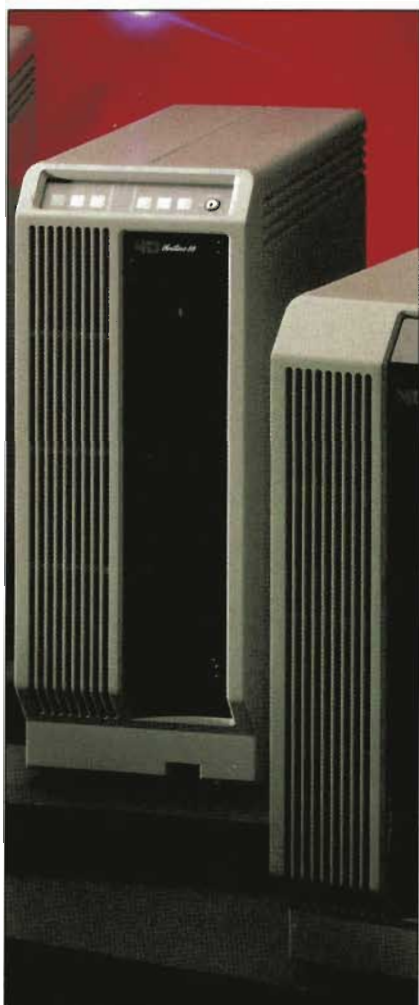


ND Uniline 88 Server

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Introduction

The Norsk Data Uniline 88 servers are the first in a new generation of high-performance server systems from Norsk Data. Based on the Motorola 88000 Reduced Instruction Set Computer (RISC) architecture, these servers deliver very high performance with an extensive range of functions, at a low cost. The Uniline 88 servers are based on the 88open concept for binary compatibility, which opens up the access to a large and steadily growing software portfolio.

Their main area of use is as multiuser application servers for ordinary or X Windows terminals, as database or file servers for up to several hundred PCs and workstations, or as servers for heavy compute jobs. Fault-tolerant features like disk mirroring and optional Uninterruptable Power Supply (UPS) make these systems ideal for business-oriented (mission-critical) tasks.

Features

- 88open Binary Compatibility Standard (BCS)
- High performance
- Industry-standard UNIX system V 3.2
- High availability and maintainability
- For mission-critical applications
- Motorola M88000 RISC-based
- Full upgrade possibility
- Easy and secure operation
- Ready-made operation menus and procedures
- Ready-to-run packaging

Product description

The Uniline 88 servers are available in four different performance versions: 88/20, 88/25, 88/25-2 and 88/25-4. These have one, two or four M88000 CPUs. All performance models come in two cabinet types: Compact (C) and Small (S). All models include a pre-packaged 630 MB system disk with a bundled DB software package and a 150 MB cartridge-tape backup device. In addition, controllers for SCSI and Ethernet are included as standard. Each model can be upgraded to the next model within the range.

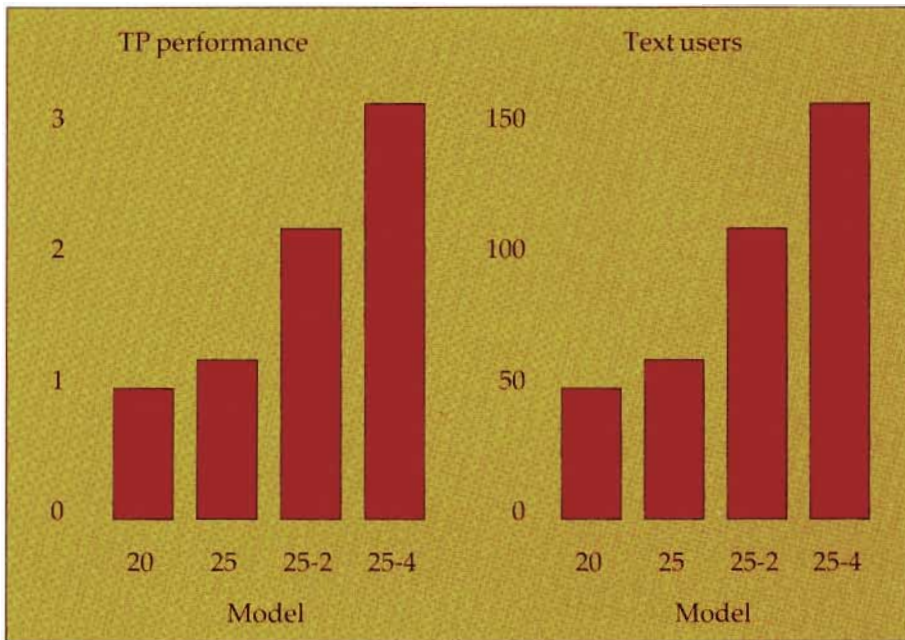
The S-cabinet systems cover the needs of small to medium operations with up to 1.3 GB of internal storage. The C-cabinet systems typically cover medium to large operations with up to 3.2 GB of internal storage. In addition, the separate Filestore cabinet can be configured with up to 4.4 GB of storage.



