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new Turbo systems now shipping!

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NeXT's strategy for software distribution

a foolproof guide to backups

on-demand TCP/IP networking

securing your NeXT computer on a WAN

boot flags and kernels

support bulletin

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announcing NeXTstation Turbo and NeXTcube Turbo

by Ken Jochims

The engineers at NeXT™ have once again raised the performance standards of NeXT computers, this time with the new NeXTstation™ Turbo and NeXTcube™ Turbo. At the heart of these new computers is the 33 MHz Motorola 68040 processor. Turbo CPU units are based on both the NeXTstation and NeXTcube platform design. And the NeXTstation Turbos are available in either 2-bits-per-pixel gray-scale monochrome or 12-bits-per-pixel color.

. . . an improved system architecture featuring two new advanced NeXT-designed VLSI chips . . . .

the NeXTstation Turbo and NeXTstation Turbo Color

The 68040 is part of an improved system architecture featuring two new advanced NeXT-designed VLSI chips as well as Motorola's 56001 digital signal processor (DSP). These design changes have streamlined the NeXTstation Turbo's board layout, eliminating over 60 board-level components.

a look at NeXT's new chips

The new TMC (turbo memory controller) and PC (peripheral controller) chips manage memory, display, and all I/O communications. The TMC handles all memory transactions, both DRAM and VRAM, as directed by the 68040. The TMC has improved all memory-related performance by incorporating the functionality of several interface and controller chips into one, running at 33 MHz, standardizing all computers on an interleaved memory architecture, and quadrupling the current DRAM maximum to 128 MB. (The 64 MB and 128 MB configurations require 16 MB parts. Pricing and availability have not yet been established.)

The TMC also features asynchronous parity memory support, which makes it possible to run with parity memory installed with virtually no performance degradation. The single exception to this is a configuration in which a Turbo product is fully loaded with four double-sided parity SIMMs. Systems with this configuration will experience approximately 8 percent performance degradation. All other configurations—two double-sided SIMMS or any combination of single-sided SIMMs—experience no performance degradation whatsoever. The TMC checks for parity errors in parallel with memory being sent to the 68040 and alerts the 68040 when an error has occurred. This form of parity checking allows the processor to run at nearly full speed until an error is detected.

The PC chip handles all DMA operations to critical I/O devices: SCSI/floppy disk, laser printer, sound channels, DSP, and Ethernet. Running up to 33 MHz, the PC chip provides a very fast data channel between low-speed I/O devices and main memory.

All these changes add up to a NeXTstation Turbo line that, using Release 3 compilers, runs up to 40 percent faster than an equivalent 25 MHz NeXTstation. This means 33 MHz 68040 systems run at 25 MIPs, 2.9 MFLOPs, and 16.3 SPEC marks.

random access memory

All Turbo systems and 25 MHz NeXTstation computers produced after January 1992 will be standardized on the 72-pin, 70-nanosecond (ns) RAM SIMM chip, which currently is used in NeXTstation Color systems. This chip supports the TMC's two-way interleaving capabilities.

An added advantage of this memory architecture change is that all NeXTstation computers can be upgraded in two-SIMM increments, and both the 8 MB and 16 MB versions ship with two open SIMM sockets for easy expansion.

configurations

To maintain the most affordable NeXTstation prices, NeXT is still offering two 25 MHz systems, one monochrome system and one color. All NeXTstation Turbo computers run at 33 MHz.

user serviceability

Turbo system users can now service some aspects of their own computers. The warranty is no longer voided if a user opens a NeXTstation Turbo or Turbo Color system and adds or replaces SIMM modules, replaces a battery, or replaces the digital signal processor memory. The Turbo system will be shipped with a service guide that documents safety precautions and instructions for completing these three specific functions.

All other repairs—a failed CPU board, monitor, or hard drive, for example—must be performed by a NeXT Authorized Service Provider.

upgrades

Both NeXTstation Turbo and NeXTstation Turbo Color upgrade boards will be available to customers who wish to upgrade their current systems with the Turbo board. Availability is scheduled for early in the second quarter. Pricing is still to be determined. All upgraded systems must run Release 2.2 or greater in order for the system to function properly.

Customers upgrading from NeXTstation Color systems will be able to move their RAM over from existing boards. Those who have monochrome systems must upgrade all their RAM to the newer 72-pin, 70-ns RAM SIMM module since the old 30-pin memory module won't work in a Turbo board.

