Nixdorf 8890 Series

MANAGEMENT SUMMARY

UPDATE: *Since we last looked at Nixdorf's 8890 Series of mainframes, the range has been revised with the introduction of Models 32, 52, and 72, which replace Models 30, 50, and 70 respectively. The old entry-level Model 10 has been withdrawn completely. Models 32, 52, and 72 offer increased main memory over their older counterparts. The basic Model 32, Model 52, and Model 72 configurations have lower purchase prices than the old Models 30, 50, and 70 respectively. The systems have also been repackaged in a more compact cabinet.*

The Nixdorf 8890 plug-compatible system comprises three models: the Model 32, the Model 52, and the Model 72. The same basic architecture is used throughout the system, and any model can be field-upgraded to the most powerful configuration. The 8890 is a medium-sized mainframe intended for commercial applications. It offers batch processing and online facilities.

Nixdorf Computer AG designs and manufactures mainframes, minicomputers including fault-tolerant systems, microcomputers, office systems, banking terminals, and data communications equipment including digital PABXs and an IBM-compatible display workstation system. Nixdorf produces the 8870 minicomputer system which runs the same applications software as the more powerful 8890 mainframe system.

In 1984, Nixdorf had total revenues of DM 3.27 billion, representing a 21 percent increase over 1983 figures. Of the total revenue, 55 percent was generated from sales of computer systems, while 45 percent came from services such as consultancy, system and user software, field main- ▷

The Nixdorf 8890 Series is a family of plug-compatible, medium-sized mainframes which provides standalone and distributed processing power. The members of the series are upgradeable on-site.

MODELS: 8890 Models 32, 52, and 72.
CONFIGURATION: From 1MB to 8MB main memory; 200MB to over 15GB disk storage; and a maximum of 256 workstations. The top-end model supports 16 communications lines.
COMPETITION: IBM 4300 Series.
PRICE: Purchase price for central processor plus main memory ranges from approximately DM 100.000 to DM 200.000.

CHARACTERISTICS

MANUFACTURER: Nixdorf Computer AG, Fürstenallee 7, 4790 Paderborn, West Germany. Telephone (05251) 150. Telex 936791.

Nixdorf Computer AG, Berliner Str. 95, D-8000 Munich 40. Telephone (089) 36010. Telex 522235.

COMPANY LOCATIONS: *Australia:* Nixdorf Computer Pty. Ltd., 655 Pacific Highway, P.O. Box 235, St. Leonards N.S.W. 2065. Telephone (02) 439 5477; *Austria:* Nixdorf Computer GmbH, Untere Donaustr. 11, 1020 Vienna. Telephone (0222) 266767; *Belgium:* Nixdorf Computer SA, Rue Colonel Bourg 105, 1040 Brussels. Telephone (02) 735 8050; *Brazil:* Nixdorf Computer Equipamentos Electrônicos Ltda., Rua Haddock Lobo Nr. 1327—4 andar, 01414 São Paulo. Telephone (011) 853 7847; *Canada:* Nixdorf Computer Canada Ltd., 505 Consumers Road, Suite 102, ▶
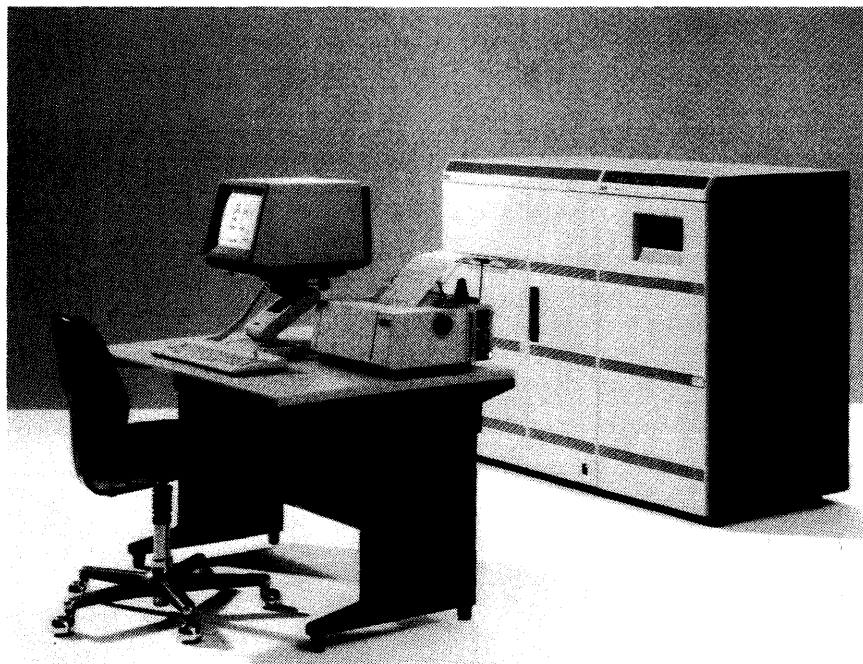
The 8890 system includes three IBM-compatible mainframes, each housed in a compact cabinet. In the front of the photo is one of Nixdorf's range of monochrome and color workstations for the 8890, plus a workstation printer.