The following table summarises the characteristics of each model:

Models	20S and 20C	25S and 25C	25-2S and 25-2C	25-4S and 25-4C
MHz	20	25	25	25
Number of CPUs	1	1	2	4
Relative TP performance	1	1.3	2.3	3.3
Text users	50	70	110	170
Memory (MB)	8-32	16-128	32-128	32-128
Disk size (GB)	 0.6 - 40 (C-cabinet) 0.6 - 16 (S-cabinet)

The following figure shows relative transaction performance, and number of active text users:





System administration

The Uniline 88 servers are provided with the Sysnet System Manager. Sysnet is a complete computer-administration package under UNIX. Even though it is an administration package in its own right, it can also be integrated with any other administration package. For Uniline 88, Sysnet is integrated with sysadm. As a consequence, Sysnet can provide additional functions that, in some areas, are far beyond even future standards like UNIX system V 4.0.

Sysnet features:

- Accessible both via menus and commands
- Online help everywhere
- Extends the range of functions in sysadm
- System, user, network and security administration
- Network transparency in backup and other features
- Language independent
- Extensive use of recommended default values
- User applications can be integrated
- Easy modification to suit specific needs
- Documentation with real-life examples

Upgrade and expansion possibilities

All models can be upgraded to the next model within the range. S-cabinet models cannot, however, be upgraded to C-cabinet. Free rack space is available for extra I/O controllers and communications processors. Memory upgrades are available as shown in the following table:

	Standard (MB)	Upgrade to: (MB)
Model 20	8	16 or 32
Model 25	16	32, 64 or 128
Model 25-2	32	64 or 128
Model 25-4	32	64 or 128

System architecture

The Uniline 88 servers are based on flexible use of Motorola's M88000 application processors and M68020 I/O processors. As the basic system, the model 20 contains one MC88100 CPU, two MC88200 Cache/Memory Management Units (CMMUs) and 8 MB of main memory. The top model 25-4 contains four CPUs, eight CMMUs and up to 128 MB of main memory, all on the same CPU board. A gate array developed in-house optimises the use of main memory, making the Uniline 88 server the world's fastest implementation of the 88000 architecture.

I/O processing

The Uniline 88 servers incorporate a modular multiprocessor design whereby capacity is increased by merely adding processors. Network access, database management and disk I/O are all handled by dedicated 32-bit processors. Performance balancing is easily achieved by supporting the main processor with the right number of network and storage processors.

The high-performance I/O system can easily be coupled with a VME bus to permit the connection of a large number of standard devices.

System environment

- Tailoring of total disk capacity, so that virtual disks in the sizes 2 KB up to 30 GB can be addressed from UNIX or from a database
- Up to 39 GB of physical disk storage
- Disk mirroring running only in the I/O processor, without affecting the performance of the main processor

- Backup to tape cartridge or disk at I/O processor level permits round-the-clock availability for mission-critical applications
- Asynchronous I/O for highly optimised implementation of multithread database systems
- Optional uninterruptable power supply permitting three minutes' controlled shutdown if the power fails for more than five seconds, and
- Automatic, controlled start-up of the system after error situations
- VME-bus interface gives access to a large number of standard devices

UNIX operating system

- An adaption to AT&T's UNIX system V version 3.2
- Conforms to IEEE P1003.1 and 88open BCS/OCS
- Is a compatible subset of the AT&T UNIX V.4 ABI
- Contains TCP/IP, NFS, X.25 and X Windows System
- Supplement for multiprocessor handling

Software included as standard

- UNIX V/88 3.2 operating system with utilities
- C compiler
- BDIO disk software with disk mirroring
- Network software (TCP/IP, NFS, RFS)
- Sysnet Operation Package
- Embedded SYBASE SQL Server
- Maintenance package for Uniline 88

