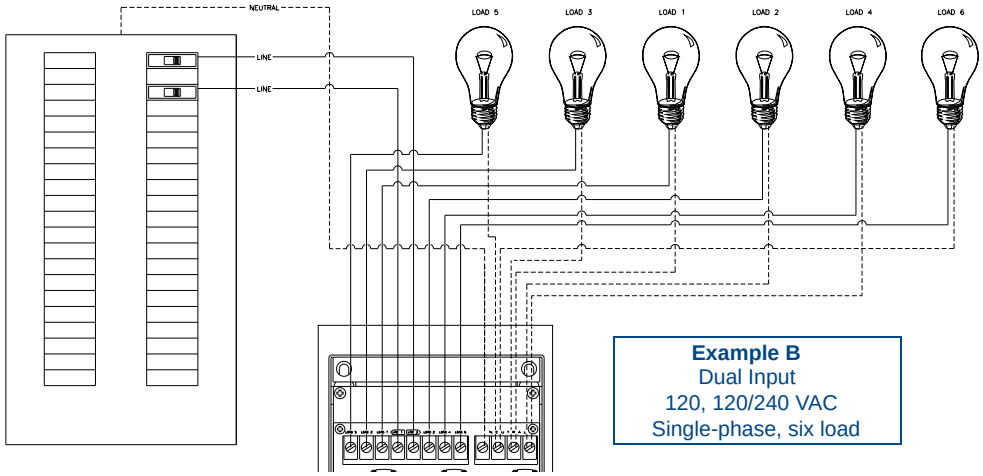


**FIG. 9** Lighting Application for the RE-DM6, Method B

NOTE

*Please refer to the AMX RADIA Lighting Programming* section on page 31 *for more information.*

# AMX Lighting Systems

## Overview

The AMX Radia Lighting Control System™ employs a dual-platform programming architecture that supports the NetLinx programming language. The AMX Lighting product line is modular by design, and includes a wide variety of integrated dimmer control modules, dimmer modules, and switch/relay modules. This product line also includes circuit cards that can control dimming and switching of incandescent, fluorescent, and neon (cold-cathode) bulbs; high- and low-voltage equipment; loads (motors); and electronic and magnetic ballasts.

These cards and controllers can be housed in any of our five enclosures to ensure complete compliance with any spacing/application requirements. Once the lighting control requirements are defined, you can choose from the extensive group of lighting controllers, modules, and accessories, install them into the best-suited enclosures, and create the perfect lighting control system for your customers.

## Features

The AMX Lighting Control System features include:

- Control of up to 1,500 dimmers or 255 6-channel devices (approximate) with a AMX NetLinx Control System complete with dimmer-level feedback
- Support for 128 lighting scene presets
- Recall of up to 3 of 128 presets with two contact closures: emergency and failsafe
- Modular and scalable lighting system configurations of one to 1,500 dimmers
- Control via AxLink
- UL and C-UL listed modules for United States and Canadian compliance

## Applications

You can use the AMX Lighting Control System for commercial, corporate, and residential applications. The NetLinx control architecture can address virtually any number of lighting zones. Entire residential or commercial lighting systems may be manually controlled or fully automated.

AMX Lighting systems may also be integrated into existing NetLinx/Axcess presentation/control systems. Residential applications can be divided into inter-linked lighting zones using central and local control configurations.

## AMX Lighting Control Equipment

The following table lists all of the AMX Lighting Control System equipment currently available. Refer to the installation sheets for these enclosures, control modules, and dimmer modules for detailed wiring drawings, application notes, and specifications.

| AMX Lighting Control Equipment | |
|---|---|
| AMX Lighting enclosures | |
| RDA-ENC2 | 2-module enclosure for single-phase dimmer modules |
| RDA-ENC4 | 4-module enclosure for dimmer modules |
| RDA-ENC6 | 6-module enclosure for single-phase dimmer modules |
| RDA-ENC6B | 6-module, 6-breaker (20 A each) enclosure for multi-phase wiring for one RDC-PDC module (two or three phase configuration) |
| RDA-ENC12B | 6-module, 12-breaker (20 A each) enclosure that supports multi-phase wiring for two RDC-PDC modules |
| Control cards | |
| RDC-DC | 6-channel, single-phase control card (120 or 240 VAC) |
| RDC-PDC | 6-channel, three-phase dimmer control card (120 or 240 VAC) |

| AMX Lighting Control Equipment (Cont.) | |
|---|---|
| Integrated dimmer control modules | |
| RE-DM4 | 4-channel integrated dimmer control module (120 or 240 VAC) |
| RE-DM6 | 6-channel integrated dimmer control module (120 or 240 VAC) |
| Dimmer modules | |
| RDA-CKM | Dual Choke module (350 µS) |
| RDA-PSM | Power supply module |
| RDM-2DC | Dual VDR module (2400 W x 2, 0-12 VDC) |
| RDM-2FDB | Dual FDB Module, 1920 W (x2) |
| RDM-2INC | Dual incandescent dimming module (2400 W x 2) |
| RDM-2SWM | Dual switch module (2400 W) |
| RDM-2ZC | Dual zero cross module (2400 W) |
| RDM-3FDB | Triple FDB module (2400 W x 3) |
| RDM-3EM | Heavy Duty Energy Management Relay Module, 20A (x3) |
| RDM-6EM | Heavy Duty Energy Management Relay Module, 20A (x6) |
| RDM-3SWM | Triple switch module (20 A x 3) |
| RDM-DC | DC Module, 1920 W, 0-12 VDC |
| RDM-2DC | Dual DC dimmer module, 1920 W, 0-12 VDC (x2) |
| RDM-3DC | Triple DC dimmer module, 1920 W, 0-12 VDC (x3) |
| RDM-FDB | FDB Module, 1920 W |
| RDM-HDC | Heavy-Duty DC Module, 2400 W, 0-12 VDC |
| RDM-HFDB | Heavy duty FDB module (20 A) |
| RDM-INC | Incandescent dimming module (2400 W) |
| RDM-INC50 | Incandescent dimming module (6000 W) |
| RDM-MDM | Multimode dimming module (2400 W/20 A) |
| RDM-SWM | Switch module (2400 W) |
| RDM-ZC | Zero-cross module (2400 W) |
| RDM-ZC50 | Zero-cross module (6000 W) |
| Dimmer Accessories | |
| RDA-PSM | 12 VDC 2.5A Power Supply Module |
| RDA-CKM | Dual Choke Module |
| RDA-DIV | Radia Module Divider |
| RDA-EFP | Radia Enclosure Filler Plate |

# Installation

## Space Requirements

AMX Lighting control installations require very little space. Space for enclosures is the main concern. All enclosures are mounted flush on a vertical surface, and must have a minimum clearance of 12" (304.8 mm) above and below to allow for air circulation.

Physical dimensions for each enclosure are described in the *RDA Enclosure Dimensions* section on page 13.

## Wiring Considerations

The following information relates to wiring considerations for a AMX Lighting system.

CAUTION

*Disconnect power to the device **at the breaker box** until the wiring is complete.*

### Preparing/connecting captive wires

1. Strip 0.25 inch of wire insulation off all wires.
2. Insert each wire into the appropriate opening on the connector according to the wiring diagrams and connector types described in this section.

NOTE

*Do not tighten the screws excessively. Doing so may strip the threads and damage the connector.*

### AxLink wiring between multiple devices

FIG. 10 shows AxLink wiring between AxLink devices.

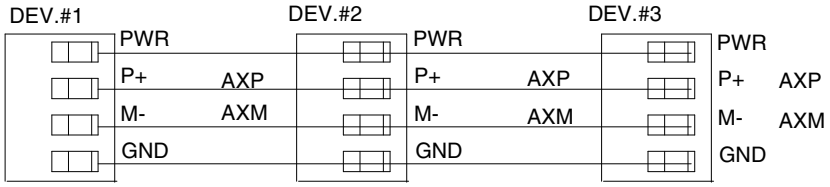


**FIG. 10** Multiple AxLink wiring connections

CAUTION

*Disconnect the main power to the AMX Lighting controller **at the breaker box** if rewiring the AxLink cables.*

## Power considerations

The following information relates to wiring considerations for an AMX Lighting system.

### AxLink connections

In order to establish an AxLink connection for programming, the controller must be connected to a power source and be powered on. The AMX Lighting system will allow programming after power has been applied.

Once power has been applied and the AMX Lighting controller has established an AxLink connection, the 12VDC supply to the processor will allow program changes if the 120VAC supply is cut off.

## Conduit

Conduit runs depend on the enclosures you use and their AMX Lighting modules. All enclosures have conduit knockouts on the top for high-voltage connections, and knockouts on the bottom for low-voltage connections.

All conduit knockouts allow for 1/2, 3/4, and 1-inch (12.7 mm, 19.0 mm, and 25.4 mm) conduits as shown in FIG. 11.

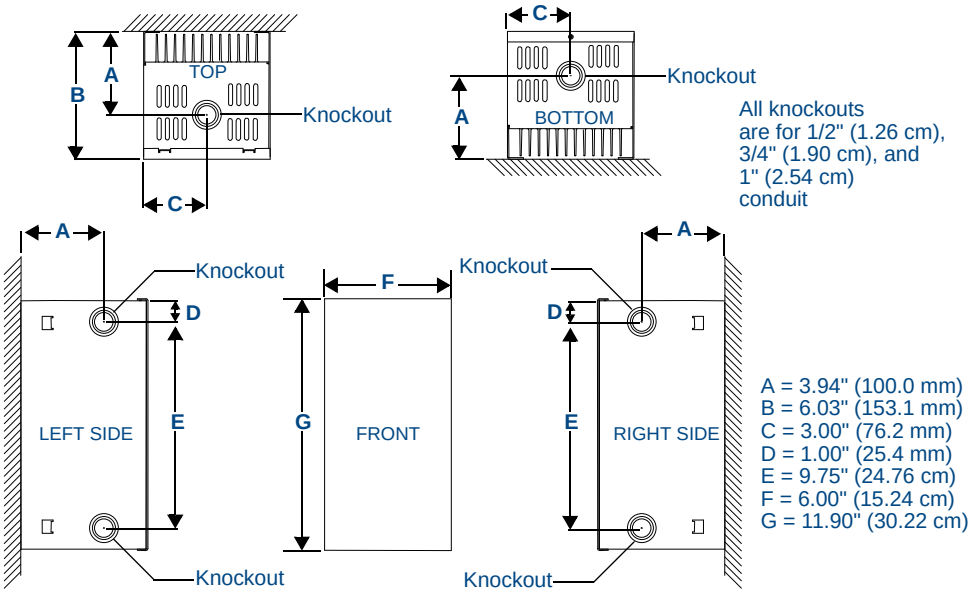


**FIG. 11** Knockout locations (RDA-ENC2 used as example)

NOTE

*Install the control modules according to local and National Electrical Code (NEC) regulations.*

You should also consider these recommendations prior to installing enclosures:

- Install separate conduit for lighting loads. The recommended knockout for loads is located on the top center of the enclosure.
- Install separate conduit for the 120 VAC wiring to the line input terminal block. The recommended knockouts for incoming power feeds are located on the top-left and top-right sides of the AMX Lighting enclosure.
- Install separate conduit for low-voltage signals for dry closures and AxLink connections. The recommended knockout for these control connections is located on the bottom of the enclosure.
- Additional knockouts are on the bottom-left and bottom-right sides of the enclosures for alternate low-voltage connections.

# RDA Enclosure Dimensions

## RDA-ENC2, -ENC4, and -ENC6 enclosure and dimensions

FIG. 12 shows the dimensions for the RDA-ENC2, RDA-ENC4, and RDA-ENC6 enclosures.

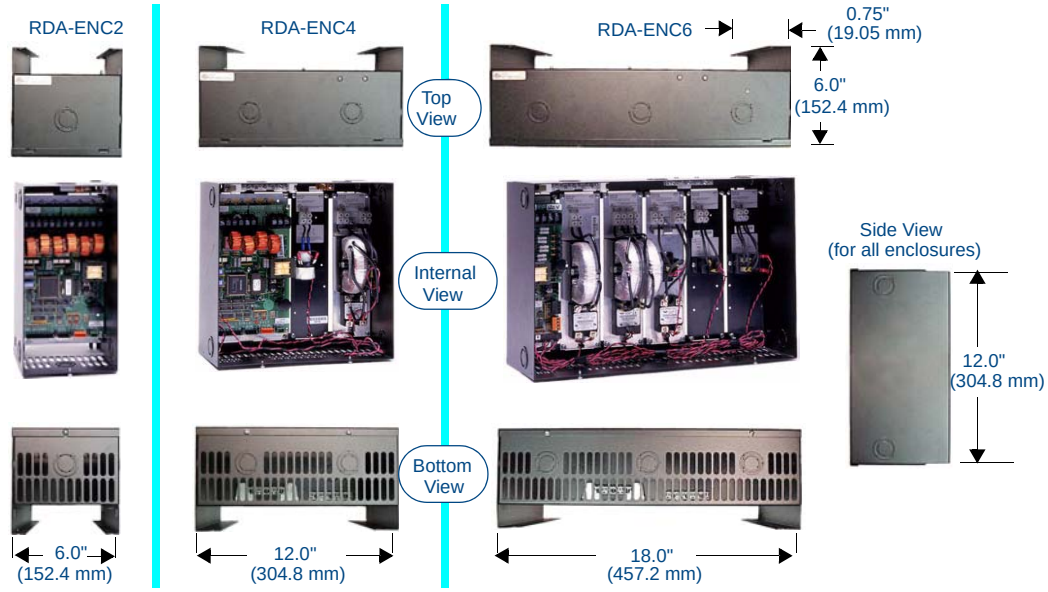


**FIG. 12** RDA-ENC2, RDA-ENC4, and RDA-ENC6 enclosure dimensions

## RDA-ENC6B and RDA-ENC12B enclosures and dimensions

FIG. 13 shows the dimensions for the RDA-ENC6B and RDA-ENC12B enclosures.

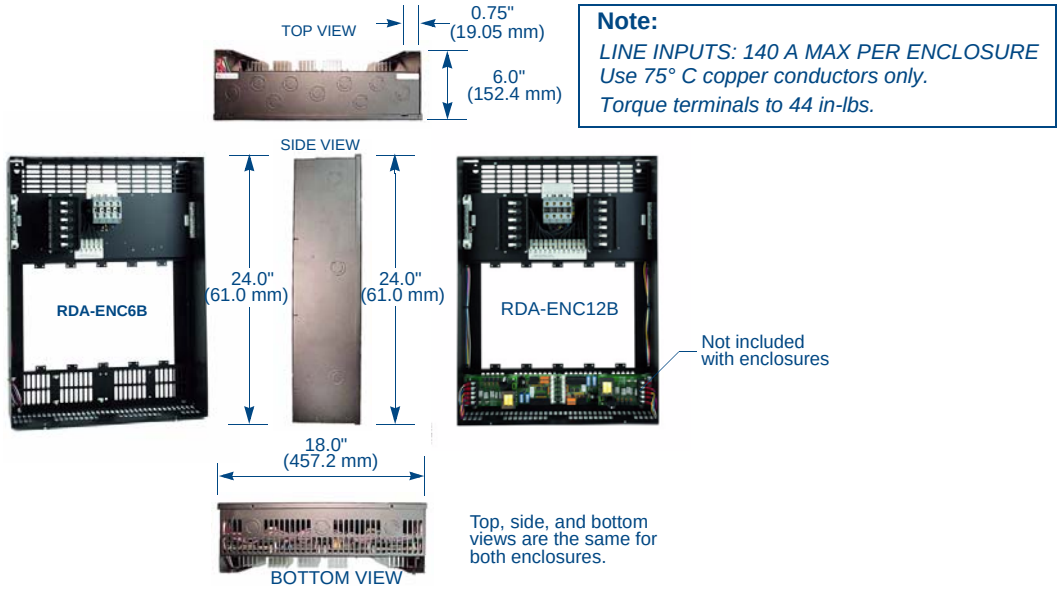


**FIG. 13** RDA-ENC6B and ENC12B enclosures and dimensions

## Mounting AMX Lighting Enclosures

AMX Lighting enclosures must be mounted on a vertical surface with a minimum of 12" (304.8 mm) clearance above and below the enclosure. FIG. 14 shows the centerline reference points and dimensions.

WARNING

*The clearance above and below the enclosure is necessary for proper ventilation and heat dissipation.*

1. Remove the front cover by removing the screws at the bottom of the enclosure; two tabs suspend the cover from the top.
2. Position the enclosure on the wall so that it is level, with the high-voltage terminals of the unit at the top.
3. Mark the four mounting holes according to the dimensions shown in FIG. 14.
4. Install screws at the marks. The maximum screw size is #12.
5. Hang the enclosure on the four screws and then tighten the screws.

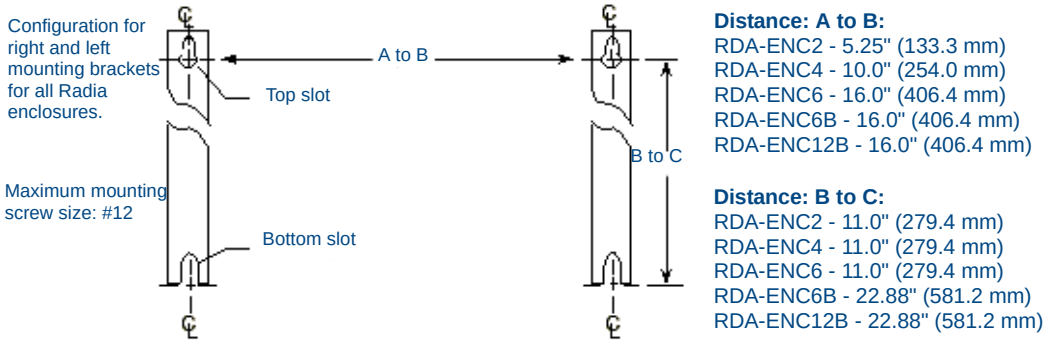


**FIG. 14** Center-line reference points and dimensions

NOTE

*Refer to the Dimmer Enclosures with Breakers installation guide for more information.*

## High-Voltage Connections

FIG. 15 shows an example of a high-voltage connection for an RE-DM4 controller.

- Each AMX Lighting module has its high-voltage connectors marked on its circuit board.
- Line, load, and neutrals are also clearly marked.

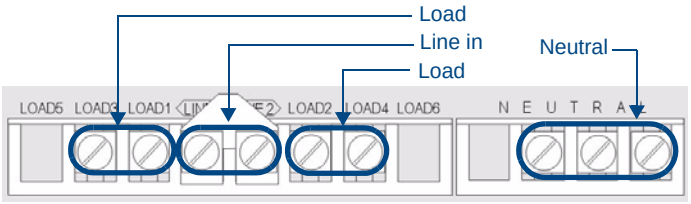


**FIG. 15** High-voltage connections for an RE-DM4

NOTE

*All high-voltage connections must comply with Class 1 wiring codes.*

### Connecting High-Voltage, Single-Phase Input Power and Loads

Follow these steps to wire high-voltage (120 VAC and 240 VAC), single-phase power connections (FIG. 16) to any of the AMX Lighting modules.

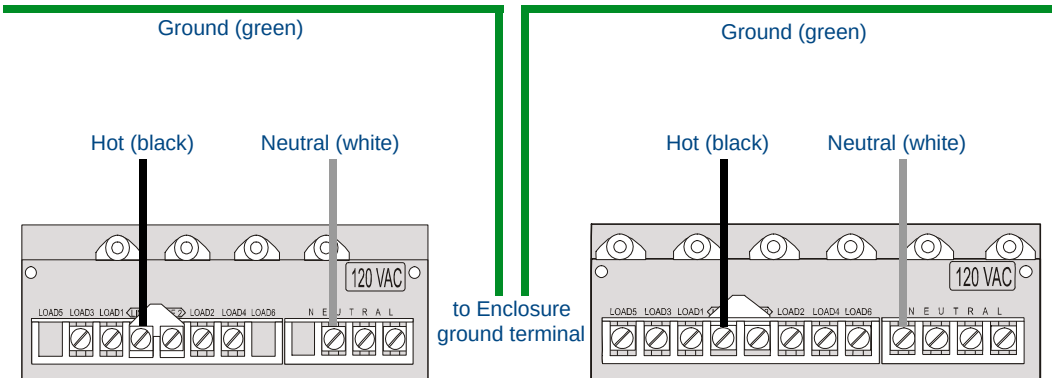


**FIG. 16** RE-DM4 and RE-DM6 (as examples only) high-voltage, single-phase power connections for line input (hot), neutral, and ground.

1. Connect the green ground wire(s) to the copper ground lug on the enclosure. Ensure the ground wire is properly connected to earth ground.
2. Connect the white neutral wire(s) to a terminal on the enclosure's neutral terminal block. Each terminal on the block can accept two 10 AWG wires.
3. Provide a separate neutral wire for each dimmed zone.
4. Connect the black line input from the electrical devices to the module's line terminal. The line input terminal accepts a 10 AWG copper conductor.
5. Connect load lines from the electrical devices to the Load terminals. Load 1 applies to dimmer 1, Load 2 applies to dimmer 2, and so on.

## RDA-ENC6B 120 VAC Single Phase Line Input

FIG. 17 shows a 120 VAC single-phase (2 W + G) wiring diagram for the RDA-ENC6B line input terminal block.

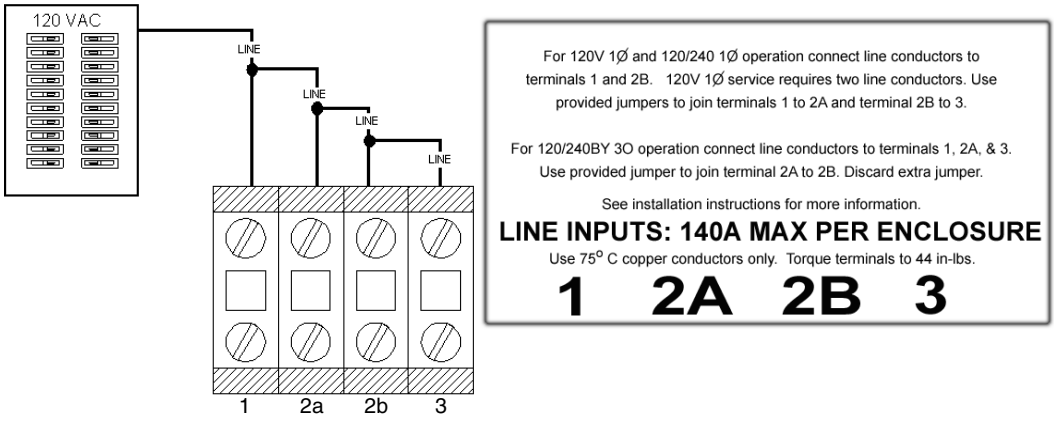


**FIG. 17** RDA-ENC6B 120 VAC single-phase (2 W + G) wiring diagram

## RDA-ENC6B 120/240 VAC Line Input (Single Phase)

FIG. 18 shows a 120/240 VAC single-phase (3 W + G) wiring diagram for the RDA-ENC6B line input terminal block.

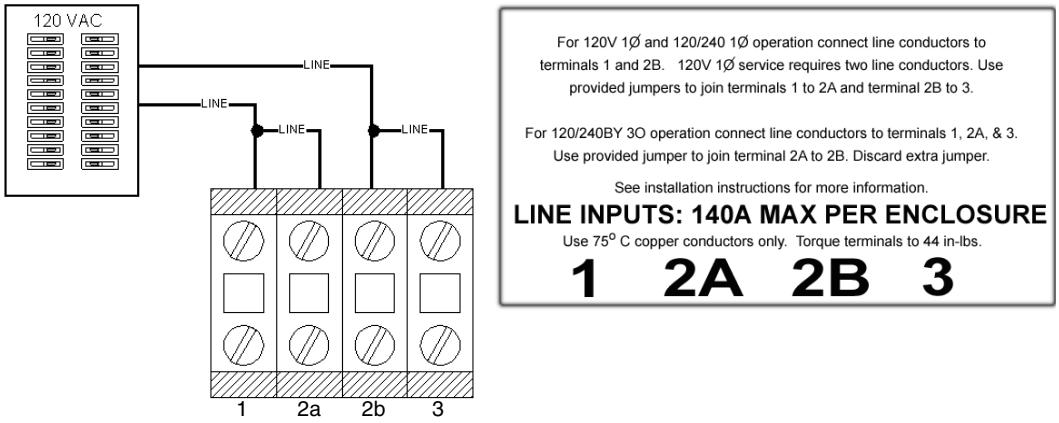


**FIG. 18** RDA-ENC6B 120/240 VAC single-phase (3 W + G) wiring diagram

## Connecting High-Voltage Input Power and Loads

Follow these steps to wire high-voltage (120 VAC and 240 VAC) power connections to any of the AMX Lighting module (FIG. 19): .

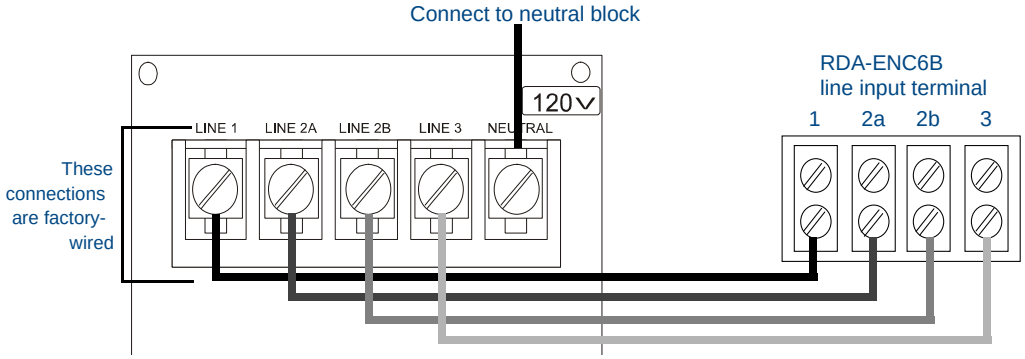


**FIG. 19** High-voltage, three-phase input power

1. Connect the green ground wire(s) to the copper ground lug on the enclosure.
   *Ensure the ground wire is properly connected to earth ground.*
2. Connect the white neutral wire(s) to one of the terminals on the enclosure's neutral terminal block.
3. Provide a separate neutral wire for each controlled zone.
4. Connect the black line input from the electrical panel to the enclosure's line terminal.
   The line input terminal accepts a 0 AWG copper conductor.
5. Connect load lines from the electrical devices to the Load terminals.
   Load 1 applies to dimmer 1, Load 2 applies to dimmer 2, and so on.

