



# NeXTSTATION NeXTSTATION TURBO



*NeXTstation computers combine state-of-the-art technology with an object-oriented operating and development environment into an easy-to-use, affordable professional workstation.*

Powered by the Motorola 68040, both the 25-megahertz NeXTstation™ and the 33-megahertz NeXTstation Turbo offer an unprecedented amount of features at an affordable price. Each system features two new NeXT-designed VLSI chips, Motorola's 56001 Digital Signal Processor, as well as built-in networking capabilities. The result is a class of workstations ideally suited for creating and deploying mission-critical custom applications and running world class productivity applications.

The NeXTstation Turbo includes 16 megabytes of main memory, which can be expanded to an impressive 128 megabytes. A choice of either 250 or 400 megabytes of hard disk storage space is available, both options coming preloaded with NeXT™ system software making NeXTstations productive right out of the box. Also included is a 2.88-megabyte, 3.5-inch floppy disk drive capable of reading and writing to 1.44 MB and 720 KB diskettes in UNIX® and MS-DOS®, and 1.44 MB in Macintosh® formats.

All NeXT computers were designed from the beginning to be part of a connected workplace. From the true multitasking capabilities of UNIX to the built-in, high-performance Ethernet – including twisted-pair and thin Ethernet – NeXTstations can be easily configured into any network, including IBM® PCs and compatibles, Sun® and Macintosh computers, DEC® and IBM mainframes.

## FEATURES AND BENEFITS

<b>Motorola 68040</b>	Combined central processing (CPU), floating-point (FPU) and paged memory management (PMMU) units with 8 kilobytes of on-chip cache memory.	A highly integrated microprocessor providing excellent computing performance, high data transfer rate, and exceptional reliability.
<b>NeXT-designed ICs</b>	Memory controller	Supports up to 128 MB of fast, interleaved RAM, with prefetching.
	Peripheral controller	Supports off-loading of all seven DMA peripheral channels from the main processor, and is capable of running at 50 MB per second.
<b>Motorola 56001 DSP</b>		Provides fast processing of large matrix calculations – used for generating CD-quality sound, music, speech, and tone detection.
<b>MegaPixel 17-inch Monochrome Display</b>	1120 x 832 resolution with 92 dpi	Delivers sharp, crisp display of text and graphics with enough screen space to run multiple applications simultaneously.
<b>Eight built-in ports</b>	SCSI	Supports up to seven SCSI peripherals.
	Two RS-423 serial ports	Allows NeXTstations to be tailored to meet your needs with popular serial-based peripherals such as fax and data modems without using expansion slots.
	DSP I/O port	Supports direct I/O access to the DSP.
	Display port	Provides connection to built-in video.
	Laser printer port	Allows direct connection to NeXT's 400 dpi Laser Printer.
	Two Ethernet (twisted and thin) ports	Provides easy connection to virtually any Ethernet network without having to purchase additional cards or adaptors.
<b>Built-in sound I/O</b>		Allows voice input to applications with sound-handling capabilities and provides dual channel CD-quality output.
<b>NeXT 2.88 MB floppy disk drive</b>		2.88 MB of storage space using extended density (ED) disks, as well as 720 KB and 1.44 MB disks.
		Allows for convenient transfer of data files between Macintosh, OS/2®, and MS-DOS.
<b>8 MB on-board RAM</b>	4 high-speed SIMM memory sockets expandable to 128 MB	Supports 8, 16 and 32 MB SIMMs in two-SIMM increments.
		When denser chips (16 MB) become available, NeXTstations can be upgraded up to 128 MB.
<b>Optional parity support</b>		Parity memory checking is available when optional parity RAM is installed.
<b>NeXTstep™</b>		UNIX®-based operating environment optimized for multitasking and networking.
		Offers superior graphical user interface and development environment, with the only object-oriented system software available on the market today.

# PRODUCT DETAILS

## 68040 Processor

The 68040 is a fast and highly integrated microprocessor with clock speeds of either 25 MHz or 33 MHz. The 68040 contains 1.2 million transistors, more than any other microprocessor in its class. This incredible number of transistors is required because the 68040 is actually four chips in one – a central processing unit, a floating point unit, a paged memory management unit, and 8 kilobytes of cache memory.

The system clock speed is identical to the CPU bus speed, providing an average execution time per instruction of 1.3 clock cycles.

There are two 4-kilobyte memory caches, one for data, the other for instructions, along with burst mode read and write-back caching for improved data transfers.

## 56001 DSP

Built into the NeXTstation's design is the 56001 DSP, a 25 MHz digital signal processor. With 24 K of static RAM cache, upgradable to 96 K, the DSP is dedicated to the task of handling digital signals – such as sound – at exceptional speeds.

The DSP is capable of generating compact-disc quality sound: 44.1 kHz sampling rate with 16-bit resolution and full stereo.

