

**RPM SERIES**  
**Rack-Mount Powered Mixers**

**Operation Manual**

**advantage** 

# RPM SERIES

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## INTRODUCTION

The **RPM Series** of Rack-Mount Powered Mixers provides an 8 input by 2 output mic/line mixer, 9-band graphic equalization, output patch points, and two choices of output amplification. A single 300 Watt Main amplifier...or...a 300 Watt Main amplifier plus a 60 Watt Zone amplifier are available. Optional output transformers may be added for driving distributed speaker systems. Optional remote control may be added for controlling mixer output levels, plus 3 relays. The RPM Series is covered by a Five-Year 'Gold Seal' Warranty.

RPM Series features include:

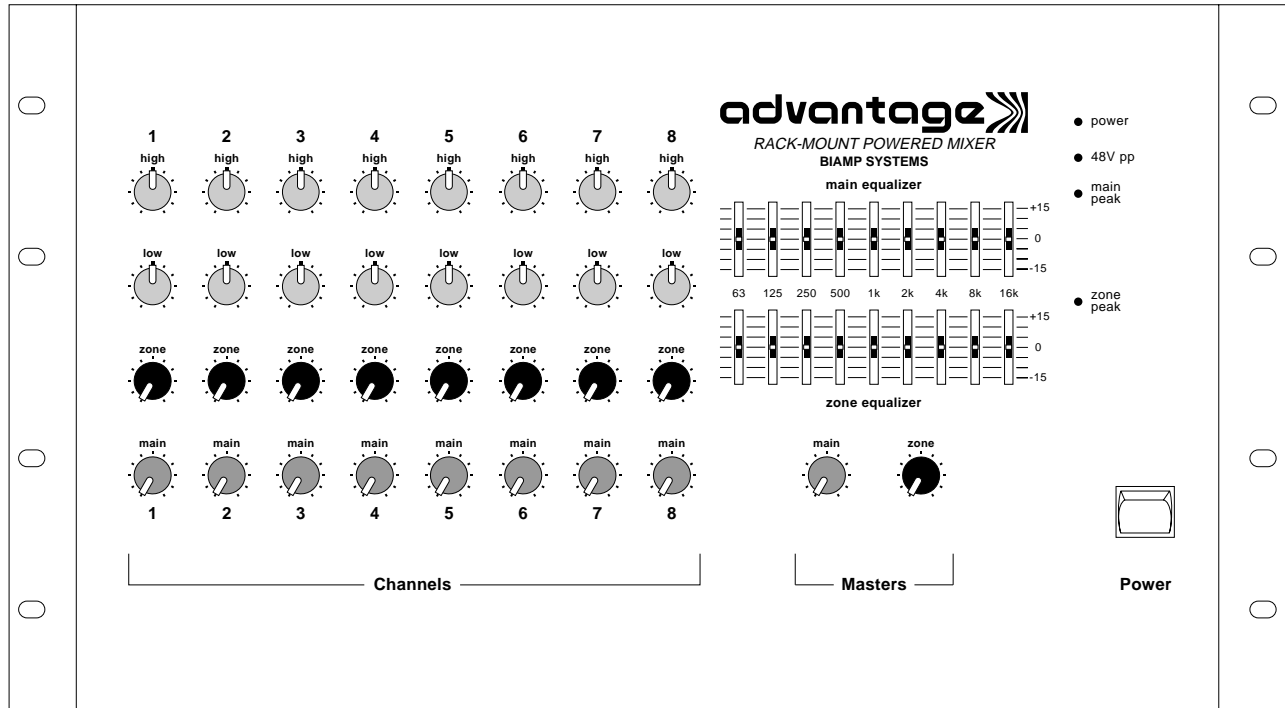
- ◆ seven balanced microphone/line level mixer input channels
- ◆ one stereo summing line level mixer input channel
- ◆ high & low equalization on each mixer input channel
- ◆ independent main & zone level controls on each channel
- ◆ main and zone mixer outputs with master level controls
- ◆ 9-band graphic equalization for amplified outputs
- ◆ patch point between mixer outputs and equalizer inputs
- ◆ mixer inputs & outputs provided on rear panel barrier strip
- ◆ 300W Main or 300W Main plus 60W Zone amplifier models
- ◆ internal limiter on 300W Main amplifier prevents output clipping
- ◆ optional output transformers for distributed speaker systems
- ◆ rear panel mounting holes for optional output transformers
- ◆ switchable +48 Volt phantom power for microphone inputs
- ◆ optional remote control of mixer output levels, plus relays
- ◆ optional isolation transformers available for microphone inputs
- ◆ covered by Advantage Five-Year "Gold Seal" Warranty



After reading this manual, if you have any questions or need technical assistance, please call Biamp Systems toll-free (1-800-826-1457).



## FRONT PANEL FEATURES



**High:** These controls adjust the high-frequency equalization (Treble) for the channels. High provides  $\pm 15\text{dB}$  of shelving equalization for frequencies above 15kHz.

