NCR 8100 Series

This NCR 8130 system includes a visual record printer that can accommodate continuous forms and journal rolls as well as cut forms such as ledger cards. Diskette storage capacity for the 8130 ranges between 900K bytes and 3.6 million bytes.

The entry-level series in NCR's broad 8000 product line, the 8100 systems are based on 8080 microprocessor and feature BASIC and COBOL as their principal programming languages. The currently offered models, the 8130 and 8150, differ only in their mass storage facilities, memory capacity, and the absence of a printer on the packaged 8150's. Packaged system prices range from $10,700 to $19,335.

MANAGEMENT SUMMARY

Introduced in October 1977, the NCR 8100 Series systems are entry-level, interactive systems intended for real-time business data processing. The current family members, the 8130 and 8150 systems, are based on the 8080 microprocessor and feature conventional minicomputer peripherals (line printer, disks, diskettes, etc.), visual record printers for continuous forms and journal rolls, and microprocessor-based peripheral controllers. The 8100 systems use BASIC and COBOL 74 as the principal programming languages. These systems have become popular in the manufacturing, wholesale, retail, local government, financial, educational, and health care markets, and COBOL-coded application packages are available for these market segments.

The 8100 Series systems are designed primarily for use as free-standing computers, but they can also be used effectively as workstations in a distributed processing network since they conform with NCR's Distributed Network Architecture. Both NCR's Data Link Communications (NCR/DLC) protocol and binary synchronous (bisync) communications for the 8100 systems became available in mid-1979.

The 8130 and 8150 systems employ the same control processor and differ only in their mass storage facilities, maximum memory capacity, and the fact that a printer is not part of the packaged 8150 models. The 8130 is a diskette system, and the 8150 uses fixed and cartridge disk drives. Program development can be done on either system using the COBOL 74 compiler. Software also ➢

CHARACTERISTICS

MANUFACTURER: NCR Corporation, Dayton, Ohio 45479. Telephone (513) 449-2000.

NCR is a leading manufacturer of business and banking equipment, maintaining 350 offices and 7 manufacturing facilities in the United States plus 650 offices in more than 100 other countries. The company also has manufacturing facilities in Dundee, Scotland; Augsburg, Germany; Oiso, Japan; Bulach, Switzerland; Massy, France; Waterloo, Canada; Puebla, Mexico; and Sao Paulo, Brazil.

MODELS: NCR 8130 and 8150.

DATE ANNOUNCED: October 1977.

DATE OF FIRST DELIVERY: March 1978.

NUMBER INSTALLED TO DATE: Not available.

DATA FORMATS

BASIC UNIT: 8-bit byte. Each byte can represent one alphanumeric character, one unpacked or two packed BCD digits, or eight binary bits.

FIXED-POINT OPERANDS: One word.

FLOATING-POINT OPERANDS: None.

INSTRUCTIONS: One, two, or three words.

MAIN STORAGE

TYPE: MOS (metal oxide semiconductor).

CYCLE TIME: 0.6 microsecond.

CAPACITY: 48K to 64K bytes (8130); 48K to 256K bytes (8150).

CHECKING: One parity bit per byte is generated during writing and checked during reading.

STORAGE PROTECTION: Optional memory support subsystem (battery backup) provides power for 48 hours for 64K bytes, with automatic restoration to the point of execution upon restoration of main power.

RESERVED STORAGE: 24K bytes of memory are reserved for the operating system. ➢

NCR 8100 Series

enables an 8150 to function as a central workstation and employ up to three remote in-house 8130 or 8150 systems in a file-sharing environment. A remote workstation can access files at the central workstation, and files on the remote workstation can be accessed by the central workstation.

The basic 8130 system includes a CPU with 48K bytes of MOS memory; an integrated flexible diskette unit with a storage capacity of 900K bytes, expandable to 1.8 million bytes; a 9-inch, 512-character CRT display; a 50-lpm dot-matrix printer; and a keyboard. A visual record printer may be substituted for the matrix printer. Memory is expandable to 64K bytes, and a free-standing diskette unit provides another 900K bytes of storage, also expandable to 1.8 million bytes, for a maximum diskette storage capacity of 3.6 million bytes. A single- or dual-transport magnetic tape cassette recorder can also be attached.

The basic 8150 system has the same configuration as the 8130 except that it substitutes an integrated fixed disk unit with a capacity of 4.9 million bytes of the diskette unit on the 8130. Memory for the 8150 is expandable to 256K bytes. Up to 39.2 million bytes of disk storage can be attached to an 8150. One 900K-byte flexible diskette unit and a single or dual magnetic tape cassette recorder can also be added. The 8150 also uses a 2.5-million-byte data cartridge for initial loading of the operating system and applications. The data cartridige can also be used for data backup. Basic 8150's do not include a printer.