## RDA-ENC6B 120/208 VAC line input (three phase)

FIG. 20 shows a 120/208 VAC three-phase (4 W + G) wiring diagram for the RDA-ENC6B line input terminal block.

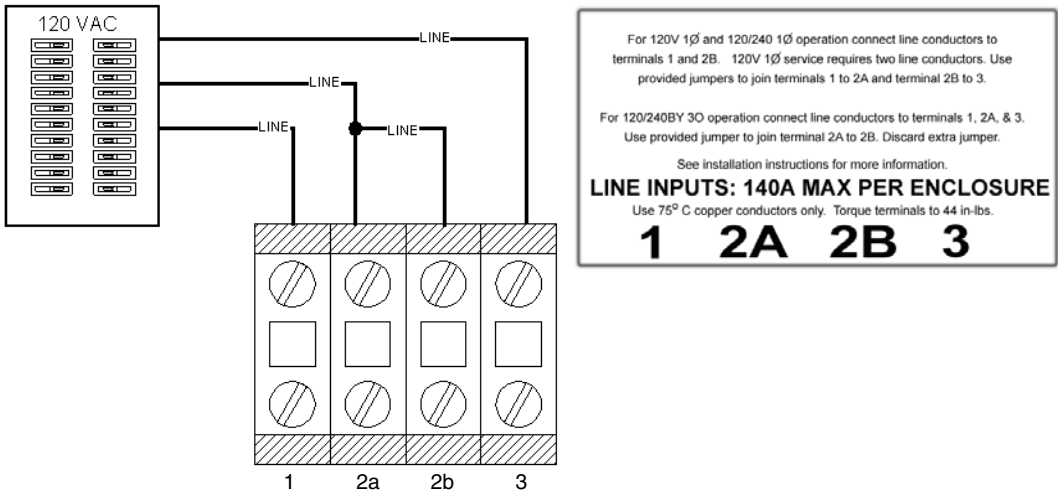


**FIG. 20** RDA-ENC6B 120/208 VAC three-phase (4 W + G) wiring diagram

NOTE

*While it is possible to wire the enclosure with 3-phase Y, please remember a single RE-DM4 or RE-DM6 will only support one Y-phase.*

## RDA-ENC6B Three Phase Line Input Connector Reference

FIG. 21 shows a sample RDA-ENC6 three phase (4 W + G) line input connector and dimmer references.

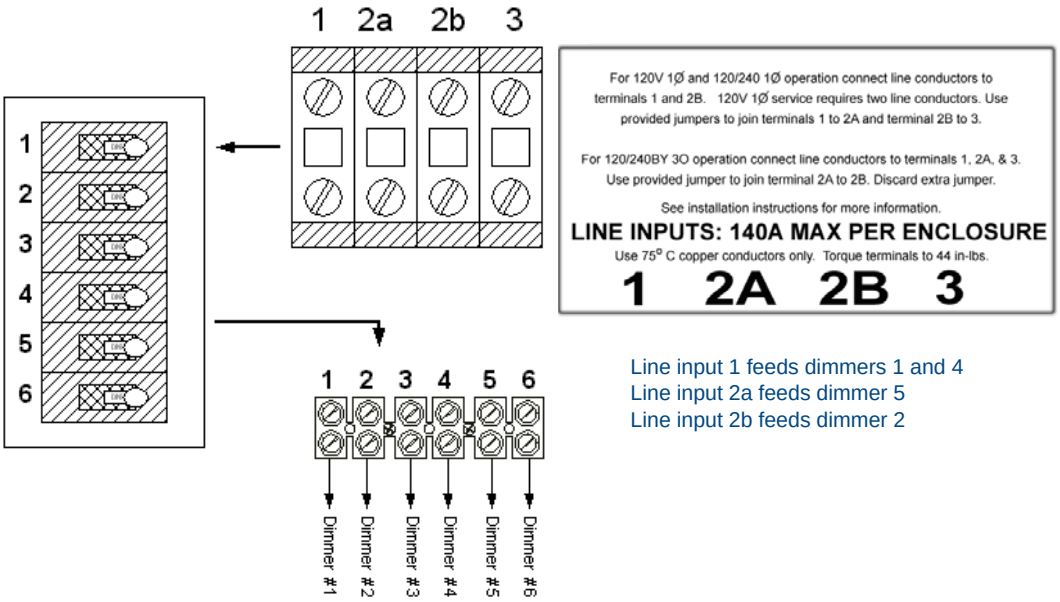


**FIG. 21** RDA-ENC6B three-phase (4 W + G) line input connector and dimmer references

## RDC-PFC Power Distribution And Line Input References

FIG. 22 shows the power distribution and line input references for the RDC-PFC line inputs.

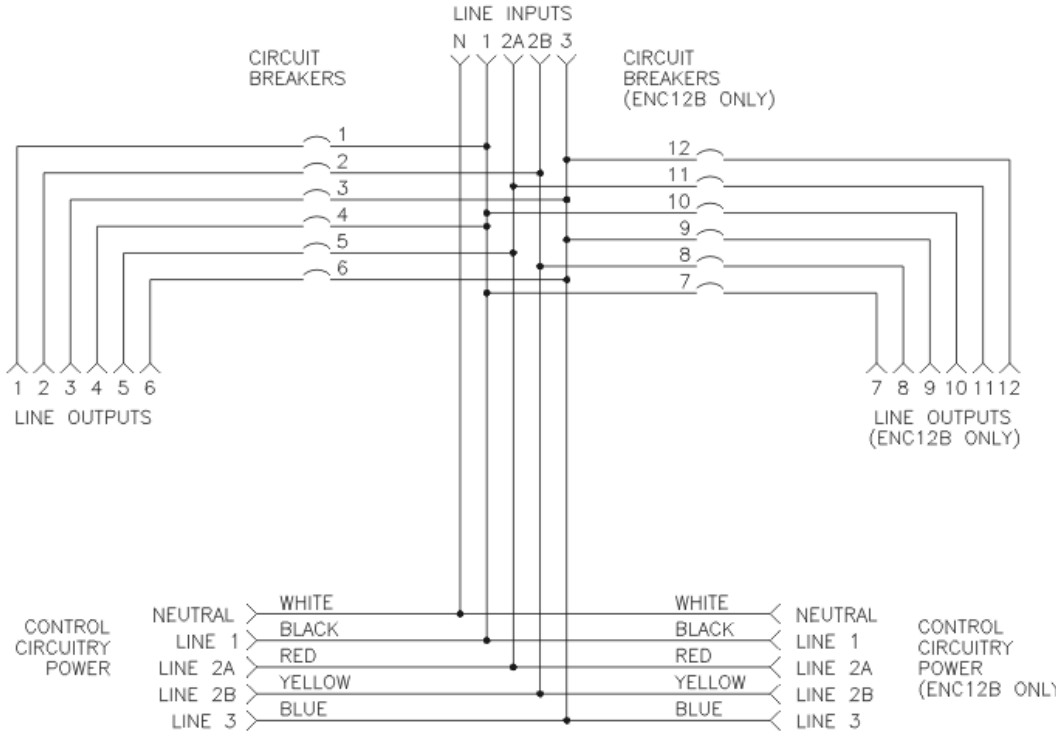


**FIG. 22** RDC-PFC power distribution and line input reference references

NOTE

*While it is possible to wire the enclosure with 3-phase Y, please remember a single RE-DM4 or RE-DM6 will only support one Y-phase.*

## Installing RDM Modules Into an RDA Enclosure

Installing any of the RDM modules is an easy task. The individual modules are shipped with the four mounting screws enclosed.

WARNING

*To prevent possible personal injury or death, disconnect power to the enclosure **at the breaker box** before attempting to install any AMX Lighting modules.*

FIG. 23 illustrates the inside of an RDA-ENC6 enclosure and the mounting slots.

The modules are positioned in the appropriate slot and secured using the supplied screws.

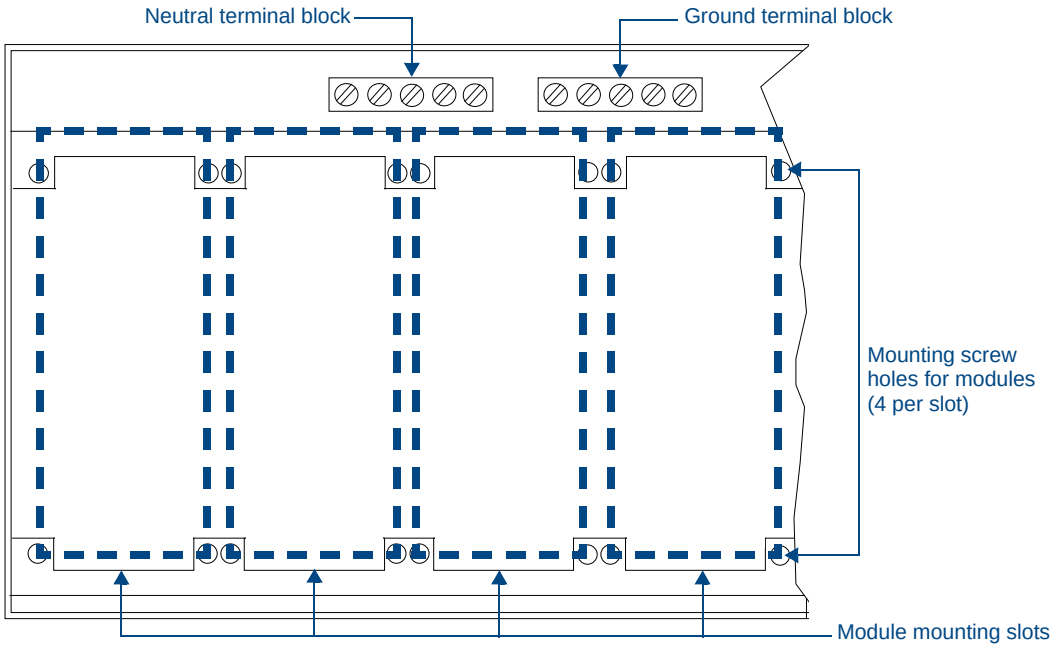


**FIG. 23** Enclosure module mounting slots and mounting screw holes

NOTE

*The RE-DM4 and RE-DM6 take up 2 Radia enclosure slots each, so an RDA-ENC6 can hold only three RE-DM4/RE-DM6 devices.*

The RDA-ENC2 enclosure contains a ground-terminating lug. The RDA-ENC4, RDA-ENC6, RDA-ENC6B, and RDA-ENC12B enclosures contain a neutral terminating block and a ground-terminating lug.

# Low-Voltage Connections

NOTE

*All low-voltage connections must comply with Class 2 wiring codes.*

The low-voltage area in the AMX Lighting controllers contain connections and DIP switches for AxLink, dry closures, and module jack connectors.

On the controller cards, low-voltage power for the board is supplied either by line power, optional auxiliary power supply (RDA-PSM), or the +12 VDC pin on the AxLink connector.

The green status LED on the controller circuit board also blinks, according to the current operating status of AxLink and red LEDs, one for each of the external connectors for additional modules.

FIG. 24 shows an example of the low-voltage connections, DIP switches and LEDs using the RE-DM4 controller.

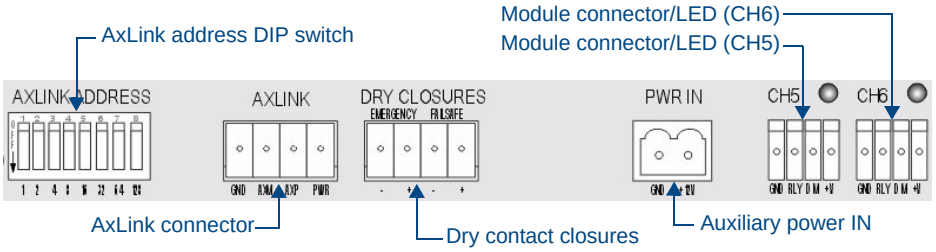


**FIG. 24** Low-voltage connections and DIP switches

## Module Connections

When connecting a dimming/switching module to a AMX Lighting controller, connect it as shown in FIG. 25.

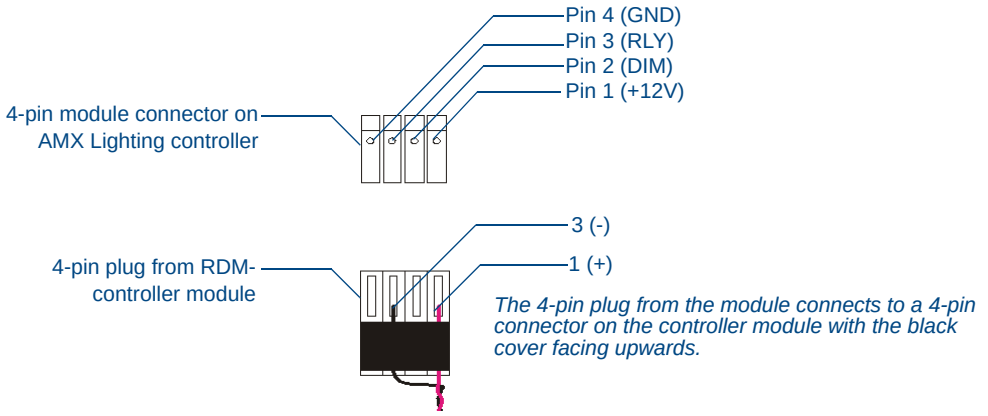


**FIG. 25** Module connection to a controller card

## Green LED Status Indicator

When you apply power to the AMX Lighting Control System, the green status LED notes its conditions:

- It is on full when AC power is applied to the control module, and no AxLink communication is present.
- It blinks on and off when AC power is applied to the control module, and AxLink communication is present.
- It blinks on and off rapidly when no AC power is applied to the control module, and the board is powered via AxLink or Aux In DC power.

The LED indicator is located above the low voltage terminal, in the lower section of the control module.

## Red LED Status Indicators (RE-DM4 only)

The red LED's function is to indicate level. LED brightness increases as signal level increases from 0 to 100.

The LED indicator is located above each external load connector jack on the control module.

## Configuring and connecting multiple controllers

Since the Radia RE-DM4 and RE-DM6 differ from other AMX lighting controllers by not having a SW2 DIP switch, the "All Lights On" installer test is invoked by turning OFF all 8 switches on SW1.

1. Power off the AMX Lighting enclosure at the breaker panel.
2. Locate the SW1 DIP switch on the controller circuit card, and set the pack number using the values shown in the preceding table.

   The pack number must be 1 to 10.

NOTE

*All Radia dimmers are Pack 1. This cannot be changed.*

FIG. 26 shows an example of how to interconnect two RE-DM4 controllers and a AxLink wall panel.

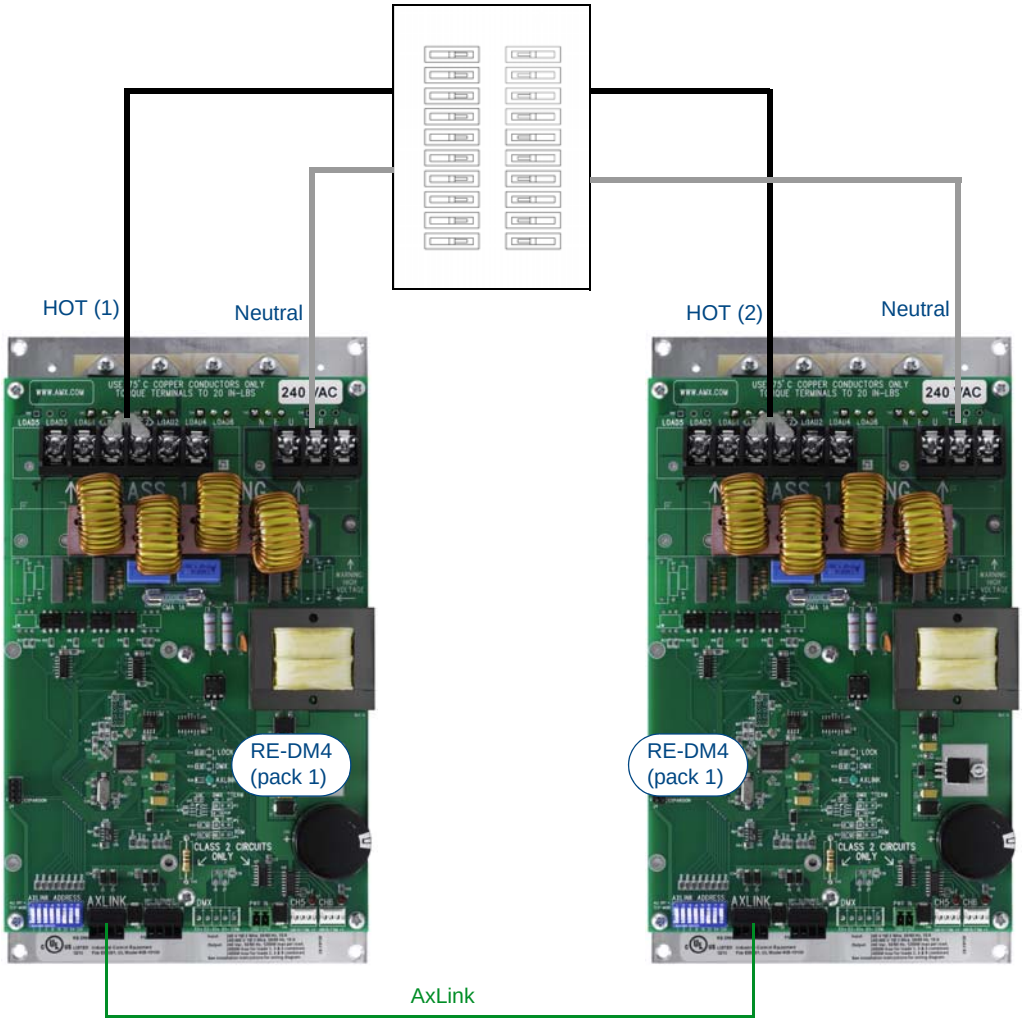


**FIG. 26** AxLink configuration sample

## Configuring and Connecting AxLink

On all AMX Lighting controllers, DIP switch SW1 sets the AxLink device number. The device number is determined by the value of all the switch position settings. The following table shows the SW1 DIP switch positions and their values.

The device number assignment range is 1 through 255.

| SW1 DIP Switch Setting Values for AxLink | |
|---|---|
| Position | Value |
| 1 | 1 |
| 2 | 2 |
| 3 | 4 |
| 4 | 8 |
| 5 | 16 |
| 6 | 32 |
| 7 | 64 |
| 8 | 128 |

NOTE

*Turning off all switches invokes "Installer Test Mode": all lighting circuits at 100%.*

1. Power off the enclosure unit at the breaker panel.
2. Locate the SW1 DIP switch (AxLink ADDRESS) on the controller circuit card and set the device number, using the values shown in the proceeding table.
3. Connect the four-pin AxLink male connector into the four-pin female AxLink connector on the controller circuit card. FIG. 27 shows how to wire the AxLink connector to a Central Controller system.

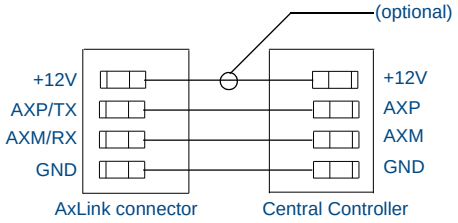


**FIG. 27** AxLink wiring diagram

4. Apply power to the controller module at the breaker panel.
5. Radia v3.xx and higher constantly read the AxLink address switch.

Power does not need to be reset or cycled after changing the AxLink address.

# External power

The following table lists the modules that use most of the operating power an AMX Lighting control module can supply. They may require extra power from the AxLink connection or an external power supply connected to the control module or module(s) when using multiple modules.

| External Modules | | |
|---|---|---|
| RDM-HSW | RDM-MR | RDM-SWM |
| RDM-2HSW | RDM-2MR | RDM-2SWM |
| RDM-3HSW | RDM-3MR | RDM-3SWM |
| RDM-HFDB | RDM-MR35 | RDM-DPSM |
| RDM-HDC | RDM-MR60 | |

If extra power is required, connect an auxiliary 12 VDC power supply as shown in FIG. 28.

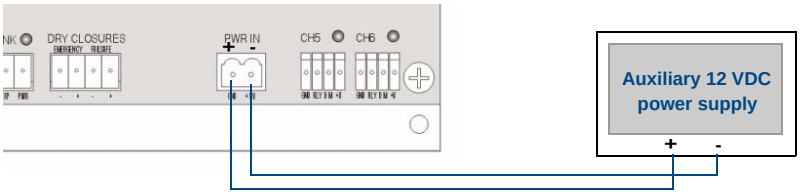


**FIG. 28** Auxiliary power connection

# Dry Closures

The RE-DM4 and RE-DM6 have two dry closure inputs via a 4-pin mini-phoenix connector. The inputs are an open collector pulled up to 5 VDC. The status is normally open, channel Off, with the closure released. When an input is pulled low to ground and falls below 3 VDC, the AMX Lighting system sees the action as an input closure, the AxLink channel is turned On, and a push sent to the Axcess Central Controller.

## Connecting Dry Closures

AMX Lighting controller modules contain four connections for two dry contact closure inputs, and one common reference point. The Radia has two (2) contact closure inputs dedicated to special purposes: Failsafe and Emergency.

## Failsafe Input

The failsafe input is provided to facilitate limited stand-alone operation in the event that the AxLink master is no longer functioning. The failsafe input shall function regardless of whether AxLink is working properly or not (i.e. there is no lockout of control).

Operationally, when the failsafe input contact closure is closed (i.e. ON), preset 128 will be recalled. When the failsafe input contact closure is opened, preset 127 will be recalled. Both of these preset recalls occur on the edge of the transition from opened-to-closed to closed-to-opened.

## Emergency Input

The emergency input is provided to interface to an alarm system (such as a fire alarm) to set the lighting to an appropriate state for an emergency (e.g. light the path to the exit). The expected operation of the alarm system is to hold (close) the contact closure as long as the alarm is active and release (open) the closure when the alarm is cleared.

Operationally, when the emergency input contact closure is closed (i.e. ON), preset 126 will be recalled. In addition, all other controls of the lighting functions will be disabled as long as the emergency input is closed.

When the emergency input contact closure is opened, normal operation of the Radia will resume.

## Default Settings

The following tables shows the default low-end settings, default preset time values, default dry-closure presets and factory presets for AMX Lighting:

| Default Low-End Settings | |
|---|---|
| Function | Low-end setting |
| Channel 1 | LE=0 |
| Channel 2 | LE=0 |
| Channel 3 | LE=0 |
| Channel 4 | LE=0 |
| Channel 5 | LE=0 |
| Channel 6 | LE=0 |

| Default preset time values | | |
|---|---|---|
| Firmware version | Function | Time Value |
| 2.0 or greater | Default ramp time | 6 |
| | Default level time | 1 |
| | Default preset time | 3 |

| Default Presets | |
|---|---|
| Preset Number | Description |
| 1 | Channel 1, Channel 1 @ 100% in 1 second |
| 2 | Channel 2, Channel 2 @ 100% in 1 second |
| 3 | Channel 3, Channel 3 @ 100% in 1 second |
| 4 | Channel 4, Channel 4 @ 100% in 1 second |
| 5 | Channel 5, Channel 5 @ 100% in 1 second |
| 6 | Channel 6, Channel 6 @ 100% in 1 second |
| 7 | Channels 1-6 @ 100% in 1 second |
| 8 | Channels 1-6 @ 0% in 1 second |
| 126 | Emergency Dry Closure On<br>Channel 1-6 @ 100% in 1 second |
| 127 | Failsafe Dry Closure Off<br>Channels 1-6 @ 0% in 1 second |
| 128 | Failsafe Dry Closure On<br>Channels 1-6 @ 100% in 1 second |

# Radia Lighting System Configuration Pages

## Overview

The AMX Radia Web pages provide a simple interface from which an installer/user may perform lighting system configuration and setup tasks without needing access to an AMX touch panel. The web pages reside on the AMX master and may be accessed through a compatible Web browser. The AMX Radia configuration web pages were designed with setup functionality in mind and not everyday control.

The browsers currently supported by the Radia Web pages are Internet Explorer version 6.0 and 7.0 and Mozilla Firefox version 2.0.0.3.

NOTE

*Use of the AMX Radia Web Pages requires the use of the Radia Duet Module. NetLinx code or a terminal may also be used to configure the lighting system if use of the module is not an option.*

## Lighting System Link

In order to access the configuration web pages for the AMX Radia, open your computer's browser and point it to the AMX master containing the loaded Duet module by typing the following URL:

**http://xxx.xxx.xxx.xxx**

where xxx.xxx.xxx.xxx is the IP address of the AMX master. This opens the *Master Configuration Manager* page (FIG. 29).


**FIG. 29** Master Configuration Manager

Once the page is loaded:

1. Click on the **System** menu button at the top of the page.
2. Click the **Manage Device** tab
3. Expand the *Lights* node in the *Device Configuration Pages* section by clicking on the link.
4. Click on the *AMX Radia RE-DM4,Radia RE-DM6 - 41001:1:0* link.