**Low:** These controls adjust the low-frequency equalization (Bass) for the channels. Low provides  $\pm 15\text{dB}$  of shelving equalization for frequencies below 50Hz.

**Zone:** These controls adjust the level of channel signals sent to the Zone Master control. Zone controls are used to create an independent mix for an auxiliary sound system. On model RPM 360, this mix is normally sent (via the Zone Master) to the Zone Equalizer and Amplifier (see Patch on pg. 3).

**Main:** These controls adjust the level of channel signals sent to the Main Master control. Main controls are used to create an independent mix for the primary sound system. This mix is normally sent (via the Main Master) to the Main Equalizer and Amplifier (see Patch on pg. 3).

**Main Master:** This control adjusts the overall level of signals sent (from the channel Main controls) to the Main Out terminal on the rear panel (see Patch on pg. 3). From the factory, this signal is then routed to the Main Equalizer and Amplifier. Remote control of mixer output levels is available as an option (see Remote Control on page 5).

**Zone Master:** This control adjusts the overall level of signals sent (from the channel Zone controls) to the Zone Out terminal on the rear panel (see Patch on pg. 3). On model RPM 360, this signal is then routed to the Zone Equalizer and Amplifier. Remote control of mixer output levels is available as an option (see Remote Control on page 5).

**Main Equalizer:** This 9-band graphic equalizer adjusts the frequency response (tonal balance) of signals sent to the Main Amplifier, to compensate for room acoustics. Each control provides  $\pm 15\text{dB}$  boost/cut at the designated center frequency. From the factory, the Main Equalizer receives signal from the mixer Main Out. However, the Main Equalizer may be wired to receive signal from an alternate source (see Patch on pg. 3).

**Zone Equalizer (model RPM 360 only):** This 9-band graphic equalizer adjusts the frequency response (tonal balance) of signals sent to the Zone Amplifier, to compensate for room acoustics. Each control provides  $\pm 15\text{dB}$  boost/cut at the designated center frequency. From the factory, the Zone Equalizer receives signal from the mixer Zone Out. However, the Zone Equalizer may be wired to receive signal from an alternate source (see Patch on pg. 3).

**Power Indicator:** This green LED lights when AC power is on.

**48V PP Indicator:** This yellow LED lights when Phantom Power is on (see Phantom Power on pg. 3). **CAUTION:** Turn levels down before switching phantom power. Leave phantom power off while making Mic input connections.

**Main & Zone Peak Indicators:** These red LEDs light when the respective amplifiers have reached maximum output power. The Main amplifier includes a built-in limiter to prevent output clipping. The Zone amplifier (model RPM 360 only) does not.

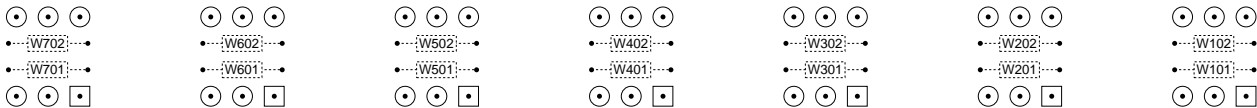
**Power Switch:** This switch applies power to the unit. **CAUTION:** Complete all wiring connections & installation before turning power on.



## OPTIONS

**NOTE:** To access internal options: 1) Disconnect AC power from the unit. 2) Remove both end panels (six screws on each end panel). 3) Disconnect wiring harnesses between front and rear circuit boards. 4) Remove three screws along top edge of rear panel and three screws along front edge of bottom panel. 5) Separate chassis into 'top/front' & 'bottom/rear' sections.

