



General Description

The MA 3 is a three-channel amplifier designed to operate reliably in commercial environments. The MA 3 was specifically designed for use in:

- Paging
- Foreground Music
- Background Music Distribution

and with the Rane family of paging, foreground music, and background music products, such as the Rane CP series.

Each channel of the MA 3 delivers 40 watts of *continuous* average power into 8Ω and 60 watts into 4Ω. Up to three *optional* 40 watt, 70.7 volt or 100 volt constant-voltage audio transformers may be installed *inside* the MA 3, eliminating the need for external wiring or transformer mounting. See the TF 407 / TF 410 data sheet for more information.

The MA 3 uses a conventional linear power supply with toroidal transformer. This configuration minimizes the emissions associated with switching supplies and noisier transformer designs. The power supply features *independent secondary supplies for each channel*, minimizing load regulation interaction and crosstalk.

Thermal management is accomplished with a sealed heat-tunnel design incorporating *low velocity* forced air and large aperture openings. This design minimizes the noise usually associated with forced air cooling and *eliminates the need for an air filter*. Forced air cooling allows the amplifier to operate reliably

in harsh environments and *avoid the buildup of heat in unventilated racks associated with passive convection cooling*.

The combination of a solid, conservative power supply and forced air cooling allows the MA 3 to *simultaneously* deliver 60 watts of *continuous-average-power* to all three channels.

SPiKe[®] *dynamic* protection circuitry completely safeguards each channel against over-voltage, under-voltage, overloads, transients from inductive loads, thermal runaway and *instantaneous* temperature peaks. Biasing is not allowed to occur when an under-voltage condition exists, reducing turn on and turn off transients.

Fast-response limiters allow the MA 3 to tolerate up to 20 dB of overdrive into 8 and 4Ω loads while holding THD below 1%. This means no loss of speech intelligibility or harsh clipping. This feature greatly *increases the dynamic range* of the system without external limiters.

Peak-responding, load-adaptive meters accurately indicate the remaining headroom. The meters are helpful in setting system levels and indicating signal compression.

Balanced inputs with Euroblock connectors are provided. Euroblock output connectors accept up to 12 gauge wire. Rear panel Level controls allow amplifier sensitivity adjustment. Internally selectable 80 Hz highpass filters offer protection against over excursion of small bookshelf speakers and saturation of distribution transformers at low frequencies.