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▷ tenance, training, and rentals. Nixdorf has over 20,000 employees throughout the world in 41 subsidiary companies.

The basic architecture of the 8890 consists of a central bus to which the central processor, main memory, and input/output system are attached. The I/O system consists of a number of bus managers connected to both the central bus and the I/O buses, and dedicated I/O controllers attached to the I/O buses. The I/O controllers support peripherals such as disk units, workstations, printers, and card readers.

Nixdorf supplies workstations, disk and magnetic tape units, and slow-speed peripherals, but the 8890 can also support products from a number of major peripheral vendors such as BASF, CDC, IBM, Memorex, and STC. The 8890 supports industry-standard IBM operating systems, including DOS/VSE, DOS/VS, VM/370, and VM/SP, and can also run under NIDOS/VSE, a Nixdorf-supplied operating system compatible with DOS/VSE.

PROCESSORS AND PERIPHERALS

Each model contains the basic central processing unit, while Models 52 and 72 contain additional central processor hardware to increase system performance. Model 52 performs almost twice as fast as Model 32, while the performance of Model 72 is almost three times that of Model 32.

Main memory extends from a minimum of 1MB to a maximum of 8MB in increments of 1MB, 2MB, and 4MB bytes. From 2 to 24 disk drives can be connected to the system, giving a total storage capacity of 15.24G bytes. Peripherals are connected into the system through integrated peripheral adaptors, a number of which are supported by an input/output controller. Each I/O controller can be specified to operate in either block multiplexer or byte multiplexer mode, depending on the type of peripherals attached. All 8890 models can support up to eight I/O controllers. The ability to connect a greater number of peripherals, other than via the peripheral adaptors, is provided by optional block multiplexer and byte multiplexer channels, where an I/O controller can support either type of channel interface.

Fixed and exchangeable disk drives ranging in capacity from 100MB to 635MB are available with the 8890 system. The five models of fixed disk use Winchester-type technology and can store 100MB, 129MB, 200MB, 260MB, or 635MB of data, respectively, while the disk drive has a capacity of 200MB. A diskette with a capacity of 256KB containing diagnostics software, is standard with each model. A user diskette drive and magnetic tape drives providing backup storage can be connected to the system.

A maximum of 256 workstations and printers can be connected to Models 32, 52, and 72. Additionally, one or four system printers can be included in a configuration.

Nixdorf supplies four models of workstations for use with the 8890. Three models are 12-inch monochrome versions ▷

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DISTRIBUTORS: Nixdorf is represented by agencies in the following countries: Argentina, Chile, Egypt, Indonesia, Israel, Korea, Malaysia, Peru, Portugal, Sri Lanka, Thailand, Venezuela, Yugoslavia, and Zimbabwe.

MODELS: 8890 Models 32, 52, and 72.

DATE ANNOUNCED: 8890 Series—September 1980; Models 32, 52, and 72—September 1984.

DATE OF FIRST DELIVERY: 8890 Series—July 1981; Models 32, 52, 72—October 1984.

NUMBER INSTALLED TO DATE: Approximately 700.

DATA FORMATS

BASIC UNITS: 8-bit byte; 32-bit word.

FIXED-POINT OPERANDS: 16-, 32-, and 64-bit operands are used.

FLOATING POINT OPERANDS: There are four 64-bit floating point registers which can be combined to provide two 128-bit registers for extended floating point arithmetics.

INSTRUCTIONS: 2, 4, and 6 bytes long.

INTERNAL CODE: ASCII.

MAIN STORAGE

TYPE: MOS.

CYCLE TIME: 200 ns. ▶

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TABLE 1. SYSTEM CHARACTERISTICS

	Model 32	Model 52	Model 72
Main memory (MB)			
Minimum	1	2	4
Maximum	4	6	8
Cache memory (KB)	No	No	64
No. of disk drives	2-8	2-16	2-24
Max. disk capacity (MB)	5080	10,160	15,240
No. of diskettes	1	1	1
No. of magnetic tapes	1-4	1-8	1-12
Maximum no. of workstations	256 (incl. printers)	256 (incl. printers)	256 (incl. printers)
System printers	1-2	1-2	1-2
Communications lines	4-8	4-16	4-16
No. of channels			
Byte multiplexer	1	2	2
Block multiplexer	1	1	3

▷ in amber/brown or black/white. All screens have a basic format of 1,920 characters, displayed as 24 lines of 80 characters. In two of the models, this can be extended to 27 lines by 132 characters, and 37 lines by 132 characters, respectively. The fourth type of workstation is color, displaying red, green, blue, and white. The 1,920 characters are displayed on a 14-inch screen. A separate keyboard is provided with each model. The keyboard is available in different layouts for functions such as typing, programming, and data entry. National versions are offered. A turntable is an optional feature and enables the user to tilt and rotate the display. There is a wide range of workstation printers with speeds extending from 35 characters per second to 300 lines per minute.