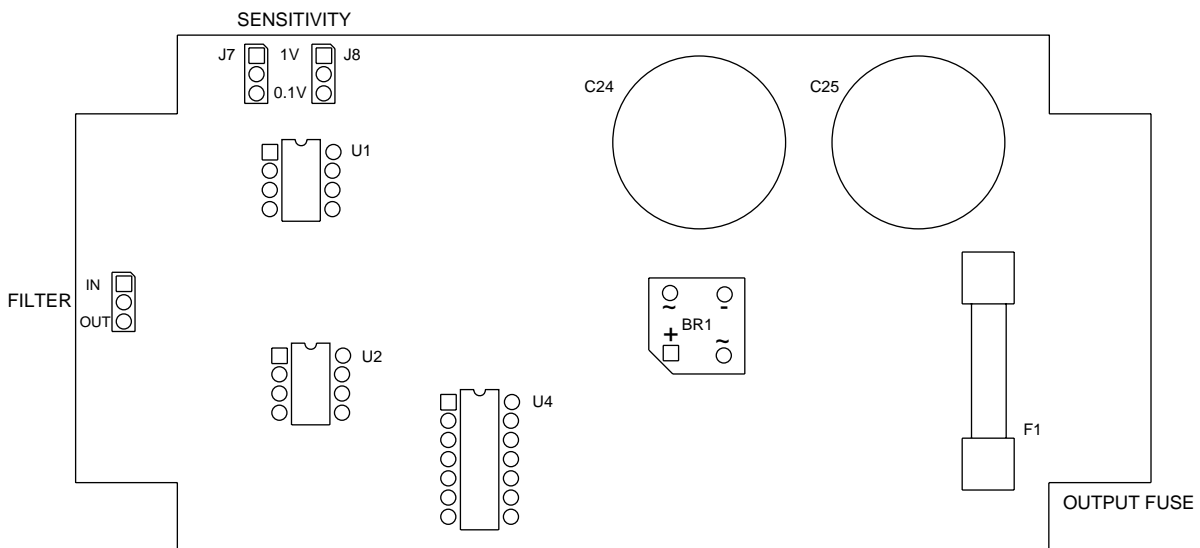
**Mic Input Transformers:** Mic Input Transformers are available as a user installed option. Positions are provided on the lower right portion of the mixer printed circuit board for installation of the transformers (see diagram below). Any or all of Channels 1~7 may have transformers installed. To install transformers, solder them into the respective positions, with Pin 1 (black stripe) located at the square pad. When transformers are installed, two jumpers (0 ohms resistors) must be removed from each channel. These jumpers (W101 & W102 for Channel 1; W201 & W202 for Channel 2; etc.) are located on the component side of the mixer printed circuit board, and require disassembly of the mixer printed circuit board for removal. Biamp Systems Input Transformer #909-0010-01.



**Speaker Output Autoformers:** Autoformers are available as a user installed option. Autoformers allow the amplifiers to drive 'constant-voltage' distributed speaker systems. Positions are provided on the rear panel for mounting (see Rear Panel Features on page 3). Model DT-1A (#909-0026-00) is used for the 300W Main amplifier. Model DT-2A (#909-0025-00) is used for the 60W Zone amplifier (RPM 360 only). **CAUTION:** See High Pass Filter below. Wiring diagrams are included with the individual autoformers.

**High Pass Filter (RPM 360 Zone amplifier only):** This two-position jumper strap enables or disables a 12dB/octave 60Hz High-Pass Filter for the amplifier (see diagram below). When the strap is in the "IN" (up) position, the High-Pass Filter is enabled. When the strap is in the "OUT" (down) position, the High-Pass Filter is disabled. The High-Pass Filters must be enabled whenever the RPM 360 Zone amplifier is used with an autoformer. This prevents excess current at low frequencies due to speaker transformer inductance, which can cause distortion or amplifier damage. The 60W Zone amplifier is shipped from the factory with the High-Pass Filters disabled ("OUT").

**Output Fuse (RPM 360 Zone amplifier only):** This fuse is in series with the output of the amplifier, and will help protect speakers against catastrophic amplifier failure (see diagram below). If the output fuse should require replacement, the maximum recommended value is 4 Amps. The output fuse should always be a Normal Blow (NB) fuse. Never use a Slow-Blow (SB) fuse. The RPM 360 Zone amplifier is shipped from the factory with the output fuses being 4 Amp Normal-Blow (4A NB).





# REMOTE CONTROL

## SET-UP

The Remote Control PCB provides connections for two remote controls (Remote 1 & Remote 2). From the factory, universal control (recall presets, store presets, switch relays, Main level, and Zone level) is possible from both Remote 1 and Remote 2. However, "set-up" mode allows specific functions to be assigned to Remote 1 and Remote 2 independently. For example, Remote 1 might be assigned to recall presets, switch relays, and adjust Main level, while Remote 2 is assigned only to adjust Zone level. The actual remote controls could then be installed in their respective areas (Main & Zone), providing localized control.

To enter "set-up" mode, and assign specific functions to Remote 1 & Remote 2, press and hold the SETUP button (accessible through hole in bottom of chassis) while turning on power to the RPM unit. Continue to hold the SETUP button for 3 seconds (the adjacent LED will flash once) then release the button immediately. In "set-up" mode, the ON & OFF buttons (A,B, or C) on a remote control are used to assign functions. There are five possible functions, each of which may be assigned to Remote 1 and/or Remote 2 (see table).

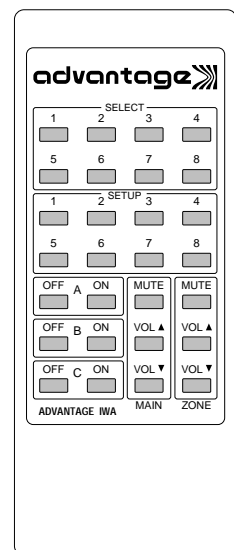
The table shows the exact sequence in which assignments must be made (use the table as a worksheet to plan assignments). Choose either ON or OFF for each function. The IR indicator will flash whenever a selection is made. The ERROR indicator will flash only if a wrong button is pressed. When all ten selections have been made, the SETUP indicator will light (1 second) and the Remote Control PCB will automatically return to normal operation. The Remote Control PCB may be returned to the factory default assignments (universal control) at any time. **CAUTION:** *Returning to factory defaults also erases presets.* To return to factory defaults, press and hold the SETUP button while turning on power. Instead of releasing the SETUP button after 3 seconds, continue to hold the button for 10 seconds (the adjacent LED will flash twice). Release the button. The LED will again light (for 1 second) and the Remote Control PCB will return to normal operation. **NOTE:** *The SETUP LED will flash occasionally during normal operation. This is only an indication that the Remote Control PCB is automatically storing the current settings in non-volatile memory.*