Features

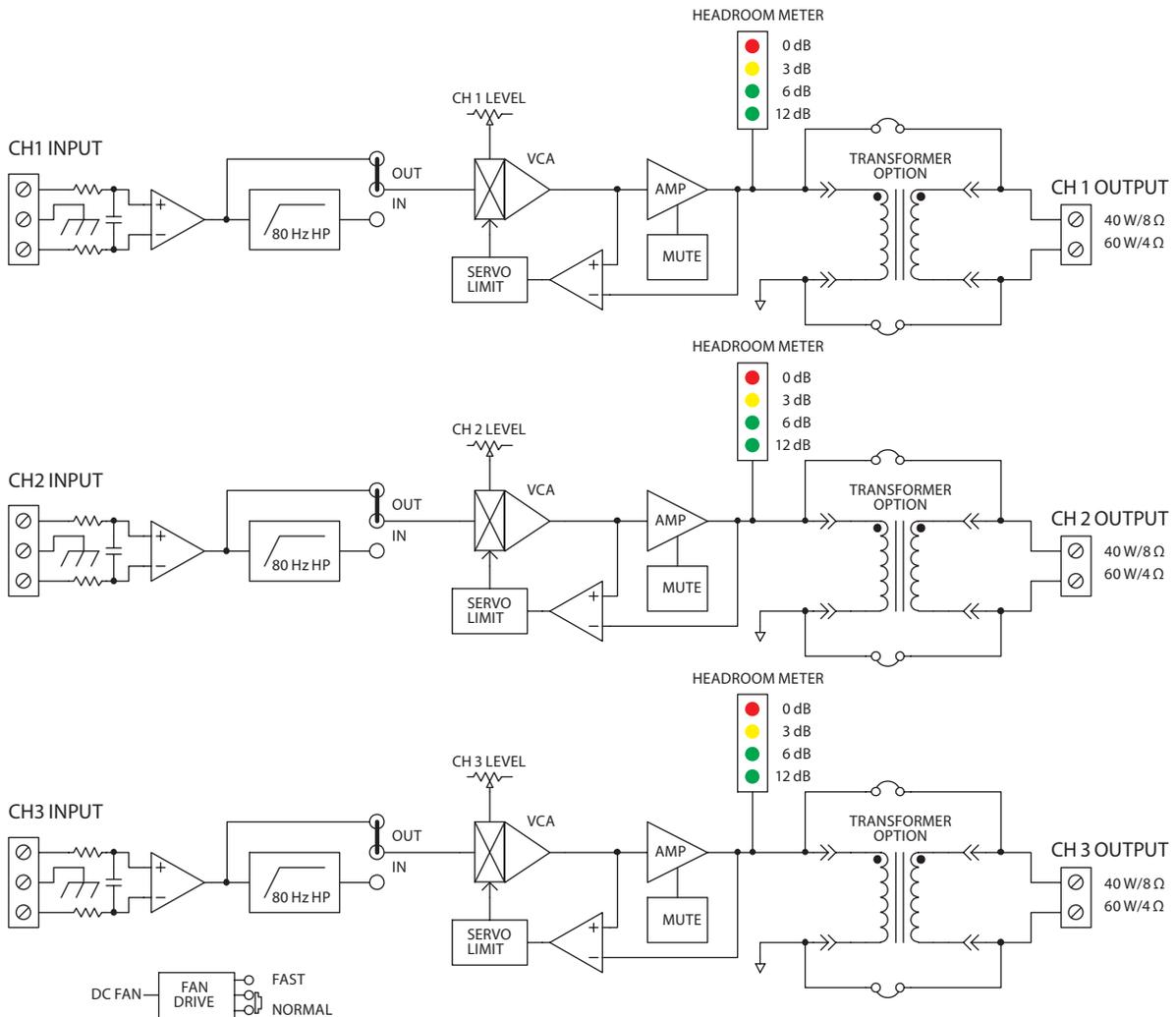
- 3 Independent Amplifiers
- 60W per Channel Continuous Average Power into 4Ω, 20-20k Hz
- 40W per Channel Continuous Average Power into 8Ω, 20-20k Hz
- Load Sensitive Dynamic Limiters
- Load Sensitive Headroom Meters
- SPiKe[®] Protection Circuitry
- High Capacity Linear Power Supply
- Sealed Heat-Tunnel Forced Air Cooling
- Input Level Controls (on rear panel)
- 80 Hz High Pass Filter Selection
- Euroblock Connectors
- IEC Socket and Line Cord
- 3 Optional Internal 70.7 V or 100 V Distribution Transformers
- UL/cUL Certification

*SPiKe is a registered trademark of National Semiconductor Corporation.