NCR offers a number of printers for use on the 8100 systems, including 50-, 70-, and 125-lpm serial matrix printers, a 200-lpm band printer, and ten models of visual record printers for use with continuous forms, cut forms, and journal rolls. A system can have one or two printers; a system with two printers can have either two line printers or one line printer and one visual record printer.

The operating systems for the 8100 series computers are the Interactive Direct Processing System (IDPS), a disk-based (floppy or hard disk, as required) system that controls single-program processing, and the Multiple-Workstation Direct Processing System (MDPS), a disk-based system that provides for muiltiple workstations and/or multiple programs. Both provide system messages for operator direction, file input/output, application program loading, and error logging. The memory-resident portion of IDPS occupies 24K bytes, with other modules being paged in from disk storage as required. The 8150 IDPS also provides memory-resident print spooling. MDPS occupies 96K bytes.

NCR offers a number of application packages for use on the 8100 Series systems, all written in COBOL. Included are a manufacturing control package, a package for plumbing and heating firms, and a package for electrical distributors and wholesalers for use on 8150 systems; and budgetary control packages for municipal governments and educational institutions and a package for restaurants for use on either 8130 or 8150 systems.

CENTRAL PROCESSOR

GENERAL: The processor used in the NCR 8100 systems is based on the popular 8080 microprocessor.

CONTROL STORAGE: None accessible to user.

REGISTERS: None programmable.

INDIRECT ADDRESSING: None.

INDEXING: None.

INSTRUCTION REPERTOIRE: From the user's viewpoint, the instruction repertoire is effectively that of the COBOL and BASIC languages. Instructions are one, two, or three words long.

INSTRUCTION TIMINGS: NCR declined to provide timings, stating that data is purely interpretive and timings are not meaningful for comparative purposes.

PHYSICAL SPECIFICATIONS: The 8130 CPU houses the processor, memory, and dual-drive flexible disk recorder in a single desk-style cabinet. The 8150 CPU houses the processor, memory, disk drive, and data cartridge in a single desk-style cabinet.

Operating environment for the systems can range from 60 to 90 degrees Fahrenheit, at 10 to 80 percent relative humidity. Power requirement is a 220 VAC, 60-Hz, 20-ampere, four-wire circuit; 110-VAC models are also available.

INPUT/OUTPUT CONTROL

I/O CHANNELS: 32 I/O ports.

SIMULTANEOUS OPERATIONS: Supports simultaneous operations through DMA (direct memory access) and the COBOL I/O overlap function.

CONFIGURATIONS RULES

Memory for the NCR 8100 systems can be expanded from the basic 48K bytes to a maximum of 64K bytes on an 8130 and to 256K bytes on an 8150.

On the 8130 system, an additional free-standing dual diskette drive can be added to the basic system. Diskette storage capacity thus ranges between 900K bytes and 3.6 million bytes. Both diskette units are handled by the integrated controller attached to one multiplexer port. One integrated and one free-standing single- or dual-transport magnetic tape cassette recorder can also be attached. Each transport has a capacity of 327K bytes of storage.

Up to three additional disk units can be attached to a basic 8150 system, providing up to 39.2 million bytes of disk storage capacity. An 8150 configuration can also include either two diskette drives with a maximum storage capacity of 1.8 million bytes or a dual-transport magnetic tape cassette recorder.

Software provides the 8150 with a distributed processing capability, supporting an 8150 central workstation and from one to three remote in-house workstations installed in a file-sharing environment. A remote workstation can access files at the central workstation, and files on the remote workstation system can be accessed by the central workstation. Distributed workstations can be either other 8150 systems or 8130 systems. Each 8150 and 8130 system is capable of performing as a stand-alone system.