1) Remote 1 - RECALL PRESETS	OFF	ON
2) Remote 1 - STORE PRESETS	OFF	ON
3) Remote 1 - SWITCH RELAYS	OFF	ON
4) Remote 1 - MAIN LEVEL	OFF	ON
5) Remote 1 - ZONE LEVEL	OFF	ON
6) Remote 2 - RECALL PRESETS	OFF	ON
7) Remote 2 - STORE PRESETS	OFF	ON
8) Remote 2 - SWITCH RELAYS	OFF	ON
9) Remote 2 - MAIN LEVEL	OFF	ON
10) Remote 2 - ZONE LEVEL	OFF	ON

## REMOTE CONTROLS

The RPM Series can be remotely controlled via infrared, wall-mount, and/or custom controls. An internal infrared receiver is provided on the Remote Control PCB (for set-up purposes only). The actual remote controls are offered optionally. This allows the user to select the type and quantity of remote controls necessary for a particular application. Remote controls affect mixer output volumes, relay switching, and memory presets. Two remote controls may be added, and may be configured for control of independent functions. Optional remote controls are: **Infrared Transmitters, External Infrared Receivers, Wall-Mount Panels, & Remote Interface Kits.**

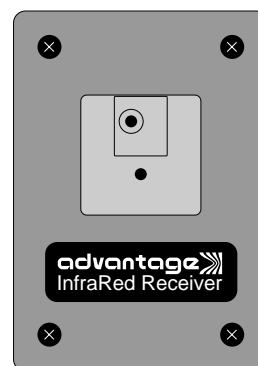
**Infrared Transmitter (Biamp #909-0063-00):** The transmitter is a hand-held remote control, which transmits infrared codes unique to Biamp. Therefore, the transmitter should not affect any other infrared controlled equipment (such as TVs or VCRs). Likewise, other infrared controllers will not provide proper control of Biamp equipment. The transmitter requires two AAA batteries, which are included with the unit (user installed). The Select 1~8 buttons choose a desired preset from non-volatile memory. The Setup 1~8 buttons create presets by storing current settings (levels & relays) in non-volatile memory. Once presets have been established, the Setup 1~8 buttons may be disabled. The MUTE, VOL ▲, and VOL ▼ buttons (Main & Zone) provide volume up, volume down, and volume off functions for the mixer outputs. The ON and OFF buttons (A, B, & C) provide switching of the respective relays (on Remote Control PCB). For best results, there should be an unobstructed line-of-sight from transmitter to receiver. The transmitter will operate up to 30 feet from a receiver. When infrared information is transmitted to a receiver, the IR LED indicators on the Remote Control PCB, and inside the receiver, will flash.



**Infrared Transmitter**  
(Biamp #909-0063-00)

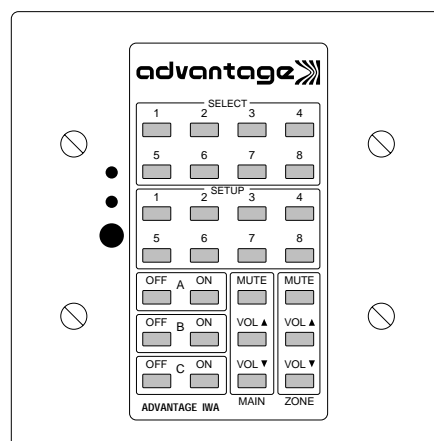
## REMOTE CONTROL

**External Infrared Receiver (Biamp #909-0030-00):** The receiver consists of a black plastic box, which contains an infrared photo detector, an LED indicator, and three screw terminals. To install the receiver, first take off the front cover by removing the four screws. Mount the receiver to a wall or other surface, using the two screw holes on the back cover (screws not included). The receiver should not be mounted in direct sunlight, or pointed directly at fluorescent lighting. For best results, there should be an unobstructed line-of-sight from transmitter to receiver. The receiver may be wired up to 2000 feet from the RPM unit, using 2-conductor shielded cable (not included). Route the cable through the access hole on the bottom of the receiver. The three screw terminals inside the receiver ("GND", "IR2", & "IR3") directly correspond to the Remote 1 and Remote 2 terminals on the Remote Control PCB (Remote 1 and Remote 2 share a common "GND" terminal). Remote Infrared Receivers may be connected to Remote 1 and/or Remote 2, depending upon the particular application. Connect the cable shield to the "GND" terminal at each end. Use the two conductors to connect "IR2" to "IR2" and "IR3" to "IR3". Replace the receiver front cover. When the RPM unit is turned on, power is delivered to the receiver. The LED indicator inside the receiver, and the IR LED indicator on the Remote Control PCB, will flash whenever infrared information is detected. **NOTE:** The Infrared Receiver includes a "Remote Translator", which allows remote control of Advantage products via third-party controllers (instructions included with receiver).



