CH4

AC Power Draw and Thermal Dissipation

This document provides detailed information about the amount of power and current drawn from the AC mains by the *CH4* amplifier and the amount of heat produced under various conditions. The calculations presented here are intended to provide a realistic and reliable depiction of the amplifier. The following assumptions or approximations were made:

- The amplifier's available channels are loaded and full power is being delivered.
- The amplifier efficiency at standard 1-kHz power is estimated to be 77%.
- Quiescent power draw is approximately 140 watts.
- When running at full speed, typical power draw for the internal fan is approximately 12 watts.
- The estimated duty cycles take into account the typical crest factor for each type of source material.
- Duty cycle of pink noise is 50%.
- Duty cycle of highly compressed rock 'n' roll midrange is 40%.
- Duty cycle of rock 'n' roll is 30%.
- Duty cycle of background music is 20%.
- Duty cycle of continuous speech is 10%.
- Duty cycle of infrequent, short duration paging is 1%.

Here are the equations used to calculate the data presented in Figure 1:

$$\text{AC Mains Power Draw (watts)} = \frac{\text{Total output power with all channels driven (watts)} \times \text{Duty Cycle}}{\text{Amplifier Efficiency}} + \text{Quiescent and Fan Power Draw (watts)}$$

The following equation converts power draw in watts to current draw in amperes:

$$\text{Current Draw (amperes)} = \frac{\text{AC Mains Power Draw (watts)}}{\text{AC Mains Voltage} \times \text{Power Factor}}$$

The value used for Power Factor is 0.98. The Power Factor variable is needed to compensate for the difference in phase between the AC mains voltage and current. The following equation is used to calculate thermal dissipation:

$$\text{Thermal Dissipation (btu/hr)} = \left(\frac{\text{Total output power with all channels driven (watts)} \times \text{Duty Cycle} \times \text{Amplifier Inefficiency}}{\text{Amplifier Efficiency}} + \text{Quiescent and Fan Power Draw (watts)}\right) \times 3.415$$

The value used for inefficiency is 0.23 (1.00–0.77). The factor 3.415 converts watts to btu/hr. Thermal dissipation in btu is divided by the constant 3.968 to get kcal. If you plan to measure output power under real-world conditions, the following equation may also be helpful:

$$\text{Thermal Dissipation (btu/hr)} = \left(\frac{\text{Total measured output power from all channels (watts)} \times \text{Amplifier Inefficiency}}{\text{Amplifier Efficiency}} + \text{Quiescent and Fan Power Draw (watts)}\right) \times 3.415$$

CH4

	LOAD														
	4Ω DUAL / 8Ω BRIDGE					8Ω DUAL / 16Ω BRIDGE					70V DUAL 600W / 140V BRIDGE 1200W				
Duty Cycle	AC Mains Power Draw (Watts)	Current Draw (Amps)		Thermal Dissipation		AC Mains Power Draw (Watts)	Current Draw (Amps)		Thermal Dissipation		AC Mains Power Draw (Watts)	Current Draw (Amps)		Thermal Dissipation	
		100-120	230-240	btu/hr	kcal/hr		100-120	230-240	btu/hr	kcal/hr		100-120	230-240	btu/hr	kcal/hr
50%	1698	14.4	7.2	1702	429	919	7.8	3.9	1090	275	1698	14.4	7.2	1702	429
40%	1387	11.8	5.9	1457	367	763	6.5	3.3	968	244	1387	11.8	5.9	1457	367
30%	1075	9.1	4.6	1213	306	608	5.2	2.6	845	231	1075	9.1	4.6	1213	306
20%	796	6.5	3.3	968	244	452	3.8	1.9	723	182	796	6.5	3.3	968	244
10%	452	3.8	1.9	723	182	296	2.5	1.3	601	151	452	3.8	1.9	723	182

Figure 1 Power Draw, Current Draw and Thermal Dissipation at Various Duty Cycles

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For more details refer to the applicable Reference Manual or Contact Crown Audio Technical Support. The provided data should not be construed as specifications.

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