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PERIPHERALS/TERMINALS

DEVICE	DESCRIPTION AND SPEED	MANUFACTURER
MAGNETIC TAPE EQUIPMENT		
7620-0103	Single cassette recorder; 7.5 ips, 800 bpi, 327K bytes on 2 tracks (80-char. blocking), 8-bit ANSI standard serial recording; 750 bytes/second	NCR
7620-0104	Dual cassette recorder; same specifications as 7620-0103	NCR
PRINTERS		
6420-0401	Band; 132 positions, 48 (64, 96, or 128 opt.) character set, 10 characters per inch, 6 or 8 lines per inch, 4 to 16.75-inch-wide paper, full-line buffer; 200 lpm	NCR
6440-0202	Serial matrix; 132 positions, 64 (96 or 128 opt.) character set; 3-channel VFU, 6 (8 opt.) lines per inch, 4- to 16.5-inch paper, 7 x 7 (9 x 7 opt.) dot matrix, compressed pitch opt., audible alarm opt., 10 characters per inch, dual print heads; bidirectional printing at about 125 lpm	NCR
6440-0302	Same as 6440-0202 but single print head; bidirectional position-seeking printing of 132 columns at about 70 lpm and 30 contiguous columns at about 195 lpm	NCR
6440-0402	Serial matrix; 132 positions, 7 x 7 dot matrix, 10 characters per inch, 6 lines per inch, paper width 4 to 16.5 inches, 64 (96 or 128 opt.) character set, 3-channel VFU; 173 cps (about 50 lpm), bidirectional	NCR
6440-XXXX	OCR font (9 x 7 dot matrix) runs at approximately 60 percent of given speed	NCR
6441-0202	Serial matrix; 132 positions, 64 (96, 98, or 128 opt.) character set, 6 (8 opt.) lines per inch, 4- to 17-inch paper, 7 x 7 (9 x 7 and 9 x 9 opt.) dot matrix, 10 (16.5 opt.) characters per inch, bidirectional printing at 70 lpm	NCR
4501-XXXX	Visual record printer; 264 positions, 7 x 7 dot matrix, 12 characters per inch; handles continuous forms or journal rolls up to 23 inches wide, cut forms from 5.2 to 16 inches wide (lower handler) or 5.2 to 22.5 inches wide (upper handler); 6 lines per inch for continuous forms or journal rolls; 4, 5, 6, or 8 lines per inch for cut forms; 64-character set; prints bidirectionally at 180 cps	NCR
TERMINALS		
System Console	CRT keyboard/display terminal; 9-inch screen, 16 lines by 32 characters, 64-character set; also available with 12-inch screen with a capacity of 24 lines by 80 characters	NCR

USER REACTION

Datapro received three responses from users of NCR's 8100 Series in our 1980 user survey, and we supplemented these with telephone interviews with four more users in May 1980. The four telephone contacts were selected at random from a list supplied by NCR.

The seven users cover an interesting and wide range of businesses: a lumber wholesaler, a supplier of temporary employees, a publisher, professional organization of five doctors, a wholesale supplier of veterinary supplies, a manufacturer of equipment for supermarkets, and a municipal water supply. One user had an 8130, and the others were using one 8150 each.

The two systems in longest use were both installed in October 1978, and the average length of use of all systems was 13 months. The principal applications included accounting, payroll and personnel, inventory control, transaction processing, insurance, medical and health care, wholesale and retail, manufacturing, government, and utilities. Not one of the users reported that applications programs had been written by in-house personnel. Six were using programs from the vendor, and three have obtained help from contract programming sources. IDPS was the operating system and COBOL the programming language being used by all seven users.

MASS STORAGE

6560-0401 CARTRIDGE DISK DRIVE: A free-standing unit with one fixed and one removable cartridge, each with a data capacity of 4.9 million bytes. The average access time is 35 milliseconds, and the data transfer rate is 312K bytes per second.

6560-0402 CARTRIDGE DISK DRIVE: Same as the 6560-0401 above, but integrated into an auxiliary cabinet.

6560-0412 CARTRIDGE DISK DRIVE: A 4.9-million-byte version of the 6560-0402; the fixed and removable disks are each initialized at half capacity.

6560-0422 CARTRIDGE DISK DRIVE: An integrated unit with one removable cartridge with a data capacity of 4.9 million bytes. Same specifications as the 6560-0402.

6566-0403 DISK DRIVE: An integrated disk drive in an auxiliary cabinet using two fixed disks with a total storage capacity of 9.8 million bytes. The average access time is 70 milliseconds, and the data transfer rate is 312K bytes per second.

6566-0413 DISK DRIVE: A 4.9-million-byte version of the 6566-0403. The unit is the same as the 6566-0403, but the upper disk is disabled.

7642-0101 FLEXIBLE DISKETTE DRIVE: A free-standing, single-drive unit capable of storing 452,608 bytes on a dual-density diskette. Data is stored in 1,768 256-byte sectors. The average rotational delay is 83 milliseconds. The data transfer rate is 62,500 bytes/second, and the average access time is 343 milliseconds.

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The only additions or enhancements planned for 1980 will be additional software from the manufacturer and from other sources. There are no plans to replace any of the systems in 1980.

The ratings assigned by these seven NCR 8100 Series users are tabulated below.

