NEXTSTEP for Intel Processors

Title: Poor PCI Video Performance Explanation
Entry Number: 1823
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The following is an explanation concerning poor video performance with PCI video cards under NEXTSTEP 3.3:

In order to work around a hardware problem involving the Intel 824x0 PCI host-bus chip, the Intel824X0 PCI driver supplied with NEXTSTEP version 3.3 disables Write-Posting--a performance feature--in this controller chip.   Without this workaround, users of bus-mastering drivers, including PCI SCSI and ethernet drivers, would experience intermittent system crashes with possible resulting data corruption.   Note that this is a problem with the controller chip, not with NEXTSTEP.   Version 3.3 of NEXTSTEP simply implements a workaround to this operating-system independent hardware problem.

The tradeoff for this increased robustness is lower performance than would be possible if write-posting could be safely enabled.   Given the potential for data loss which exists with this chip, NeXT strongly recommends that users of PCI bus mastering devices accept the lower performance this workaround causes.   Though it is possible to achieve higher performance even for bus-mastering devices by disabling the Intel824X0 driver, this is not a recommended or supported system configuration because of the increased risk of system crashes and data loss.

If the PCI bus is only being used for video, however, and no PCI bus-mastering devices are installed, NeXT knows of no adverse impact which will result from removing the Intel824x0 driver, and substantially improved video performance may result. However, note that use of PCI devices with this driver disabled is not supported even for non bus-mastering devices and, if done, is at your own risk. In addition, if you chose to disable the Intel824x0 driver, you must insure that if PCI bus-mastering devices are later installed in the system the Intel824x0 driver will be re-enabled at that time or an increased risk of data corruption will result.

The PCI chipset bug only occurs in the A0 stepping of the Intel 824x0 series of chipset. This bug was corrected in the A1 stepping of the chip which went into production around September of '94. Unfortunately, this chip is usually soldered directly to the motherboard; therefore, you should contact your PC vendor if you require servicing.

Knowledge of the fixed A1 stepping came too late for NeXT to respond before shipping 3.3. Fortunately, Intel provided an identification register that allows software to determine which step of the chip is present. The Intel824x0 driver is being modified to determine the stepping and only disable write posting if an A0 chip is found. If your system contains an A1 or later stepping, the driver will not disable write-posting (fast performance). This updated driver has been completed, and will be posted to NEXTANSWERS upon completion of testing.

Update:

NeXT has releaseed a new driver for the Intel 824x0 chipset which automatically recognizes the flawed 824x0 chipset on your system. It will only disable write-posting if it detects a flawed chipset. See NeXTanswers document 1790_Intel_824X0_PCI_Chipset_Driver_Overview.rtf for more information.