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SUBJ.: Capacitance on the SCSI Signal Lines

The 25 pF capacitance limitation on the SCSI signal lines required by both SCSI-2 and the draft SPI document should be replaced by a 35-40 pF requirement, with a 25 pF recommendation. The weakening of this requirement is due to termination requirements.

First, the existing SCSI-2 25 pF requirement is routinely violated by most devices that have on board termination. The SCSI protocol chip typically requires 15 to 20 pF, leaving 5 to 10 F for PCB tracings and the SCSI connector. This is already pretty tight (I have seen PCB tracings of 10 pF in some systems). If the device also provides on board termination, then an additional 10-15 pF must be allowed when the resistor packs are installed (usually 1 pF is consumed if the packs are not installed).

Note that this violation is not actually a serious engineering problem, since the terminator capacitance must be accounted for whether it is on a device or a separate device. However, there is now a trend towards using electrically isolatable termination that does introduce an engineering concern.

An electrically isolatable terminator is not socketed, and so it loads the bus even if termination is disabled. This means that every device on the SCSI bus, not just the two terminating devices, will add 10 to 15 pF of capacitance to the bus.

Our own experience and discussions with others indicate that this should not be a valid concern for traditional 8 device buses (we have no experience with 16 device buses). The capacitance variation for cables is so wide that it swamps the additional 10 pF. Moreover, the original 25 pF was derived form a bottom up analysis of what component

manufacturers can provide - not what the system needed. This termination problem is just another instance of a bottom up concern.

The additional capacitance should cause no problem for differential devices. Single ended devices doing fast transfers already have to be system engineered correctly. This is simply another concern that should be raised and handled in the same manner as the other fast single ended issues.