	Excellent	Good	Fair	Poor	WA*
Ease of operation	4	2	0	0	3.7
Reliability of mainframe	4	2	1	0	3.4
Reliability of peripherals	3	3	0	0	3.5
Maintenance service:					
Responsiveness	3	4	0	0	3.4
Effectiveness	5	1	0	0	3.8
Technical support:					
Trouble-shooting	2	2	1	1	2.8
Education	1	4	1	1	2.7
Documentation	0	3	1	1	2.4
Manufacturer's software:					
Operating system	2	4	0	1	3.0
Compilers and assemblers	1	0	1	0	3.0
Applications programs	2	1	1	0	3.3
Ease of programming	1	1	1	0	3.0
Ease of conversion	1	2	1	0	3.0
Overall satisfaction	3	2	1	0	3.3

*Weighted Average on a scale of 4.0 for Excellent.

Among the praiseworthy aspects of their systems the users mentioned were the response time, the productivity aids, the energy efficiency of the systems, and the fact that overall costs had turned out to be less than had been expected and that delivery had been ahead of schedule. One user commented that his 8150 is easy to use and understand, and another claimed to have had only "a few small problems—that's enough said." Even the most critical user added, "The service is good and that is what really counts when the chips are down."

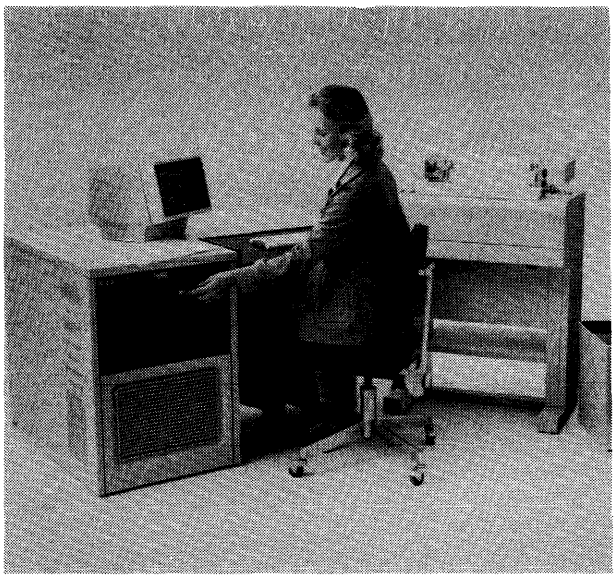
Problems which the users had encountered included the need to expand the original system proposed by the vendor (two users), late delivery, and an "unexpectedly long time getting the software to work." The most critical user felt that NCR's sales and system support have "vanished."

In assigning the ratings, one user was especially severe concerning NCR's technical support. However, even his ratings included two Excellents in the hardware area and two more Excellents for NCR's maintenance service. Based on the responses of these users, NCR's main problems would appear to be in the area of technical support and, to a lesser extent, in software.

Five of the users would recommend the 8100 to other users; one felt it was "still too early to offer a good concise answer"; and, not surprisingly, the seventh user would not recommend the system.□

7642-0201 FLEXIBLE DISKETTE DRIVE: A dual-drive version of the 7642-0101 with a total storage capacity of 905,216 bytes. Specifications are the same as the 7642-0101.

7644-0101 FLEXIBLE DISKETTE DRIVE: A quad-capacity version of the 7642-0101 capable of storing 905,216 bytes.



This NCR 8150 configuration consists of a CPU with 48K bytes of MOS memory, 4.9-megabyte cartridge disk drive, visual display terminal with 9-inch screen, keyboard, and serial matrix printer. The 8150 can be expanded to include up to 256K bytes of memory and 39.2 million bytes of disk storage.

7644-0201 FLEXIBLE DISKETTE DRIVE: A quad-capacity version of the 7642-0201 capable of storing 1,810,432 bytes.

INPUT/OUTPUT UNITS

See Peripherals/Terminals table.

SOFTWARE

OPERATING SYSTEMS: The *Interactive Direct Processing System (IDPS)* is a disk-based (floppy or hard disk, as required) system that controls single-program processing. Translation tables are available for all character translations provided for the hardware modules. IDPS has 24K bytes of memory-resident modules; other modules are called in from the system disk when needed.

The *Multiple-Workstation Direct Processing System (MDPS)* is a disk-based operating system that provides all the features necessary for multiple workstation and/or multiple program operation. MDPS requires a system with a minimum memory size of 96K bytes. MDPS provides support for the system workstation and a maximum of three additional workstations, each of which is capable of performing jobs in either the primary or secondary mode of operation. If a workstation is operating in the primary mode, the current job may be suspended to permit another job to be performed in the secondary mode. When the workstation returns to the primary mode of operation, processing of the suspended job continues. For performance considerations, all workstations except one must be limited to performing file inquiry and data entry. Foreground jobs are jobs performed in the primary or secondary mode of operation. When an MDPS System Generation is performed, the desired size of the partition associated with each workstation is read in. Also at this time, an optional batch partition may be established to enable background processing. Each workstation is capable of scheduling background jobs to be processed in the batch partition. Once a workstation schedules a background job, the processing of the job is no longer dependent on that workstation.

