

General Description

The Rane Model MA 6S Multichannel Amplifier supplies six completely independent amplifier channels in one 3-space rack-mount unit. Each channel delivers 100 watts rms into an eight ohm load, or 150 watts each into a four ohm load. Adjacent pairs of channels (1&2, 3&4, 5&6) may operate bridged to provide 300 watts into an eight ohm load.

Each channel of the MA 6S includes an input Voltage Controlled Attenuator (VCA). This carefully designed VCA prevents clipping at the output of the amplifier for any load for up to 15 dB of input overdrive. This VCA provides additional headroom to each channel, making the 100 watt ratings effectively much higher, and the results much louder.

All channels of the MA 6S are completely independent. Each is contained on its own circuit board making it immune to the actions of any other channel. Power is distributed to each channel from one master high current power supply, however the power supply is designed so that signal may not back-feed from a heavily loaded channel to any other channel. This makes power supply cross talk between channels inaudible.

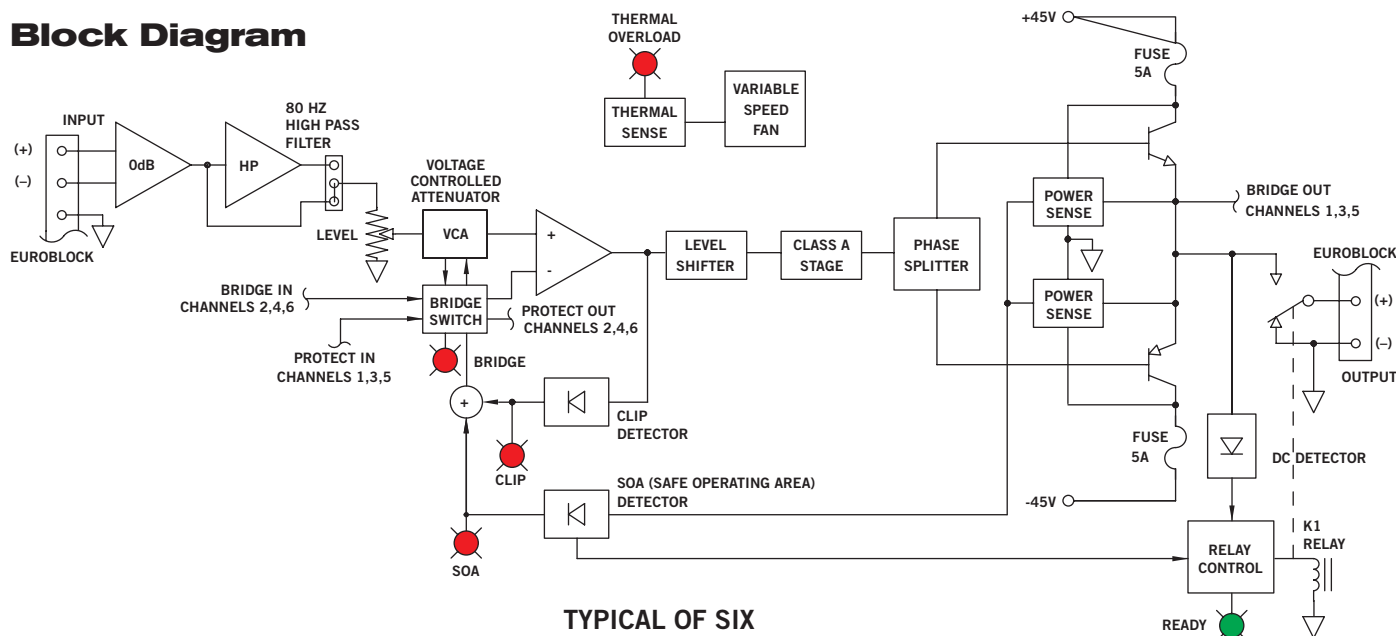
The heavy gauge all-steel construction of the MA 6S offers a high level of mechanical integrity, even when the amplifier is rack-mounted and unsupported in the rear. As an added benefit, mounting holes are provided on the side rails so the amplifier may be supported from the back.