**External Receiver**  
(Biamp #909-0030-00)

**Wall-Mount Panel (Biamp #909-0073-00):** The wall-mount is a "hard-wired" control panel, which receives power from the Remote Control PCB. There are no batteries to wear out, and it is not easily lost or stolen. The wall-mount may be wired up to 2000 feet from the RPM unit, using 2-conductor shielded cable (not included). Remove the mounting box from the front panel. Route the cable through a "knock-out" hole on the rear of the mounting box. Install the mounting box in a wall or panel. The three screw terminals on the Wall-Mount Panel circuit board ("GND", "IR2", & "IR3") directly correspond to the Remote 1 and Remote 2 terminals on the Remote Control PCB (Remote 1 and Remote 2 share a common "GND" terminal). Wall-Mount Panels may be connected to Remote 1 and/or Remote 2, depending upon the particular application. Connect the cable shield to the "GND" terminal at each end. Use the two conductors to connect "IR2" to "IR2" and "IR3" to "IR3". Install the front panel in the mounting box. The wall-mount has twenty-eight buttons. The Select 1~8 buttons choose a desired preset from non-volatile memory. The Setup 1~8 buttons create presets by storing current settings (levels & relays) in non-volatile memory. Once presets have been established, the Setup 1~8 buttons may be disabled. The MUTE, VOL ▲, and VOL ▼ buttons (Main & Zone) provide volume up, volume down, and volume off functions for the mixer outputs. The ON and OFF buttons (A, B, & C) provide switching of the respective relays (on Remote Control PCB). When the RPM unit is turned on, power is delivered to the Wall-Mount Panel and the green LED indicator will light. The red LED indicator on the Wall-Mount, and the IR LED indicator on the Remote Control PCB, will flash whenever infrared information is detected. The Wall-Mount Panel includes an infrared detector (below LED indicators), which allows it to operate as an External Infrared Receiver as well. The infrared detector may be disabled via a circuit board jumper strap. Complete instructions are included with the Wall-Mount Panel.



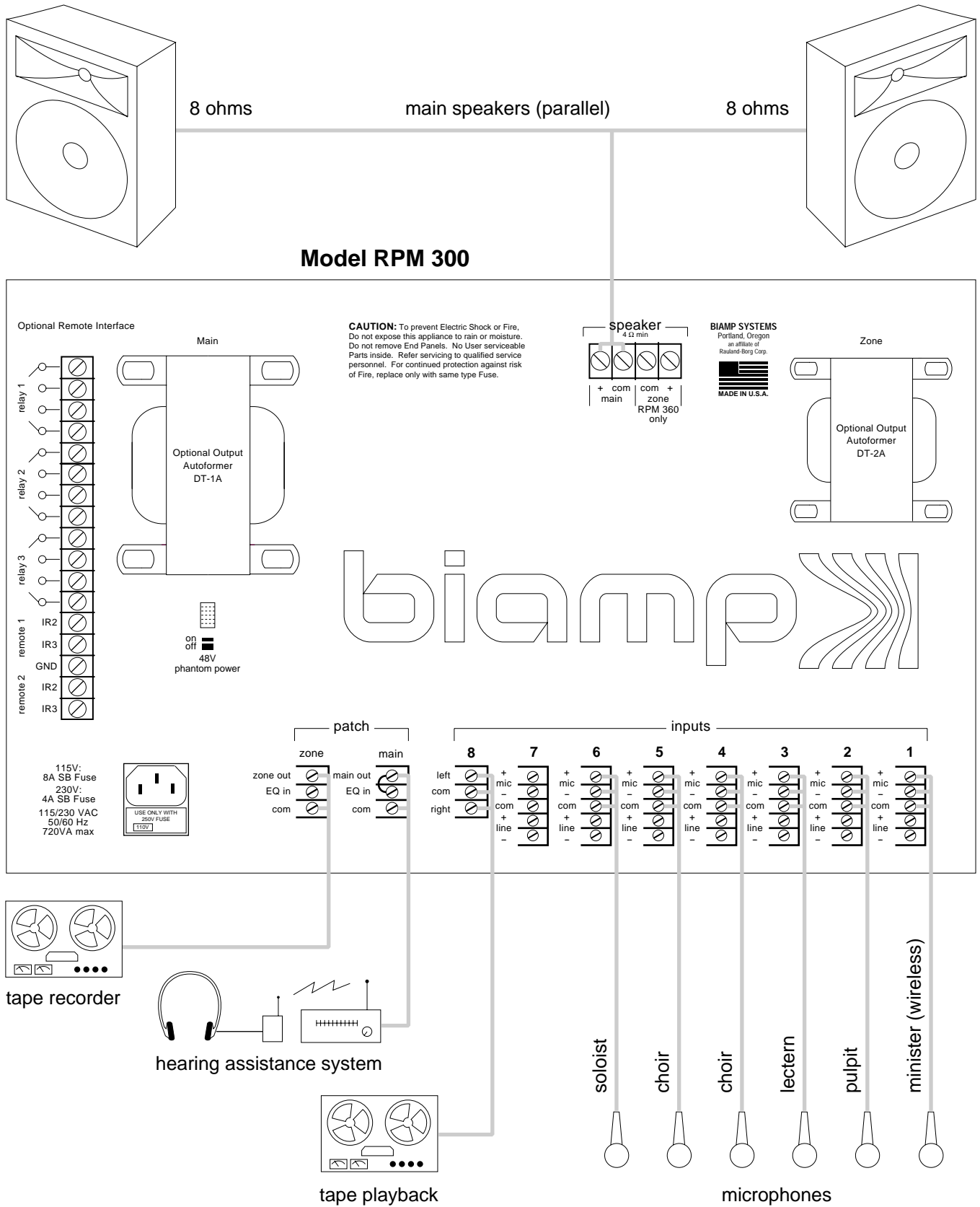
**Wall-Mount Panel**  
(Biamp #909-0073-00)