NeXTcube Turbo

NeXT plans for the 33 MHz 68040 NeXTcube Turbo to be available early in the second quarter. The 25 MHz NeXTcube will continue to be available between announcement and availability of the NeXTcube Turbo.

configurations

The NeXTcube Turbo has three expansion slots and the capacity for up to 2.8 gigabytes (GB) of internal hard disk storage space. One major change is that the NeXTcube Turbo will no longer support the 256 MB Optical Disk Drive (which NeXT no longer produces). Until the NeXTcube Turbo ships, NeXT will continue to deliver 25 MHz NeXTcube systems.

upgrades

Upgrades will also be available for the installed base of NeXTcubes, although RAM must be upgraded to the newer 72-pin, 70-ns RAM SIMM modules. In addition, a NeXTcube Turbo board will not support the optical disk. Availability of upgrades is scheduled for the second quarter of this year.

SIMMs installed in NeXTstation and NeXTstation Turbo products

	product number	configuration	SIMM type installed	interleave memory	quantity installed	open sockets
NeXTstation (includes Software Release 2.2 and 2.88 MB floppy disk drive)	N1100-1768	NS 8 MB DRAM 105 MB SCSI	1 MB	No	8	0
	N1100-4486	NST 8 MB DRAM 200 MB SCSI	4 MB	Yes	2	2
	N1100-4487	NST 16 MB DRAM 200 MB SCSI	8 MB	Yes	2	2
	N1100-4488	NST 32 MB DRAM 200 MB SCSI	8 MB	Yes	4	0
	N1100-4490	NST 16 MB DRAM 400 MB SCSI	8 MB	Yes	2	2
	N1100-4491	NST 32 MB DRAM 400 MB SCSI	8 MB	Yes	4	0
NeXTstation Color (includes Software Release 2.2 and 2.88 MB floppy disk drive)	N1200-2322	NSC 16 MB DRAM 105 MB SCSI	4 MB	Yes	4	4
	N1200-4492	NSTC 16 MB DRAM 200 MB SCSI	8 MB	Yes	2	2
	N1200-4493	NSTC 32 MB DRAM 400 MB SCSI	8 MB	Yes	4	0
	N1200-4494	NSTC 16 MB DRAM 200 MB SCSI	8 MB	Yes	2	2
	N1200-4495	NSTC 32 MB DRAM 400 MB SCSI	8 MB	Yes	4	0

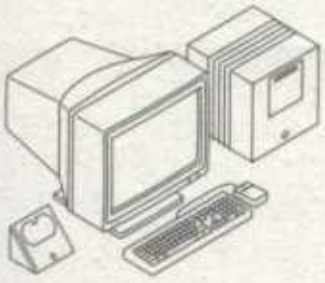
NS = NeXTstation
NST = NeXTstation Turbo
NSC = NeXTstation Color
NSTC = NeXTstation Turbo Color

troubleshooting gray screens

In certain situations, a NeXTdimension™, NeXTcube, or NeXTstation system may display a blank, gray screen. In most cases, the gray screen is a result of the computer mistakenly trying to talk to a nonexistent monitor, and a hardware repair is necessary. However, if a NeXTdimension falls prey to a gray screen, there is a simple software solution to try before contacting a service provider.

symptom

The NeXTdimension system appears to boot normally, but when it starts the WindowServer it displays a gray screen. If you're booting in verbose mode, the last line to be displayed will be "Starting NeXTdimension server."



cause

Preferences behaves as if a monochrome monitor is attached that's the main screen (screen 0).

solution

1 Enter the ROM monitor (after the system test, press and hold down the Command key and press the ~ key).

2 Boot the system to single-user mode using the ROM monitor command:

```
bsd -s
```

3 At the single-user prompt, type the following:

```
/bin/sh /etc/rc
```

4 After lots of messages about starting up daemons scroll by, type the following:

```
niutil -destroy . /screens/MegaPixel
```

This action destroys the portion of the local NetInfo **/screens** database that says the MegaPixel Display should be used as the main screen. The WindowServer will correctly reconstruct this portion of the database when it starts up.

5 Power off the system power backup and enter the ROM monitor.

6 Type **bsd** at the "NeXT>" prompt.

7 Once the system comes up with the WindowServer running on the NeXTdimension display and finishes the boot process, go into Preferences and reset the boot device to the correct boot device.

If the NeXT dimension doesn't respond, or if a NeXTcube or NeXTstation is displaying a gray screen, contact your service provider.