Four models of system printers with speeds of 300, 600, 1200, and 2000 lines per minute can be connected to the 8890 Models 32, 52, and 72. Some peripheral compatibility is offered between the Nixdorf 8870 minicomputer and the 8890 system. Workstations and printers can be used by both systems, although one board in the workstation and printer must be changed. Also, different keyboards are required by each machine, depending on the application.

Between 4 and 16 communications lines are supported by the 8890. The lines are connected into the system through an integrated communications adaptor in the I/O controller.

SOFTWARE

The main operating system is NIDOS/VSE (Nixdorf Disk Operating System/Virtual Storage Extended) which is compatible with DOS/VSE and can support IBM software programs. All IBM/370-compatible programming languages, such as Assembler, Cobol, Fortran, RPG II, and PL/1 can run under NIDOS/VSE.

Nixdorf also provides the VM/ESX operating system, but this is presently only intended for converting Nixdorf 8870 ▷

► CAPACITY: Model 32—1MB to 4MB; Model 52—2MB to 6MB; Model 72—4MB to 8 MB.

CHECKING: Seven Error Correction Control (ECC) bits are provided for each word, enabling 1-bit errors to be corrected and 2-bit errors to be detected.

STORAGE PROTECTION: Main memory is divided into blocks of 2KB. Each block contains a storage protection key which must correspond to the storage key of an application program before the application program can access the memory block. A motor generator which provides power to the system for up to 1,000 hours is optionally available.

CENTRAL PROCESSOR

GENERAL: A 32-bit central bus connects the CPU, main memory, and the input/output bus managers. It is 36 bits wide including 4 bits for parity checking, and has a data transfer rate of 9MB per second.

The 32-bit Nixdorf 8890 CPU comprises: control storage and an instruction processing unit in all models; an instruction preprocessing unit in Models 52 and 72; and 64KB of cache memory in Model 72. The instruction preprocessing unit reads and analyzes the next instruction while the processing unit is executing the current one. In Model 32, all instruction stages are performed by the instruction processing unit, and the inclusion of the preprocessing unit in the two larger models approximately doubles the throughput of the CPU. The CPU also contains a time-of-day clock, a clock comparator, a CPU timer, and a monitor feature which is used for program testing.

All models contain a service processor through which the system diskette, central operator console, and remote maintenance console are attached to the system. The service processor automatically tests the CPU at system startup, and if an error occurs, it initiates diagnostics software contained in the system diskette. Hardware errors are indicated by a light on the front of the cabinet. The service processor can also be used to notify the operator if overheating occurs in the system.

CONTROL STORAGE: The capacity of the control storage is 256KB. Control storage contains microcodes for the implementation of the System/370 Universal Instruction Set and for workstation diagnostics support, and routines for testing the CPU, main memory, and input/output system. ►

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Integrated Adaptor Table

	8890/32	8890/52	8890/72
Disk Adaptor (4 disks/adaptor)	2	4	6
Magnetic Tape Adaptor (4 tapes/adaptor)	1	2	3
Printer and Card Reader Adaptor (2 printers, 1 card reader/adaptor)	1	1	1
Diskette Adaptor (1 diskette/adaptor)	1	1	1
Communications Adaptor (V.24) (4 lines/adaptor)	2	4	6
Automatic Calling Equipment Adaptor (V.25) (4 lines/adaptor)	1	1	1
Display Terminal Adaptor (8 terminals/adaptor)	12	12	12

► software to the 8890. The Business Basic language is available under both the 8870 NIROS operating system and VM/ESX. It provides source program compatibility between the two systems.

Subsidiaries in each country market software developed by Nixdorf or software houses specifically for that country. Therefore, in different countries, common applications packages will be available, but vary in their individual programs. Such applications include banking, manufacturing, and finance. A popular international package is COMET, an accounting and finance system which can be modified to suit an individual's needs. It is available in different languages, and national versions which handle local legal and financial requirements. COMET originated as an 8870 package and runs under the VM/ESX operating system. Software is available that enables the 8890 to act as the central processor in a videotex network.

Nixdorf is currently implementing the ECMA Standard for Open Systems Local Area Networking (OSLAN) on the 8890 system. Other major computer manufacturers supporting this standard include Bull, Digital Equipment Corporation, Ericsson, Fujitsu, Hewlett-Packard, ICL, Intel, Logica, Olivetti, Siemens, 3 Com, and Xerox.

The Nixdorf 8890 is sold as an unbundled system. The user pays separately for hardware, software, support, and training. Basic documentation is supplied with both hardware and software.