Features and Specifications

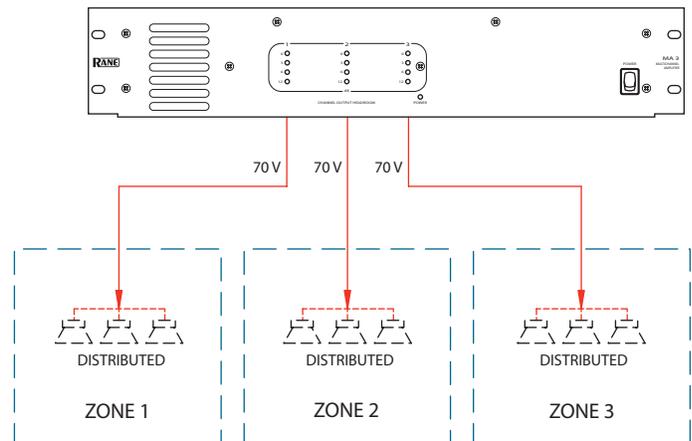
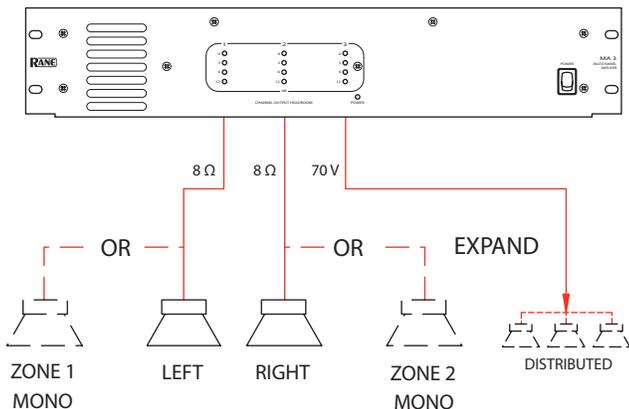
Parameter	Specification	Limit	Units	Conditions/Comments
Input:	Euroblock Connector			
Impedance	20k	min.	Ω	Each leg
Maximum Input Level	+20	min.	dBu	
Sensitivity	Off to 0		dBu	Input required for full power; 8Ω
CMR	40	min.	dB	20 Hz to 20 kHz
Highpass Filter	80 Hz (switchable)	±2.5%	Hz	2nd-order butterworth
Amplifier: Gain	27	±0.5	dB	1 kHz
Power Output	40/60	min.	watts	8/4 Ω cont. avg. power, all channels driven
Frequency Response	20 - 20k		Hz	+0, -5 dB
S/N	90	min.	dBr	re: 40 W, 8Ω, A-weighted
Crosstalk	-60	max.	dB	1 kHz, 4Ω, all channels driven
THD+N	0.05%	typ.		1 kHz, 40 W, 8Ω, 80 kHz BW
	0.1%	typ.		1 kHz, 60 W, 4Ω, 80 kHz BW
	0.2%	typ.		20 Hz-20 kHz, 35W, 8Ω, 80 kHz BW
Slew Rate	10	min.	V/μs	
Damping Factor	80	min.		8Ω, 1 kHz
On/Off Transient Muting	Active			Drop out 85 VAC (120V unit)
Fan Cooling	Active Constant-Current			Sealed tunnel, 2-speed
Tunnel Power Dissipation	120W; 410 BTU/hr			60 W/channel; 4Ω load; all channels driven
SOA	SPiKe*			Safe Operating Area
Limiter: Attack Time	10	typ.	ms	10 dB step
Decay Time	3000	typ.	ms	10 dB step
Threshold	0.1% THD+N	typ.		@1 kHz
Action	1% THD+N	max.		15 dB overdrive (max. level) @ 1 kHz
Meter: Attack Time	20	typ.	ms	10 dB step
Decay Time	500	typ.	ms	10 dB step
Indicators	0, 3, 6, 12	+0, -2	dB	20log (Vmax/Vout) or 10log (Pmax/Pout)
Supply: Type	Linear; Toroidal Transformer			Independent secondaries for each channel
Line Voltage	120/230		VAC	Internal selection
Power Consumption	33.6W; 115 BTU/hr			No load (idle)
Total Load & Unit	360W; 1200 BTU/hr			60 W/channel; 4Ω load; all channels driven
Optional Transformers:	40	typ.	watts	50 Hz to 15 kHz ±1 dB
Insertion Loss	0.5	typ.	dB	Installs internally, 1 per channel, up to 3
Unit: Agency Listing				
.....120 VAC model	UL			UL 6500
	cUL (Canada)			C22.2
.....Construction	All Steel			
.....Size	3.5"H x 19"W x 9"D (2U)			(8.9 cm x 48.3 cm x 22.9 cm)
.....Weight	26 lb			(11.8 kg)
Shipping: Size	4.25" x 20.3" x 13.75"			(11 cm x 52 cm x 35 cm)
.....Weight	30 lb			(13.6 kg)

Note: 0 dBu = 0.775 Vrms. *SPiKe is an acronym for Self Peak Instantaneous temperature (Ke) protection circuitry.

