

Model MA 6 Multichannel Amplifier

General Description

The Rane Model MA 6 Multichannel Amplifier supplies six completely independent amplifier channels in one 3 space rack mount unit. Each channel is capable of providing 100 Watts rms, to an eight ohm load or 150 Watts each into a four ohm load. Adjacent pairs of channels (1&2, 3&4, 5&6) may be bridged so the pair will provide up to 300 Watts into an eight ohm load.

Each channel of the MA 6 includes an input limiter circuit. This limiter has been carefully designed to prevent overload (clipping) from occurring at the output of the amplifier, while, at the same time, doing so in a transparent manner. This limiter provides an additional 15 dB of headroom to each channel, making the 100 watt ratings effectively much higher.

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

Heavy gauge all-steel construction of the MA 6 chassis assembly affords 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

- SIX INDEPENDENT AMPLIFIERS
- 100 WATTS PER CHANNEL @ 8 OHMS
- 150 WATTS PER CHANNEL @ 4 OHMS
- 300 WATT BRIDGED PAIRS @ 8 OHMS
- INPUT LIMITERS ON EACH CHANNEL
- SIGNAL PRESENT INDICATORS
- LIMITER STATUS INDICATORS
- OVERLOAD / CLIP INDICATORS
- INPUT LEVEL CONTROLS
- 3-SPACE RACK MOUNT CHASSIS
- HEAVY GAUGE STEEL PACKAGE
- EXTRA STRENGTH POWER SUPPLY
- AUTOMATIC 2-SPEED FORCED AIR COOLING

Applications

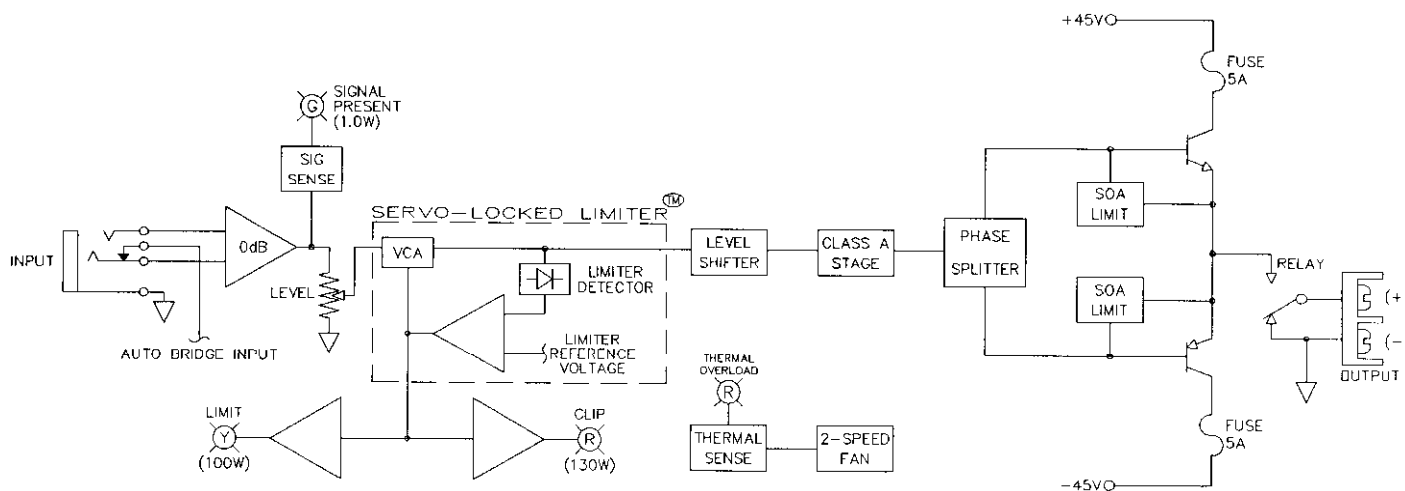
- MULTI-ZONE SOUND SYSTEMS
- STAGE MONITORS
- BI-AMP/TRI-AMP SYSTEMS
- RECORDING STUDIOS
- SIGNAL DISTRIBUTION SYSTEMS
- BROADCAST MONITORS
- PAGING SYSTEMS
- HOTELS
- RESTAURANTS
- CINEMA SURROUND-SOUND SYSTEMS