COMPETITIVE POSITION

The Nixdorf 8890 competes with the lower-end models in the IBM 4300 Series. If we assign a system throughput figure of "1" to the 8890 Model 2, we'll consider the 4361 Model Group 3 as having a system throughput of 1.5 and the Nixdorf 8890 Model 2 as having a throughput of 1.6. The IBM 4341 Model Group 9 has a system throughput of 1.9; the Nixdorf 8890 Model 72 is 2.1. Since the top-end of the Nixdorf 8890 Series, the 8890 Model 72, has a throughput of 2.1, compared to the 3.0 throughput of the IBM 4361 Model Group 4, this IBM model (4361 Model Group 4) is more powerful than any models in the Nixdorf 8890 Series. ►

► **REGISTERS:** There are sixteen 32-bit general-purpose registers for use as base and index registers, and accumulators. These can be linked to form eight 64-bit registers. There are also sixteen 32-bit control registers which provide additional information for system control.

ADDRESSING: There are three basic addressing modes.

INSTRUCTION REPERTOIRE: The Nixdorf 8890 instruction set supports the System/370 Universal Instruction Set, with the exception of four multiprocessor instructions and two direct control instructions. The instruction set includes 19 system control instructions, eight I/O instructions, 90 standard instructions (such as arithmetic, logical, and shift), 9 decimal instructions, 44 floating point instructions, and 7 extended floating point instructions.

PHYSICAL SPECIFICATIONS: The Basic Cabinet for all models measures 122 x 103 x 72 cm³ and weighs 320 kg. The Extension Cabinet measures 122 x 60 x 72 cm³ and weighs 150 kg.

INPUT/OUTPUT CONTROL

Three I/O buses are attached to the Nixdorf 8890 central bus through I/O bus managers. Each I/O bus is 32 bits wide and operates at a data transfer rate of 7MB per second. Between one and three I/O controllers are connected to each I/O bus, but the total number of I/O controllers in a system cannot exceed eight. An I/O controller contains a 16-bit microprocessor and can work in either byte multiplexer or block multiplexer mode. It supports integrated adaptors through which peripherals and communications lines are connected into the system.

In byte multiplexer mode, an I/O controller supports integrated adaptors for slow peripherals such as line printers, card readers, diskettes, and magnetic tapes with transfer rates of less than 160KB per second. The controller can also support a byte multiplexer channel interface with a maximum data rate of 140KB per second, as well as an integrated communications adaptor.

In block multiplexer mode, an I/O controller supports integrated adaptors for high-speed peripherals such as disk drives, magnetic tapes with a transfer rate of up to 470KB per second, and display terminals, or it can provide a block multiplexer channel interface. The data rate of the block multiplexer channel is 2.2MB per second.

CONFIGURATION RULES

The three Nixdorf 8890 models all include in their basic configurations a Basic Cabinet and a Peripheral Cabinet. ►

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TABLE 2. PERIPHERALS TABLE

TERMINALS

DEVICE	DESCRIPTION
TERMINALS	
8178-A2	12-inch screen; amber char. on brown background; 24 char. by 80 lines.
8180-A1	12-inch screen; amber char. on brown background; 24 x 80 char. standard, optional 32 x 80, 43 x 80, 37 x 132.
8180-P1	12-inch screen; white char. on black background; 24 x 80 char. standard, optional 32 x 80, 43 x 80, 27 x 132.
8179-C4	14-inch screen; 4-color screen; red, green, blue, white; 24 x 80 char.
PRINTERS	
MD 02	Ink jet; 210 cps; 128-char. set; 132 char. per line.
ND 03	Needle; 100 cps; 128-char. set; 80 char. per line; 9 x 9 matrix.
ND 04	Needle; 100 cps; 128-char. set; 132 char. per line; 9 x 9 matrix.
ND 11	Needle; 210 cps; 128-char. set; 132 char. per line; 9 x 9 matrix.
ND 13	Needle; 80 cps; 128-char. set; 80 char. per line; 9 x 9 matrix.
ND24	Needle; 140 cps standard, 30 cps near letter quality; 96-char. set; 80 char. per line; 12 x 14 matrix.
ND 25	Needle; 140 cps standard, 30 cps near letter quality; 96-char. set; 132 char. per line; 12 x 14 matrix.
ND 26	Needle; 100 cps; 128-char. set; 80 char. per line.
TD 03	Daisy; 36 cps; 96-char. set; 132 char. per line.
TD 06	Daisy; 35 cps; 96-char. set; 132 char. per line.
ZD 07	System line printer; 300/600/1200 lpm; 64/96-char. set; 132 char. per line.
ZD 09	Needle; 300 lpm standard, 75 lpm near letter quality; 96-char. set; 132 char. per line.
Needle	400 cps standard, 100 cps near letter quality; 96-char. set; 132 char. per line.
Band	System line printer; 2000/1640/1200 lpm; 48/64/96-char. sets; 132 char. per line.
MAGNETIC TAPE UNITS	
8409	1600/3200 bpi; 25 ips start/stop; 50/100 ips streaming; 40/160KB per sec.; 80MB capacity.
8420/3	800/1600 bpi; 75 ips start/stop; 60/120KB per sec.; 41MB capacity.
8420/4	1600/6250 bps; 75 ips start/stop; 120/470KB per sec.; 144MB capacity.