NOTE

*The AMX master must be running firmware v3.21.343 or higher for the Radia Eclipse configuration pages to work as expected.*

## Main Lighting System Page

Clicking on the *AMX Radia RE-DM4,Radia RE-DM6 - 41001:1:0* link opens the *Radia Configuration Manager* page (FIG. 30).


**FIG. 30** Radia Configuration Manager

This page displays basic system status information and options for navigating to and configuring a particular component. The information provided includes:

- the lighting area Label
- the component AxLink Address
- the virtual address used
- the device or preset model
- the component status
- the Configure button for each device to be configured.

NOTE

*The Global Presets listing is a special type of lighting component, since it is always declared Online and has no AxLink Address associated with that entry.*

## Device Configuration Page

This page provides the ability to name your specific Radia device by typing an installation-specific label in the *Lighting Area Name* field (FIG. 31).

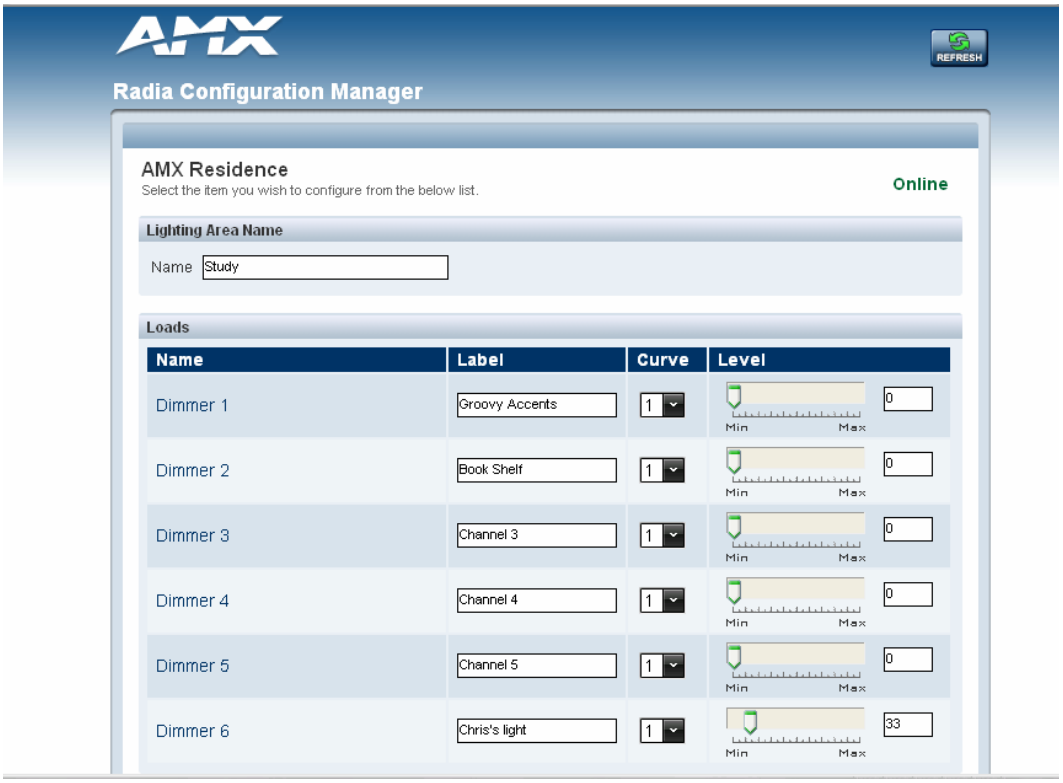


**FIG. 31** Device Configuration Page

To configure a particular device from the *Device Configuration* page:

1. In the main *Radia Configuration Manager* page, click the **Configure** button.
2. In the *Lighting Area Name* field, enter a descriptive name for the area.

NOTE

*Although the Lighting Area Name field can accept over 200 characters, choosing a short but descriptive name for the lighting area is highly recommended.*

3. For each dimmer, change the name in the *Label* field if necessary.
4. For each dimmer, change the Curve selected in the drop-down menu if necessary.
5. For each dimmer, change the level with the *Level* slidebar if necessary. The field to the right of the slidebar will display the exact level. Alternately, enter the exact level you wish to have associated with that dimmer by entering the number into the field to the right of the slidebar, and the slidebar will move to match the entry.
6. Click the **Accept** button at the bottom of the page to save your changes.

NOTE

*You do not need to click the* Accept *button to save changes if you only adjusted the dimmer levels by using the* Level *slidebar. To exit a Radia configuration page, you must choose* Cancel*, whether you have chosen to accept the changes or not.*

Each Radia device has, by default, 11 predefined presets, also shown on the *Device Configuration* page (FIG. 32), that can be modified as well.

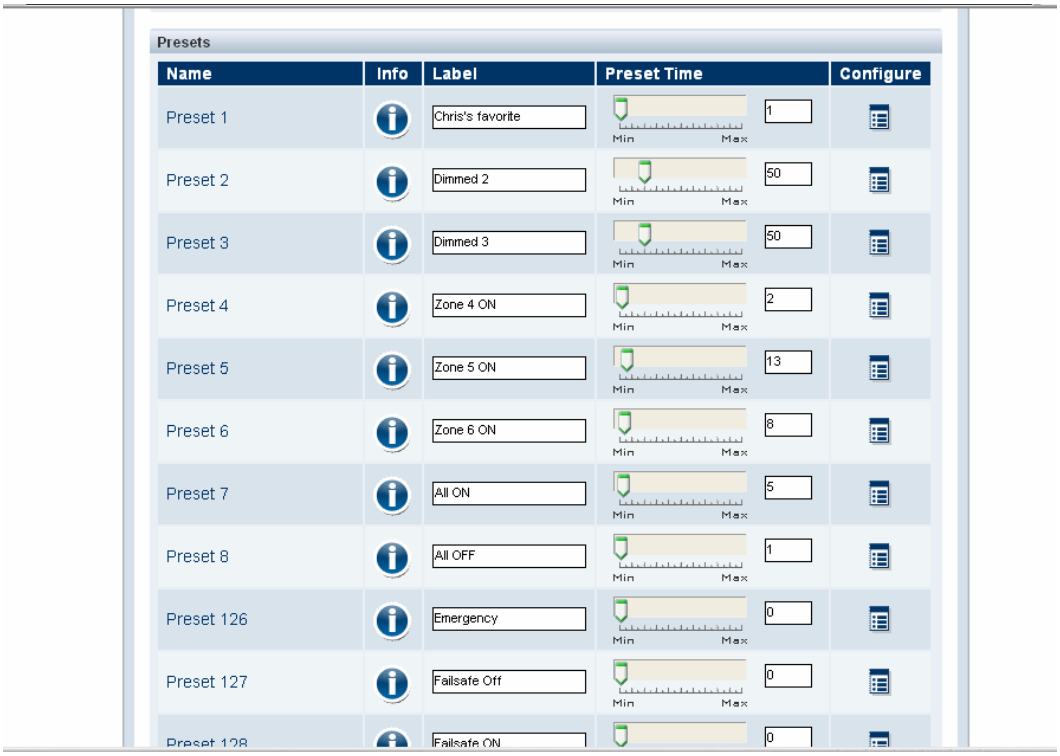


**FIG. 32** Presets section

To modify an existing preset:

1. In the *Device Configuration* page, scroll down to the preset to be modified.
2. For more information on the preset, click the **Info** button for the preset. This opens a new information box with the preset's dimmer and level information.

   When finished, close the box.
3. In the *Label* field, change the preset's label if necessary.
4. Select the *Preset Time* by either moving the slidebar or entering the preset time (1-255) in the field to the right of the slidebar.

   If you enter a preset time number higher than 255, the slidebar will move to the "Max" position.
5. To configure the preset, click the preset's **Configure** button to open the *Preset Configuration* page (FIG. 33).

   When finished, click the **Accept** button at the bottom of the page and return to the *Device Configuration* page.

   To return to the *Device Configuration* page without saving any changes, click the **Cancel** button.

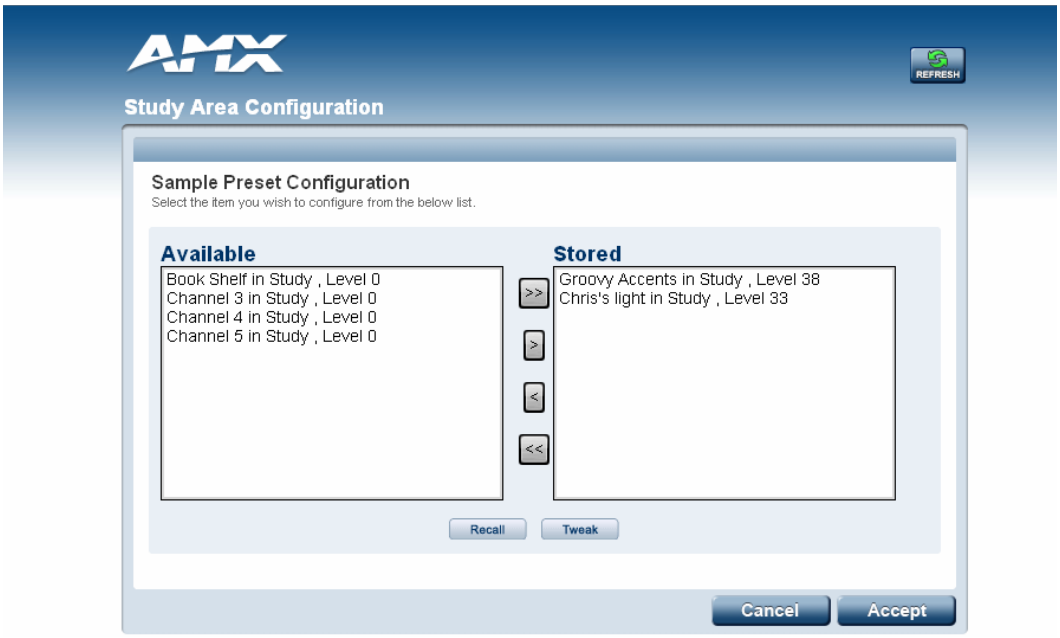


**FIG. 33** Preset Configuration Page

6. To save your changes, click the **Accept** button at the bottom of the *Device Configuration* page.

NOTE

*You do not need to click the* Accept *button to save changes if you only adjusted the dimmer levels by using the* Level *slidebar. To exit a Radia configuration page, you must choose* Cancel*, whether you have chosen to accept the changes or not.*

To create a new preset:

1. Scroll to the bottom of the *Device Configuration* page and click the **Add Preset** button (FIG. 34).

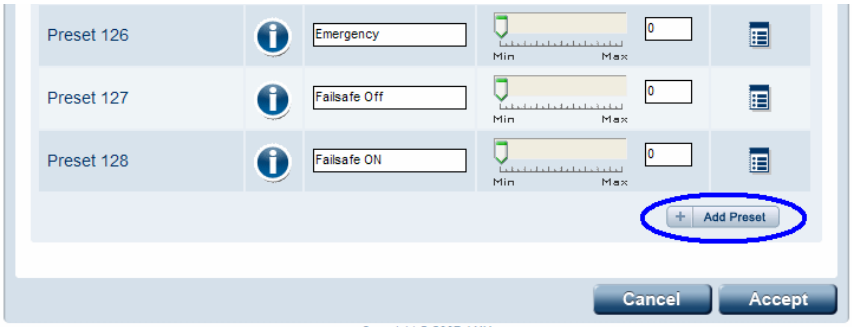


**FIG. 34** New Preset button

2. Enter a name for the new preset in the *Label* field.
3. Enter a time (0-255) in the *Preset Time* field. If you do not add a time, a default value of "1" will be entered.
4. Click the **Configure** button to open the *New Preset Configuration* page (FIG. 33).
5. Click a desired lighting component in the *Available* field to highlight it. To move an individual lighting component into the *Stored* field, click the ">" button.

   To move a previously selected lighting component back to the *Available* field, click on it in the *Stored* field and then click the "<" button.

   To move all of the lighting components from the *Available* field to the *Stored* field, highlight one component and click the ">>" button.

   Reverse the process and click the "<<" button to return all lighting components to the *Available* field.

6. Clicking the **Recall** button will recall the preset and the **Tweak** button will refresh and auto-save the preset with the current load levels.

   The **Recall** and **Tweak** buttons are only enabled for existing and saved presets; neither button will be enabled for a new preset that has not been saved.

7. To finalize your changes to the preset, click the **Accept** button at the bottom of the page. To return to the *Device Configuration* page and cancel any unsaved changes, click the **Cancel** button.


*While creating a new preset, you cannot edit any other saved preset during that time, or the new preset information will be lost. Please create your new preset and save it before attempting to edit or add others. A new preset without any stored information will be deleted.*


*To exit a Radia configuration page, you must choose* Cancel*, whether you have chosen to accept the changes or not.*

# AMX RADIA Lighting Programming

## Overview

The AMX Lighting Control SystAxLinkem employs the Axcess and SEND_STRING software programs to control the dimming of electronic ballasts, incandescent lamps, low voltage track lighting, and a host of new transformers. This manual describes connecting and programming a AMX Lighting system.

This section explains firmware, channels, SEND_STRING wall panels, programming commands, and lighting curves.


*This manual refers to AMX Lighting firmware version 4.0 and higher.*

## Software

To best facilitate use of the Radia Eclipse RE-DM4 and RE-DM6, both use a VisualArchitect-ready Cafe Duet module for communications between a NetLinx master and the Radia unit.

"The Duet module is designed to the DeviceSDK Lighting device class, including:

- Ramp lighting levels
- Turn lights on and off
- Recall lighting presets
- Status feedback for on/off, level and active preset

The Duet module utilizes the master's web servlet to provide a GUI interface for lighting system and preset configuration, including:

- Name zones
- Select zones
- Ramp zones
- Discrete and toggle on/off
- Recall presets
- Save current preset settings
- Undefine zones for exclusion from preset definition
- Save a lighting scene as a preset on the Radia device and on the NetLinx master preset in a VA 1.2-compatible XML file format.
- Transfer the configuration XML file by uploading from the Radia device to the NetLinx master, downloading from the NetLinx master to Radia, and uploading from the NetLinx master to a PC for use in VisualArchitect. The Duet module will provide any conversion between RADIA format requirements and the XML file format, if necessary

The Duet module queries the Radia Eclipse device on startup to populate the dimmers attached to the Radia system, based on its configuration file.

# Presets: Defined vs. Undefined Levels

Understanding the meaning of the terms "defined" and "undefined", as used in the context of levels in the Radia lighting system, is helpful. Each dimmer on the Radia has a TRUE/FALSE status associated with it that is referred to as "defined". The state of the defined status is used when saving presets so that the Radia knows which dimmers are to be affected when the preset is recalled. Upon power-up, all the dimmers are in the undefined state. As soon as any of the dimmers changes state (i.e. the level changes), the dimmer automatically becomes defined. Upon recording a preset, the Radia will save all of the dimmer levels that are defined at that time and only affect those when the preset is recalled.

For example, if all the dimmers are undefined and dimmers 1 and 3 get their levels changed, the Radia will save the levels of 1 and 3 only when told to record preset 7. When preset 7 is recalled, only dimmers 1 and 3 will be adjusted. The other dimmers (2, 4, 5 and 6) are said to be undefined for that preset.

## Preset Status

Channels 1-128 reflect the current status of active presets. A preset is "active" for as long as its associated dimmers (circuits) remain at the levels associated with the preset. For example, assume the following presets exist in the Radia:

| Preset # | | | | | | |
|---|---|---|---|---|---|---|
| Preset # | Dimmer #1 | Dimmer #2 | Dimmer #3 | Dimmer #4 | Dimmer #5 | Dimmer #6 |
| **1 – Meeting (A)** | 100% | 50% | 100% | | | |
| **2 – Presentation (A)** | 50% | 25% | 50% | | | |
| **3 – Off (A)** | 0% | 0% | 0% | | | |
| **4 – Meeting (B)** | | | | 100% | 50% | 100% |
| **5 – Presentation (B)** | | | | 50% | 25% | 50% |
| **6 – Off (B)** | | | | 0% | 0% | 0% |
| **7 – Cleaning (A&B)** | 100% | 100% | 100% | 100% | 100% | 100% |
| **8 – Night (A&B)** | 0% | 0% | 0% | 0% | 0% | 0% |

Also, the configuration of the Radia is such that dimmers 1-3 are controlling lights in room A (a conference room) and dimmers 4-6 are controlling lights in room B (another conference room). In each of these room is a 3-button wall-mounted control panel that provides control of the local lights:

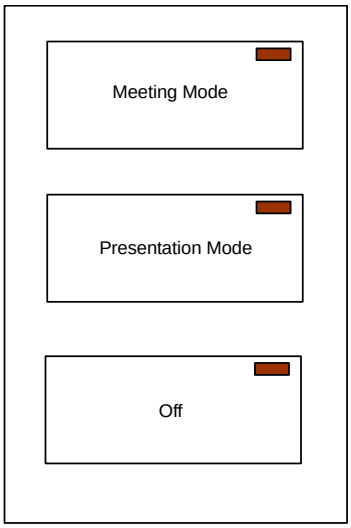


**FIG. 35** Example - 3-button wall-mounted control panel

The room A panel has the following mapping between buttons and presets and feedback:

- Meeting Mode -> Preset 1 -> Feedback from channel 1
- Presentation Mode -> Preset 2 -> Feedback from channel 2
- Off -> Preset 3 -> Feedback from channel 3

The room B panel has a similar mapping between buttons and presets:

- Meeting Mode -> Preset 4 -> Feedback from channel 4
- Presentation Mode -> Preset 5 -> Feedback from channel 5
- Off -> Preset 6 -> Feedback from channel 6

One other panel, used by security, has two buttons to control the lights for Cleaning mode and Night mode. These buttons recall presets 7 and 8, respectively.

Operationally, room A panel and room B panel should appear to be independent with the currently active preset feedback active on its associated control panel.

- If room A is in Presentation Mode, then the Presentation Mode button LED should be lit (i.e. channel 2 should be on).
- If room B is in Meeting Mode, then the Meeting Mode button LED should be lit (i.e. channel 4 should be on), meaning that both channels 2 and 4 will be on with all others off.

Assuming the conditions above (channels 2 & 4 on), when Cleaning mode is selected by security, channels 2 and 4 will be turned off and channel 7 will be turned on.

Thus, a preset's feedback will remain on until something affects any one of the dimmers affected by the preset.

## Lighting Systems Overview

AMX Lighting systems are based on a modular construction. The modular structure has three basic components: Controller, Enclosure, and Dimmer/Switch Modules. All AMX Lighting controllers have six channels of control. Seven channels of control will always require the use of two controllers.

In order to have the controllers address different dimmers' ranges, the dimmers have a DIP switch installed to address each pack/group of six channels to a specific range. Changing the SEND_STRING DIP switch address (value) is a means of differentiating the various dimmers.

All AxLink devices also have an address DIP switch to set a unique ID from 1 to 255.

FIG. 36 shows a sample AMX Lighting RE-DM4 controller and its internal components.

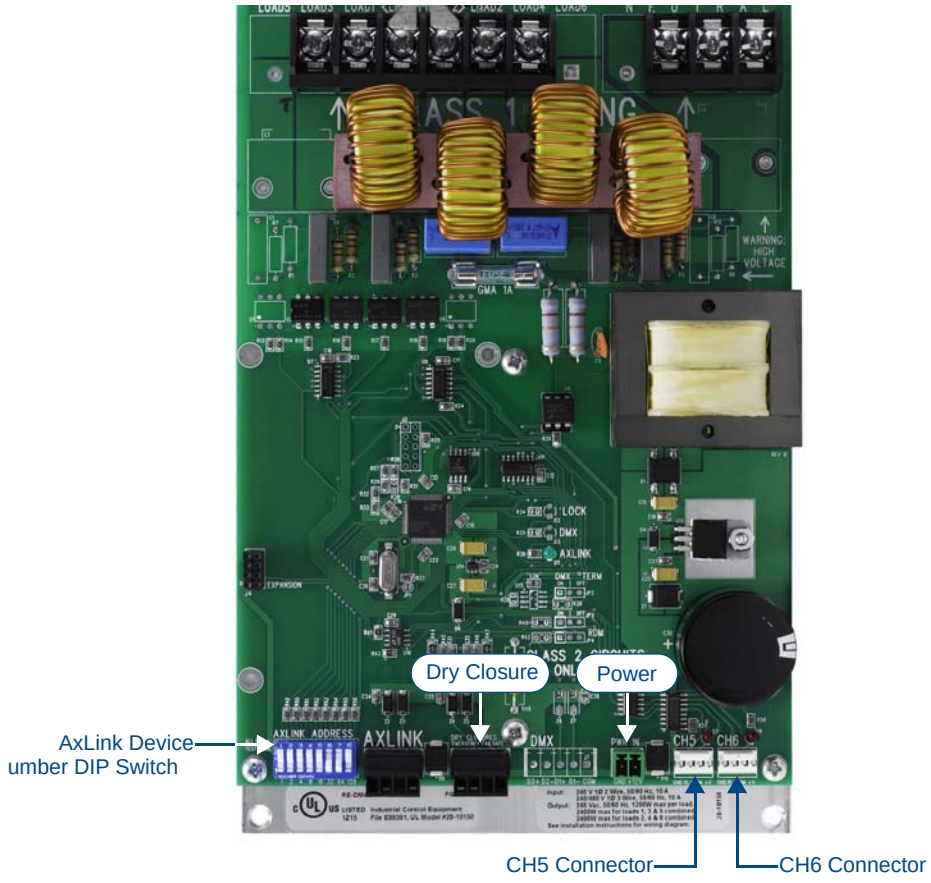


**FIG. 36** Sample AMX Lighting controller and internal components

# Programming Commands

The AMX Lighting system uses four main types of programming commands: Setup, Recording, Status, and Operation commands. The following description applies to the AxLink Command Structure.

## Setup commands

These types of commands are global commands sent to Pack #1 that affect the entire network.

These commands are used to set the default values and parameters that are typically entered at the startup of the system and not changed. If certain commands are issued with a time value associated then the AMX Lighting system will use an available default value determined at setup.

The commands for recording and recalling presets use these defaults, as do ramping operations. Curve settings are setup commands done on a individual channel basis and are not global.

Curves are set in the beginning and do not need to be changed unless the loads also change.

## Recording commands

These commands send preset data to the AMX Lighting memory chip. All recording and setup commands are stored in non-volatile memory. These commands are also used to store presets, assign presets for dry closure recall, and erase stored presets.

## Status commands

Status commands allow a user or a program to get data from the lighting system and act on that information. This feature gives a computer the ability to perform interactive processes with the AMX Lighting system.

## Operation commands

The operational commands category, the largest category used by the AMX Lighting system, is used for real-time lighting control and setup of scenes prior to programming presets. Operational commands recall, ramp, and set levels for dimmers. They can also be used for remote operation of the dry closure contact.

# Control Curves and Low-End Settings

The market currently has a great selection of new lamp and ballast options. Each one has properties and dimming characteristics that present a new challenge for the dimmer manufacturer to provide an appropriate dimmer. What was designed as a standard incandescent dimmer must now be able to control electronic ballast, incandescent lamps, low voltage track lighting, and a host of new transformers. One way to solve many of these problems is to apply different control curves to each dimmer and to provide a variable low-end cut-off point.

A dimming curve is a graphical or electronic representation of the amount of control that must be applied to a dimmer in relation to the dimmer output. This is much like a directional map that the controller follows. The amount of control is typically measured in percent; from an Off-state of level 0 to an On-state at level 100. Dimmer output is measured in volts. A graphical representation of a dimming curve is usually the percentage of dimming in relation to the output voltage (RMS) of the dimmer connected to a standard load. FIG. 37 shows a sample dimming curve.

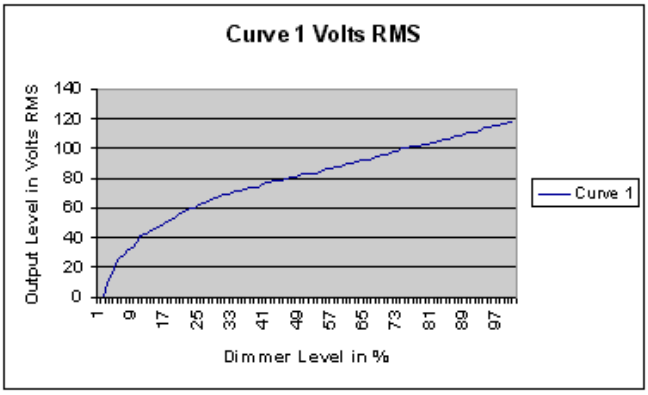


**FIG. 37** Sample dimming curve

Sometimes a fixture or lamp has a problem dimming down to a low range. When this happens, the lights can flicker and cause unwanted dimming performance.

To correct for anomalies in the dimming performance of various devices, the AMX Lighting controller has provisions to set an individual low-end trim for each of the six dimming channels. The AMX Lighting dimming system employs a low-end cut-off that allows the dimmer to turn on to a specified level or to dim down to a specific level. The level at which the dimmer turns on is called the Low End Setting.

Low End commands prevent the dimmer from going below a set threshold. They also force the dimmers on to the preset threshold, which is useful for some transformer loads and track lights.

## Levels

Radia only supports 8-bit levels with values from 0-255; equivalent to 0-100%. Each AxLink level (1-6) corresponds o a dimmer (1-6). The levels can be used both as feedback and control.

As feedback, when a dimmer is ramping (i.e. changing level), Radia will send notification to the master as the level changes EXCEPT as noted below.

As control, Radia also can receive level changes from the master and it will update the dimmers' output level corresponding to the received level from the master. The rate of actual dimmer level change is determined by the default level time as specified in the 'LT' command.