**Remote Interface Kit (Biamp #909-0041-00):** The Remote Interface Kit allows the user to create a customized control panel, using his own switches, enclosure, and panel. It can provide up to 40 buttons (12 more than standard remote controls). The Remote Interface Kit is a tested circuit board assembly, which includes two wiring harnesses. The circuit board connects to the Remote Control PCB in exactly the same way the External Infrared Receiver does, using 2-conductor shielded cable (not included), and may be wired up to 2000 feet from the RPM unit. The three screw terminals on the Remote Interface Kit circuit board ("GND", "IR2", & "IR3") directly correspond to the Remote 1 and Remote 2 terminals on the Remote Control PCB (Remote 1 and Remote 2 share a common "GND" terminal). Remote Interface Kits may be connected to Remote 1 and/or Remote 2, depending upon the particular application. When the RPM unit is turned on, power is delivered to the circuit board. The circuit board is 2.27"W by 2.65"H, with four mounting holes (2" centers) and #6 mounting hardware provided. Complete instructions are included with the Remote Interface Kit.



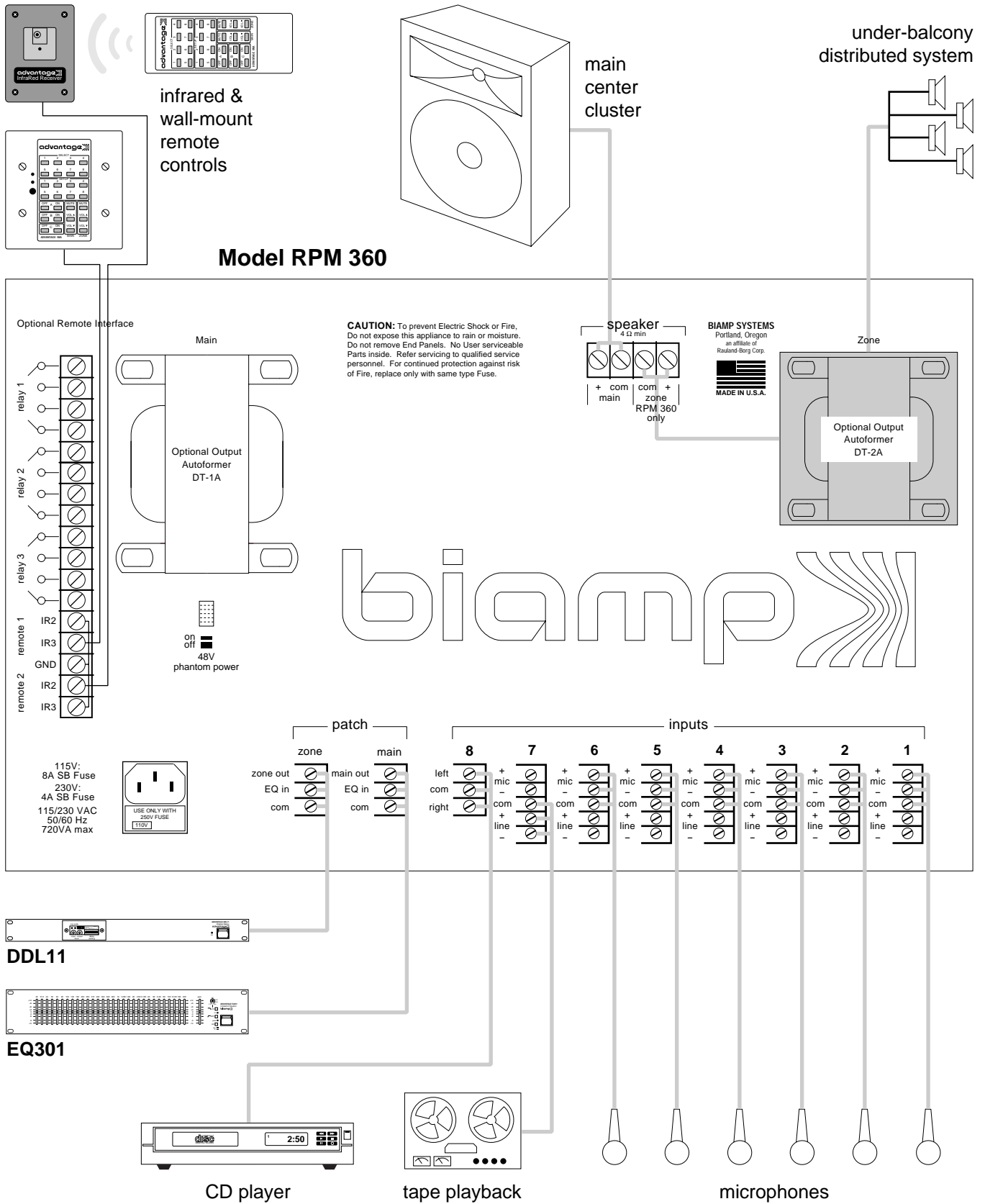
# APPLICATIONS

## 300W Church System plus Hearing Assistance & Recording Outputs



# APPLICATIONS

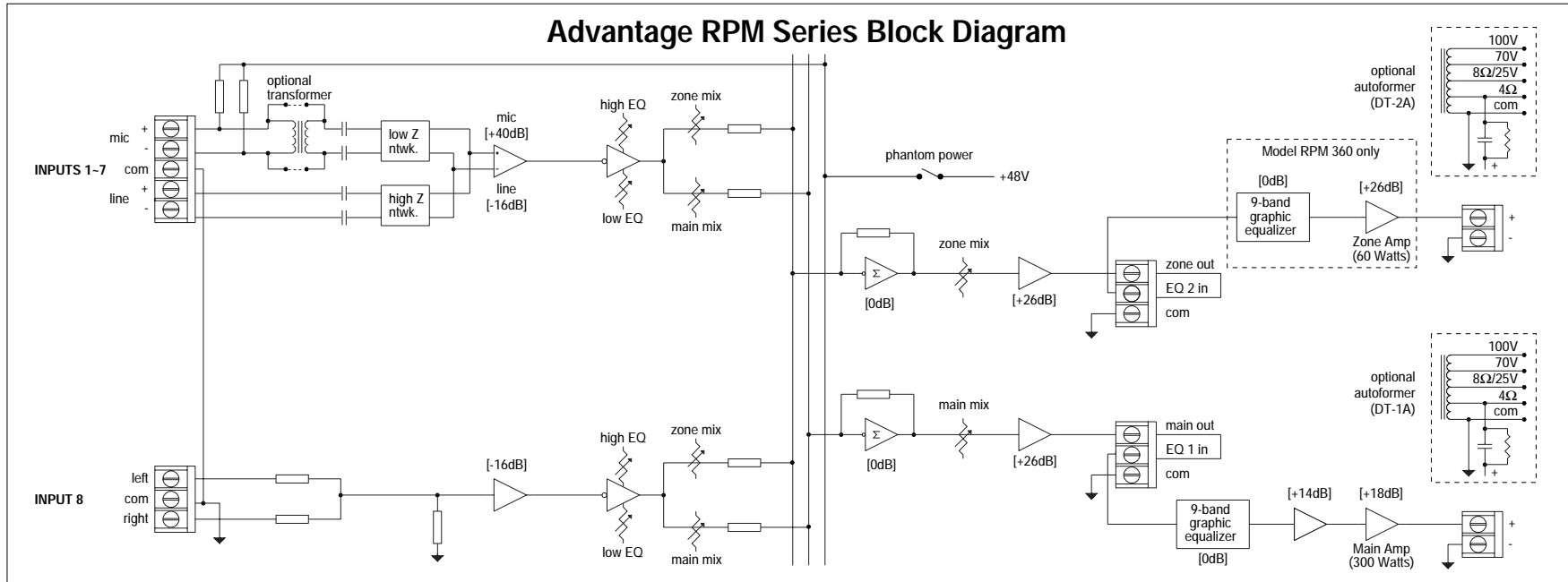
## 300W Auditorium System plus 60W Delayed Under-Balcony Speakers & Remote Control