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Both operating systems provide system messages for operator direction, file input/output, application program loading, error logging, a date and time-of-day interface, and other supervisory services.

The operator specifies the job to be performed by entering Job Control Language (JCL) statements. The JCL permits the operator to specify the program to be performed and the files and hardware modules to be used. A disk file can be created, having a series of JCL statements (procedure file) which cause a number of programs to be performed. When the operator requests that the procedure file be performed, all the JCL instructions, and therefore all the programs, are run as a result of this single operator input.

Different methods of processing are used for COBOL and BASIC programs. COBOL source programs are first compiled to produce object code, after which the object code is loaded into memory. Once a program is loaded, the COBOL Runtime Interpreter decodes the COBOL object code, and IDPS or MDPS schedules the input, output, and internal processing. For fast access, the COBOL Runtime Interpreter is memory-resident while a COBOL program is running. In the case of BASIC programs, the BASIC Interpreter directly translates and performs the BASIC program instructions, without generating any object code. The BASIC Interpreter also relies on the operating system for input/output scheduling and internal processing. For maximum efficient operation, the operating systems use the direct memory access and buffer capabilities of the 8100 family of peripherals; internal processing and a number of input/output operations are performed at the same time.

When an input/output error occurs, the input/output function is tried a number of times. A message is displayed to the operator only when the error cannot be recovered by the system. The system message includes a response indicator, which informs the operator of the available alternatives.

On 8150 systems, IDPS optionally provides memory-resident spooling. This feature is capable of spooling 90 lines of print into the approximately 9K bytes of memory it requires. A program can then proceed approximately 1.5 minutes in advance of the printer, so that the printer can operate during file inquiry and media change procedures.

In a distributed processing environment, IDPS enables the central workstation to function as a single-program workstation with input/output multi-tasking support. Intelligent controllers are used to spread the processing workload. Under IDPS, the central workstation controls the file-sharing capabilities so that central applications and remote applications can access the same files at the same time.

The Remote Batch Subsystem (RBS), available only with the IDPS operating system, provides the capability for batch communications between an NCR 8100 system and a system at another location. Using either a dedicated line or a switched telephone network, RBS performs point-to-point communication in a half-duplex mode of operation. RBS uses the binary synchronous method of communication while it simulates the operating sequences used in an IBM 2780 or 3780 terminal; as a result, batch communication is possible between an NCR 8100 system and an IBM system or another NCR 8100 system. The RBS software modules are requested during system generation and are included as part of the operating system software. When a modem is used, RBS communicates at any line speed up to 9600 bits per second. The NCR I-8100 Series hardware adapter provides an internal clock that permits modemless, in-house communication at line speeds of 1200, 2400, 4800, or 9600 bits per second. If 4-wire service is provided, a continuous carrier is maintained on each circuit to permit 2-way alternate transmissions and to eliminate turnaround time.

System generation is a process through which an operating system, utility routine package, and other system software is selected. Many software modules are provided by NCR, not all of which are needed by every user. System generation is used to select the software that meets the unique needs of the user—peripheral drivers, selected JCL, and selected utility routines which are required for the user's hardware configuration. Unnecessary software modules are not included, saving both memory and disk space.

LANGUAGES: A one-pass *COBOL* compiler is available for use on the 8130 and 8150 systems. Based on American National Standard COBOL 74, the compiler generates COBOL object code, which is decoded by the COBOL Runtime Interpreter when the object program is loaded into memory for processing. The program source statements can be input from a file on any magnetic media, and the object code which is generated can be output to disk. The compiler runs on a system with 64K bytes of memory.

COBOL User Debug is an aid to the system analyst in finding application program errors. It is put in available memory with the COBOL application program. The program can then be performed a single step at a time, data can be displayed and changed, program traps can be inserted and removed or other debug features performed which assist the system analyst in diagnosing the program error.

NCR BASIC runs on any 8100 system which uses a line printer as the system (unit 0) printer. The BASIC Interpreter directly translates and performs each instruction in a BASIC source program. BASIC source programs can be loaded into memory from magnetic media or entered directly through the keyboard/CRT. The BASIC Interpreter also has user debug features to help the user diagnose program errors while the program is running. A BASIC program can process sequential files stored on any magnetic media and relative files stored on disk. In general, data files created by a BASIC program can be accessed by a COBOL program, and COBOL data files can be accessed by a BASIC program.

TEXT EDITOR: This facility creates and edits data files having a record length of 80 characters or less. Several types of files are created by the Text Editor:

- COBOL source program files, for input to the COBOL compiler;
- Procedure files, containing a series of JCL statements to be processed as a unit;
- Parameter files, containing the parameters required to run a utility routine; and
- User data files, to be used as input files by application programs.