Receipt of level changes will also define the affected dimmer for the purposes of presets. During ramping of a dimmer output due to incoming level changes, Radia will not send feedback level updates. It will resume sending level updates back to the master upon reception of a command or channel that affects the dimmer/level.

NOTE

*For more information on programming lighting systems, please refer to the AMX RADIA Lighting Programming* section on page 31.

## Default Settings

The factory defaults for all adjustable settings is as follows:

### Default Low-end

The default low-end setting is 1 for all dimmers.

### Default Ramp Time

The default ramp times, in seconds, are:

| Default Ramp Time | |
|---|---|
| Function | Time Value (in seconds) |
| Ramp Time | 6 |
| Level Time | 1 |
| Preset Time | 3 |

## Initial Level Status Reporting

When communication with a master is established, the master assumes the Radia is at its default level status, and the master assumes that all levels are at zero. However, Radia may not be at the same status assumed by the master on default, and at least one or more levels would be non-zero if new levels are established.

Therefore, Radia saves the value of each level, and will send an update to the master of the value of any non-zero level if your code contains a CREATE_LEVEL or LEVEL_EVENT for Radia.

## Channels

The channels are defined as follows:

| AMX Lighting Channel Commands | | | |
|---|---|---|---|
| Channel # | Function | Channel # | Function |
| **1-128** | Status of presets, indicates active preset | **139** | Ramp channel 5 down |
| **129** | Ramp channel 1 up | **140** | Ramp channel 6 down |
| **130** | Ramp channel 2 up | **141** | Ramp all 60 channels up |
| **131** | Ramp channel 3 up | **142** | Ramp all 60 channels down |
| **132** | Ramp channel 4 up | **143** | Turn all 60 channel on |
| **133** | Ramp channel 5 up | **144** | Turn all 60 channels off |
| **134** | Ramp channel 6 up | **145** | Ramp active preset up |
| **135** | Ramp channel 1 down | **146** | Ramp active preset down |
| **136** | Ramp channel 2 down | **147** | Status of dry closure 1 |
| **137** | Ramp channel 3 down | **148** | Status of dry closure 2 |
| **138** | Ramp channel 4 down | **155** | All levels 'Undefined' |

## SEND_STRINGs

The Radia supports a large number of strings, which can be used to allow interaction with a person using a terminal. These strings remain primarily to facilitate backward compatibility for other AMX lighting equipment.

Conventions used in this protocol section of the document:

| Protocol Conventions | | |
|---|---|---|
| Symbol | Function | Values |
| **<CR>** | ASCII Carriage Return character | 13 ($0D) |
| **<curve>** | Value for Curve | 1,2,3,4,5,6,7,8,9,A,B,C,D,E,F,N,O,R |
| **<closure>** | Value for Dry Closure | 1-2 |
| **<level>** | Value for Dimmer Level (in %) | 0-100 |
| **<dimmer>** | Value for Dimmer Number | 1-6 or A for all. Can include a range of dimmers or ranges of dimmers unless noted otherwise. For example:<br>• “1-3” indicates dimmers 1 through 3 inclusive.<br>• “1-3&5-6” indicates dimmers 1 through 3 and 5 through 6, inclusive.<br>• “A” indicates ALL dimmers. |
| **<pack>** | Pack Number | 1 |
| **<preset>** | Value for preset number | 1-128 |
| **<time>** | Time value for fade (in seconds) | 0-255 |


*In contrast with previous versions of Radia dimmers, Radia Eclipse dimmers accept both upper- and lower-case strings*

- All string responses are preceded with a single byte 12 ($0C in HEX or ASCII character '?') and followed by a carriage return (13 or hex $0D), line feed (10 or hex $0A), and a question mark '?' (63 or hex $3F).
- All invalid strings will generate the error string 'ERROR! PLEASE RE-ENTER' followed by the BEL character (7), carriage return (13 or hex $0D), line feed (10 or hex $0A), and a question mark '?' (63 or hex $3F).

### Ramp Dimmers Up

This function ramps up the specified dimmer(s) until the ramp is stopped or the dimmer(s) reach 100%.

- Since this function uses the terminating carriage return (ASCII 13) to stop ramping, do not send the carriage return with the string.
- The ramp rate for this function is the default ramp time as established by the 'RT' command.

| Ramp Dimmers Up | | |
|---|---|---|
| String: | **<dimmer>U** | |
| Response: | <dimmer> UP | (if one dimmer specified) |
| | GROUP UP | (if multiple dimmers specified) |
| | ALL UP | (if all ('A') dimmers specified) |
| Examples: | **SEND_STRING Radia,'1U'** | Ramp dimmer one up |
| | Response: "'01 UP',13,10,?" | |
| | **SEND_STRING Radia,'2-4&6U'** | Ramp dimmers 2, 3, 4, and 6 up |
| | Response: "'GROUP UP',13,10,?" | |
| | **SEND_STRING Radia,'AU'** | Ramp all dimmers up |
| | Response: "'ALL UP',13,10,?" | |
| | **SEND_STRING Radia,"13"** | Stop ramping |
| | Responses for the commands issued above respectively: | |
| | "12,'01 STOP',13,10,'?"' | Dimmer one stopped |
| | "12,'GROUP STOP',13,10,'?"' | Dimmer group stopped |
| | "12,'ALL STOP',13,10,'?"' | All dimmers stopped |

### Ramp Dimmers Down

This function ramps down the specified dimmer(s) until the ramping stops or the dimmer(s) reach 0%.

- Note that this function uses the terminating carriage return (ASCII 13) to stop ramping, so do not send the carriage return with the string.
- The ramp rate for this function is the default ramp time as established by the 'RT' command.

| Ramp Dimmers Down | | |
|---|---|---|
| String: | **<dimmer>D** | |
| Response: | <dimmer> DOWN | (if one dimmer specified) |
| | GROUP DOWN | (if multiple dimmers specified) |
| | ALL DOWN | (if all ('A') dimmers specified) |
| Examples: | **SEND_STRING Radia,'1D'** | Ramp dimmer one down |
| | Response: "12,'01 DOWN',13,10,?" | |
| | **SEND_STRING Radia,'2-4&6U'** | Ramp dimmers 2, 3, 4, and 6 down |
| | Response: "12,'GROUP DOWN',13,10,?" | |
| | **SEND_STRING Radia,'AU'** | Ramp all dimmers down |
| | Response: "12,'ALL DOWN',13,10,?" | |
| | **SEND_STRING Radia,"13"** | Stop ramping. |
| | Responses for the commands issued above respectively: | |
| | "12,'01 STOP',13,10,'?"' | Dimmer one stopped |
| | "12,'GROUP STOP',13,10,'?"' | Dimmer group stopped |
| | "12,'ALL STOP',13,10,'?"' | All dimmers stopped |

## Stop Ramping Dimmer

This function stops the specified dimmer(s) from ramping.

This command will also stop the ramping of dimmers that are being ramped by the PU and PD commands.

| Stop Ramping Dimmer | | |
|---|---|---|
| String: | **<dimmer>S** | |
| Response: | <dimmer> STOP | (if one dimmer specified) |
| | GROUP STOP | (if multiple dimmers specified) |
| | ALL STOP | (if all ('A') dimmers specified) |
| Examples: | **SEND_STRING Radia,"'1S',13"** | Stop ramping dimmer 1 |
| | Response: "12,'01 STOP',13,10,'?"' | |
| | **SEND_STRING Radia,"'2-4S',13"** | Stop ramping dimmers 2-4 |
| | Response: "12,'GROUP STOP',13,10,'?"' | |
| | **SEND_STRING Radia,"'AS',13"** | Stop ramping all dimmers |
| | Response: "12,'ALL STOP',13,10,'?"' | |

## Ramp Active Preset Up

This function ramps up the currently active (last recalled) preset until the ramp is stopped or all dimmers in the preset reach 100%. Note this function uses the terminating carriage return (ASCII 13) to stop ramping, therefore the carriage return must not be sent with the string.

The ramp rate for this function is the default ramp time as established by the 'RT' command.

- Only dimmers that are assigned a level greater than 0 in the preset are ramped.
- Dimmers with a level of 0 and Undefined dimmers are not affected by the PU command.

| Ramp active preset up | | |
|---|---|---|
| String: | **PU** | |
| Response: | PRESET <preset> RAMPING UP | |
| Examples: | **SEND_STRING Radia,'PU'** | Ramp preset up |
| | Response: "12,'PRESET 001 RAMPING UP',13,10,?" | |
| | **SEND_STRING Radia,"13"** | Stop ramping |
| | Response: "12,'PRESET 001 RAMP STOPPED',13,10,'?"' | |

## Ramp Active Preset Down

This function ramps down the currently active (last recalled) preset until the ramp is stopped or all dimmers in the preset reach 0%. Note this function uses the terminating carriage return (ASCII 13) to stop ramping, so the carriage return must not be sent with the string.

The ramp rate for this function is the default ramp time as established by the 'RT' command.

| Ramp Active Preset Down | | |
|---|---|---|
| String: | **PD** | |
| Response: | PRESET <preset> RAMPING DOWN | |
| Examples: | **SEND_STRING Radia,'PD'** | Ramp preset down |
| | Response: "12,'PRESET 001 RAMPING DOWN',13,10,?" | |
| | **SEND_STRING Radia,"13"** | Stop ramping |
| | Response: "12,'PRESET 001 RAMP STOPPED',13,10,'?"' | |

### Stop Ramping Preset

This function stops the ramping of the most recently ramped preset.

| Stop Ramping Preset | | |
|---|---|---|
| String: | **PS** | |
| Response: | PRESET <preset> RAMP STOP | |
| Example: | **SEND_STRING Radia,"'PS',13"** | Stop ramping preset |
| | Response: "12,'PRESET 001 RAMP STOP',13,10,'?'" (if preset 1 was ramping) | |

### Recall Preset

This function recalls the specified preset over an optionally specified time.

If time is not specified, then the rate used when saving the preset used.

| Recall Preset | | |
|---|---|---|
| String: | **<preset>B[<time>]** | |
| Response: | GOTO <preset> in <time> | |
| Examples: | **SEND_STRING Radia,"'2B',13"** | Recall preset 2 at the saved rate |
| | Response: "12,'GOTO 002 in 5',13,10,'?'" | |
| | **SEND_STRING Radia,"'56B10',13"** | Recall preset 56 over 10 seconds |
| | Response: "12,'GOTO 056 in 10',13,10,'?'" | |

NOTE

*If no time was specified for recording the preset or recalling the preset, the preset will be recalled using the default time when the preset was saved.*

### Record Preset

This function records the current level of all "defined" dimmers and associates them with the specified preset.

- An optional time parameter may be specified to record the specified rate at which the preset is to be recalled.
- If time is not specified, then the default preset rate value at the time of the preset recording will be used when recalling the preset as set by the "PT" command.

| Record Preset | | |
|---|---|---|
| String: | **<preset>R[<time>]** | |
| Response: | RECORD <BEL> <preset> IN <time> | |
| Examples: | **SEND_STRING Radia,"'3R',13"** | Record preset 3 at default rate |
| | Response: "12,'RECORD ',7,'003 IN 5',13,10,'?'" | |
| | **SEND_STRING Radia,"'32R3',13"** | Record preset 32 with 5 second ramp |
| | Response: "12,'RECORD ',7,'032 IN 3',13,10,'?'" | |

### Level Status

This function returns the current dimmer levels of all dimmers.

All level values are returned as a percentage (0-100).

| Level Status | | |
|---|---|---|
| String: | **[<pack>]Z** | |
| Response: | P<pack>:<level1>,<level2>,<level3>,<level4>,<level5>,<level6> | |
| Example: | **SEND_STRING Radia,"'Z',13"** | Request level status |
| | Response: "12,'P01:00,25,37,100,00,00',13,10,'?'" | |

If <pack> is specified, it must be 1.

### Set Curve

This function sets the specified dimmer(s) to follow the specified curve.

| Set Curve | | |
|---|---|---|
| String: | **<dimmer>/<curve>** | |
| Response: | <dimmer> CURVE <curve> | |
| Examples: | **SEND_STRING Radia,"'1/1',13"** | Set dimmer 1 to curve 1 |
| | Response: "12,'1 CURVE 1',13,10,'?"' | |
| | **SEND_STRING Radia,"'1-4/N',13"** | Set dimmers 1-4 to curve N |
| | Response: "12,'GROUP CURVE N',13,10,'?"' | |
| | **SEND_STRING Radia,"'A/3',13"** | Set all dimmers to curve 3 |
| | Response: "12,'ALL CURVE 3',13,10,'?"' | |

### Curve Status

This function returns the curve assigned to each dimmer.

| Curve Status | | |
|---|---|---|
| String: | **[<pack>]C** | |
| Response: | P<pack>:<curve1>,<curve2>,<curve3>,<curve4>,<curve5>,<curve6> | |
| Example: | **SEND_STRING Radia,"'C',13"** | Request current curve settings |
| | Response: "12,'P01:1,1,1,1,N,N',13,10,'?"' | |

If <pack> is specified, it must be 1.

NOTE

*See Appendix A: AMX Lighting Curves* section on page 49 *for more information.*

### Set Low End

This function sets the minimum on percentage for the specified dimmer (i.e. a level of 0 will still be off).

For example, if the low end is set to 10, then any request for a level between 1-10 will result in the output level being 10, a request for 0 will be 0, and a request for a level between 11-100 will result in the outputting of that level.

This function is used to prevent certain loads from dimming below the dimmer's ability.

| Set Low End | | |
|---|---|---|
| String: | **<dimmer>LE<percent>** | |
| Response: | MINIMUM LEVEL IS: <percent> | |
| Example: | **SEND_STRING Radia,"'2LE20',13"** | Set minimum level to 20% |
| | Response: "12,'MINIMUM LEVEL IS: 020',13,10,'?"' | |

### Low End Status

This function returns the low end settings assigned to each dimmer.

| Low End Status | | |
|---|---|---|
| String: | **[<pack>]LE?** | |
| Response: | P<pack>:<percnt1>,<percnt 2>,<percnt 3>,<percnt 4>,<percnt 5>,<percnt 6> | |
| Example: | **SEND_STRING Radia,"'LE?',13"** | Request current low end settings |
| | Response: "12,'P01:000,005,000,000,005,000',13,10,'?"' | |

If <pack> is specified, it must be 1.

### Dimmer Status

This function returns the status of the specified dimmer.

| Dimmer Status | | |
|---|---|---|
| String: | **<dimmer>** | |
| Response: | CHAN:<dimmer> CURV:<curve> LEV:<level> | |
| Example: | **SEND_STRING Radia,"'3',13"** | Request dimmer 3 status |
| | Response: "12,'CHAN:3 CURV:1 LEV:43',13,10,'?"' | |

- The use of multiple dimmers (e.g. 'A', '&', and '-') are not allowed with this function, and their use will return an error.
- If the level of the dimmer is undefined, the level is reported an 'UN'.
- This is the only method used to determine if a level is undefined. For example, the response to the command above would be: "12,'CHAN:3 CURV:1 LEV:UN',13,10,'?"'

### Reboot

This function reboots the dimmer and initializes it to its power-up state. The device will go off-line with the master and return on-line.

| Reboot | | |
|---|---|---|
| String: | **[<pack>]QQQ** | |
| Response: | None | |
| Example: | **SEND_STRING Radia,"'QQQ',13"** | Reboot dimmer |
| | Response: none | |

If <pack> is specified, it must be 1.

### Set Default Level Time

This function sets the time taken for a level to change from its current level to a new level when using a level command.

| Set Default Level Time | | |
|---|---|---|
| String: | **LT<time>** | |
| Response: | 'LEVEL TIME SET AT <time>' | |
| Example: | **SEND_STRING Radia,"'LT3',13"** | Set default level ramp time to 3 seconds |
| | Response: "12,'LEVEL TIME SET AT 003',13,10,'?"' | |
| | **SEND_STRING Radia,"'LT0',13"** | Set default level ramp time to 0 seconds (instantaneous) |
| | Response: "12,'LEVEL TIME SET AT 000',13,10,'?"' | |

### Set Default Preset Time

This function sets the time taken for a preset recall to ramp when no time is specified to override this default time.

| Set Default Preset Time | | |
|---|---|---|
| String: | **PT<time>** | |
| Response: | PRESET TIME SET AT <time> | |
| Example: | **SEND_STRING Radia,"'PT4',13"** | Set default preset ramp time to 4 seconds |
| | Response: "12,'PRESET TIME SET AT 004',13,10,'?"' | |

### Set Default Ramp Time

This function sets the default ramp rate for ramping strings and channels (e.g. 'U', 'D', 'PU', 'PD'). The specified ramp rate is the time required to ramp from 0 to 100%.

| Set Default Ramp Time | | |
|---|---|---|
| String: | **RT<time>** | |
| Response: | RAMP TIME SET AT <time> | |
| Example: | **SEND_STRING Radia,"'RT5',13"** | Set ramp time to 5 seconds |
| | Response: "12,'RAMP TIME SET AT 005',13,10,'?"' | |


*A ramp time of zero (0) is invalid and will generate an error.*

### Ramp To Level

This function ramps the specified dimmer(s) to the specified level over the optionally specifiable time.

| Ramp To Level | | |
|---|---|---|
| String: | **<dimmer>L<level>T[<time>]** | |
| Response: | <dimmer> LEVEL <level> IN <time> | |
| Examples: | **SEND_STRING Radia,"'2L88',13"** | Ramp dimmer 2 to 88% at the default level rate |
| | Response: "12,'02 LEVEL 088 IN 005',13,10,'?"' | Assuming default level rate is 5 |
| | **SEND_STRING Radia,"'1-4&6L100',13"** | Ramp 1-4, & 6 to 100% at the default level rate. |
| | Response: "12,'GROUP LEVEL 100 IN 005',13,10,'?"' | |
| | **SEND_STRING Radia,"'6L50T5',13"** | Ramp dimmer 6 to 50% over 5 seconds. |
| | Response: "12,'06 LEVEL 050 IN 005',13,10,'?"' | |
| | **SEND_STRING Radia,"'AL0',13"** | Ramp all dimmers to 0% at the default ramp rate. |
| | Response: "12,'ALL LEVEL 000 IN 005',13,10,'?"' | |

### Undefine Dimmer

This function "undefines" the specified dimmer so that it will not be included in the next saved preset. This allows a preset to affect a subset of the dimmers rather than all of them.

| Undefine Dimmer | | |
|---|---|---|
| String: | **<dimmer>LU** | |
| Response: | <dimmer> LEVEL UN IN 000 | |
| Example: | **SEND_STRING Radia,"'1LU',13"** | Set dimmer 1 to undefined level |
| | Response: "12,'001 LEVEL UN IN 000',13,10,'?"' | |
| | **SEND_STRING Radia,"'2-4LU',13"** | Set dimmers 2-4 to undefined level |
| | Response: "12,'GROUP LEVEL UN IN 000',13,10,'?"' | |
| | **SEND_STRING Radia,"'ALU',13"** | Set all dimmers to undefined level |
| | Response: "12,'ALL LEVEL UN IN 000',13,10,'?"' | |

### Phase Query

This function queries the current state of the phase detection system.

- Phase zero-crossing detection occurs at all times.
- In the presence of a phase/zero-cross error, the AxLink LED will blink very fast (>10Hz) and all string responses (where existent) will be "PHASE ERROR!".

| Phase Query | | |
|---|---|---|
| String: | **[<pack>]Y** | |
| Response: | P<pack>: <pass/fail> 1<state1> 2A<state2A> 2B<state2B> 3<state3> | |
| The <pass/fail> item will either be 'OK' or 'FAIL' to indicate an overall condition.<br>The <state> items are phase specific to indicate which phase is failing.<br>The <state> will either be 'Y' for okay or 'N' failure. | | |
| Example: | **SEND_STRING Radia,"'Y',13"** | check phase status |
| | Response: "12,'P01: OK 1Y 2AN 2BN 3N',13,10,'?'" | Good response |
| | **SEND_STRING Radia,"'Y',13"** | check phase status |
| | Response: "12,'P01: FAIL 1Y 2AN 2BN 3Y',13,10,'?'" | Fail on 2A and 2B |

### Version Query

This function queries the Radia for its firmware version.

| Version Query | | |
|---|---|---|
| String: | **<pack>VER** | |
| Response: | P<pack> <version string> | |
| Example: | **SEND_STRING Radia,"'VER',13"** | Request version |
| | Response: "12,'P01 v3.14',13,10,'?'" | |

NOTE

*If <p> is specified, it must be 1 (e.g. 1Y).*

### Factory Default

This function commands the Radia to restore all factory defaults.

| Factory Default | | |
|---|---|---|
| String: | **FACTORY** | |
| Response: | None | |
| Example: | **SEND_STRING Radia,"'FACTORY',13"** | Restore Factory Defaults |
| | Response: None | |

# SEND_COMMANDs

The Radia Eclipse firmware supports the SEND_COMMANDs listed in the table below. The number of SEND_COMMANDs is expected to grow as we transition away from using the SEND_STRING method of controlling Radia dimmers.

Note that most SEND_COMMANDs do not have responses. With those that do, they respond with a COMMAND, not a string.

Conventions used in this protocol section of the document include:

| SEND_COMMAND Protocol Conventions | | |
|---|---|---|
| Symbol | Function | Values |
| **<m>** | Value for Dimmer Level (in %) | 0-100 |
| **<n>** | Value for Dimmer Number | 1-6 or A for all. Can include a range of dimmers or ranges of dimmers unless noted otherwise. For example:<br>• "1-3" indicates dimmers 1 through 3 inclusive.<br>• "1-3&5-6" indicates dimmers 1 through 3 and 5 through 6, inclusive.<br>• "A" indicates ALL dimmers. |
| **<s>** | Value for preset number | 1-128 |
| **<t>** | Time value for fade (in seconds) | 0-255 |

## Ramp Preset Up (NEW)

This function ramps up the specified or currently active (last recalled) preset until the ramp is stopped or the all dimmers in the preset reach 100%.

If <preset> is not specified, then the last recalled preset is ramped.


*Use the 'PS' command to stop preset ramping. This command allows the programmer to specify which preset to stop.*

The ramp rate for this function is the default ramp time as established by the 'RT' command.

- Only dimmers that are assigned a level greater than 0 in the preset are ramped.
- Dimmers with a level of 0 and Undefined dimmers are not affected by the PU command.

| Ramp Preset Up | | |
|---|---|---|
| **Command:** | **PU<preset>** | |
| **Response:** | None | |
| **Examples:** | **SEND_COMMAND Radia,'PU'** | Ramp last preset up |
| | **SEND_COMMAND Radia,'PS'** | Stop ramping. |
| | **SEND_COMMAND Radia,'PU52'** | Ramp preset 52 up |
| | **SEND_COMMAND Radia,'PS52'** | Stop ramping preset 52 |

### Ramp Preset Down (NEW)

This function ramps down the specified or currently active (last recalled) preset until the ramp is stopped or the all dimmers in the preset reach 0%.

- If <preset> is not specified, then the last recalled preset is ramped.
- Note this function uses the 'PS' command to stop ramping.
- The ramp rate for this function is the default ramp time as established by the 'RT' command.

| Ramp Preset Down | | |
|---|---|---|
| Command: | **PD<preset>** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'PD'** | Ramp last preset down |
| | **SEND_COMMAND Radia,'PS'** | Stop ramping. |
| | **SEND_COMMAND Radia,'PU43'** | Ramp preset 43 down |
| | **SEND_COMMAND Radia,'PS43'** | Stop ramping preset 43 |

### Stop Ramping Preset (NEW)

This function stops the ramping of the specified or currently active ramping preset.

- If <preset> is not specified, then the last recalled preset is stopped.

| Stop Ramping Preset | | |
|---|---|---|
| Command: | **PS<preset>** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'PS'** | Stop ramping last preset |
| | **SEND_COMMAND Radia,'PS32'** | Stop ramping preset 32 |

### Recall Preset

This function recalls the specified preset over an optionally specified time.

- If time is not specified, then the rate used when saving the preset used.
- If no rate was specified when saving the preset, then the current default preset rate is used (as set by the "PT" command).

| Recall Preset | | |
|---|---|---|
| Command: | **RP<preset>T[<time>]** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'RP2'** | Recall preset 2 at the saved rate |
| | **SEND_COMMAND Radia,'RP56T10'** | Recall preset 56 over 10 seconds |

### Record Preset

This function records the current level of all "defined" dimmers and associates them with the specified preset.

- An optional time parameter may be specified to record the specified rate at which the preset is to be recalled.
- If time is not specified, then the default preset rate value at the time of the preset recording will be used when recalling the preset as set by the "PT" command.

| Record Preset | | |
|---|---|---|
| Command: | **SP<preset>T[<time>]** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'SP3'** | Record preset 3 at default rate |
| | **SEND_COMMAND Radia,'SP32T3'** | Record preset 32 with 5 second ramp |

### Set Curve

This function sets the specified dimmer(s) to follow the specified curve.

| Set Curve | | |
|---|---|---|
| Command: | **SC<dimmer>C<curve>** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'SC1C1'** | Set dimmer 1 to curve 1 |
| | **SEND_COMMAND Radia,'SC1-4CN'** | Set dimmers 1-4 to curve N |
| | **SEND_COMMAND Radia,"SCAC3'** | Set all dimmers to curve 3 |

### Curve Status (NEW)

This function returns the curves assigned to each dimmer. The response will be an incoming COMMAND to the master.

| Curve Status | | |
|---|---|---|
| Command: | **?C** | |
| Response: | ?C-<curve1>,<curve2>,<curve3>,<curve4>,<curve5>,<curve6> | |
| Example: | **SEND_COMMAND Radia,'?C'** | Request current curve settings |
| | Response: 'C-1,1,1,1,N,N' | |


*See the Appendix A: AMX Lighting Curves* section on page 49 *for more information.*

### Set Low End (NEW)

This function sets the minimum on percentage for the specified dimmer (i.e. a level of 0 will still be off).