MULTICHANNEL AMPLIFIER

Features and Specifications

Parameter	Specification	Limit	Units	Conditions/Comments
Power Output	100 150 300		W W W	All Channels Driven, 20-20k Hz (6) 8 ohm Loads (6) 4 ohm Loads (3) Bridged Pairs into 8 ohms
Inputs: Type.	Active Balanced/Unbalanced			
Connectors	1/4" TRS			
..... Impedance	9.7k		ohms	
Maximum Level	+20		dBu	
Sensitivity	Off to 0 dBu (Adjustable)		dBu	Input Rqd. For Rated Power Out
Outputs: Type	Direct Coupled			
Connectors	Terminal Blocks			
..... Damping Factor	300:1			1 kHz
..... Minimum Load	No Less Than 4 Ohms No Less Than 8 Ohms			Single Channel Operation Bridged Operation
On/Off Transient Muting	Yes, Output Relays			Activates approximately 10 seconds after power is applied, drops out immediately after turn-off; drops out any time there is DC or large subsonic signals.
Fan Cooling	Yes, 2-Speed Thermostat			Intake Rear; Exhaust Front
LED Threshold: Signal Present	-20		dBu	Input Level
Limit	90		W	8 ohms, Single Channel Operation
..... Fault	270		W	8 ohms, Bridged Operation
..... Fault	Clipping, Ultrasonics, or any Failure to Accurately Reproduce the Input Signal			
Ultrasonic Filter	80 kHz, 12 dB/Oct		Hz	
Frequency Response	5-80 kHz		dB	
THD + Noise	0.2		%	100 W /8 ohms, 1 kHz
IM Distortion (SMPTE)	0.1		%	60 Hz /7 kHz, 4:1
Signal-to-Noise Ratio	96		dB	re 100 W /8 ohms, A-Weighted
Crosstalk	-60		dB	1 kHz, Any Channel to Any Channel
Limiter: Type	Servo-Locked™ Input VCA			
..... Range	15		dB	
Max Input @ Clipping	+15		dBu	
..... Attack Time Constant	10		ms	
Decay Time Constant	10		ms	
Detection	Full-Wave Peak			
Maximum Power Useage	1800		W	
Line Voltage: Domestic	95-130 VAC, 50/60 Hz			
..... Export	190-250 VAC, 50 Hz			
Unit: Construction	All Steel			
S i z e	5.25"H x 19"W x 11"D (3U)			(13.3cm x 48.3cm x 27.9cm)
W e i g h t	44 lb			(20 kg)
Shipping: Size	11" x 23" x 16"			(27.9cm x 58.4cm x 40.6cm)
Weight	48 lb			(21.8kg)
Note: 0 dBu = 0.775Vrms				

Block Diagram



Application Information

Affectionately known as the 900 watt six-pak, Rane's MA 6 is a powerhouse of flexibility. The MA 6 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 takes a little getting used to, it will soon become apparent just how desirable this configuration is for a wide variety of applications.

The MA 6 provides an unprecedented degree of flexibility:

- a) Use it as a monitor amplifier for six separate channels of stage monitor mixing;
- 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 limiters for driver protection;
- c) Run three bi-amped monitors at 100 watts each;
- d) Drive three passive two-way monitors at 300 watts each.

A single MA 6 will handle any of these situations and many more at a fraction of the cost, size and weight of the equivalent number of two-channel amplifiers.

Do not underrate the performance capability of 100 watts with a *limiter*. Each yellow Limit LED on the MA 6 front panel lights to show peaks above 100 watts which would have otherwise caused clipping – yet all program under 100 watts is completely unaffected. This kind of limiting allows each channel to be run more closely to rated output without clipping more than doubling the actual sound output. (See accompanying graph.)

Field measurements show a minimum 4 dB increase in continuous SPL, which is the equivalent SPL of a 250 watt amplifier without limiting. As many customers have

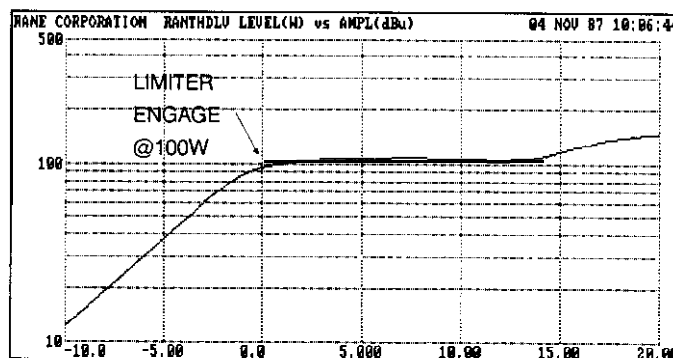
proclaimed, "This is the loudest 100 watt amplifier, I've ever heard."