Block Diagram

Application Examples

Two-Channel Direct Drive Left & Right, Third Channel Distributes
with Internal Constant-Voltage Transformer

All Three Channels Distributed to Independent Zones

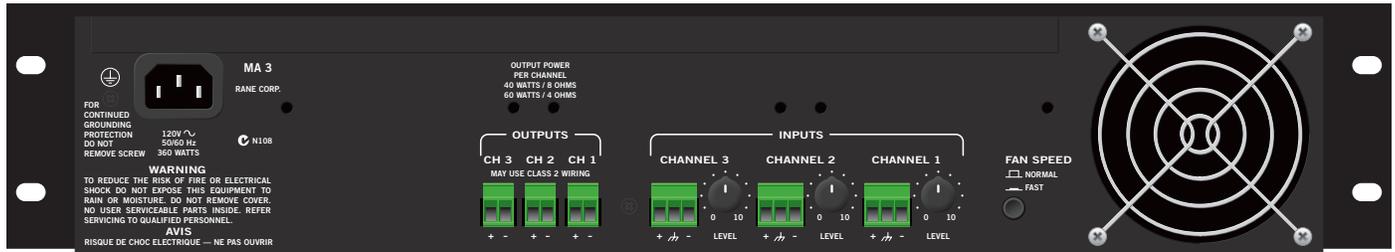


MA 3

MULTICHANNEL AMPLIFIER



Rear Panel



Architectural Specifications

The MA 3 shall be a three channel amplifier. It shall deliver 40 watts continuous average power into 8 ohms and 60 watts continuous average power into 4 ohms. The amplifier shall have balanced inputs with Euroblock connectors and Euroblock output connectors capable of accepting 12 gauge wire. Input level controls shall allow adjustment of input sensitivity. An internal means of selecting 80 Hz highpass 2nd-order Butterworth filters shall be provided. Load sensitive limiter circuits shall expand the dynamic range of the amplifiers and prevent clipping and the associated loss of speech intelligibility.

The power supply shall use a conventional linear supply with means of operating from 120 VAC 50/60 Hz or 230 VAC 50 Hz. An IEC connector with integral fuse and IEC cord shall be utilized. A front panel mounted power switch shall be provided with “power-on” indicator.

Thermal management shall employ forced air cooling, allowing the amplifiers to operate reliable in unventilated racks at

elevated ambient temperatures. The design shall incorporate a sealed heat tunnel with large aperture openings and low velocity air flow to minimize noise and eliminate the need for air filtering and the associated maintenance.

The design shall provide protection against overvoltage, undervoltage, overloads, transients from inductive loads, thermal runaway and *instantaneous* temperature peaks. Load sensitive headroom meters shall provide indication of 0, 3, 6 and 12 dB of remaining headroom.

The main chassis shall be constructed of 12 gauge, cold-rolled steel capable of reliably supporting rack mount applications. There shall be a means of installing up to three 40W, 70.7V (or 100 volt) constant-voltage distribution transformers inside the amplifier with quick connect terminals.

The 120 VAC unit shall be UL listed and cUL certified.

The unit shall be a Rane Corporation Model MA 3.

Available Accessories

- TF 407: 40W, 70.7V Distribution transformer
- TF 410: 40W, 100V Distribution transformer

Both transformers rated 40 watts, 50 Hz to 15k Hz ± 1 dB, with 0.5 dB Insertion loss.

Up to 3 mount inside the MA 3, one for each channel. See the TF 407/410 Data Sheet.

References

1. D. Bohn, “Constant-Voltage Audio Distribution Systems,” *RaneNote*, (2000).