For example, if the low end is set to 10, then any request for a level between 1-10 will result in the output level being 10; a request for 0 will be 0; a request for a level between 11-100 will result in the outputting of that level.

This function is used to prevent certain loads from dimming below the product's ability.

| Set Low End | | |
|---|---|---|
| Command: | **LE<dimmer>L<percent>** | |
| Response: | None | |
| Example: | **SEND_COMMAND Radia,'LE2L20'** | Set minimum level of dimmer 2 to 20% |

### Low End Status (NEW)

This function returns the low end settings assigned to each dimmer. The response will be an incoming COMMAND to the master.

| Low End Status | | |
|---|---|---|
| Command: | **?LE** | |
| Response: | LE-<percent1>,<percent 2>,<percent 3>,<percent 4>,<percent 5>,<percent 6> | |
| Example: | **SEND_COMMAND Radia,'?LE'** | Request current low end settings |
| | Response: 'LE- 000, 005, 000, 000, 005, 000' | |

### Reboot (NEW)

This function reboots the dimmer and initializes it to its power-up state. The device will go off-line and then return on-line with the master controller.

| Reboot | | |
|---|---|---|
| Command: | **RESET** | |
| Response: | None | |
| Example: | **SEND_COMMAND Radia,'RESET'** | Reboot dimmer |

### Set Default Level Time

This function sets the time taken for a level to change from its current level to a new level when using a level command.

| Set Default Level Time | | |
|---|---|---|
| Command: | **LT<time>** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'LT3'** | Set default level ramp time to 3 seconds. |
| | **SEND_COMMAND Radia,'LT0'** | Set default level ramp time to 0 seconds (instantaneous). |

### Set Default Preset Time

This function sets the time taken for a preset recall to ramp when no time is specified to override this default time.

| Set Default Preset Time | | |
|---|---|---|
| Command: | **PT<time>** | |
| Response: | None | |
| Example: | **SEND_COMMAND Radia,'PT4'** | Set default preset ramp time to 4 seconds. |

### Set Default Ramp Time

This function sets the default ramp rate for ramping strings, command, and channels (e.g. 'U', 'D', 'PU', 'PD'). The specified ramp rate is the time required to ramp from 0 to 100%.

| Set Default Ramp Time | | |
|---|---|---|
| Command: | **RT<time>** | |
| Response: | None | |
| Example: | **SEND_COMMAND Radia,'RT5'** | Set ramp time to 5 seconds |

NOTE

*A ramp time of zero (0) is invalid.*

### Ramp to Level

This function ramps the specified dimmer(s) to the specified level over the optionally specifiable time.

| Ramp To Level | | |
|---|---|---|
| Command: | **P<dimmer>L<level>T[<time>]** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'P2L88'** | Ramp dimmer 2 to 88% at the default level rate. |
| | **SEND_COMMAND Radia,'P1-4&6L100'** | Ramp 1-4, and 6 to 100% at the default level rate. |
| | **SEND_COMMAND Radia,'P6L50T5'** | Ramp dimmer 6 to 50% over 5 seconds. |
| | **SEND_COMMAND Radia,'PAL0'** | Ramp all dimmers to 0% at the default ramp rate. |

### Undefine Dimmer (NEW)

This function "undefines" the specified dimmer so that it will not be included in the next saved preset. This allows a preset to affect a subset of the dimmers rather than all of them.

| Undefine Dimmer | | |
|---|---|---|
| Command: | **UN<dimmer>** | |
| Response: | None | |
| Examples: | **SEND_COMMAND Radia,'UN1'** | Set dimmer 1 to undefined level. |
| | **SEND_COMMAND Radia,'UN2-4'** | Set dimmers 2-4 to undefined level. |
| | **SEND_COMMAND Radia,'UNA'** | Set all dimmers to undefined level. |

## Phase Query (NEW)

This function queries the current state of the phase detection system. Phase zero-crossing detection occurs at all times.

- In the presence of a phase/zero-cross error, the AxLink LED will blink very fast (more than 10Hz) and all string responses with strings that give responses will be "PHASE ERROR!".
- The response will be an incoming COMMAND to the master.

| Phase Query | | |
|---|---|---|
| Command: | **?Y** | |
| Response: | Y-<pass/fail> 1<state1> 2A<state2A> 2B<state2B> 3<state3> | |
| The <pass/fail> item will either be 'OK' or 'FAIL' to indicate an overall condition.<br>The <state> items are phase specific to indicate which phase is failing.<br>The <state> will either be 'Y' for okay or 'N' failure. | | |
| Examples: | **SEND_COMMAND Radia,'?Y'** | check phase status |
| | Response: 'Y-OK 1Y 2AN 2BN 3N' | Good response |
| | **SEND_COMMAND Radia,'?Y'** | check phase status |
| | Response: 'Y-FAIL 1Y 2AN 2BN 3Y' | Fail on 2A and 2B |

# Appendix A: AMX Lighting Curves

## Overview

Thousands of different lighting fixtures with unique shapes and styles exist, all designed to do something visibly different with light. Any one of those fixtures in a hundred different locations could produce a different lighting effect. Two identical lights in different locations could produce different reflections and shadows.

For instance, consider a situation where low-voltage track lights are mixed with compact fluorescent down lights to illuminate a hallway with pictures. Under normal dimming conditions, the two different light sources would dim differently and possibly require individually set dimmers to accomplish uniform lighting at different levels. An Up or Down button on a wall control panel would dim both sources at a common rate, but the lamps and fixtures would dim at different rates due to the lamp and ballast characteristics. The track light may stay bright for an extended period and then rapidly dim to nothing while the fluorescent lamp dims smoothly to a point and then abruptly shuts off. The combined effect produces an uncoordinated scene change.

An unwanted feature of dimmable fluorescent ballasts and low-voltage electronic transformers is their tendency to cause the lamps to flicker when dimmed to low levels. The normal way to avoid this is to use presets that are not dimmed below the fixture's threshold or to use any low end trim feature provided by the ballast or transformer manufacturer. Problems arise when the performance of the dimmer does not match the performance of the dimmable ballast. The AMX Lighting system now gives the user the ability to change the performance of the dimmer to avoid problems.

Many types of track lights and dimmable ballast only have a limited dimming range for the dimmer to work with. In a dimming range of 0 to 120 volts AC, many lamps do not start to dim until fewer than 100 volts is applied. Lamps often do most of their dimming between 40 and 100 volts. Dimmers designed to increment voltages from 0 to 120 volts can be wasted on lamps that do not even respond to 50% of the dimmer's output. Some lamps are more sensitive to voltage changes at the low end and can accommodate many degrees of dimming, but standard dimmers tend to rush past the lamp's sensitive range and occasionally linger in an unusable range.

Slowly turning a lamp on can be a very different effect than slowly dimming that same lamp off. Some light sources require a minimum level to turn on. Once these lamps are on, they can be dimmed down to lower light levels. At the same time, most common dimmers are built to dim at a uniform rate, regardless of the individual characteristics of each lamp or the number of lamps.

The properties and dimming characteristics of each new lamp and ballast on the market present a new challenge to the dimmer manufacturer to provide an appropriate dimmer. What was designed as a standard incandescent dimmer must now be able to control electronic ballasts, incandescent lamps, transformered low-voltage track lighting, and a host of electronic transformers.

One way to solve many of these problems is to tailor the style of dimming for each individual dimmer in a system. The way to do this is to apply different dimming curves to each dimmer and to provide a variable low-end cut-off point.

A dimming curve is a graphical or electronic representation of the amount of control to a dimmer in relation to the dimmer output. It is like a directional map followed by the dimmer. The amount of control is typically measured in percentages, from an off-state at level 0 to an on-state at level 100. Dimmer output is measured in volts. A graphical representation of a dimming curve is usually the percentage of dimming in relation to the output voltage (RMS) of the dimmer connected to a standard load.

AMX Lighting curve changes are implemented by a command to the AMX Lighting device. This example would set dimmer channel #1 to curve 6. The available curves that can be sent to the AMX Lighting controller are: 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, N, O, R, and F.

The Radia Eclipse controllers can employ a low-end cut-off that allows the dimmer to turn on to a specified level or to dim down to no less than a specified level. This level at which the dimmer turns on is called the Low End Setting. This is also used to turn a light off at the low end point when dimming down from a bright level. A low end setting of 25 applied to the standard dimming curve would prevent the fixture from being dimmed below Level 25. From an off condition, the same fixture would dim up to Level 25 and hold that level until the dimming curve directed the level higher.

If a fixture flickers just before it goes out, then the Low-End Setting can be used to avoid the unusable dimming range. Setting the Low-End Setting to just above the level where flickering problem starts will prevent the dimmer from allowing the flicker to be seen.

Dimmer manufacturers follow or adopt a level to output ratio called the Square Law curve. It is an exponential relationship between percentage of light perceived and the percentage of light measured. The Square Law Curve is a presumed relationship between perceived illuminance and measured illuminance. The Radia Eclipse controller's Curve 1 is a basic Square Law Curve. From this basic curve, AMX has developed a set of curves other than standard to accommodate the many different properties of the various loads connected to a AMX dimmer. Multiple curves provide a user with multiple ways to control lighting. This provides lighting designers with a more powerful lighting tool.

To demonstrate how a AMX dimmer actually performed under real conditions, we adopted a set of uniform tests to display the output characteristics of a dimmer.

The AMX test fixture for incandescent tests was set up using a constant Voltage feed of 120 VAC to the dimmer. The output of the dimmer was connected to (6) 100W GE lamps with a total load of 5 Amps. All fluorescent tests were done using the RDM-HDC module connected to a (2) lamp Advance Mark VII ballast using T-8 rapid start lamps. These curve plots are to be used as a relative guide to determining optimum performance. Actual field performance and measurements will be similar but not equal. FIG. 38 shows a basic dimming curve.

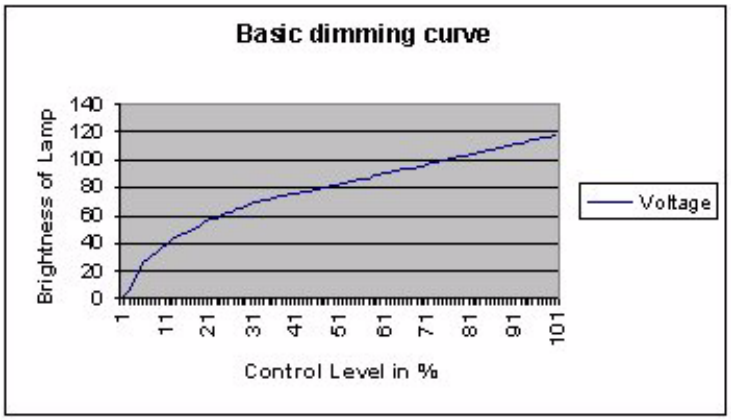


**FIG. 38** Basic dimming curve

Each curve allows a dimmer to change its output characteristics in relation to the amount of dimming. For example, the standard dimming curve at 50% could make a light brighter than another curve which was also at 50%.

Each AMX Lighting control channel has three dimmer characteristics; AC dimming, DC dimming, and switching. These are the three primary control methods for most lighting systems worldwide. The first characteristic is the output level in volts RMS. This is represented by the following Curve charts showing the Y-axis in (Dimmer) Output Level in Volts RMS (0-120VAC). The second characteristic is displayed on the second curve chart with the (Dimmer) Output Level in Volts DC (0-12VDC). The third characteristic is the turn on level for the switched (relay) aspect and is noted in text as the Relay Turn On Level.

This third characteristic controls the RLY output of the RDM connections on the RE-DM4. Previous versions of Radia would turn on the RLY outputs at INPUT (from control system) levels of 1 or above. Radia Eclipse turns on the RLY output at the OUTPUT level of 1, so that it can effected by curve choices and low end settings.

These three characteristics are applied to different AMX Lighting dimmers to change the way the dimmers perform. The first characteristic most often used for incandescent dimming requires a variable high-voltage output to one Hot wire connected to the incandescent lamp. The curve determines the amount of high-voltage applied to the dimmer's output in relation to the control level. The second dimmer characteristic applied to low-voltage output of the AMX RDM-HDC module is commonly used for fluorescent ballasts that require a low-voltage control signal to vary the output of the ballast. The third dimmer characteristic merely turns a relay on or off at a specified level. This third characteristic is set at an output level of 1. The combinations of these characteristics allow AMX to tailor the outputs of different AMX Lighting dimmers.

The RDM-INC module only requires the first characteristic that controls the high voltage output of a dimmer. All the internal dimmers in the RE-DM4 and RE-DM6 also use the first characteristic to determine dimmer output. All curve diagrams that use this characteristic are labeled in Volts RMS.

The RDM-SWM and RDM-ZC modules uses the third dimmer characteristic of switching a relay on or off. The relay turn on level indicates the level at which the switch module turns on. This is typically set to 1. A notable exception is Curve N, which is set at Level 9.

The RDM-FDB module uses a combination of the first and third characteristics to send a variable high-voltage output along with a single switched output. The RDM-FDB module is a combination of two devices in a single package. One device is an incandescent dimmer like the RDM-INC, and one device is a relay like the RDM-SWM. These devices combine to switch power on and off to a ballast, and at the same time deliver a high-voltage reference signal to the dimming ballast. The RDM-FDB module also works with several lighting interfaces made by companies other than AMX.

The RDM-HDC module uses a combination of the second and third dimmer characteristic to send a variable low-voltage control signal along with a single switched output. This module is commonly used for control of dimmable fluorescent ballasts.

Curves can be used for energy-saving applications where the high end needs to be trimmed to reduce voltage to the lamps and thereby increase lamp life. They can also be used to reduce the dimming range of some fluorescent ballasts, which can prevent premature failure of the ballasts and lamps.

The AMX Lighting system now offers over 12 ways to alter the performance of the lighting fixture by digitally changing the way the dimmer responds. Using the RDM-HDC module, for instance, to control an 0-10 volt ballast applied to a single compact fluorescent light fixture might 'look' better when dimmed using one curve instead of another. After the furniture is installed, the designer may decide that a different curve applied to certain fixtures has a better 'feel.' It is now possible to apply many new curves to all the AMX Lighting dimmers using simple commands. Designers and specifiers have much more control over the look and feel of their designs using the AMX Lighting system. Installers will have greater ability to temper the output of a dimmer to avoid problems.

As the dimming level increases the output voltage increases. The dimmer goes smoothly from 0 to 120 volts output. This is the most common curve used in dimming applications.

- Relay turn on level = 1%
- Dimming Range = 0 - 120 VAC.

## Curve Configuration

Each Radia dimmer maintains non-volatile configuration information that is necessary to the operation of the dimmer such as presets, curves, ramp times, etc. The configuration can be uploaded and downloaded from the dimmer for the purposes of providing a user interface to ease the configuration process and for archival purposes.

## Curves

Curves are used to define the relationship between the dimmer's level and the actual output voltage. For example, the typical curve (curve 1) is a linear mapping of the dimmer's input level to the dimmer's output level which means a value of 10% in the input level will result in a 10% output voltage.

The selection of which curve to use is purely a function of the type of electrical load connected to the dimmer's output. For example, an incandescent load would typically use curve 1 or curve 2 and a Prescolite fluorescent ballast would use curve 4.

The table below summarizes the curves supported by the Radia:

| Curves | | | |
|---|---|---|---|
| Symbol | Description | Symbol | Description |
| 1 | Standard Dimming Curve | A | S-curve #1 |
| 2 | Economical Dimming Curve (0-90%) | B | Log-curve #1 |
| 3 | 0-10 VDC Curve for Advance MK VII, Motorola Helios | C | Log-curve #2 |
| 4 | 0-12 VDC Curve for Prescolite Intelect | D | S-Curve #2 |
| 5 | Advance Mark VII | E | 25% off |
| 6 | Advance Mark VII | F | Always ON |
| 7 | 12% roll off | N | 10% off |
| 8 | 19% roll off for Lutron FDB | O | Always off |
| 9 | 33% roll off for Lutron FDB | R | Reverse Linear |

The following table provides a general relationship between load type and which curve to use:

| Load Type | Curves |
|---|---|
| Incandescent | Curve 1 – Standard dimming curve |
| | Curve 2 – Energy efficient, uses 10% less energy. |
| Advance Mark VII Ballast | Curves 3, 5, or 6 |
| 4-wire Ballasts | Curve 5 – Used for some ballasts |
| | Curve 7 – Used with other ballasts with the RDM-DC series of modules. |
| Low voltage | Curves 5, 6, B, C – All logarithmic curves with slight variations in the curve. |
| Lutron FDB Ballasts | Curve 8 – Used in conjunction with the RDM-FDB series of modules. |
| | Curve 9 – Used in conjunction with the RDM-FDB series of modules. Provides a slightly different “look” than curve 8. Since this curve has the highest low end turn-on level by default, it is probably a good choice for Advance Mark X. We have found the Mark X usually needs its low-end setting adjusted higher. |
| Non-dimming/Switched | Curve N, Curve E – Used for ON/OFF control only. Useful for all switch modules (i.e. RDM-SWM, RDM-HSW, RDM-DPSM, RDM-ZC modules). |
| Fan motors | Curve R - Used for devices that start at a high voltage and then decrease voltage in order to function. |

## Standard Dimming Curve (1)

FIG. 39 shows the curve 1 voltage output in 120 volts DC.

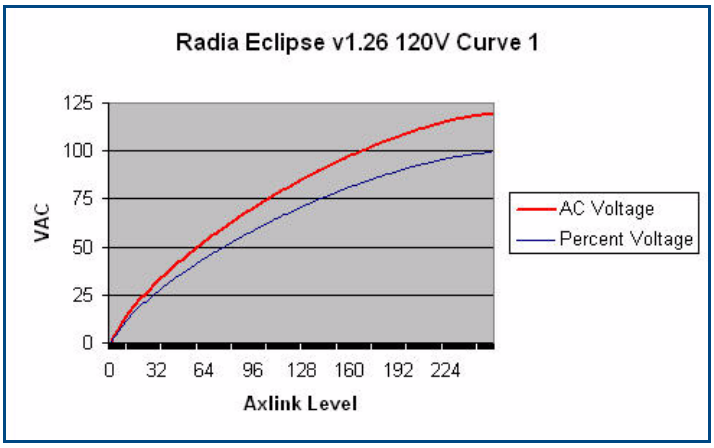


**FIG. 39** Curve 1 Voltage output in 120 Volts AC

FIG. 40 shows the dimmer turning on to level 20 from an off condition. It maintains the level until the dimmer reaches a level above 20%, at which point the dimmer output starts to climb again.

Conversely, it will dim down to 20% and maintain that level until it turns off.

- Relay turn on level = 1%
- Dimming Range = 56 - 120 VAC.

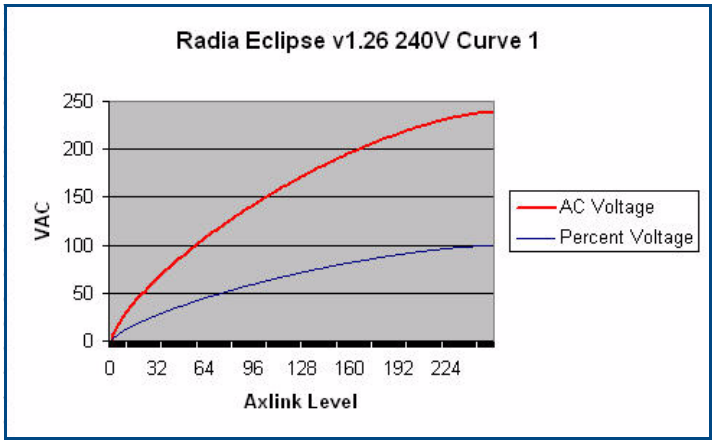


**FIG. 40** Curve 1 Voltage Output in 240V AC

FIG. 41 shows the low-voltage output of the RDM-HDC module. The voltage range is 4 to 12 VDC when attached to test ballast.

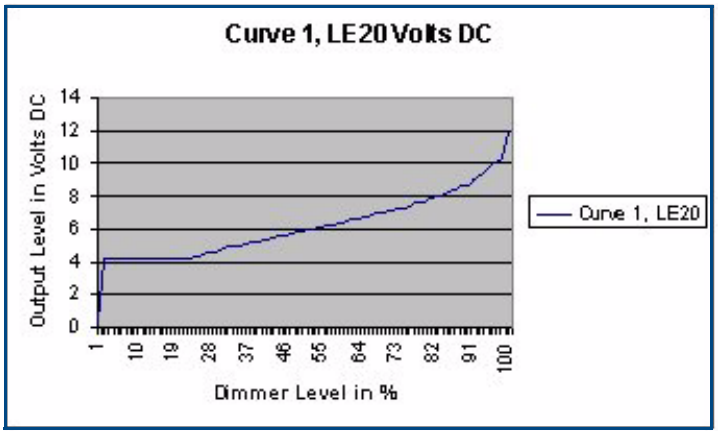


**FIG. 41** Curve 1 voltage output with Low End Setting @ 20% Volts DC

FIG. 42 shows three different Low End Settings of 5%, 10%, and 20%. Each curve holds its assigned value until the dimmer level reaches 0. Ramping up from level 0 will turn on the lamps at three different levels respectively. Low End settings can be used to correct for problems in dimming various lighting products at low levels. Dimming ranges can be controlled using the low end setting.

- Curve 1 dimming range is normally 0 -120 VAC, but with a Low End Setting of 5 the range is reduced to 26 - 120, or a 20% reduction in total dimming range.
- A Low End Setting of 10% reduces the range from 40 to 120 VAC or 35% reductions while a Low End Setting of 20 on Curve 1 is about a 50% reduction in dimming range.
- Small adjustments in a curve can cause significant changes in a dimmer's response.

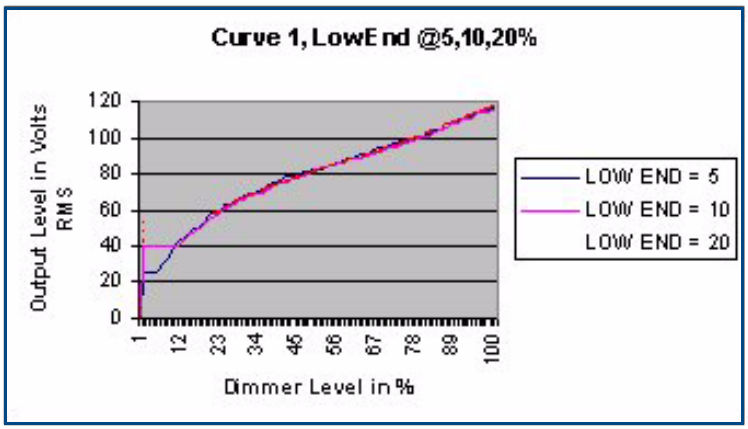


**FIG. 42** Curve 1 with Low End Setting @ 5%, 10%, and 20% Volts RMS

## Economical Dimming Curve (2)

Similar to Curve 1, Curve 2 rolls off at 90% of the top end or about 105 volts maximum. FIG. 43 shows a curve that reduces the maximum output to 90% of maximum to conserve energy. It is also called the 'energy saving curve'.

- Relay turn on level = 1%
- Dimming Range = 0 - 114 VAC.

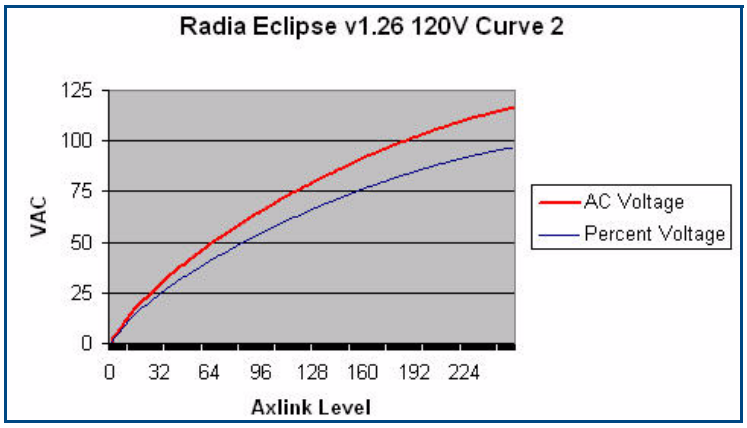


**FIG. 43** Curve 2 at 120V AC

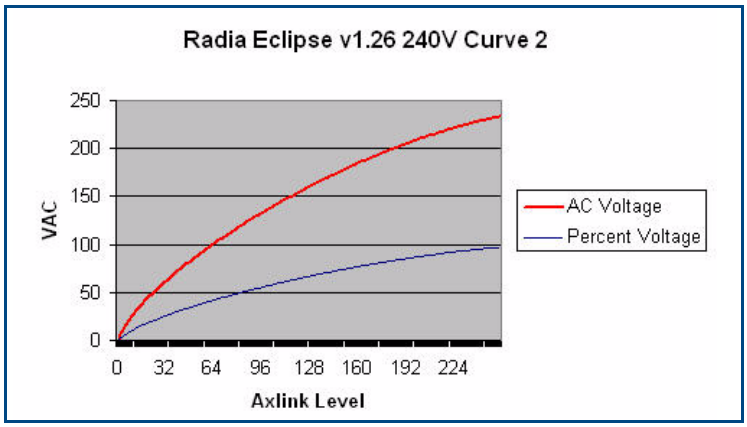


**FIG. 44** Curve 2 at 240 VAC

FIG. 45 shows the low-voltage output of the RDM-HDC module. The voltage range is from 0 to 9 VDC when attached to test ballast. This curve can be used with 0-10 VDC dimming ballasts.

