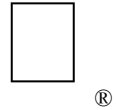


# New Technical Notes

Macintosh



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Developer Support

## +5 Volt Trickle

### Hardware

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One of the features of the new NuBus90 spec is the availability of +5 trickle charge. There are some things that you will need to know about this feature before you design any NuBus card. This Tech Note will provide these things.

### Topics

- NuBus90 +5 trickle feature
- +5 trickle feature on Macintosh
- Possible problems with +5 trickle

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## NuBus90 Spec

In the currently unapproved version of the NuBus90 spec dated 11/12/91, “The –5.2V supply is available only to Triple-Height boards while the optional +5V standby is available only to PC-style boards.”

The rest of the specification for the +5V standby reads:

In a PC-format system there may optionally be a standby power supply which provides a small amount of current at +5V when the main power supplies ( $\pm 12$  and +5) are off but still connected to the primary AC supply. In other words, this supply is only available whenever the main supplies can be powered-on via the PFW\* signal.

The worst case current drawn by a board shall be listed in the configuration ROM, and it is the responsibility of the system designer to devise a mechanism to manage excess current draw.

**Note 1:** If excess current is drawn from the standby supply then it will drop out of regulation. All boards should be designed so that they cannot be damaged if this occurs.

**Note 2:** The board designer must prevent any NuBus signal from being

activated (except PFW\*) while the main power supplies are off.

The pin that this power is offered on is pin B25.

## **+5 Standby/Trickle on Macintosh**

In the Macintosh the only kind of NuBus boards that you are ever likely to see are the PC-style boards, so for NuBus90 supported boards, the +5V standby may be available. This NuBus90 information may not be approved yet, but Apple is assuming that this particular feature will stay in the NuBus90 specification.

You will find this +5V Standby supply on the B25 pin of the Quadra 900 and 950 computers and you are likely to see it on some of our future machines which also support some of the features of NuBus90.

On the Quadra 900 and 950 computers the current draw that is allowed is a minimum load of 1 mA, and maximum (Peak) load of 1.25 A. This is the total for all five slots. You should not design a card that uses this much standby power. On the future Macintosh computers that support this feature, you are likely to see some fluctuation of the supported current, but it is likely to be in the range of 75 mA. The NuBus90 specification limits the maximum +5V standby current to 200 mA per slot.

The worst case current draw information that the spec says to put in the Config ROM is not supported by the Macintosh operating system. The problems of whether you have the power you need to boot your card is something you need to address in your INIT code and in your own hardware.

## **Possible Problems**

### **+5 Trickle on No Connects**

There are a couple of possible problems that can arise from this +5 trickle. One problem is that the +5V trickle is connected via a previously defined pin. The pin was not used by the Macintosh. The pin was one of the -5.2V signals. If your NuBus card either connects all of the no connects together or expects the no connects to be a ground, then your card is likely to not work very well. The current that is available on pin B25 is not enough to power your board, but it might be enough to make your board act a little strange.

If you think that you might have a problem with this pin, then here is the rule to follow:

- Don't connect your card to any pins that are labeled no connects in *Designing Cards and Drivers for the Macintosh Family*, third edition

### **+5 Trickle on +5-Quadrads**

There is one other problem that appears on the Quadra 900 and 950. On these machines the +5V trickle apparently leaks through one of the VIAs and into the +5V lines. While the machine is running, this is not a problem. The amount of extra voltage is minuscule.

However, when the machine is shut down and still connected to the wall power, the +5V line becomes a +0.2V line. In most cases this is still too small a voltage to affect any of your circuitry, but it is important for you to know that this condition does exist.