▷ ## ADVANTAGES AND RESTRICTIONS

Although the Nixdorf 8890 is a plug-compatible system, Nixdorf does not emphasize this feature of its mainframes, a situation that is perhaps reflected by the fact that over 90 percent of the customers use only Nixdorf equipment. This uniformity of equipment could prove an advantage for users since Nixdorf can provide all hardware, software, and maintenance requirements, thereby eliminating the need for the user to deal with several companies. Also, all models can be upgraded on-site to the most powerful configuration, a distinct advantage for users whose requirements will most likely increase.

USER REACTION

The 1985 Datapro Survey of German Users of Computer Systems brought responses from eight Nixdorf 8890 users. The average life of the system was approximately 3½ years. Major applications areas included accounting/billing, order processing/inventory control, and sales distribution. In response to the question, "Did the system do what you expected it to do?", seven users said yes, and one said no. When asked if they would recommend the system to another user, six answered affirmatively, and two, negatively. ▷

► The same cabinets are used for each model, enabling the 32 and 52 to be upgraded onsite to the Model 72.

The Basic Cabinet contains the central processor, optional instruction preprocessing unit, optional cache memory, main memory to a maximum of 8MB, a system diskette, up to five input/output processors, and integrated adaptors for disk units, magnetic tape units, system printers, workstations, and communications lines.

The Peripheral Cabinet can support two 14-inch disk drives or four 8-inch disk drives, plus one streaming tape cassette.

The Extension Cabinet is added into a system when maximum configurations are required. It includes up to three input/output processors and additional integrated adaptors for system printers, magnetic tape units, workstations, and communications lines.

The Model 32 contains the basic CPU, 1MB of main memory, two fixed disk drives, the system diskette, one user diskette, one magnetic tape unit, and one system printer. Expansion possibilities include: increasing main memory capacity to 4MB; increasing magnetic tape capacity to four units; the addition of six more fixed or removable disk drives to a total capacity of 5GB; a second system printer and one card reader; and support for up to 256 workstations and printers. One byte multiplexer and one block multiplexer channel can be connected to the Model 32, which also supports from four to eight communications lines. ►

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A major advantage cited by users was the ease in which they were kept abreast of vendor changes in both hardware and software. This requirement was given the maximum rating of 4.0. A disadvantage of the system noted by users was poor compatibility of terminals and peripherals.

Users were asked to evaluate the different aspects of their systems under the headings Excellent, Good, Fair, and Poor. The weighted average obtained is based on a scale of 4.0 for Excellent. The system ratings are summarized in the following table:

	Weighted Average
Ease of Operation	2.57
Reliability of Mainframe	3.38
Reliability of Peripherals	3.43
Maintenance Service:	
Responsiveness	2.88
Effectiveness	2.75
Technical Support:	
Troubleshooting	2.67
Education	2.50
Documentation	2.33
Manufacturer's Software:	
Operating System	2.75
Compilers & Assemblers	2.38
Applications Programs	2.80
Ease of Programming	2.57
Ease of Conversion	2.83
Overall Satisfaction	2.50 □

► The Model 52 includes the basic CPU with an additional instruction preprocessing unit (IPU) and between 2MB and 6MB of main memory. Disk capacity ranges from 200MB on two disks up to 10GB on sixteen disks. Mass storage on the Model 52 also includes one system diskette, one user diskette, and magnetic tapes for a maximum of eight units. The system can support 256 workstations and printers, two system printers, one card reader, two byte multiplexer channels, and one block multiplexer channel. Communications facilities include from four to sixteen lines.

Model 72 is the most powerful system in the 8890 Series. The basic configuration comprises a CPU with IPU and 64KB of cache memory, 4MB of main memory, two disk drives, one system diskette, one user diskette, one magnetic tape unit, one system printer, and one card reader. Main memory can be expanded to 8MB. Another 22 fixed or removable disk drives can be added to the system for a maximum disk capacity of 15.24GB; twelve magnetic tape units can be supported. Model 72 can support 144 workstations, two system printers, and two byte and three block multiplexer channels. From 4 to 16 communications lines can be attached to the system.

MASS STORAGE

The user diskette is connected into the system through the integrated diskette adaptor which supports up to four fixed or exchangeable disk drives.