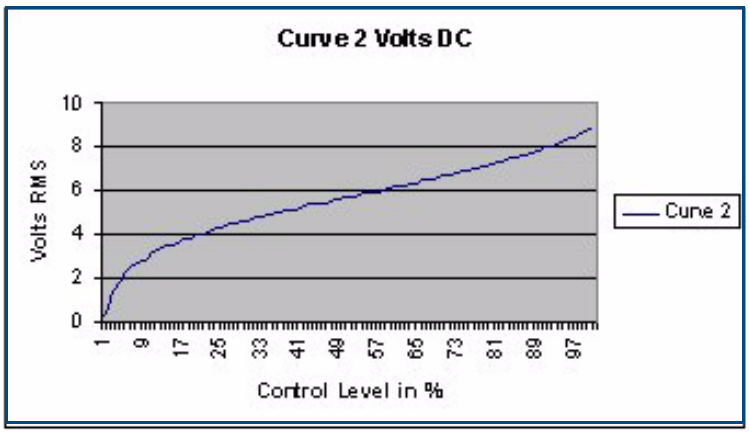


**FIG. 45** Curve 2 voltage output in volts DC

## 0-10VDC Curve (3)

FIG. 46 shows the output voltage of a dimmer. It has a smooth taper and a cut off point of 25 volts. This curve will shrink incandescent dimming range 25%.

- Relay turn on level = 1%
- Dimming Range = 30 - 115 VAC.

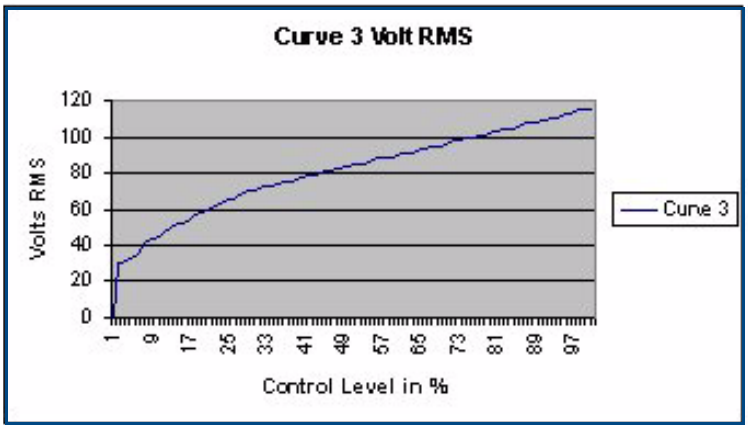


**FIG. 46** Curve 3 voltage output in volts RMS

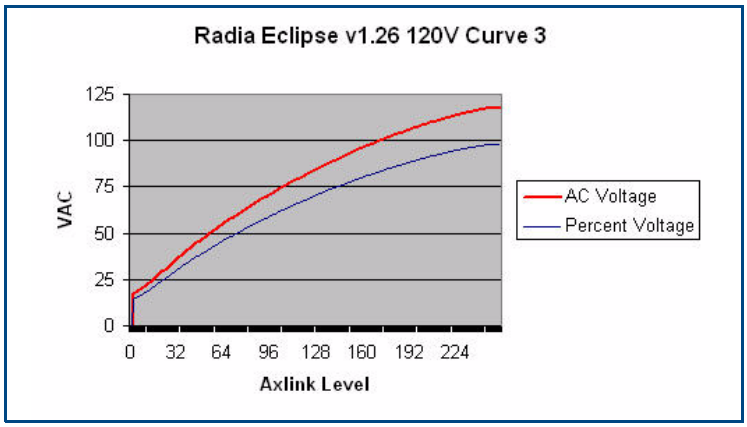


**FIG. 47** Curve 3 at 120 VAC

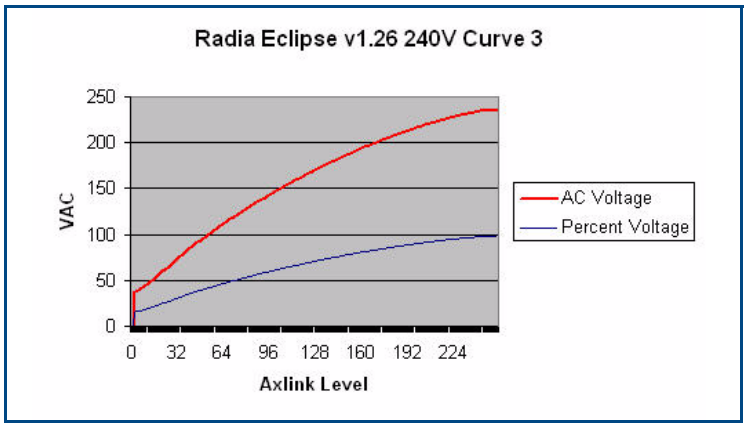


**FIG. 48** Curve 3 at 240 VAC

FIG. 49 shows the output voltage of the RDM-HDC module. The voltage range is from 2.6 to 9.3 VDC when attached to test ballast.

This curve is primarily used with Advance Mark VII ballast using the RDM-HDC module.

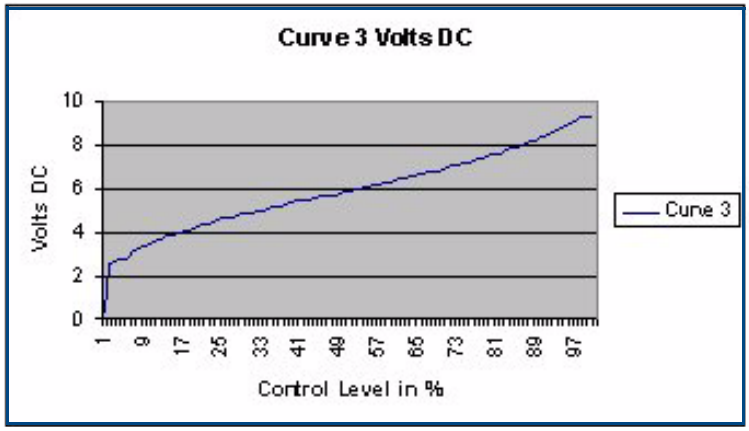


**FIG. 49** Curve 3 output in volts DC

### 0-12VDC Curve (4)

FIG. 50 shows the output voltage of a dimmer. There is a noticeable gap at the low end. Curve 4 is a smooth fade until 15%, then it rolls off sharply.

- Relay turn on level = 1%
- Dimming Range = 0 - 120 VAC.

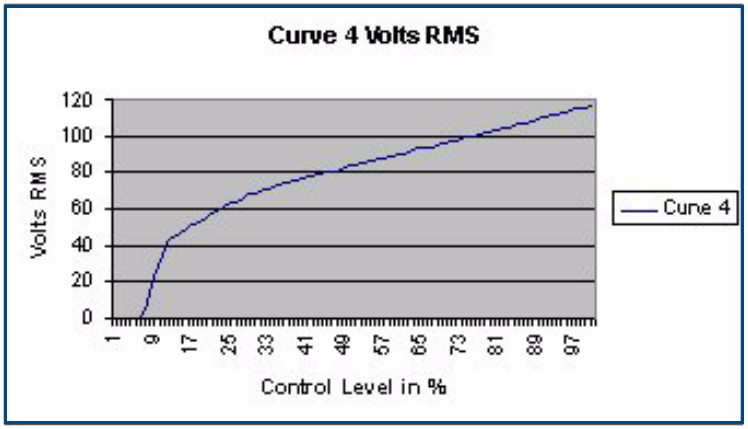


**FIG. 50** Curve 4 Voltage output in Volts RMS

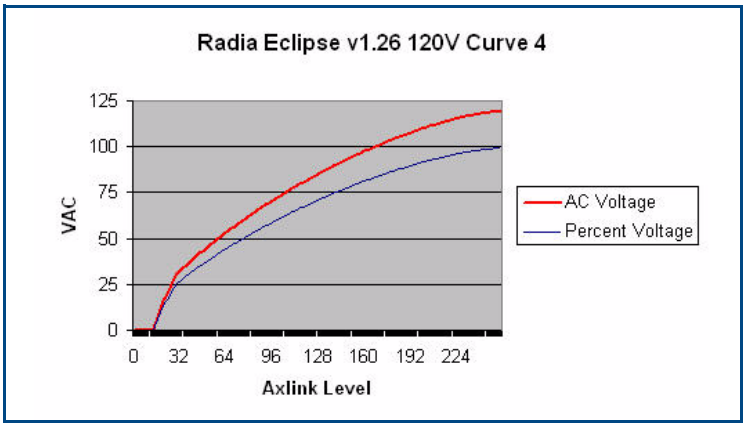


**FIG. 51** Curve 4 at 120 VAC

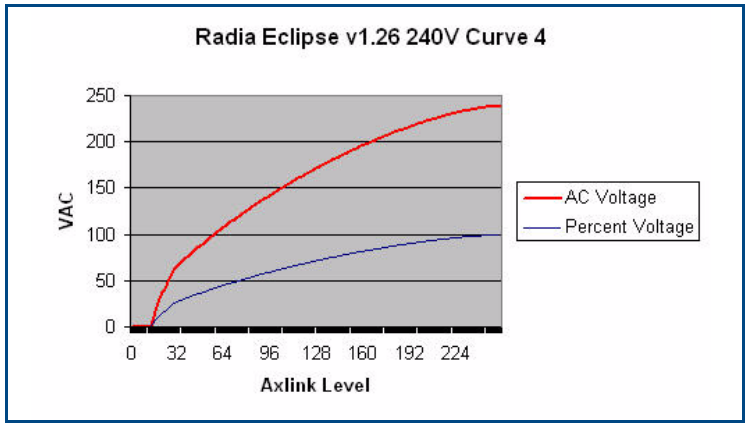


**FIG. 52** Curve 4 at 240 VAC

FIG. 53 shows the output voltage of the RDM-HDC module. Curve 4 is primarily used for control of Prescolite Intelect Ballast, using the RDM-HDC module. Its range is from 1 to 12 VDC.

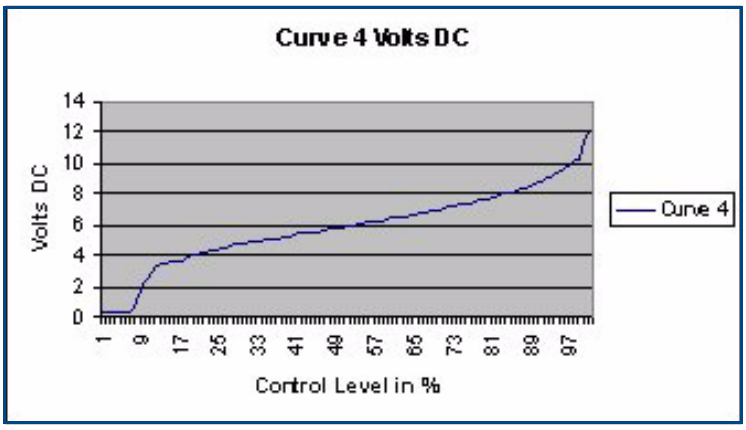


**FIG. 53** Curve 4 Voltage output in volts DC

## Lutron FDB Curve (5)

FIG. 54 shows the output voltage of a dimmer. It quickly dims the high end and extends the mid-range dimming control with a cut-off at 18 volts. This curve can be useful with two wire dimmable fluorescent ballasts.

- Relay turn on level = 1%
- Dimming Range = 16 - 120 VAC.

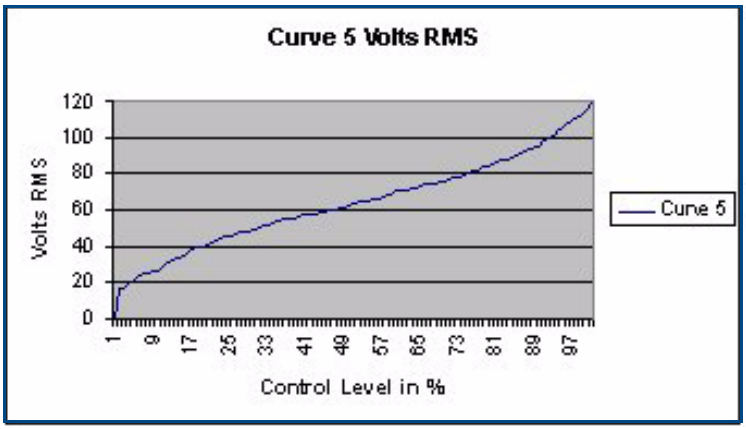


**FIG. 54** Curve 5 Voltage output in Volts RMS

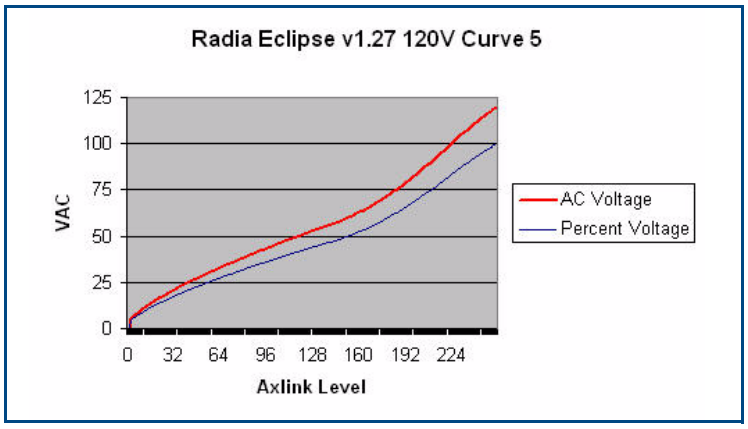


**FIG. 55** Curve 5 at 120V

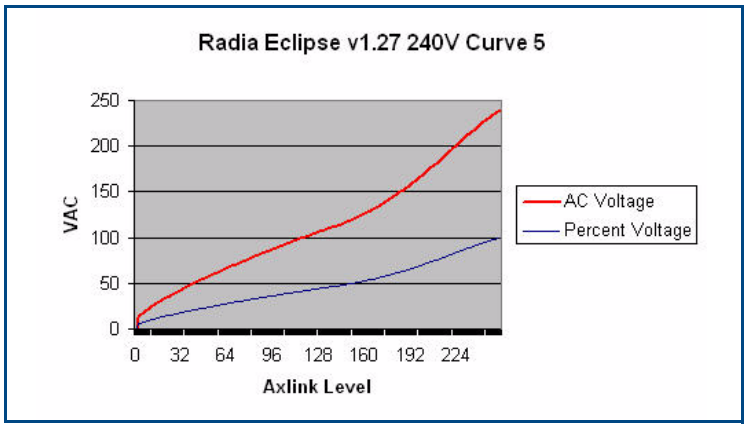


**FIG. 56** Curve 5 at 240 VAC

FIG. 57 shows the output voltage of Curve 5 applied to the RDM-HDC module. It turns on to about 2 volts and rises to 12 VDC. There is a large increase in output above 98%.

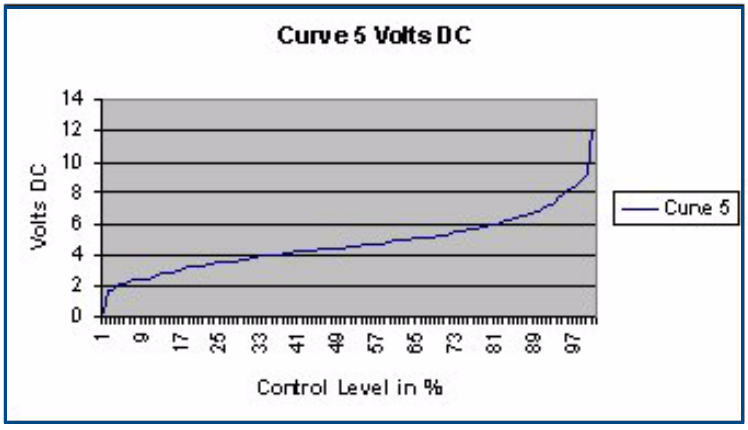


**FIG. 57** Curve 5 Voltage output in volts DC

## Advance Mark VII Curve (6)

FIG. 58 shows the voltage output of Curve 6 applied to a dimmer. Curve 6 will smoothly dim the high end and extend the low-end range of dimming. This curve can be useful for dimming applications using transformers and requiring a more precise low end dimming range.

- Relay turn on level = 1%
- Dimming Range = 21 - 120 VAC.

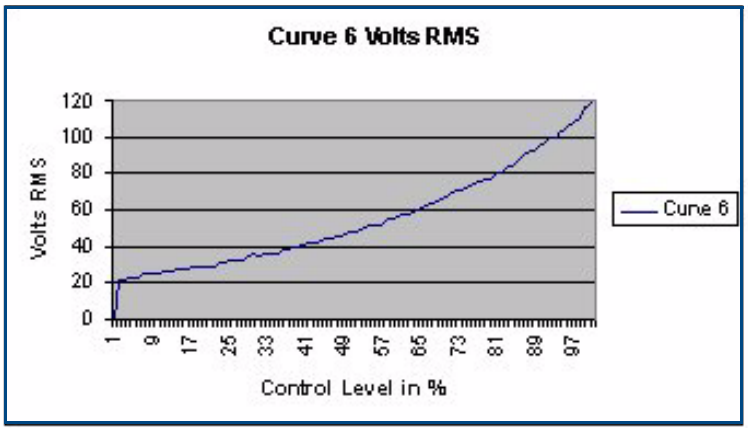


**FIG. 58** Curve 6 Voltage output in Volts RMS

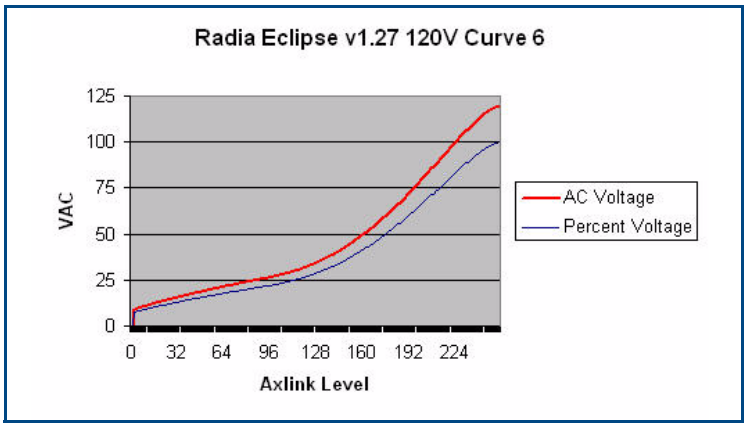


**FIG. 59** Curve 6 at 120 VAC

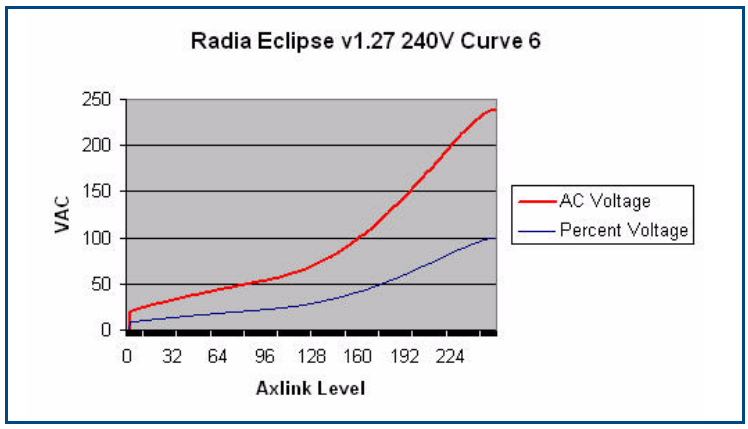


**FIG. 60** Curve 6 at 240 VAC

FIG. 61 is a plot shows the output voltage of Curve 6 applied to the RDM-HDC module. The turn on voltage is 2 VDC and rises to 12 VDC. Output increases rapidly above 95%.

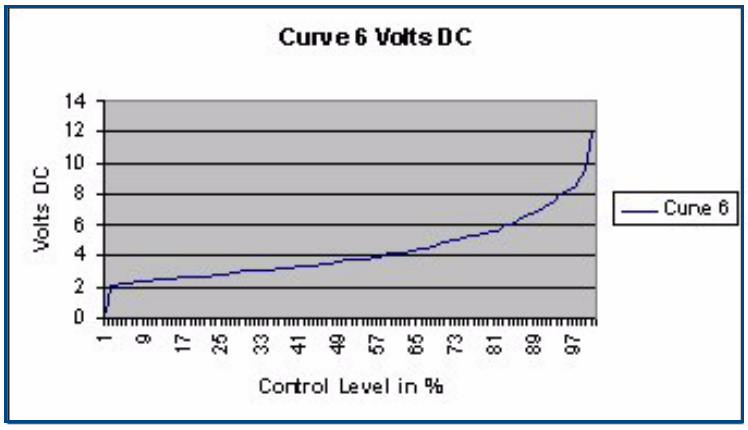


**FIG. 61** Curve 6 Voltage output in volts DC

## 12% Roll Off (7)

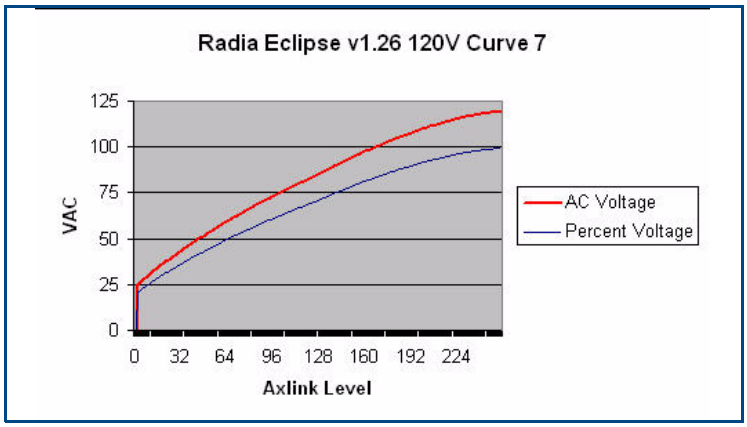


**FIG. 62** Curve 7 at 120 VAC

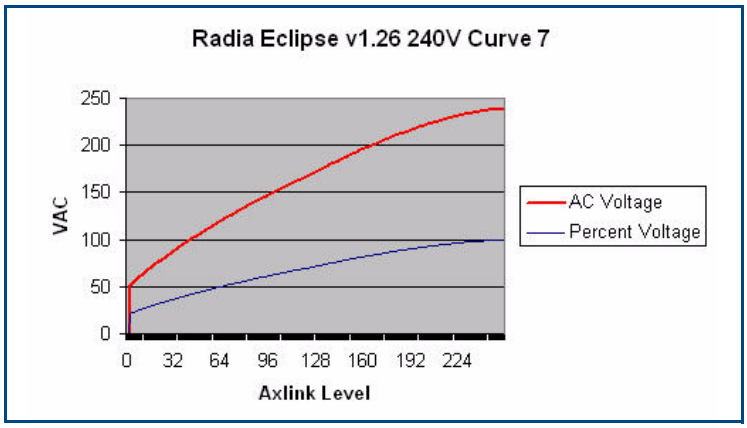


**FIG. 63** Curve 7 at 240 VAC

FIG. 64 shows the output voltage of a dimmer. This curve follows the Standard dimming curve (Curve 1) for the first half of its control. After Level 50, the curve rolls off to 40 volts before cut off. This provides a 30% reduction in dimming.

- Relay turn on level = 1%
- Dimming Range = 39 - 1 20 VAC.

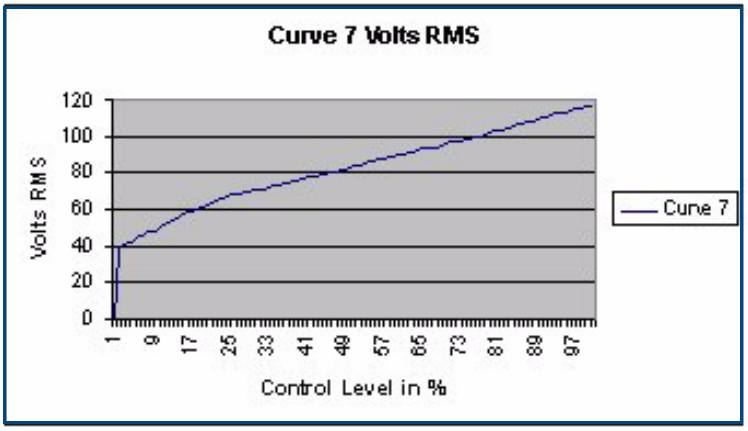


**FIG. 64** Curve 7 Voltage output in Volts RMS

FIG. 65 shows the DC output voltage of Curve 7 applied to the RDM-HDC module. It starts at 3 VDC and rises to 12 VDC.