Features

- 6 Independent Amplifiers
- 100 watts per Channel @ 8Ω
- 150 watts per Channel @ 4Ω
- 300 watt Bridged Pairs @ 8Ω
- Input Sensitivity Controls
- Input Protection Overload
- Euroblock Connectors
- 80 Hz High-Pass Filter Option
- Ready, Safe Operating Area (SOA), & Clip Limit Indicators
- Quiet Variable Speed Fan
- High Current Power Supply
- UL Listed / CSA Certified / Meets CE Requirements

Parameter	Specification	Limit	Units	Conditions/Comments
Power Output	100 150 300	min min min	W W W	All channels driven, 20-20k Hz (6) 8Ω loads (6) 4Ω loads (3) bridged pairs into 8Ω
Inputs: Type	Active Balanced/Unbalanced			
.....Connectors	Euroblock			Accepts 22 to 12 AWG wire
.....Impedance	20k	1%	Ω	Minimum each leg to ground
.....Maximum Level	+20	1	dBu	
.....Sensitivity	Off to 0 dBu (Adjustable)	1	dBu	Input required for rated power output
Outputs: Type	Direct Coupled			
.....Connectors	Euroblock			
.....Damping Factor	300	10%		1 kHz
.....Load	4 8	min min	Ω Ω	Single channel operation Bridged operation
On/Off Transient Muting	Yes, Output Relays			Activate approximately 3 seconds after power is applied; drop out immediately after turn-off; drop out with DC or large infrasonic signals.
Fan Cooling	Active Variable Speed			Intake rear; exhaust front
Heat Dissipation	183 BTU's/hr 2500 BTU's/hr 2140 BTU's/hr 1350 BTU's/hr	typ typ typ typ		"0" power 1 kHz, 100 W x 6 @ 8Ω 1 kHz, 33 W x 6 @ 8Ω Pink noise, 10 W x 6 @ 8Ω
Clip	1%	.5	THD	Attenuates input to maintain <3% THD for 15 dB of overdrive
SOA (Safe Operating Area)	-30	max	dB	Attenuates input to maintain safe power dissipation
Subsonic Filter Option	80	4%	Hz	For line distribution transformers
.....Rolloff	18		dB/oct	(Shipped with internal defeat on)
Frequency Response	10-55	0/-3dB	kHz	Output relay drops out below 10 Hz
THD+Noise	0.07	.03	%	100 W / 8Ω, 20-20k Hz
IM Distortion (SMPTE)	0.1	.05	%	60 Hz / 7 kHz, 4:1
Signal-to-Noise Ratio	103	2	dB	re 100 W, +4 dBu sens., 20 kHz BW
Crosstalk	-60	3	dB	1 kHz, any channel to any channel
Limiter: Type	Servo-Locked™ Input Attenuator			
.....Range	15/30	1	dB	Clip/Safe Operating Area (SOA)
.....Attack Time Constant	1/25	1	ms	Clip/Safe Operating Area (SOA)
.....Decay Time Constant	300/300	1	ms	Clip/Safe Operating Area (SOA)
.....Detection	Full-Wave Peak			
Maximum Power	2200		W	(6) Channels driven to full power
Unit: Agency Listing				
.....120 VAC model	UL cUL (Canada)			UL 813 (file E104174) C22.2 (file E104174)
.....230 VAC model	CE-EMC Cert. EN55013, EN55020 CE-Safety Cert. EN60065			EMC directive 89./336/EEC LV Directive 73/23/EEC
Unit: Construction	All Steel			
.....Size	5.25"H x 19"W x 11.5"D (3U)			(13.3 cm x 48.3 cm x 29.2 cm)
.....Weight	33 lb			(15 kg)
Shipping: Size	11" x 23" x 16"			(27.9 cm x 58.4 cm x 40.6 cm)
.....Weight	38 lb			(17.5 kg)
Note: 0 dBu=0.775 Vrms				

Block Diagram



TYPICAL OF SIX

Application Information

Affectionately known as the 900 watt six-pack, Rane's MA 6S is a powerhouse of flexibility. The MA 6S innovative concept in power amplifier design offers many distinct advantages over standard two-channel units. Although the idea of six 100-watt amplifiers in one box is unusual, it is soon apparent just how desirable this configuration is for a wide variety of applications.