The Text Editor uses a temporary work file while updating a file's contents; therefore, the file input to the Text Editor remains in its original state while the work file is updated. Once all corrections have been made, the updated work file can be copied to any output file on any magnetic media, including the original input file. A printed copy of all or any part of the work file can be made at any time during the edit process. UTILITIES: Utility routines provide a number of file management and system management capabilities needed to manage the operating system, programs, and data stored on an NCR 8100 system.

The operating systems optionally include a set of character translation tables for the keyboard, CRT, and printer. The *Native Language Support* utility routine (DPSLANGSUP) provides the capability of changing these tables so that CRT and printer displays and keyboard input can be in one of a number of available native languages. DPSLANGSUP can

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also be used to translate the text part of numbered system messages.

The *Inquiry Utility Routine (INQUIRY)* gives the operator the ability to display selected contents of a disk data file on the CRT or system printer. An inquiry parameter file is used to access and format the data file which is displayed. With this utility, an operator can also interrupt an application program, look at the contents of a file, and then continue performing the interrupted program. Application programmers use inquiry parameter file utility routines to create the parameter files used by INQUIRY. A parameter file contains the inquiry parameters used to display the contents of a file in one or more user-defined formats.

The *Select Utility Routine (SELECT)* provides the capability of copying selected records from an existing input file to an output file. The routine will copy the records with no changes or new records can be created that contain selected data from the existing records. The size or contents of a data field can be changed or new data fields can be created containing user-specified values. SELECT accesses input files of any organization (sequential, relative, or indexed) but always processes the files sequentially. The parameters which define the data selection process can be input from the keyboard after SELECT has been loaded into memory or can be supplied in a parameter file created by the Text Editor.

The *MDPS Data Entry* program permits a workstation operator to create and maintain transaction files to be processed by background jobs. The file maintenance capabilities of MDPS Data Entry include creating a new file, modifying records in an existing file, and adding records to an existing file. Techniques are available to perform data verification and data duplication. The MDPS Data Entry package is comprised of three programs. Two of the programs are used to generate and maintain a data directory file and the parameter files. The third is a data entry program which uses these files to simplify workstation operation. The Data Entry programs are written in COBOL; the COBOL Runtime Interpreter must be used with them.

The NCR 8100 systems have a number of other utilities to meet system management requirements. With them, users can maintain files, create backup files, sort files, prepare media for use, and obtain system status information. The utilities provide the following features:

- Copy, display, delete, or print a file;
- Copy, display, delete, or print all files on a device;
- Sort a file;
- Initialize a medium—for disk, flexible disk, and data cartridge;
- Change name of a file;
- Pack files on disk to create free space for new files; and
- Display system status and system log.

APPLICATIONS PROGRAMS: A number of specialized industry packages, all written in COBOL 74, are currently offered by NCR for use on the 8100 systems, including the following:

The *Manufacturing Control System* includes separate order processing, sales analysis, inventory, and product definition modules and general accounting applications.

The *Interactive Budgetary Control System for Government,* intended for municipalities of 10,000 to 15,000 persons, helps track budgets, expenditures, and receipts and gives managers quick access to accounting information.

The *Interactive Budgetary Control System for Educational Institutions* is designed for schools or colleges with up to 4,500 students and includes budgetary expenditure and revenue and general ledger applications.

The *Interactive Distribution System for Electrical Distributors and Wholesalers* includes accounts receivable, payroll, general ledger, inventory, order processing, and sales analysis applications for electrical firms with fewer than 20 employees and less than $2.5 million in annual sales.

The *Interactive System for Plumbing and Heating Firms* includes three software modules. The order entry module handles all aspects of order entry including the editing and validating of orders, the processing of stocked, non-stocked and direct-shipped items, reviewing and updating of customer status and inventory levels, and special charges. The inventory management module updates inventory files and produces a variety of reports highlighting inventory levels and exception items. The sales analysis module provides special reports on salesperson productivity and profitability. A commission report indicates current and year-to-date commissions earned.

The *Restaurant Evaluation of Cost and Inventory by Product and Employee (RECIPE)* system uses cassette tapes generated by NCR point-of-service terminals and provides sales analysis, inventory, and cost evaluation for small to medium-sized restaurants.

The *Interactive Student Records System (ISRS)* (8150 only) consists of a series of programs for school districts of up to 5,000 students and with individual schools not exceeding 1,500 students. ISRS is an on-line direct processing system which provides for the immediate updating and reporting of management information contained in the data base. Among its features are reports in four broad areas: student data reports, attendance reports, grading reports, and system maintenance reports.