DISKETTE DRIVE: This diskette drive is IBM 3741-compatible and has a capacity of 243KB. Average access time is 91 ms and the data transfer rate is 31KB per second. The drive can be connected to all Nixdorf 8890 models.

FIXED DISK DRIVES

8330-F1: Capacity of 100MB on 14-inch disk. Average access time is 27 ms and the data transfer rate is 675KB per second.

8310-2: Capacity of 129MB on 14-inch disk. Average access time is 27 ms and the data transfer rate is 1MB per second.

8330-F11: Capacity of 200MB on 14-inch disk. Average access time is 27 ms and the data transfer rate is 675KB per second.

8370-1: Capacity of 260MB on 14-inch disk. Average access time is 27 ms and the data transfer rate is 1MB per second.

8350: Capacity of 635MB on 14-inch disk. Average access time is 23 ms and the data transfer rate is 1.2MB per second.

REMOVABLE DISK DRIVE

8330-R11: Capacity of 200MB on 14-inch removable disk. Average access time is 28.5 ms and the data transfer rate is 806KB per second.

INPUT/OUTPUT UNITS: See Peripherals Table.

Workstation display units are attached to an 8890 through the integrated display terminal adaptor which supports eight terminals. An X.25 Control Unit can be attached to the integrated display terminal adaptor. This unit provides for local or remote connection of four or eight devices into an X.25 network. However, it is currently available only in Germany. The integrated tape adaptor can control four magnetic tape units, and the integrated printer and card reader adaptor supports two system printers and one card reader. An OCR-reader with a reading rate of 140 characters per second is optionally available. It can read OCR-A and OCR-B fonts.

COMMUNICATIONS CONTROL

The 8890 system can support both local and remote workstations. Local terminals can be sited at a maximum distance of 2000 meters from the central cabinet. Remote terminals are connected through an RS-232-C/V.24 interface.

The integrated communications adaptor provides four V.24 interfaces for BSC and SDLC connections, while the integrated automatic calling equipment (ACE) adaptor provides four V.25 ports. Both adaptors connect into an I/O controller.

SOFTWARE

OPERATING SYSTEM: NIDOS/VSE (Nixdorf Disk Operating System/Virtual Storage Extended) is a modular operating system that contains three main components: control programs, processing programs, and data management routines. The control programs consist of the Initial Program Loader (IPL), the supervisor, and the job control program. The processing programs are initiated by the job control program and include utilities, compilers, and application programs. The data management routines enable the user to access external disk storage connected through the block multiplexer channel. The data management routines also provide security features.

NIDOS/VSE, as the name suggests, supports virtual memory storage and can contain up to twelve virtual and real memory partitions. The operating system can run in either the System/370 mode or the ECPS/VSE (Extended Control Program Support/Virtual Storage Extended) mode. The ECPS/VSE mode provides increased performance by oper- ►

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ating directly on virtual addresses. The System/370 mode is available from Release 1 of NIDOS/VSE onward, and the ECPS/VSE mode is supported by Release 2 onward.

Release 2 also offers the following extensions to the operating system:

- Data Entry Control System—provides data entry and verification facilities;

- Extended Control Facility—provides control of workstations from the central console;

- Extended Spooling Facility;

- Extended Remote Job Entry—supports remote access of IBM 2780/3780/3740 devices;

- Program Development and Maintenance System; and

- Tape Management System/VSE—controls magnetic tape files.

Nixdorf also offers the VM/ESX (Virtual Machine/Extended Systems Executive) operating system with the 8890 Series. VM/ESX is currently offered for users who wish to convert software running on the Nixdorf 8870 minicomputer series to run on the 8890 models. Nixdorf is developing VM/ESX on the 8890 and intends that it become a more general-purpose operating system.

IBM operating systems supported by the 8890 include DOS/VSE, DOS/VS, VM/370, and VM/SP.

LANGUAGES: Languages offered by Nixdorf under NI-DOS/VSE are Basic, Cobol, and RPG II. All other IBM/370-compatible languages are also supported. Under VM/ESX, Basic, and Cobol are supported.

- Basic—A Basic compiler and runtime system are available. Business Basic programs written for the 8870 can be transferred to the 8890.

- Cobol—The Cobol compiler supports the ANSI 1974 standard.

COMMUNICATIONS SOFTWARE: Protocols supported by the 8890 include SNA/SDLC and BSC. The 3270 Multi-Host facility is also available.

UTILITIES

Document: This aids users in the generation and formatting of documents.

Job Accounting: Job accounting information is automatically written to a job accounting file when a job is completed. This information can be analyzed by the user.

Nixdorf File Utility: This contains functions which aid the user in maintaining, updating, copying, and printing disk and magnetic tape files.

DATABASE

Nixdorf Data Base System (NDB) is a relational data management system that offers reentrant code and multithreading facilities. A user can access a maximum of 240 data bases with 240 files per data base; each file contains up to 31 keys with which the user can search data. A data query language offering fast data retrieval and a dictionary holding all stored data are optionally available.