A single MA 6S will handle any of the following situations and many more at a fraction of the cost, size and weight of the equivalent number of two-channel amplifiers: a) Use it as a monitor amplifier for six separate channels of stage monitors; b) Drive a pair of two-way speaker systems, bi-amped with two bridged pairs at 300 watts for the low end and two 100-watt channels for the high end, each with driver protection limiters; c) Run three bi-amped monitors at 100 watts each; d) Drive three passive two-way monitors at 300 watts each.

Input Amplifier

True instrumentation balanced inputs provide a constant input impedance for both common mode and differential input signals. Bandwidth of the input amplifier ensures better common mode signal rejection at high frequencies.

80Hz High-Pass Filter

An internal jumper allows selecting an 80 Hz high-pass filter for use with line distribution transformers. The 18 dB per octave filter helps eliminate core saturation at low frequencies.

Front Panel Status Indicators

Individual indicators are provided for each channel to indicate the status of the Mute Relay, Clipping Protection, and SOA (Safe Operating Area) protection circuits.

Clipping Protection

An independent indicator lights when the clipping or voltage limit of the amplifier has been reached. Input level attenuation of up to 15 dB will hold the output signal THD to <3%. The attack time for clipping protection is 1ms and the decay 300 ms.

Safe Operating Area (SOA)

An independent indicator lights when the SOA protection circuit is operating. Up to 30 dB of input attenuation is used to provide maximum power to the load while maintaining safe power dissipation in the output devices of the amplifier. This topology protects the amplifier without interrupting the output signal. Other protection circuits typically "turn off" the output devices or "mute" the input signal to protect the amplifier. Input levels more than 30 dB over a safe limit will cause the output relay to turn off and remain off until the amplifier has been turned off and the problem corrected. The attack time of the SOA protection circuit is 25 ms and the decay is 300 ms.