The *Hospital Management System* (8150 only) includes software modules which provide a wide range of data processing services for small to medium-sized hospitals. The Patient Processing module accepts all intial background information about a patient plus daily information describing treatments and services given to the patient. It also handles all accounting and record keeping associated with discharging the patient or transferring him to another facility. Based on the records created in the Patient Processing module, the Billing module prepares all bills according to one of several standard procedures. Third-party claim forms are prepared automatically as a byproduct of other applications. The Accounts Receivable module produces analytical reports showing which accounts are past due and how long they have been past due. Other management reports include daily revenue by department or by nursing station, monthly insurance log, aged trial balance by type of payer, accounts payable, payroll, and general ledger.

All of the applications use the procedure file capabilities of the 8100 systems. Responsibility for file and hardware module assignment, sequence of programs which are run consecutively, and file backup requirements are handled by the application. The operator does not have this responsibility. In these systems, applications like banking, receivables, and general ledger all access the same master data base. Input for one application automatically updates files accessed by other applications. These features and many others provide efficient use of the system resources.

NCR 8100 Series

PRICING

POLICY: The NCR 8100 Series systems are available for purchase or on a one-, three-, or five-year lease agreement. The prices include initial installation; upgrades or other configuration modifications will incur installation charges.

Purchase prices, monthly rentals on a three-year agreement, and monthly maintenance prices are shown in the accompanying price list. One-year lease prices are about 5 percent higher and five-year prices are about 10 percent lower than the three-year prices shown.

NCR warrants the 8100 Series systems for 90 days. After this period expires, maintenance service is available at monthly rates listed in the Equipment Prices section of this report. Maintenance is performed by NCR field engineering personnel. Approximately 417 service points staffed by 9000 qualified field engineers are located throughout the United States, and there are more than 700 NCR sales and service offices located in 120 countries throughout the world.

Maintenance rates include both preventive and remedial maintenance. Preventive maintenance is performed between 8:00 a.m. and midnight, exclusive of Sundays and holidays. Remedial maintenance entitles the customer to 16-hour coverage (8:00 a.m. to midnight), Monday through Friday. Additional scheduled maintenance is available at increased rates. Users should consult an NCR representative for these prices.

The Investment Tax Credit is passed on to users who elect a three- or five-year rental agreement. However, delivery of new equipment cannot be guaranteed.

EQUIPMENT: The components and prices of numerous packaged configurations of the NCR 8100 systems are listed in the Equipment Prices section that follows.■

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Monthly Rental (3-Year*)
PACKAGED SYSTEMS				
All configured systems below are built around the same 8100 processor, which includes 48K bytes of MOS memory, 9-inch CRT, desk, integrated keyboard, and printer interfce.				
8130 Systems				
G001-0111	Includes processor group with integrated 1-megabyte diskette unit and 50-lpm matrix printer	$10,700	$121	$490
G002-0121	Same as G001-0111 but with 70-lpm matrix printer	11,955	137	514
G003-0131	Same as G001-0111 but with 125-lpm matrix printer	14,855	147	600
G004-0141	Same as G001-0111 but with 200-lpm band printer	18,135	167	700
G005-0162	Same as G001-0111 but with Visual Record Printer and floating keyboard	12,500	144	551
G006-0211	Includes processor group with integrated 2-megabyte diskette unit and 50-lpm matrix printer	11,900	126	526
G007-0221	Same as G006-0211 but with 70-lpm matrix printer	13,155	142	550
G008-0231	Same as G006-0211 but with 125-lpm matrix printer	16,055	152	636
G009-0241	Same as G006-0211 but with 200-lpm band printer	19,335	172	736
G010-0262	Same as G006-0211 but with Visual Record Printer and floating keyboard	13,700	149	587
3275-XXXX	Subsstitution of 12-inch CRT for 9-inch CRT	550	2	17
3275-K052	16K-byte add-on memory module	600	6	52
3275-P157	Memory support subsystem	700	4	26
8150 Systems				
G011-0000	Includes processor group with 4.9-megabyte fixed disk unit	13,305	125	559
G012-0000	Same as G011-0000 but with 12-inch CRT	13,855	127	576
G013-0000	Same as G011-0000 but with floating keyboard	13,305	125	559
G014-0000	Same as G012-0000 but with floating keyboard	13,855	127	576
3275-K052	16K-byte add-on memory module	600	6	52
3275-P157	Memory support subsystem	700	4	26
MAGNETIC TAPE				
7620-0103	Single cassette recorder	1,340	13	40
7620-0104	Dual cassette recorder	2,680	26	80
3275-K133	Cassette interface	735	6	24
MASS STORAGE				
7642-0101	Free-standing flexible diskette; single drive, 0.5 megabyte	3,400	30	110
7642-0201	Free-standing flexible diskette; dual drive, 1 megabyte	4,600	35	148
7644-0101	Free-standing flexible diskette; single drive, 1 megabyte	4,200	35	133
7644-0201	Free-standing flexible diskette; dual drive, 2 megabytes	5,800	40	176
6560-0401	Free-standing disk, 9.8 megabytes, fixed	11,500	93	380
6560-0402	Integrated disk, 9.8 megabytes, fixed/removable	10,650	93	355
6560-0412	Integrated disk, 4.9 megabytes, fixed/removable	9,500	79	315
6560-K122	Upgrade 6560-0412 to 6560-0402	1,150	14	40
6560-0422	Integrated disk, 4.9 megabytes, removable	9,500	79	315
6560-K222	Upgrade 6560-0422 to 6560-0402	1,150	14	40
6566-0403	Integrated disk, 9.8 megabytes, fixed	5,000	45	166
6566-0413	Integrated disk, 4.9 megabytes, fixed	4,000	37	147
6566-K123	Upgrade 6566-0413 to 6566-0403	1,000	7	19
6020-0101	Cabinet for integrated disk	850	—	24

