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## Apple IIGS: Power Specifications and Discussion

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TOPIC -----

What is the milliampere output on the Apple IIGS? Is an overload possible? A customer has an Apple IIGS with all slots filled, and he cannot use his internal 2400-baud modem without disconnecting a card.

DISCUSSION -----

The following is a compendium of information from four different manuals and four engineers, with some common sense thrown in.

All DC outputs are regulated at the same time and their voltages will, to some extent, reflect unequal loadings. For example, if the +5V is loaded very heavily, then all other supply voltages will rise slightly. Conversely, if the +5V is lightly loaded, and the +12V is heavily loaded, both it and all other supplies will sag slightly.

Nominal current load ratio is:

+12V is 1/2 the +5V  
-5V is 1/10 the +5V  
-12V is 1/10 the +5V

The current capacities for the Apple IIGS power supply are:

Power Supply	Max. Current Available
+12V	1.5A
+5V	4.0A
-12V	250 mA
-5V	250 mA

This information was obtained from the label on the bottom of the power supply.

The primary reasons for the stated limitations on the various supply voltages:

1) To ensure that the current capabilities of the traces and connectors

are not exceeded.

- 2) To ensure nominal system loading.
- 3) To allow for memory card and its effects on the supply.
- 4) To ensure compatibility with existing cards.

It is a misconception that the current draw on any given supply on any given slot should be 1/7th the total current available. If there is 500 mA available on the +5V line, this means that the total current draw per slot should not exceed the stated maximum. One-seventh of 500 mA is 71.43 mA, which would almost demand the use of CMOS on all boards, but this is not the case. Some of Apple's interface cards exceed 71 mA.

#### Points To Ponder

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- 1) Tech Comm doesn't know of a test that would indicate a maximum current drain from each supply. As you can see from the earlier paragraph, the loading ratio plays a part in how the system reacts under load.
  - 2) Misconception as stated above. As long as the loading ratios are close to the stated ratio, higher supply loading might be possible without degradation.

#### Added Concerns

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- 1) The power supply capabilities are from the label on the bottom of the supply. These specifications were designed into, and marked on, the power supply by the manufacturer.
  - 2) The specified currents should not exceed the capabilities of the traces and connectors. If the customer is experiencing failures, it may be due to improper loading ratios and not current limitations. There is nothing physically added to the logic board to limit any current supplied to an interface card.

Our only concern, in this instance, is the loading ratio and the imbalance in the current drawn from the +12V and the +5V supplies. They are drawing almost three times the current from the +12V as the +5V. The best thing to do is to find a way to balance the load to match recommended the load ratio.  
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