APPLICATIONS SOFTWARE

COMET: A software package developed by Nixdorf to run under VM/ESX on all models in the 8890 Series, COMET covers a wide range of accounting and financial applications, and includes word processing. It contains a Help facility and provides graphics features. In addition to the main modules detailed below, COMET contains additional modules which aid report writing and file inquiry.

- Cost Accounting: Cost center accounting, job order costing, cost objective accounting, flexible and fixed standard costing, actual costing;

- Financial Accounting: Sales, purchase and general ledgers, automatic payments, draft management;

- Fixed Asset Accounting: Calculation of depreciation, forecasting;

- Order Processing and Invoicing: Incoming orders, pricing and discounting, deliveries, invoicing, reports;

- Payroll: Gross and net pay, reports;

- Production Control: Material billing and control, routing, capacity planning, cost estimation;

- Purchase Order Processing: Supplier selection, purchasing, order monitoring, invoicing;

- Stock Control: Stock keeping, valuation and monitoring, ordering, stock taking; and

- Word Processing: Data and text processing are integrated. While working in one file, a user can access data from another.

COMET is available in international versions which operate with different languages, currencies, and legal and financial requirements.

CHICO: (Checklist-Input Customized Output) is intended for use with COMET and helps users initially select the correct COMET modules. CHICO then questions the user to determine individual requirements and parameters, and structures the model accordingly.

A large number of software packages running on the 8890 are available from Nixdorf national subsidiaries and software houses. The choice of packages differs between countries, but the same range of applications is covered. These packages include financial accounting, financial planning, personnel accounting, cost accounting, investment and bookkeeping, sales processing, purchasing, stock control, material control, production control, project planning, and word processing.

SERVICE AND SUPPORT DIAGNOSTICS

Nixdorf offers a remote diagnostic facility by which an 8890 system can be connected through an acoustic coupler to a remote maintenance console in a Nixdorf business office. A Nixdorf engineer can then run diagnostic programs to aid the user in identifying the fault.

MAINTENANCE

The basic maintenance contract offers software support in normal office hours (8 a.m. to 5 p.m.) and 24-hour hardware support. After installation, Nixdorf will provide support and advice concerning new applications, optimization of solutions, and upgrading possibilities.

Nixdorf 8890 Series

► TRAINING: Nixdorf runs training courses in branch of-fices in each country, and in-house where practical. Training courses for the 8890 system must be paid for by the user. Courses vary in length from three days to two weeks, and include operation and service of the 8890, and software training. Software courses cover installation, and introductory and comprehensive seminars on operating systems, programming languages, the database system, and applications packages.

DOCUMENTATION: Nixdorf provides one set of general operating and software documentation free of charge with an 8890 system. A wide range of more detailed manuals for the

8890 can be purchased separately, covering topics such as operating system, language and applications software information, and CPU and peripheral information. Documentation is available in both German and English.

PRICING

The 8890 is sold unbundled, which means that the user pays for hardware, software, and training separately. The following prices are in German marks, DM. Volume purchase discounts are available for workstations and printers as follows: 30 to 99 units—10 percent; 100 to 499 units—15 percent; 500 to 1,999 units—20 percent; over 2,000 units—30 percent.

EQUIPMENT PRICES

	Purchase Price (DM)	Monthly Lease* (DM)	Monthly Maint. (DM)
Model 32 with 1MB main memory, 1 I/O bus, 1 byte multiplexer (BYMUX) I/O processor, 2 block multiplexer (BLMUX) I/O processors, system diskette	99.300	3.965	675
Model 52 with 2MB main memory, 1 I/O bus, 1 BYMUX IOP, 2 BLMUX IOPs, system diskette	142.300	5.695	970
Model 72 with 4MB main memory, 1 I/O bus, 1 BYMUX IOP, 2 BLMUX IOPs, system diskette	207.300	8.205	1.350
Upgrade from Model 32 to Model 52	17.500	665	210
Upgrade from Model 52 to Model 72	26.000	870	210
1MB memory extension	25.500	1.065	85
2MB memory extension	39.000	1.640	170
4MB memory extension	65.000	2.820	256
Local console without keyboard	2.475	116	25
Remote console without keyboard	3.275	138	25
Acoustic coupler for remote console	1.500	50	—
Console keyboard	1.700	59	10
100 cps console printer	6.378	242	82
100 cps console printer with form feed	6.800	255	85
BYMUX IOP	4.300	163	20
BLMUX IOP	8.500	312	30
2nd I/O bus	4.200	158	20
BYMUX channel interace	7.900	205	14
BLMUX channel interface	8.500	218	19
Peripheral Cabinet	5.500	213	30
Extension Cabinet	21.000	817	120
Power on/off feature for external control units (one per system)	850	25	14
Integrated adaptor for 8330-R11 disk units	6.900	360	21
Integrated adaptor for 8330-F1, 8310-2, 8330-F11, 8370-1	6.900	360	21
Disk controller for 8350 disk unit	25.000	900	298
2-channel adaptor for disk controller	15.000	418	32
8330-F1 disk unit, 100MB	22.900	760	185
8310-2 disk unit, 129MB	26.500	1.040	255
8330-F11 disk unit, 200MB	29.500	1.155	255
8370-1 disk unit, 260MB	32.500	1.268	255
8330-R11 disk unit, 200MB	42.950	1.550	352
Two 8350 disk units, 635MB each	128.000	4.188	841
3rd 8350 disk unit, 635MB	54.100	1.825	410
4th 8350 disk unit, 635MB	54.100	1.825	410
Integrated adaptor for 160K bps tape unit	2.500	75	12
Integrated adaptor for 120K bps tape unit	2.500	75	12
Integrated adaptor for tape unit up to 470K bps	25.500	762	94
8409 tape unit (40/160K bps)	24.750	801	202
8420/3 tape unit (120K bps)	32.400	1.157	288
8420/3 tape unit (60/120K bps)	39.900	1.395	322
8420/4 tape unit (470K bps)	49.700	1.780	396
8420/4 tape unit (120/470K bps)	51.900	1.935	415