The MA 6 is housed neatly in an all-steel chassis with hefty 12-gauge side rails to withstand continuous heavy road use. The power supply and massive heatsink are efficiently cooled with a thermostatically controlled two-speed fan for stringent thermal stability and resultant long-term reliability.

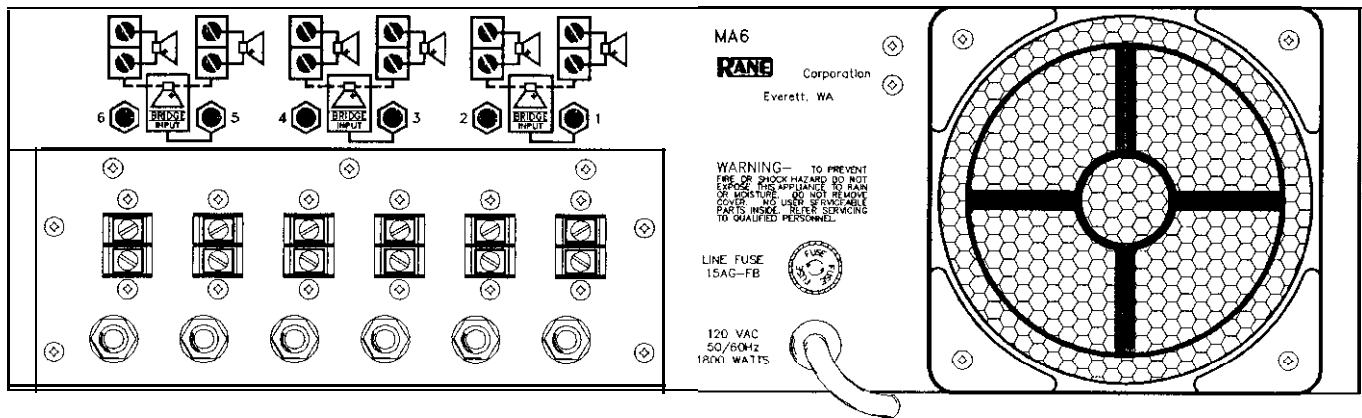
Take a moment to think about this fascinating 900 watt six-pak. It could do amazing things for your system.

The Limiter Performancegraph, below, illustrates how well the MA 6 protects itself from overload while providing an additional 15 dB of headroom. The horizontal axis is scaled as relative input level; the vertical axis indicates output power. As the input approaches the level required to clip the unprotected amplifier, the limiter engages and provides a smooth 100 watt power output until the +15 dB input level is

Limiter Performance



Rear Panel Details



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 type limiter to provide an additional 15 dB of headroom beyond full power output. A full-wave peak detection scheme shall be utilized with 10 ms attack and release characteristics.

A thermostatically controlled two-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 subsonic muting.

Ultrasonic filters shall be built-in, and LEDs provided to indicate Fault, Limit and Signal Present conditions.

The inputs shall be active balanced/unbalanced designs terminated with 1/4" TRS (tip-ring-sleeve) connectors. The outputs shall be active unbalanced terminated in terminal blocks.

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

The unit shall be a Rane Corporation Model MA 6.

Available Accessories

- BB 6 BANANA BRACKET ADAPTER KIT
- MT 6 MULTICHANNEL TRANSFORMER SYSTEM

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. D. Bohn, "MA 6 Limiter Operation," *RaneNote 103*, (1983).
3. T. Pennington, "Everything You Always Wanted To Know About Six" *RaneNote 105*, (1983).
4. D. Bohn, "Cinema Sound System," *RaneNote 114*, (1986).
5. T. Pennington, "Cost-Effective Noise Masking Systems," *RaneNote 116*, (1987).
6. T. Pennington, "Distributed Factory Sound," *RaneNote 119*, (1988).