*Rental prices include maintenance.

NCR 8100 Series

EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Monthly Rental (3-Year*)
LINE PRINTERS				
6420-0401	Band; 132 positions, 64-character set, 200 lpm	10,800	95	295
6440-0202	Serial matrix; 132 positions, 64-character set, 125 lpm	6,600	60	205
6440-0302	Serial matrix; 132 positions, 64-character set, 70 lpm	4,650	55	171
6440-0402	Serial matrix; 132 positions, 64-character set, 50 lpm	3,995	39	147
6441-0202	Serial matrix; 132 positions, 64-character set, 70 lpm	4,245	43	140
6420-K032	Printer interface for 6420-0101, -0401	1,000	—	62
VISUAL RECORD PRINTERS				
4501-0106-1000	Visual Record Printer; includes a continuous forms feed, lower cut form handler, and bar code reader	6,895	73	236
4501-0206-1000	Visual Record Printer; includes a journal drive, lower cut form handler, and bar code reader	6,795	72	232
4501-0306-1000	Visual Record Printer; includes a journal drive, continuous forms feed, lower cut form handler, and bar code reader	7,395	76	252
4501-0406-1000	Visual Record Printer; includes side-by-side continuous forms feeds, lower cut form handler, and bar code reader	7,495	77	256
4501-0506-1000	Visual Record Printer; includes overlapping continuous forms feeds, lower cut form handler, and bar code reader	7,545	77	258
4501-0109-1000	Visual Record Printer; includes continuous forms feed	7,795	79	270
4501-0209-1000	Visual Record Printer; includes journal drive, upper and lower cut form handlers, and bar code reader	7,695	78	266
4501-0309-1000	Visual Record Printer; includes journal drive, continuous forms feed, upper and lower cut form handlers, and bar code reader	8,295	82	286
4501-0409-1000	Visual Record Printer, includes side-by-side continuous forms feeds, upper and lower cut form handlers, and bar code reader	8,395	83	290
4501-0509-1000	Visual Record Printer; includes overlapping continuous forms feeds, upper and lower cut form handlers, and bar code reader	8,445	83	292
COMMUNICATIONS				
3275-K205	NCR/DLC common carrier adapter	2,435	16	77
3275-K207	NCR/DLC in-house adapter	2,390	16	76
3275-K215	Bisynchronous adapter	2,275	15	72

*Rental prices include maintenance.

SOFTWARE PRICES

	One-Time License Fee	OTLF Annual Maint.**	Monthly License Fee
8130 IDPS (must be ordered with a BASIC and/or a COBOL interpreter)	$ 500	$ 36	$ 16
8150 IDPS (must be ordered with a BASIC and/or a COBOL interpreter	1,000	84	32
8130 MDPS			
8150 MDPS			
COBOL 74 Compiler	1,100	60	30
8130 COBOL 74 Interpreter	500	36	16
8150 COBOL 74 Interpreter	750	60	24
8130 BASIC Interpreter	500	36	15
8150 BASIC Interpreter	750	48	25
Remote Batch Subsystem (available only with IDPS)	840	48	25
Accounts Payable	1,100	60	30
Accounts Receivable	1,100	60	30
General Ledger	1,100	60	30
Payroll	1,280	72	35
Order Processing	1,280	72	35
Inventory	1,280	72	35
Sales Analysis	1,280	72	35
Product Definition, 8150	1,100	60	30
Group Practice Management System	3,000	180	90
Restaurant Evaluation System (RECIPE)	1,845	96	55
Student Records System, 8150	2,180	150	50
Hospital Management System, 8150	5,500	420	139

** Starts on the 13th month.