*The monthly lease includes maintenance and is based on a 36-month lease period.

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Nixdorf 8890 Series

	Purchase Price (DM)	Monthly Lease* (DM)	Monthly Maint. (DM)
Integrated adaptor for 2 system printers	1.850	54	12
Band printer, 300 lpm	27.500	951	318
Band printer, 220 lpm	27.500	951	318
Band printer, 440 lpm	37.500	1.305	442
Band printer, 600 lpm	37.500	1.305	442
Integrated adaptor for 1 diskette drive	850	24	4
Diskette drive	8.500	268	62
8178-A2 workstation without keyboard	2.475	116	25
8180-A1 workstation without keyboard	3.550	167	32
8180-P1 workstation without keyboard	4.250	196	37
8179-C4 workstation without keyboard	4.800	222	46
RS-232-C/V.24 interface for workstation	800	22	—
V.11 interface for workstation	800	22	—
Keyboard	1.700	59	10
Hand-held OCR-reader	2.950	124	25
MD 02 workstation printer, 210 cps	9.300	348	125
ND 03 workstation printer, 100 cps	6.378	242	82
ND 04 workstation printer, 100 cps	6.678	251	84
ND 11 workstation printer, 210 cps	9.900	331	129
ND 13 workstation printer, 80 cps	3.100	141	63
ND 24 workstation printer, 140/30 cps	3.900	167	69
ND 25 workstation printer, 140/30 cps	4.900	192	—
TD 03 workstation printer, 36 cps	9.500	326	88
Single sheet feeder for TD 03	3.580	99	20
TD 06 workstation printer, 35 cps	5.800	204	59
Single form feeder for TD 06	590	25	10
Single sheet feeder for TD 06	2.475	87	25
ZD 09 workstation printer, 300 lpm	17.800	670	225
Form feed for workstation printers	422	16	5

*The monthly lease includes maintenance and is based on a 36-month lease period.

SOFTWARE PRICES

	Onetime License Fee (DM)	Monthly* License Fee (DM)	Mainten-ance Per Month (DM)
NIDOS/VSE for Model 32, Release 2	42.620	990	980
NIDOS/VSE for Model 52, Release 2	46.725	1.627	980
NIDOS/VSE for Model 72, Release 2	51.975	1.837	980
Release 2 contains a number of aids including ECON, ESF/VSE, NIFTY, PWS/VSE, and TCP			
Extended Control Facility ECON	4.480	160	80
Extended Spooling Facility ESF/VSE	3.025	108	30
Nixdorf File Utility NIFTY	1.210	43	10
Disk Space Management DSM/VSE	7.000	250	40
Programmer Workstation PWS/VSE	4.760	170	35
Tape Management System TMS/VSE	7.000	250	40
Multi-Host Facility MHF 3270	5.600	200	40
Job Transfer Program JTP	8.400	300	60
File Transfer Program FTP	2.100	75	10
Transaction Control Program TCP	29.250	936	515
Printer Spooling TPS	6.400	200	40
Data Entry Generator DEG	6.160	220	30
Communication Program Generator CPG	12.950	450	65
Cobol compiler	9.410	336	40
Basic compiler	14.940	415	85
Nixdorf Data Base System NDB	24.320	760	190
NDB Data Dictionary	16.000	500	150
NDB Data Query	16.000	500	150
VM/ESX for Model 32	15.190	422	228
VM/ESX for Model 52	21.060	585	315
VM/ESX for Model 72	28.080	780	420

*The monthly license fee does not include maintenance. ■