Other uses for the DSP range from receiving still and video images to a variety of other data transmission and acquisition activities.

## Network Support

Built-in networking, both thin and twisted-pair Ethernet ports are designed into all NeXT™ computers.

Network software and administrative tools are preloaded on all hard drives to simplify connecting to virtually any network, with no additional cards to purchase, install, or configure.

## DMA Architecture

NeXT computers were designed to handle the most complex tasks efficiently. Rather than emulating a traditional PC or workstation architecture, NeXT systems used a direct memory access (DMA) architecture similar to that of mainframe computers for off-loading I/O functions from the CPU to the peripheral controller (PC) chip to maximize system throughput.

## RAM Configurations

NeXTstations are currently available in 8, 16, or 32 MB RAM configurations.

To support the fast memory transfer capability of the Turbo Memory Controller (TMC), NeXTstations utilize very-high speed (70-nanosecond) 72-pin DRAM SIMMs.

RAM upgrades can be added incrementally in two-SIMM increments up to 32 MB of RAM.

When denser chips (16 MB) become available, NeXTstations can be upgraded up to 128 MB.

Parity memory is also an option, and can be ordered on a select number of 16 MB configurations.

## SCSI

SCSI is an expandable high-performance interface for connecting NeXTstations to hard disks and other peripherals, such as the NeXT Colour Printer, NeXT CD-ROM Drive, scanners, and other devices. Up to seven SCSI peripherals (including the internal hard disk) can be connected.

SCSI data transfer rates are up to 4.8 MBytes per second (SCSI implementation).

A SCSI-type connector was used on NeXTstations to provide high data reliability in CPU-to-peripheral connection.

## Sound I/O

NeXT computers have been designed to accept and process sound.

Using the built-in microphone in the MegaPixel Display™ or an external microphone, voice messages can be easily added to electronic mail or used to annotate applications.

## NeXTstep

Based on the industry's first object-oriented system software, NeXTstep offers an elegant graphical user interface and one of the most productive development environments available today.

## UNIX

NeXT's operating system is based on the Mach UNIX kernel developed at Carnegie Mellon University, which features shared memory, fast inter-process communication, multi-tasking, and network support.

NeXT's UNIX is compatible with UNIX 4.3 BSD (Berkeley Software Distribution).

## Display PostScript

NeXT offers a unified imaging model, Display PostScript®, for imaging on both the screen and printer.

## Bundled Software

Each NeXTstation ships with an unprecedented amount of end-user and development software including:

## End-User Applications

- Workspace Manager™
- NeXTmail™
- Digital Webster™ (Webster's Ninth New Collegiate Dictionary® and Collegiate® Thesaurus) – English only
- Digital Librarian™
- Mathematica® – for higher education customers only
- FaxReader
- Preferences
- Preview for PostScript®
- PrintManager

## System Administration Applications

- VT100™
- BuildDisk
- BuildDOS
- InstallTablet
- MailManager
- NetInfoManager
- NetManager
- PrinterTester
- UserManager

NeXTstep Release 2.2 Extended also includes:

## Example Applications and Utilities

- Oxford® Dictionary of Quotations
- William Shakespeare: The Complete Works (for Digital Librarian)
- TEX™ Document Processing System (Radical Eye Software)
- Dataviz/Bridge™

## Developer Tools

- Interface Builder™
- NeXT Compiler for the Objective C Language
- C++ Language Compiler
- Objective C Class Definitions
- 56001 DSP Tools
- GNU Emacs
- GNU Debugger
- Bug-56™ Debugger (Ariel)
- Malloc Debugger
- ApplInspector™
- PostScript Tools
- Application Kit™
- Music Kit™
- Sound Kit™
- On-line technical documentation
- Edit



# TECHNICAL SPECIFICATIONS

## PROCESSORS

### Motorola 68040 25/33 MHz CPU

- Integrated Central Processing Unit
- Integrated Memory Management Unit
- Integrated Floating-Point Unit
- Integrated 8-kilobyte instruction/data caches

### Performance 25 MHz

- 18.6 Dhrystone MIPS
- 2.0 MFLOPS DP LINPACK
- 10.9 SPEC marks

### Performance 33 MHz

- 25 Dhrystone MIPS
- 2.9 MFLOPS DP LINPACK
- 16.3 SPEC marks

### Memory Controller

- Controls up to 128 MB of interleaved main memory
- Controls 256 kilobytes of 2-bit monochrome display memory
- Includes 16 bit monochrome video write buffer
- Performs in-line memory prefetching

### Peripheral Controller

- Controls 7 DMA channels
- 50 MB/sec bandwidth

### Motorola 56001 25 MHz Digital Signal Processor

## MEMORY

### DRAM Main Memory

- 8 MB to 32 MB of main memory
- Optional main memory parity checking
- Expandable using DRAM SIMM modules