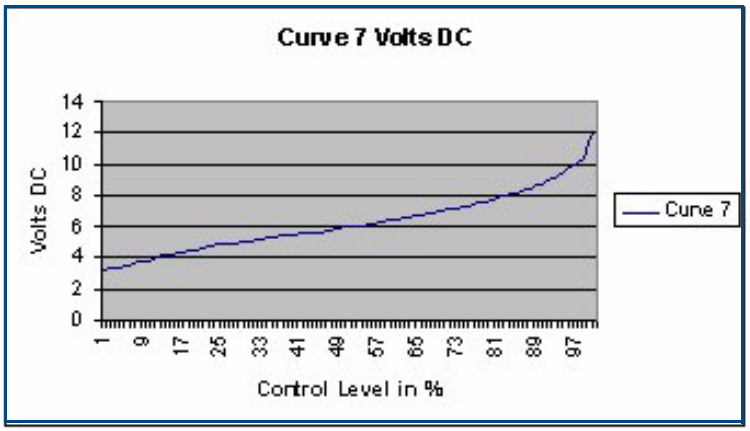


**FIG. 65** Curve 7 Voltage output in volts DC

## 19% Roll Off (8)

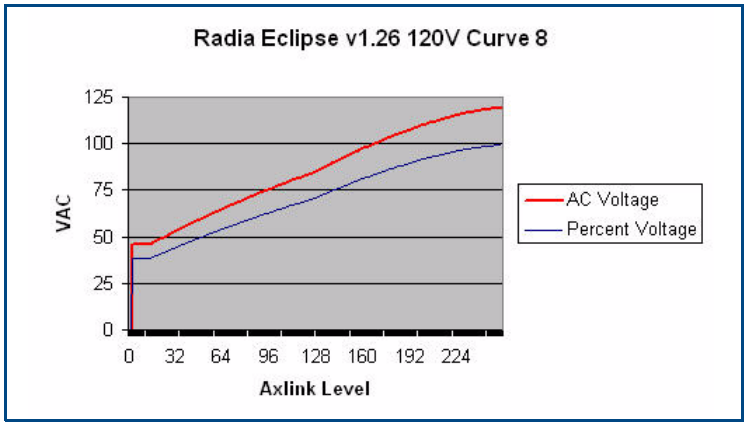


**FIG. 66** Curve 8 at 120 VAC

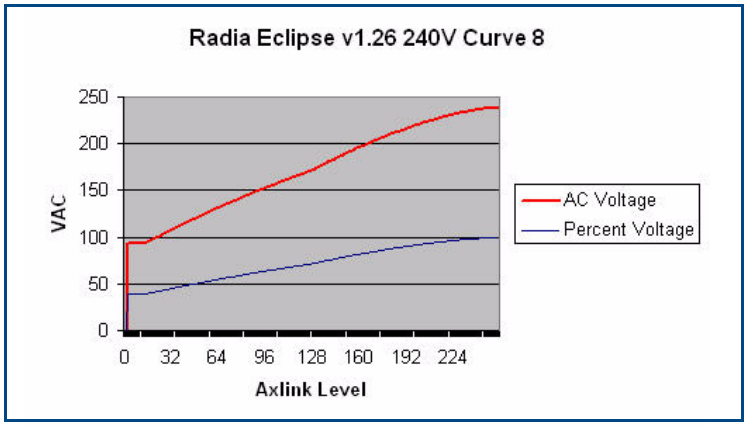


**FIG. 67** Curve 8 at 240 VAC

FIG. 68 shows the output voltage of a dimmer. This curve follows the Standard dimming curve (Curve 1) for the first 50% and then levels off to a 50 volts cut-off. This can be used on Advance Mark X ballasts.

- Relay turn on level = 1%
- Dimming Range = 52 - 120 VAC.

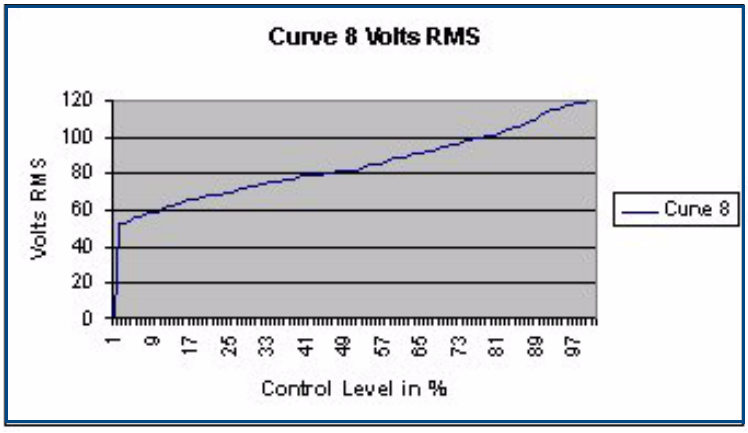


**FIG. 68** Curve 8 Voltage output in Volts RMS

FIG. 69 shows the output voltage of the RDM-HDC module. The low end starts at 4 volts and slowly rises to 12 VDC. This curve provides precise mid-range dimming.

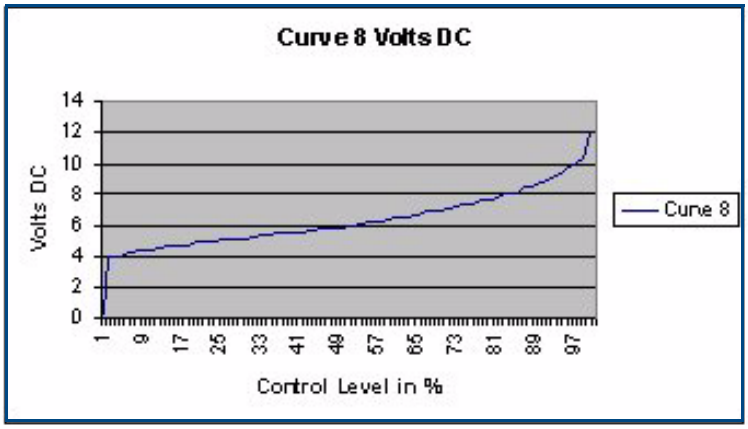


**FIG. 69** Curve 8 Voltage output in volts DC

## 33% Roll Off (9)

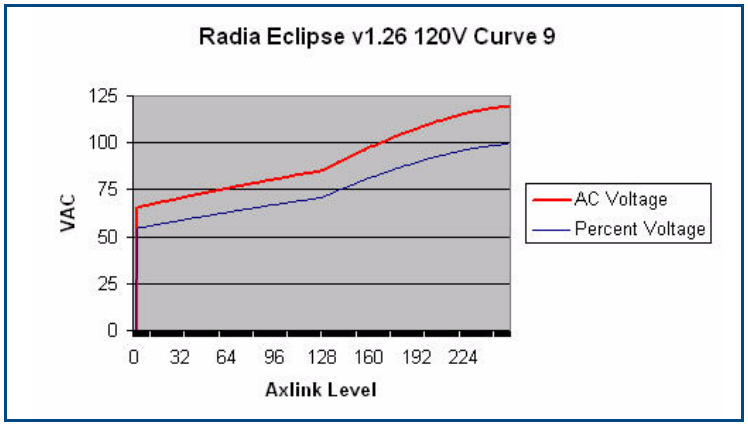


**FIG. 70** Curve 9 at 120 VAC

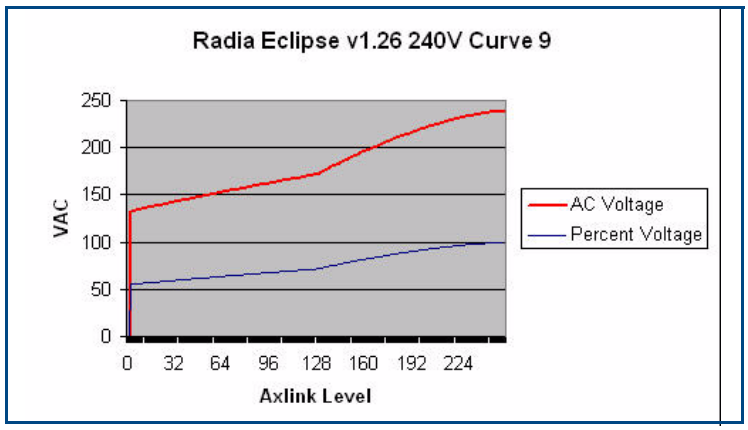


**FIG. 71** Curve 9 at 240 VAC

FIG. 72 shows the output voltage of a dimmer. Curve 9 starts at 70 volts and rises to 120 volts for a dimming range of 40%. This curve can be used to dim some fan motors. Use this curve when very little voltage range can be tolerated.

- Relay turn on level = 1%
- Dimming Range = 72 - 120 VAC.

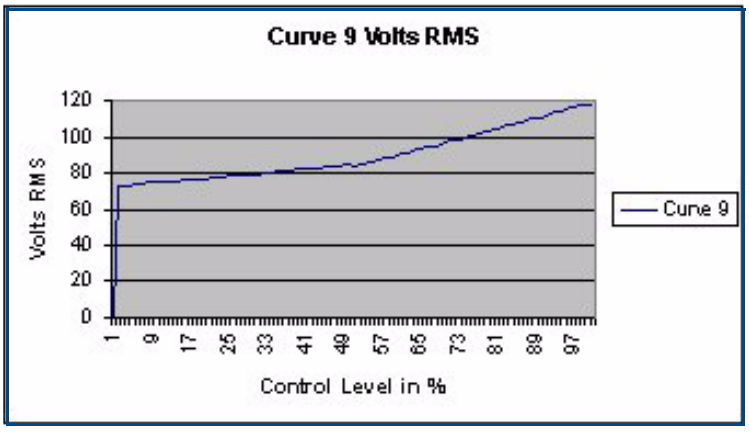


**FIG. 72** Curve 9 Voltage output in Volts RMS

FIG. 73 shows the output voltage of the RDM-HDC module. Curve 9 starts at 5 volts and rises to 12 VDC. This provides a dimming range of 7 VDC.

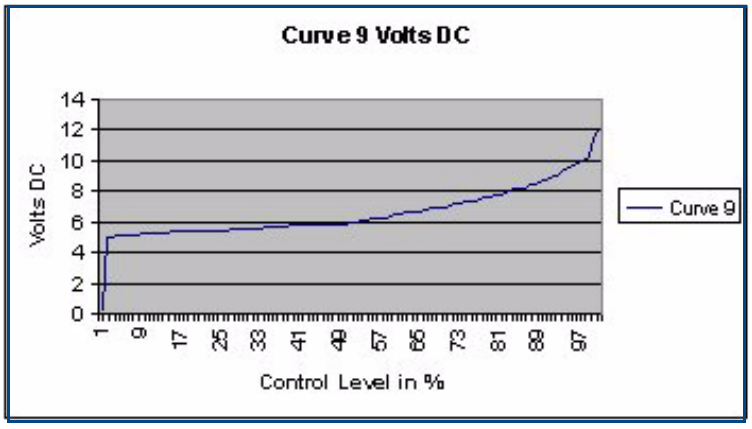


**FIG. 73** Curve 9 Voltage output in volts DC

## S-Curve #1 (A)

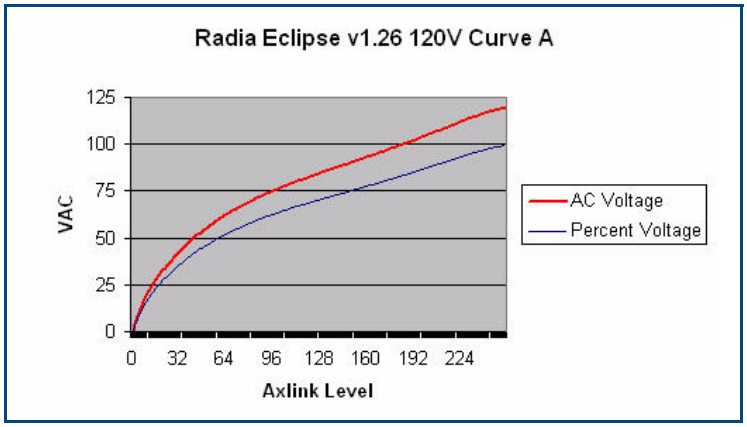


**FIG. 74** Curve A at 120 VAC

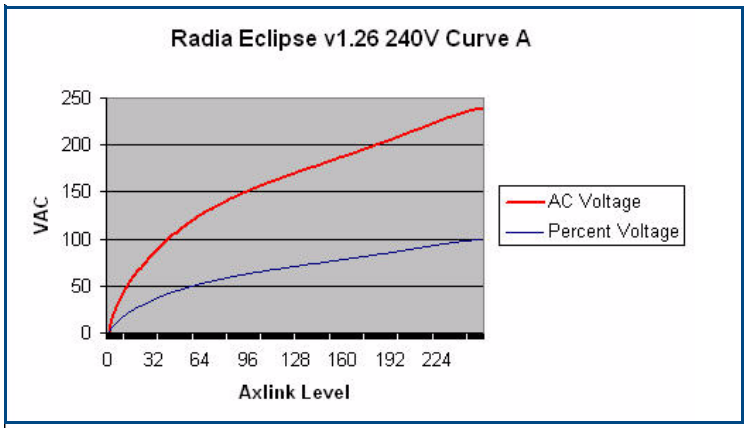


**FIG. 75** Curve A at 240 VAC

FIG. 76 shows the output voltage of a dimmer. Curve A is an alternate version of the Standard dimming curve (Curve 1). It rolls off the high end quickly and extends the dimming range in the middle with a sharper roll off starting at 20% dimming level.

- Relay turn on level = 1%
- Dimming Range = 0 - 120 VAC.

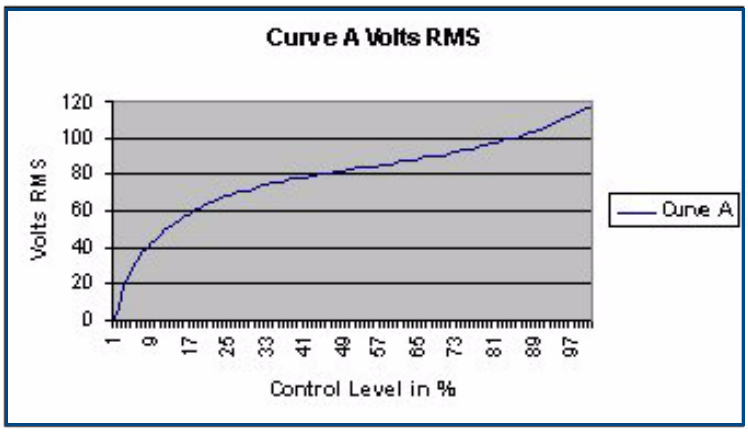


**FIG. 76** Curve A Voltage output in Volts RMS

FIG. 77 shows the output voltage of the RDM-HDC module. Curve A starts at 2 volts and slowly rises. It increases 3 volts in the last 10% of its travel. This curve can be used with 0-12 VDC dimming ballasts like Prescolite Intelect ballasts.

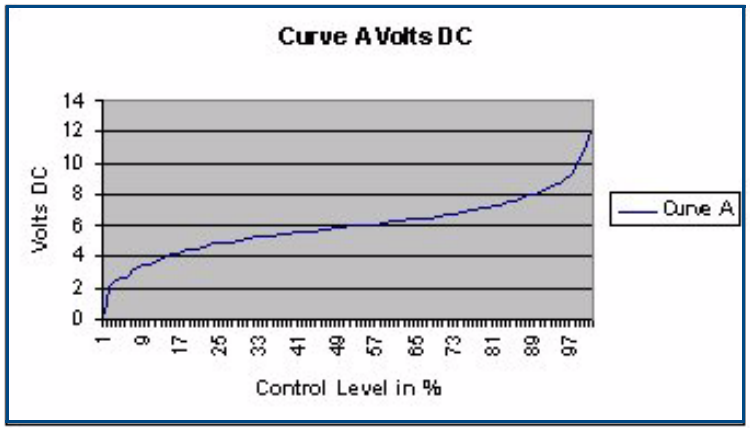


**FIG. 77** Curve A Voltage output in volts DC

## Log-Curve #1 (B)

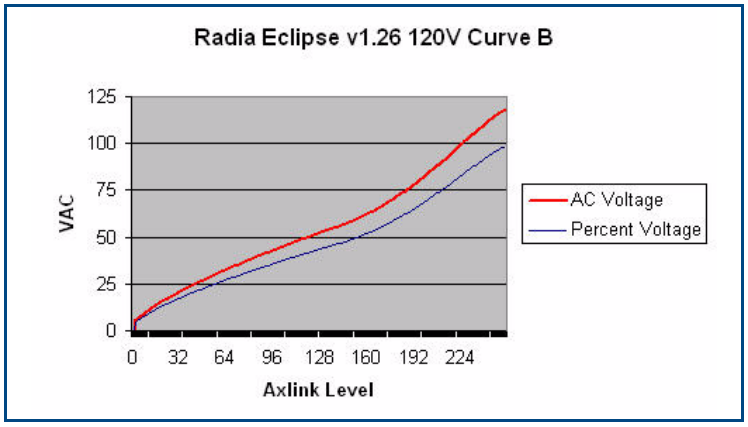


**FIG. 78** Curve B at 120 VAC

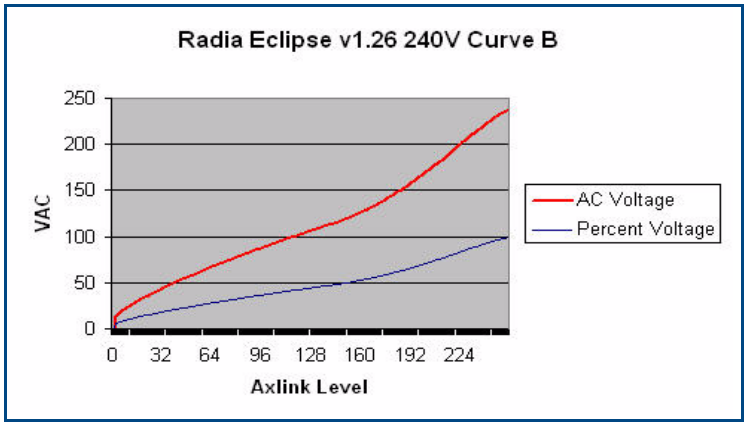


**FIG. 79** Curve B at 240 VAC

FIG. 80 shows the output voltage of a dimmer. It rolls off the high end slower and becomes somewhat linear until a roll-off at 18 VAC.

- Relay turn on level = 1%
- Dimming Range = 18 - 115 VAC.

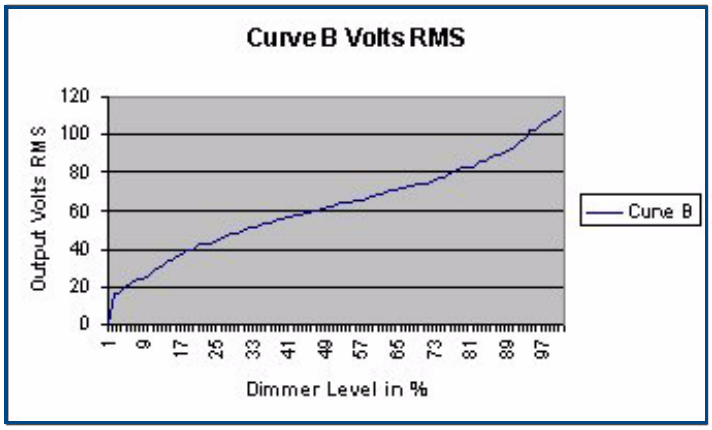


**FIG. 80** Curve B Voltage output in Volts RMS

FIG. 81 shows the output voltage of Curve B applied to the RDM-HDC module. The turn on voltage is 2VDC and rises to 10VDC. This curve can be used with 0-10 VDC dimming ballasts.

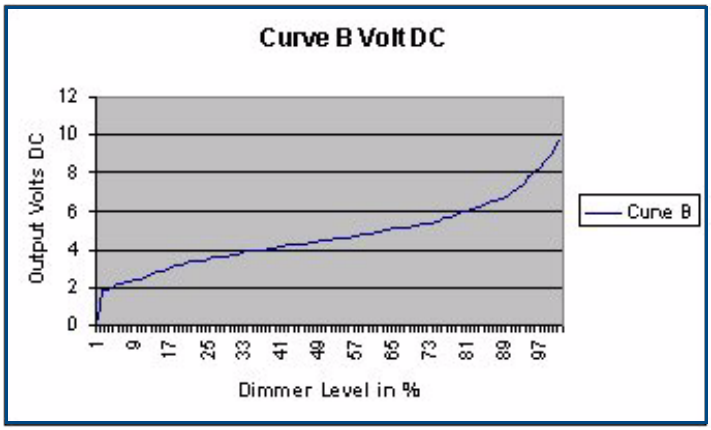


**FIG. 81** Curve B Voltage output in Volts DC

## Log-Curve #2 (C)

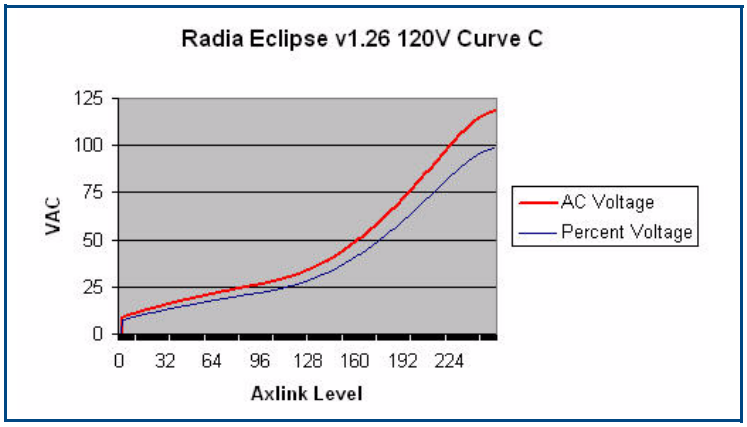


**FIG. 82** Curve C at 120 VAC

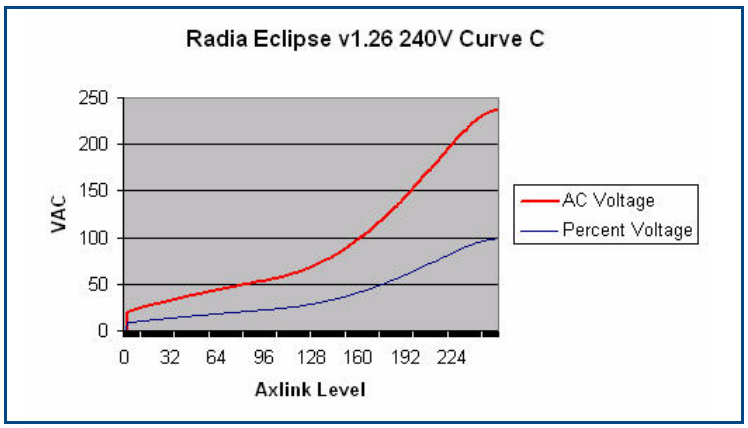


**FIG. 83** Curve C at 240 VAC

FIG. 84 shows the output voltage of a dimmer. This curve starts at the low end at about 20 volts and gently rises to only 113 volts. This curve reduces dimming range by about 20%.

- Relay turn on level = 1%
- Dimming Range = 20 - 115 VAC.

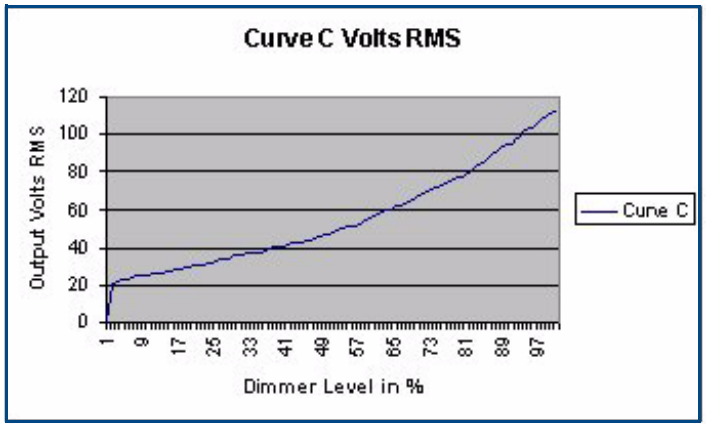


**FIG. 84** Curve C Voltage output in Volts RMS

FIG. 85 shows the DC output voltage of Curve C applied to the RDM-HDC module. It starts at 2VDC and rises to 10VDC. This curve can be used with 0-10 VDC dimming ballasts.

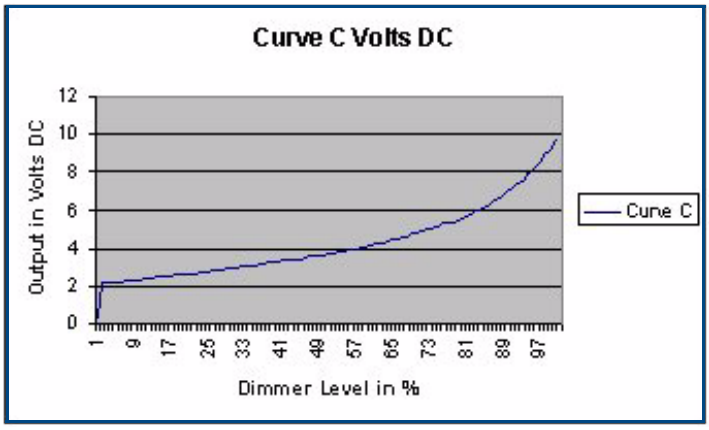


**FIG. 85** Curve C Voltage output in Volts DC

## S-Curve #2 (D)

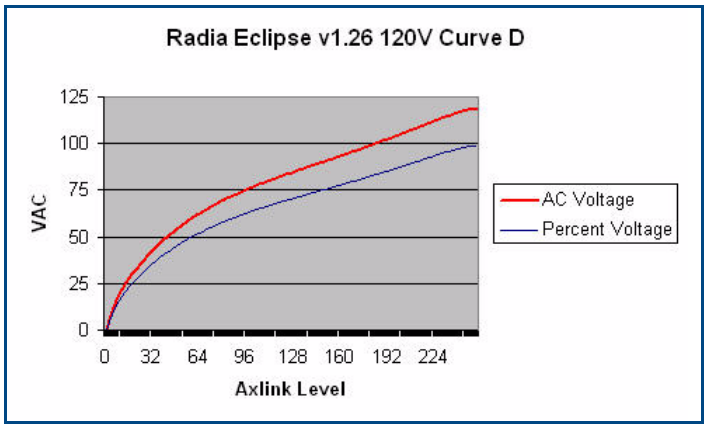


**FIG. 86** Curve D at 120 VAC

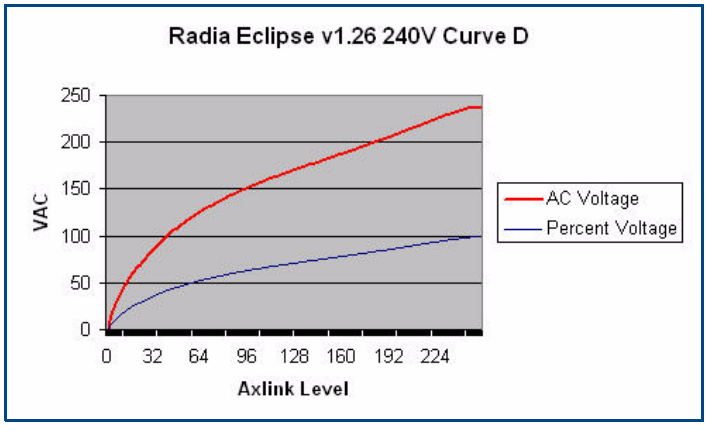


**FIG. 87** Curve D at 240 VAC

FIG. 88 shows the output voltage of a dimmer. Curve D is an alternate version of Curve A. It rolls off the high end slower and extends the dimming range in the middle with a sharp roll off starting at 25% dimming level.