Standard optional system software:

Communication products:

- MS-Net for Uniline 88
- Telnet Booster for Uniline 88

X products:

- X Windows for Uniline 88
- Motif for Uniline 88 (prerequisite: X Windows)
- X-Clam for Uniline 88 (pre-requisite: X Windows)

Compiler products and development tools:

- LPI FORTRAN for Uniline 88
- LPI COBOL for Uniline 88
- PLANC for Uniline 88
- LED for Uniline 88
- NDB for Uniline 88

Database and Application Development products:

- SYBASE
- ORACLE
- SIBAS/R

ND Uniline 88

Technical specifications

System performance:

- 20 - 100 MIPS
- 30 - 100 tps (TP1)

Application processors:

- One to four MC88100, 20 MHz or 25 MHz

Cache/Memory Management

Units (CMMUs):

- Two to eight MC88200 CMMUs (32 - 128 KB cache memory)

Main memory:

- 8 - 128 MB CPU-board memory

I/O processors (DOMINO):

- One M68020 Control/SCSI processor
- One to four M68020 LAN processors (Ethernet II)
- Up to eight M68020 SCSI processors
- Up to four M68020 Telnet Boosters (Ethernet III)

Environmental:

- Operating temperature: +16 C to +32 C
- Electrical:
 - UPS 184 - 264 Volts AC, 47-63 Hz, or
 - 85 - 132 Volts AC, 47-63 Hz

Power supply:

- Optional uninterruptable power supply (UPS)

Cabinets:

- Compact:
 - 54.0 x 66.5 x 81.0 cm
 - Max. 15 boards
 - Max. 6 SCSI devices
 - Max. 3.2 GB storage capacity
 - Max. 2200 VA power consumption
 - Max. 100 kg weight

- Small:
 - 27.2 x 66.5 x 81.0 cm
 - Max. 6 boards
 - Max. 3 SCSI devices
 - Max. 1.3 GB storage capacity
 - Max. 1500 VA power consumption
 - Max. 65 kg weight
- Filestore:
 - 27.2 x 66.5 x 81.0 cm
 - Max. 7 SCSI devices
 - Max. 4.4 GB storage capacity
 - Max. 1500 VA power consumption
 - Max. 65 kg weight
- Peripherals
 - 5.25" disk drive 630 MB
 - 5.25" cartridge tape 155 MB
 - ND GTS 2.2 GB streamer model A (cabinet mounted)
 - ND GTS 2.2 GB streamer model B (free-standing)
 - Free-standing magtape HP 1600
- Miscellaneous:
 - Control Processor plug-board with integrated Centronics Line Printer controller (print 5296)
 - Remote diagnostics (Telefix)
 - Control panel with key
 - Wyse 120 local console

Documentation:

- Uniline 88 Maintenance manual
- Sysnet System Manager Manual
- Release Notes

Operating system documentation (Unisoft):

- User's Guide
- User's Reference Manual
- ASSIST Software User's Guide
- ASSIST Software Development Tools Guide
- System Administrator's Guide part 1
- System Administrator's Guide part 2
- System Administrator's Reference Manual
- Programmer's Guide part 1
- Programmer's Guide part 2
- FACE User's Guide
- FMLI Programmer's Guide
- Programmer's Reference Manual
- Network User's Guide
- Network System Administrator's Guide
- Network Programmer's Guide vol 1
- Network Programmer's Guide vol 2
- POSIX Conformance Guide
- Product Description

Abbreviations

BCS	- Binary Compatible Standard	RFS	- Remote File Sharing
BDIO	- ND's Basic Disk Input Output System	SCSI	- Small Computer Systems Interface (standard I/O bus)
DOMINO	- Intelligent I/O Controller in ND's MFbus	sec	- second
GB	- GigaByte = 1000 Megabytes	SQL	- Structured Query Language
I/O	- Input/output	SVID	- System V Interface Definition
KB	- KiloByte = 1000 bytes	TCP	- Transmission Control Protocol/Internet Protocol
LAN	- Local Area Network	TELNET	- Terminal Protocol
MB	- MegaByte = 1000 Kilobytes	TP	- Transaction Processing
MFbus	- Multi-Function bus	tps	- transactions per second
MS-NET	- MicroSoft Networks	UNIX	- Operating system and trademark of AT&T Company
NFS	- Network File System		
ns	- nanosecond		
POSIX	- Portable Operating System Interface, IEEE's UNIX Standard		

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