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## CONTRACTOR SERIES

## 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 *CL4* 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:

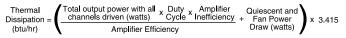
- The amplifier's available channels are loaded and full power is being delivered.
- The amplifier efficiency at standard 1-kHz power is estimated to be 77%.
- · Quiescent power draw is approximately 140 watts.
- When running at full speed, typical power draw for the internal fan is approximately 12 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:

| AC Mains Power<br>Draw (watts) | = | Total output power with all x Duty channels driven (watts) x Cycle | + | Quiescent and<br>Fan Power |
|--------------------------------|---|--|---|----------------------------|
|                                |   | Amplifier Efficiency   |   | Draw (watts)               |

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

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:



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:

$$\begin{array}{l} \mbox{Thermal}\\ \mbox{Dissipation}\\ \mbox{(btu/hr)} \end{array} = \left( \begin{array}{c} \mbox{Total measured output power } x & \mbox{Amplifier}\\ \mbox{Inefficiency} \end{array} \right) x \ 3.415 \\ \mbox{Amplifier Efficiency} \end{array} \right) x \ 3.415 \\ \mbox{Constant} x \ 3.415 \\ \mbox{Draw (watts)} \end{array} \right) x \ 3.415 \\ \mbox{Constant} x \ 3.415 \\ \mbox$$

|               |                 |            |            |                       |                     |                              |         | 6L4                           |        |                      |                                |         |                       |        |         |
|---------------|-----------------|------------|------------|-----------------------|---------------------|------------------------------|---------|-------------------------------|--------|----------------------|--------------------------------|---------|-----------------------|--------|---------|
|               | LOAD            |            |            |                       |                     |                              |         |                               |        |                      |                                |         |                       |        |         |
|               |                 | 2Ω DL      | JAL / 8Ω B |                       | 4Ω DUAL / 8Ω BRIDGE |                              |         |                               |        | 8Ω DUAL / 16Ω BRIDGE |                                |         |                       |        |         |
| Duty<br>Cycle |                 | Current Dr | aw(Amps)   | ) Thermal Dissipation |                     | AC Mains<br>Power Current Dr |         | raw(Amps) Thermal Dissipation |        | AC Mains<br>Power    | <sup>S</sup> Current Draw(Amps |         | ) Thermal Dissipation |        |         |
|               | Draw<br>(Watts) | 100-120    | 230-240    | btu/hr                | kcal/hr             | Draw<br>(Watts)              | 100-120 | 230-240                       | btu/hr | kcal/hr              | Draw<br>(Watts)                | 100-120 | 230-240               | btu/hr | kcal/hr |
| 50%           | 2478            | 21.1       | 10.6       | 2314                  | 583                 | 1698                         | 14.4    | 7.2                           | 1702   | 429                  | 919                            | 7.8     | 3.9                   | 1090   | 275     |
| 40%           | 2010            | 17.1       | 8.6        | 1947                  | 491                 | 1387                         | 11.8    | 5.9                           | 1457   | 367                  | 763                            | 6.5     | 3.3                   | 968    | 244     |
| 30%           | 1542            | 13.1       | 6.6        | 1580                  | 398                 | 1075                         | 9.1     | 4.6                           | 1213   | 306                  | 608                            | 5.2     | 2.6                   | 845    | 231     |
| 20%           | 1075            | 9.1        | 4.6        | 1213                  | 306                 | 796                          | 6.5     | 3.3                           | 968    | 244                  | 452                            | 3.8     | 1.9                   | 723    | 182     |
| 10%           | 607             | 5.2        | 2.6        | 845                   | 213                 | 452                          | 3.8     | 1.9                           | 723    | 182                  | 296                            | 2.5     | 1.3                   | 601    | 151     |

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



A Harman International Company

Crown International, Inc. P.O. Box 1000 Elkhart, IN 46515-1000 TEL: 219-294-8200 FAX: 219-294-8FAX www.crownaudio.com

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