- Relay turn on level = 1%
- Dimming Range = 0 - 115 VAC

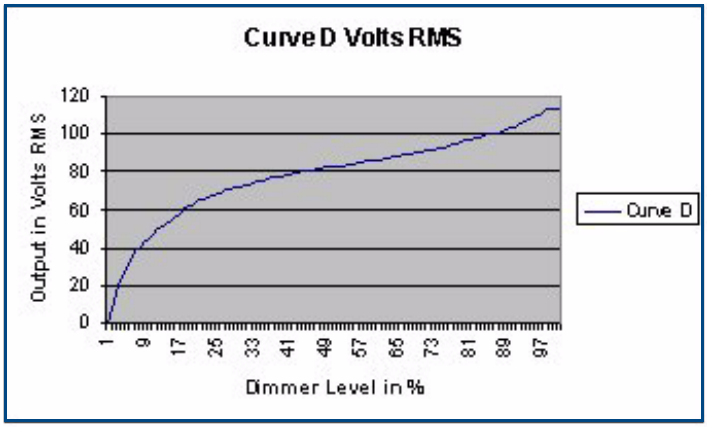


**FIG. 88** Curve D Voltage output in Volts RMS

FIG. 89 shows the output voltage of the RDM-HDC module. Curve D is a variation of Curve A but at a 10% reduction. This curve can be used with 0-10 VDC dimming ballasts using the proper low-end cutoff.

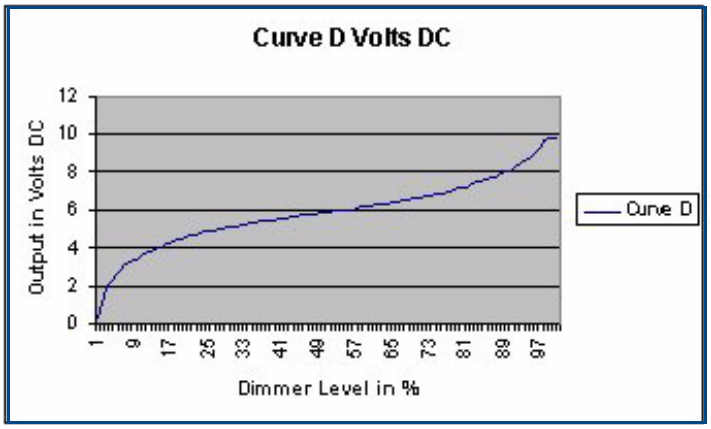


**FIG. 89** Curve D Voltage output in volts DC

## 10% Off Curve (N)

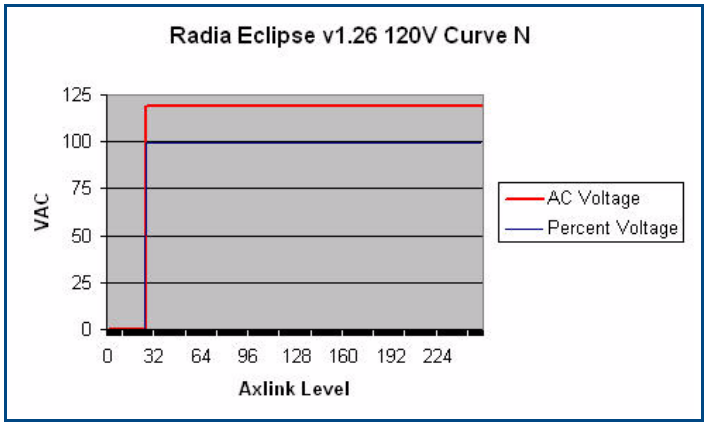


**FIG. 90** Curve N at 120 VAC

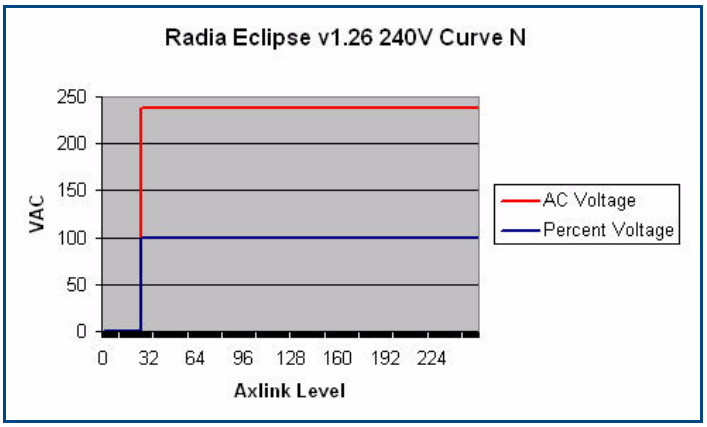


**FIG. 91** Curve N at 240 VAC

FIG. 92 shows the output voltage of the RDM-HDC module. This is an incandescent dimmer always on, starting at Level 9. Relay turn on level = 09. The RDM-HDC module will output 12 VDC above Level 09.

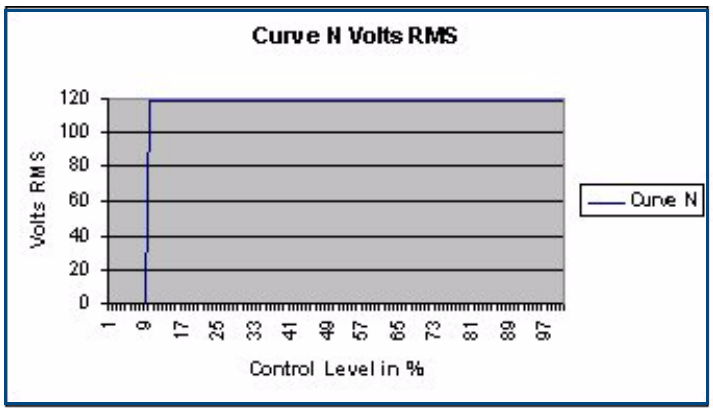


**FIG. 92** Curve N Voltage output in Volts RMS

## Always OFF Curve (O)

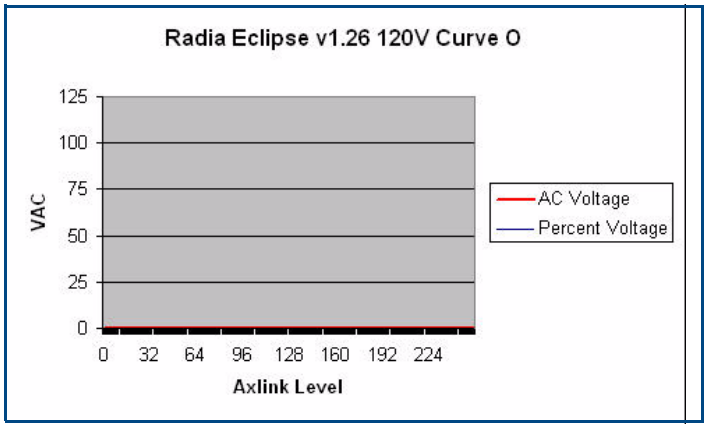


**FIG. 93** Curve O at 120 VAC

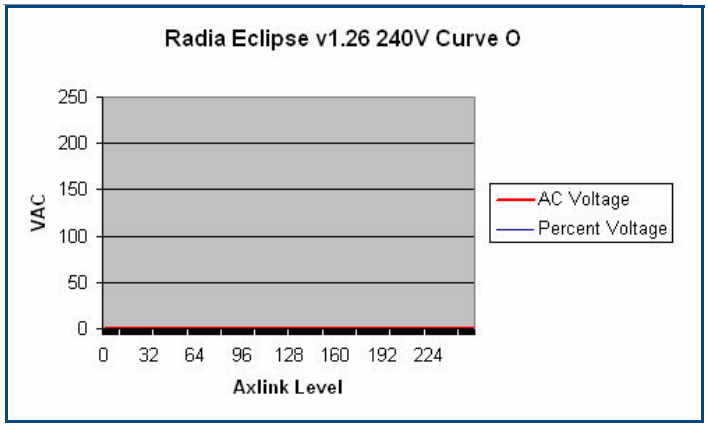


**FIG. 94** Curve O at 240 VAC

FIG. 95 is an incandescent dimmer, always off. No Level command will turn this dimmer on. Relay turn on level = none. The RDM-HDC module will output no voltage.

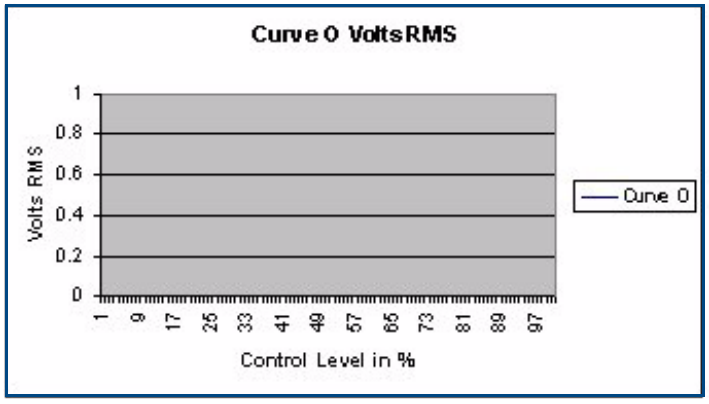


**FIG. 95** Curve O Voltage output in Volts RMS

## Always ON Curve (F)

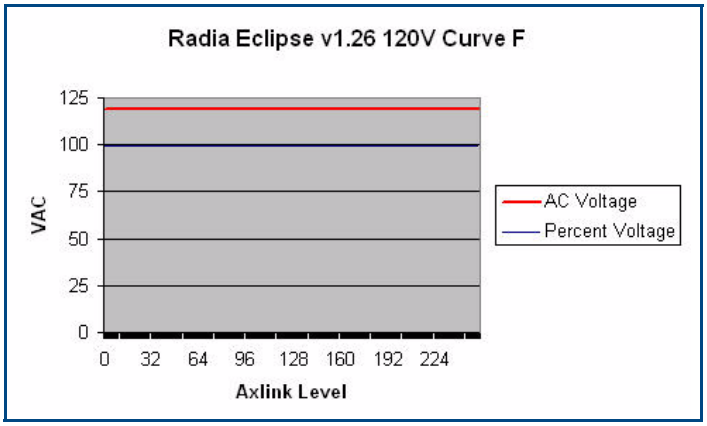


**FIG. 96** Curve F at 120 VAC

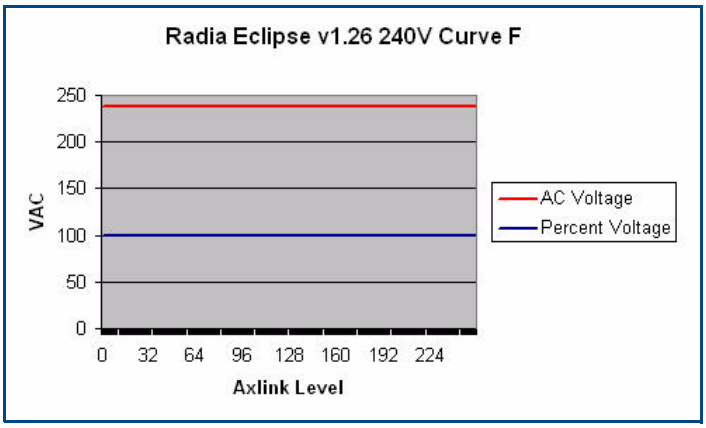


**FIG. 97** Curve F at 240 VAC

FIG. 98 is an incandescent dimmer, always on. No command will turn this dimmer off. Relay turn on level = always on. The RDM-HDC module will output a constant 12 VDC.

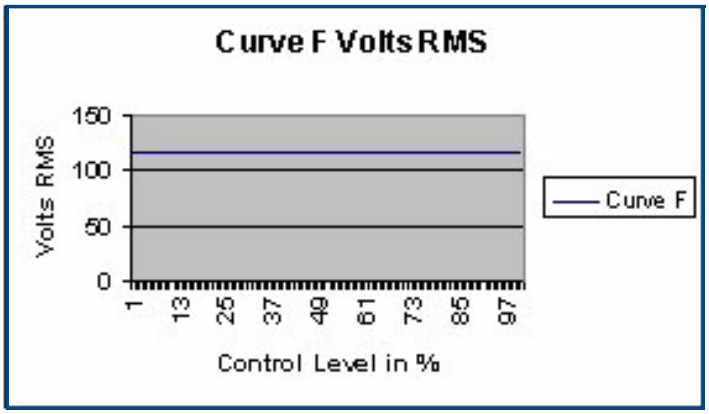


**FIG. 98** Curve F Voltage output in Volts RMS

FIG. 99 is the voltage plot of the original Radia MC Series in FDB mode. This is provided for informational purposes only as the current RDD-DM4 does not support FDB mode due to large variety of FDB ballasts. AMX recommends using the RDM-FDB, RDM-FDB2, RDC-HFDB, or RDC-MDM module for 3-wire dimming control of FDB ballasts.

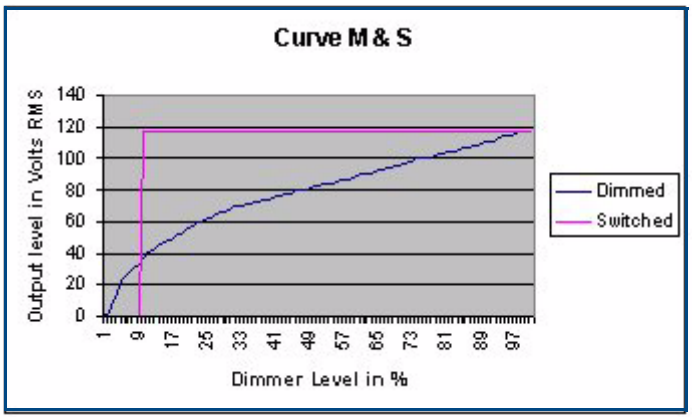


**FIG. 99** Curve M & S Voltage output in Volts RMS

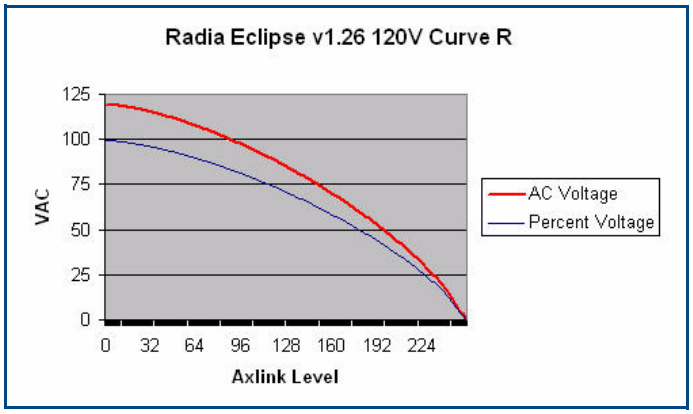


**FIG. 100** Curve R at 120 VAC

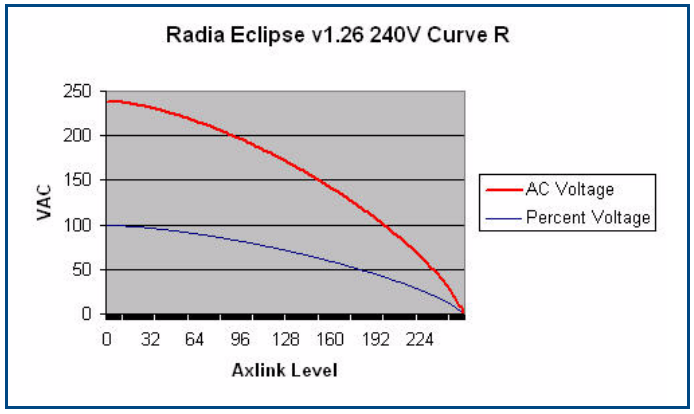


**FIG. 101** Curve R at 240 VAC

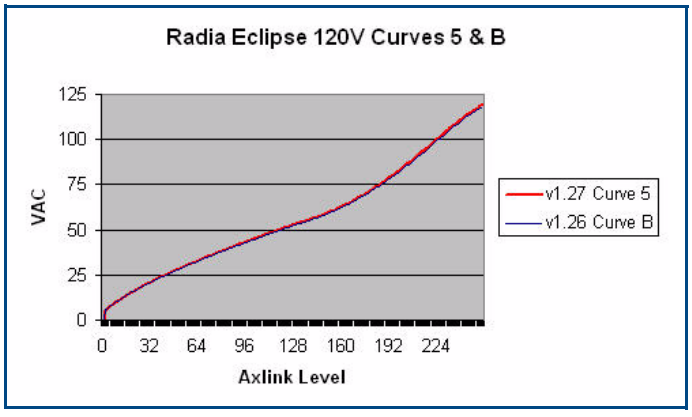


**FIG. 102** Curves 5 & B at 120 VAC

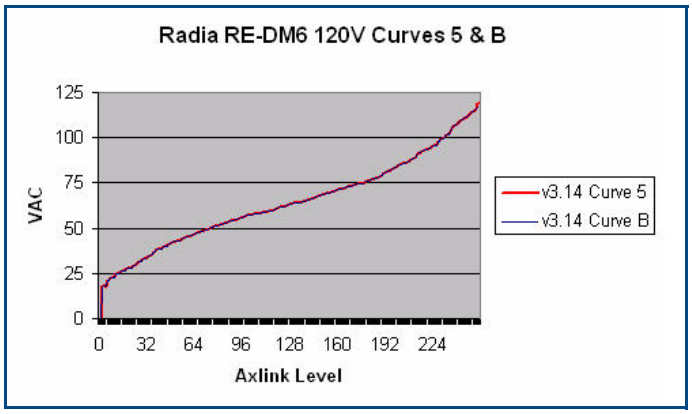


**FIG. 103** Curves 5 & B on the Radia Eclipse RE-DM6 at 120 VAC

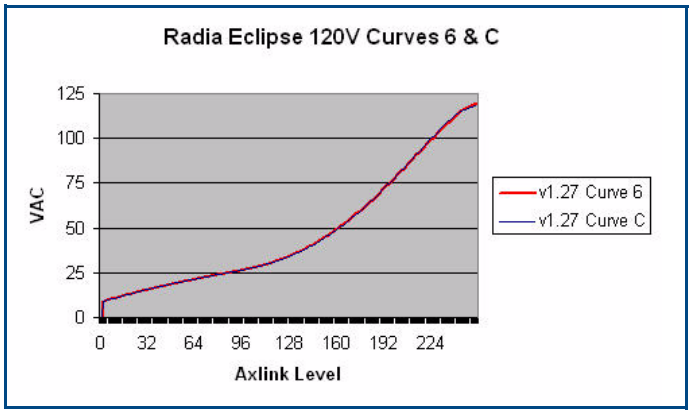


**FIG. 104** Curves 6 & C at 120 VAC

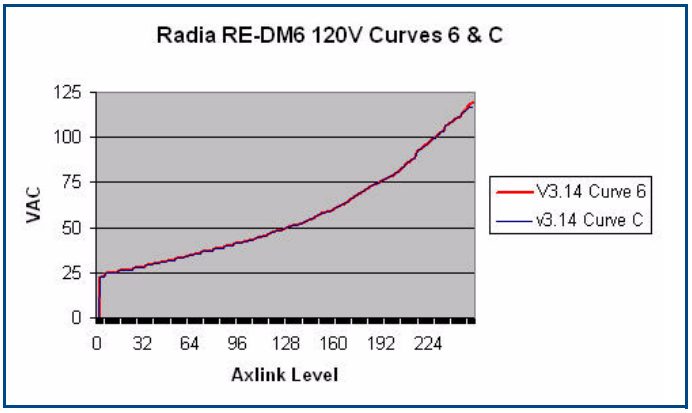


**FIG. 105** Curves 6 & C on the Radia Eclipse RE-DM6 at 120 VAC

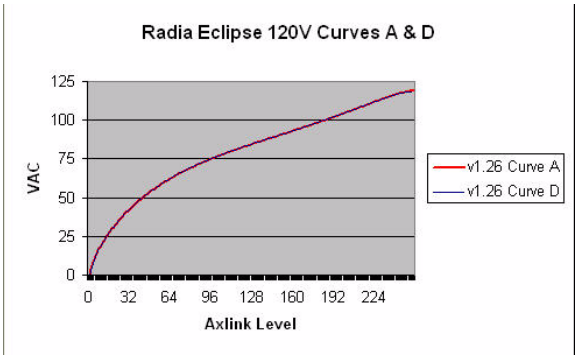


**FIG. 106** Curves A & D at 120 VAC

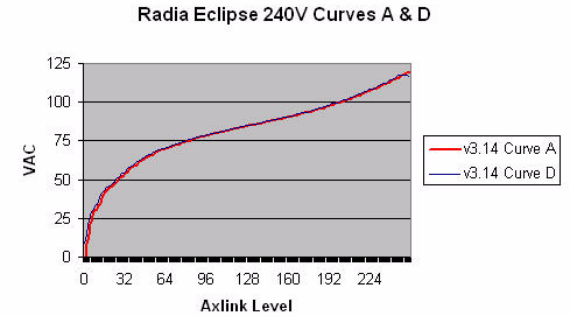


**FIG. 107** Curves A & D at 240 VAC

# Appendix B: Troubleshooting

## Software Issues

The following items address software-related technical support issues and describe the steps necessary to use NetLinx software in Terminal Emulator mode.

### Using PASS mode

Use the PASS mode with a computer running capable of connecting to a NetLinx master controller, and the AMX Lighting controller connected as an AxLink device.

Establishing communication with the master controller via terminal or Telnet:


*If the master is version 3.21.343 or below, it does not yet have the Radia Eclipse device name in its device table, so Radia Eclipse will show as "Unknown" in the list returned.*

1. Type "**show device /min<enter>**" to get the status of devices online with the controller. This is one way to determine the AxLink device number of the AMX Lighting controller.
2. Enter Pass mode by typing "**PASS**" followed by the device number.

   If the device number of the AMX Lighting controller were 96, you would type "PASS 96".

   The whole typed enter pass mode command is *PASS 96<enter>*, where <enter> means "Hit the enter key".
3. The AMX Lighting controller returns the string *ERXON* in acknowledgment. If you do not get the pack, you have not communicated or something else is wrong.
4. The master controller returns *Entering pass mode* in acknowledgement.
5. In order to exit pass mode, you must type *++<esc><esc>*, or reboot the NetLinx master controller.

### Testing AMX Lighting features

In general, any SEND_STRING valid for the Radia can be used in PASS mode. The ones below are a useful subset.

**Testing procedures for AMX Lighting features**

| To test this | Type this, then press Enter | Result |
|---|---|---|
| Communications | 1 | Status of AMX Lighting channel 1 |
| Curves | AC | Status of All Curves |
| | AZ | Status of All Levels |
| | AL100 | All levels = 100% |
| | AL0 | All levels = 0 |
| Channels | 1L50T9 | AMX Lighting channel 1 = 50% |
| | 2L50T9 | AMX Lighting channel 2 = 50% |
| | 3L50T9 | AMX Lighting channel 3 = 50% |
| | 4L50T9 | AMX Lighting channel 4 = 50% |
| | 5L50T9 | AMX Lighting channel 5 = 50% |
| | 6L50T9 | AMX Lighting channel 6 = 50% |
| Low End Setting | LE? | Pack Status of Low End Trim |
| Ramping Up | AL100T20 | Ramp all up in 20 sec. |
| Ramping Down | AL0T20 | Ramp all down in 20 sec. |
| Phase Status | Y | Y-OK or Y-FAIL status is returned |

# Hardware Issues

The following items address hardware related technical support issues.


*You should make sure that each AxLink device number is a unique number. Duplicate AxLink device numbers will cause problems. The same holds true for SEND_STRING pack numbers, so do not duplicate pack numbers as well.*

## Troubleshooting hardware

The following table shows the different areas that should be checked if a hardware problem arises.

| Hardware Checklist | |
|---|---|
| To check this | Type this, then press **Enter**. |
| Verify Status of AxLink DIP switch | Default is 6 & 7 on, all others off, which makes the Radia device 96 |
| Verify Status of Low Voltage Cables | • Wiggle check<br>• Correct position?<br>• Good strong connection?<br>• Verify with wiring diagram or manual. |
| Verify Status of Loads | • Have loads been checked for shorts?<br>• Have loads been verified to work (Bypass module)?<br>• Check for transformers.<br>• Electronic or magnetic?<br>• Transformer rating (overload)? |
| Verify Status of Wires | • Correct voltage?<br>• Correct phase?<br>• One Neutral per controlled Zone?<br>• Check for common neutrals.<br>• Wires connected to correct terminal?<br>• Are all multi-phase line terminals connected? |


*You can verify Radia Eclipse can turn the loads on/off by turning off all AxLink switches. This will set all circuits to 100%.*


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