# SPECIFICATIONS

AMPLIFIERS:	<u>Main (RPM 300 &amp; RPM 360)</u>	<u>Zone (RPM 360 only)</u>	
Rated Power (4 ohm load)	300 Watts RMS	60 Watts RMS	
Frequency Response (20Hz~20kHz @ rated power)	+0/-3dB	+0/-3dB	
Signal-to-Noise Ratio (20Hz~20kHz @ rated power)	100dB	95dB	
Total Harmonic Distortion (2kHz @ rated power)	< 0.04%	< 0.1%	
Intermodulation Distortion (SMPTE)	< 0.15%	< 0.05%	
Gain (equalizer input to amplifier output)	32dB	26dB	
<hr/>			
<b>MIXER INPUTS:</b>	<b>MIXER OUTPUTS (Main &amp; Zone):</b>		
mic input sensitivity	-65dBu (435µV)	maximum output level	
mic input impedance (balanced)	2k ohms	+21dBu (8.7V)	
line input sensitivity	-8.5dBu (291mV)	output impedance	
line input impedance (balanced)	200k ohms	< 50 ohms	
equalizer input sensitivity	-0dBu (.775V)	<b>MIXER GAIN:</b>	
equalizer input impedance	47k ohms	mic input to main output	66dB
		mic input to zone output	66dB
		<b>EQUIVALENT INPUT NOISE (mic input, 150Ω termination)</b>	
			-112dBu
<hr/>			
<b>EQUALIZATION:</b>			
low-frequency input channel EQ:	±15dB @ 50Hz	9-band graphic output EQ:	±15dB @ 64Hz, 125Hz, 250Hz, 500Hz,
high-frequency input channel EQ:	±15dB @ 15kHz		1kHz, 2kHz, 4kHz, 8kHz, 16kHz
<hr/>			
<b>POWER CONSUMPTION (120/240VAC 50/60Hz):</b>	<b><u>RPM 300</u></b>	<b><u>RPM 360</u></b>	
	< 600 Watts	< 720 Watts	
<hr/>			
<b>WEIGHTS:</b>	<b><u>RPM 300</u></b>	<b><u>RPM 360</u></b>	
	< 27 lbs. (12.25kg)	< 30 lbs. (13.61kg)	
<hr/>			
<b>DIMENSIONS (both models):</b>	Height = 10.44 inches (265mm)	Width = 19 inches (483mm)	Depth = 9.65 inches (245mm)

\*preliminary



## WARRANTY

### BIAMP IS PLEASED TO EXTEND THE FOLLOWING 5-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS OWNER'S MANUAL.

BIAMP Systems expressly warrants this product to be free from defects in material and workmanship for a period of 5 YEARS from the date of purchase as a new product from an authorized BIAMP dealer under the following conditions.

1. The Purchaser is responsible for completing and mailing to BIAMP, within 10 days of purchase, the attached warranty application.

2. In the event the warranted BIAMP product requires service during the warranty period, BIAMP will repair or replace, at its option, defective materials, provided you have identified yourself as the original purchaser of the product to any authorized BIAMP Service Center. Transportation and insurance charges to and from an authorized Service Center or the BIAMP factory for warranted products or components thereof to obtain repairs shall be the responsibility of the purchaser.

3. This warranty will be VOIDED if the serial number has been removed or defaced; or if the product has been subjected to accidental damage, abuse, rental usage, alterations, or attempted repair by any person not authorized by BIAMP to make repairs; or if the product has been installed contrary to BIAMP's recommendations.

4. Electro-mechanical fans, electrolytic capacitors, and the normal wear and tear of appearance items such as paint, knobs, handles, and covers are not covered under this warranty.

5. BIAMP SHALL NOT IN ANY EVENT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, LOSS OF USE, PROPERTY DAMAGE, INJURY TO GOODWILL, OR OTHER ECONOMIC LOSS OF ANY SORT. EXCEPT AS EXPRESSLY PROVIDED HEREIN, BIAMP DISCLAIMS ALL OTHER LIABILITY TO PURCHASER OR ANY OTHER PERSONS ARISING OUT OF USE OR PERFORMANCE OF THE PRODUCT, INCLUDING LIABILITY FOR NEGLIGENCE OR STRICT LIABILITY IN TORT.

6. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. BIAMP EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE REMEDIES SET FORTH HEREIN SHALL BE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDIES WITH RESPECT TO ANY DEFECTIVE PRODUCT. THE AGENTS, EMPLOYEES, DISTRIBUTORS, AND DEALERS OF BIAMP ARE NOT AUTHORIZED TO MODIFY THIS WARRANTY OR TO MAKE ADDITIONAL WARRANTIES BINDING ON BIAMP. ACCORDINGLY, ADDITIONAL STATEMENTS SUCH AS DEALER ADVERTISEMENTS OR REPRESENTATIONS DO NOT CONSTITUTE WARRANTIES BY BIAMP.

7. No action for breach of this warranty may be commenced more than one year after the expiration of this warranty.

Thank you for purchasing BIAMP...  
AMERICAN SOUND CRAFTSMANSHIP

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