### DSP Static Memory

- 24 kilobytes DSP static RAM
- Expandable up to 96 kilobytes using an SRAM SIMM module

## INTERNAL MASS STORAGE

### 3.5-inch Floppy Disk Drive

- 2.88 MB formatted capacity using extended density (ED) disks
- 3.5-inch third-height form factor
- Read/Write compatible with 720 KB and 1.44 MB disks

### 105 MB Hard Disk Drive

- 3.5-inch third-height form factor
- 105 MB formatted capacity
- 17 ms average seek time
- 4.0 MB/sec maximum transfer rate (synchronous)
- Software Release 2.2 preinstalled on disk

### 250 MB Hard Disk Drive (optional)

- 3.5-inch half-height form factor
- 239 MB formatted capacity
- 13 ms average seek time
- 4.0 MB/sec maximum transfer rate (synchronous)
- Software Release 2.2 preinstalled on disk

### 400 MB Hard Disk Drive (optional)

- 3.5-inch half-height form factor
- 406 MB formatted capacity
- 13 ms average seek time
- 4 MB/sec maximum transfer rate (synchronous)
- Software Release 2.2 Extended preinstalled on disk

## DISPLAY

### MegaPixel Display

- 17-inch monochrome flat square display
- 1120 x 832 resolution at 2 bits/pixel
- 68 Hz refresh rate, noninterlaced
- 92 dots per inch
- Integrated microphone and speaker
- CD-quality stereo sound via line outs and headphone jack
- Glare-reduction screen
- Built-in tilt mechanism

## INPUT DEVICES

### Keyboard

- 84 keys, including: cursor keys, numeric pad, monitor brightness, sound volume, and power on/off

### Mouse

- Two-button opto-mechanical mouse

## COMMUNICATION AND INTERFACES

- Thin Ethernet, IEEE 802.3a compatible at 10 Mbit/sec
- Twisted-pair Ethernet, 10BaseT-compatible at 10 Mbit/sec
- Two RS-423 serial ports
- SCSI-2 connector with transfer rate of 4.8 MB/sec (burst rate)
- Laser printer port (for NeXT 400 dpi Laser Printer)
- Digital Signal Processor port
- MegaPixel Display port

## OTHER NeXTSTATION SPECIFICATIONS

### Size

- 397.8 mm x 364.5 mm x 64 mm (15.66 in. (h) x 14.35 in. (w) x 2.5 in. (d))
- Magnesium structure with plastic housing

### Weight

- 5.5 kg to 6.6 kg (12 lbs. to 14.5 lbs.)

### Power

- Parallel Resonance Switching technology
- 100V to 240V, 47 Hz to 63 Hz self-adapting
- 150W, 2.5A maximum (including MegaPixel Display)

## OPERATING ENVIRONMENT

- Ambient temperature: 0°C to 40°C (32°F to 104°F)
- Relative humidity: 10% to 90%
- Altitude: 0 to 4,572 m (0 to 15,000 ft.)

## REGULATIONS

- UL478, CSA 220, and IEC950 (EN60950) product safety requirements
- FCC Class A, VCCI Class 1, CISPR-22 Class A (EN550022) EMI requirements

All performance numbers shown were attained using Release 3.0 compilers, GNU C 1.36, Absoft FORTRAN 77 3.1, Greenhills Fortran-68000 1.8.5, Kuck and Associates Preprocessor.

# ORDERING INFORMATION

## NeXTSTATION 8/250 COMPUTER SYSTEM

### NeXTstation Turbo - 8/250

Order No. N1100-4486

Order No. for Germany N1100-4501

NeXTstation professional workstation with 8 MB of RAM (two each 4 MB SIMMs), built-in 2.88 MB floppy disk drive, and 250 MB hard disk drive; includes 0.5 metre MegaPixel Display cable.

## NeXTSTATION 16/400 COMPUTER SYSTEM

### NeXTstation Turbo - 16/400

Order No. N1100-4490

Order No. for Germany N1100-4504

NeXTstation professional workstation with 16 MB of RAM (two each 8 MB SIMMs), built-in 2.88 MB floppy disk drive, and 400 MB hard disk drive; includes 0.5 metre MegaPixel Display cable.

### MegaPixel Display

Order No. N4000A

17-inch monochrome MegaPixel Display (monitor power provided by the CPU)

### NeXT System Starting Point™ Kit

UK	Order No. N8504-4807
France	Order No. N8504-4808
Germany	Order No. N8504-4810
Euro-English*	Order No. N8504-4811
Swiss-French	Order No. N8504-4812
Swiss-German	Order No. N8504-4813
Spain	Order No. N8504-4814
Portugal	Order No. N8504-4815
Italy	Order No. N8504-4816
Sweden	Order No. N8504-4817

\*Includes USA keyboard

### Keyboard

### Mouse

### CPU power cord

### Keyboard tilt feet

Complete set-up, learning, and reference documentation

Limited one-year warranty statement