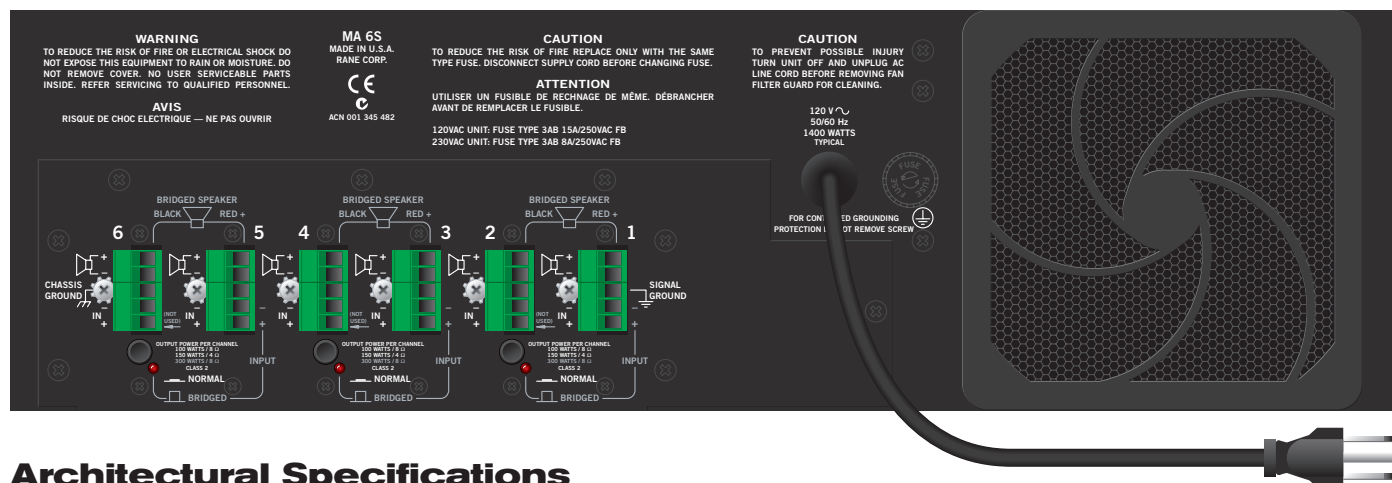
Bridging Topology

The Bridging topology used in the MA 6S ensures accurate tracking of Bridged channels at all times. The output levels will continue to track even during clipping, transient overload, short circuit, or SOA protection conditions including the following: + output shorted to ground, - output shorted to ground, + output shorted to - output. This action guarantees maximum efficiency and reliability when operating Bridged channels.

Euroblock Connectors

Euroblock quick disconnects are provided to allow fast and inexpensive connection of both input and output signals. Up to 12 AWG wire may be used.

Rear Panel



Architectural Specifications

The power amplifier shall be a multichannel unit consisting of six (6) independent power amplifiers. Each amplifier shall be able to deliver 100 watts into 8 ohms, or 150 watts into 4 ohms with all channels loaded. In addition, bridged pairs shall be able to put out 300 watts each into 8 ohms, all channels driven.

Each amplifier channel shall be supplied with an input attenuator VCA to provide an additional 15 dB of headroom beyond full power output. A full-wave peak detection scheme shall be utilized with 1ms attack and 300 ms release times.

An actively controlled variable speed fan shall be supplied, drawing air into the rear of the unit and exiting through the front.

Input level controls calibrated in dBu for full power output shall be included. Output relays shall be provided to control turn-on, turn-off and infrasonic muting.

Ultrasonic and bypassable 80 Hz High Pass Filters shall be built-in, and LEDs provided to indicate Clip fault and Safe Operating Area conditions.

The inputs shall be active balanced design terminated with a Euroblock connector. The outputs shall be active unbalanced terminated with a Euroblock connector.

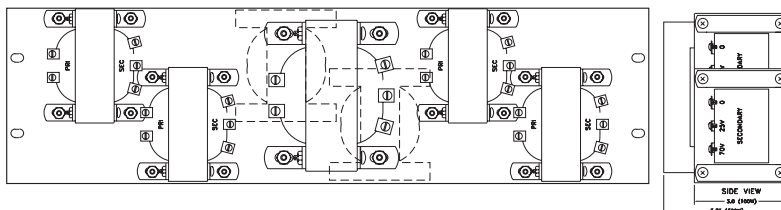
The 120 VAC unit shall be UL listed and CSA certified. The 230 VAC unit shall meet CE requirements.

The unit shall be capable of operation by means of its own built-in power supply connected to 120 VAC (100 V or 240 VAC where applicable). The unit shall be entirely constructed from cold-rolled steel.

The unit shall be a Rane Corporation Model MA 6S.

Available Accessories

- KTM 6 Multichannel Transformer Kit and Transformers
Allows up to (6) 100 watt 70.7 or 25 V transformers,
or (3) 300 watt, or any combination.
(European 100 V version available, please inquire.)



References

1. T. Pennington, "Design and Applications of a Multi-Channel Power Amplifier", presented at the 80th Convention of the Audio Engineering Society, Montreux, Switzerland, Mar. 4-7, 1986, preprint no. 2345.
2. T. Pennington, "Cost-Effective Noise Masking Systems," *RaneNote*, (1987).
3. M. Ross, "Power Amp Clipping and It's Effects on Loudspeakers," *RaneNote*, (1997).
4. D. Bohn, "Constant-Voltage Audio Distribution Systems," *RaneNote*, (2000).